Silicon Graphics® 550 Visual Workstation User's Guide

CONTRIBUTORS

Written by Laraine MacKenzie, Cullen P. Vane, and Olivier Clarinval.

Edited by Connie Boltz.

Production editing by Rena Patel, Karen Jacobson.

Chapters 3 and 4 provided by Acer Incorporated

Illustrated by Dan Young

Contributions by Cullen P. Vane, Laura Cooper, Raj Mirpuri, Susan Austin, Vera Shinsky, Eileen Carter, Ellen Evlanova, Cheryl Archer, Angela Lummel, M. Mantle, David Metzner, Patrick Heinz, Jim Pagura, Adolpho Gonzalez, Bob Sanders, Charles Alexander, Binh Dao, Paul Davidson, D. J. Kim, Jennifer Han, Joe Hartley, J. Corchado, Tyler Vane, Zachary Vane, Craig Dunwoody, Jose Luis Serrato, Ujesh Desai, J. Garcia.

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This device has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

For additional Regulatory Information, refer to the label attached to the back of the system.

Record of Revision

Version	Description
001	June 2000
	Initial Rev

007-4279-001 iii

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About This Guide

This guide provides information on using and administering a Silicon Graphics 550 Visual Workstation.

The following topics are covered in this manual:

- Chapter 1, "System Setup," describes how to prepare the system for installation and how to connect it to its peripheral devices.
- Chapter 2, "Installation of Customer Replaceable Components," describes how to
 install customer replaceable components. This includes the removal and
 replacement of drives, the power supply, the fans, expansion cards, the system
 board, and the I/O gasket.
- Chapter 3, "System Board," describes the system board and all its major components. It contains the system board layout, jumper settings, cache and memory configurations, and information on other internal devices.
- Chapter 4, "Setup Utility," gives information about the system BIOS and tells how to configure the system by changing the settings of the BIOS parameters.
- Appendix A, "Connector Pinouts," contains port pinout information for the rear panel ports.
- Appendix B, "Physical Environment Specifications," details the physical environment specifications for the Silicon Graphics 550 Visual Workstation system.
- Appendix C, "Regulatory Information," provides regulatory information.

For general information about SGI Visual Workstations, consult http://www.sgi.com/workstations.

Obtaining Publications

To obtain SGI documentation, go to the SGI Technical Publications Library at http://techpubs.sgi.com.

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System Setup

This chapter details the steps required to install a Silicon Graphics 550 Visual Workstation. It describes how to prepare the system for installation and how to connect it to its peripheral devices. It also provides a general description of the external and internal structure of the Silicon Graphics 550 Visual Workstation.

External Structure

This section describes the external features of the system housing (the front bezel and the rear panel).

• Front Bezel

As illustrated in Figure 1-1, the floppy drive and up to three 5.25-inch devices are accessible from the front panel. The top 5.25-inch drive bay is occupied by a CD-ROM drive. The power switch, the reset button, and the floppy disk eject button are also located on the front bezel.

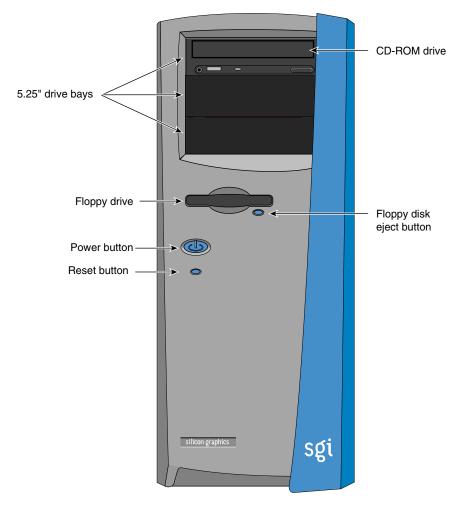


Figure 1-1 Front Bezel

• Rear Panel

As shown in Figure 1-2, the rear panel includes the AC power input socket, the rear system fans, six expansion slots, and the I/O panel. Figure 1-3 shows a detailed view of the I/O panel.

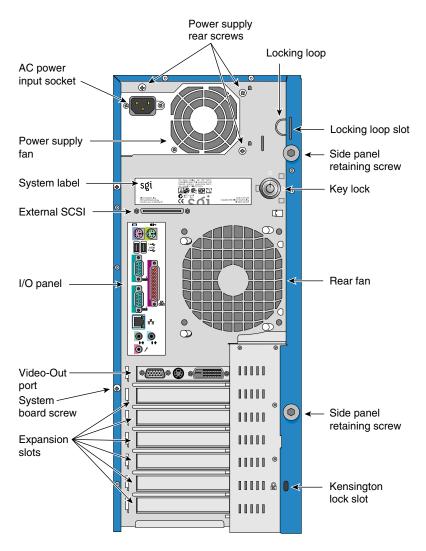


Figure 1-2 Rear Panel

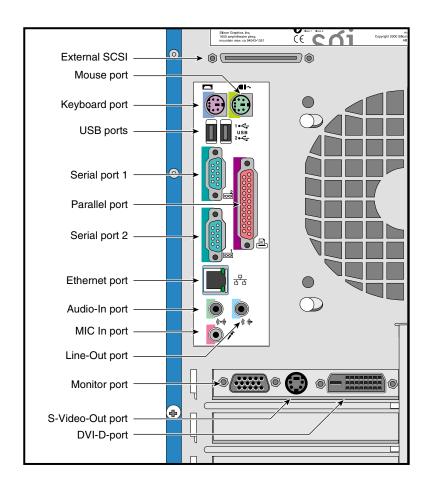


Figure 1-3 I/O Ports

Note: The DVI-D port is optional, depending on your graphics card.

Internal Structure

This section describes the location of the main components inside the Silicon Graphics 550 Visual Workstation chassis as illustrated in Figure 1-4.

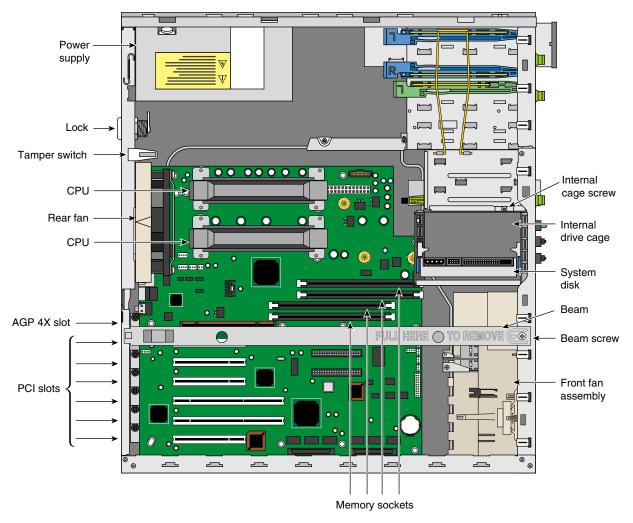


Figure 1-4 Internal Structure

- The Silicon Graphics 550 Visual Workstation has three 5.25-inch and four 3.5-inch drive bays, as shown in Figure 1-5. All three 5.25-inch drive bays are externally accessible from the front panel. Two of the 3.25-inch drive bays are located on the front panel (behind the bezel)—the other two are housed and accessible inside the chassis.
- The Silicon Graphics 550 Visual Workstation is cooled by three fans—one front system fan and two rear system fans (see Figure 1-4). The front fan pulls the cool air into the chassis, while the two rear fans pull the warm air out of the chassis. One rear fan is located on the rear panel; the other rear fan is located in the power supply.
- The power supply is auto-switching for 110V or 220V AC power. The power supply converts AC power to DC voltages which are used by the system board, the fans, and the 3.5-inch and 5.25-inch drives. It is located above the system board on the rear panel.
- The system board is mounted parallel to the right side panel. For an overview of the system board and its components, see Chapter 3, "System Board".

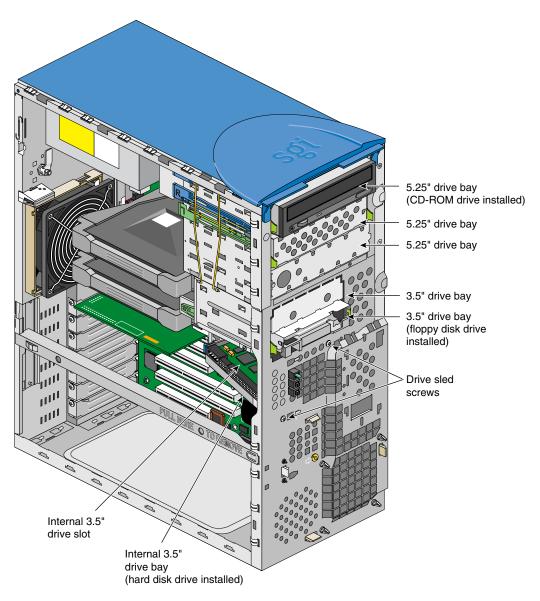


Figure 1-5 5.25-inch and 3.5-inch Drive Bays

Pre-installation Instructions

Before proceeding with the installation, select a suitable site that will allow for continued maximum performance of the unit, and for easy access to its components.

Consider the following questions before selecting a site for the system:

- Will the intended location allow for convenient access to areas of routine procedures, such as the power switch, the drive bays, and the rear panel connectors?
- Is the intended location free of dust, spills, or any other condition inappropriate for a high-performance computing system?
- Will the system be stable and free from vibration?
- Is the intended location well-ventilated and away from any source of heat? For the cooling system to perform properly, it is essential that the system be located in an area where airflow is unrestricted. Refer to Appendix B, "Physical Environment Specifications" for physical environment specifications.

Connecting External Devices

Follow the instructions in this section to connect the system to the power source and to its external peripheral devices.

1. Connect the AC power cable to the system as shown in Figure 1-6.

Caution: Always use a grounded electrical outlet.

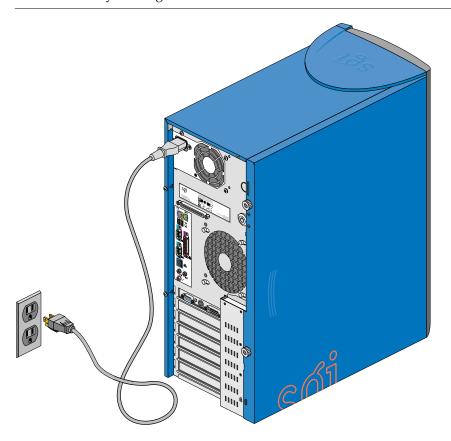


Figure 1-6 Connecting AC Power Cable

- 2. Connect the keyboard and mouse to the system as shown in Figure 1-7.
- 3. Connect the Ethernet cable to the system as shown in Figure 1-7. The built-in Ethernet port is designed for use with 10-Base-T or 100-Base-TX Ethernet networks and will automatically switch to the proper speed.

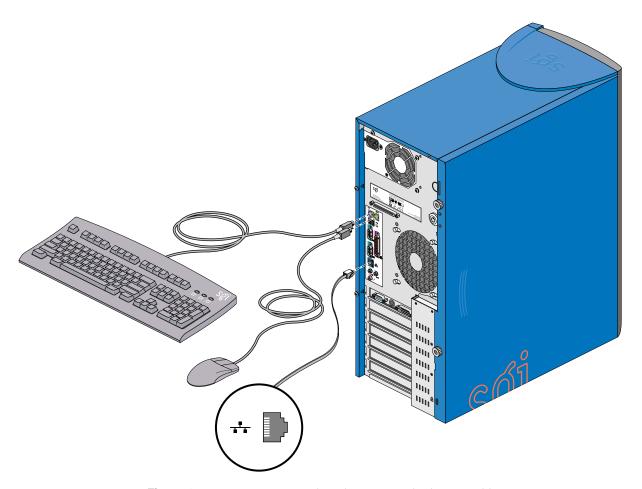


Figure 1-7 Connecting Keyboard, Mouse, and Ethernet Cable

- 4. Connect a DB15 HD video cable to the system as shown in Figure 1-8.
- 5. Connect the monitor to the power source as shown in Figure 1-8.

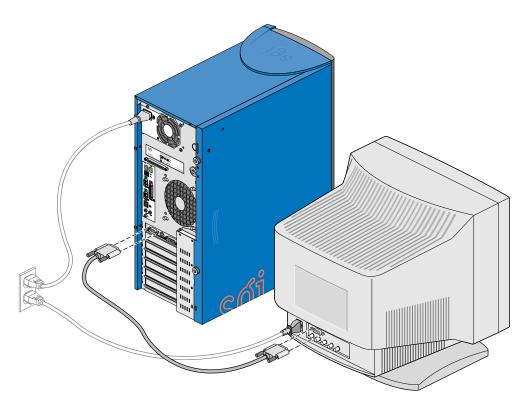


Figure 1-8 Connecting DB15 HD Video Cable

6. Follow these directions to connect speakers to the system. Figure 1-9 illustrates the procedure:

Note: Speakers on your Silicon Graphics 550 Visual Workstation may be an optional feature.

- a. Connect the power cable to the right speaker (the speaker with control buttons and four ports).
- b. Connect the right speaker to the system by plugging the cable into the system line-out port and the speaker input signal port. Refer to Figure 1-10 for the location of the line-out port.
- c. Connect the right speaker to the left speaker, as shown in Figure 1-9.

d. Plug the speaker power supply into an AC power outlet.

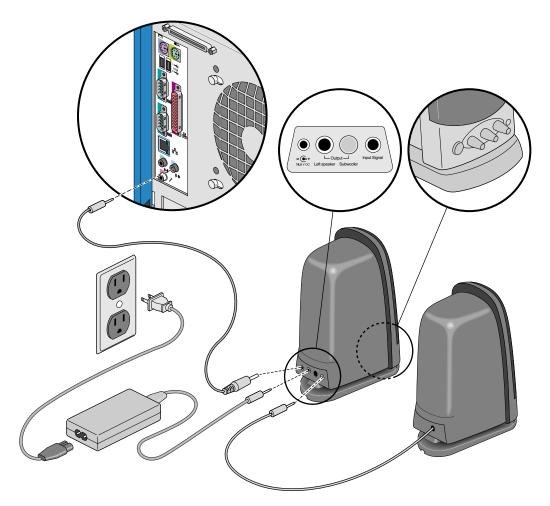


Figure 1-9 Connecting Speakers

7. Connect other external devices to their respective ports. Refer to Figure 1-10 for a detailed view of the I/O panel.

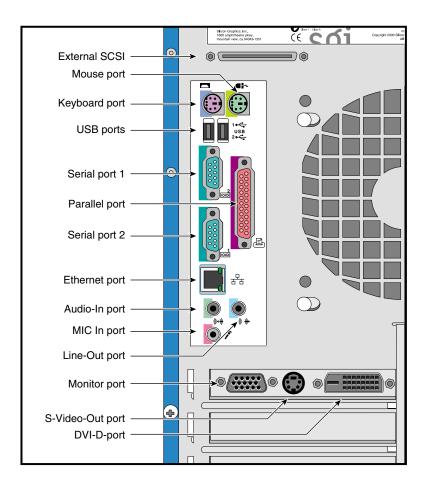


Figure 1-10 I/O Panel

8. To turn on the system, press the power switch on the front panel (see Figure 1-1).

Installation of Customer Replaceable Components

This chapter describes how to install customer replaceable components. This includes the removal and replacement of the beam, 3.5-inch and 5.25-inch drives, the power supply, the fans, expansion cards, the system board, and the I/O gasket. A description of the steps to be taken to prepare the system for installation is provided first. The installation of memory modules and a CPU is described in Chapter 3.

Pre-installation Instructions

The following steps describe how to prepare the system for the removal and installation of customer replaceable components:

- 1. Turn off the system before opening the side panel. To turn off the system, hold down the power button for four seconds.
- 2. Unplug the AC power cable from the wall socket and from the power supply.
- 3. Follow these instructions to remove the side panel, as shown in Figure 2-1:
 - a. Unscrew the two thumbscrews on the back of the case.
 - b. Slide the panel toward the rear of the chassis.
 - c. Lift the panel up and away from the chassis.

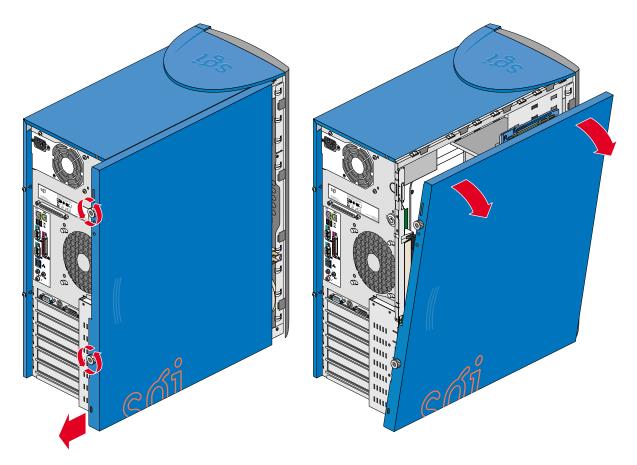


Figure 2-1 Removing Side Panel

- 4. If you will need access to the front panel drives, you will have to remove the bezel. Follow these instructions if you need to remove the bezel:
 - a. Remove the side panel as explained in Step 3.
 - b. Release the four tabs on the side of the bezel by gently lifting them out of the chassis while at the same time pulling the bezel away from the system. Figure 2-2 illustrates the procedure.
 - c. After the four tabs are released, rotate the bezel away from the chassis.

