# InterServe 600 Series

*System Reference*

September 1997

DHAF02050

INTERGRAPH
COMPUTER SYSTEMS

## Copyright



## Product ID Information

The product ID information is located on the back of the base unit.

## Power Input Rating

The unit's power input rating and other power information for the system is stated in Chapter 2 under "Fixed Power Supply (MPWS131)" or "Redundant Power Supplies (MPWS138)."

## FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. If the equipment is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## CDC Statement

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

## Cautions

Changes or modifications made to the system that are not approved by the party responsible for compliance could void the user's authority to operate the equipment.

THIS PRODUCT CONFORMS TO THE APPLICABLE REQUIREMENTS OF 21 CFR SUBCHAPTER J AT DATE OF MANUFACTURE.

Read all safety and operating instructions before using the equipment. Keep these instructions for future reference. Follow all warnings on the equipment or in the operating instructions.

## Warnings

To reduce the risk of electrical shock, do not attempt to open the equipment unless instructed. Do not use a tool for purposes other than instructed.

There are no user serviceable parts in the power supply. Refer all servicing of the power supply to qualified service personnel.

Hazardous energy levels exist in the system base unit due to the constant AC-supply design of the power supplies.

# Contents

# Introduction

The *InterServe 600 Series System Reference* provides technical, servicing, and upgrading information for InterServe 615, 615UW, 625, 625UW, 635, and 645 systems.

**NOTE** For information about InterServe 610, 620, 630 and 640 servers, refer to DHAF02030.

# Restrictions

In the servicing instructions, heed all warnings and cautions. Some precedures may only be performed by trained Intergraph Field Service personnel. Personal injury and damage to equipment can occur if documented procedures are not followed.

**WARNING** **For InterServe 635 and 645 systems, hazardous energy levels exist in the system base unit due to the constant AC-supply design of the power supplies. Disconnect the power cord from the system before opening the base unit.**

**CAUTION** Use an antistatic wrist strap for all servicing and upgrade procedures to avoid the possibility of electrostatic discharge.

# Conventions

| | |
|---|---|
| **Bold** | Commands, words, or characters that you key in literally. |
| *Italic* | Variable values that you supply, or cross-references. |
| `Monospace` | Output displayed on the screen. |
| SMALL CAPS | Key names on the keyboard, such as D, ALT or F3. Names of files and directories. You can type filenames and directory names in the dialog boxes or the command line in lowercase unless directed otherwise. |
| CTRL+D | Press a key while simultaneously pressing another key; for example, press CTRL and D simultaneously. |

# Additional System Information

A *System Setup* is shipped with each system, and provides detailed information about:

- Setting up the system.
- Configuring the operating system and associated system software.
- Using the system.
- Using the AMIBIOS Setup program.
- Installing system software.

A *System Introduction* is delivered with the system, and provides information about:

- Intergraph Support
- System hardware features
- Available hardware options

# Operating System Information

For more detailed information on the Windows NT Server 4.0 operating system, refer to the printed and online Windows NT documentation from Microsoft:

- For basic information on using and installing Windows NT Server 4.0, refer to *Start Here*, delivered in the Windows NT Server software package.
- For detailed information on using Windows NT Server 4.0, refer to Windows NT Server Help.
- Additional online Windows NT Server 4.0 documentation is delivered on CD-ROM with the operating system. You can purchase printed copies of these documents from Intergraph.

Refer to the *Late-Breaking News* shipped with your system for important hardware, software, and documentation information not covered in this document.

# 1 Accessing the System

This chapter describes opening the system base unit to gain access to various field replaceable and upgradeable parts.

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# Precautions

Before servicing or upgrading the system, heed the following:

**WARNING** **Leave the AC power cord from the InterServe 615, 615UW, 625, and 625UW base unit connected to the AC wall outlet to maintain safety ground. If the AC power cord is disconnected, you could be injured or cause damage to the system.**

**WARNING** **Hazardous voltages exist inside the InterServe 635 and 645 base unit. Disconnect the AC power cord from the base unit before servicing or upgrading the system. If the AC power cord remains connected, you could be injured or cause damage to the system.**

**CAUTION** The parts inside the base unit are designed to fit within very tight tolerances; some force is required to remove or insert parts. However, if you cannot remove or install a part properly, ensure that there are no obstructions hindering the part.

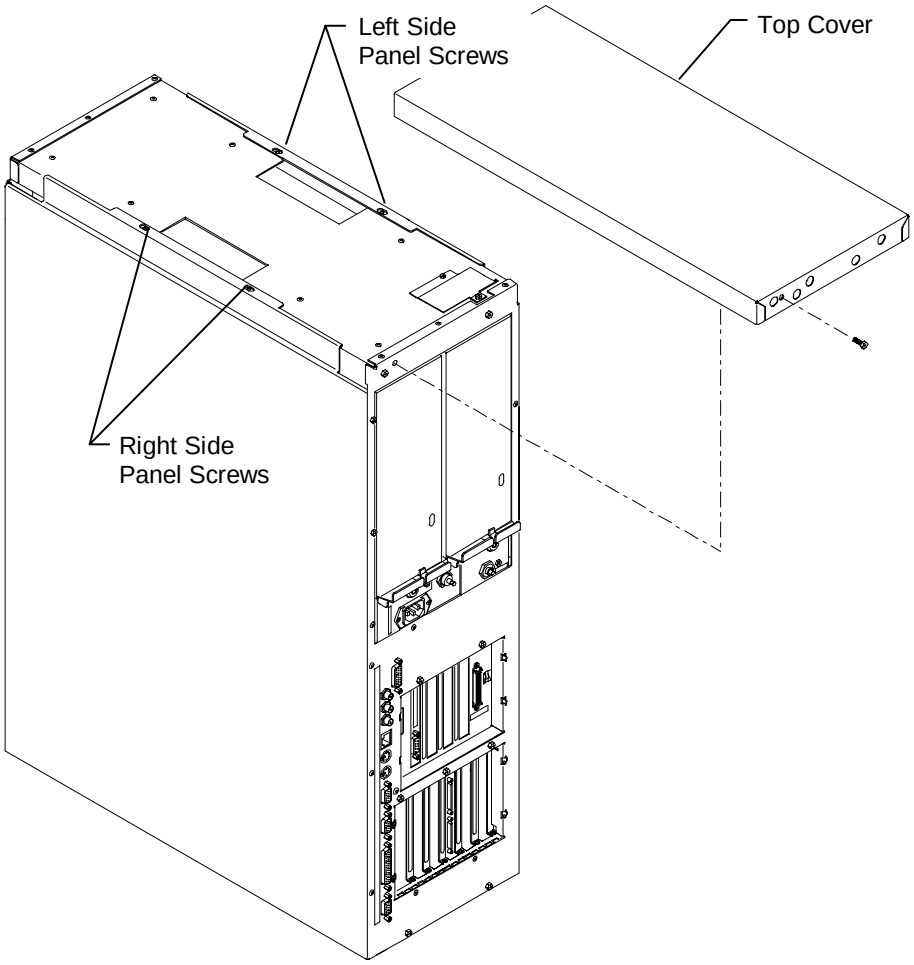
# Top Cover and Side Panels

**CAUTION** Use caution when removing covers and panels to avoid injury.

**NOTE** The left and right side panels are identified when facing the front of the base unit.

**To remove the top cover and side panels:**

1. Shut the system down; then turn the system power off.
2. Remove the stabilizer feet.
3. Remove the screw on the back of the top cover; then pull the top cover back an inch and lift it off the base unit.
4. Remove the two screws at the top of each side panel; then pull the side panels up and away from the base unit. Refer to the following figure.

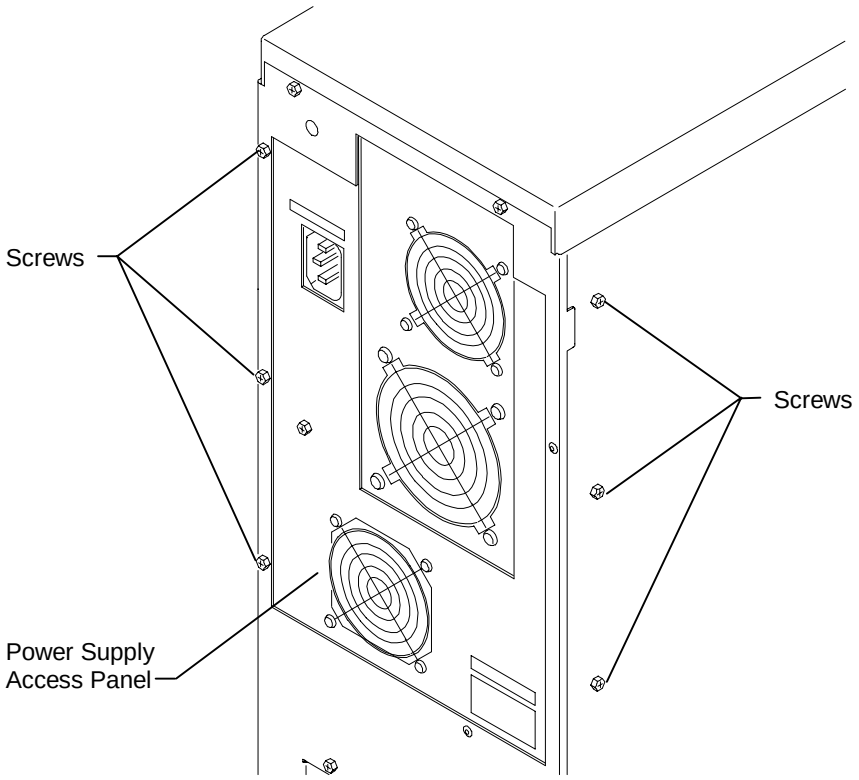



# Power Supply Access Panel

**NOTE** Only InterServe 615, 615UW, 625, and 625UW systems use the power supply access panel.

**To remove the power supply access panel:**

1. Remove the screws from around the power supply access panel as shown in the following figure.

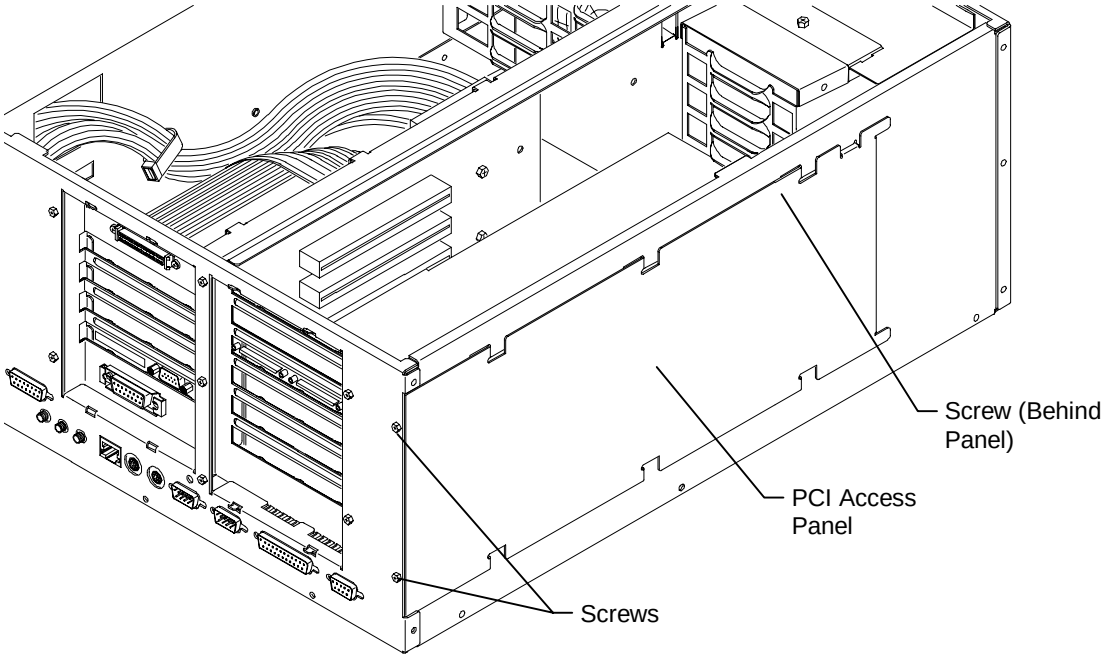



2. Slide the power supply access panel to the right and pull it out of the base unit.

# PCI Access Panel

**To remove the PCI access panel:**

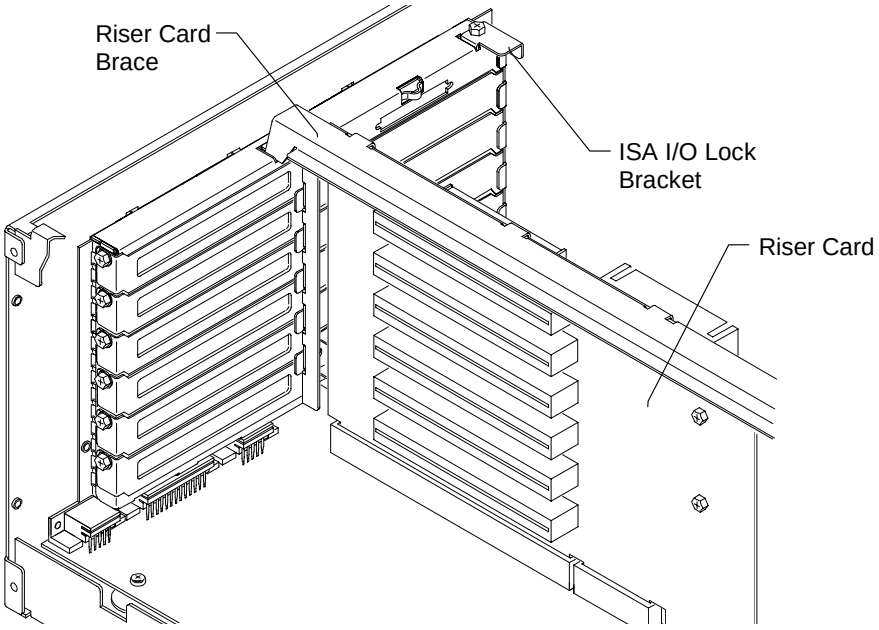
1. Remove the top cover and left side panel.
2. Lay the base unit on its right side.
3. Remove the two screws at the bottom of the unit and the screw behind the PCI access panel.
4. Slide the PCI access panel to the back of the base unit. Refer to the following figure.



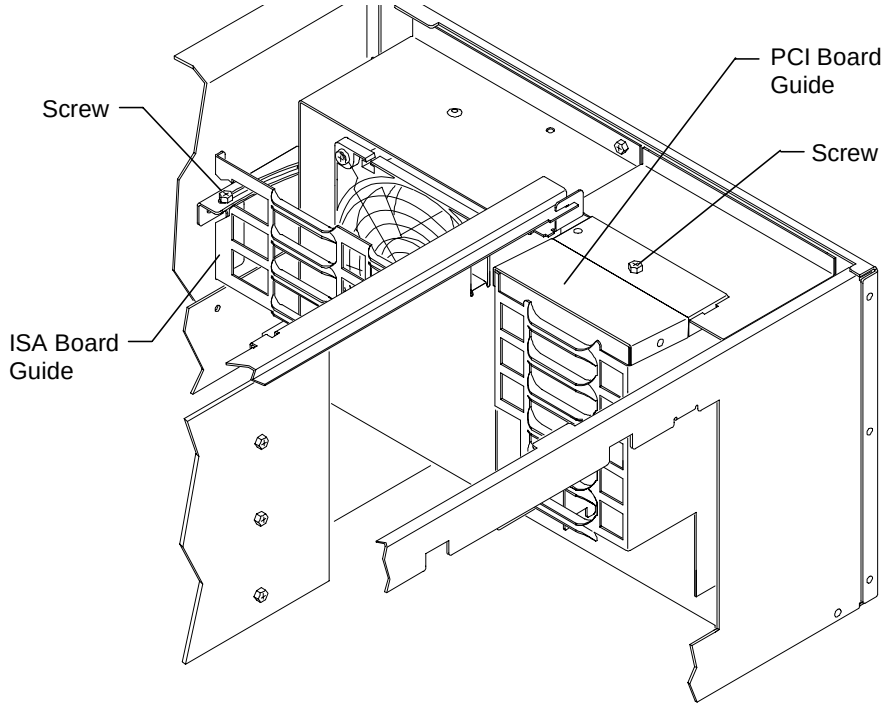

# Riser Card Brace and PCI Board Guide

**To remove the riser card brace and PCI board guide:**

1. Remove the PCI access panel.
2. Remove the RAID controller and other installed PCI option boards. Note the position of each PCI board. After servicing, you must replace each board into the same slot from which you removed it.
3. Remove the ISA I/O lock bracket as shown in the following figure.

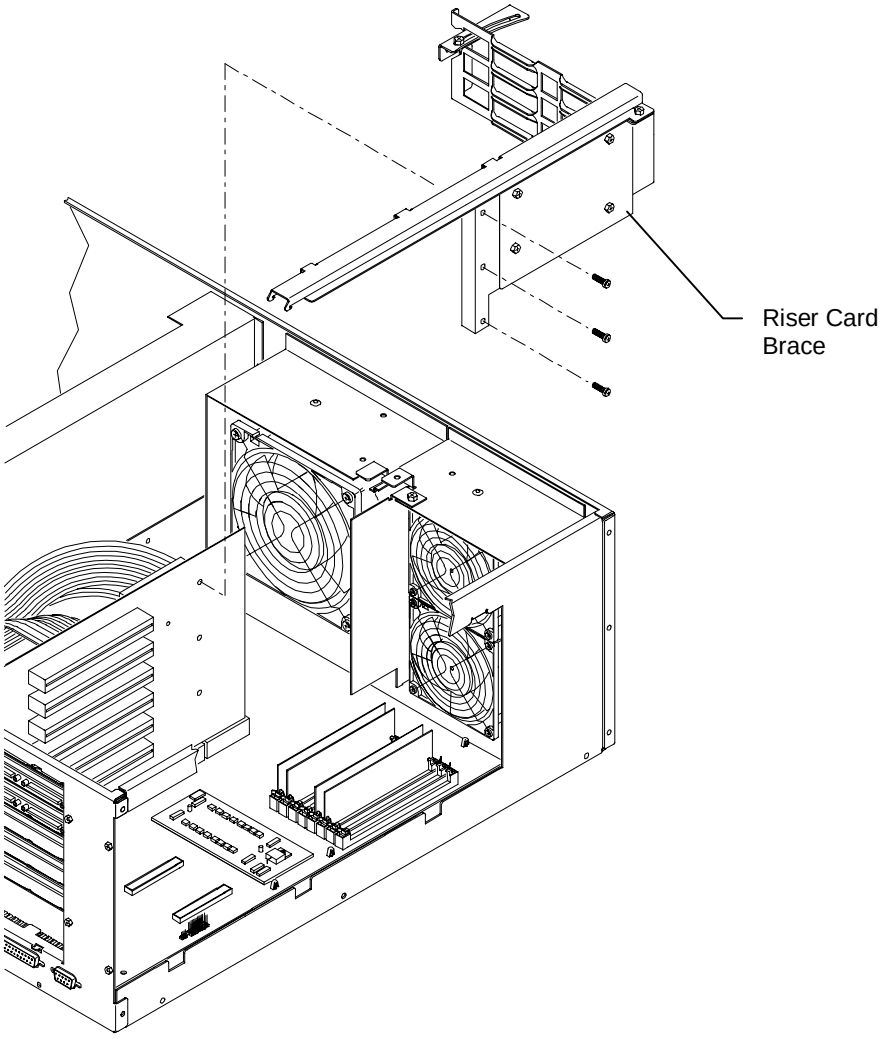


4. Remove the screw for the PCI board guide, and remove it as shown in the following figure.
5. Loosen the screw and pivot the ISA board guide toward the fan assembly as shown in the following figure.




6. Note the position of and remove each ISA board. After servicing, you must replace each board into the same slot from which you removed it.

7. Remove the three screws as shown in the following figure. Slide the riser card brace to the back of the base unit and remove the brace.

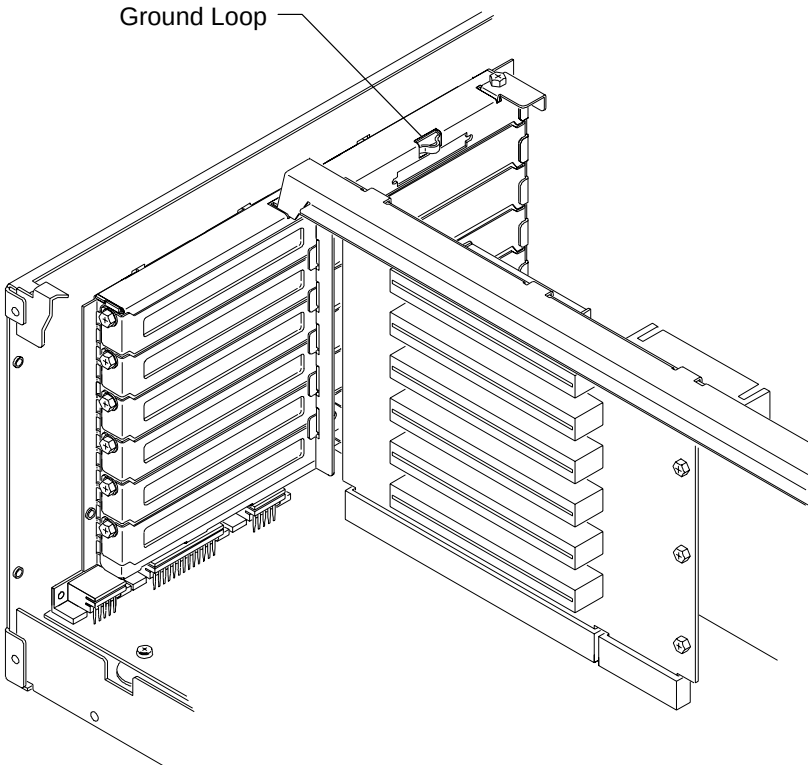



# Protecting Against Electrostatic Discharge

Sensitive components inside the base unit can be damaged by static electricity. To protect against this possibility, take the following precautions when working with the internal components of the system.

- Do not service the system on surfaces known to have high electrostatic buildup, such as rugs and carpets. Work on a static-safe surface instead.
- Touch the bare metal of the base unit to ensure the base unit and your body are at the same electric potential.
- Handle all printed circuit boards as little as possible and by the edges only. Leave new parts in their protective packaging until you install them.
- Use a disposable or re-usable antistatic wrist strap when servicing or upgrading the system. A disposable wrist strap can only be used once.

- A re-usable antistatic wrist strap can be attached to the ground loop above the ISA slots, as shown in the following figure, or to any other bare metal part of the base unit. The metal conductor bead in the elastic sleeve of re-usable antistatic straps must contact bare skin.




# Closing the System

**CAUTION** After servicing or upgrading the system, always replace the panels and covers that were removed. The panels and covers ensure the system maintains proper air flow, so internal components do not overheat, causing failure. The panels and covers also ensure that electromagnetic interference (EMI) emissions remain below the standard requirements.

**NOTE** When securing panels with screws, ensure the screws are tight, but do not strip the screw heads.

**To close the system:**

1. Remove the antistatic wrist strap from the base unit.
2. Replace the PCI access panel if removed.
3. Set the base unit in the upright position.
4. Replace the left and right side panels if removed.
5. Replace the top cover if removed. Ensure the top cover is completely installed so the safety interlock switch engages. If the cover is not properly installed, the system will not start.
6. Replace the stabilizer feet.
7. Restart the system.

# 2 Servicing System Parts

Open the base unit and protect against electrostatic discharge as described in Chapter 1, "Accessing the System." After servicing, close the base unit as also described in Chapter 1.

**WARNING** **Leave the AC power cord from the InterServe 615, 615UW, 625, and 625UW base unit connected to the AC wall outlet to maintain safety ground. If the AC power cord is disconnected, you could be injured or cause damage to the system.**

**WARNING** **Hazardous voltages exist inside the InterServe 635 and 645 base unit. Disconnect the AC power cord from the base unit before servicing the system. If the AC power cord remains connected, you could be injured or cause damage to the system.**

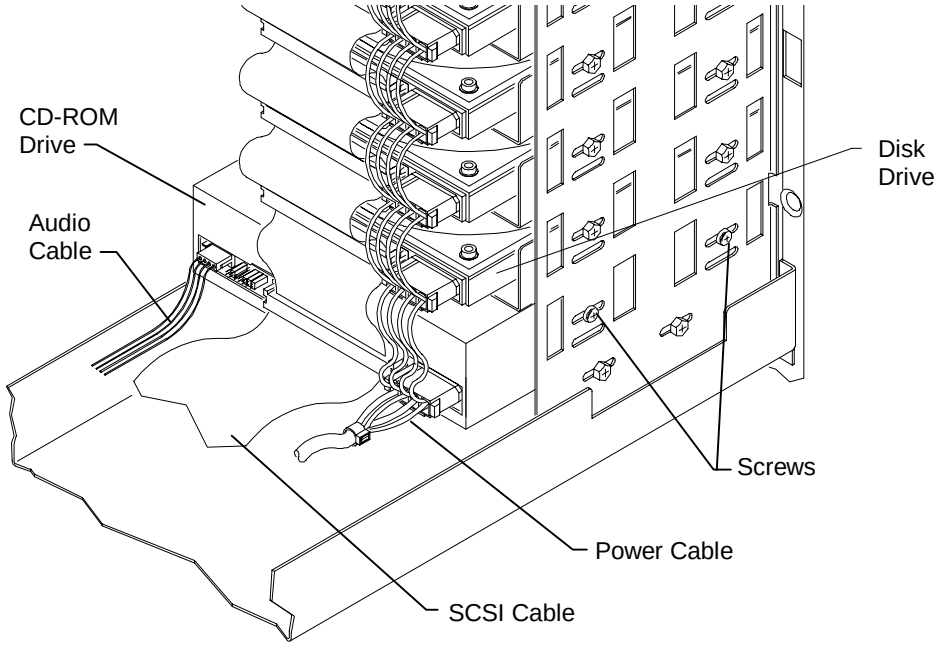
**CAUTION** The parts inside the base unit are designed to fit within very tight tolerances; some force is required to remove or insert parts. However, if you cannot remove or install a part properly, ensure that there are no obstructions hindering the part.

## Internal SCSI Drives

This section applies to CD-ROM drives, fixed disk drives, and tape drives.

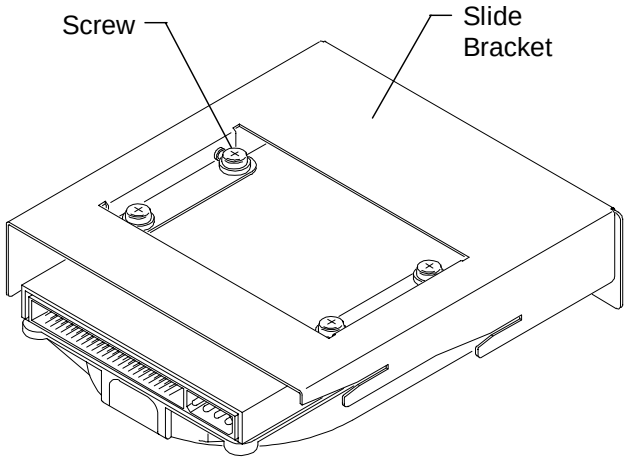
**To replace an internal SCSI drive:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Disconnect the power cable and SCSI cable from the drive. If removing the CD-ROM drive, also remove the audio cable. Refer to the following figure.




3. Remove the screws from both sides of the SCSI drive.
4. Slide the SCSI drive out of the front of the base unit.

5. If replacing a disk drive (located above the CD-ROM drive), remove the bracket from the drive. Refer to the following figure.




6. Disable SCSI termination and set the SCSI ID on the back of the drive to the same ID as the drive being replaced. If necessary, refer to the documentation delivered with the SCSI drive for instructions.
7. If installing a hard disk drive, attach the drive to the bracket.
8. Insert the new SCSI drive through the front panel.
9. Secure the SCSI drive using the screws removed previously.
10. Connect the SCSI cable, power cable, and audio cable (CD-ROM drive only). The SCSI cable red stripe (pin 1) must be adjacent to the power connector.

