



# Sun Fire™ E6900/E4900 Systems Service Manual

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# Preface

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This document describes how to remove and install field-replaceable units (FRUs). This document also presents a functional description of the systems, configuration rules, and illustrated parts breakdowns for each system.

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## Who Should Use This Document



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**Caution** – This document is written for qualified service-trained maintenance providers. If you are not a qualified service-trained maintenance provider and you service the system, your warranty on the system will be void.

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# How This Document Is Organized

This document contains the following chapters and appendixes:

Chapter 1 describes the safety precautions and tools you will need.

Chapter 2 describes how to power on and power off the system.

Chapter 3 describes how to install and remove the FrameManager.

Chapter 4 describes how to install and remove the power supplies, the AC input box, the redundant transfer unit (RTU), and the redundant transfer switches (RTS).

Chapter 5 describes how to install and remove the patch panel.

Chapter 6 describes how to install and remove the fan trays.

Chapter 7 describes how to install and remove the System Controller board.

Chapter 8 describes how to install and remove the CPU/Memory board, DIMMs (Dual Inline Memory Modules), and EMI springfingers clip.

Chapter 9 describes how to install and remove the PCI I/O assembly and how to install and remove the cards in the I/O assembly.

Chapter 10 describes how to install and remove the Repeater board.

Chapter 11 describes how to install and remove the centerplane.

Chapter 12 describes how to perform the periodic maintenance tasks for Sun Fire systems.

Appendix A presents a functional description of the systems; the card cage layout and the layout of various boards, such as the CPU/Memory board and the I/O assembly.

Appendix B describes system serial number locations and rules for system configuration.

Appendix C provides illustrations of the field-replaceable units.



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# Typographic Conventions

**TABLE P-1** Typographic Conventions

Typeface	Meaning	Examples
<i>AaBbCc123</i>	Document titles, new words or terms, words to be emphasized	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this.

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## Related Documentation

Application	Title
Installation	<i>Sun Fire E6900/E4900 System Getting Started</i>
	<i>Sun Fire E6900/E4900 System Installation Guide</i>
Operation	<i>Sun Fire Cabinet Installation and Reference Guide</i>
	<i>Sun Fire E6900/E4900 Systems Overview Manual</i>
Software	<i>Sun Fire Midrange Systems Platform Administration Manual</i>
	<i>Sun Fire Midrange Systems Controller Command Reference Manual</i>

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## Notes and Cautions

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**Note** – Procedures contained in this document must be performed by qualified service-trained maintenance providers. Before you begin, carefully read each of the procedures in this manual. If you have not performed similar operations on comparable equipment, *do not attempt* to perform these procedures.

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**Caution** – This equipment contains lethal voltage. Accidental contact with centerplane, card cage, and drive areas can result in serious injury or death.

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**Caution** – Improper handling by unqualified personnel can cause serious damage to this equipment. Unqualified personnel who tamper with this equipment may be held liable for any resultant damage to the equipment.

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Individuals who remove any outer panels or open covers to access this equipment must observe all safety precautions and ensure compliance with skill level requirements, certification, and all applicable local and national laws.

For system compliance class and conformity information, refer to the system installation guide that came with your system.

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# Safety and Tools Requirements

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This chapter describes the safety and system precautions you must take when servicing the system. It also lists the tools and equipment you will need.



## 1.1 Safety Precautions

For your protection, observe the following safety precautions when servicing your equipment:

- Follow all cautions, warnings, and instructions marked on the equipment.
- Never push objects of any kind through openings in the equipment as they may touch dangerous voltage points or short out components that could result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

To protect both yourself and the equipment, observe the following safety precautions:







**TABLE 1-1** Safety Precautions

Item	Problem	Precaution
ESD wrist or foot strap	Electro-Static Discharge (ESD)	Connect the ESD banana connector to your system and wear the wrist strap or foot strap when handling printed circuit boards. Each system except for the Sun Fire 3800 has an ESD socket.
ESD mat	ESD	Using an approved ESD mat provides protection from static damage when used with a wrist strap or foot strap. The mat also cushions and protects small parts that are attached to printed circuit boards.

---

## 1.2 Symbols

TABLE 1-2 Symbols

Symbol	Description	Meaning
	<b>CAUTION</b>	Hazardous voltages are present. To reduce the risk of electrical shock and danger, follow the instructions.
	<b>CAUTION</b>	Risk of personal injury or equipment damage. To reduce the risk, follow the instructions.
	<b>CAUTION</b>	<b>CAUTION:</b> Hot surfaces. Avoid contact. Surfaces are hot and may cause personal injury if touched.
	<b>COMPONENT ACTIVATED</b>	Component is activated when the green activated LED on the system component is lit.
	<b>FAULT</b>	System has detected a hardware failure. When the fault LED (amber) is lit, the system has detected hardware failure.
	<b>OK TO REMOVE</b>	You can safely remove board or component from the system when the OK to remove LED (amber or blue) is lit.

---

---

## 1.3 System Precautions

Ensure that the voltage and frequency of the power outlet to be used matches the electrical rating labels on the equipment.

Wear an ESD wrist/foot strap when handling any magnetic storage devices, CPU/Memory boards, or other printed circuit boards.

Use only properly grounded power outlets as described in the installation guides.