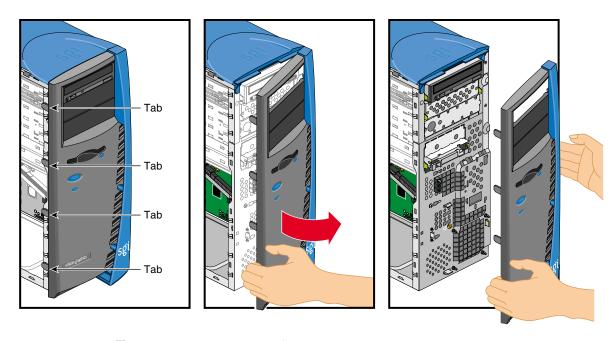


Figure 2-2 Removing Bezel

Removing the Beam

The following steps describe how to remove the beam from the chassis. Removing the beam will allow easier access to components within the chassis.

Note: You should never run your Silicon Graphics 550 Visual Workstation without the beam installed.

- 1. Remove the side panel as described in "Pre-installation Instructions" on page 16.
- 2. Remove the beam screw located on the right side of the beam. Figure 2-3 shows the location of the screw.

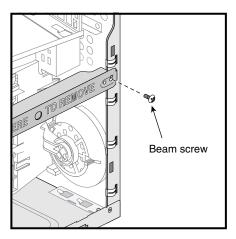
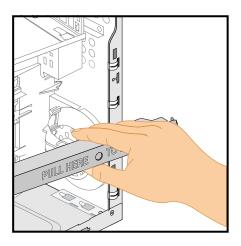


Figure 2-3 Removing Beam Screw

- 3. To remove the beam from the chassis, gently pull the right side of the beam from the chassis (the beam is marked "Pull Here for Removal"). This will unlock the beam.
- 4. Swing the right side of the beam away from the chassis. Figure 2-4 shows how to swing the beam from the chassis.



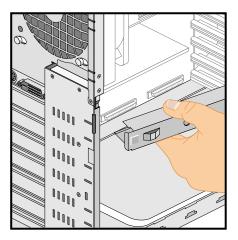


Figure 2-4 Swinging Beam from Chassis

5. After the beam is clear of the chassis, pull the beam off of the slot located on the left side of the chassis. Figure 2-5 shows how to completely remove the beam from the chassis.

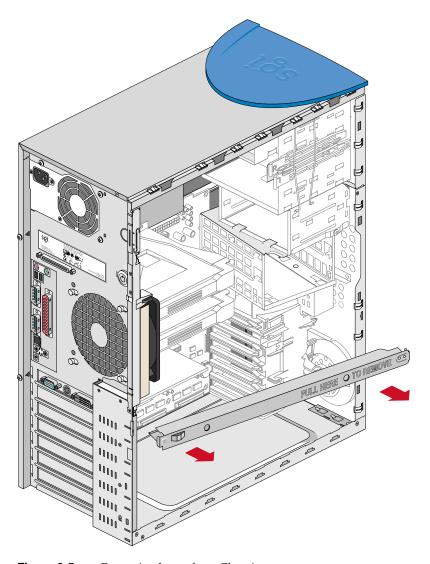


Figure 2-5 Removing beam from Chassis

Replacing the Beam

The following steps describe how to replace the beam in the chassis.

1. Hook the tab located on the left side of the beam into the slot in the chassis. Figure 2-6 shows the location of the beam's tab and the chassis' slot.

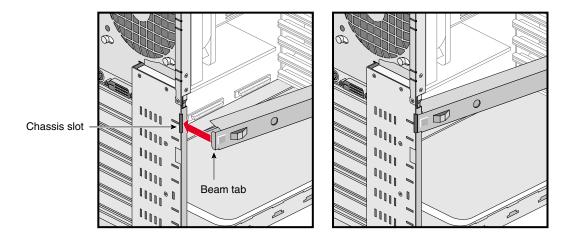


Figure 2-6 Location of Beam Tab and Chassis Slot

- 2. Swing the beam towards the chassis until the tab on the right side of the beam fits into the slot on the right side of the chassis. Figure 2-6 shows the location of these tabs and slots.
- 3. Insert the right hand tab on the beam into the slot on the chassis and gently push the tab into the slot until the tab locks into the chassis.
- 4. Replace the beam screw in the beam. Figure 2-7 shows the location of the screw.

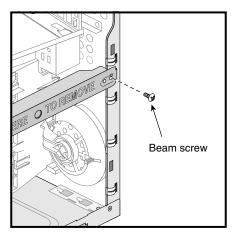


Figure 2-7 Replacing the Beam Screw

Removing and Installing Drives

This section covers the removal and installation of 5.25-inch and 3.5-inch drives in the drive bays.

Removing and Installing a 5.25-inch Drive

The following instructions describe how to remove 5.25-inch drives:

- 1. Remove the side panel and the bezel as described in "Pre-installation Instructions" on page 16.
- 2. Disconnect all cables from the rear of the drive to be removed.
- 3. To remove the drive from a drive bay, press the drive rail plastic release tabs on both sides of the drive and pull the drive out of the chassis. Figure 2-11 on page 28 illustrates the procedure (Figure 2-11 illustrates removal of a 3.5-inch drive, but the removal of 5.25-inch is similar).
- 4. To remove a drive rail from the drive, pull the rail away from the drive by lifting one end of the rail.

Any empty 5.25-inch drive bays should be covered with a drive filler plate. The following instructions describe how to remove and install 5.25-inch drive bay filler plates:

- To remove a drive filler plate, insert a finger into the hole on the filler plate and pull it out of the chassis.
- To install a drive filler plate in an empty drive, insert and push the filler plate into the drive bay until the drive filler plate snaps into place.

The following instructions describe how to install 5.25-inch drives:

- 1. All drives are mounted on snap-on drive rails. The Silicon Graphics 550 Visual Workstation comes with two sets of spare 5.25-inch drive rails. The spare drive rails are located inside the chassis on the side of the 5.25-inch drive bays.
- 2. The drive rails for the 5.25-inch drives are interchangeable—they do not have 'R' or 'L' markings that indicate which side they have to be mounted on. Any unmarked drive rail can be mounted on either side of the drive.
- 3. To mount a drive rail to the drive, place one end of the drive rail wire clip into its drive screw hole. Gently push on the middle of the drive rail until the other end of the wire clip snaps into its screw hole. Figure 2-8 illustrates the procedure.

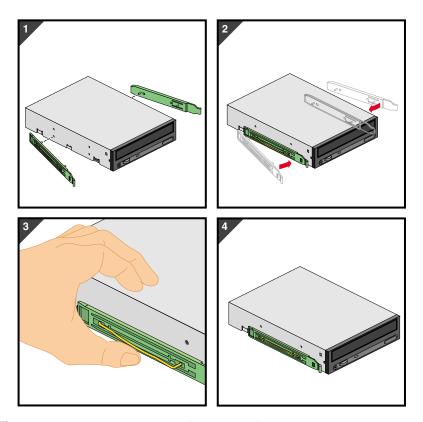


Figure 2-8 Mounting Drive Rails to 5.25-inch Drives

- 4. To mount a 5.25-inch drive in the drive cage, place the drive in the selected drive bay and slide the drive into the bay until the rails snap into place.
- 5. Connect cables to the drive.
- 6. The Silicon Graphics 550 Visual Workstation comes with two plastic blanking plates installed on the bezel. The following directions show how to remove and install the bezel blanking plates:
 - To remove a blanking plate, push on the release mechanism at one end of the blanking plate and pull the blanking plate out of the bezel. Figure 2-9 illustrates the procedure.

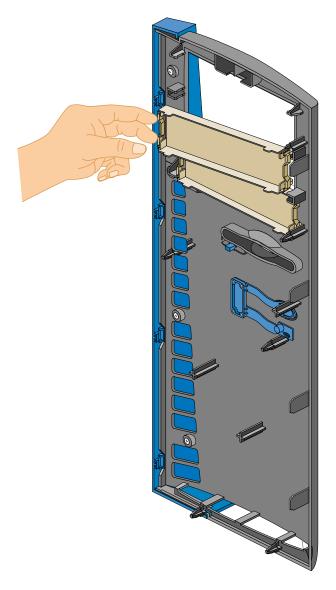
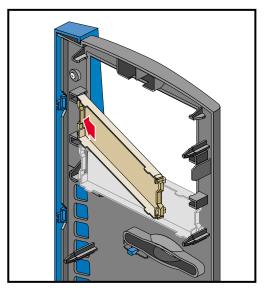


Figure 2-9 Removing Bezel Blanking Plate

• To install a blanking plate, insert one end of the blanking plate into its retaining notches, then push the other end until it snaps into place. See Figure 2-10 for an illustration of the procedure.



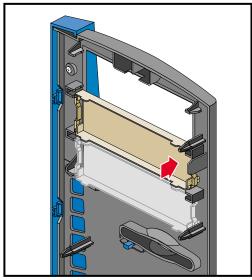


Figure 2-10 Installing Bezel Blanking Plate

7. Replace the bezel and the side panel as described in "Post-installation Instructions" on page 64.

Removing and Installing a 3.5-inch Drive in the Front-Access Drive Cage

The following instructions describe how to remove 3.5-inch drives from the front-access drive cage:

- 1. Remove the side panel and the bezel as described in "Pre-installation Instructions" on page 16.
- 2. Disconnect all cables from the rear of the drive to be removed.
- 3. To remove the 3.5-inch drive from a drive bay, press the drive rail plastic release tabs on both sides of the drive and pull the drive out of the chassis. Figure 2-11 illustrates the procedure.

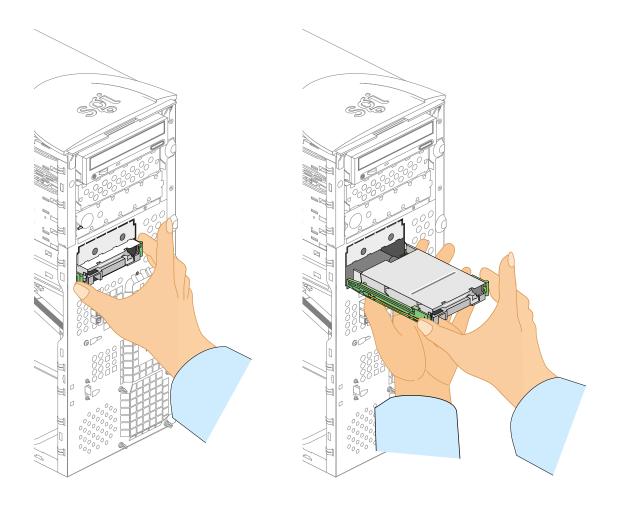


Figure 2-11 Removing Drive from Drive Bay

4. To remove a drive rail from the drive, pull the rail away from the drive by lifting one end of the rail.

The upper 3.5-inch front access drive bay is covered with a detachable filler plate. Follow these instructions to detach the filler plate:

Note: Once removed, the filler plate cannot be re-installed.

- The lower 3.5-inch drive bay needs to be empty to proceed with the removal of the filler plate; refer to the above instructions to remove the 3.5-inch drive from the front-access bay.
- Hold the filler plate by its lower side and pull it. The action of pulling the filler plate
 will break its connections to the chassis. See Figure 2-12 for an illustration of the
 procedure.

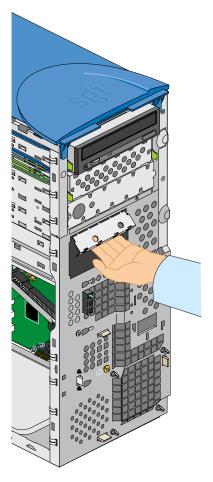


Figure 2-12 Detaching 3.5-inch Drive Filler Plate

The following instructions describe how to install 3.5-inch drives in the front-access drive cage:

Note: Use of 10,000 RPM drives in the front-access drive cage is not recommended.

- 1. All drives are mounted on snap-on drive rails. The Silicon Graphics 550 Visual Workstation comes with two sets of spare 5.25-inch drive rails. One set of spare 5.25-inch drive rails is located inside the chassis on the side of the 5.25-inch drive bays. The other set is located inside a plastic bag attached to the side panel.
- 2. There are two different sets of drive rails for 3.5-inch drives. The difference between the two sets is the distance between the wire clips. To choose which drive rail fits on your drive, place the drive rail wire clips next to the drive screw holes and verify that the distance between the wire clips is the same as the distance between the two screw holes. If the distance is the same, the drive rail is the correct one.
- 3. The drive rails for the 3.5-inch drives are not interchangeable. They have 'R' or 'L' markings that indicate which side they have to be mounted on. Before mounting the rails to the drive, check to be sure the rail marked 'L' is on the left side of the drive and the rail marked 'R' is on the right side of the drive, as shown in Figure 2-13.
- 4. To mount a drive rail to the drive, place one end of the drive rail wire clip into its drive screw hole. Gently push on the middle of the drive rail until the other end of the wire clip snaps into its screw hole. Figure 2-13 illustrates the procedure.
- 5. A 5.25-inch to 3.5-inch drive bay conversion bracket is included in your system. This bracket can be used in any available 5.25-inch drive bay.

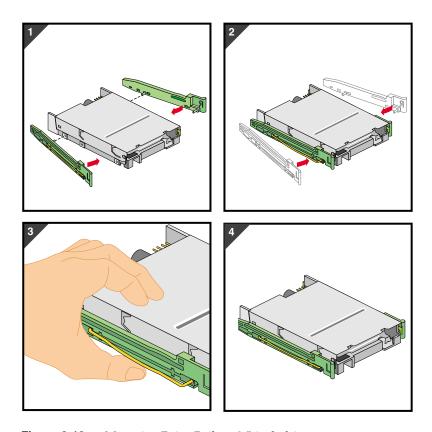


Figure 2-13 Mounting Drive Rails to 3.5-inch drives

6. To mount a 3.5-inch drive in the front-access drive cage, place the drive in the selected drive bay and slide the drive into the bay until the rails snap into place.

Note: For a drive to be correctly mounted in the front-access drive cage, it must be installed right side up.

- 7. Connect cables to the drive.
- 8. Replace the bezel and the side panel as described in "Post-installation Instructions" on page 64.

Removing and Installing a 3.5-inch Drive in the Internal Drive Cage

The following instructions describe how to remove 3.5-inch drives from the internal drive cage:

- 1. Remove the side panel as described in "Pre-installation Instructions" on page 16.
- 2. Disconnect all cables from the drive to be removed.
- 3. To remove the drive from a drive bay, press the drive rail plastic release tabs on both sides of the drive and pull the drive out of the chassis. If the drive is hard to pull out, you can facilitate the removal by gently pushing the drive from behind.
- 4. To remove a drive rail from the drive, pull the rail away from the drive by lifting one end of the rail.

The following instructions describe how to install 3.5-inch drives in the internal drive cage:

Note: Only low-profile (i.e., one-inch) drives can be mounted in the internal drive cage.

- 1. All drives are mounted on snap-on drive rails. The Silicon Graphics 550 Visual Workstation comes with two sets of spare 3.5-inch drive rails. One set of spare 3.5-inch drive rails is located inside the chassis on the side of the 5.25-inch drive bays. The other set is located inside a plastic bag attached to the side panel.
- 2. There are two different sets of drive rails for 3.5-inch drives. The difference between the two sets is the distance between the wire clips. To choose which drive rail fits your drive, place the drive rail wire clips next to the drive screw holes and verify that the distance between the wire clips is the same as the distance between the two screw holes. If the distance is the same, the drive rail is the correct one.
- 3. The drive rails for the 3.5-inch drives are not interchangeable. They have 'R' or 'L' markings that indicate which side they have to be mounted on. Before mounting the rails to the drive, check to be sure the rail marked 'L' is on the left side of the drive and the rail marked 'R' is on the right side of the drive, as shown in Figure 2-13.
- 4. To mount a drive rail to the drive, place one end of the drive rail wire clip into its drive screw hole. Gently push on the middle of the drive rail until the other end of the wire clip snaps into its screw hole. Make sure that the connectors face out. Figure 2-13 illustrates the procedure.

5. To mount a 3.5-inch drive in the internal drive cage, place the drive upside down in the selected drive bay and slide the drive into the bay until the rails snap into place. Figure 2-14 shows how to install the drive correctly.