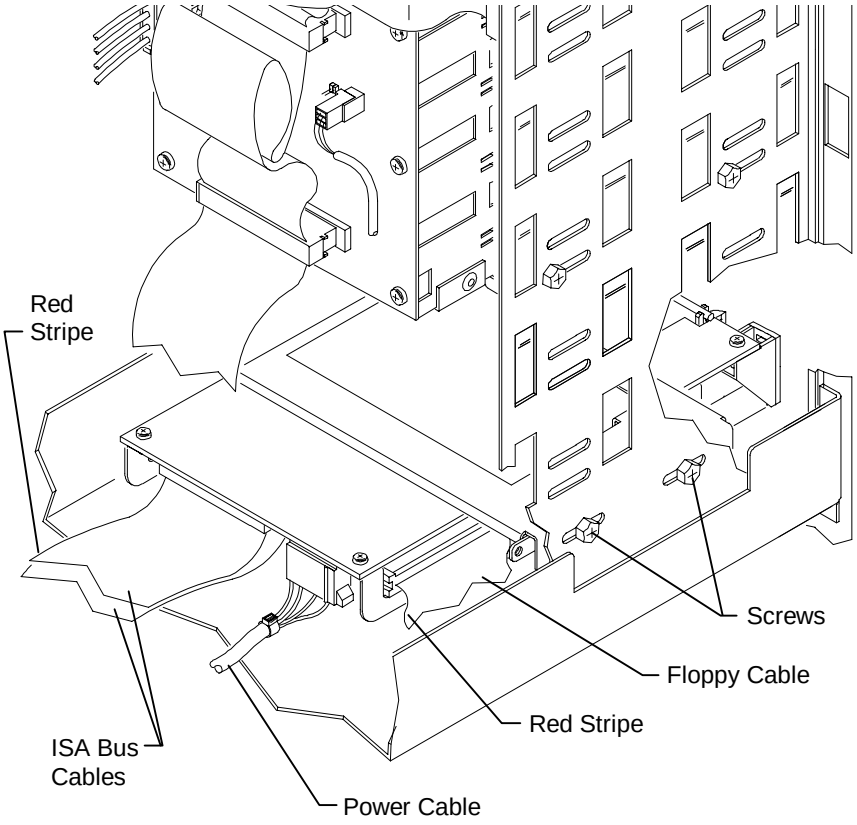
**Note** If installing a non-Intergraph CD-ROM drive, use the audio cable delivered with the new CD-ROM drive.

11. Close the base unit.

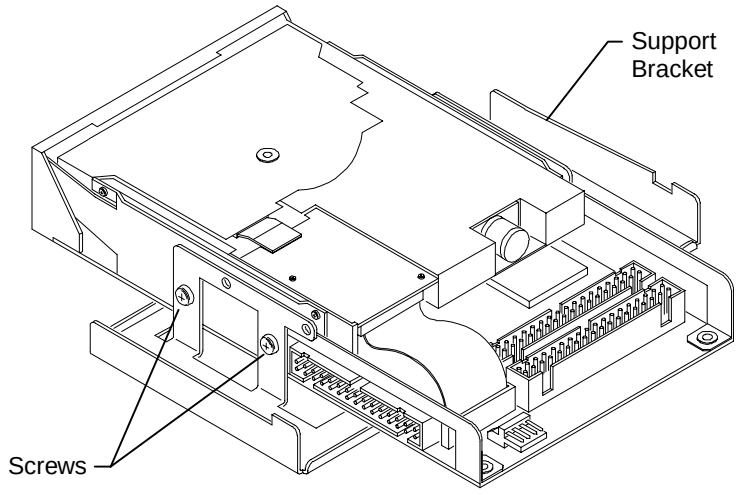
# Combo Drive (MESAM86)

**To replace the combo drive:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Remove the CD-ROM drive as described previously in “Internal SCSI Drives.”
3. Using a quarter-inch nutdriver, remove the screws from both sides of the combo drive as shown in the following figure. Then slide the drive out of the base unit.




4. Disconnect the floppy cable, ISA bus cables, and power cable from the combo drive. Note the position of the red stripe on the floppy cable and ISA bus cables.
5. Remove the four screws from the support bracket as shown in the following figure.

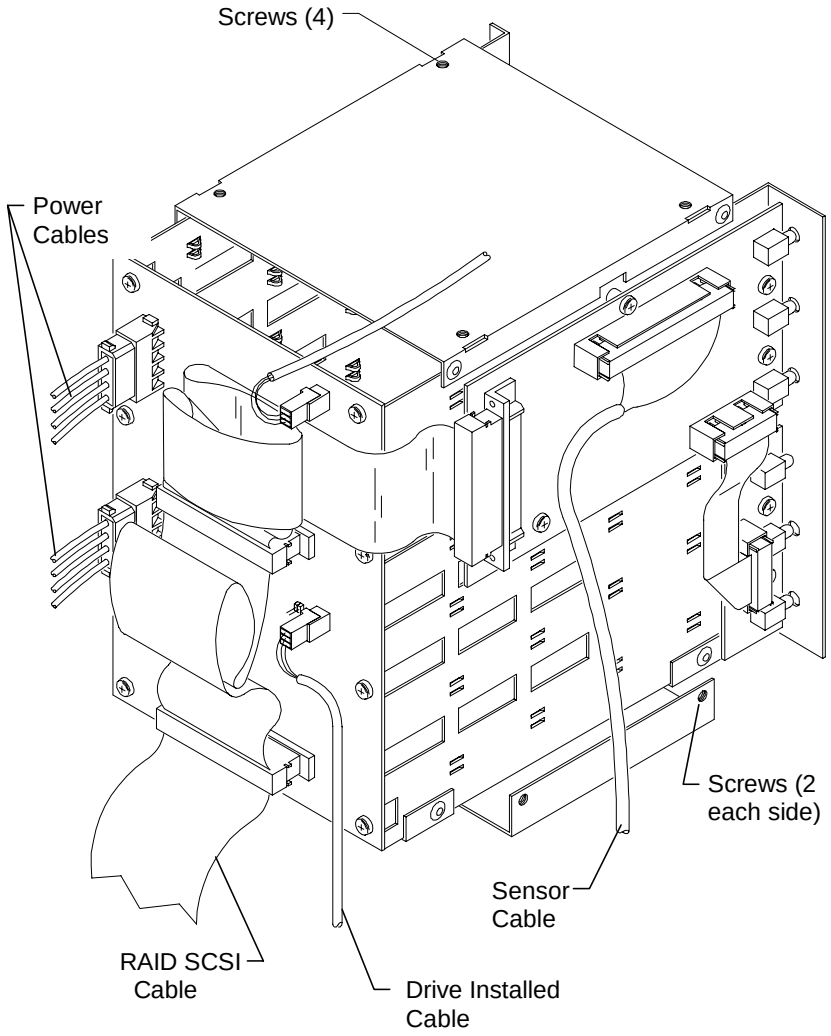



6. Secure the replacement drive to the support bracket using the screws removed previously.
7. Connect the cables to the combo drive.
8. Install the drive into the base unit, and secure it using the screws removed previously.
9. Replace the CD-ROM drive and secure it to the chassis. Connect the cables to the drive.
10. Close the base unit.

# Internal RAID Section (MESAN15)

**To replace the internal RAID section:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Remove the CD-ROM drive as described previously in “Internal SCSI Drives.” Support the drive as you remove it.
3. Remove the RAID disk drives from the slots and place the drives onto a flat antistatic surface.
4. Disconnect the cables (except the sensor cable) attached to the internal RAID subsystem. Refer to the following figure.
5. Remove the four screws from the top, and the two screws on either side, of the RAID subsystem. Refer to the following figure.




6. Slide the RAID subsystem out of the base unit. Disconnect the sensor cable.
7. Connect the sensor cable to the new RAID subsystem. Slide the subsystem into the base unit.
8. Replace the eight screws removed previously.
9. Reconnect the internal cables.

**NOTE** For assistance about cable connections, refer to Chapter 5, “Hardware Information.”

7. Replace the CD-ROM drive and reconnect its cables.
8. Close the base unit.
9. Install the RAID disk drives into the proper slots.

# Riser Card (MSMT463)

**To replace the riser card:**

1. Open the base unit and remove the necessary parts as described in Chapter1.
2. Disconnect the SCSI cable and main power cable from the riser card.
3. Disengage the riser card from its system board slot, and remove the card from the base unit.
4. Insert the new riser card into its system board slot, pushing firmly over the center of the PCI connectors.

**CAUTION** Do not rock the riser card back and forth; pins inside the connector may be damaged as a result. Press firmly so the card connector slides evenly into the slot.

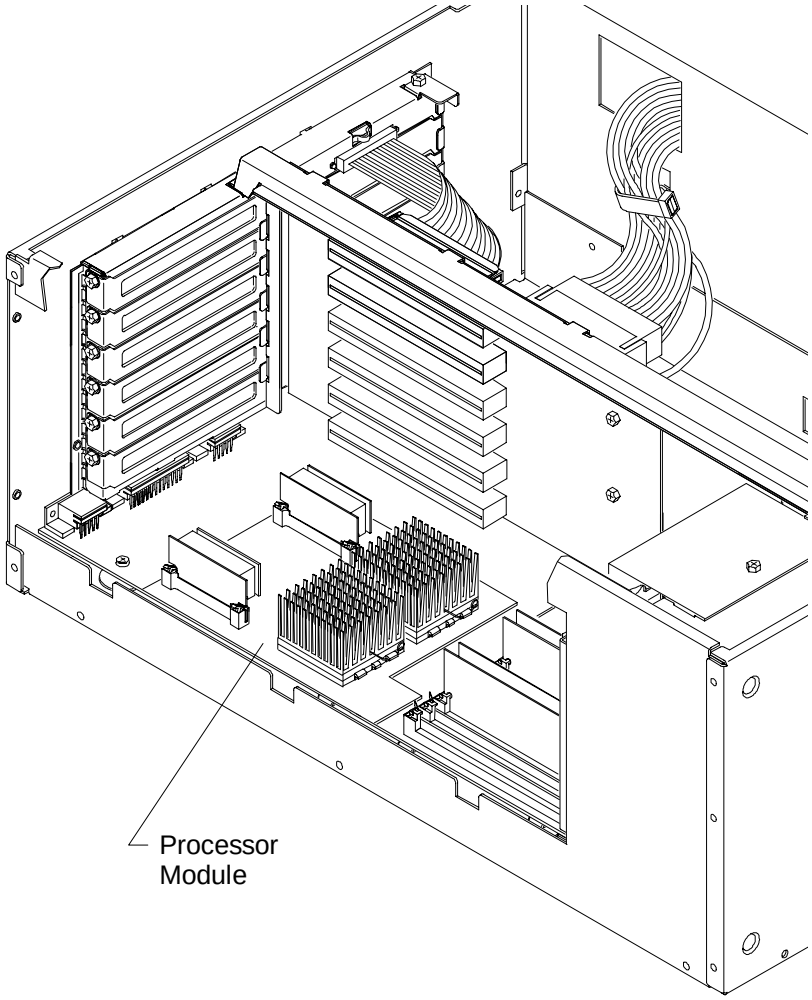
5. Replace the option board bracket. Do not tighten the pivoting ISA board guide until the ISA boards have been installed.
6. Replace the option boards connected to the riser card. Connect any external cables attached to the boards. Replace the option boards in the same slots from which you removed them.
7. Replace the ISA I/O lock bracket and PCI access panel.
8. Connect the SCSI and power cables to the riser card.
9. Close the base unit.

# Processor Module (MSMT310)

The module contains two CPUs and a Voltage Regulator Module (VRM) for each CPU.

**To replace the processor module:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Lay the base unit on its right side.
3. Remove the installed PCI option boards.
4. Remove the screws from the perimeter of the processor module. Refer to the following figure.

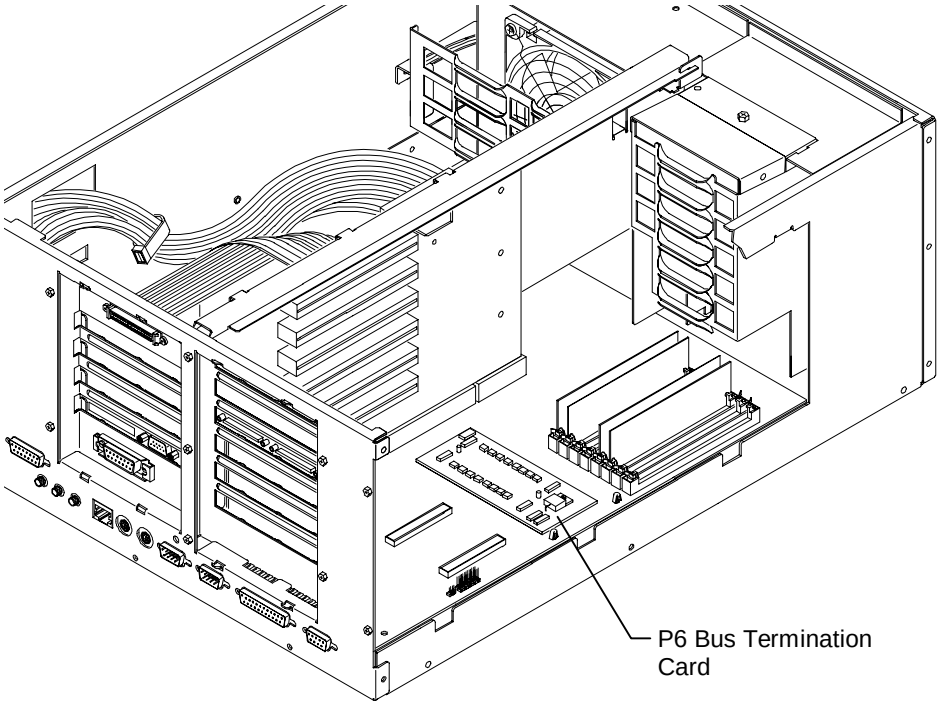



5. Disengage the processor module from the system board connectors.
6. Align the new processor module over the connectors and firmly press it onto the connectors.
7. Secure the module using the screws removed previously.
8. Replace the option boards in the same slots from which you removed them.
9. Close the base unit.

# P6 Bus Termination Card (MSMT311)

**To replace the P6 bus termination card:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Ensure the AC power cable is disconnected and the antistatic strap is properly connected.
3. Lay the system on its right side.
4. Remove the installed PCI option boards.
5. Remove the screws that secure the termination card to the system board.




6. Carefully disengage the termination card from the connectors.
7. Install the new termination card. The connectors are keyed to ensure proper orientation. Carefully but firmly push the termination card into the connectors.
8. Secure the termination card with the screws removed previously.
9. Replace the option boards in the same slots from which you removed them.
10. Close the base unit.

# System Board (MSMT359)

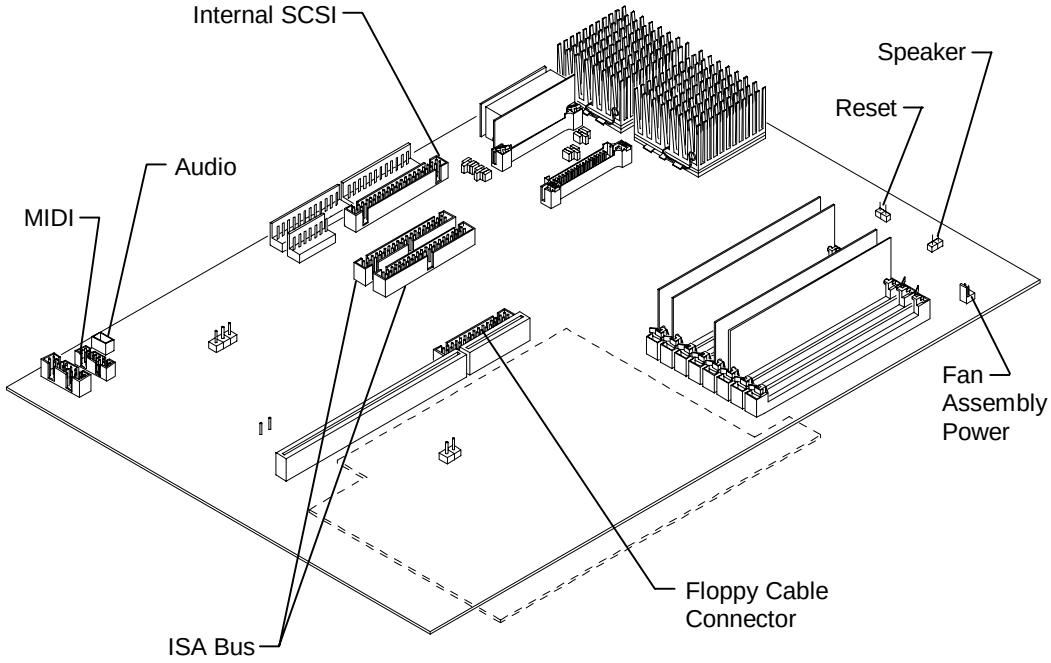
**CAUTION** The system board is extremely sensitive to static electricity. To prevent serious damage to the system board, wear the antistatic wrist strap while performing the following steps. Do not open the antistatic bag containing the system board until instructed.

**NOTE** Before opening the base unit, run the AMIBIOS Setup program and record all the custom settings for your system. After replacing the system board, you must run the System Configuration Utility for the ISA boards. Ensure you have the necessary ISA board configuration files on diskette before you begin.

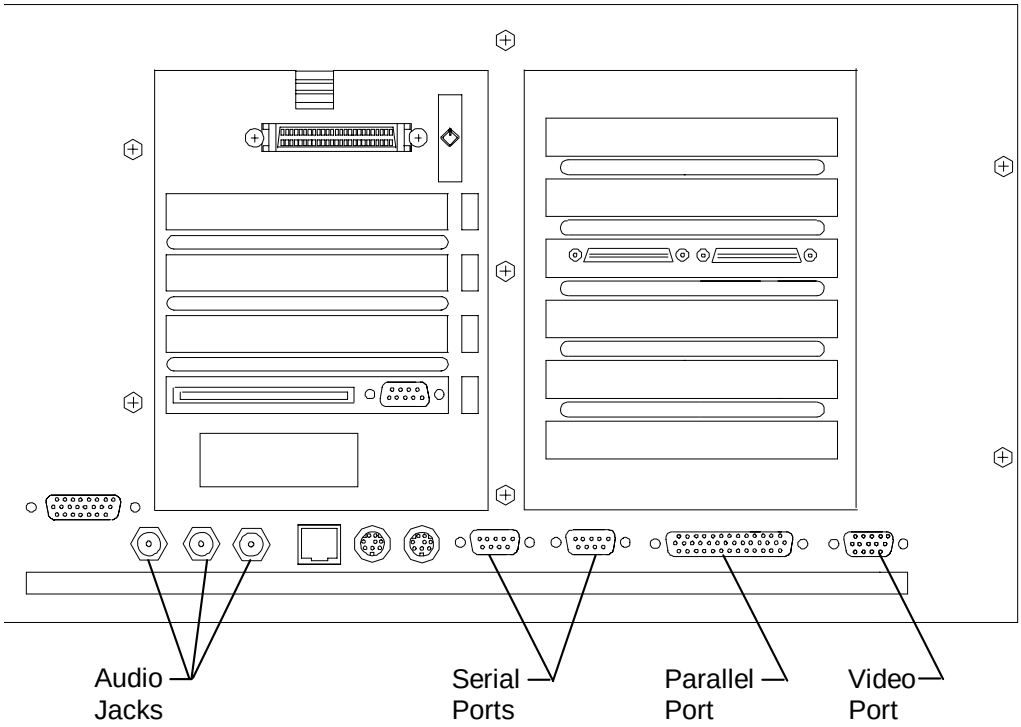
**To replace the system board:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Ensure the AC power cable is disconnected and the antistatic strap is properly connected.
3. Remove the riser card as described previously in “Riser Card (MSMT463).”
4. Remove the processor module as described previously in “Processor Module (MSMT310)” or the P6 bus termination card as described in “P6 Bus Termination Card (MSMT311.”
5. Remove the option board fan assembly as described later in “Option Board Fan Assembly MMSA356.”

6. Disconnect all cables attached to the system board. Refer to the following figure for cable connector locations.




7. Disconnect the cables from the external ports.
8. Using a three-sixteenth-inch nutdriver, remove the jackscrews from the video, parallel, and serial ports.
9. Using an 8 mm or five-sixteenth-inch nutdriver, remove the hex nuts from the audio jacks.




10. Using a quarter-inch nutdriver, remove the eight grounding screws from the system board.

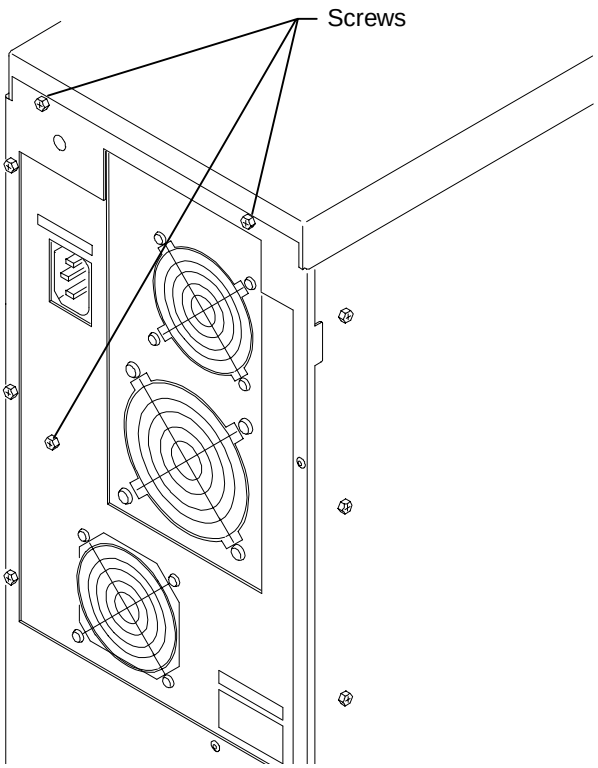
11. Slide the system board to the front of the base unit.
12. Lift the board and remove it from the base unit. Set the board on a flat antistatic surface.
13. Remove the new system board from the antistatic bag and place it on a flat antistatic surface.
14. Remove the SIMMs from the old system board and install them onto the new system board in the same configuration.
15. Remove the G95 WRAM module, if installed, and install it onto the new system board.
16. Lower the system board into the base unit. Ensure the standoffs line up with the holes in the chassis. Slide the system board so the external ports fit into the back panel.
17. Install the jackscrews onto the video, parallel, and serial ports.
18. Install the hex nuts onto the line out, line in, and microphone ports.
19. Install the eight ground screws.
20. Install the processor module (or P6 bus termination card).
21. Connect the MIDI and audio cables to the system board.
22. Replace the option board fan assembly.
23. Replace the riser card, option board bracket, option boards, and SCSI and power cables.
24. Replace the PCI access panel.
25. Connect the external system cables to the external ports.
26. Close the base unit.
27. Run the AMIBIOS Setup utility and change the parameters to your required settings. Refer to the *System Setup*.
28. If you have ISA option boards installed, run the System Configuration Utility. Refer to the *System Setup*.

# Fixed Power Supply (MPWS131)

**CAUTION** Replacement power supplies should be purchased from Intergraph to ensure proper specifications are met and to guarantee safety.

**To replace the power supply:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Disconnect the power cables from the riser card, hard disk drives (or internal RAID subsystem and DC distribution board), CD-ROM drive, and combo drive.
3. Using a quarter-inch nutdriver, remove the screws securing the power supply to the back of the base unit. Refer to the following figure.



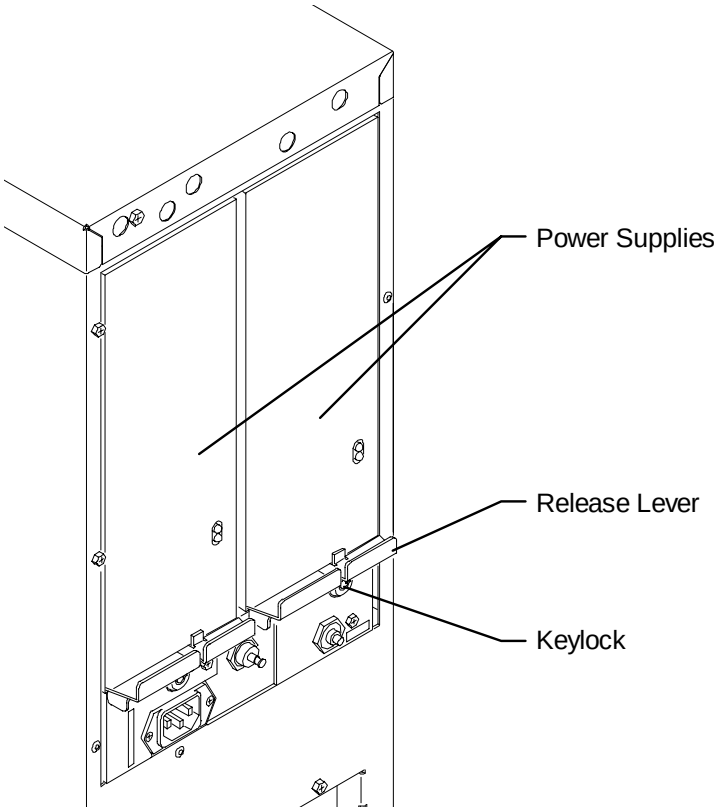

**CAUTION** Support the power supply with your hand as you remove the screws. Otherwise, the power supply will fall onto the system hard disk drive or RAID disk drives fan assembly.

4. Push the power supply out the side of the base unit.
5. Place the new power supply in the base unit and slide the power cable bundle through the opening. Connect the main power cable to the riser card.
6. Connect the remaining power cables to the hard disk drives (or internal RAID subsystem and DC distribution board), CD-ROM drive, and combo drive.
7. Secure the power supply to the base unit using the screws removed previously.
8. Connect the AC power cord.
9. Close the base unit.

# Redundant Power Supplies (MPWS138)

**To replace a redundant power supply:**

1. Turn the keylock to the OFF position on the power supply being replaced. Refer to the following figure.
2. Disengage the power supply by pulling the release lever. Refer to the following figure.

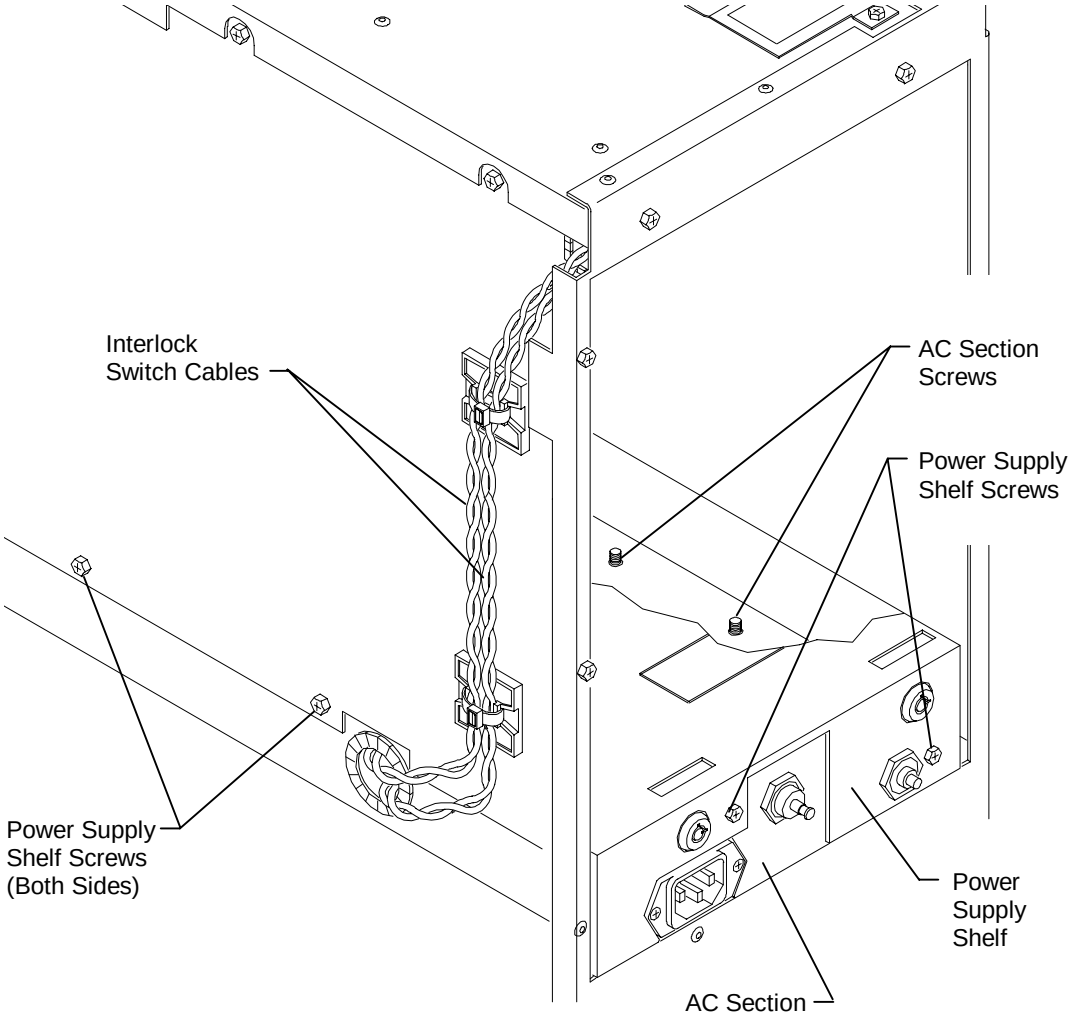



3. Install the new power supply into the base unit.
4. Turn the keylock switch to the ON position.

# AC Section (MESAN14)

**To replace the AC section:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Remove both power supplies as described previously in “Redundant Power Supplies (MPWS138)”..
3. Remove the power supply shelf as shown in the following figure. Six screws secure the shelf to the base unit.
4. Remove the two screws on the bottom of the AC section, on the left side of the base unit.