Caution: For a drive to be correctly mounted in the internal drive cage, it must be installed upside down.

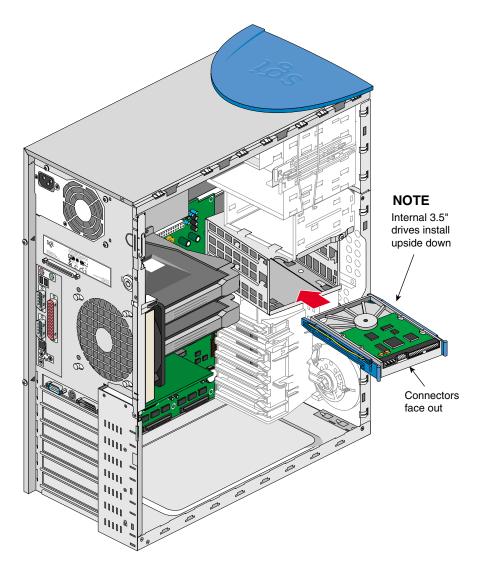


Figure 2-14 Mounting Drives in the Internal Drive Cage

- 6. Connect cables to the drive.
- 7. Replace the side panel as described in "Post-installation Instructions" on page 64.

Replacing the Power Supply

Follow the instructions in this section to remove and replace the power supply.

Warning: Do not open the power supply. Even when unplugged, it may contain dangerous voltages. There are no user-serviceable parts inside.

- 1. Unplug the AC power cable from the wall socket and from the power supply.
- 2. See "Pre-installation Instructions" on page 16 to remove the side panel.
- 3. Disconnect all the power supply cables from the system board, the 3.5-inch drives and the 5.25-inch drives. See Figure 2-15 on page 37 for the location of the cable connections.
- 4. In order to gain easier access to the power supply, place the system on its right side on a padded surface so as not to scratch the system.
- 5. Remove the three power supply screws located on the rear panel. Figure 1-2 on page 4 shows the location of the screws.
- 6. Pull the power supply out of the system, avoiding any physical contact between the power supply and any system component.
- 7. To install the power supply, continue to rest the system on its right side.
- 8. Carefully place the power supply into its housing, and push it into place.
- 9. Replace the three rear screws shown in Figure 1-2 on page 4.
- 10. Connect the power supply cables to the system board, the hard drive(s), the CD-ROM drive, and to the floppy disk drive. Refer to Figure 2-15 for the location of the power supply cable connections.

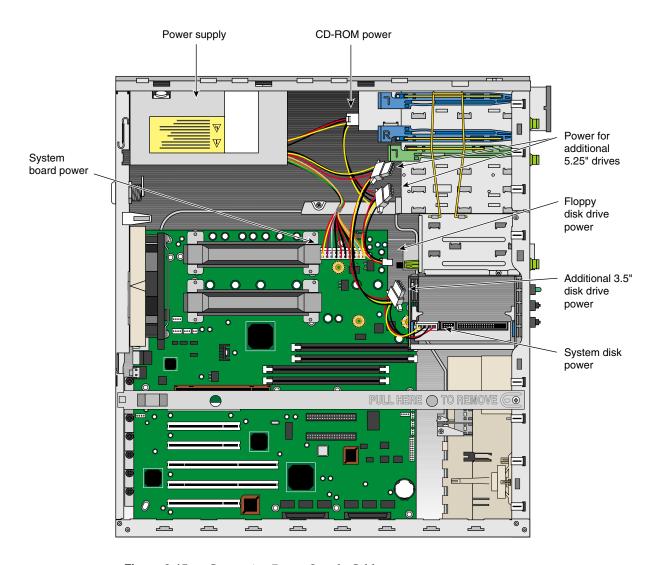


Figure 2-15 Connecting Power Supply Cables

- 11. Replace the side panel as shown in "Post-installation Instructions" on page 64.
- 12. Reconnect the AC cable to the power supply and to the wall socket.

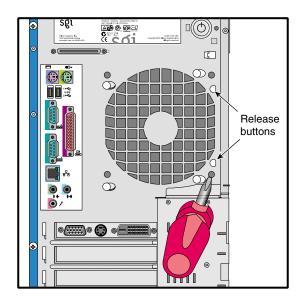
Replacing Fans

This section covers the removal and installation of the rear and front system fans.

Replacing the Rear System Fan

Follow the instructions in this section to remove and replace the rear system fan:

- 1. Remove the side panel as shown in "Pre-installation Instructions" on page 16.
- 2. Rest the system on its right side on a padded surface so as not to scratch the system.
- 3. Disconnect the fan cable from the system board. See Figure 2-17 on page 40 for the location of the fan cable connection.
- 4. Remove the system board as described in "Replacing the System Board" on page 51.
- 5. Locate the two fan release buttons on the back side of the rear panel, as shown in Figure 2-16.
- 6. Using a pointed tool (such as a Phillips-head screwdriver), push on one of the release buttons while at the same time pulling the fan upward until the release button comes out of its notch. Keep upward pressure on the fan while pushing on the second release button until the fan is released from the chassis. Figure 2-16 illustrates the procedure.



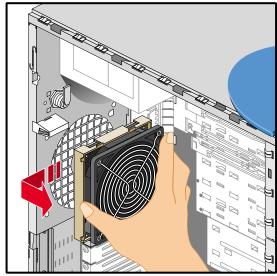
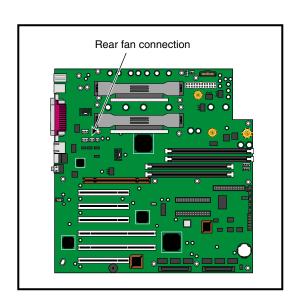


Figure 2-16 Disengaging Release Buttons and Removing Rear Fan

- 7. Carefully remove the fan from the system without touching any system component.
- 8. To install the rear fan, keep the system resting on its right side.
- 9. Insert the fan's four retaining pins into their respective holes. Make sure that the fan is positioned so as to have the two release buttons on the upper side of the fan.
- 10. Push the fan down until the two release buttons click into place.
- 11. Connect the fan cable. For the location of the rear fan cable connection, see Figure 2-17.



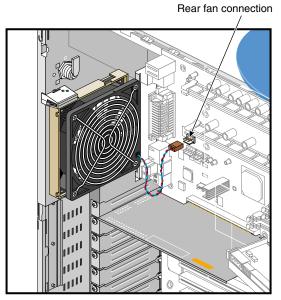


Figure 2-17 Connecting Rear Fan Cable

Replacing the Internal Drive Cage

The following instructions describe how to remove and replace the internal drive cage from the chassis.

- 1. Remove the side panel as described in "Pre-installation Instructions" on page 16.
- 2. Remove the beam as described in "Removing the Beam" on page 18.
- 3. Remove all drives as described in "Removing and Installing a 3.5-inch Drive in the Internal Drive Cage" on page 33.
- 4. Remove the internal cage screw located above the internal drive cage. Figure 2-18 shows the location of the screw.

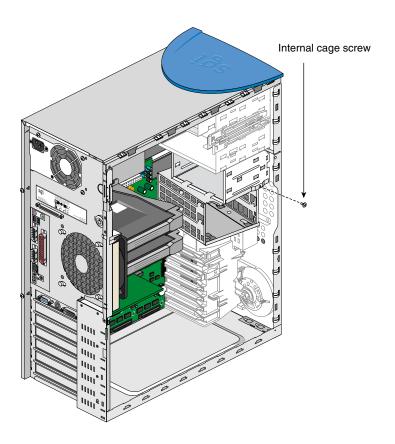


Figure 2-18 Location of Internal Cage Screw

- 5. Remove the two drive sled screws located on the front of the chassis. Figure 1-5 on page 8 shows the location of these screws.
- 6. After all the screws are removed, the internal drive bracket can be easily removed by gently pulling the bracket forward. Figure 2-19 shows the bracket being removed from the system.

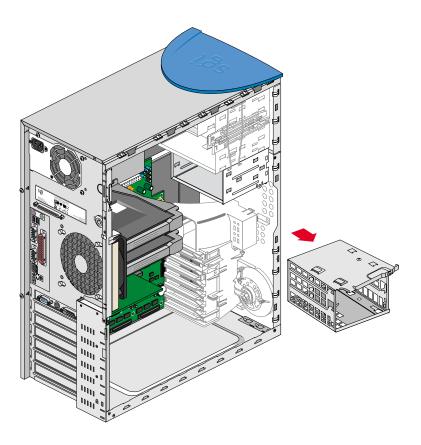


Figure 2-19 Removing the Drive Cage

Replacing the Front System Fan

Follow these instructions to remove the front system fan:

- 1. Remove the side panel and the bezel as shown in "Pre-installation Instructions" on page 16.
- 2. Remove the beam as described in "Removing the Beam" on page 18.
- 3. Disconnect the front fan cable from the system board.

- 4. Remove the front fan screw located on the front panel. Figure 2-20 shows the location of the screw.
- 5. Release the three retaining clips shown in Figure 2-21 by pushing on one clip at a time while holding the fan plastic frame inside the chassis.

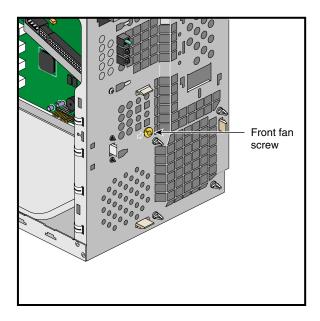
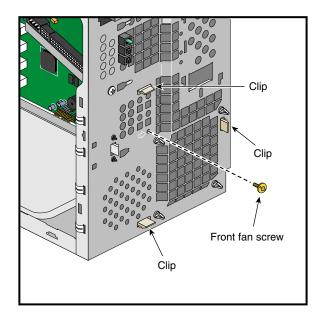


Figure 2-20 Removing Front Fan Screw and Releasing Clips

- 6. Once the three clips are released, the fan plastic frame can be removed from the system.
- 7. The fan is held in its plastic frame by four fan retaining clips. To remove the fan from its plastic frame, place the frame on a flat surface, with the frame facing down, as shown in Figure 2-22.
- 8. Using a flat screwdriver, gently push on the center of the fan. While pushing on the fan, release one fan retaining clip at a time by pulling it away from the fan. The procedure is illustrated in Figure 2-22.
- 9. Once all four clips have been released, the fan can be removed from the plastic frame.



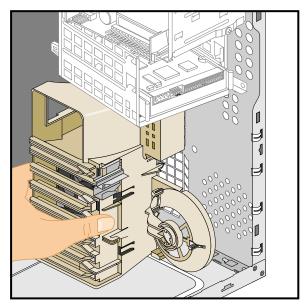
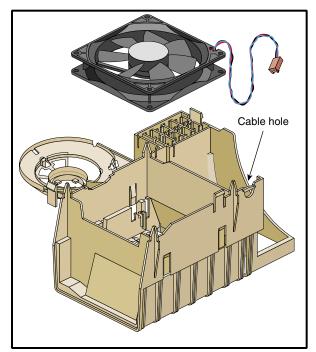


Figure 2-21 Removing Fan from Plastic Frame

Follow these instructions to install the front system fan:

- 1. To install the front fan, place the plastic frame on a flat surface with its retaining clips facing up.
- 2. Insert the fan in its housing. Make sure that the fan cable comes out next to the slot in the plastic frame, as shown in Figure 2-22.
- 3. Insert the fan cable into the slot.
- 4. Pass the cable connector and pull the cable through the hole located next to the cable slot, as shown in Figure 2-22.



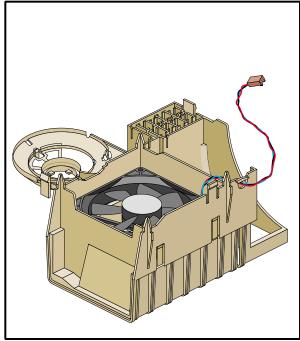


Figure 2-22 Installing Fan into Plastic Frame

- 5. Place the fan plastic frame in the chassis and insert the frame guiding pins into their corresponding holes on the front panel. Push the fan frame until its retaining clips snap into place.
- 6. Connect the front fan cable. For the location of the front fan cable connection, refer to Figure 2-23.

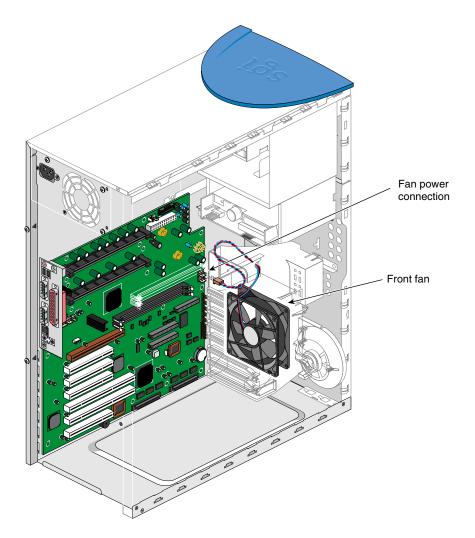


Figure 2-23 Connecting Front Fan Cable

Replacing Expansion Cards

This section describes how to remove and install PCI (Peripheral Component Interconnect) and AGP (Accelerated Graphics Port) cards. Refer to Figure 3-1 on page 72 for the location of the expansion card slots.

Follow electrostatic discharge (ESD) precautions. Electronic equipment can be irreparably damaged by ESD. Always follow these preventative measures when handling a system component:

- Remove a component from its antistatic bag only when you are ready to install it.
- If you have to handle a component before installation, do not place it on surfaces that produce ESD (carpeting, for example), or near devices that create static electricity.
- Attach a static wrist strap to a grounded connection on your system when installing or removing a component.

The following instructions describe how to remove expansion cards:

- 1. Remove the side panel as described in "Pre-installation Instructions" on page 16.
- 2. Remove the beam as described in "Removing the Beam" on page 18.
- 3. Remove the retaining screw for that expansion card, as shown in Figure 2-24.
- 4. Gently pull the card straight up out of the slot (away from the system board).

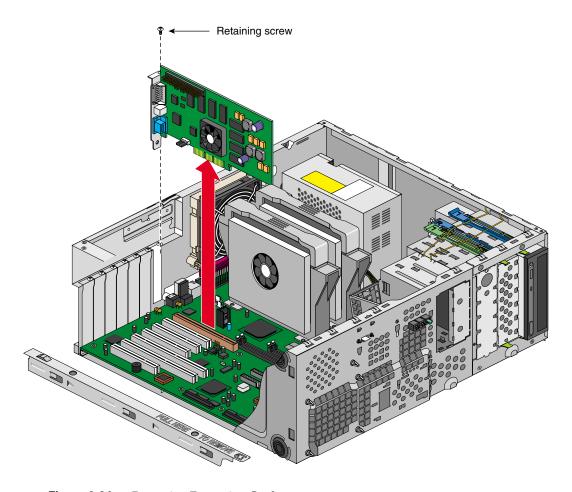


Figure 2-24 Removing Expansion Card

- 5. If no other card will be installed in the empty slot, a filler plate needs to be installed in the expansion slot opening. Follow these instructions to install a filler plate in an expansion slot opening:
 - Place the filler plate on the slot opening
 - Tighten the retaining screw shown in Figure 2-25.

The following instructions describe how to install expansion cards:

- 1. Remove the side panel as described in "Pre-installation Instructions" on page 16, if not already done.
- 2. If a filler plate covers the slot opening selected for installation, follow these instructions to remove it:
 - Remove the retaining screw shown in Figure 2-25.
 - Remove the filler plate from the chassis.

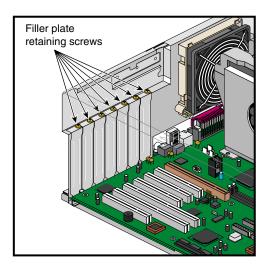


Figure 2-25 Location of the Retaining Screw for the Expansion Slot Filler Plate

- 3. Insert the expansion card into its slot by pushing the card into the connector until it is properly seated. Figure 2-26 illustrates the procedure.
- 4. Tighten the retaining screw, as shown in Figure 2-26.

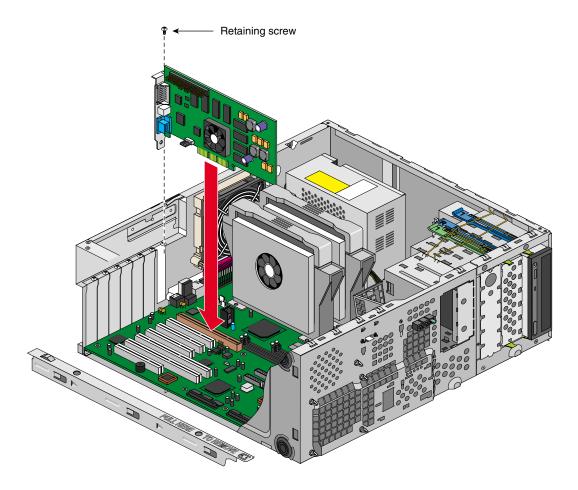


Figure 2-26 Installing Expansion Card

- 5. Replace the beam as described in "Replacing the Beam" on page 21.
- 6. Replace the side panel as shown in "Post-installation Instructions" on page 64.
- 7. When the system is turned on, the BIOS automatically detects and assigns resources to the new device.

Note: The BIOS detects and configures only Plug and Play expansion cards.

Replacing the System Board

This section describes how to remove and replace the Silicon Graphics 550 Visual Workstation system board.

Follow electrostatic discharge (ESD) precautions. Electronic equipment can be irreparably damaged by ESD. Always follow these preventative measures when handling a system component:

- Remove a component from its antistatic bag only when you are ready to install it.
- If you have to handle a component before installation, do not place it on surfaces that produce ESD (carpeting, for example), or near devices that create static electricity.
- Attach a static wrist strap to a grounded connection on your system when installing or removing a component.

The following instructions describe how to remove the Silicon Graphics 550 Visual Workstation system board:

Note: Refer to Figure 1-4 on page 6 to review the internal structure of the system.

- 1. To facilitate the removal of system components, rest the chassis on its right side on a padded surface so as not to scratch the system.
- 2. Remove the side panel as described in "Pre-installation Instructions" on page 16.
- 3. Remove the beam as described in "Removing the Beam" on page 18.
- 4. Remove all expansion boards. Refer to "Replacing Expansion Cards" on page 47 for the removal of expansion boards.
- 5. Disconnect all cables from the system board.
- 6. Remove the internal drive cage as described in "Replacing the Internal Drive Cage" on page 40.
- 7. Remove the front system fan assembly as described in "Replacing the Front System Fan" on page 42.
- 8. Remove the two screws at the standoffs at the top of the system board. Refer to Figure 2-30 on page 55 to see the placement of these screws.
- 9. Loosen the system board screw. Figure 2-27 shows the location of the screw.

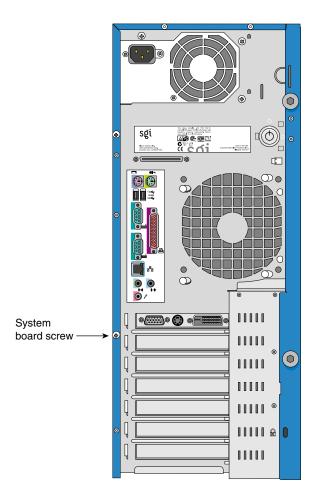
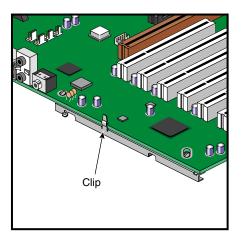


Figure 2-27 Location of System Board Screw

- 10. Pull the system board away from the I/O gasket and lift the board away from the chassis.
- 11. To detach the retaining bracket from the system board, unsnap the release clip and remove the bracket retaining hooks from the system board. Figure 2-28 shows the procedure.



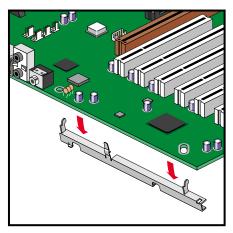
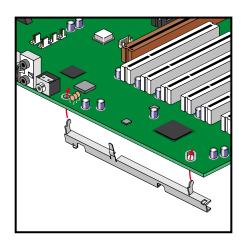


Figure 2-28 Removing Retaining Bracket from System Board

The following instructions describe how to install the Silicon Graphics 550 Visual Workstation system board:

1. To mount the retaining bracket onto the system board, place the retaining hooks into their system board holes and snap the release clip onto the board. Figure 2-29 illustrates the procedure.



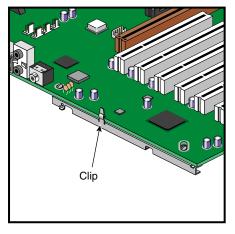


Figure 2-29 Snapping Retaining Bracket onto System Board

- 2. The system should still be resting on its right side to facilitate the installation.
- 3. Place the system board into the chassis so as to align the I/O ports with their respective holes in the I/O gasket.
- 4. Position the system board so as to have the standoff hooks inserted into their corresponding holes in the system board. See Figure 2-30 for an illustration of the procedure.

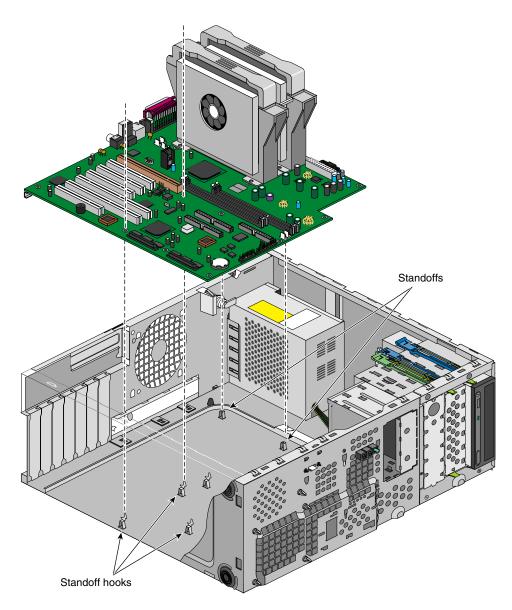


Figure 2-30 Positioning the System Board on Standoffs and Standoff Hooks

- 5. Secure the system board screw onto the retaining bracket. See Figure 2-27 on page 52 for the location of the system board screw.
- 6. Replace the front system fan assembly as described in "Replacing the Front System Fan" on page 42.
- 7. Replace the internal drive cage as described in "Replacing the Internal Drive Cage" on page 40.
- 8. Replace all drives in the internal drive cage as described in "Removing and Installing a 3.5-inch Drive in the Internal Drive Cage" on page 33.
- 9. Replace the expansion boards. Refer to "Replacing Expansion Cards" on page 47 for the installation of expansion boards.
- 10. Connect all system board cables to their connectors. Refer to Figure 2-31 on page 57 and Figure 3-1 on page 72 for location of system board connectors

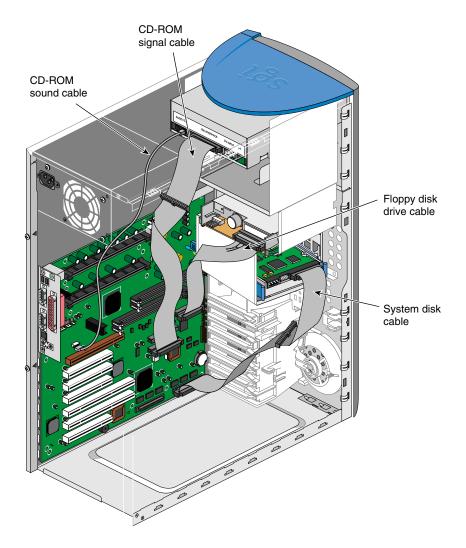


Figure 2-31 Location of System Board Connectors

- 11. Replace the beam as described in "Replacing the Beam" on page 21.
- 12. Replace the side panel as shown in "Post-installation Instructions" on page 64.

Replacing the I/O Panel Gasket

The following instructions describe how to remove the I/O panel gasket. To avoid scratching and other possible cosmetic problems and to ease in disassembly, the system should still be resting on its side on a padded surface.

- Remove the system board as described in "Replacing the System Board" on page 51.
- 2. Locate the three notched fingers at the bottom of the I/O panel gasket, as shown in Figure 2-32.
- 3. To remove the I/O panel gasket, lift one notched finger at a time out of its slot.
- 4. Once all three notched fingers have been lifted out of their slots, the I/O panel gasket slides out of its housing and can be removed from the chassis.

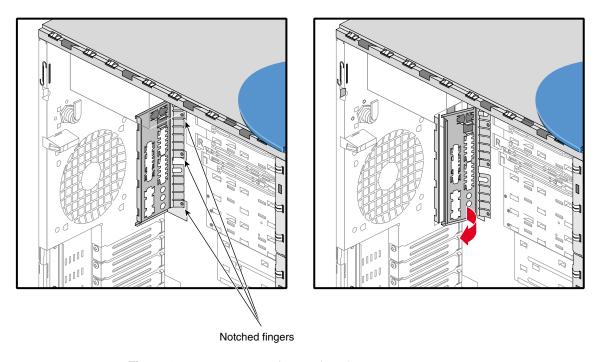


Figure 2-32 Removing I/O Panel Gasket

The following instructions describe how to install the I/O panel gasket:

- 1. Locate the four retaining slots on the system's I/O panel opening. See Figure 2-33 for the location of the retaining slots.
- 2. Insert the I/O gasket's four indentations into their corresponding retaining slots on the I/O panel opening. See Figure 2-33 for an illustration of the procedure.
- 3. In order to secure the I/O gasket on the chassis, each notched finger needs to be inserted into its slot. To do so, push on the I/O gasket where each notched finger meets with the I/O gasket until the notched finger snaps into its slot. Repeat the procedure for the remaining notched fingers.
- 4. Install the system board as described in "Replacing the System Board" on page 51.

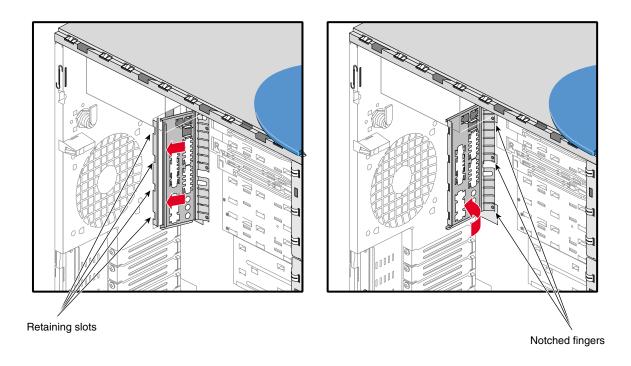


Figure 2-33 Installing I/O Panel Gasket

Securing the System

The Silicon Graphics 550 Visual Workstation's side panel can be locked into place on the system using a locking loop and a padlock, thus preventing access to the internal components of the system. The locking loop is stored in a slot on the chassis and needs to be moved to another slot to be used. Follow these steps to install the locking loop:

- 1. Remove the side panel if not already done. For removal of the side panel, refer to "Pre-installation Instructions" on page 16.
- 2. Locate the locking loop. See Figure 2-34 for the locking loop.

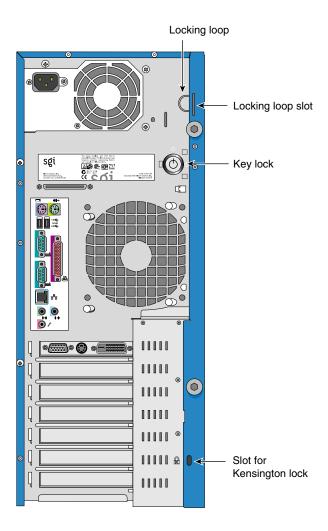
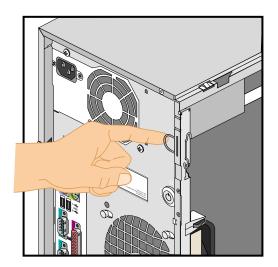


Figure 2-34 Location of Locking Loop

3. Remove the locking loop from its storage slot by pressing the two hooks towards each other and pushing the loop out of the chassis. Figure 2-35 illustrates the procedure.



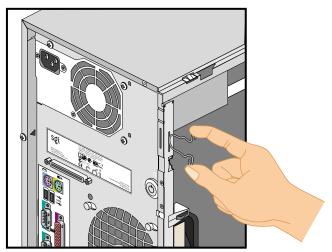
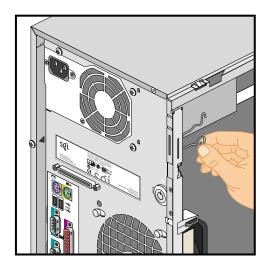


Figure 2-35 Removing Locking Hook from its Storage Slot

4. Locate the slot facing the rear of the chassis. See Figure 2-34 for the location of the slot.

5. Insert the loop part of the locking loop into the slot inside the chassis and push the locking loop until it snaps into place. Figure 2-36 illustrates the procedure.



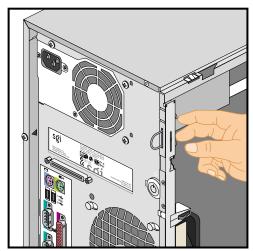


Figure 2-36 Installing Locking Loop in its Functional Slot

- 6. Replace the side panel as described in "Post-installation Instructions" on page 64.
- 7. To lock the side panel on the system (see "Post-installation Instructions" on page 64 for side panel installation), insert a padlock into the locking loop.

The system itself can be secured in a particular location by using a Kensington locking device. See Figure 1-2 on page 4 for the location of the Kensington lock slot.

Note: A Kensington locking device is not included with the Silicon Graphics 550 Visual Workstation.

Post-installation Instructions

After completing the installation of customer replaceable components, follow these instructions to ready the system for operation:

- 1. If your installation involved the removal of the bezel, follow these steps to replace the bezel:
 - Locate the four tabs on the right side of the bezel, as shown in Figure 2-37.
 - Place the right side of the bezel on the chassis so as to insert the four tabs in their respective slots, as shown in Figure 2-37.
 - Push the left side of the bezel towards the chassis until all four tabs on the left side of the bezel are securely snapped onto the chassis.

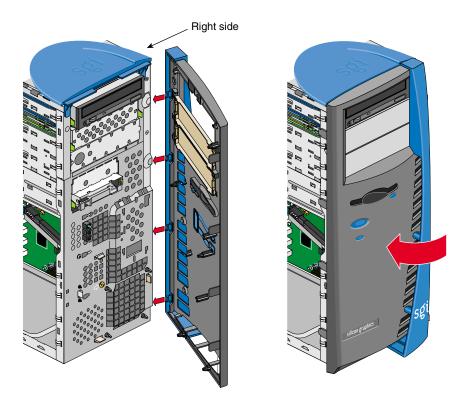


Figure 2-37 Replacing Bezel

- 2. Follow these steps to replace the side panel:
 - Locate the two tabs on the lower side of the side panel.
 - Place the two tabs onto the lower chassis rail.
 - Slide the side panel toward the rear of the system, until the rear tab hits the rear of the chassis and the side panel cannot be moved any farther. Figure 2-38 illustrates the procedure.

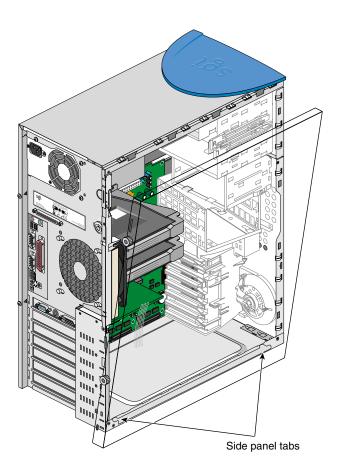


Figure 2-38 Placing Side Panel onto Lower Chassis Rail

• Push the upper side of the side panel toward the chassis.

- Gently lift the side panel and push it against the chassis.
- Slide the side panel towards the front of the chassis until it fits into place. The procedure is illustrated in Figure 2-39.
- Tighten the two thumbscrews on the back of the case.

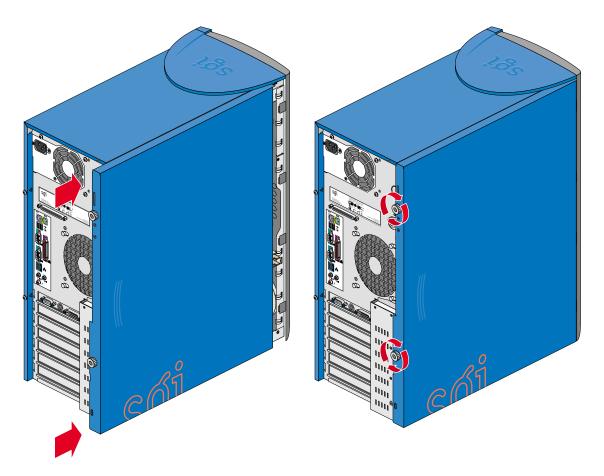


Figure 2-39 Sliding Side Panel into Place

- 3. To connect your system to external devices, refer to "Connecting External Devices" on page 9.
- 4. To turn on the system, press the power button on the front panel. See Figure 1-1 on page 3 for the location of the power button.

System Board

The Silicon Graphics 550 Visual Workstation contains an M29A system board. This chapter describes the M29A system board and all its major components. It contains the system board layout, jumper settings, cache and memory configurations, and information on other internal devices.