5. Disconnect the AC section cables attached to the power distribution board. Note the placement of the cables so that you can install them in the proper locations on the new assembly.
6. Disconnect the interlock switch cables from the keylock switches.
7. Remove the AC section from the base unit.
8. Push the main power cable through the opening in the AC section.
9. On the new AC section, ensure the plastic edging is installed around the opening to protect the main power cable. Push the main power cable through the opening.
10. Install the new AC section and secure it with the screws removed previously.
11. Connect the main power cable to the power distribution board and the other cables to the AC section.
12. Connect the interlock switch cables to the keylock switches.

**NOTE** Refer to Chaper 5 if you need details about cable connections.

13. Install the cover plate and replace both power supplies.
14. Connect the AC power cord to the base unit.
15. Close the base unit.

# Power Distribution Board (MPCBD13)

**NOTE** MPCBD13 is used only in InterServe 615 and 625 with the internal RAID section MESAN15.

**To replace MPCBD13:**

1. Open the base unit and remove the necessary parts as described in Chapter 3.
2. Remove the power supply as described previously in “Fixed Power Supply (MPWS131)”.
3. Disconnect the fan power cable from the system board.
4. Using a quarter-inch nutdriver, remove the screw (next to the power distribution board) securing the fan assembly to the base unit.
5. Push the fan assembly towards the internal RAID subsystem and lift the assembly out of the base unit.
6. Disconnect the cables from the power distribution board.
7. Using a No. 1 Phillips screwdriver, remove the screws securing the power distribution board to the base unit.
8. Remove the board from the base unit.
9. Attach the new power distribution board to the base unit.
10. Replace the fan assembly.
11. Connect the cables to the power distribution board.

**Note** Refer to Chaper 5 if you need details about cable connections.

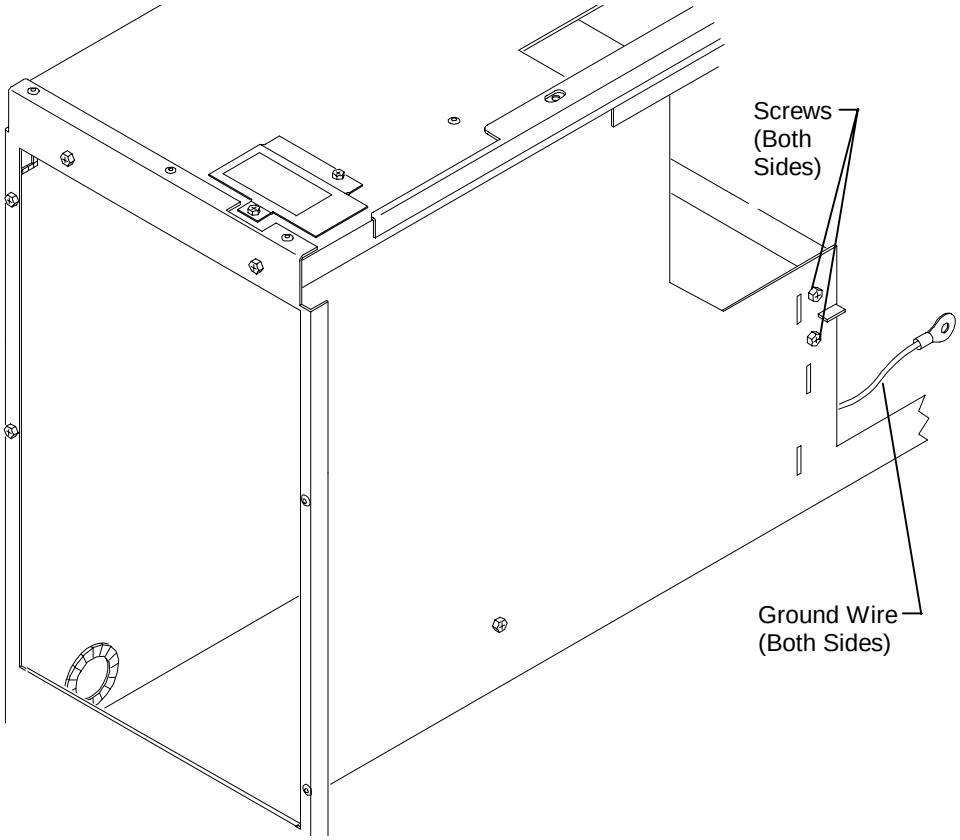
12. Replace the power supply.
13. Close the base unit.

# Power Distribution Board (MPCBD17)

**NOTE** MPCBD17 is used only in InterServe 635 and 645.

**To replace MPCBD17:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Remove the AC section as described previously in “AC section (MESAN140).”
3. Disconnect the two ground wires from the power distribution board.
4. Disconnect the power and signal cables from both sides of the power distribution board. Note the position of the cables so you can reconnect them properly when installing the new power distribution board.
5. Remove the screws securing the power distribution board to the base unit. These screws are located on either side of the board.




6. Remove the power distribution board from the base unit.
7. Attach the new power distribution board to the base unit.
8. Attach the ground wires to the base unit.

**WARNING** **You must attach both ground wires for safety purposes. Additionally, you must torque the screws to 9.2 - 12.5 inch-lbs. using a calibrated torque wrench or screwdriver.**

9. Connect the internal cables to the power distribution board.

**Note** Refer to Chapter 5 if you need details about cable connections.

10. Replace the AC section and power supplies.
11. Close the base unit.

# InterSite Server Monitor Board (CINF029)

The InterSite Server Monitor (ISM) board is standard hardware for InterServe 635 and 645. It may be installed as an option in InterServe 615, 615UW, 625, and 625UW. The board is installed in ISA slot 4 by default.

**To replace the ISM board:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Disconnect the external cables attached to the board.
3. Loosen the screw on the ISA board bracket (next to the fans) and pivot it out of the way of the ISM board.

4. Remove the ISA I/O lock bracket and disengage the ISM board from its slot connector.
5. Remove the board from the slot; then disconnect the cables from the temperature sensor and feature connectors on the ISM board.
6. Disengage the release lever on the PC Card socket on the ISM board; then remove the PC Card modem from the board.
7. Connect the battery cable to connector J1 on the new ISM board.
8. Install the modem card (label side up) into the PC Card socket on the new ISM board.
9. Connect the temperature sensor cable to connector J10 on the new ISM board.
10. Connect the feature cable to connector J9 on the new ISM board.
11. Install the board into ISA slot 4.
12. Replace the ISA I/O lock bracket, and pivot the ISA board bracket onto the ISM board edge.
13. Connect the external cables to the ISM board.
14. Close the base unit.

Refer to the *InterSite Server Monitor Setup Guide* for information on installing and configuring the ISM software.

# Memory

**To service the SIMMs:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Ensure the AC power cable is disconnected and the antistatic strap is properly connected.
3. Verify the SIMMs are installed properly, and that the same memory density SIMMs are used in all sockets.
4. Remove and re-install SIMMs, then restart the system to verify that all SIMMs function properly.
5. If the memory errors continue, replace the memory with new SIMMs.

The following tables show the location, number and density of SIMMs that are required for the supported memory for base configurations and upgrades. Each bank contains two sockets, and both sockets must be populated. Memory density must be the same in all populated sockets.

### Base Configurations

| Supported Memory | Bank 0 | Bank 1 | Bank 2 | Bank 3 |
|---|---|---|---|---|
| 64 MB | 2 x 32 MB | | | |
| 128 MB | 2 x 64 MB | | | |
| 256 MB | 2 x 128 MB | | | |

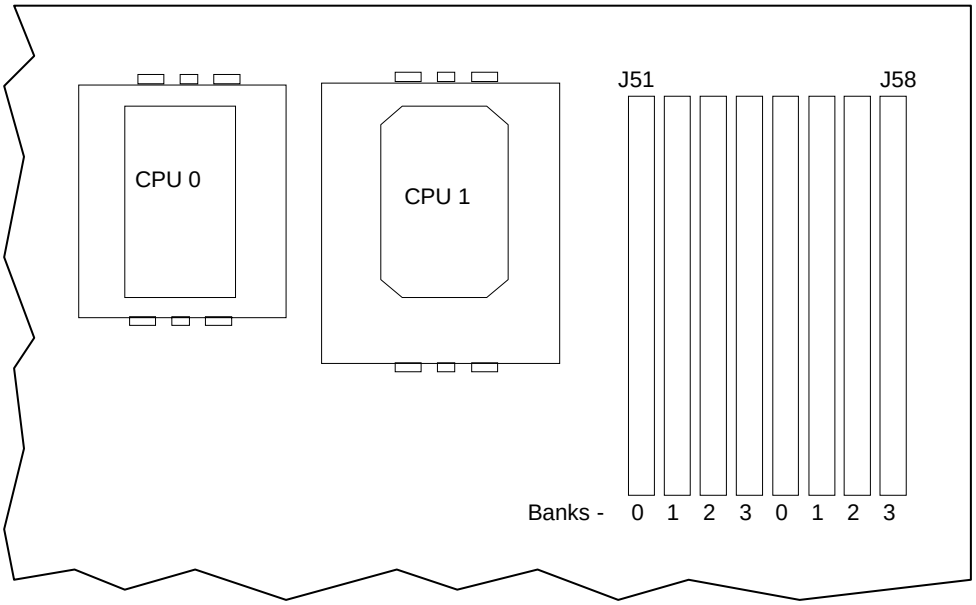
### First Upgrade

| Supported Memory | Bank 0 | Bank 1 | Bank 2 | Bank 3 |
|---|---|---|---|---|
| 128 MB | 2 x 32 MB | 2 x 32 MB | | |
| 256 MB | 2 x 64 MB | 2 x 64 MB | | |
| 512 MB | 2 x 128 MB | 2 x 128 MB | | |

### Second Upgrade

| Supported Memory | Bank 0 | Bank 1 | Bank 2 | Bank 3 |
|---|---|---|---|---|
| 256 MB | 2 x 32 MB | 2 x 32 MB | 2 x 32 MB | 2 x 32 MB |
| 512 MB | 2 x 64 MB | 2 x 64 MB | 2 x 64 MB | 2 x 64 MB |
| 1 GB | 2 x 128 MB | 2 x 128 MB | 2 x 128 MB | 2 x 128 MB |

The following figure shows the socket layout. The socket reference numbers are also printed on the system board.



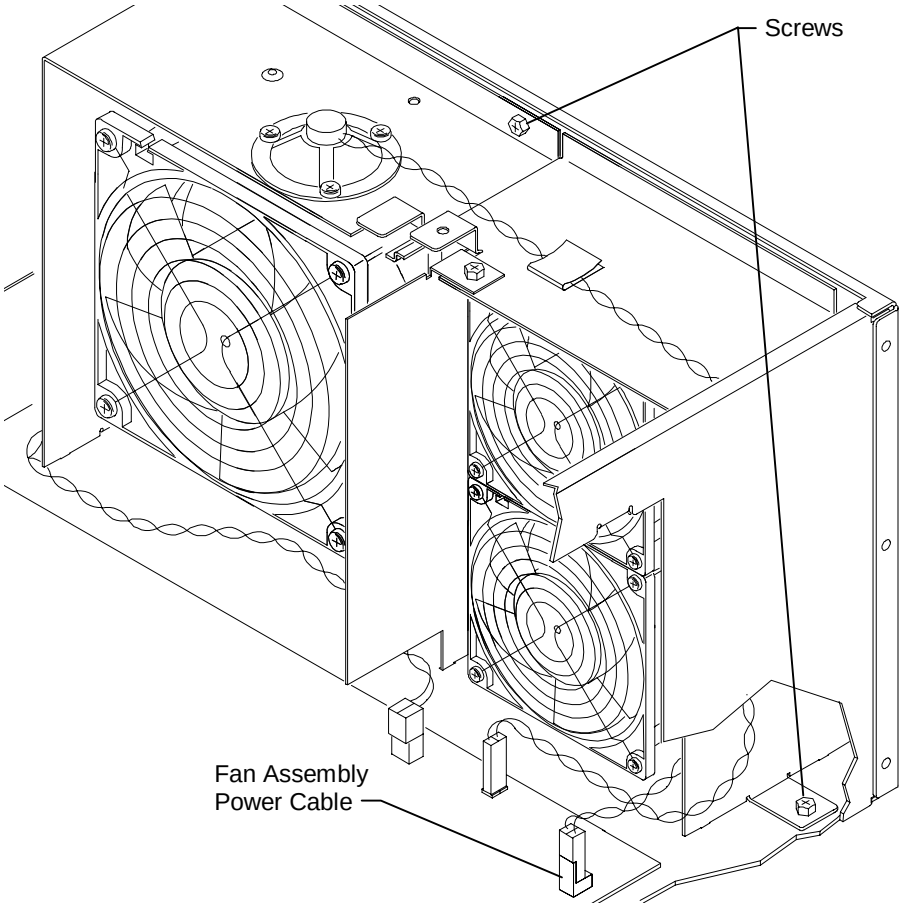

System memory modules available from Intergraph have been certified for use with Intergraph computers at extremes of temperature and system load to ensure reliable performance. System memory modules available from other vendors may function improperly or unreliably in your Intergraph computer.

# Option Board Fan Assembly

**NOTE** Replace the fan assembly as one unit. Do not remove individual fans.

**To relace the option board fan assembly:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Remove the two fan assembly screws as shown in the following figure.
3. Disconnect the fan assembly power cable from the system board.



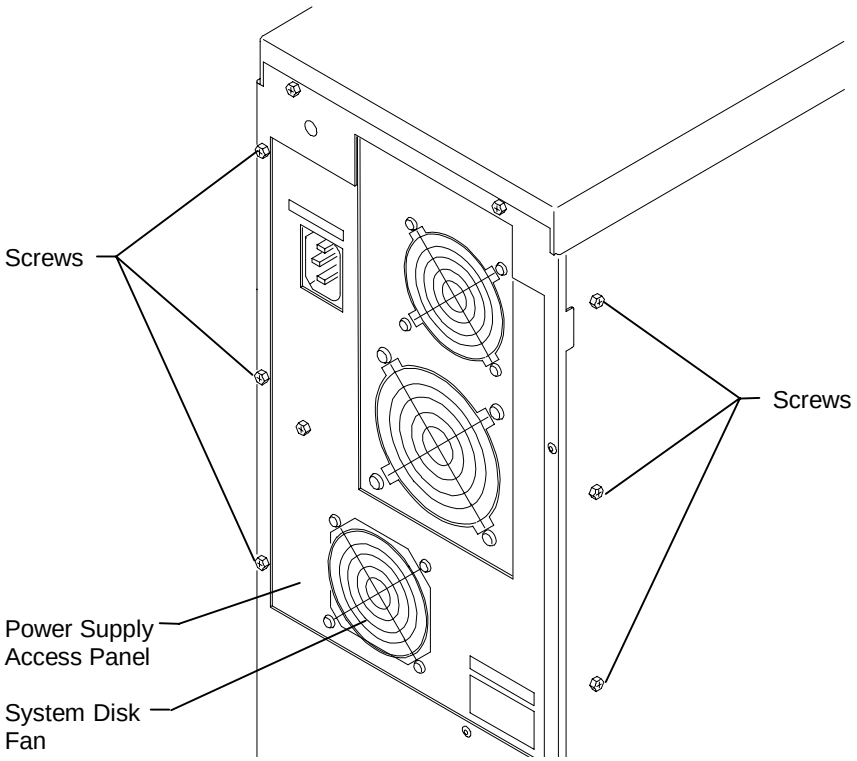

4. Remove the fan assembly from the base unit.
5. Install the new fan assembly into the chassis and connect the fan power cable to the system board connector J68.
6. Close the base unit.

# System Disk Fan (MCBLY690)

For InterServe 615 and 615UW systems without the internal RAID subsystem, a fan in the power supply access panel provides cooling to the system hard disk drive.

**To replace the system disk fan:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Remove the screws from the back cover as shown in the following figure. Pull on the side of the cover opposite the AC receptacle to disengage it.




**CAUTION** Do not remove the two screws at the top of the chassis. The power supply will fall down, damaging the system hard disk drive.

3. Disconnect the fan power cable from the system board J12.
4. Using a No. 1 Phillips screwdriver, remove the fan from the panel.
5. Attach the new fan to the back panel and connect the fan power cable to the system board.
6. Replace the back panel and close the base unit.

# Auxiliary Fan (CFAN111)

For systems with the internal RAID subsystem, a fan between the power supply and internal RAID section provides cooling to the RAID disk drives.

**To replace the auxiliary fan:**

1. Open the base unit and remove the necessary parts as described in Chapter 3.
2. Remove power supply as described previously in, “Fixed Power Supply (MPWS131).”
3. Disconnect the fan power cable from the system board connector J12.
4. Using a short No. 1 Phillips screwdriver, remove the screws securing the fan to the fan assembly.
5. Remove the fan assembly from the base unit, and remove the fan from the assembly.
6. Attach the new fan to the fan assembly.
7. Connect the fan power cable to the system board.
8. Replace the power supply.

# Lithium (CMOS/Clock) Battery

**WARNING There is a danger of explosion if the battery is incorrectly replaced.**

**WARNING Replace the battery with the same or equivalent type only, as recommended by the manufacturer. Dispose the discharged battery according to the manufacturer’s instructions.**

**To replace the Lithium battery:**

1. Remove the ISA boards if they are installed in the system.
2. Note the positive and negative orientation of the battery. Carefully remove the discharged battery by grasping it firmly and lifting upward.
3. Install the new battery in the same orientation as the discharged battery.
4. Replace the ISA boards.
5. Dispose the discharged battery according to the manufacturer’s instructions.

# 3 Upgrading the System

You can upgrade your server by adding processors, memory, internal or external SCSI devices (such as disk drives and tape drives), and option boards. This chapter also describes how to use the System Configuration Utility (SCU) when adding ISA option boards, non-compliant PCI option boards, and PC Card devices.

**WARNING** **Leave the AC power cord from the InterServe 615, 615UW, 625 and 625UW base unit connected to the AC wall outlet to maintain safety ground. If the AC power cord is disconnected, you could be injured or cause damage to the system.**

**WARNING** **Hazardous voltages exist inside the InterServe 635 and 645 base unit. Disconnect the AC power cord from the base unit before upgrading the system. If the AC power cord remains connected, you could be injured or cause damage to the system.**

**CAUTION** The parts inside the base unit are designed to fit within very tight tolerances; some force is required to remove or insert parts. However, if you cannot remove or install a part properly, ensure that there are no obstructions hindering the part.

# Adding Processors

Single to dual processor upgrade kits include a CPU with attached heat sink, Voltage Regulator Module (VRM), and a metal clip. Dual to quad upgrade kits contain two processors, two VRMS, two metal clips, a processor module (MSMT310), and screws.

## Single to Dual Upgrade

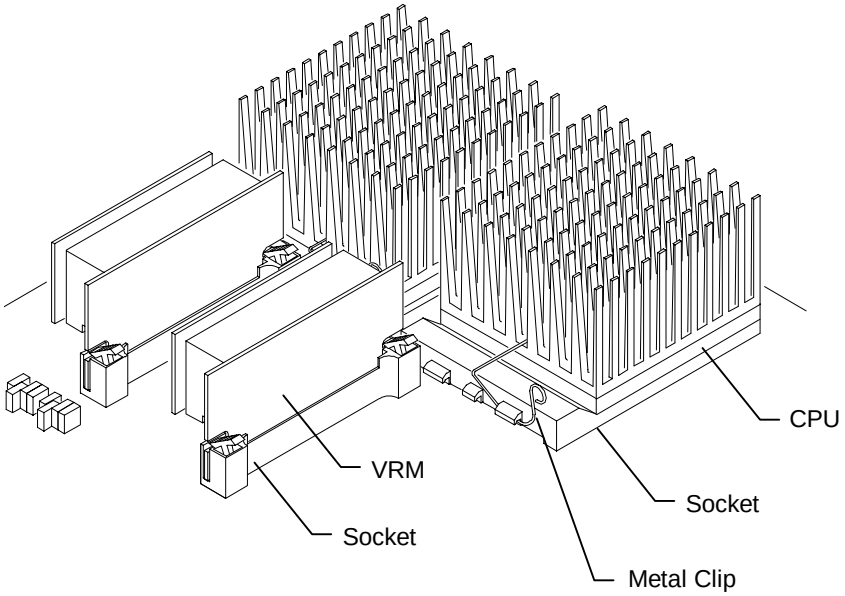
**To upgrade a single processor system:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.

**NOTE** If full-length ISA option boards are installed, they must be removed to access the CPU sockets.

2. Find the empty processor socket (adjacent to the existing CPU) on the system board. Raise the lever on the empty socket to open the socket.
3. Install the new CPU into the socket. The CPU socket is keyed to ensure proper insertion.
4. Lower the lever to lock the CPU in the socket.
5. Attach the metal clip over the new CPU. Examine how the clip on the first CPU is installed to see how it should fit on the new CPU. Ensure each end of the clip fully engages the socket tabs.
6. Attach the VRM into the empty VRM socket. Ensure the release tabs in the VRM socket fully engage the VRM.

   The following figure shows the finished upgrade with the new? CPU and VRM installed.




7. Replace the ISA option boards and close the base unit.

## Dual to Quad Upgrade

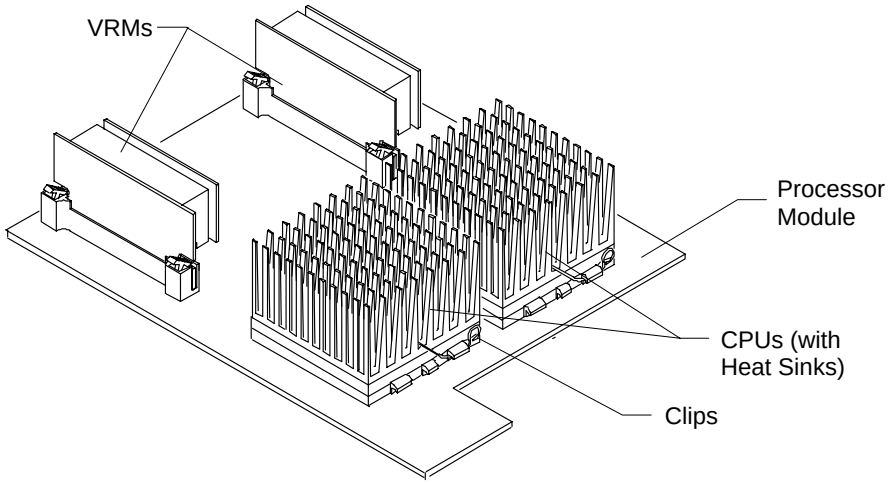
**To upgrade a dual processor system:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.

**NOTE** If PCI option boards are installed, they must be removed to access the quad processor sockets.

2. Remove the P6 bus termination card. The processor module will be installed in this location.
3. On the processor module, raise the lever on the empty sockets to open the sockets.
4. Install the CPUs into the sockets. The CPU sockets are keyed to ensure proper insertion.
5. Lower the lever to lock the CPU in the socket.
6. Attach a metal clip over each CPU. Ensure each end of the clip fully engages the socket tabs.
7. Attach the VRM into the empty VRM sockets. Ensure the release tabs in the VRM socket fully engage the VRM.

   The following figure shows the CPUs and VRMs installed on the processor module.




8. Align the processor module with the sockets that previously held the P6 bus termination card and carefully insert the module.
9. Press the processor module firmly into the sockets. Secure the module with screws supplied in the kit.
10. Replace the PCI option boards and close the base unit.

# Adding Memory

You can expand the system memory up to double the base memory. The memory upgrade kit from Intergraph contains two SIMMs and a disposable antistatic wrist strap.

**CAUTION** System memory modules available from Intergraph have been certified for use with Intergraph computers at extremes of temperature and system load to ensure reliable performance. System memory modules available from other vendors may function improperly or unreliably in your Intergraph computer.

To avoid damaging the SIMMs and voiding the warranty, take the following precautions.

- Do not bend, twist, drop, or otherwise handle the SIMMs carelessly.
- Do not expose the SIMMs to moisture or extreme temperatures.
- Do not remove the SIMMs from the antistatic bag until installation.

The following table shows valid memory configurations. Each bank contains two sockets, and both sockets must be populated. Memory density must be the same in all populated sockets. NP designates not populated.

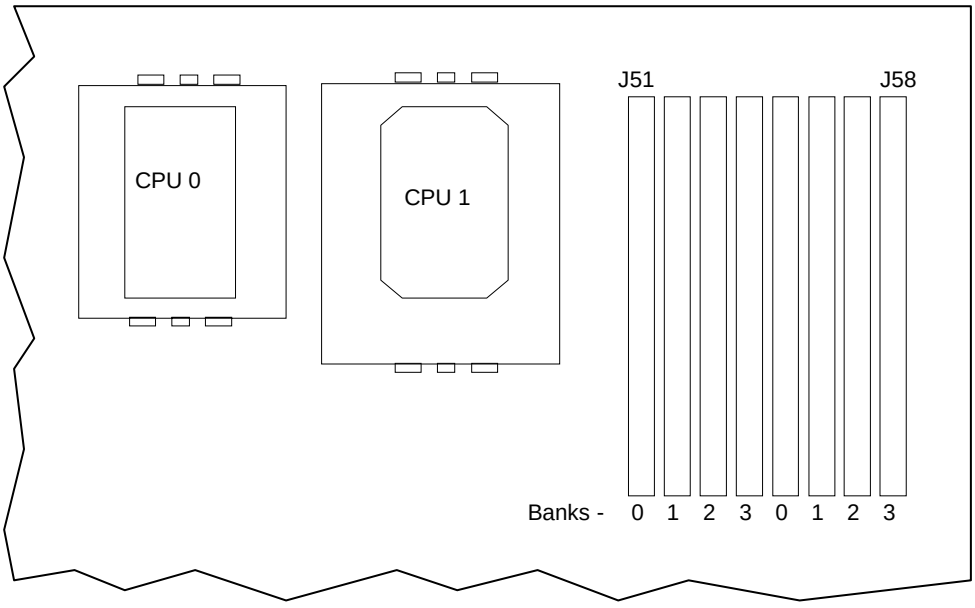
| Supported Memory | Bank 0 | Bank 1 | Bank 2 | Bank 3 |
|---|---|---|---|---|
| 64 MB | 2 x 32 MB | NP | NP | NP |
| 128 MB | 2 x 64 MB | NP | NP | NP |
| | 2 x 32 MB | 2 x 32 MB | NP | NP |

| Supported Memory | Bank 0 | Bank 1 | Bank 2 | Bank 3 |
|---|---|---|---|---|
| 256 MB | 2 x 128 MB | NP | NP | NP |
| | 2 x 64 MB | 2 x 64 MB | NP | NP |
| | 2 x 32 MB | 2 x 32 MB | 2 x 32 MB | 2 x 32 MB |
| 512 MB | 2 x 128 MB | 2 x 128 MB | NP | NP |
| | 2 x 64 MB | 2 x 64 MB | 2 x 64 MB | 2 x 64 MB |
| 1 GB | 2 x 128 MB | 2 x 128 MB | 2 x 128 MB | 2 x 128 MB |

**To install the memory upgrade:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Using a quarter-inch nutdriver, remove the graphics boards and other installed PCI option boards.
3. Remove the existing SIMMs from their sockets before adding new ones.
4. Remove the SIMMs from the antistatic bag and install them in this order:
   - If the total number of installed SIMMs will be four, install the SIMMs in the Bank 1 sockets first, then in the Bank 0 sockets.
   - If the total number of installed SIMMs will be eight, install the first SIMM in socket J58. Install the remaining SIMMs in the next empty socket until socket J51 is the last socket populated.

   The following figure shows the socket layout.




5. Position the SIMM in the next available socket so that the notch faces the back of the base unit.
6. Insert the SIMM at a 60 degree angle, pressing it firmly into the socket.
7. Push on the top edge of the SIMM until it snaps into the metal clips. The socket tabs must fit inside the mounting holes of the SIMM.
8. Repeat steps 5 through 7 for the remaining SIMMs.

9. Replace the graphics and PCI option boards and close the base unit.
10. Restart the system. The new memory is recognized automatically.

# Adding Internal SCSI Devices

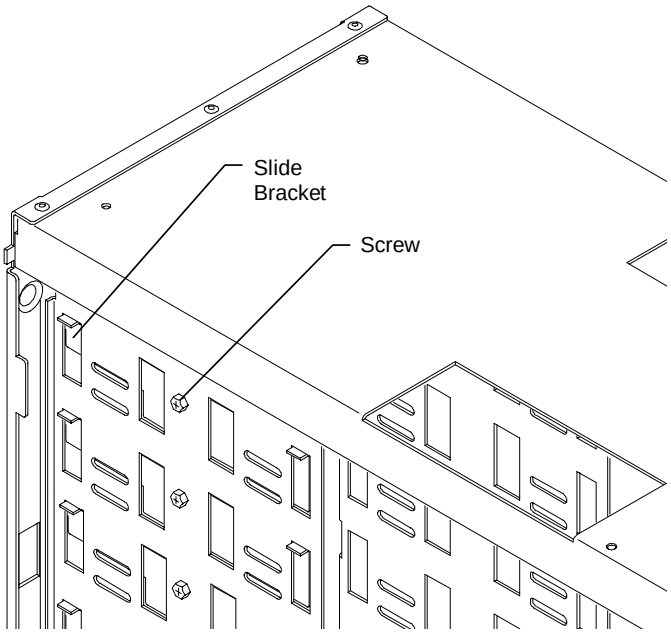
You can install internal SCSI devices such as hard disk drives, tape drives, and CD-ROM drives in the auxiliary drive bays of the server. However, a bracket must be removed from the destination bay prior to installation. The bays are designed to accommodate one-inch high devices. If the device is more than one inch high, then the bay underneath must be empty.

**NOTE** When installing a SCSI device, carefully follow the vendor's instructions for setting the SCSI ID and disabling the SCSI termination before installing the devices.

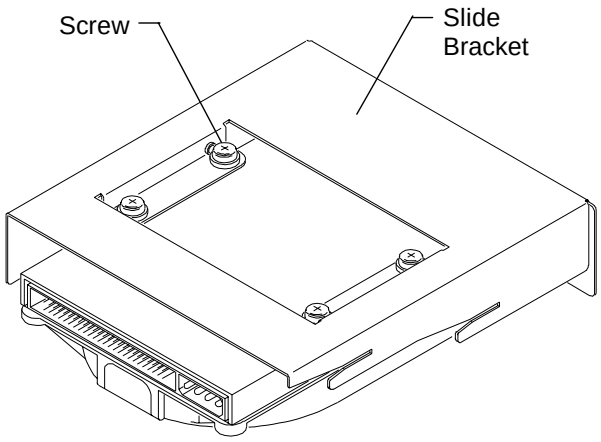
**NOTE** Systems with the internal RAID subsystem have one bay available for an optional SCSI device. Systems without internal RAID have five bays available.

**To install an internal SCSI device in the auxiliary drive bay:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Select a bay to install the device and remove the blanking plate or other device from the destination bay.
3. Remove the screw that secures the disk drive slide bracket to the destination bay, and remove the bracket. Refer to the following figure.




4. Disable the device's SCSI termination, and set the device's SCSI ID to an unused number.
5. If installing a hard disk drive, mount the disk drive into the slide bracket using four screws.




**NOTE** Do not mount tape drives or CD-ROM drives to the slide bracket.

6. Slide the device into the drive bay and secure it to the metal chassis.
7. Connect the power cable and SCSI cable to the device.
8. Close the base unit.
9. Restart the system.
10. If necessary, install the device's drivers and configure the device according to the vendor's instructions.

# Adding External SCSI Drives

You can add single-ended external SCSI drives to the system by connecting them to the SCSI port on the back of the base unit. Additional SCSI option boards (adapters) can be installed to support external SCSI drives as well. The section "Adding Option Boards" earlier in this chapter describes installing new boards.

The Adaptec AIC 7860 SCSI controller on the system board provides the Ultra SCSI bus for external devices.

## SCSI Cable Guidelines

If you are using a SCSI adapter card, this information also applies.

The number of drives and length of the cables used to connect the drives becomes a factor when using SCSI-1, Fast (SCSI-2), Ultra SCSI, and Ultra Wide SCSI drives. Fast SCSI, and Ultra SCSI impose shorter cable restrictions than SCSI-1. The total length of the SCSI cabling must not exceed the following:

| Drives | SCSI-1 | Fast SCSI-2 | Ultra SCSI |
|---|---|---|---|
| 1 to 4 | 19.8 feet (6 meters) | 9.9 feet (3 meters) | 9.9 feet (3 meters) |
| 5 to 7 | 9.9 feet (3 meters) | 9.9 feet (3 meters) | 4.5 feet (1.5 meters) |

**NOTE** The SCSI controller (on the system board or an adapter card) counts as one device.

The total length of the SCSI cabling is the sum of the following:

- SCSI cable inside the base unit - 6.0 inches (15 cm)
- SCSI cable inside each device - average 8 inches, (20 cm)
- SCSI cable between the base unit and the first device
- SCSI cable between each device

**To install an external SCSI device:**

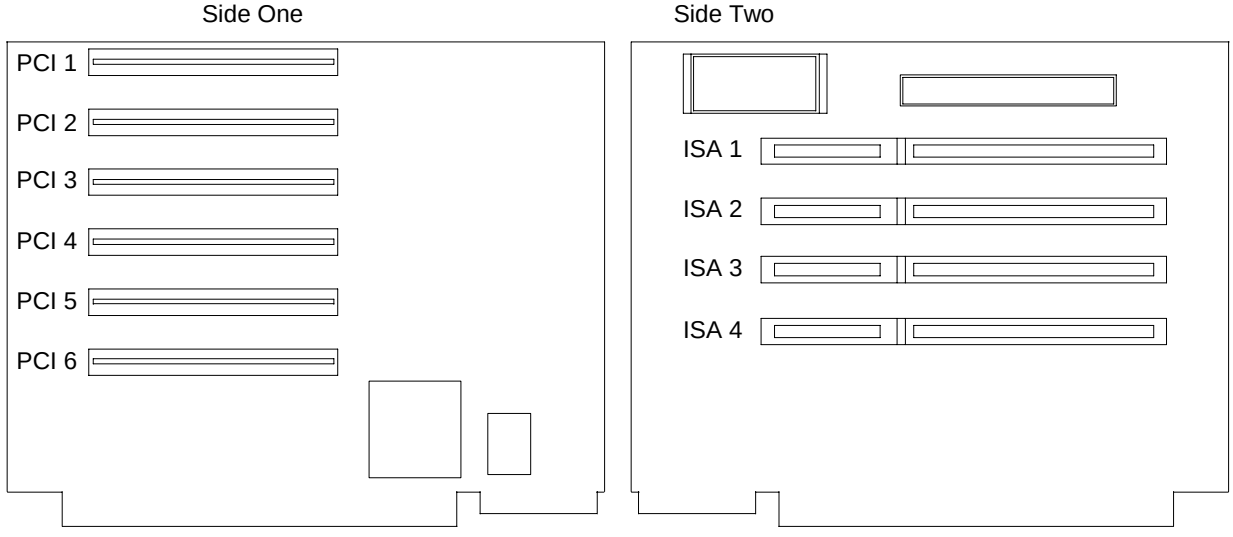
1. Set the device's SCSI ID to an unused number and enable or disable the device's SCSI termination according to the note above and the vendor's instructions.
2. Connect one end of the SCSI cable to the Fast SCSI-2 port on the back of the base unit. If external devices are already installed, connect the SCSI cable to the available SCSI port on the last device on the SCSI cable chain.
3. Connect the device to the other end of the SCSI cable.
4. If necessary, install the device drivers and configure the device according to the vendor's instructions.

# Adding Option Boards

This section briefly describes the differences between Peripheral Component Interconnect (PCI), ISA, and Plug-n-Play (PnP) option boards. Instructions are also provided for installing option boards into the system.

Option boards are installed on the riser card. PCI boards connect to side one of the riser card, while ISA and PnP boards can be installed on side two. The following figure shows the slots on the riser card.

**NOTE** PCI slots 1 through 4 are on the secondary PCI bus. PCI slots 5 and 6 are on the primary PCI bus.



## PCI Boards

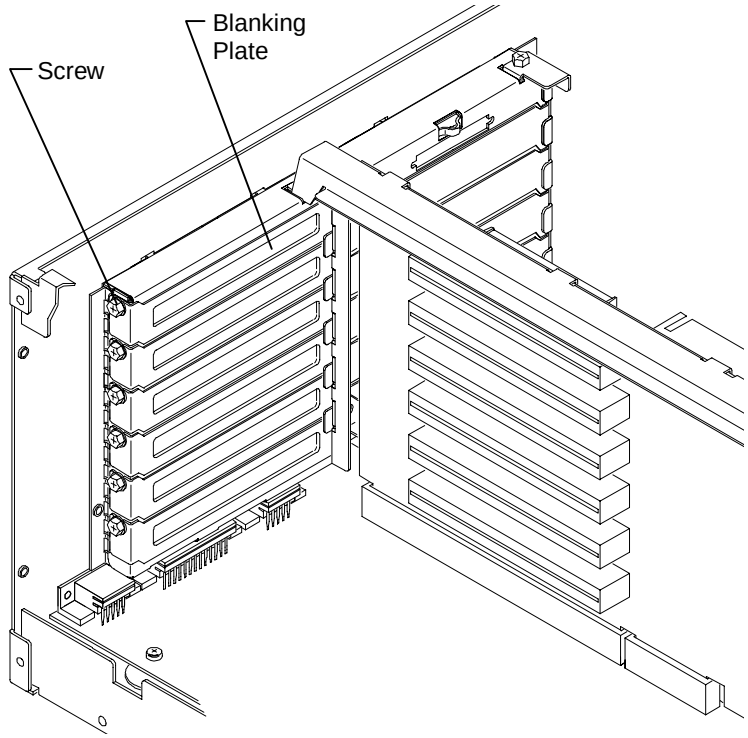
PCI boards do not require manual system configuration when installing the board. The system BIOS detects the board's presence during startup and reads information from the board's configuration registers to assign the necessary system resources. Some PCI boards do not comply with the PCI specification, and must be configured as if they were ISA boards using the System Configuration Utility (SCU). Intergraph only provides PCI boards that comply with the specification.

**NOTE** PCI Slot 6 is not available in quad processor systems. If you plan to upgrade a dual-processor system to four processors, the PCI card installed in PCI slot 6 will have to be moved.

**CAUTION** The system's PCI slots are limited to 25 W power dissipation per the *Peripheral Component Interconnect Specification*. Therefore, PCI boards must draw less than 25 watts of power.

**To install PCI option boards:**

1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Using a quarter-inch nutdriver, remove the blanking plate from an available PCI slot. Refer to the following figure.




3. Install the PCI board. Press firmly to ensure the board seats completely into the riser card slot.
4. Mount the board to the chassis using the screw removed previously.
5. Close the base unit.
6. Restart the system. The new PCI board is recognized and configured automatically during boot up. If the PCI board does not comply with the PCI specification it must be configured as if it were a ISA board using System Configuration Utility (SCU).

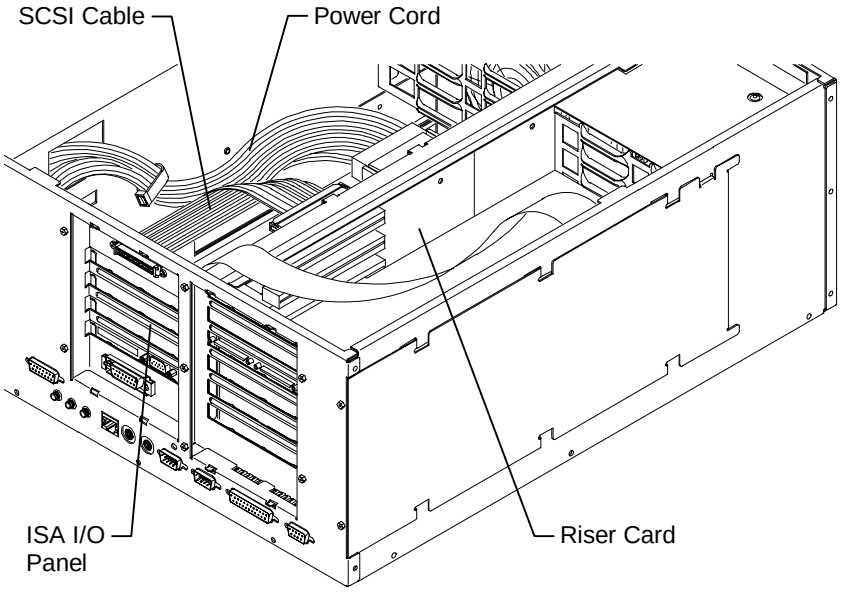
## ISA and PnP Option Boards

ISA boards are not designed with internal registers that define the board configuration to the system during startup. Therefore, you must run the SCU to define the board to the system. Run the SCU before installing an ISA board to reserve system resources for the board and to prevent conflicts with option boards already installed. Refer to "Using the System Configuration Utility" later in this chapter.

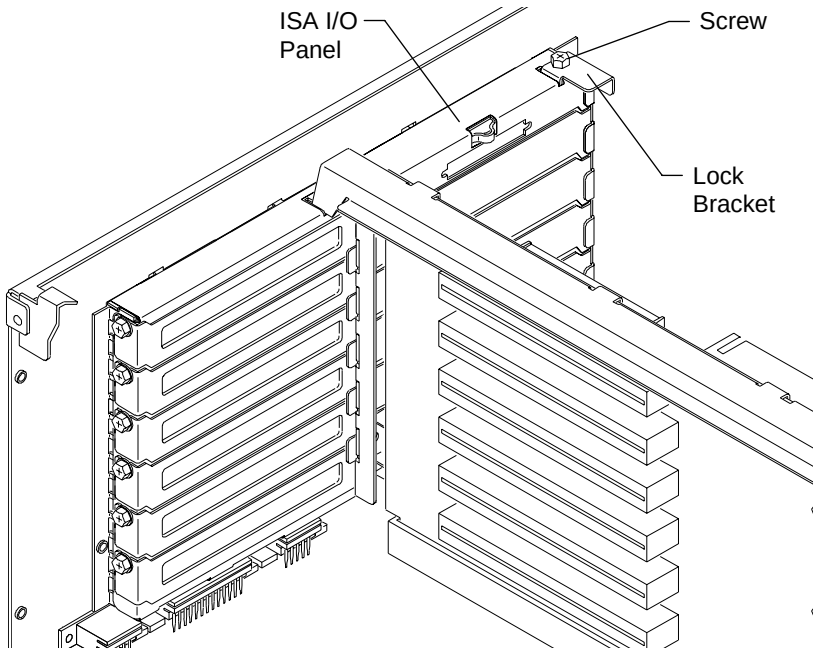
PnP boards are ISA boards that contain configuration registers like PCI boards. You do not have to run the SCU to define a PnP board. During startup, the system BIOS automatically detects the installed board and assigns the necessary system resources. Since PnP boards are ISA-based boards, they can be installed in the same slots as ISA boards.

**To install ISA and PnP boards:**

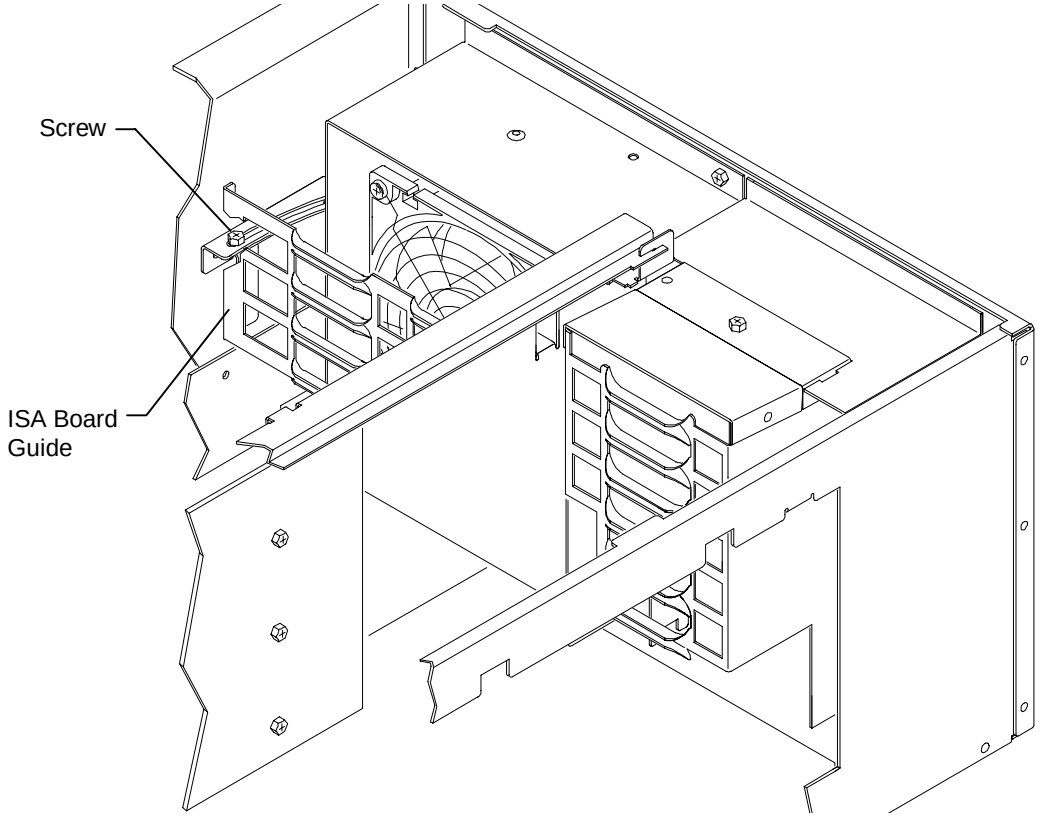
1. Open the base unit and remove the necessary parts as described in Chapter 1.
2. Disconnect the power cable and SCSI cable from the riser card. Refer to the following figure.




3. Remove the screw securing the ISA I/O lock bracket as shown in the following figure. Pull up the bracket to remove it. The internal cables have been omitted for clarity.


ISA I/O
Panel
Screw
Lock
Bracket

4. Loosen the screw to allow the pivoting ISA board guide to swing toward the system fans. Refer to the following figure.




5. Install the option board into the first available slot from the system board. Press firmly to ensure the board seats completely in the slot.
6. Slide the pivoting board bracket over the edge of the ISA board; then tighten the screws.
7. Secure the ISA board to the chassis by installing the I/O lock bracket, which installs in only one orientation. Mount the bracket to the chassis using the screw removed previously.
8. Close the base unit.
9. Restart the system. If you installed an ISA board, the installation is complete. If you installed a PnP board, notice when the following message displays.

   ```
   Hit DEL if you want to run SETUP
   ```

10. Press DELETE to run AMIBIOS Setup.
11. When the main menu displays, select the Advanced Setup icon.
12. Click on the Boot to PnP Operating System parameter and select Enable in the Options menu. Press ENTER.
13. Exit AMIBIOS Setup and restart the system.

# Using the System Configuration Utility

The SCU is an MS-DOS utility that will not run in the Windows NT environment. Use the System Utilities (SYSUTIL) diskette delivered with your system to boot the system into MS-DOS. The system must be set to boot from the floppy disk drive (normally drive A) to use the SCU. If necessary, refer to "Changing the System Boot Sequence" later in this chapter.

**NOTE** If installing a PC Card device or a non-compliant PCI card, which require specific system resources, treat the device as if it were an ISA option board.

## ISA Boards with a Configuration File

Some ISA boards are shipped with a diskette containing a configuration file. The configuration file can be loaded to the system so that the BIOS reads this file to assign resources during startup. If you install ISA boards that are shipped with a configuration diskette, follow this procedure.

**NOTE** If a configuration diskette is not delivered with the option board, refer to "ISA Boards without a Configuration File" later in this chapter.

**To define ISA boards with a configuration file:**

1. Shut down and power off the system.
2. Insert the SYSUTIL diskette into the floppy diskette slot of the combo drive; then restart the system.
3. When the MS-DOS Startup menu displays, select option 1 to run the SCU.
4. Use the arrow keys or the mouse to select Step 2 from the SCU Main Menu. Then press INSERT to add a board that was not detected or has not been installed.

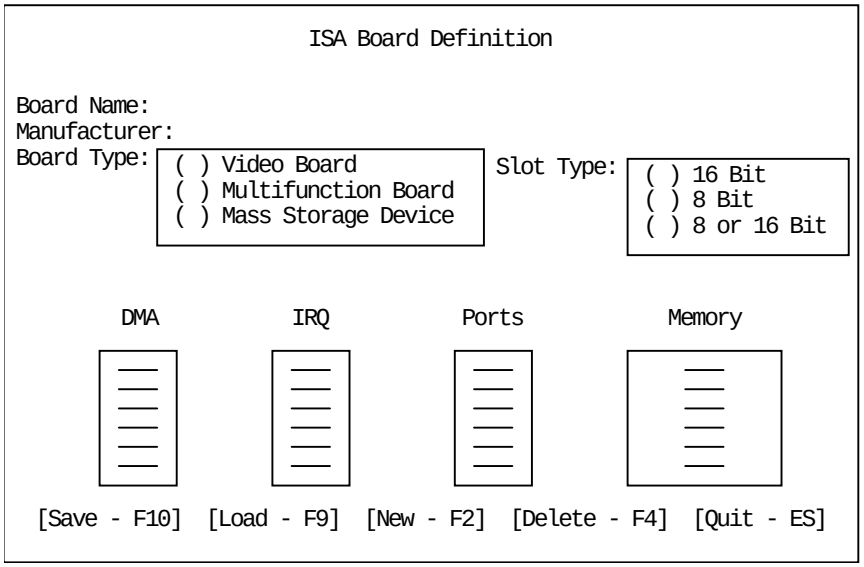
   A prompt displays requesting you to copy the configuration files needed to configure the system. The configuration file is on a diskette provided by the ISA board manufacturer.
5. Press ENTER to accept A:\ as the path to the configuration file.
6. Select the slot where the board will be installed. Only slots 1 through 4 are valid for the server.
7. When prompted to insert the source disk, insert the diskette containing the configuration file and press ENTER.
8. When prompted to insert the destination disk, insert the SYSUTIL diskette and press ENTER. The configuration file from the option board manufacturer will be installed to the system and to the SYSUTIL diskette.
9. Press ESC to return to the SCU Main Menu.
10. Select Step 4 to save the configuration, and then select Step 6 to exit the SCU.
11. Remove the diskette from the combo drive and restart the system.

## ISA Boards without a Configuration File

Some ISA board vendors do not include configuration files with their boards. For these boards, you must use the SCU to define the ISA board to the system (that is, manually create a configuration file).

**To define ISA boards without a configuration file:**

1. Shut down and power off the system.
2. Insert the SYSUTIL diskette into the floppy diskette slot of the combo drive; then restart the system.
3. When the MS-DOS Startup menu displays, select option 1 to run the SCU.
4. From the SCU Main Menu, select Step 2, then press F6. The ISA Board Definition Menu displays as shown in the following figure.




5. Enter the data specified in the manufacturer's configuration instructions.

**NOTE** Use the TAB and arrow keys to move the cursor from field to field. Once inside the DMA, IRQ, and Ports fields, press ENTER to display the sub-fields for entering the information.

6. Press F10 to save the data to the system.
7. Press ENTER to return to the ISA Board Definition Menu.
8. Press ESC to return to the SCU Main Menu.
9. Select Step 2. The Add and Remove Boards Menu displays.
10. Select the required slot number and press INSERT.
11. Select INSERT again to add the board. The ISA Board Database Menu displays.
12. Select the correct board name and press ENTER.
13. When the Slot Selection Menu displays, select the required slot and press ENTER.
14. Press ESC to return to the SCU Main Menu.
15. Select Step 4 to save the configuration.
16. Select Step 6 to exit the SCU.
17. Remove the diskette from the combo drive; then restart the system.

## Changing the System Boot Sequence

**To change the system boot sequence:**

1. Restart the system.
2. Press DELETE when the following message displays:

   ```
   Press DEL if you want to run Setup
   ```

   The AMIBIOS Setup Main Menu displays.
3. In the Setup menu, click the Advanced icon. A list of parameters displays.
4. Click the System Boot Up Sequence parameter. The Options menu displays, with a choice of boot sequences. The default is C:, A:, which designates the system hard disk drive (C:) as the initial boot device, followed by the floppy disk drive (A:).
5. Click the A:, C: parameter to reverse the boot sequence; then press ENTER.
6. Select Exit and Save to exit AMIBIOS Setup.
7. Restart the system.

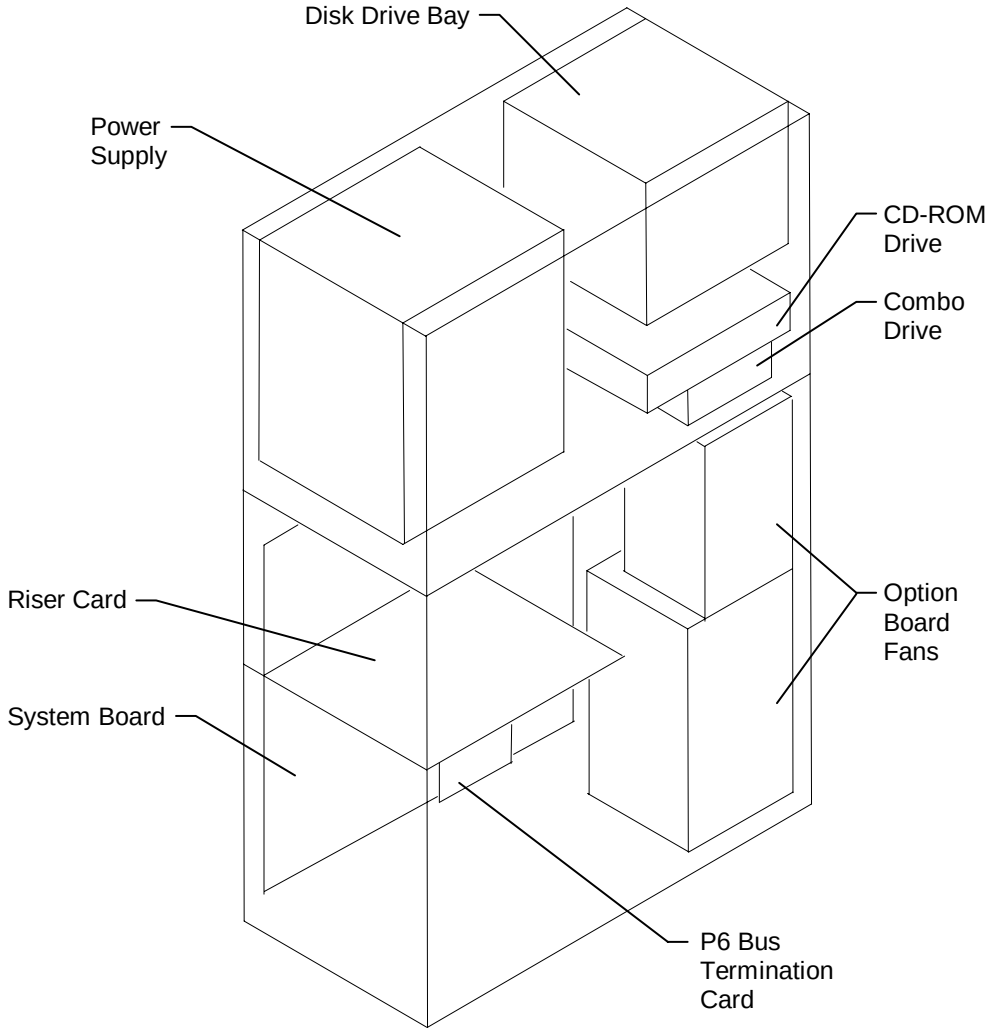
Until the boot sequence is changed back to C:, A:, the system will check for a bootable diskette in the floppy disk drive before attempting to boot from the system's boot disk drive.