Overview

The M29A system board is a PCI bus-based, dual-processor system board built on an extended ATX baseboard. It comes with dual Slot 2 processor sockets using Pentium III Xeon processors integrated with the Intel i840 chipset. The system board also integrates the Intel 82559 10/100 Mbps PCI Ethernet chipset that supports WOL (Wake on LAN) and AOL (Alert on LAN) for better remote site management.

For expandability, the system includes one AGP Pro (Accelerated Graphics Port) slot, four 32-bit PCI-bus slots, two 64-bit PCI-bus slots, and four RIMM sockets. It also includes integrated SCSI via an Adaptec 7899 dual channel Ultra160/M controller.

For connectivity, the system board supports two USB (Universal Serial Bus) connectors, a speaker-out/line-out, audio-in, and microphone-in port, and other standard features such as two UART NS16C550 serial ports, one enhanced parallel port with Enhanced Parallel Port (EPP)/Extended Capabilities Port (ECP) support, a diskette drive interface, and two embedded hard disk interfaces.

Processor

The Pentium III Xeon processor implements a Dynamic Execution micro-architecture, a unique combination of multiple branch prediction, data flow analysis, and speculative execution. The Pentium III Xeon processor improves upon previous generations of Intel processors by adding Streaming SIMD (Single Instruction Multiple Data) extensions. The SIMD extensions significantly accelerate performance of 3D graphics. Besides 3D graphics improvements, the extensions also include additional integer and cacheability instructions that improve other aspects of performance.

In addition, the Pentium III Xeon processor uses a variation of the S.E.C (Single Edge Contact) package technology first introduced on the Pentium II processor. The SEC packaging technology allows the Pentium III Xeon processor to implement Dual Independent Bus Architecture and has 256KB of level 2 cache. Level 2 cache is integrated in the processing unit and communication occurs at the full speed of the processor core. The Pentium III Xeon processor supports both uniprocessor and multiprocessor implementations with support for two processing units on each local processor bus, or system bus.

Memory

The four RIMM sockets on the board allow a maximum of 2GB of memory using four 512-MB RDRAM (Rambus DRAM) RIMMs. RDRAM is a new high-performance memory technology that increases overall system throughput when running workstation applications.

System Chipsets

Intel i840 Chipset

Intel Scalable Bandwidth Technology provides the Intel 840 chipset with the ability to meet the needs of high performance multi-processor systems utilizing the Intel Pentium III Xeon processor. In addition, the 840 chipset provides up to 3.2 GB/s of memory bandwidth and supports the new high-performance RDRAM memory technology.

The 840 chipset has three core components:

- The 82840 Memory Controller Hub (MCH) differentiates the Intel 840 chipset from other Intel 800 series chipsets. The MCH provides graphics support for AGP 2X/4X, dual RDRAM memory channels, and multiple PCI segments for high performance I/O.
- The 82801 I/O Controller Hub (ICH) utilizes Intel Hub Architecture to make a direct connection to the MCH. The ICH supports 32-bit PCI, IDE controllers and dual USB ports.
- The 82802 Firmware Hub (FWH) stores system BIOS and video BIOS, as well as an Intel Random Number Generator (RNG). The Intel RNG provides truly random numbers to enable stronger encryption, digital signing and security protocols.

In addition to providing high performance, the Intel 840 chipset was designed for scalability. The 82806 64-bit PCI Controller Hub (P64H) supports 64-bit PCI slots at speeds of either 33 or 66 MHz. The P64H connects directly to the MCH using Intel Hub Architecture, providing a dedicated path for high performance I/O.

LAN Subsystem

Intel's 82559 10/100 Mbps Fast Ethernet controller supports Advanced Configuration and Power Interface (ACPI) 1.20A based power management, wake on Magic Packet, wake on interesting packet, advanced System Management Bus (SMB) based

manageability, Wired for Management (WfM) 2.0 compliance, IP checksum assist, PCI 2.2 compliance, and PC 98, PC 99, and Server 99 compliance.

Expansion Slots

AGP Pro Bus

The AGP Pro specifies an extension of the existing AGP bus. It delivers four times the electrical power of the current AGP specification supported by both 2X and 4X AGP modes. MCH provides an AGP interface as an independent graphics controller which makes it ideal for users of simulation, mechanical CAD, financial modeling and digital content creation applications.

PCI Bus

The system board has four PCI buses that support 32-bit/33 MHz PCI devices and two PCI buses that support 64-bit/66 MHz PCI devices.

Hardware Management Support

The system board supports the power-management function that conforms to the power-saving standards of the U.S. Environmental Protection Agency (EPA) Energy Star program. It also offers the Plug-and-Play feature. This feature saves the user from configuration troubles, thus making the system more user-friendly.

Major Components

The system board has the following major components:

- Slot 2 processor socket that supports Pentium III Xeon processors and future generation Pentium CPUs
- Intel i840 chipset
- Onboard 10/100 Mb/s Intel 82559 LAN chip that supports WOL and AOL
- Four RIMM sockets that accept 64-, 128-, 256, and 512-MB RDRAMs with a maximum memory capacity of 2GB

- One AGP Pro slot, four 32-bit PCI bus slots, and two 64-bit PCI bus slots
- Integrated Adaptec 7899 with dual channel Ultra160/M controller
- System clock/calendar with battery backup
- IDE hard disk and diskette drive interfaces
- External ports:

USB connector Serial port 1 and 2

PS/2-compatible keyboard port Speaker-out/Line-out port

PS/2-compatible mouse port Audio-in port

10/100 MBps Ethernet port Microphone-in port

Parallel port

Figure 3-1 shows the layout of the system board.

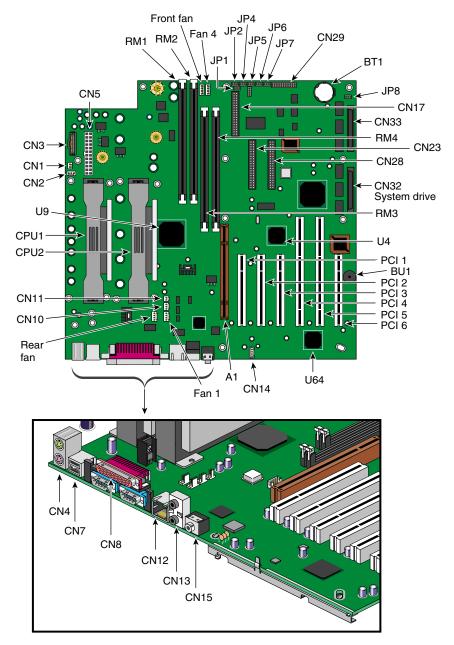


Figure 3-1 System Board Layout

Table 3-1 describes the system board items in Figure 3-1.

Table 3-1System Board Items

Item	Description
A1	AGP slot
BT1	Battery
BU1	Buzzer
CN1	CPU 1 thermal sensor connector
CN2	CPU 1 fan connector
CN3	Power assist
CN4	Upper: PS/2 mouse connector Lower: PS/2 keyboard connector
CN5	Power connector
CN7	USB connectors
CN8	Upper: Parallel port Lower left: Serial 1 port Lower right: Serial 2 port
CN10	CPU 2 thermal sensor connector
CN11	CPU 2 fan connector
CN12	LAN jack (RJ45)
CN13	Upper: Line-out port Lower: Audio-in port
CN14	CD-ROM connector
CN15	Mic-in port
CN17	FDD connector
CN22	Reserved
CN23	IDE2 connector
CN28	IDE1 connector

Table 3-1	(continued)	System Board Items
Item	Description	
CN29	Front connector	
CN30	Wake on LAN connector	
CN32	Ultra 160/m SCSI channel A connector	
CN33	Ultra 160/m SCSI channel B connector	
CPU1-2	Two CPU Slot-2 slots	
Fan1-4	Housing fan connectors	
RM1-4	RIMM slots	
JP1	Password setting 1-2: Check password 2-3: Bypass password	
JP2	BIOS settings 1-2: OEM BIOS 2-3: BIOS	
JP4	Flashed BIOS saft 1-2: FWH top lock 2-3: FWH top unlock	,
JP5	System reboot with 1-2: Timeout reboot 2-3: Don't reboot	hen POST timed out
JP6	Onboard buzzer, 1-2: Onboard Buzzer 2-3: External speaker	
JP7	Force CPU to run	at 2 x 133 MHz or 2 x 100
	1-2 : Set by ICH1111 2-3: CPU strap	
JP8	SCSI terminator	for Channel A
	1-2 : SCSI terminator 2-3: SCSI terminator	
JP8X	SCSI terminator	for Channel B

Table 3-1 (continued)System Board Items		System Board Items
Item	Description	
P1,2,3, and 6	32-bit/33-MHz	PCI slots
P4 and 5	64-bit/66-MHz	PCI slots
U4	Intel 82801 chip	eset (ICH)
U9	Intel 82840 chip	set (MCH)
U16	Intel 82559 LAN	N chipset
U37	SMC 47B277 su	per I/O chipset
U48	AD1881 audio	chipset
U63	Adaptec AIC-7	899 chipset
U64	Intel 82806 chip	eset (P64H)

Figure 3-2 shows the parts of the front connector (CN29).

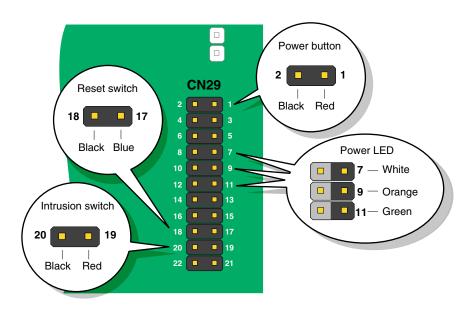


Figure 3-2 Front Connector (CN29)

System Component Installation

The following sections show you how to install system components like the CPU, memory modules, and expansion cards.

ESD Precautions

Always observe the following electrostatic discharge (ESD) precautions before installing a system component:

- 1. Do not remove a component from its antistatic packaging until you are ready to install it.
- 2. Wear a wrist grounding strap before handling electronic components. Wrist grounding straps are available at most electronic component stores.

Installing and Removing the Processor

Note: Observe the ESD precautions when installing or removing a system component. See "ESD Precautions" on page 76.

Each Pentium III Xeon comes in a drop-in SC330 (330-pin slot connector) SECC (Single Edge Contact Connector) package.

The system board supports dual Pentium III Xeon processors running at 733 MHz, 800 MHz, 866 MHz, and 933 MHz with on-die 256 KB L2 cache on a 133-MHz system bus

Installing the Retention Mechanism

The retention mechanism needs to be installed to support and hold the processor in place. To install the retention mechanism, complete the following steps:

1. Attach both of the retention mechanisms with joint bars. Snap in the joint bars on both sides of the retention mechanisms, as shown in Figure 3-3.

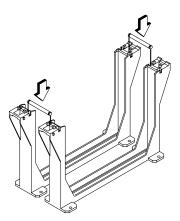


Figure 3-3 Joint Bars

2. Align and insert the metal plate beneath the system board along the Slot 2 retention holes, as shown in Figure 3-4.

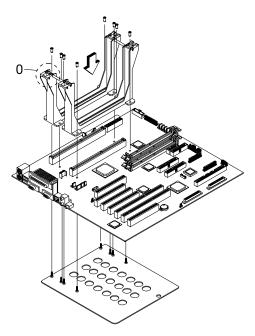


Figure 3-4 Metal Plate

- 3. Insert both of the retention mechanisms into the Slot 2 sockets. Make sure that the shafts of the retention mechanism with O signs are facing the external ports of the system board.
- 4. Secure the retention mechanisms with six screw nuts, three for each retention mechanism.

Installing the Processor

Complete the following steps to install a processor:

1. Attach the fan/heatsink module to the Pentium III Xeon processor and secure it with four screws, as shown in Figure 3-5.

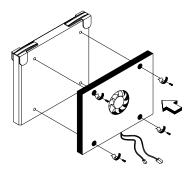


Figure 3-5 Fan/heatsink Module

2. Insert the Pentium III Xeon processor into an empty Slot 2 socket, as shown in Figure 3-6.

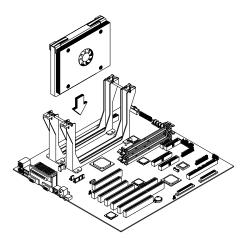


Figure 3-6 Pentium III Xeon Processor

3. Carefully press down the Pentium III Xeon processor until it is properly inserted into the socket.

Note: If it is difficult to insert the processor card into the slot, do not force it. The orientation of the fan/heatsink may be incorrect.

4. Use the retention mechanism cover to secure the processor by pressing it down until it locks with the retention mechanism, as shown in Figure 3-7.

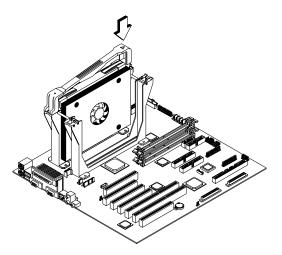


Figure 3-7 Retention Mechanism Cover

The retention mechanism cover only fits one way. Both shafts of the retention mechanism and the retention mechanism cover have O and OO signs. Match the O on the cover with the O on the retention mechanism first, hook them together, insert the OO side to the retention mechanism, and make sure they are clipped.

5. Connect the 3-pin and 2-pin fan/heatsink cables to the system board. See Figure 3-1 on page 72 for the location of the fan/heatsink connectors.

Caution: The heatsink becomes **very** hot when the system is on. NEVER touch the heatsink with any metal or with your hands.

Removing a Processor

Complete the following steps to remove a processor:

- 1. Disconnect the 3-pin and 2-pin fan/heatsink cables from the system board.
- 2. Unclip the retention mechanism cover, as shown in Figure 3-8.

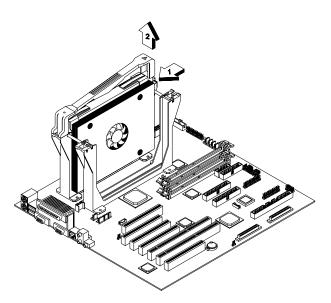


Figure 3-8 Unclipping Retention Mechanism Cover

3. Flip up both plastic ears of the Pentium III Xeon processor, as shown in Figure 3-9. This procedure detaches the processor from the socket.

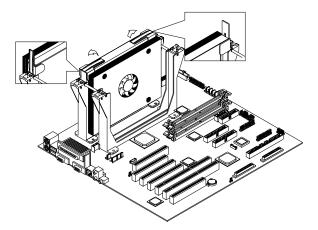


Figure 3-9 Plastic Ears

4. Carefully lift up and remove the Pentium III Xeon processor.

Installing and Removing the Terminator Board

When you are not using a Slot 2 socket, you must install a terminator board into the empty slot.

Complete the following step to install the terminator board:

- 1. Position the terminator board over the empty slot, as shown in Figure 3-10.
- 2. Carefully insert the golden fingers of the terminator board into the slot until the board fits completely.

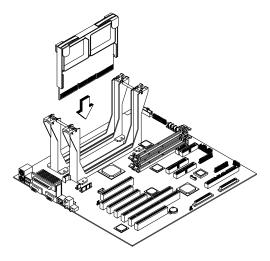


Figure 3-10 Terminator Board

- 3. Use the retention mechanism cover to secure the processor by pressing it down until it locks with the retention mechanism.
- 4. The retention mechanism cover only fits one way. Both shafts of the retention mechanism and the retention mechanism cover have O and OO indicators. Match the O on the cover with the O on the retention mechanism, hook them together, insert the OO side to the retention mechanism, and make sure they are clipped.

Complete the following steps to remove the terminator board:

- 1. Unclip the retention mechanism cover.
- 2. Flip up both plastic ears of the terminator board. This procedure detaches the terminator board from the socket.
- 3. Lift up and remove the terminator board.

Installing and Removing Memory Modules

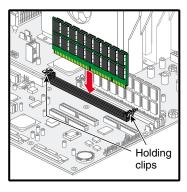
Each of the sockets represents one independent bank. This allows you to install RIMMs with different capacities to form a configuration.

Installing a RIMM

To install a RIMM, align it with the socket and press it down until the holding clips secure the RIMM in place.

Note the following important points about installing RIMMs:

- The RIMM socket is slotted to ensure proper installation. If you slip in a RIMM but it does not completely fit, you may have inserted it the wrong way. Reverse the orientation of the RIMM.
- RIMMs must be installed in pairs.
- The RIMMs shipped with your system are PC800. When adding additional RIMM modules, be sure that they are PC800 as mixing RIMMs will cause your system to default to the slower speed.



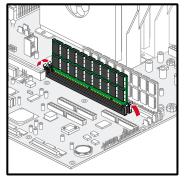


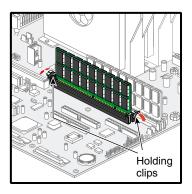
Figure 3-11 Installing a RIMM

Removing a RIMM

To remove a RIMM, press the holding clips on both sides of the socket outward to release the RIMM.

Note: Place your forefingers on the top of the RIMM before you press the holding clips to gently disengage the RIMM from the socket.