# 4 System Hardware Overview

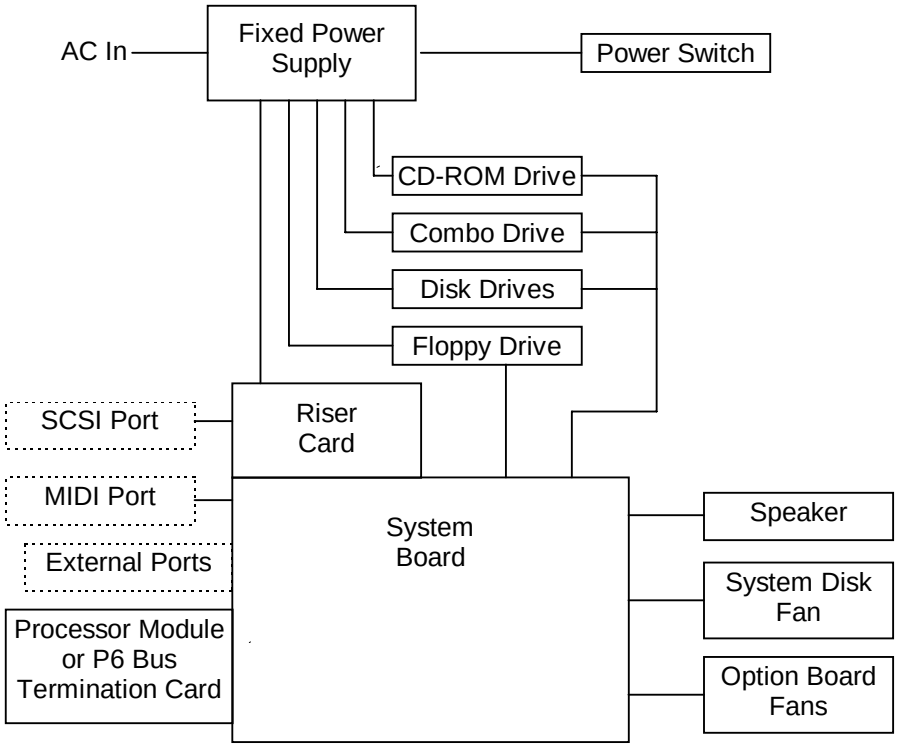
This chapter provides an overview of the InterServe 615, 625, 635, and 645 systems. The "Major Assemblies" sections show relative locations of components such as power supplies, peripherals, and boards. The "Functional Diagram" sections provide an overview of the power and data signal paths between the major assemblies. The table after each diagram refer to pages in Chapter 5 for specific wiring diagrams, connector pinouts, and other information.

## InterServe 615, 615UW, 625UW (Non-RAID)

### Major Assemblies



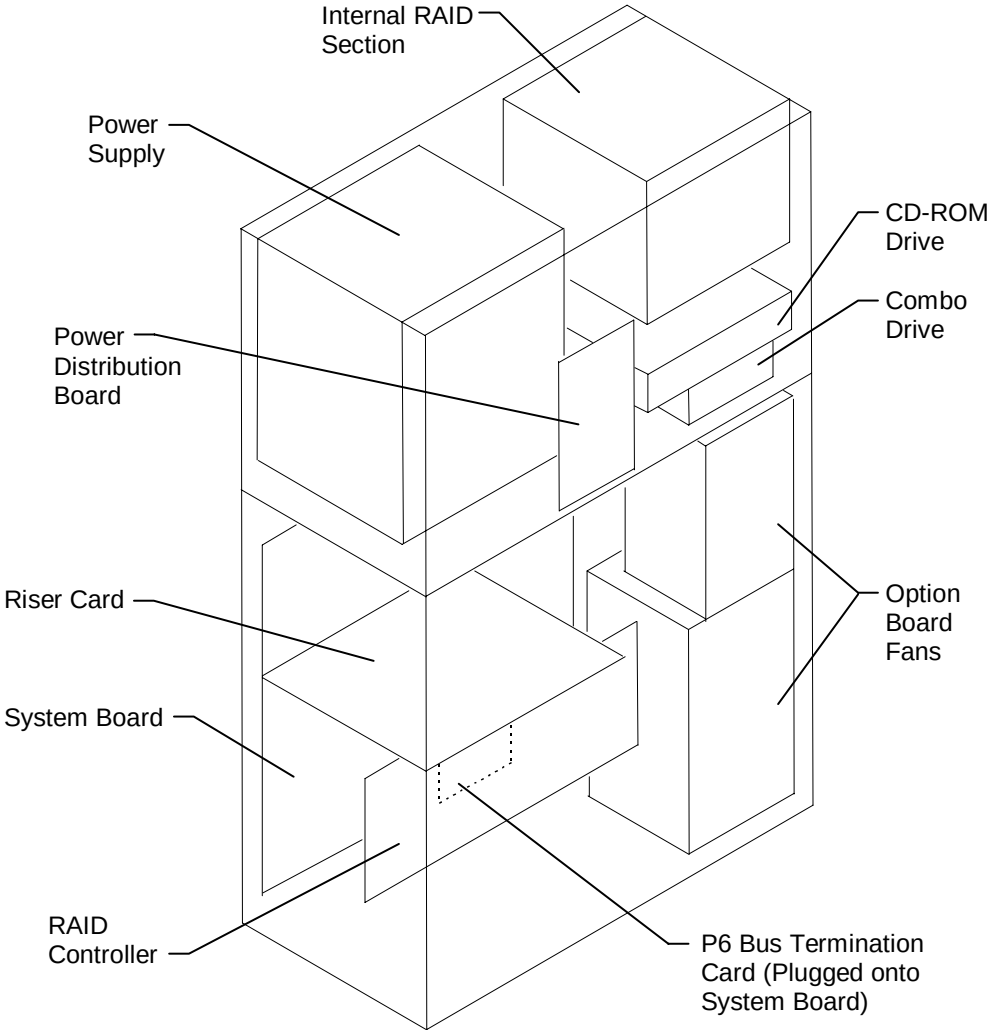
## Functional Diagram



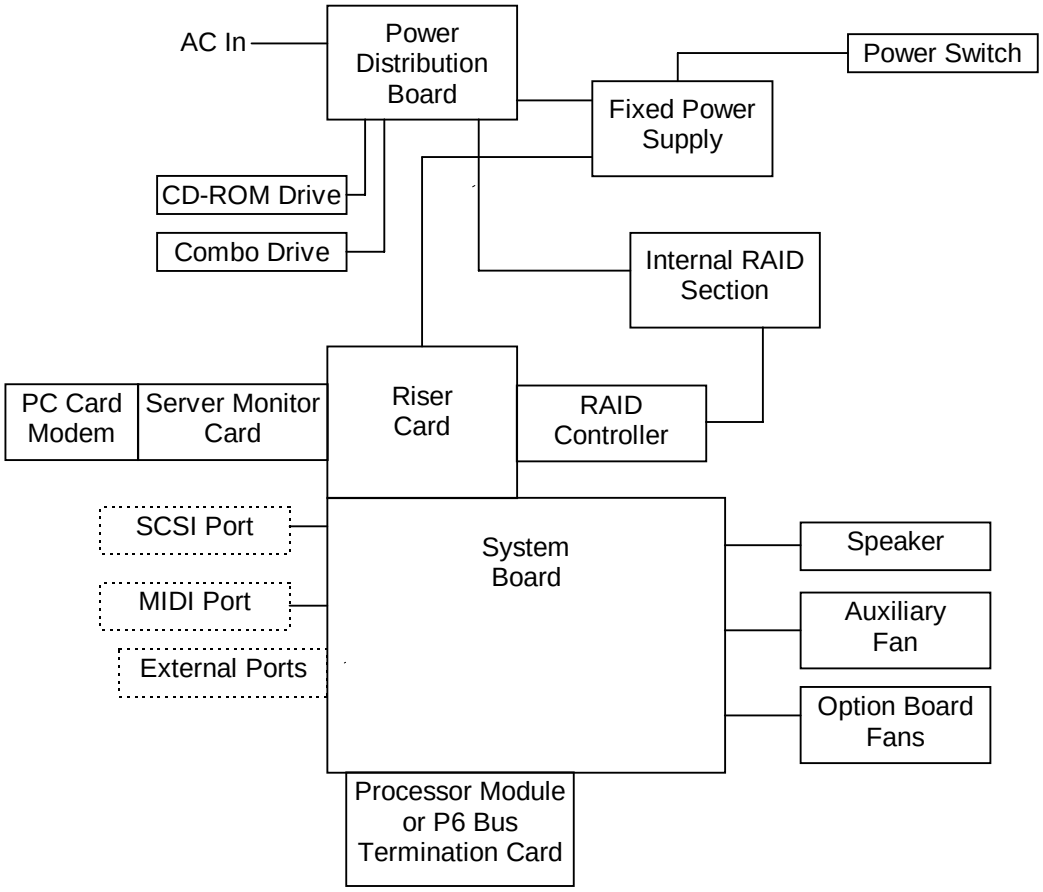

| Item | Part Number | Page |
|---|---|---|
| Fixed Power Supply | MPWS131 | 75 |
| CD-ROM Drive | CDSK106 | 83 |
| Combo Drive | MESAM86 | 84 |
| Fixed Disk Drives | CDSK*xxx* | 85 |
| Riser Card | MSMT463 | 79 |
| System Board | MSMT359 | 49 |
| Option Board Fans | MCBLZ520, MCBLY690 | 88 |
| System Disk Fan | MCBLY690 | 88 |

# InterServe 615, 625 (Internal RAID)

## Major Assemblies



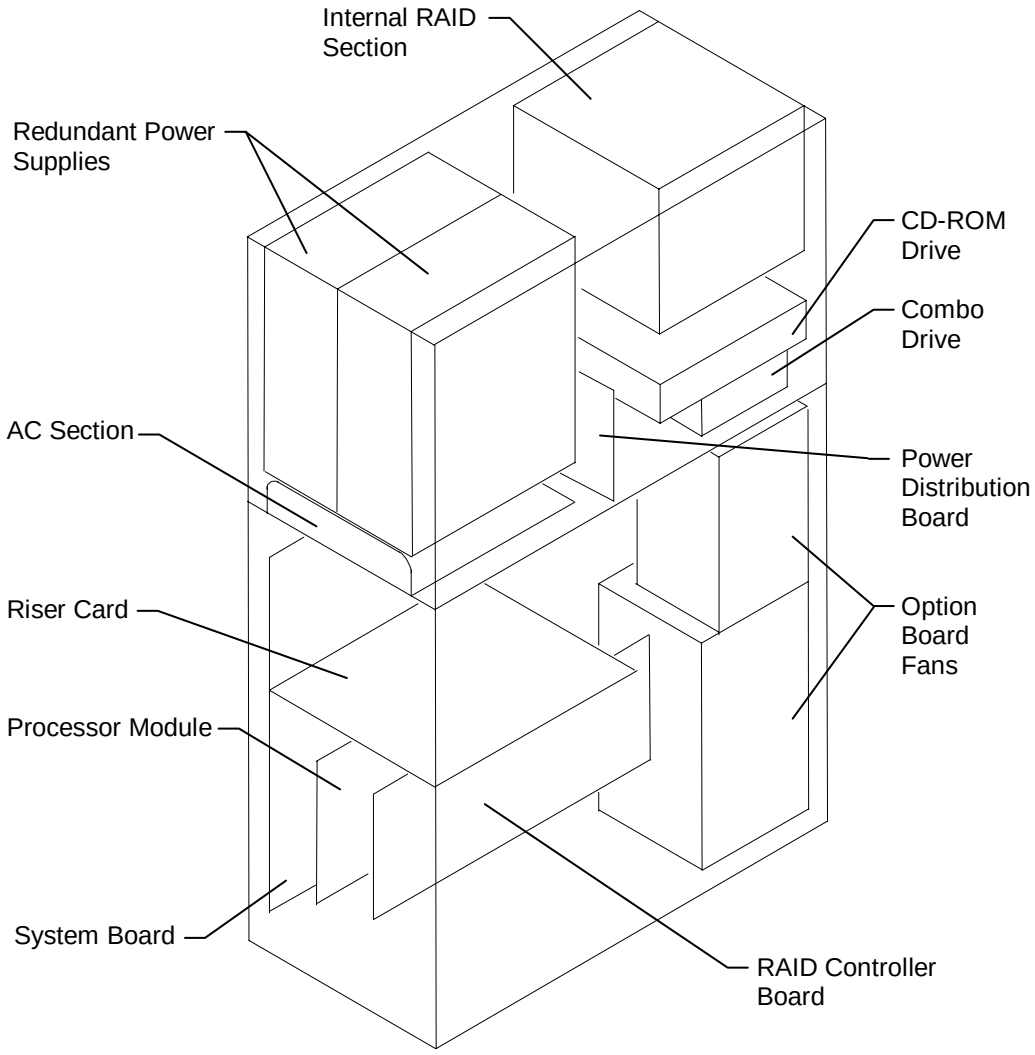
## Functional Diagram



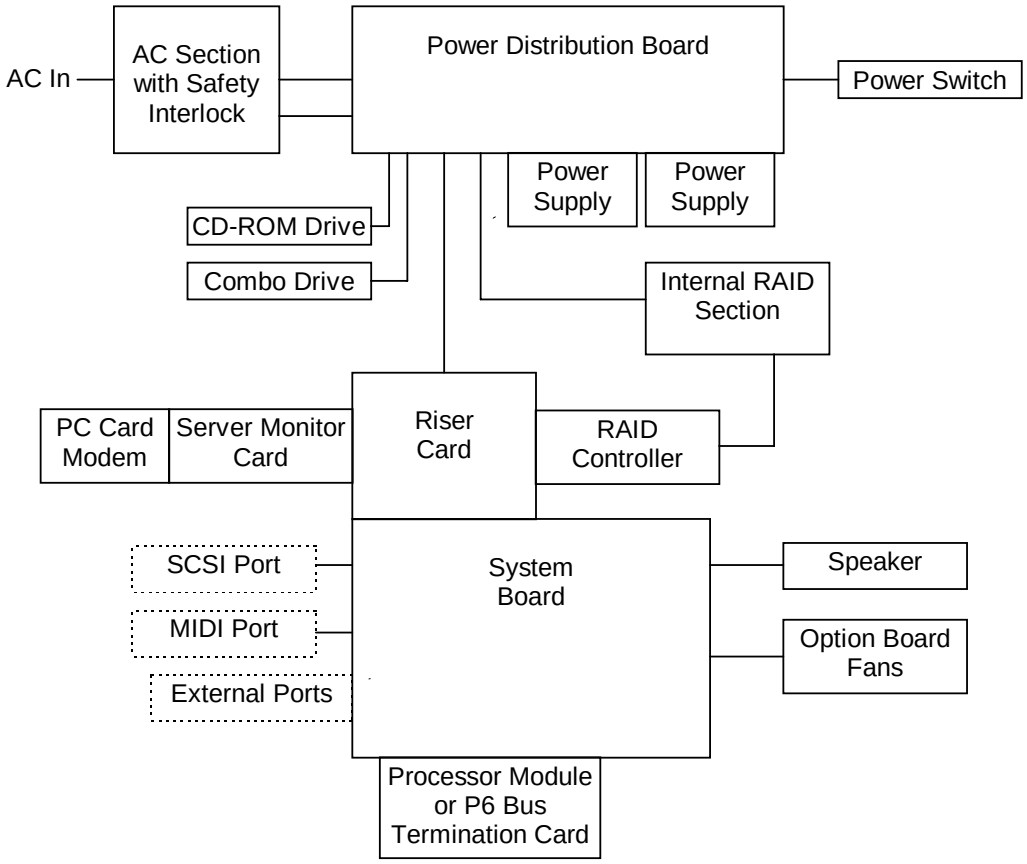

| Item | Part Number | Page |
|---|---|---|
| Power Distribution Board | MPCBD13 | 65 |
| Fixed Power Supply | MPWS131 | 75 |
| CD-ROM Drive | CDSK106 | 83 |
| Combo Drive | MESAM86 | 84 |
| Internal RAID Section | MESAN15 | 80 |
| Riser Card | MSMT280 | 79 |
| System Board | MSMT359 | 49 |
| Option Board Fans | MCBLZ520, MCBLY690 | 88 |
| Auxiliary Fan | CFAN111 | 88 |

# InterServe 635, 645

## Major Assemblies



## Functional Diagram




| Item | Part Number | Page |
|---|---|---|
| AC Section | MESAN14 | 73 |
| Power Distribution Board | MPCBD17 | 67 |
| Redundant Power Supplies | MPWS138 | 77 |
| CD-ROM Drive | CDSK106 | 83 |
| Combo Drive | MESAM86 | 84 |
| Internal RAID Section | MESAN15 | 80 |
| Riser Card | MSMT280 | 79 |
| System Board | MSMT359 | 49 |
| Option Board Fans | MCBLZ520, MCBLY690 | 88 |

# 5 System Hardware Information

This chapter contains technical information about the boards and other hardware that comes standard with the InterServe 615, 615UW, 625, 625UW, 635, and 645 servers. The following hardware items are described.

- Internal cables
- System board (MSMT359)
- External Ports
- Power Distribution Board (MPCBD13)
- Power Distribution Board (MPCBD17)
- AC Section (MESAN14)
- Fixed Power Supply (MPWS131)
- Redundant Power Supplies (MPWS138)
- Riser Card (MSMT280 and MSMT463)
- Peripherals
- System Fans

## Internal Cables

The following cables are used in the system base unit.

| Part Number | Description |
|---|---|
| MCBL038A | MIDI cable |
| MCBL067A | Floppy cable |
| MCBL234A | Internal SCSI drives |
| MCBL176A | SCSI cable for external drives |
| MCBLY690 | Option boards fan (80 m) |
| MCBLZ520 | Option boards fan (119 mm) |
| MCBL172A | System disk fan (80 mm) |
| MCBL234A | Wide SCSI cable for internal drives |
| MCBLY110 | Audio cable for CD-ROM drive |
| MCBLY520 | Speaker cable |
| MCBLZ390 | On/Off cable |
| MCBLZ530 | Deskside fan power cable |
| MCBLZ610 | Deskside power on LED cable |
| MCBLZ620 | Deskside SCSI active LED cable |
| MCBLZ660 | Deskside auxiliary fan power cable |

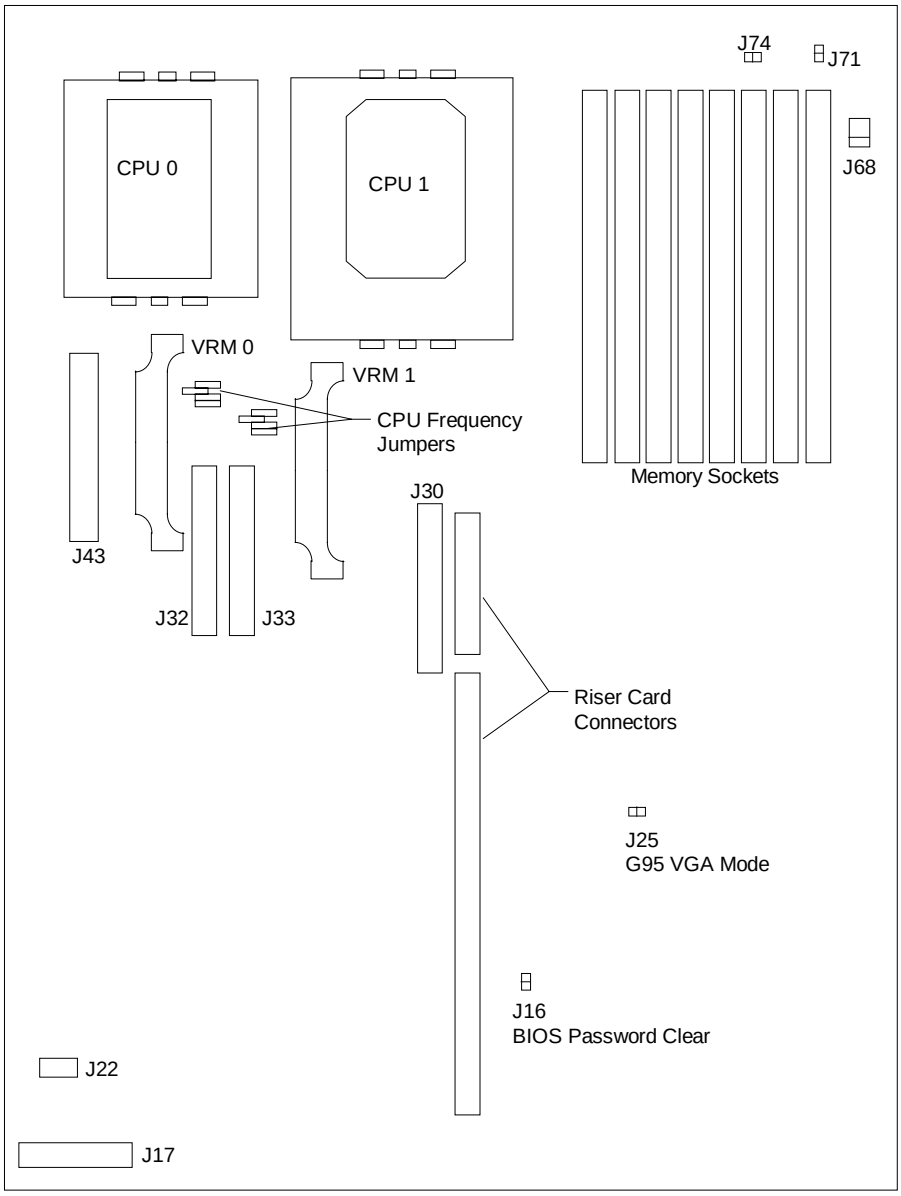
# System Board (MSMT359)

This section provides cable and jumper connectors, board components, memory addresses, I/O addresses, and DMA channels for the MSMT359. The system board provides the following system functionality:

- Processors - one to four Intel Pentium Pro 200 MHz, each with 512 kB L2 cache
- PCI Bridge - Intel Orion PCI bridge provides the interface between the processors and PCI expansion bus
- PCI to ISA Bridge - Intel 82379AB provides the interface betwwen the ISA expansion bus and the PCI bus
- Memory - eight memory sockets and Intel memory controllers supports up to 1 GB of four-way interleaved memory
- Networking - Intel 82557 provides Ethernet 10Base-T or 100Base -TX protocol, autodetects network type
- SCSI - Adaptec 7860 Ultra SCSI controller supports external SCSI drives
- System I/O - Standard Microsystems Corporation FDC37C932 Super I/O Controller for control of mouse, keyboard, floppy disk drive, Real Time Clock, Non-Volatile RAM, serial ports, and parallel port

## Cable and Jumper Connectors

The following figure shows the location of the cable and jumper connectors. The CPU, VRM, memory sockets, and riser card connectors are provided for reference.



### Cable Routing and Pinouts

The following table shows the cable routing from the system board connectors to the various system components.

| From MSMT359 | Cable | To |
|---|---|---|
| J17, MIDI | MCBL038A | External MIDI port |
| J22, Audio | MCBLY110 | CD-ROM drive |
| J30, Floppy data | MCBL067A | J2, Combo drive |
| J32, ISA bus (PCMCIA data) | MCBLZ370 | J3, Combo drive |
| J33, ISA bus (PCMCIA data) | MCBLZ370 | J6, Combo drive |
| J43, SCSI | MCBL176A | External SCSI port |
| J64, Fan | MCBL172A | Fan |
| J68, Fan | MCBLZ530 | Fan |
| J71, Speaker | MCBLY520 | Fan |
| J74, Reset | MCBL064A | J15, MPCBD17 |

**NOTE** MCBL064A is used only in systems with the MPCBD17 board. MCBLZ370 is only used in systems with the combo drive.

**J17, MCBL038A, MIDI**

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | +5V | 6 | Y-axis, joystick 1 | 11 | X-axis, joystick 2 |
| 2 | Fire button 0 | 7 | Fire button 1 | 12 | MIDI out |
| 3 | X-axis, joystick 1 | 8 | +5V | 13 | Y-axis, joystick 2 |
| 4 | Ground | 9 | +5V | 14 | Fire button 3 |
| 5 | Ground | 10 | Fire button 2 | 15 | MIDI in |

**J22, MCBLY110, CD-ROM drive audio**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | Right Channel | Red |
| 2 | Ground | Black |
| 3 | Left Channel | White |
| 4 | Ground | Black |

**J30, MCBL067A, Floppy Data**

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 2 | RPM | 14 | DRV0- | 26 | TRK0- |
| 4 | No connect | 16 | MTR1- | 28 | WRPRT- |
| 6 | DRATE0 | 18 | DIR | 30 | RDATA- |
| 8 | INDEX- | 20 | STEP- | 32 | HDSEL |
| 10 | MTR0- | 22 | WDATA- | 34 | DSKCHG |
| 12 | DRV1- | 24 | WGATE- | Odd | Ground |

**J32, MCBLZ370, ISA Bus**

| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|---|---|
| 1 | IRQ15 | 11 | SD+(14) | 21 | SA+(17) | 31 | SA+(6) |
| 2 | IRQ14 | 12 | SD+(15) | 22 | SA+(18) | 32 | SA+(7) |
| 3 | IRQ10 | 13 | SD+(11) | 23 | SA+(21) | 33 | SA+(10) |
| 4 | IRQ3 | 14 | SD+(10) | 24 | SA+(22) | 34 | SA+(11) |
| 5 | IRQ7 | 15 | SD+(0) | 25 | SA+(1) | 35 | SA+(14) |
| 6 | IRQ9 | 16 | SD+(1) | 26 | Ground | 36 | SA+(15) |
| 7 | IOCS16- | 17 | SD+(4) | 27 | SA+(3) | 37 | BALE |
| 8 | Ground | 18 | SD+(5) | 28 | Ground | 38 | IOR- |
| 9 | IOCHRDY+ | 19 | MEMW- | 29 | RSTDRV | 39 | D7BUFDIR |
| 10 | Ground | 20 | MEMR- | 30 | Ground | 40 | PWR_DWN |

**J33, MCBLZ370, ISA Bus**

| Pin | Signal | Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|---|---|
| 1 | Spare | 11 | SD+(13) | 21 | SA+(23) | 31 | SA+(8) |
| 2 | IRQ11 | 12 | SD+(12) | 22 | SBHE- | 32 | SA+(9) |
| 3 | IRQ4 | 13 | SD+(9) | 23 | SA+(0) | 33 | SA+(12) |
| 4 | IRQ5 | 14 | SD+(8) | 24 | Ground | 34 | SA+(13) |
| 5 | 0WS- | 15 | SD+(2) | 25 | SA+(2) | 35 | SA+(16) |
| 6 | Ground | 16 | SD+(3) | 26 | Ground | 36 | AEN |
| 7 | MEMCS16- | 17 | SD+(6) | 27 | ISA BCLK | 37 | IOW- |
| 8 | Ground | 18 | SD+(7) | 28 | Ground | 38 | Ground |
| 9 | SPKR- | 19 | SA+(19) | 29 | SA+(4) | 39 | LOBUFDIR |
| 10 | Ground | 20 | SA+(20) | 30 | SA+(5) | 40 | HIBUFDIR |

**J43, MCBL176A, SCSI**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 26 | Command Data-0 | 41 | Attention |
| 27 | Command Data-1 | 43 | Busy |
| 28 | Command Data-2 | 44 | Acknowledge |
| 29 | Command Data-3 | 45 | Reset |
| 30 | Command Data-4 | 46 | Message |
| 31 | Command Data-5 | 47 | Select |
| 32 | Command Data-6 | 48 | Command |
| 33 | Command Data-7 | 49 | Request |
| 34 | Command Data Parity | 50 | Input/Output |
| 38 | Terminator Power | | |

**NOTE** Pins 12, 13, 14, 37, and 39 are not connected; all other pins not listed are connected to ground.

**J68, MCBLZ530, Fan**

| Pin | Signal | Color |
|---|---|---|
| 1 | + 12 V | Red |
| 2 | Ground | Black |

**J71, MCBLY520, Speaker**

| Pin | Signal | Color |
|---|---|---|
| 1 | + 5.1 V | Red |
| 2 | Ground | White |

**J74, MCBL064A, Reset**

| Pin | Signal | Color |
|---|---|---|
| 1 | Reset | Orange |
| 2 | Ground | Black |

### Jumper Connectors

This section defines the settings for the BIOS password clear (J16), G95 VGA mode (J25), and CPU frequency jumper connectors.