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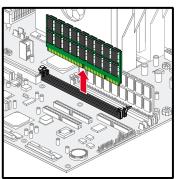


Figure 3-12 Disengaging a RIMM

Installing Expansion Cards

There are three kinds of expansion slots available in this system board. These are 32-bit/33-MHz PCI, 64-bit/66-MHz PCI, and AGP Pro slots. The AGP Pro slot can be used by both high-powered (three-slot wide I/O bracket) and low-powered (two-slot wide I/O bracket) AGP cards.

Complete the following steps to install expansion cards:

- 1. Locate an empty expansion slot on the system board.
- 2. Remove the metal bracket located on the opposite side of the empty expansion slot using a Phillips screwdriver.
- 3. Insert an expansion card into the slot. Make sure that the card is properly seated.
- 4. Secure the card to the housing with a screw.

When you turn on the system, BIOS automatically detects and assigns resources to the new device.

Note: BIOS detects and configures only PnP (Plug n Play) expansion cards.

Error Messages

This section explains the different types of error messages and corresponding corrective measures.

Note: Do not continue using the computer if you receive an error message of any type. Note the message and take corrective action. Ask a qualified technician for assistance.

There are two general types of error messages:

- Software error messages
- System error messages

Software Error Messages

Software error messages are returned by your operating system or application. These messages typically occur after you boot the operating system or when you run your applications. If you receive this type of message, consult your application or operating system manual for help.

System Error Messages

A system error message indicates a problem with the computer itself. A message of this type normally appears during the power-on self-test, before the operating system prompt appears.

 Table 3-2
 System Error Messages

Error Message	Possible Cause and Corrective action
CMOS battery bad	CMOS battery power lost.
	Action: Replace the lithium battery or contact your dealer.
CMOS checksum error	CMOS RAM error.
	Action: Run Setup and reconfigure the system. (To enter the BIOS Setup screen, press CTRL + ALT + ESC during POST. For details about running Setup, see Chapter 4, "Setup Utility".)
CPU clock mismatch	CPU frequency has been changed by the user. Action: When the user changes the CPU frequency, this message appears once and then BIOS adjusts the CPU clock automatically.
Diskette drive controller error or Not installed floppy disk controller Error	This error is caused by one of the following: * Power supply cable is not connected to the diskette drive connector. * The diskette drive cable is not plugged to the diskette drive interface on the system board.
	* The diskette drive controller is defective. Action: Check and connect the floppy cable on both floppy drive and system board ends. If the cable is good and properly connected, the diskette drive controller may be the problem. Change the diskette drive controller or disable the onboard controller by installing another add-on card with a controller.
Diskette drive A error	Diskette drive A or B may be bad.
Diskette drive B error	Action: Check the floppy drive cable connections. If the diskette drive is connected properly, then replace the diskette drive.

Table 3-2 (continued)	System Error Messages
Error Message	Possible Cause and Corrective action
Diskette drive A type mismatch floppy drive A error Diskette drive B type mismatch floppy drive B error	The floppy drive does not support the type indicated in the BIOS Setup configuration. Action: Run Setup and select the proper floppy drive type. (To enter the BIOS Setup screen, press CTRL + ALT + ESC during POST.)
ECC facility fail	RIMM might be bad.
	Action: Replace the RDRAM chips or the RIMMs.
Equipment configuration error	The hardware configuration does not match the Setup configuration data.
	Action: Run Setup and configure the system. (To enter the BIOS Setup screen, press CTRL + ALT + ESC during POST.)
Expansion ROM allocation failed	The I/O expansion ROM fails to allocate for the PCI device.
	Action: Change the I/O expansion ROM address.
IDE drive 0 error IDE drive 1 error	The IDE drive may be bad, type mismatched, or not properly installed.
	Action: Replace the disk drive or the hard disk drive controller. Check the HDD cable connections and BIOS Setup configuration.
IDE drive 0/1 auto detection failed	The hard disk drive may be bad, or not compatible with IDE industrial specification.
	Action: Replace the disk drive or the hard disk drive controller. Check the HDD cable connections and BIOS Setup* configuration
IRQ setting error	Wrong IRQ setting for the PCI device.
	Action: Run Setup to make sure there is no IRQ device conflict. (To enter the BIOS Setup screen, press CTRL + ALT + ESC during POST.)

Table 3-2 (continued)	System Error Messages
Error Message	Possible Cause and Corrective action
Insert system diskette and press the Enter key to reboot	A non-bootable diskette is detected on the diskette drive when the system boots. Action: Insert a bootable disk in the diskette drive or remove this disk if a hard disk drive is installed
I/O parity error	The I/O access is not correct. Action: Check all I/O related circuits (i.e. system I/O controller, memory controller, interrupt controller, DMA controller, and so on.)
Keyboard error or no keyboard connected	POST detects an error in the keyboard or the keyboard is not connected. Action: Reconnect or replace the keyboard.
Keyboard interface error	POST detects an error in the interface between the system board and the keyboard. The keyboard circuit module may be defective. Action: Check the keyboard interface circuit or change the keyboard.
Keyboard locked	The keyboard lock feature prevents any access to the keyboard. Action: Unlock the keyboard.
Pointing device error	The pointing device installed may be bad or the device is not properly connected. Action: Reconnect or replace the pointing device.
Pointing device interface error	POST detects an error in the interface between the system board and the pointing device. Action: Check the keyboard interface circuit or run Setup and check pointing device. (To enter the BIOS Setup screen, press CTRL + ALT + ESC during POST.)

Table 3-2 (continued)	System Error Messages
Error Message	Possible Cause and Corrective action
Pointing device IRQ conflict	The same IRQ address was assigned to an add-on card and an onboard pointing device.
	Action: Run Setup and change the IRQ setting of the pointing device or the add-on card. (To enter the BIOS Setup screen, press CTRL + ALT + ESC during POST.)
Press Ctrl + Alt + Esc to enter Setup or F1 key to continue	A system configuration error is detected, or the hardware configuration does not match the Setup configuration data in CMOS. Action: Run Setup. (To enter the BIOS Setup screen, press CTRL + ALT + ESC during POST.)
Press 1 key to enter Setup or other key to continue	This message appears on the screen when a terminal instead of a console monitor is installed. Action: Press 1 to enter Setup and check the configuration. Pressing any other key prevents entering Setup.
Press Esc to turn off	A non-maskable interrupt (NMI) occurs.
NMI, or any key to reboot	Action: Press Esc to reject NMI error or press any other key to reboot the system.
Memory error at: MMMM:SSSS:OOO	RDRAM, RIMM, or add-on memory card may be defective.
(W:XXXX, R:YYYY) where: M: MB, S: Segment, O: Offset, X/Y: write/read pattern	Action: Replace the RDRAM chips or the RIMMs.
NVRAM checksum error	The NVRAM in the EISA model contains EISA configuration information. Accidental data writes in the NVRAM area causes an error. POST detects the error and displays the corresponding error message.

Table 3-2 (continued)	System Error Messages	
Error Message	Possible Cause and Corrective action	
Onboard serial port 1 conflict(s)	Onboard serial port address conflicts with the add-on card serial port.	
Onboard serial port 2 conflict(s)	Action: Change the onboard serial port address in Setup or change the add-on card serial port address. (To enter the BIOS Setup screen, press CTRL + ALT + ESC during POST.)	
Onboard parallel port conflict(s)	Onboard parallel port address conflicts with the add-on card parallel port.	
	Action: Change the onboard parallel port address in Setup or change the add-on card parallel port address. (To enter the BIOS Setup screen, press CTRL + ALT + ESC during POST.)	
Onboard xxx conflict(s)	Onboard device resources (for example, IRQ, DMA, I/O address) conflict.	
	Action: Try to reassign or disable onboard device resources.	
PCI device error	PCI device may be bad.	
	Action: Check the PCI card. Replace it if it is bad.	
Real-time clock (RTC)	POST detects a real-time clock error.	
Error	Action: Check RTC circuit or replace the RTC.	
RAM parity error	RDRAM chips, RIMMs, or add-on memory card may be defective.	
	Action: Replace the RDRAM chips or RIMMs, or disable parity check in Setup if the model supports it.	
System management memory bad	System management memory (SMM) is bad. May be caused by system green malfunction.	
	Action: Replace the RDRAM chips or RIMMs.	
System resource conflict	Some system resource conflicts with the resources required by the PCI devices.	
	Action: Run Setup to reconfigure the system. (To enter the BIOS Setup screen, press CTRL + ALT + ESC during POST.)	

As a general rule, if an error message says "Press F1 to continue" it is caused by a configuration problem, which can be easily corrected. An equipment malfunction is more likely to cause a fatal error, i.e., an error that causes complete system failure.

Following are some corrective measures for error conditions:

- 1. Run Setup. You must know the correct configuration values for your system before you enter Setup, which is why you should write them down when the system is correctly configured. An incorrect configuration is a major cause of power-on error messages, especially for a new system.
- 2. Remove the system unit cover. Check that the jumpers on the system board and any expansion boards are set correctly.
- 3. If you cannot access a new disk, it may be because your disk is not properly formatted. Format the disk first using the FDISK and FORMAT commands.
- 4. Check that all connectors and boards are securely plugged in.

If you go through these corrective steps and still receive an error message, the cause may be an equipment malfunction.

If you are sure that your configuration values are correct and your battery is in good condition, the problem may be a damaged or defective chip.

In either case, contact an authorized service center for assistance.

The BIOS Utility allows you to view your system's configuration settings. Most systems are already configured by the manufacturer or the dealer. There is no need to run Setup when starting the computer unless you receive a Run Setup message.

The Setup program loads configuration values into the battery-backed nonvolatile memory called CMOS RAM. This memory area is not part of the system RAM.

Note: If you repeatedly receive Run Setup messages, the battery may be bad. In this case, the system cannot retain configuration values in CMOS. Ask a qualified technician for assistance.

Chapter 4

Setup Utility

This chapter gives information about the system BIOS and tells how to configure the system by changing the settings of the BIOS parameters.

Introduction

Most systems are already configured by the manufacturer or the dealer. There is no need to run Setup when starting the computer unless you get a Run Setup message.

The Setup program loads configuration values into the battery-backed nonvolatile memory called CMOS RAM. This memory area is not part of the system RAM.

Note: If you repeatedly receive Run Setup messages, the battery may be bad. In this case, the system cannot retain configuration values in CMOS. Ask a qualified technician for assistance.

Before you run Setup, make sure that you have saved all open files. The system reboots immediately after you exit Setup.

Entering Setup

To enter Setup, go to the BIOS screen and simultaneously press the key combination Ctrl+Alt+Esc.

Note: You must press Ctrl+Alt+Esc while the system is booting. This key combination does not work during any other time.

The system supports two Setup Utility levels: Basic and Advanced. Figure 4-1 shows the Basic Setup Utility screen, and Figure 4-2 shows the Advanced Setup Utility screen.

If you are an advanced user, you may want to check the detailed configuration of your system. Detailed system configurations are contained in the Advanced Level. To view the Advanced Level, press F8.

Use the Up and Down arrow keys to move around the Setup Utility screen.

Use the Page Up and Page Down keys to move to the next page or to return to the previous page if the setup screen has more than one page available.

Use the Left and Right arrow, +, or - keys to select the options if they are available.

Press Esc to return to the Main menu.

Note: A parameter with an asterisk (*) mark indicates that the parameter appears only when you are in the Advanced Level. Also, grayed items on the screens have fixed settings and are not user-configurable.

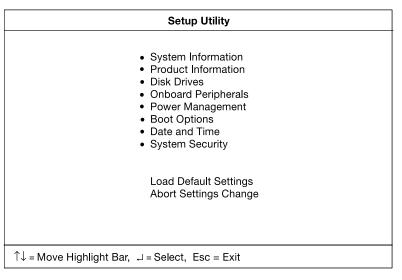


Figure 4-1 Basic Setup Utility Screen

Setup Utility • System Information • Product Information • Disk Drives • Onboard Peripherals • Power Management • Boot Options • Date and Time • System Security • Advanced Options Load Default Settings Abort Settings Change

Figure 4-2 Advanced Setup Utility screen

System Information Screen

The screen in Figure 4-3 appears if you select System Information from the Main menu:

Processor	Pentium [®] III Xeon [™]
Processor Speed	733 MHz
evel 1 Cache Size	
evel 2 Cache Size	•
Floppy Drive A	•
Floppy Drive B	
DE Primary Channel Master	Hard Disk, xxxxMB
DE Primary Channel Slave	None
DE Secondary Channel Master	
DE Secondary Channel Slave	None
Total Memory	128 MB
1st Bank	RDRAM, 64 MB
2nd Bank	RDRAM, 64 MB
3rd Bank	SDRAM, 64 MB
4th Bank	None
Serial Port 1	3F8h, IRQ 4
Serial Port 2	2F8h, IRQ 3
Parallel Port	2F8h, IRQ 3
PS/2 Mouse	Installed
PgDn/PgUp = Move Screen, Esc = Ba	

Figure 4-3 System Information Screen

Table 4-1 describes the parameters of the System Information Screen.

Table 4-1 System Information Screen Parameters

Parameter	Description
Processor	Type of processor currently installed in your system.
Processor speed	Clock speed of the processor currently installed in your system.

 Table 4-1 (continued)
 System Information Screen Parameters

Parameter	Description
Level 1 cache	Total amount of first-level or the internal fast-accessed memory size (i.e., the memory integrated into the CPU).
Level 2 cache	Total amount of second-level cache memory size that comes with the CPU. The available cache size is 256/512 KB.
Floppy drive A	System's current diskette drive A settings.
Floppy drive B	System's current diskette drive B settings.
IDE primary channel master	Current configuration of the IDE device connected to the master port of the primary IDE channel.
IDE primary channel slave	Current configuration of the IDE device connected to the slave port of the primary IDE channel.
IDE secondary channel master	Current configuration of the IDE device connected to the master port of the secondary IDE channel.
IDE secondary channel slave	Current configuration of the IDE device connected to the slave port of the secondary IDE channel.
Total memory	Total amount of onboard memory. The memory size is automatically detected by BIOS during the POST. If you install additional memory, the system automatically adjusts this parameter to display the new memory size.
1st/2nd/3rd/4th bank	Type and size of RDRAM installed in RIMM sockets 1, 2, 3, and 4 respectively. The None setting indicates that there is no RDRAM installed.
Serial port 1	Serial port 1 address and IRQ setting.
Serial port 2	Serial port 2 address and IRQ setting.

Table 4-1 (continued) System Information Screen Parameters

Parameter	Description
Parallel port	Parallel port address and IRQ setting.
PS/2 mouse	Pointing device installation settings. Displays None if no pointing device is installed.

Product Information Screen

Figure 4-4 shows the Product Information screen, which contains the general data about the system, such as the product name, serial number, BIOS version, and so on. This information is necessary for troubleshooting and may be required when asking for technical support.

Product Information		
Product Name	xxxxxxxxxxxxxxxxxxxxxxxx	
Esc = Back to Main Menu	F1 = Help	

Figure 4-4 Product Information Screen

Figure 4-4 describes the screen's parameters.

 Table 4-2
 Product Information Parameters

Parameter	Description
Product name	Official name of the system
System S/N	System's serial number
Main board ID	Main board's identification number
Main board S/N	Main board's serial number
System BIOS version	Version of the BIOS utility
SMBIOS version	Version of the SMBIOS

Disk Drives Screen

Select Disk Drives to input configuration values for disk drives. Figure 4-5 shows the Disk Drives menu:

Disk Drives		
Floppy Drive AFloppy Drive B		
IDE Primary Channel Master IDE Primary Channel Slave IDE Secondary Channel Master IDE Secondary Channel Slave		
↑↓ = Move Highlight Bar Esc = Exit	F1 = Help →← = Change Setting	

Figure 4-5 Disk Drives Menu

Table 4-3 describes the parameters in this screen.

 Table 4-3
 Disk Drive Parameters

Parameter	Description	Option
Floppy drive A and B	Selects the floppy disk drive type.	1.44 MB, 3.5-inch None 360 KB, 5.25-inch 1.2 MB, 5.25-inch 720 KB, 3.5-inch 2.88 MB, 3.5-inch
IDE primary channel master and slave	This item lets you select the IDE hard disk parameters that your system supports. Auto enables BIOS to automatically detect the parameters of installed HDD during the POST (power-on self-test). If you prefer to enter HDD parameters manually, select User. Select None if no HDD is connected to the system.	Auto User None
IDE Secondary channel master and slave	The IDE CD-ROM is always automatically detected	

IDE Channel Type Screen

The screen in Figure 4-6 appears if you select any of the IDE Drive parameters:

IDE Primary/Secondary Channel Master/Slave		
Device Detection Mode Device Type	[Auto] Hard Disk	
Cylinder Head Sector Size	[xxxx] [xxxx]	
Hard Disk LBA Mode *Hard Disk Block Mode* *Hard Disk 32 bit Access* *Advanced PIO Mode* *DMA Transfer Mode*	[Auto] [Auto] [Auto]	
↑↓ = Move Highlight Bar Esc = Exit	F1 = Help →← = Change Setting	

Figure 4-6 IDE Drive Screen

Note: The parameters with an asterisk (*) before them only appear in the IDE Primary Channel Master screen.

Table 4-4 describes the screen's parameters.

 Table 4-4
 IDE Drive Parameters

Parameter	Description	Option
Device detection mode	Lets you specify the type of hard disk installed in your system. If you want BIOS to automatically configure your hard disk, select Auto. If you know your hard disk type, you can enter the setting manually.	Auto User None
Type	Indicates a hard disk type device.	Usarinnut
Cylinder	Specifies the number of cylinders of your hard disk, and is automatically set depending on your Type parameter setting.	User input

Table 4-4 (continued)	IDE Drive Parameters
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Parameter	Description	Option
Head	Specifies the number of heads of your hard disk, and is automatically set depending on your Type parameter setting.	User input
Sector	Specifies the number of sectors of your hard disk, and is automatically set depending on your Type parameter setting.	User input
Size	Specifies the size of your hard disk, in MB.	User input
Hard disk LBA mode	This enhanced IDE feature allows the system to use a hard disk with a capacity of more than 528 MB. This is made possible through Logical Block Address (LBA) mode translation. LBA is now considered a standard feature of current IDE hard disks on the market because of its capability to support capacities larger than 528MB. Note that if your HDD is formatted with LBA On, it will not be able to boot with LBA Off.	Auto Normal LBA Large
Hard disk block mode	Enhances disk performance depending on the hard disk in use. If you set this parameter to Auto, the BIOS utility automatically detects if the installed hard disk drive supports the Block Mode function. If supported, it allows data transfer in blocks (multiple sectors) at a rate of 256 bytes per cycle.	Auto Disabled
Hard disk 32 bit access	Improves system performance by allowing use of the 32-bit hard disk access. This enhanced IDE feature works only under DOS, Windows 3.x, Windows 95, Windows NT, and Novell NetWare. If your software or hard disk does not support this function, set this parameter to Disabled.	Enabled Disabled

 Table 4-4 (continued)
 IDE Drive Parameters

Parameter	Description	Option
Advanced PIO mode	When set to Auto, the BIOS utility automatically detects if the installed hard disk supports the function. If supported, it allows for faster data recovery and read/write timing that reduces hard disk activity time. This results in better hard disk performance.	Auto Disabled
DMA transfer mode	The Ultra DMA and Multi-DMA modes enhance hard disk performance by increasing the transfer rate. However, besides enabling these features in the BIOS Setup, both the Ultra DMA and Multi-DMA modes require the DMA driver to be loaded. By setting this parameter to Auto, BIOS automatically sets the appropriate DMA mode for your hard disk.	Auto Disabled

Onboard Peripherals Screen

Figure 4-7 shows the Onboard Peripherals screen, which allows you to configure the onboard communication ports and the onboard devices.

Onboard Peripherals	
Serial Port 1	[Enabled]
Base Address	[3F8h]
IRQ	[4]
Serial Port 2	[Enabled]
Base Address	[2F8h]
IRQ	[3]
Parallel Port	[Enabled]
Base Address	[378h]
IRQ	[7]
Operation Mode	[Bi-directional]
ECP DMA Channel	[-]
Floppy Disk Controller	[Enabled]
IDE Controller	[Both]
PS/2 Mouse Controller	[Enabled]
USB Host Controller	[Enabled]
USB Legacy Mode	[Disabled]
	[Enabled]
Onboard Ethernet Chip	[Enabled]
	[Enabled]
↑↓ = Move Highlight Bar	F1 = Help
Fsc = Fxit	•
ESC = EXIL	→ = Change Setting

Figure 4-7 Onboard Peripherals Screen

Table 4-5 following table describes the parameters in this screen.

 Table 4-5
 Onboard Peripherals Parameters

Parameter	Description	Option
Serial port 1 and 2	Enables or disables the serial port.	Enabled Disabled
Base address	Sets the I/O base address of the serial port.	3F8h 2F8h 3E8h 2E8h

 Table 4-5 (continued)
 Onboard Peripherals Parameters

Parameter	Description	Option
IRQ	Sets the IRQ (interrupt request) channel of the serial port.	4 11
Parallel port	Enables or disables the parallel port.	Enabled Disabled
Base address	Sets the I/O base address of the parallel port.	378h 278h 3BCh
IRQ	Sets the interrupt request (IRQ) channel of the parallel port. Note: If you install an add-on card that has a parallel port whose address conflicts with the onboard parallel port, a warning appears on the screen. Check the parallel port address of the add-on card and change the address to one that does not conflict.	7 5
Operation mode	Selects the operation mode of the parallel port. Standard Parallel Port (Standard) allows normal speed one-way operation. Standard and Bidirectional (Bidirectional) allows normal speed operation in a two-way mode. Enhanced Parallel Port (EPP) allows bidirectional parallel port operation at maximum speed. Extended Capabilities Port (ECP) allows parallel port to operate in bidirectional mode and at a speed higher than the maximum data transfer rate.	Bi-directional EPP ECP Standard

 Table 4-5 (continued)
 Onboard Peripherals Parameters

Parameter	Description	Option
ECP DMA channel	Sets the DMA channel of the parallel port when the parallel operation mode is set to ECP.	1 3
Floppy disk controller	Sets the control level of the diskette drive.	Normal Disabled Write protect all sectors Write protect boot sector
IDE controller	Sets the control level of the diskette drive.	Normal Disabled Write protect all sectors Write protect boot sector
PS/2 mouse controller	Enables or disables the onboard PS/2 mouse controller.	Enabled Disabled
USB host controller	Enables or disables the USB controller on board.	Enabled Disabled
USB legacy mode	When enabled, allows you to use a USB keyboard in DOS. Set this to Disabled to deactivate the USB keyboard function in DOS.	Disabled Enabled
Onboard SCSI	Enables or disables the onboard SCSI feature.	Enabled Disabled
Onboard ethernet chip	Enables or disables the onboard network feature.	Enabled Disabled
Onboard audio clip	Enables and disables the onboard audio.	Enabled Disabled

Power Management Screen

The Power Management screen allows you to configure the system power-management feature. Figure 4-8 shows the Power Management parameters and their default settings:

Power Management		
Power Mangement Mode IDE Hard Disk Standby Timer System Sleep Timer Sleep Mode	[Off] Minute(s)	
Power Switch <4 sec	[Power Off]	
System wake-up event Modem Ring Indicator PCI Power Management RTC Alarm Resume Day Resume Time	[Enabled] [Disabled] []	
↑↓ = Move Highlight Bar Esc = Exit	F1 = Help →← = Change Setting	

Figure 4-8 Power Management Screen

Table 4-6 describes the parameters in this screen.

 Table 4-6
 Power Management Parameters

Parameter	Description	Option
Power management mode	Allows you to reduce power consumption. When this parameter is set to Enabled, you can configure the IDE hard disk and system timers. Setting it to Disabled deactivates the power-management feature and its timers.	Enabled Disabled
IDE hard disk standby timer	Allows the hard disk to enter standby mode after inactivity of 1 to 15 minutes, depending on your setting. When you access the hard disk again, allow 3 to 5 seconds (depending on the hard disk) for the disk to return to normal speed. Set this parameter to OFF if your hard disk does not support this function.	Off 1 minute 15 minutes
System sleep timer	This parameter sets the system to the lowest power-saving mode after a specified period of inactivity. Any keyboard or mouse action or any activity detected from the IRQ channels resumes system operation.	Off On
Sleep mode	Lets you specify the power-saving mode that the system will enter after a specified period of inactivity. This parameter becomes configurable only if the System Sleep Timer is on. Any keyboard or mouse action, or any enabled monitored activities occurring through the IRQ channels resume system operation.	Standby Suspend

 Table 4-6 (continued)
 Power Management Parameters

Parameter	Description	Option
Power switch < 4 sec.	When set to Power Off, the system automatically turns off when the power switch is pressed for less than 4 seconds. When set to Suspend, the system enters the suspend mode when pressed for less than 4 seconds.	Suspend Power off
System wake-up event	The system wake-up event allows the system to resume operation when the modem ring indicator is enabled.	
Modem ring indicator	When Enabled, any fax/modem activity wakes up the system from suspend mode.	Enabled Disabled
PCI power management	Enables or disabled the PCI power management function.	Enabled Disabled
RTC alarm	Allows you to set a certain time on a certain day to wake up your system from suspend mode.	Disabled Enabled
Resume day	If RTC alarm is enabled, the system will resume operation on the day indicated here.	User input
Resume time	If RTC alarm is enabled, the system will resume operation on the time indicated here.	User input

Boot Options Screen

The Boot Options Screen allows you to specify your preferred setting for bootup. The screen in Figure 4-9 appears if you select Boot Options from the Basic Configuration menu.

Boot	Options
Boot Sequence 1st [Floppy Disk] 2nd [Hard Disk] 3rd [IDE CD-ROM]	
Silent BootNum Lock After Boot Memory Test	[Disabled] [Enabled] [Enabled] [Enabled]
Update BIOS with Boot Block	[Disabled]
↑↓ = Move Highlight Bar Esc = Exit	F1 = Help →← = Change Setting

Figure 4-9 Boot Options Screen

Note: The parameter with an asterisk (*) only displays in the IDE Primary Channel Master screen.

The following table describes the parameters in this screen.

Table 4-7Boot Option Parameters

Parameter	Description	Option
Boot Sequence	This parameter allows you to specify the boot search sequence during POST.	
	1st . The system checks this drive first.	
	2nd . The system then checks this drive if it can not boot from the 1st specified drive.	
	3rd . If the 1st and 2nd searches fail then it boots from this drive.	
	BIOS will display an error message if the drive(s) specified is not bootable.	
Fast boot	Allows the system to boot faster by skipping some POST routines.	Disabled Enabled
Silent boot	Enables or disables the Silent Boot function. When set to Enabled, BIOS is in graphical mode and displays only an identification logo during POST and while booting. After booting, the screen displays the operating system prompt (such as DOS) or logo (such as Windows 95). If any error occurs while booting, the system automatically switches to the text mode.	Enabled Disabled
	Even if your setting is Enabled, you may also switch to the text mode while booting by pressing the Delete key when you see the "Press DELETE key to enter setup" message on the screen.	
	When set to Disabled, BIOS is in the conventional text mode where you see the system initialization details on the screen.	
Num lock after boot	Allows you to activate the Num Lock function upon booting.	Enabled Disabled

 Table 4-7 (continued)
 Boot Option Parameters

Parameter	Description	Option
Memory test	When set to Enabled, this parameter allows the system to perform a RAM test during the POST routine. When set to Disabled, the system detects only the memory size and bypasses the test routine.	Enabled Disabled
Configuration table	Allows you to enable or disable the appearance of the configuration table after POST but before booting. The configuration table gives a summary of the hardware devices and settings that BIOS detected during POST.	Enabled Disabled
Update BIOS with boot block	When enabled, it automatically flashes the BIOS file from the hard disk drive in case the system fails to boot up.	Disabled Enabled

Date and Time Screen

The real-time clock keeps the system date and time. After setting the date and time, you do not need to enter them every time you turn on the system. As long as the internal battery remains good (approximately seven years) and connected, the clock continues to keep the date and time accurately even when the power is off.

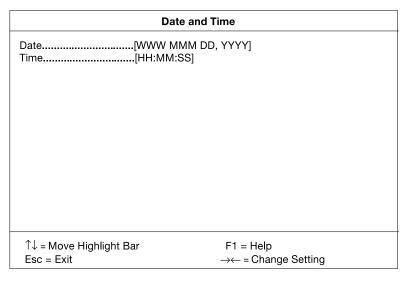


Figure 4-10 Date and Time Screen

Table 4-8 describes the screen's parameters.

Table 4-8Date and Time Parameters

Parameter	Description
Date	Set the date following the weekday-month-day-year format. Valid values for weekday, month, day, and year are:
	Weekday: Sun, Mon, Tue, Wed, Thu, Fri, Sat
	Month: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
	Day: 1 to 31
	Year: 1980 to 2079
Time	Set the time following the hour-minute-second format. Valid values for hour, minute, and second are:
	Hour: 00 to 23
	Minute: 00 to 59
	Second: 00 to 59

System Security Screen

The Setup program has a number of security features to prevent unauthorized access to the system and its data. The screen in Figure 4-1 appears if you select System Security from the Main menu.

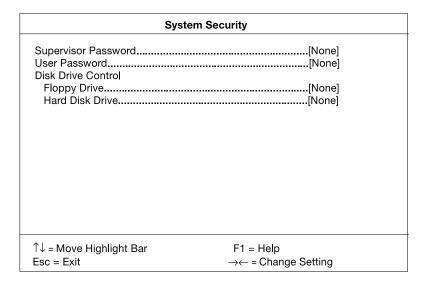


Figure 4-11 System Security Screen

Supervisor Password

The Supervisor Password prevents unauthorized access to the BIOS utility.

Setting and Changing Password

Complete the following steps to set or change a Password:

1. Make sure that JP1 is set to 2-3 (bypass password).

Note: You cannot enter the BIOS utility if a Setup password does not exist and JP2 is set to 1-2 (Password check enabled). By default, JP1 is set to 2-3 (Bypass password).

2. Enable the Supervisor Password parameter in the System Security menu by pressing the left or right arrow keys. The Supervisor Password screen in Figure 4-12 appears:

Supervisor Password	
Enter your Password twice. The Password be up to 7 characters long.	ord may
Enter PasswordEnter Password again	
Set or Change Password	
↑↓ = Move Highlight Bar Esc = Exit	F1 = Help →← = Change Setting

Figure 4-12 Supervisor Password Screen

- 3. Type a password in the Enter Password field. The password may consist of up to seven characters.
- 4. Press the Enter key. Retype your password in the Enter Password again field to verify your first entry.
- 5. Highlight Set or Change Password and press the Enter key.
- 6. Press the Esc key to return to the System Security menu and then press the Esc key again to exit Setup. The Exit Setup screen appears:

Settings have been changed.
Do you want to save to CMOS settings?

[Yes] [No]

7. Choose Yes to save your settings and exit the Setup Utility. Your password will be saved to CMOS.

For the password to take effect, you must set jumper JP1 to 1-2 (Check password), as follows:

- 1. Turn off and unplug the computer.
- 2. Open the computer housing and set JP1 to 1-2 (Check password) to check the password function.
- 3. Close your computer's housing and reboot your system.

The next time you want to enter the BIOS utility, you must key in your Setup password.

Removing a Password

To remove your Supervisor password, complete the following steps:

- 1. Disable the Supervisor Password parameter in the System Security menu by pressing the left or right arrow key to select None.
- 2. Press the Esc key to return to the System Security menu and then press the Esc key again to exit Setup. The Exit Setup screen appears:

Settings have been changed. Do you want to save to CMOS settings? [Yes] [No]

Choose Yes to save your settings and exit Setup Utility. Your previous password will be removed from CMOS.

Note: Remember to set JP1 to 2-3 (Bypass password) because you won't be able to access Setup Utility if a password does not exist and JP1 is set to 1-2 (Check password).

Bypassing a Supervisor Password

If you forget your Supervisor password, follow these steps to bypass the password security feature by hardware:

- 1. Turn off and unplug the computer.
- 2. Open the computer housing and set JP1 to 2-3 (Bypass password) to bypass the password function.
- 3. Turn on the system and enter the BIOS utility. This time, the system does not require you to type in a password.

Note: You can either change the existing Setup password or remove it by selecting None.

User Password

The User Password secures your system against unauthorized use. Once you set this password, you have to type it whenever you boot the system. To set this password, enter the Setup Utility, select System Security, and then highlight the User Password parameter. Follow the procedure in the "Supervisor Password" on page 115. Figure 4-13 shows the User Password screen.

Note: Be sure to set JP2 to 1-2 to enable the User password.

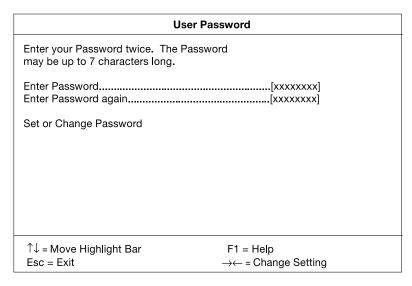


Figure 4-13 User Password Screen

Processor Serial Number

The Pentium III processor incorporates an individual serial number in each chip that can identify individual CPUs. When Enabled, CPUs can be identified by processor serial number. Disable this parameter to deactivate this feature.

Advanced Options Screen

The Advanced Options configuration screen allows you to configure the system memory, PCI device settings, and CPU frequency.