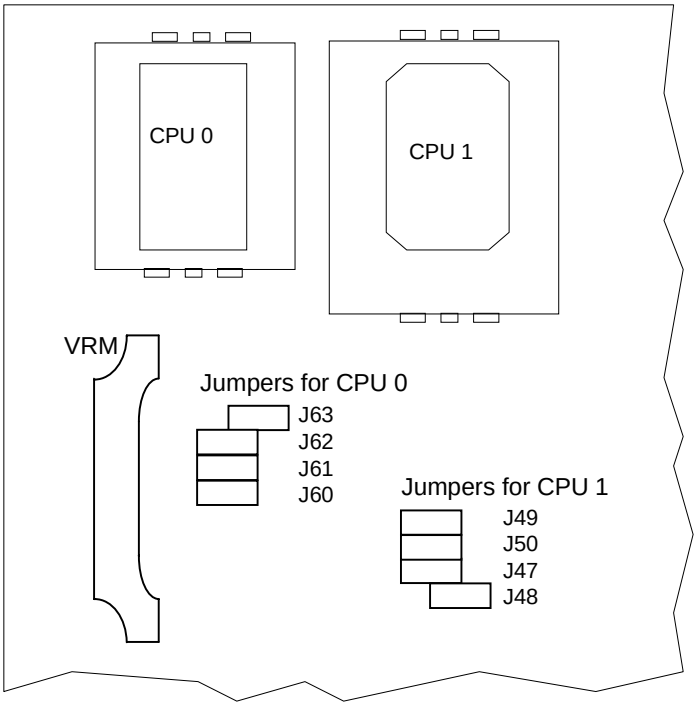
| Function | Settings | Result |
|---|---|---|
| BIOS Password Clear | Off (default) | Password enabled |
| | On | Password disabled |
| G95 VGA Mode | Off (default) | VGA mode enabled |
| | On | VGA mode disabled |

**NOTE** You must remove the PCI option boards and the processor module (or P6 bus termination card) to access the BIOS and G95 jumpers.

| CPU 0 Frequency | | CPU 1 Frequency | |
|---|---|---|---|
| **Jumper** | **Setting** | **Jumper** | **Setting** |
| J63 | OUT | J49 | IN |
| J62 | IN | J50 | IN |
| J61 | IN | J47 | IN |
| J60 | IN | J48 | OUT |

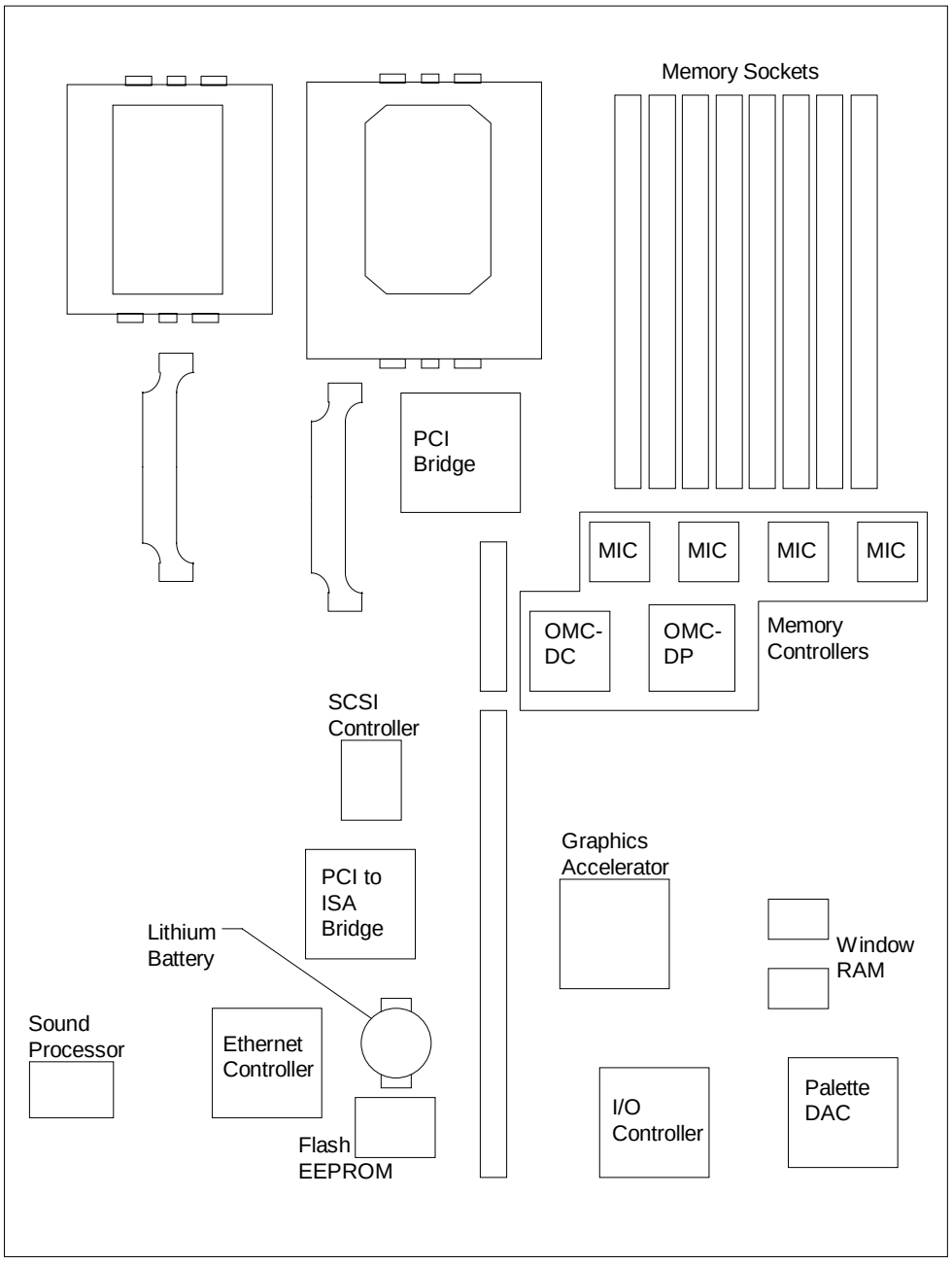
**CAUTION** Do not change the jumper settings in an attempt to change CPU speed. The CPU s will only operate properly when the jumpers are installed in their default settings.

The following figure shows the detail of the CPU frequency jumper connectors.



## Board Components

The following figure shows the locations of the major integrated components.



### Lithium Battery (CMOS/Clock Battery)

When the system is off, the Lithium battery on the system board provides power to the real time clock and BIOS flash EPROM, which stores the BIOS information. As long as the system is running, the batteries are not used to sustain the information. If the battery fails, the system date and time will be lost and the BIOS will not be installed when the system is rebooted. To replace a failed battery, refer to Chapter 2, "Servicing the System."

### Graphics Accelerator

The graphics accelerator (Matrox MGA-2064W) interfaces to the system board through the PCI bus. This accelerator supports all of the standard VGA graphics modes in addition to native modes capable of resolutions up to 1600 x 1200. The frame buffer interface is 64 bits wide and is clocked at 100 MHz. Color depths of 4, 8, 16, 24, and 32 bits are supported, allowing a resolution of 1280 x 1024 (24 bit color depth) in only 4 MB of frame buffer memory. Features such as bit block transfer (BitBlt), Line Draws, and Fills provide hardware acceleration for Windows. Video playback is accelerated through scaling and YUV to RGB color space conversion.

### Palette DAC

The palette DAC operates up to 175 MHz and converts the digital RGB data in the frame buffer to analog signals for the monitor. The device includes two fully programmable phase-locked loop clock sources for both the memory clock and the pixel clock.

### Window RAM

Window RAM (WRAM) is the video memory used by the MGA-2064W. The graphics frame buffer consists of two 256K x 32 WRAM components for 2 MB of video memory. WRAM is a dual-ported video memory specially designed to accommodate common drawing functions, offering higher graphics performance at a lower cost than standard Video RAM.

Starting with 2 MB WRAM, a 2 MB or 6 MB WRAM mezzanine module can be added for improved video performance. 8 MB of WRAM is the maximum amount configurable. Memory above 2 MB increases the number of colors available at each resolution, enabling you to work in true color mode at higher resolutions. Increased WRAM also improves color acceleration by providing extra caching memory for storing off-screen fonts and images.

### SCSI Controller

The SCSI controller is the Adaptec Ultra SCSI Adapter (AIC-7860), which provides a single-ended bus for SCSI-1, Fast SCSI-2, and Ultra SCSI devices. The SCSI bus is dedicated to the hard disk drives and CD-ROM drive. The SCSI bus actively terminates on the system board and at the end of the internal SCSI cable. The AIC-7860 supports low-speed devices to allow legacy SCSI devices to be used with the system. By default, the controller functions in Fast SCSI-2 mode rather than Ultra mode.

### I/O Controller

The Standard Microsystems Corporation (SMC) Super I/O Controller (FDC37C932) integrates mouse, keyboard, serial, parallel (multi-mode), floppy (2.88 MB), and Real-Time Clock (RTC) functions into one chip.

The FDC37C932 supports four serial ports via two external port connectors (COM 1 and COM 2). COM1 can be configured as COM1 or COM3; COM2 can be configured as COM2 or COM4. The serial ports use the system I/O addresses shown below.

| Port | Addresses | Interrupts |
|---|---|---|
| COM1 | 3F8-3FF | IRQ4 |
| COM2 | 2F8-2FF | IRQ3 |
| COM3 | 3E8-3EF | IRQ4 |
| COM4 | 2E8-2EF | IRQ3 |

The addresses for each serial port can be configured in AMIBIOS Setup, as described in the *System Setup*. Do not assign more than one device to the same COM port number. Serial port problems occur because a serial port and another device are assigned to the same COM number. The system and the connected serial device must be set to the same communications parameters (baud rate, parity, number of data bits, and number of stop bits). Refer to the serial device documentation for information about setting these parameters.

The parallel port functionality of the FDC37C932 includes the following modes:

- Normal mode (or Compatibility mode) - an industry-standard parallel interface mode. Normal mode provides an asynchronous, byte-wide forward channel (host to peripheral), and is the base mode common to all compliant interfaces.
- SPP mode (or Byte or Bi-Dir mode) - compatible with IBM PS/2 hosts. SPP is an asynchronous, byte-wide reverse channel (peripheral to host) mode using the eight data lines of the interface for data, and the control/status lines for handshaking. Transfer direction is controlled by the host when the peripheral and the host both support bi-directional use of data lines.
- EPP mode - provides an asynchronous, byte-wide, bi-directional channel controlled by the host device. This mode also provides separate address and data cycles over the eight data lines of the interface. EPP increases the data transfer performance to 2 MB per second while retaining backward compatibility with existing AT and PS/2 compatible interfaces.
- ECP mode - similar to EPP, providing an asynchronous, byte-wide, bi-directional channel controlled by the host device. Additionally, ECP implements a control line to distinguish between command and data transfers. A command may optionally be used to indicate single byte data compression or channel address. Other ECP mode features include:
  - Supports 2 MB per second data transfer rate
  - High performance, half duplex, forward and reverse channel
  - Interlocked handshake for fast, reliable data transfer
  - Channel addressing for low-cost peripherals
  - Link and data layer separation
  - Active output drivers and adaptive signal timing
  - Peer-to-peer capability

The addresses and interrupts used by the external parallel port can be assigned in AMIBIOS Setup. Refer to the *System Setup* for information to configure the ports. The parallel port addresses and interrupts are shown in the following table.

| Port | Address | Interrupt |
|---|---|---|
| LPT1 | 378-37A | IRQ7 or IRQ5 |
| LPT2 | 278-27A | IRQ7 or IRQ5 |
| LPT3 | 3BC-3BE | IRQ7 or IRQ5 |

### PCI Bridge

The PCI bridge chip (Intel 82454) provides high-bandwidth PCI compatibility for the system. The bridge chip supports the primary PCI bus and is the path by which processors have access to all PC compatibility devices such as the ISA bus, BIOS PROM, and graphics controller. PCI slots 5 and 6 are on the primary PCI bus. PCI slots 1 through 4 (secondary) are supported by an Intergraph programmable part on the riser card.

### PCI to ISA Bridge

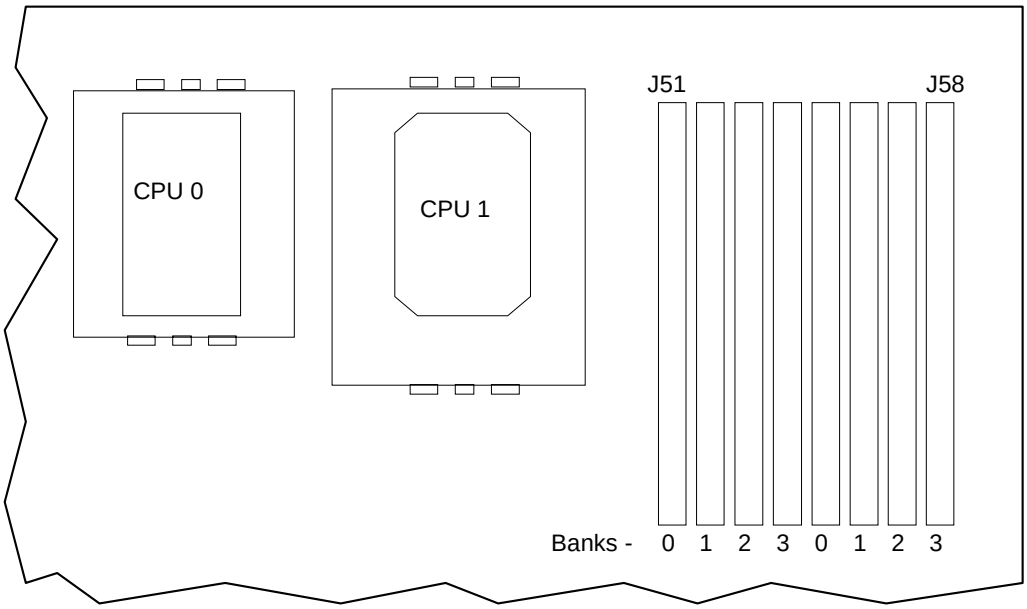
The Intel 82379AB System I/O-APIC (Advanced Programmable Interrupt Controller) bridges the ISA bus off the Primary PCI bus (PCI bus 0). The 82379AB supports all four ISA expansion slots.

### Flash EPROM

The MSMT329 uses a flash EPROM chip (MYPG782) for the system's Basic/Input Output System (BIOS). The *System Setup Guide* contains information about reprogramming the flash EPROM with a new BIOS when necessary. It also defines the features of the AMIBIOS Setup program, used to modify the BIOS parameters.

### Memory Sockets and Components

The system board contains eight memory sockets which accept 72 pin SIMMs from Intergraph. The sockets are divided into four banks. When all sockets are populated, the memory is four-way interleaved which results in maximum memory performance. Refer to Chapter 3 for instructions to upgrade memory. The following figure shows the socket numbers and bank organization.




The Orion memory components (OMC) include the OMC-DP (data path) and the OMC-DC (data control). The OMC-DP provides a consolidated memory data path between the P6 bus and the memory interface chips (MICs). The MICs provide the interface between the P6 bus (via the OMC-DP) and the installed memory modules. Each MIC handles 1/4 of the memory data path, and is optimized for interleaved performance using read-around writes and data buffering. The OMC-DC is an addressing and control device for the DRAM array that interfaces to the OMC-DP.

## Sound Processor

The sound controller is the Vibra 16C chip from Creative Labs. Integrated onto the system board, the Vibra 16C is a complete, full-feature MPC 2.0 compliant sound implementation, providing full Sound Blaster Pro functionality and compatibility. The Vibra 16C has the following features and specifications:

| Feature | Specification |
|---|---|
| Audio Resolution | 16-bit |
| Sound Blaster Compatibility | Sound Blaster Pro, with Sound Blaster 16 register compatibility |
| MIDI/UART Mode/ Compatibility | Roland MPU401 |
| Bus Interface | 16-bit ISA |
| CODEC | 16-bit Sigma Delta Stereo |
| CODEC FIFO | 4 Samples |
| FM Synthesizer | Yamaha OPL3 |
| External Audio Inputs | Microphone (Monoral), Stereo Line-In |
| Internal Audio Inputs | Stereo FM Synthesis, Stereo Wave Data, Stereo CD, Monoral PC Speaker |
| Audio Outputs | Stereo Line-Out |
| MIDI/Joystick | MIDI In, MIDI Out, Up to 4 fire buttons |
| ADPCM Audio Compression | 4:1, 3:1, and 2:1 |

| Feature | Specification |
|---|---|
| Sampling Rate Range | 5 KHz - 44.1 KHz in 228 selectable steps |
| Selectable Microphone AGC | Yes |
| Microphone Support | Low-Impedance (600 Ohms) Dynamic, Electek |

The Vibra 16C is configured through I/O port accesses. When the system is powered up, the hardware forces the Vibra 16C to respond to default I/O port addresses, interrupt request (IRQ) level, and direct memory access (DMA) request and acknowledge. The following table shows the default Vibra 16C configurations and available programmable settings.

| Parameter | Default | Other Available |
|---|---|---|
| Base I/O Address / MPU-401 | 220/330 | 240/300 |
| 8-bit DMA Req / Ack Level | 1 | 3 |
| 16-bit DMA Req / Ack Level | 5 | 7 |
| Interrupt Request Level | 10 | 5, 7 |

The settings above may be changed in AMIBIOS Setup (see “Chipset Setup” in the Setup and Maintenance Guide, delivered with the system) so the Vibra 16C internal registers respond to custom settings. Additionally, the integrated sound subsystem can be disabled by jumper connectors.

## Memory Address Map

The following table lists the memory address map assignments.

| Memory Address Range | Description (Size) |
|---|---|
| 0_00000000 - 0_0009FFFF | System Board Memory (640K) |
| 0_000A0000 - 0_000BFFFF | Video Memory (128K) |
| 0_000C0000 - 0_000C7FFF | Video ROM (32K) |
| 0_000C8000 - 0_000CFFFF | SCSI ROM (32K) |
| 0_000D0000 - 0_000DFFFF | Available I/O Adapter ROM (64K) |
| 0_000E0000 - 0_000FFFFF | System BIOS ROM (128K) |
| 0_00100000 - 0_7FFFFFFF | System Board Memory (2047M) |
| 0_80000000 - 0_AFFFFFFF | Unused |
| 0_B0000000 - 0_DFFFFFFF | Typical PCI Adapter Usage |
| 0_E0000000 - 0_FEBFFFFF | Unused |
| 0_FEC00000 - 0_FEC003FF | SIO.A APIC Registers (1K) |
| 0_FEC00400 - 0_FEC007FF | I/O APIC Registers (1K) |
| 0_FEC00800 - 0_FEDFFFFF | Unused |
| 0_FEE00000 - 0_FEE00FFF | Processor APIC Registers (4K) |
| 0_FEE01000 - 0_FFF7FFFF | Unused |
| 0_FFF80000 - 0_FFFDFFFF | Reserved |
| 0_FFFE0000 - 0_FFFFFFFF | System BIOS ROM - shadow |
| 0_FFFE0000 - F_FFFFFFFF | Unused |

## I/O Addresses

The primary system I/O devices are:

- Adaptec AIC-7860 Ultra SCSI
- DEC 21050 PCI-to-PCI Bridge
- Intel 82093AA I/O Advanced Programmable Interrupt Controller (I/O APIC)
- Intel 82454 Orion PCI Bridge (OPB)
- Intel 82452, 82453 Orion Memory Controllers (OMC)
- Intel 82379AB System I/O-APIC PCI to ISA Bridge
- Matrox MGA-2064W G95 Graphics Accelerator
- Standard Microsystems FDC37C932 Super I/O Controller
- Creative Labs Vibra 16C Sound Processor

The following table lists a small subset of the reserved I/O addresses used in the system.

| Address Range | Description | Address Range | Description |
|---|---|---|---|
| 0000 - 000F | DMA Controller 1 (DMA1) registers | 0278 - 027F | Parallel Port LPT2 |
| 0020 - 0021 | Interrupt Controller 1 (INT1) | 02E8 - 02EF | Serial Port COM4 |
| 0022 - 0023 | System Configuration | 02F8 - 02FF | Serial Port COM2 (FDC37C932) |
| 0040 - 0043 | Timer Counter 1 | 0370 - 0377 | Secondary Floppy Disk Controller |
| 0060 - 0064 | Keyboard (FDC37C932), NMI Status | 0378 - 037F | Parallel Port LPT1 (FDC37C932) |
| 0070 - 0071 | Real Time Clock (FDC37C932) | 03B0 - 03BF | Monochrome Display/Printer Adapter |
| 0078 - 007B | BIOS Timer | 03D0 - 03DF | Color/Graphics Monitor Adapter (CGA/MCGA) |
| 0080 - 0091 | DMA page registers | 03E8 - 03EF | Serial Port COM3 |
| 0092 - 0092 | System Control Port | 03F0 - 03F7 | Floppy Controller (FDC37C932) |
| 0093 - 009F | DMA page registers | 03F8 - 03FF | Serial Port COM1 (FDC37C932) |
| 00A0 - 00A1 | Interrupt Controller 2 (INT2) | 0480 - 048F | DMA high page registers |
| 00B2 - 00B3 | Advanced Power Management Control/Status Ports | 04D0 - 04D1 | Interrupt Controller Edge Level Control |
| 00C0 - 00DF | DMA Controller 2 (DMA2) registers | 0CF8 - 0CFF | PCI Configuration Space Access |

| Address Range | Description |
|---|---|
| 00F0 - 00F1 | Clear/Reset Math Coprocessor |
| 01F0 - 01F8 | IDE Hard Disk Controller (FDC37C932) |

| Address Range | Description |
|---|---|
| B000 - DFFF | Typical PCI Adapter Usage |

### DMA Channels

The system board uses Direct Memory Address (DMA) channels to exchange data without accessing the CPU. Some channels are assigned for specific use by the system, as defined below. Each DMA channel appropriates full 32-bit processing. For an ISA bus, channels 0 through 3 are 8-bit and channels 4 through 7 are 16-bit channels.

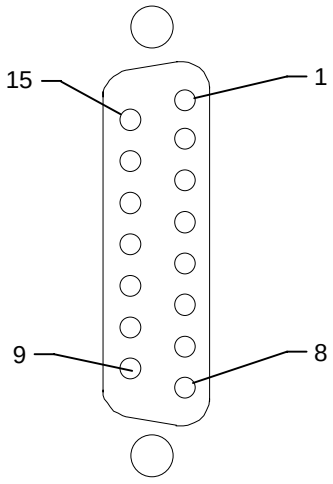
| DMA | Assignment |
|---|---|
| 0 | Spare |
| 1 | Spare |
| 2 | Floppy I/O Controller |
| 3 | Parallel Port |

| DMA | Assignment |
|---|---|
| 4 | Cascade input for 0-3 |
| 5 | Spare |
| 6 | Spare |
| 7 | Spare |

# External Ports

The following figures show the external ports in their proper orientation, when the base unit is in the upright position.

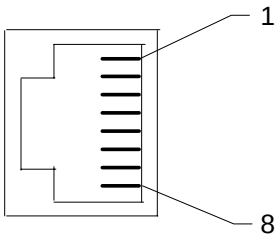
### MIDI




| Pin | Signal |
|---|---|
| 1 | +5V |
| 2 | Fire button 0 |
| 3 | X-axis, joystick 1 |
| 4 | Ground |
| 5 | Ground |
| 6 | Y-axis, joystick 1 |
| 7 | Fire button 1 |
| 8 | +5V |

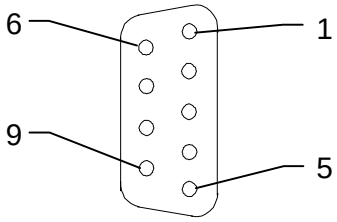
| Pin | Signal |
|---|---|
| 9 | +5V |
| 10 | Fire button 2 |
| 11 | X-axis, joystick 2 |
| 12 | MIDI out |
| 13 | Y-axis, joystick 2 |
| 14 | Fire button 3 |
| 15 | MIDI in |

## Ethernet



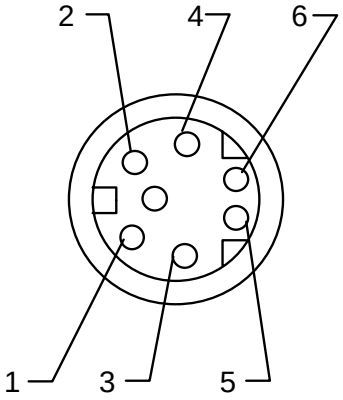

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | TD+ - Transmit | 5 | Reserved |
| 2 | TD– - Transmit | 6 | RD– - Receive |
| 3 | RD+ - Receive | 7 | Reserved |
| 4 | Reserved | 8 | Reserved |

## Serial (COM)



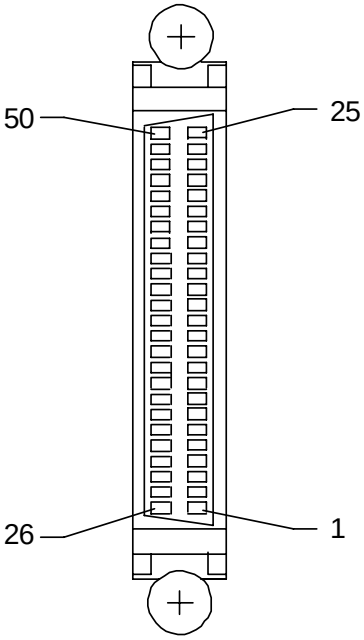

| Pin | Signal |
|---|---|
| 1 | DCD - Data Carrier Detect |
| 2 | RD - Receive Data |
| 3 | TD - Transmit Data |
| 4 | DTR - Data Terminal Ready |
| 5 | Ground |
| 6 | DSR - Data Set Ready |
| 7 | RTS - Request to Send |
| 8 | CTS - Clear to Send |
| 9 | RI - Ring Indicator |

## Mouse and Keyboard




| Mouse | | Keyboard | |
|---|---|---|---|
| **Pin** | **Signal** | **Pin** | **Signal** |
| 1 | MDATA | 1 | KDATA |
| 2 | Reserved | 2 | Reserved |
| 3 | Ground | 3 | Ground |
| 4 | Fused VCC - +5V | 4 | Fused VCC - +5V |
| 5 | MCLK | 5 | KCLK |
| 6 | Reserved | 6 | Reserved |

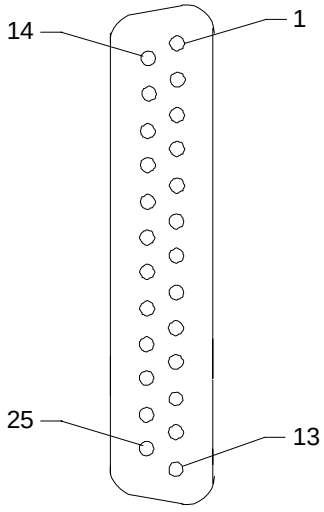
## SCSI




| Pin | Signal |
|---|---|
| 26 | Command Data-0 |
| 27 | Command Data-1 |
| 28 | Command Data-2 |
| 29 | Command Data-3 |
| 30 | Command Data-4 |
| 31 | Command Data-5 |
| 32 | Command Data-6 |
| 33 | Command Data-7 |
| 34 | Command Data Parity |
| 38 | Terminator Power |
| 41 | Attention |
| 43 | Busy |
| 44 | Acknowledge |
| 45 | Reset |
| 46 | Message |
| 47 | Select |
| 48 | Command |
| 49 | Request |
| 50 | Input/Output |

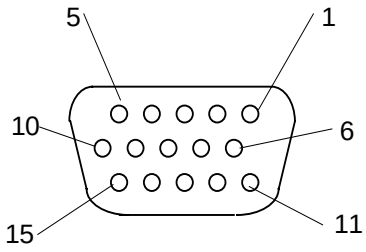
**Note** Pins 12, 13, 14, 37, and 39 are not connected; all other pins not listed are connected to ground.

## Parallel




| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | -Strobe | 10 | -ACK - Acknowledge |
| 2 | Data 0 | 11 | Busy |
| 3 | Data 1 | 12 | PE - Paper Empty |
| 4 | Data 2 | 13 | +Select |
| 5 | Data 3 | 14 | -Auto FDXT - Auto Feed |
| 6 | Data 4 | 15 | -Error |
| 7 | Data 5 | 16 | -Init - Start |
| 8 | Data 6 | 17 | -SLCTIN - Select |
| 9 | Data 7 | 18-25 | Ground |

### Video

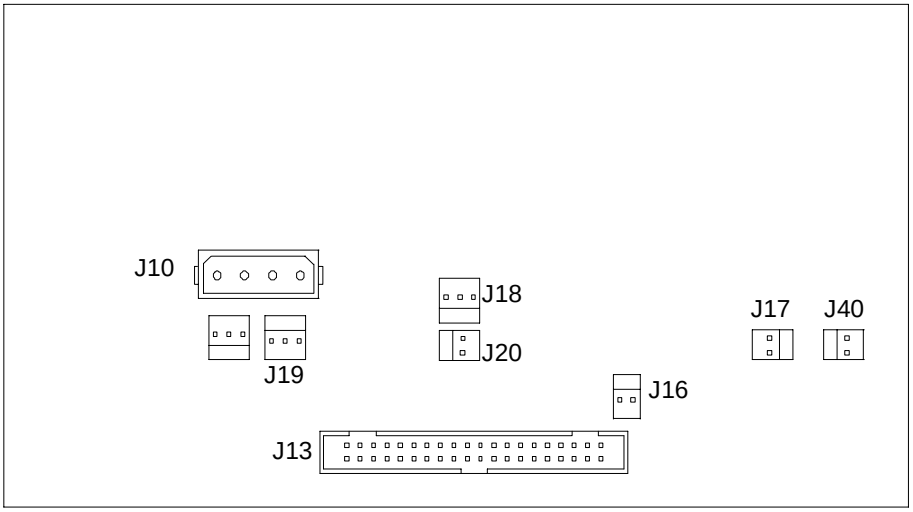



| Pin | Signal |
|---|---|
| 1 | R - Red |
| 2 | G - Green |
| 3 | B - Blue |
| 4 | MID2 - Monitor ID2 |
| 5, 6, 7, 8, 10 | Ground |
| 9 | No Connect |
| 11 | MID0 - Monitor ID0 |
| 12 | MID1 - Monitor ID1 |
| 13 | HSYNC - Horizontal Sync |
| 14 | VSYNC - Vertical Sync |
| 15 | MID3 - Monitor ID3 |

# Power Distribution Board (MPCBD13)

## Cable Routing and Pinouts

The following figure shows the MPCBD13 cable connectors.




| From MPCBD13 | Cable | To |
|---|---|---|
| J10, Power | P8 | MPWS131 |
| J13, RAID sensor | MCBL055A | MESAN15, J3 (MSMT321) |
| J16 | MCBLZ610 | Power On LED |
| J17 | MCBL056A | Alarm Silence Button |
| J18, Drive installed | MCBL057A | MESAN15 JP8 |

| From MPCBD13 | Cable | To |
|---|---|---|
| J19, Drive installed | MCBL057A | MESAN15 JP7 |
| J20 | MCBL060A | Auxiliary LED |
| J40 | MCBL060A | Channel Mode LED |

**NOTE** For the pinout of the power cable P8 attached to J10, refer to “Fixed Power Supply (MPWS131).”

**J13, MCBL055A, RAID Sensor**

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1,2,3,4 | +5.1V | 22 | Not used | 34 | Drive 3 Status |
| 6 | Dskbad | 24 | Not used | 36 | Drive 4 Status |
| 8 | Dskgood | 26 | Alarm Reset | 38 | Drive 5 Status |
| 10 | Alarm | 30 | Drive 1 Status | 40 | Drive 6 Status |
| 12,14,28 | No Connect | 32 | Drive 2 Status | Remaining | Ground |
| 16 | Pwrbad | | | | |

**J16, MCBLZ610, Power On LED**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | Pwrgood | Black |
| 2 | Ground | Black |

**J17, MCBL056A, Alarm Silence Button**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | Alarm reset | Red |
| 2 | Ground | Black |

**J18, MCBL057A, Drive Installed**

| Pin | Signal | Wire Color |
|---|---|---|
| J18 - 1 | Drive 1 | Brown |
| J18 - 2 | Drive 2 | Black |
| J18 - 3 | Drive 3 | Red |

**J19, MCBL057A, Drive Installed**

| Pin | Signal | Wire Color |
|---|---|---|
| J19 - 1 | Drive 4 | Brown |
| J19 - 2 | Drive 5 | Black |
| J19 - 3 | Drive 6 | Red |

**J20, MCBL060A, Auxiliary LED**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | Remote On/Off In | Black |
| 2 | Remote On/Off Out | Black |
| 3 | LED Ground | Orange |

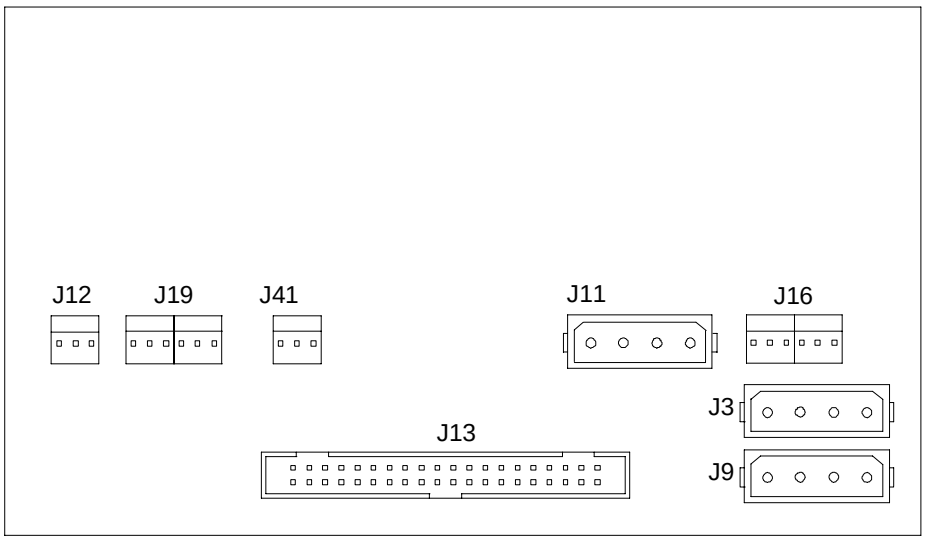
**J40, MCBL060A, Channel Mode LED**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | Disk bad | Black |
| 2 | Ground | Black |
| 3 | Disk good | Orange |

# Power Distribution Board (MPCBD17)

## Side 1 Cable Routing and Pinouts

The following figure shows the MPCBD17 side 1 cable connectors.




| From MPCBD17, Side 1 | Cable | To |
|---|---|---|
| J3, RAID power | MCBL050A | MESAN15 J12 |
| J9, RAID power | MCBL050A | MESAN15 J6 |
| J11, Auxiliary power | MCBL049A | CD-ROM Drive, Combo Drive |
| J12 | MCBLZ390 | Power On Switch |
| J13, RAID sensor | MCBL055A | MESAN15 J3 (MSMT321) |
| J16 | MCBL080A | Power On LED, Channel Mode LED |

| From MPCBD17, Side 1 | Cable | To |
|---|---|---|
| J19, Drive installed | MCBL077A | MESAN15 JP8, JP7 |
| J41, Server monitor | MCBL078A | CINF029 J9 |

**J3, MCBL050A, RAID power**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | +12V | Yellow |
| 2 | Ground | Black |
| 3 | Ground | Black |
| 4 | +5.1V | Red |

**J9, MCBL050A, RAID power**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | +12V | Yellow |
| 2 | Ground | Black |
| 3 | Ground | Black |
| 4 | +5.1V | Red |

**J11, MCBL049A, Auxiliary Power**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | +12V | Yellow |
| 2 | Ground | Black |
| 3 | Ground | Black |
| 4 | +5.1V | Red |

**J12, MCBLZ390, Power On Switch**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | Power Switch On | Red |
| 2 | Ground | Black |
| 3 | Power On Reset | Brown |

**J13, MCBL055A, RAID sensor**

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1,2,3,4 | +5.1V | 22 | Not used | 34 | Drive 3 Status |
| 6 | Dskbad | 24 | Not used | 36 | Drive 4 Status |
| 8 | Dskgood | 26 | Alarm Reset | 38 | Drive 5 Status |
| 10 | Alarm | 30 | Drive 1 Status | 40 | Drive 6 Status |
| 12,14,28 | No Connect | 32 | Drive 2 Status | Remaining | Ground |
| 16 | Pwrbad | | | | |

**J16, MCBL080A, Power On LED and Channel Mode LED**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | Pwrgood | Black |
| 2 | Ground | Black |
| 3 | Pwrbad | White |
| 4 | Dskbad | Black |
| 5 | Ground | Black |
| 6 | Dskgood | Orange |

**J19, MCBL077A, Drive Installed**

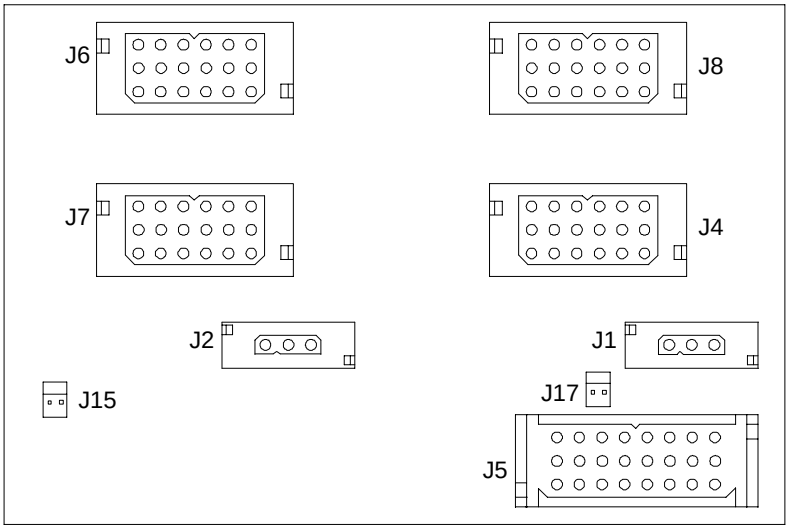
| Pin | Signal | Wire Color |
|---|---|---|
| 1 | Drive 1 | Brown |
| 2 | Drive 2 | Black |
| 3 | Drive 3 | Red |
| 4 | Drive 4 | Brown |
| 5 | Drive 5 | Black |
| 6 | Drive 6 | Red |

**J41, MCBL078A, Server Monitor**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | +3.3 V | 4 | Remote Power Off |
| 2 | Ground | 5 | LPOK |
| 3 | No Connect | 6 | Remote Reset |

## Side 2 Cable Routing and Pinout

The following figure shows the MPCBD17 side 2 connectors.




| From MPCBD17, Side 2 | Cable | To |
|---|---|---|
| J1 | MESAN14 | MESAN14 Keylock Switch 1 |
| J2 | MESAN14 | MESAN14 Keylock Switch 2 |
| J4 | n/a | MPWS138, Power Supply 1 |
| J5 | MCBL048A | MSMT463 J3, Main Power |
| J6 | n/a | MPWS138, Power Supply 2 |
| J7 | n/a | MPWS138, Power Supply 2 |
| J8 | n/a | MPWS138, Power Supply 1 |
| J15, Reset | MCBL064A | MSMT359, J74 |
| J17 | n/a | MESAN14 Alarm Silence Button |

**J1, MESAN140 Keylock Switch 1**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | AC_Neutral_2 | Blue |
| 2 | No Connect | |
| 3 | AC_Line_2 | Brown |

**J2, MESAN140 Keylock Switch 2**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | AC_Neutral_1 | Blue |
| 2 | No Connect | |
| 3 | AC_Line_1 | Brown |

**J4, MPWS138, Power Supply 1**

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | AC_Line_2 | 7 | No Connect | 13 | AC_Neutral_2 |
| 2 | No Connect | 8 | AC_Ground | 14 | No Connect |
| 3 | -5.1V | 9 | Fan_OK_2 | 15 | CS_RTN |
| 4 | -12V | 10 | +3.3V_CS | 16 | DC_OK_1 |
| 5 | +12V | 11 | +12V_CS | 17 | AC_OK_1 |
| 6 | Ground | 12 | +5.1V | 18 | RMT_ON_OFF |

**J5, MCBL048A, Main Power**

| Pin | Signal | Wire Color | Pin | Signal | Wire Color |
|---|---|---|---|---|---|
| 1 | +3.3V | Orange | 13 | +5V | Red |
| 2 | +3.3V | Orange | 14 | Ground | Black |
| 3 | +3.3V | Orange | 15 | Ground | Black |
| 4 | Ground | Black | 16 | +5V | Red |
| 5 | Ground | Black | 17 | Ground | Black |
| 6 | Ground | Black | 18 | -12V | Blue |
| 7 | +3.3V | Orange | 19 | +5V | Red |
| 8 | +3.3V | Orange | 20 | -5V | Red |
| 9 | +5V | Red | 21 | Ground | Black |
| 10 | Ground | Black | 22 | +12V | Yellow |
| 11 | +5V | Red | 23 | Ground | Black |
| 12 | Ground | Black | 24 | Power Good | Green |

**NOTE** The DC Power Good signal is a TTL-compatible signal that initiates an orderly start-up procedure under normal input operating conditions. During power up, this signal should remain low (< 0.8 VDC) for at least 100 ms after the +5.1 VDC output has reached its minimum sense level of 4.75 VDC. The signal should then transition to high (> 2.4 VDC) to indicate a stable power source. The signal drives an LED on the back of the power supply to indicate the status (green is good, off is no signal).

**NOTE** The AC Power Good signal is a TTL-compatible signal that transitions to high to indicate that the AC input voltage is within the 90 - 132 VAC or 180 - 264 VAC range. The signal drives an LED on the back of the power supply to indicate the status (green is good, off is no signal). Provided there is an AC input, this signal must be available to report whether the outputs are non-functional or functional.

**J6, MPWS138, Power Supply 2**

| Pin | Signal |
|---|---|
| 1,3,5,8,10,12 | +5.1V |
| 2,4,6,7,9,11,14,16,18 | Ground |
| 13,15,17 | +3.3V |

**J7, MPWS138, Power Supply 2**

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | AC_Line_1 | 7 | No Connect | 13 | AC_Neutral_1 |
| 2 | No Connect | 8 | AC_GND | 14 | No Connect |
| 3 | -5.1V | 9 | Fan_OK_1 | 15 | CS_RTN |
| 4 | -12V | 10 | +3.3V_CS | 16 | DC_OK_1 |
| 5 | +12V | 11 | +12V_CS | 17 | AC_OK_1 |
| 6 | Ground | 12 | +5.1V | 18 | RMT_ON_OFF |

**J8, MPWS138, Power Supply 1**

| Pin | Signal |
|---|---|
| 1,3,5,8,10,12 | +5.1V |
| 2,4,6,7,9,11,14,16,18 | Ground |
| 13,15,17 | +3.3V |

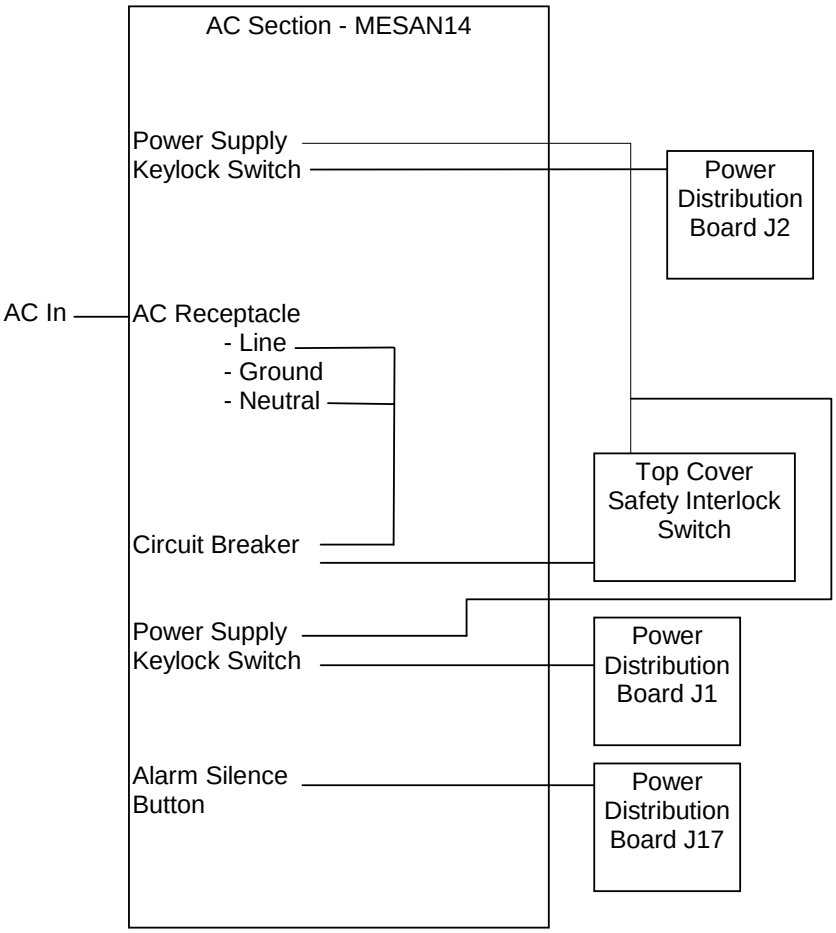
**J15, MCBL064A, Reset**

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | System Reset | Brown |
| 2 | No Connect | Black |

**J17, MESAN140 Alarm Silence Button**

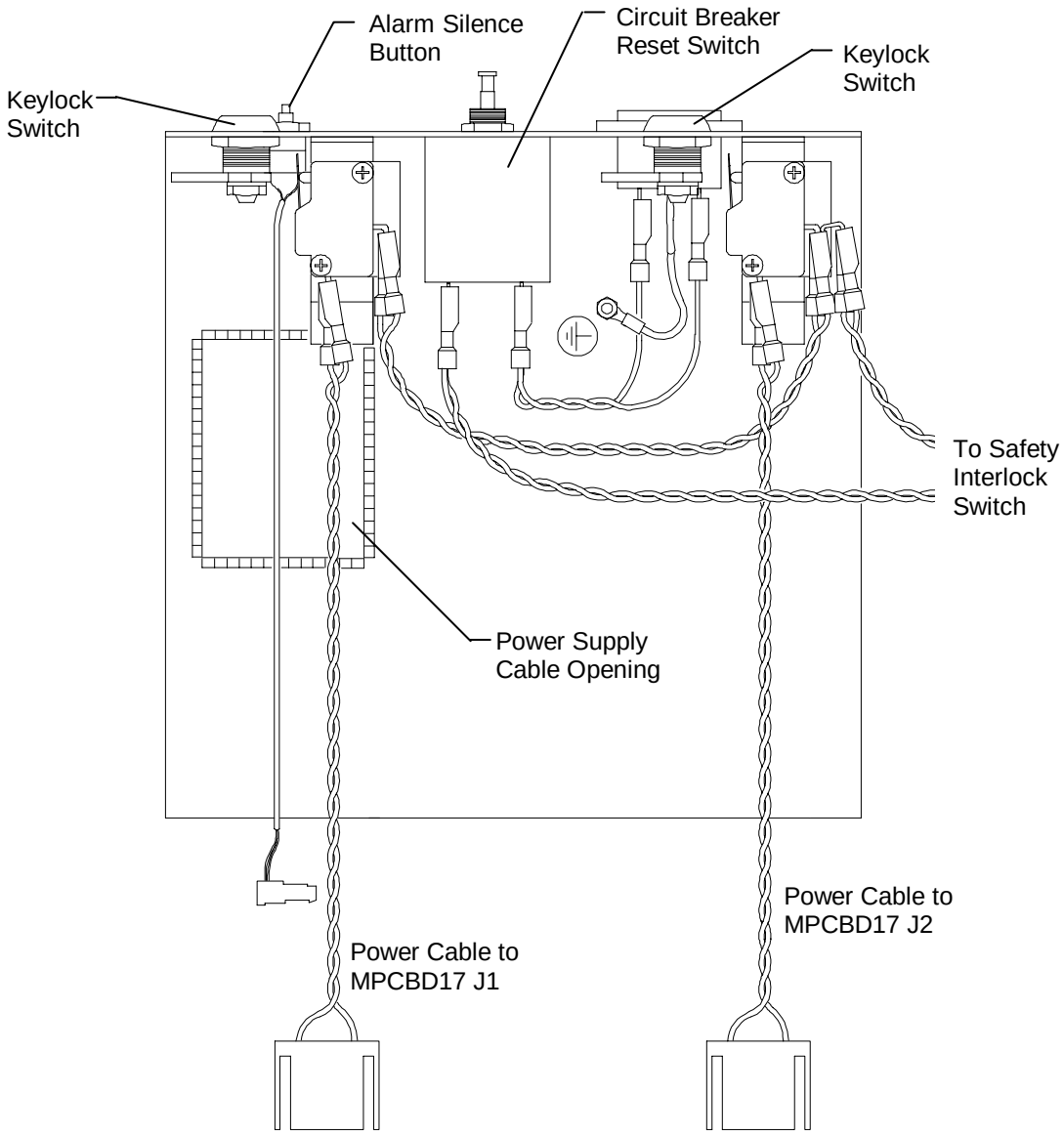
| Pin | Signal | Wire Color |
|---|---|---|
| 1 | Alarm Reset | Brown |
| 2 | No Connect | Black |

# AC Section (MESAN14)




**NOTE** The brown wires carry the AC line signal. The blue wires are neutral, and the green wires with yellow stripe are safety ground.

The following figure shows the top view of the AC section.




## Keylock Switch

The keylock switch performs two functions: it physically locks the power supply in the base unit (by rotating a blade into a slot on the power supply), and engages an AC switch that provides power input to each supply. The power supply will not come out of the base unit until the keylock switch is turned to the OFF position.

## Alarm Silence Button

The alarm silence button allows you to temporarily disable the alarm when it is sounding.

### Circuit Breaker Reset Switch

The circuit breaker contains an external button to indicate power fault status. When the button is extended (white area showing), a fault has occurred. Do not reset the circuit breaker until after the fault has been removed. Reset the circuit breaker by pressing the button.

### Safety Interlock Switch

The safety interlock switch, located in the top of the base unit, prevents the system from powering on if the top cover is not properly installed.

### Power Cables

These two-wire cables provide the AC line and neutral signals to the power distribution board, which in turn drives the power supplies.

### Power Supply Cable Opening

The main power cable from the power distribution board to the riser card passes through this opening. If servicing the AC section, be sure the plastic edging remains in the opening to protect the wires from damage.

# Fixed Power Supply (MPWS131)

MPWS131 is a 539 watt autoranging supply, that switches between 90-132 VAC or 180-264 VAC, depending on the location. The input frequency is 47-63 Hz, single phase. At full load, the power supply has a minimum efficiency of 65 percent.

### DC Output Specifications

The following table details the DC Output Specifications for the power supply.

| | Outputs | | | | | |
|---|---|---|---|---|---|---|
| | **#1** | **#2** | **#3** | **#4** | **#5** | **Unit** |
| **Nominal Output Voltages** [1, 5] | +3.3 [4] | +5.1 [4] | +12.0 [4] | –12.0 | –5.0 | VDC |
| **Continuous Load (Maximum)** [1] | 48 [3, 4] | 76 [3, 4] | 12 [4] | 0.5 | 0.5 | ADC |
| **Continuous Load (Minimum)** [1] | 0 | 6 | 0 | 0 | 0 | ADC |
| **Noise and Ripple (PARD), DC to 30 MHz (Maximum)** | 50 | 50 | 100 | 250 | 100 | mVp-p |
| **Initial Setting Tolerance (Maximum)** [2, 5] | ±3% | ±3% | ±5% | ±10% | ±10% | |
| **Regulation Line/Load (Maximum)** [2, 5] | ±3% | ±3% | ±5% | ±10% | ±10% | |
| **Overshoot, Turn on/off (Maximum)** | 5% | 5% | 10% | 10% | 10% | |

The following notes apply to the DC output specifications table.

1. Power supply meets or exceeds these specifications. For the noted specifications, the Maximum values describe the smallest acceptable maximum load and the Minimum values describe the largest acceptable minimum load.
2. These outputs are measured at the user end of an unloaded peripheral cable.
3. +3.3 V and +5.1 V will never draw over 400 Watts combined.
4. Any combination of +3.3 V, +5.1 V, and +12 V do not exceed their maximum or 539 watts of total power.
5. The sum of Initial Setting Tolerance and Line/Load Regulation do not exceed 3% for the +3.3 V and +5.1 V outputs, 5% for the +12 V output, and 10% for the negative output voltages.

## Cable Connectors

The following table shows the cable connectors from the power supply that connect to the riser card and to the devices in the server.

| Connector | Device |
|---|---|
| P1 | Main Power (Riser Card) |
| P2 | CD-ROM Drive |
| P3 | Auxiliary Drive |
| P4 | Auxiliary Drive (or RAID section) |
| P5 | Auxiliary Drive |
| P6 | Auxiliary Drive (or RAID section) |
| P7 | Auxiliary Drive |
| P8 | Auxiliary Drive |
| P9 | Combo Drive |
| P10 | On/Off cable |

## P1 Connector Pinout

| Pin | Signal | Wire Color | Pin | Signal | Wire Color |
|---|---|---|---|---|---|
| 1 | +3.3V | Orange | 13 | +5V | Red |
| 2 | +3.3V | Orange | 14 | Ground | Black |
| 3 | +3.3V | Orange | 15 | Ground | Black |
| 4 | Ground | Black | 16 | +5V | Red |
| 5 | Ground | Black | 17 | Ground | Black |
| 6 | Ground | Black | 18 | -12V | Blue |
| 7 | +3.3V | Orange | 19 | +5V | Red |
| 8 | +3.3V | Orange | 20 | -5V | Red |
| 9 | +5V | Red | 21 | Ground | Black |
| 10 | Ground | Black | 22 | +12V | Yellow |
| 11 | +5V | Red | 23 | Ground | Black |
| 12 | Ground | Black | 24 | Power Good | Green |

### P2 - P8 Connector Pinout

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | +12V | Yellow |
| 2 | Return | Black |
| 3 | Return | Black |
| 4 | +5V | Red |

### P9 Connector Pinout

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | +5V | Red |
| 2 | Return | Black |
| 3 | Return | Black |
| 4 | +12V | Yellow |

### P10 Connector Pinout

| Pin | Signal | Wire Color |
|---|---|---|
| 1 | System Reset | Yellow |
| 2 | No Connect | Black |
| 3 | Ground | Black |
| 4 | System On | Red |

# Redundant Power Supplies (MPWS138)

The InterServe 635 and 645 systems use redundant 550 watt current-sharing power supplies. Each power supply has five outputs, is hot swappable, and is auto-ranging between 90 - 132 VAC and 180 - 264 VAC. The input frequency range for each power supply is 47 - 63 Hz, single phase. Refer to “Power Distribution Board (MPCBD17)” for pinouts of the cannectors.

### DC Output Specifications

The power supply has the following DC output specifications:

| | Outputs | | | | | |
|---|---|---|---|---|---|---|
| | **#1** [4, 5] | **#2** [4, 5] | **#3** [5] | **#4** | **#5** | **Unit** |
| **Nominal Output Voltages** [1, 3] | +3.3 | +5.1 | +12.0 | -12.0 | -5.0 | VDC |
| **Continuous Load (Maximum.)** [1] | 45 | 85 | 12 | 1 | 1 | ADC |
| **Continuous Load (Minimum.)** [1] | 0.0 | 3.5 | 1.0 | 0.0 | 0.0 | ADC |
| **Noise and Ripple (PARD), DC to 30 MHz (Maximum)** | 50 | 50 | 100 | 250 | 100 | mVp-p Max |

| | Outputs | | | | | |
|---|---|---|---|---|---|---|
| | **#1** [4, 5] | **#2** [4, 5] | **#3** [5] | **#4** | **#5** | **Unit** |
| **Initial Setting Tolerance (Maximum)** [3] | 3% | 3% | 5% | 10% | 10% | Max |
| **Regulation Line/Load (Maximum)** [2, 3] | 3% | 3% | 5% | 10% | 10% | Max |
| **Overshoot, Turn on/off (Maximum)** | < 5% | < 5% | < 10% | < 10% | < 10% | Max |

The following notes apply to the previous table.