Press F8 to access this screen.

Note: To avoid damaging the system, do not change any settings in the Advanced Options if you are not a qualified technician.

Figure 4-14 shows the Advanced Options screen.

Advance Options • Memory/Cache Options • PnP/PCI Options • CPU Frequency ↑↓ = Move Highlight Bar, ↓ = Select, Esc = Exit

Figure 4-14 Advanced Options Screen

Memory/Cache Options

The Memory/Cache Options menu allows you to configure the advanced system memory functions.

Settings have been changed.
Do you want to save to CMOS settings?
[Yes] [No]

Table 4-9 describes the memory/cache option parameters.

 Table 4-9
 Memory/Cache Option Parameters

Parameter	Description	Option
Level 1 cache (CPU cache)	This parameter enables or disables the first-level or internal memory, that is, the memory integrated into the CPU	Enabled Disabled
Level 2 cache	This parameter enables or disables the second-level cache memory. The second-level cache is incorporated in the CPU module	Enabled Disabled
Memory at 15MB-16MB reserved for	To prevent memory address conflicts between the system and expansion boards, reserve this memory range for the use of either the system or an expansion board	System Expansion board
Memory parity mode	Enables or disables the ECC (Error Checking and Correction) feature. The ECC feature enables BIOS to detect and correct data errors. Disable this parameter if you want to disregard the function.	ECC+scrubb ing

PnP/PCI Options

The PnP/PCI Options menu allows you to specify the settings for your PCI devices. Selecting this option displays the following screen:

Do you want to load default settings? [Yes] [No]

Table 4-10 describes the PnP/PCI option parameters

Table 4-10PnP/PCI Option Parameters

Parameter	Description	Option
PCI IRQ sharing	Select Auto to let BIOS automatically configure the plug-and-play (PnP) devices installed on your system. Otherwise, select Manual. Note: See your manual for technical	Auto Manual
	information about the PCI card.	
Onboard SCSI	Allows you to manually assign the interrupt for the onboard SCSI when the PCI IRQ Setting parameter is set to Manual. This parameter is grayed and not user-configurable when the PCI IRQ Setting is set to Auto.	User input
Onboard LAN	When you set the PCI IRQ Setting parameter to Auto, this parameter specifies the auto-assigned interrupt for the onboard LAN. If you set the PCI IRQ Setting parameter to Manual, you need to specify the interrupt that you want to assign for the onboard LAN installed in your system.	User input
AGP	This item shows the assigned interrupt for the onboard accelerated graphics port (AGP) controller	User input
PCI IRQ sharing	Setting this parameter to Yes allows you to assign the same IRQ to two different devices. To disable the feature, select No. Note: If there are no IRQs available to assign for the remaining device function, You should enable this parameter	Yes No

 Table 4-10 (continued)
 PnP/PCI Option Parameters

Parameter	Description	Option
VGA palette snoop	This parameter permits you to use the palette snooping feature if you installed more than one VGA card in the system.	Disabled Enabled
	The VGA palette snoop function allows the control palette register (CPR) to manage and update the VGA RAMDAC (Digital Analog Converter, a color data storage) of each VGA card installed in the system. The snooping process lets the CPR send a signal to all the VGA cards so that they can update their individual RAMDACs. The signal goes through the cards continuously until all RAMDAC data has been updated. This allows the display of multiple images on the screen.	
	Note: Some VGA cards have required settings for this feature. Check your VGA card manual before setting this parameter.	
Graphics aperture size	This parameter determines the effective size of the graphics aperture. Graphics aperture is the address range that the AGP video and the CPU use to manage graphical objects. The lowest setting is 8 MB and the highest is 256 MB.	User input

Table 4-10 (continued) PnP/PCI Option Parameters

Parameter	Description	Option
Plug and play OS When this parameter is set to Yes, BIOS initializes only PnP boot devices such as SCSI cards. When set to No, BIOS initializes all PnP boot and non-boot devices such as sound cards. Note: Set this parameter to Yes only if your operating system is Windows 95/98 or 2000.	Yes No	
	your operating system is Windows 95/98	
Reset resource assignments	Set this parameter to Yes to avoid IRQ conflict when installing non-PnP or PnP ISA cards. This clears all resource assignments and allows BIOS to reassign resources to all installed PnP devices the next time the system boots. After clearing the resource data, the parameter resets to No.	No Yes

Load Default Settings Option

Use this option to load the default settings for the optimized system configuration. When you load the default settings, some of the parameters are grayed-out with their fixed settings. These grayed parameters are not user-configurable.

The following dialog box appears when you select Load Default Settings from the main menu.

Do you want to load default settings? [Yes] [No]

Select Yes to load the default settings. Select No to ignore the message and return to the BIOS utility.

Abort Settings Change Option

Use this option to disregard your changes to the BIOS and reload your previous settings. The following dialog box appears when you select Abort Settings Change from the main menu:

Do you want to abort settings change?
[Yes] [No]

Select Yes to disregard your changes and reload your previous settings. After reload, the main menu appears on screen. Select No to ignore the message and return to the BIOS utility.

Exit Setup

Examine the system configuration values. When you are satisfied that all the values are correct, write them down. Store the recorded values in a safe place. In the future, if the battery loses power or the CMOS chip is damaged, you will know what values to enter when you rerun Setup.

Press the Esc key to leave the Setup Utility. The following dialog box appears:

Do you really want to exit SETUP?
[Yes] [No]

Use the arrow keys to select your response, and press the Enter key.

If you made any changes to the Setup Utility, the following dialog box appears:

Settings have been changed.
Do you want to save to CMOS settings?
[Yes] [No]

Use the arrow keys to select your response. Select Yes to save the changes in CMOS. Select No to retain the old configuration values. Press the Enter key to exit.

Connector Pinouts

This Appendix contains port pinout information for the following Silicon Graphics 550 Visual Workstation ports:

- Keyboard Port
- Mouse Port
- Video-Out Ports
 - DB15 HD Port
- Serial Ports
- Parallel Port
- USB Ports
- Ethernet Port
- Audio Ports
 - Mic-In Port
 - Line-In and Line-Out Ports

Keyboard Port

The Silicon Graphics 550 Visual Workstation uses a standard PS/2 keyboard port, as shown in Figure A-1.

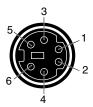


Figure A-1 Keyboard Port Pinout

Table A-1 shows the cable pinout assignments for the keyboard port.

Table A-1Keyboard Port Pinout

Pin	Assignment
1	Keyboard Data
2	(Reserved)
3	Ground
4	Keyboard Power (+5V)
5	Keyboard Clock
6	(Reserved)

Mouse Port

The Silicon Graphics 550 Visual Workstation uses a standard PS/2 mouse port, as shown in Figure A-2.

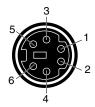


Figure A-2 Mouse Port Pinout

Table A-2 shows the cable pinout assignments for the mouse port.

Table A-2Mouse Port Pinout

Pin	Assignment
1	Mouse Data
2	(Reserved)
3	Ground
4	Mouse Power (+5V)
5	Mouse Clock
6	(Reserved)

Video-Out Ports

The Silicon Graphics 550 Visual Workstation comes with an DB15 HD video port, an S-Video port and a DVI-D port.

DB15 HD Port

Figure A-3 shows the DB15 HD port.



Figure A-3 DB15 HD Port Pinout

Table A-3 shows the port pinout assignments for the DB15 HD port.

Table A-3DB15 HD Port Pinout

Pin	Assignment	Pin	Assignment
1	Red	9	No Connect
2	Green	10	Ground
3	Blue	11	Ground
4	Ground	12	IIC Data
5	Ground	13	Horizontal Sync
6	Red Return	14	Vertical Sync
7	Green Return	15	IIC Clock
8	Blue Return		

Serial Ports

The Silicon Graphics 550 Visual Workstation serial ports use a standard PC-compatible pinout. The serial port supports data rates from 300 bits per second (bps) to 115.2 Kbps. Figure A-4 shows the serial port.

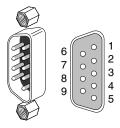


Figure A-4 Serial Port Pinout

Table A-4 shows cable pinout assignments for the serial ports.

Table A-4Serial Port Pinout

Pin	Assignment	Description
1	DCD	Data Carrier Detect
2	RD	Receive Data
3	TD	Transmit Data
4	DTR	Data Terminal Ready
5	SG	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicator

Parallel Port

The Silicon Graphics 550 Visual Workstation uses a standard DB25 1284 EPC parallel port, as shown in Figure A-5.

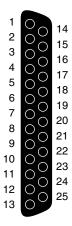


Figure A-5 Parallel Port Pinout

Table A-5 shows the cable pinout assignments for the parallel port.

Table A-5Parallel Port Pinout

Pin	Assignment	Pin	Assignment	Pin	Assignment
1	Strobe	10	Ack	19	Ground
2	Data 0	11	Busy	20	Ground
3	Data 1	12	Error	21	Ground
4	Data 2	13	Select	22	Ground
5	Data 3	14	AutoFd	23	Ground
6	Data 4	15	Fault	24	Ground
7	Data 5	16	Init	25	Ground
8	Data 6	17	SelectIn		
9	Data 7	18	Ground		

USB Ports

The Silicon Graphics 550 Visual Workstation has two 4-pin USB connectors. Figure A-6 shows a USB port.

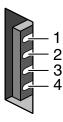


Figure A-6 USB Port Pinout

Table A-6 shows the cable pinout assignments for the USB ports.

Table A-6USB Port Pinout

Pin	Assignment	Color	Comment
1	VCC	Red	Cable power
2	-Data	White	
3	+Data	Green	
4	Ground	Black	Cable ground

Ethernet Port

The Silicon Graphics 550 Visual Workstation has an RJ45 port for 10-Base-T or 100-Base-TX twisted-pair Ethernet. The port autoselects the speed (10 Mbps or 100 Mbps) and type (half duplex or full duplex) at bootup, based on what it is connected to. Figure A-7 shows the Ethernet port.

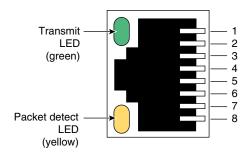


Figure A-7 Ethernet Port Pinouts

Table A-7 shows the cable pinout assignments for the Ethernet port.

Table A-7 Ethernet Port Pinout

Assignment
Transmit+
Transmit-
Receive+
(Reserved)
(Reserved)
Receive-
(Reserved)
(Reserved)

Audio Ports

The Silicon Graphics 550 Visual Workstation uses a 3.5 mm mini jack stereo microphone port, an analog line-level audio input port and an analog line-level audio output port.

Table A-8 shows the port pinout information for the mic-in, line-in, and line-Out ports.

Table A-8 Mic-in, Line-Out Port Pinouts

Connector	Tip	Ring	Sleeve
Mic-in	L	R	Ground
Line-in	L	R	Ground
Line-out	L	R	Ground

Mic-In Port

Figure A-8 shows the mic-In port.

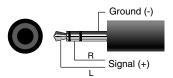


Figure A-8 Mic-In Port Pinout

Line-In and Line-Out Ports

Figure A-9 shows the line level port.

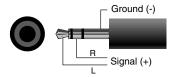


Figure A-9 Line Level Port

Physical Environment Specifications

Table B-1 shows the physical environment specifications for the Silicon Graphics 550 Visual Workstation.

Table B-1 Physical Er	nvironment Specifications
------------------------------	---------------------------

System dimensions	48.9 cm (19.25") H x 20.95 cm (8.25") W x 44.1 cm (17.375") D-without bezel, 49.16 cm (19.375") D-with bezel
Power Requirements	The power requirements are shown on the back of the system
Ambient Temperature	+10°C (+50°F) to +35°C (+95°F) (operating) -20°C (-4°F) to +60°C (+149°F) (non-operating)
Relative Humidity	10% to 90% non-operating (no condensation)
Vibration	0.38 mm (0.015"), 5-16.2 Hz; 0.2 G, 16.2-250 Hz (operating) 0.6 G, 5-27.1 Hz; 0.4 mm (0.016"), 27.1-50 Hz; 2 G, 50-500 Hz (non-operating)
System Weight	16.78 kg (37 lbs) in the two CPU configuration

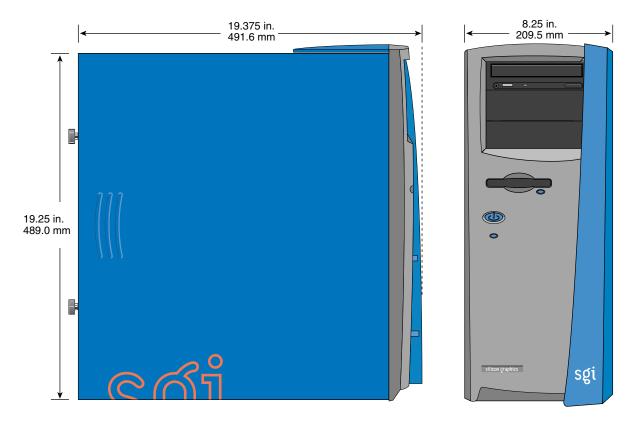


Figure B-1 shows the system dimensions with bezel.

Figure B-1 System Dimensions

Regulatory Information

FCC notice

This device has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the device and receiver
- Connect the device into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/television technician for help

Notice: Shield cables

All connections to other computing devices must be made using shielded cables to maintain compliance with FCC regulations.

Notice: Peripheral devices

Only peripherals (input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this equipment. Operation with non certified peripherals is likely to result in interference to radio and TV reception.

Caution: Changes or modifications not expressly approved by the manufacturer could void the user's authority, which is granted by the Federal Communications Commission, to operate this computer.

Use conditions

This part complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Notice: Canadian users

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Remarque à l'intention des utilisateurs canadiens

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

Important safety instructions

Read these instructions carefully. Save these instructions for future reference.

- 1. Follow all warnings and instructions marked on the product.
- 2. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- 3. Do not use this product near water.
- 4. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
- 5. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register, or in a built-in installation unless proper ventilation is provided.
- 6. This product should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
- 7. Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord.
- 8. If an extension cord is used with this product, make sure that the total ampere rating of the equipment plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total rating of all products plugged into the wall outlet does not exceed the fuse rating.
- 9. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
- 10. Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage points or other risks. Refer all servicing to qualified service personnel.
- 11. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - a. When the power cord or plug is damaged or frayed
 - b. If liquid has been spilled into the product
 - c. If the product has been exposed to rain or water

- d. If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal condition.
- e. If the product has been dropped or the cabinet has been damaged
- If the product exhibits a distinct change in performance, indicating a need for service.
- 12. Replace the battery with the same type as the product's battery we recommend. Use of another battery may present a risk of fire or explosion. Refer battery replacement to a qualified serviceman.
- 13. Warning! Batteries may explode if not handled properly. Do not disassemble or dispose of them in fire. Keep them away from children and dispose of used batteries promptly.
- 14. Use only the proper type of power supply cord set (provided in your accessories box) for this unit. It should be a detachable type: UL listed/CSA certified, type SPT-2, rated 7A 125V minimum, VDE approved or its equivalent. Maximum length is 15 feet (4.6 meters).

Laser compliance statement

The CD-ROM drive in this computer is a laser product. The CD-ROM drive's classification label (shown below) is located on the drive.

CLASS 1 LASER PRODUCT

CAUTION: INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.

APPAREIL A LASER DE CLASSE 1

ATTENTION: RADIATION DU FAISCEAU LASER INVISIBLE EN CAS D'OUVERTURE. EVITTER TOUTE EXPOSITION AUX RAYONS.

LUOKAN 1 LASERLAITE LASER KLASSE 1

VORSICHT: UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHLL AUSSETZEN

PRODUCTO LÁSER DE LA CLASE I

ADVERTENCIA: RADIACIÓN LÁSER INVISIBLE AL SER ABIERTO. EVITE EXPONERSE A LOS RAYOS.

ADVARSEL: LASERSTRÅLING VEDÅBNING SE IKKE IND I STRÅLEN

VARO! LAVATTAESSA OLET ALTTINA LASERSÅTEILYLLE.

VARNING: LASERSTRÅLNING NÅR DENNA DEL ÅR ÖPPNAD ÅLÅ TUIJOTA SÅTEESEENSTIRRA EJ IN I STRÅLEN

VARNING: LASERSTRÅLNING NAR DENNA DEL ÅR ÖPPNADSTIRRA EJ IN I STRÅLEN

ADVARSEL: LASERSTRÅLING NAR DEKSEL ÅPNESSTIRR IKKE INN I STRÅLEN

Lithium battery statement

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

ADVARSEL!: Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Léver det brugte batteri tilbage til leverandøren.

ADVARSEL: Eksplosjonsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner.

VARNING: Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

VAROITUS: Päristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

VORSICHT!: Explosionsgefahr bei unsachgemäßen Austausch der Batterie Ersatz nur durch denselben oder einem vom Hersteller empfohlenem ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

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