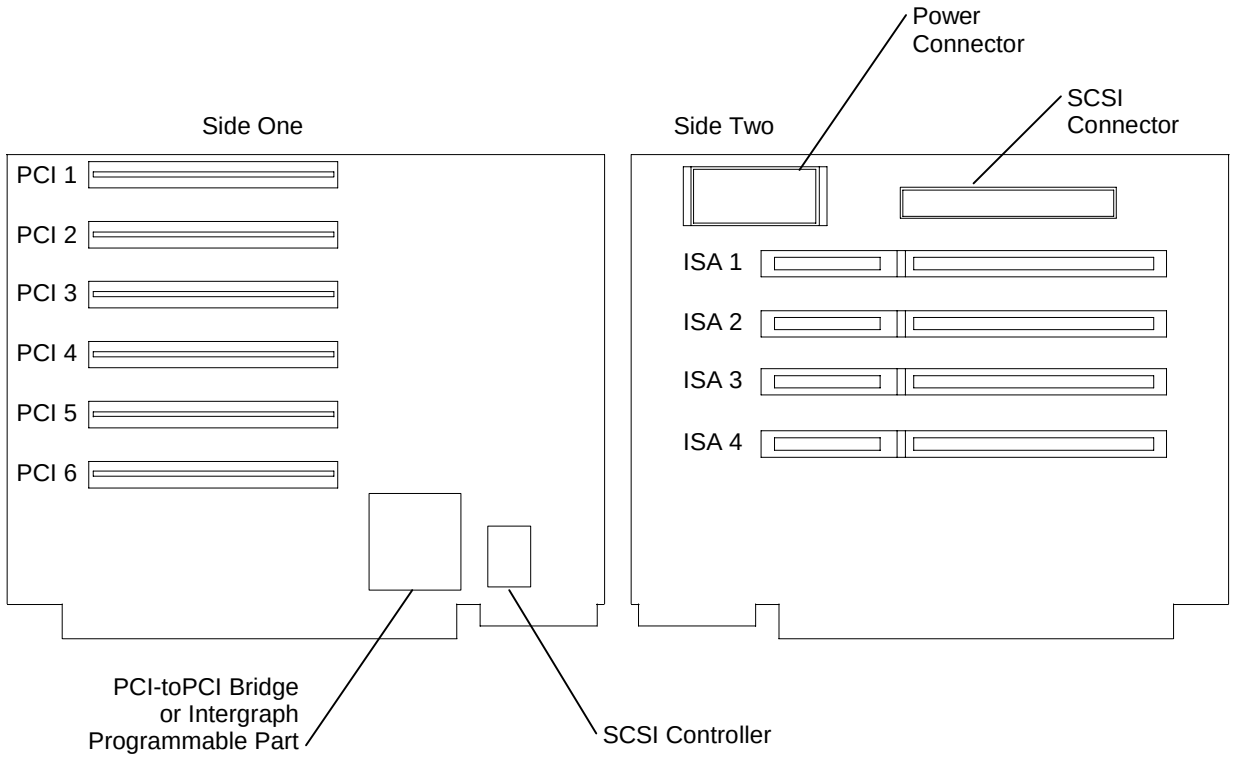
1. The power supply meets or exceeds these specifications.
2. These outputs are measured at the user end of an unloaded peripheral cable.
3. The sum of the Initial Setting Tolerance and Line/Load Regulation does not exceed 3% for the +3.3 V and +5.1 V outputs, 5% for the +12 V output, and 10% for the negative output voltages.
4. Any combination of +3.3 V or +5.1 V do not exceed their maximum or 450 watts of total power.
5. Any combination of +3.3 V, +5.1 V, or +12 V do not exceed their maximum or 550 watts of total power.

## Operating Characteristics

Characteristics of the power supplies include the following:

- Over-Current Protection is provided on +3.3 VDC and +5.1 VDC outputs. The Over-Current Protection disables the DC outputs and keeps them disabled until AC is cycled.
- Over-Voltage Protection is provided on +3.3 VDC and +5.1 VDC. The Over-Voltage Protection disables the DC outputs when the output reaches 5.5 - 6.8 VDC for +5.1V DC or 3.7 - 4.4 VDC for +3.3 VDC. The DC outputs remain disabled until AC is cycled.
- The current is equally shared (within $\pm$10%) by the two power supplies at maximum load. If one power supply fails, the remaining power supply takes over. +3.3 V, +5.1 V, +12 V, -5 V, and -12V power outputs have series-connected blocking diodes to prevent an output fault in one power supply from pulling down the outputs of the other power supply.
- If one of the power supplies fails, an LED in that power supply either goes out or changes from green to amber, and the power on LED on the front of the base unit changes from green to amber. Look at the back of the base unit to see which power supply failed.
- If a power supply is not supplying all of its DC voltage output levels correctly, an audible alarm sounds.

# Riser Card (MSMT280 and MSMT463)




## Expansion Slots

The riser card has six PCI slots and four ISA slots. PCI slots 5 and 6 are on the primary PCI bus, supported by the PCI bridge on the system board. PCI slots 1 through 4 (secondary) are supported by an Intergraph programmable part (on MSMY463) or by a PCI-to-PCI bridge (on MSMT280).

## SCSI Controller and Connector

If the riser card is MSMT280, the system's internal SCSI devices use the SCSI controller on the system board (AIC-7860). The SCSI cable for external devices connects to the SCSI connector on the riser card.

If the riser card is MSMT463, the system's internal SCSI devices use the SCSI controller on the riser card (AIC-7880). The SCSI cable for internal devices connects to the SCSI connector on the riser card. External devices use the SCSI controller on the system board.

## Power Connector

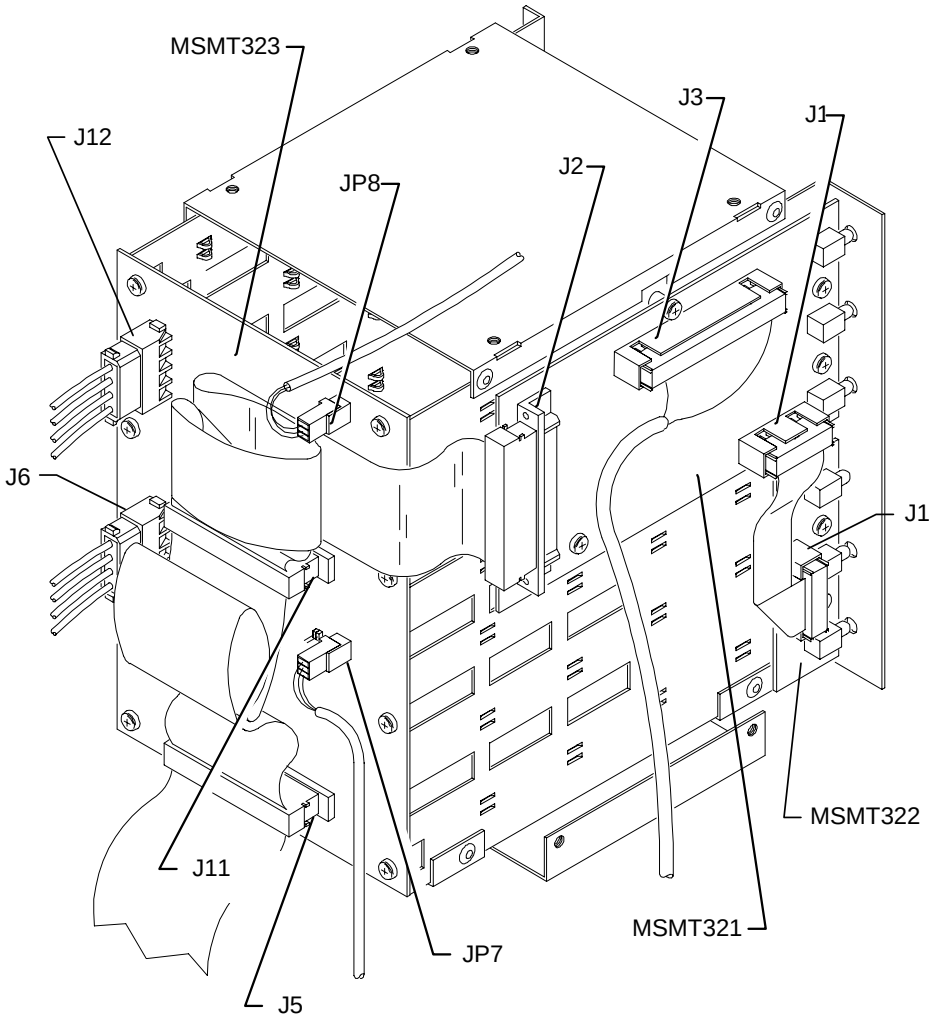
For InterServe 615, 615UW, 625, and 625UW systems, the power supply cable P1 from MPWS131 connects to the power connector. Refer to the table "P1 Riser Card Connector Pinout" on page 77 cable pinout.

For InterServe 635 and 645 systems, the power cable MCBL048A from MPCBD17 J5 connects to the power connector. Refer to the table “J5, MCBL048A, Main Power” on page 72 for the cable pinout.

# Peripherals

## Internal RAID Section (MESAN15)

The following figure shows the MESAN15 assembly.




**Cable Routing for InterServe 615, 625 Systems Using the MPCBD13 Board**

| From | Cable | To |
|---|---|---|
| J12, MSMT323 | P4 | MPWS131 |
| J6, MSMT323 | P6 | MPWS131 |
| JP8, MSMT323 | MCBL057A | MPCBD13, J18 |

| From | Cable | To |
|---|---|---|
| JP7, MSMT323 | MCBL057A | MPCBD13, J19 |
| J5, MSMT323 | MCBL054A | CINF026, CH2 |
| J11, MSMT323 | MCBL054A | MSMT321, J2 |
| J1, MSMT321 | MCBL061A | MSMT322, J1 |
| J3, MSMT321 | MCBL055A | MPCBD13, J13 |

**NOTE** MSMT323, MSMT322, and MSMT321 are indidual boards on the internal RAID section.

**J6 and J12, RAID Drive Power**

Refer to the table “P2 - P8 Connector Pinout” on page 77 for the P4 and P6 cable pinouts.

**JP7, MCBL057A, Drive Installed**

Refer to the table “J18, MCBL057A, Drive Installed” on page 67 for the cable pinout.

**JP8, MCBL057A, Drive Installed**

Refer to the table “J19, MCBL057A, Drive Installed” on page 67 for the cable pinout.

**J5, MCBL054A, RAID SCSI**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1-16 | Ground | 50 | Shell OK (Ground) |
| 17 | Term Power | 51 | Term Power |
| 18 | Term Power | 52 | Term Power |
| 19 | No Connect | 53 | No Connect |
| 20-34 | Ground | 54 | Fault Clock (Ground) |
| 35 | SCSI Data Bit 12 | 55 | Attention |
| 36 | SCSI Data Bit 13 | 56 | Fault Data |
| 37 | SCSI Data Bit 14 | 57 | Busy |
| 38 | SCSI Data Bit 15 | 58 | Acknowledge |
| 39 | SCSI Data Parity 1 | 59 | Reset |
| 40 | SCSI Data Bit 0 | 60 | Message |
| 41 | SCSI Data Bit 1 | 61 | Select |
| 42 | SCSI Data Bit 2 | 62 | Carrier Detect |
| 43 | SCSI Data Bit 3 | 63 | Request |
| 44 | SCSI Data Bit 4 | 64 | I/O |
| 45 | SCSI Data Bit 5 | 65 | SCSI Data Bit 8 |
| 46 | SCSI Data Bit 6 | 66 | SCSI Data Bit 9 |
| 47 | SCSI Data Bit 7 | 67 | SCSI Data Bit 10 |
| 48 | SCSI Data Parity 0 | 68 | SCSI Data Bit 11 |
| 49 | SWAP (Ground) | | |

**J11, MCBL054A, RAID SCSI**

This connector uses the same cable as J5 above.

**J1, MCBL061A, LED Signals**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | Ground | 8 | Slot 2 Green |
| 2 | Slot 3 Amber | 9 | Ground |
| 3 | Ground | 10 | Slot 1 Amber |
| 4 | Slot 3 Green | 11 | Ground |
| 5 | Ground | 12 | Slot 1 Green |
| 6 | Slot 2 Amber | 13 | VCC |
| 7 | Ground | 14 | VCC |

**J3, MCBL055A, RAID Sensor**

Refer to the table, “J13, MCBL055A, RAID Sensor” on page 67 for the cable pinout.

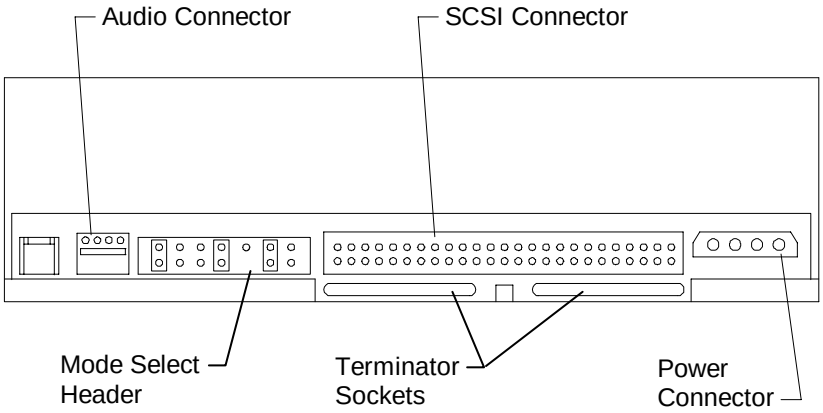
### Cable Routing for InterServe 635, 645 Systems Using the MPCBD17 Board

| From | Cable | To |
|---|---|---|
| J12, MSMT323 | MCBL050A | MPCBD17, J3 |
| J6, MSMT323 | MCBL050A | MPCBD17, J9 |
| JP8, MSMT323 | MCBL077A | MPCBD17, J18 |
| JP7, MSMT323 | MCBL077A | MPCBD17, J19 |
| J5, MSMT323 | MCBL054A | CINF026, CH2 |
| J11, MSMT323 | MCBL061A | MSMT321, J2 |
| J1, MSMT321 | MCBL061A | MSMT322, J1 |
| J3, MSMT321 | MCBL055A | MPCBD17, |

**NOTE** MSMT323, MSMT322, and MSMT321 are individual boards on the internal RAID section.

## CD-ROM Drive

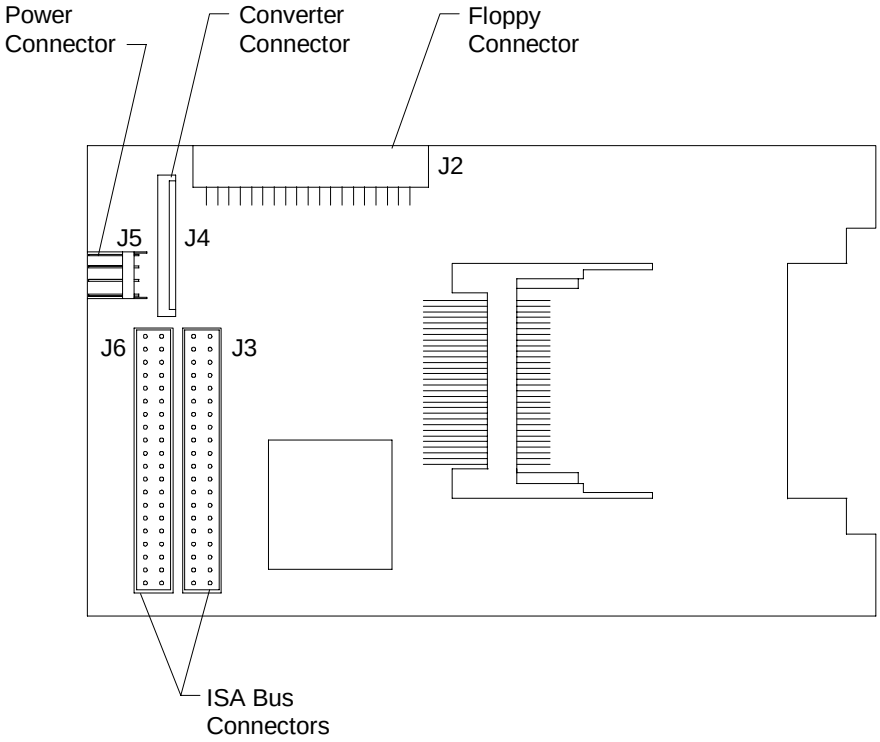
The following figure shows the back of the CD-ROM drive.




- The audio connector uses MCBLZ640 (with the Panasonic CD-ROM drive) or MCBLZ220 (with the Sony CD-ROM drive) and connects to J22 of the system board. Refer to the table "J22, MCBLZ640 or MCBLZ220, Audio" on page 52 for the cable pinout.
- The SCSI connector uses MCBL234A and connects to the SCSI connector on the riser card. Refer to the "Riser Card (MSMT463)" for the cable pinout.
- Settings for mode select header, which sets SCSI ID, parity, and other drive functionality are printed on the CD-ROM drive.
- Terminator resistors are installed in the terminator sockets only when active termination is required. By default, these sockets are emtpy since termination is provided by the SCSI cable.
- The power connector uses the power cable as defined below:
  - InterServe 615, 615UW and 625UW (non RAID) uses P6 power supply cable from MPWS131. See the table "P2 - P7 Disk Drives" on page 78 the for pinout.
  - InterServe 615 and 625 (internal RAID) uses the P6 power supply cable from MPWS131. See the table "P2 - P7 Disk Drives" on page 78 the for pinout.
  - InterServe 635 and 645 uses power cable MCBL049A from the power distribution board. See the table "J11, MCBL049A, Auxiliary Power," on page 69 the for pinout.

## Combo Drive (MESAM86)

The following figure shows the cable connectors on the combo drive.




- The power connector uses the power cable as defined below:
  - InterServe 615 and 615UW (non RAID) uses P9 power supply cable from MPWS131. See the table “P9 Connector Pinout” on page 78 the for pinout.
  - InterServe 615 and 625 (internal RAID) uses the P9 power supply cable from MPWS131. See the table “P9 Connector Pinout” on page 78 the for pinout.
  - InterServe 635 and 645 uses power cable MCBL049A from the power distribution board. See the table “J11, MCBL049A, Auxiliary Power” on page 69 the for pinout.
- The ISA bus connector J3 uses MCBL084A and connects to J32 on the system board. Refer to the table “J32, MCBLZ370, PCMCIA ISA Bus” on page 53 and for the cable pinout.
- The ISA bus connector J6 uses MCBL084A and connects to J33 on the system board. Refer to the table “J33, MCBLZ370, PCMCIA ISA Bus” on page 53 and for the cable pinout.

- The floppy connector uses cable MCBL067A and connects to J30 on the system board. Refer to the table “J30, MCBL067A, Floppy” on page 53 for the cable pinout. The floppy connector also uses cable MCBLZ230 to connect to the converter connector J4 on the combo drive. The following table shows the pinout of MCBLZ230.

| Pin | Signal | Pin | Signal | Pin | Signal |
|---|---|---|---|---|---|
| 1 | VCC | 10 | MTR1- | 19 | Ground |
| 2 | INDEX- | 11 | No connect | 20 | TRK0- |
| 3 | VCC | 12 | DIR | 21 | Ground |
| 4 | DRV1- | 13 | No connect | 22 | WRPRT- |
| 5 | VCC | 14 | STEP- | 23 | Ground |
| 6 | DSKCHG | 15 | Ground | 24 | RDATA- |
| 7 | No connect | 16 | WDATA- | 25 | Ground |
| 8 | No connect | 17 | Ground | 26 | HDSEL |
| 9 | RPM | 18 | WGATE- | | |

## Disk Drives

The following disk drives are used in the non-RAID InterServe systems. For information about the RAID drives used in systems with the internal RAID section, refer to the InterRAID documentation.

| Part Number | Vendor Number | Capacity |
|---|---|---|
| CDSK111 | Seagate ST51080N | 1 GB |
| CDSK094 | Seagate ST32155N | 2 GB |
| CDSK098 | Conner CFP4207S | 4 GB |
| CDSK123 | Seagate ST34371N | 4 GB |

SCSI ID selection is defined in the following table. Each disk drive has a connector which uses jumpers to set the SCSI ID. Where Seagate uses ID1, ID2, and ID4 to identify how to set the SCSI ID, Conner uses 0E1, 0E2, and 0E3.

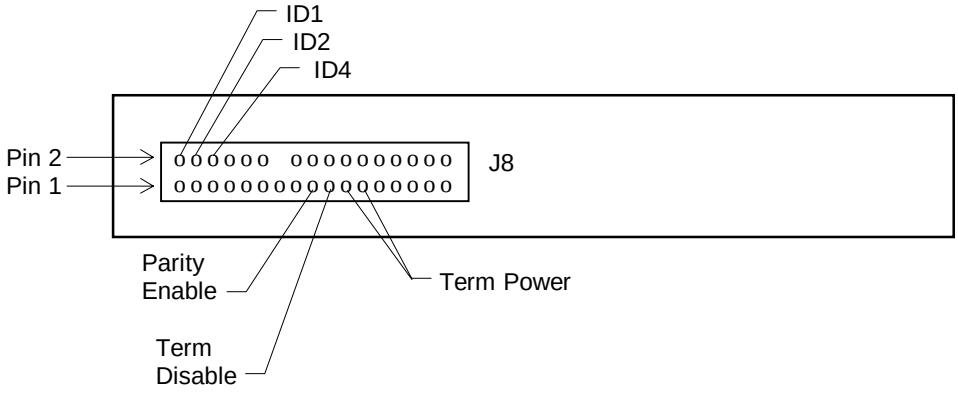
| SCSI ID | ID1/0E1 | ID2/0E2 | ID4/0E3 |
|---|---|---|---|
| 0 | Off | Off | Off |
| 1 | On | Off | Off |
| 2 | Off | On | Off |
| 3 | On | On | Off |
| 4 | Off | Off | On |
| 5 | On | Off | On |
| 6 | Off | On | On |

The disk drive SCSI connector uses MCBL234A and connects to the SCSI connector on the riser card. Refer to the “Riser Card (MSMT463)” for the cable pinout.

The disk drive power connector uses either of the P2 through P7 power supply cables from MPWS131. See the table “P2 - P7 Disk Drives” on page 78 the for cable pinout.

### CDSK111 1 GB

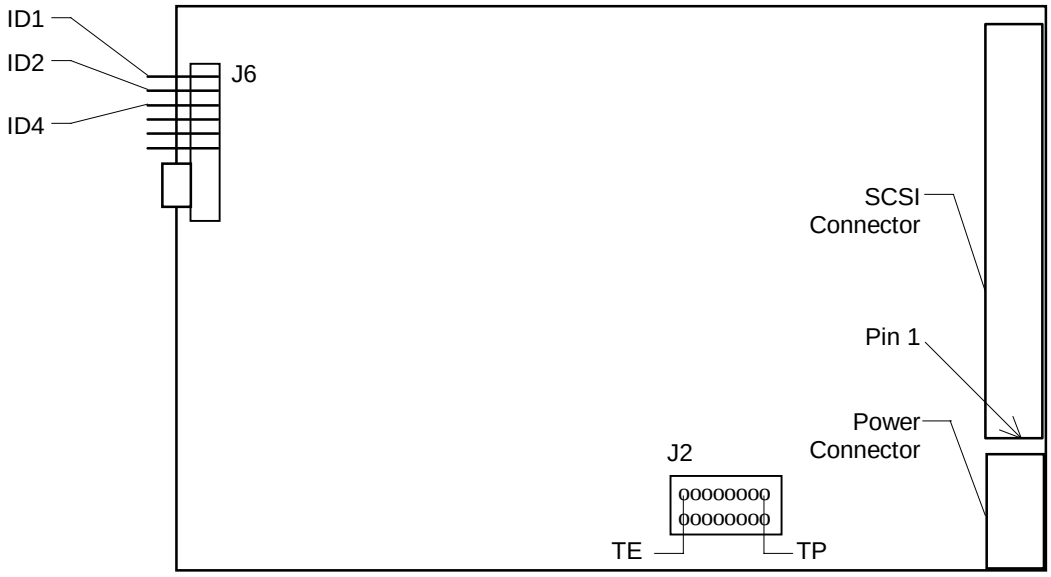
The following figure shows the jumper connector J8 on the back of the disk drive.




SCSI ID selection uses the ID1, ID2, and ID4 jumpers on connector J8. To disable SCSI termination, install the Term Disable jumper and remove both Term Power jumpers from connector J8. To enable SCSI termination, remove the Term Disable jumper and install both Term Power jumpers onto J8.

### CDSK094 2 GB

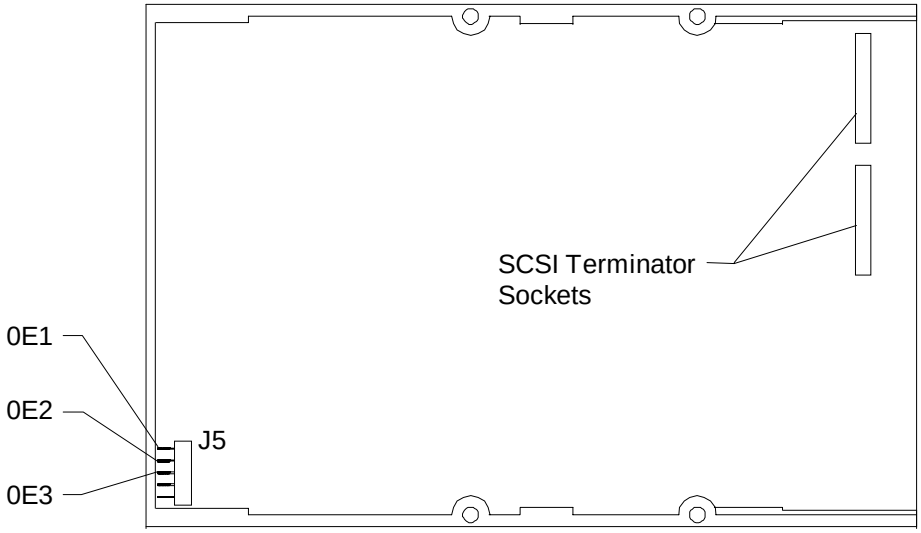
The following figure shows the jumper connectors J6 and J2 on the disk drive.




SCSI ID selection uses the ID1, ID2, and ID4 jumpers on connector J6. To disable SCSI termination, remove the TE jumper from connector J2.

### CDSK098 4 GB

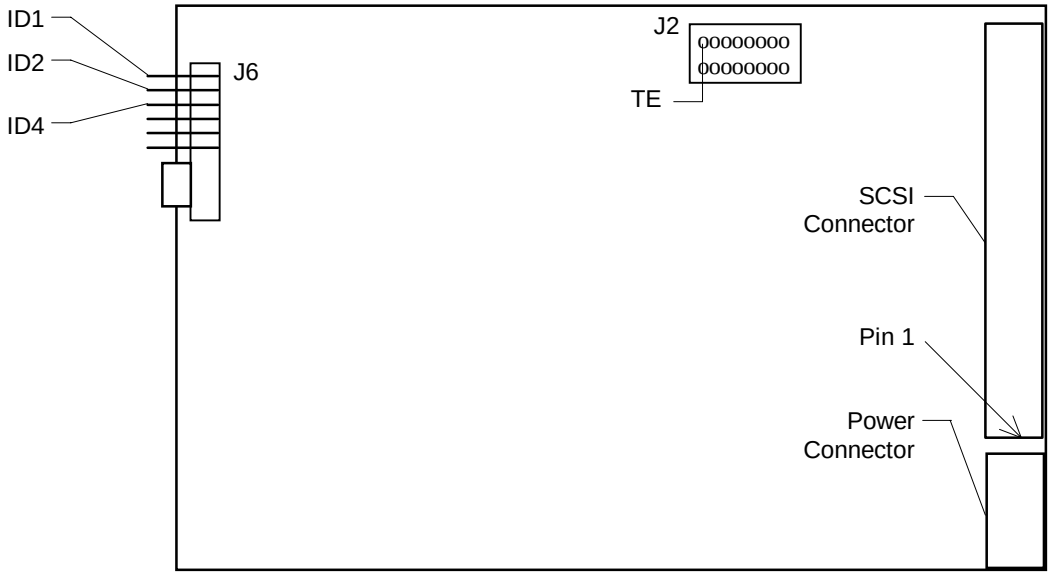
The following figure shows the jumper connector J5 and SCSI terminator sockets on the disk drive.




Connectors 0E1 through 0E3 are also available on a jumper block near the SCSI terminator sockets; do not install jumpers on these connectors. To enable SCSI termination, install the proper resistors into both terminator sockets. To disable SCSI termination, remove both resistors from the sockets.

### CDSK123 4 GB

The following figure shows the jumper connectors J6 and J2 on the disk drive.




SCSI ID selection uses the ID1, ID2, and ID4 jumpers on connector J6. To disable SCSI termination, remove the TE jumper from connector J2.

# System Fans

## Option Board Fans (MCBLZ520 and MCBLY690)

The option board fans are one 119 mm (MCBLZ520) and two 80 mm (MCBLY690), attached to the fan housing. The fan power cable MCBLZ530 connects the fans to J68 on MSMT359. All InterServe systems use these fans.

## Auxiliary Fan (CFAN111)

Only InterServe 615 and 625 systems with RAID use CFAN111 (92 mm), located under the power supply. The fan power cable connects to J12 on MSMT359. CFAN110 (fan guard) is installed over the opening in the power supply access panel. InterServe 615 systems without internal RAID do not use CFAN111.

## System Disk Fan (MCBL172A)

Only non-RAID InterServe systems use MCBL172A, an 80 mm fan mounted to the power supply access panel. MCBLZ660 is used to connect MCBL172A to the system board.

# Index