---

**Caution** – DO NOT make mechanical or electrical modifications to the system or the cabinet. Sun Microsystems is not responsible for regulatory compliance of modified cabinets.

---



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**Caution** – The chassis AC power cord(s) must remain connected to ensure a proper ground.

---

### 1.3.1 Captive Screws



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**Caution** – Completely loosen all captive screws before ejecting the System Controller board, power supplies, and I/O assemblies. Captive screws that have not been completely loosened may cause damage to the System Controller board, power supplies, or I/O assemblies.

---

### 1.3.2 Fan Speed Message

The fan speed message states “WARNING” instead of “NOTICE” when the fan changes speed. Fans will go from low to high speed if all of the system fans are not providing cooling, or when the environmental threshold is exceeded for the CPU. Use the `showenv -v` command to obtain CPU environmental threshold information. Refer to the *Sun Fire 6800/4810/4800/3800 System Controller Command Reference Manual* for correct usage of the `showenv` command. The system is OK and is still within the thermal specification when this “WARNING” message appears.

### 1.3.3 Sun Fire Cabinet Fan Tray Power Switches

If the Sun Fire cabinet fan trays are not operating, make sure that the fan trays are switched on. The fan tray power switches are located in the back of each cabinet fan tray, below the power cord socket.

## 1.3.4 Firmware On Replacement Boards and Assemblies

After installing a board or assembly, use the `showboards -p proms` command to determine if the firmware needs to be updated. If an update is required, use either the system controller `flashupdate -f` or `flashupdate -c` command. Refer to the *Sun Fire 6800/4810/4800/3800 System Controller Command Reference Manual* for correct usage of the `flashupdate` command.

---

**Note** – Do not use the `flashupdate -u` command as shown in onscreen messages. Using `flashupdate -u` can result in incompatibility issues that require a reboot of the system controller and domains.

---

You can find a list of the most current patches for bug fixes and system firmware upgrade on SunSolve Online<sup>sm</sup>. SunSolve provides recommended and security patches, including Year 2000 patches, to all users. Other product and OS patches are available to SunSpectrum<sup>sm</sup> contract customers. Contact your local Sun Customer Care Center or your service provider if you need assistance in accessing the list of current patches and system firmware upgrades.

## 1.3.5 Switzerland Caution



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**Caution** – The Sun Fire Sun Fire 3800 system exceeds the rating requirements in Switzerland for pluggable type A equipment. To comply with national requirements, customers in Switzerland who receive a standalone Sun Fire Sun Fire 3800 system (shipped without a rack) must provide a means to connect the system to a pluggable type B power circuit.

---



---

## 1.4 Filler Boards and Filler Panels

Filler boards and filler panels are used for EMI protection and to ensure proper air flow in order to prevent the system from overheating.

TABLE 1-3 describes the precautions you must take when you remove boards or assemblies from a system.

**TABLE 1-3** Overheating Precautions Using Filler Boards

<b>If you have...</b>	<b>Do the following</b>
Empty PCI card slots	Install PCI filler boards in all empty PCI card slots.
Empty CompactPCI I/O slots	Install CompactPCI I/O filler boards in all unused CompactPCI slots.
CPU/Memory board	Install a filler board in a system to prevent the system from overheating if the system is to be operating without the CPU/Memory board installed. If two CPU/Memory boards must be removed, use a CPU filler panel over one board slot and install a filler board in the second board slot in order to prevent the system from overheating. Do not install two filler panels. The filler panels are for short term use only (CPU/Memory board replacement).
System Controller board	A filler board occupies the empty slot for one of the System Controller boards. If you install a redundant System Controller board, remove the System Controller filler board.
Empty power supply slots	Install power supply filler panels in empty power supply slots within one minute in a powered-on system.
Empty fan tray slots	Install fan tray filler panels in empty fan tray slots within one minute in a powered-on system.

---

## 1.5 Periodic Maintenance

The Sun Fire system have been designed such that the air intake screens can be cleaned or changed without the need to power off the system.

The Sun Fire system each have one air intake screen that requires periodic inspection and cleaning. Inspecting the air intake screen for debris and trapped particles should be done every three months of operation. The level of debris found on the screen and surrounding area should be considered in the decision of when to remove and clean the air intake screen. See Section 12.1 “Cleaning the Air Intake Screen”.

If the air intake screen collects a substantial amount of debris in less than three months, investigate the air supply system for sources of contamination and take corrective action. In addition, notify and update account management, as required.

Have spare air intake screens onsite so that replacements are available when needed for cleaning.

---

## 1.6 Tools Required

For the procedures in this document, you will need these tools:

- Screwdriver, Phillips No. 1 with six-inch shank
- Screwdriver, Phillips No. 2 with six-inch shank
- Screwdriver, Phillips No. 2 with 10-inch shank
- Screwdriver, straight slot with six-inch shank
- Needlenose pliers
- ESD mat
- ESD grounding wrist strap or foot strap

## Powering Off and On

---

This chapter describes how to power the system off and on. These systems do not have a physical keyswitch. Before physically powering off the system, you must halt the Solaris operating environment in each domain and then power off the domain.

---

### 2.1 Powering Off the System

1. Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete step-by-step commands for powering off the domains and the system.
2. For Sun Fire E6900 system or Sun Fire E4900 system mounted in a Sun Fire cabinet, turn the FrameManager's keyswitch to the off position (FIGURE 2-1).

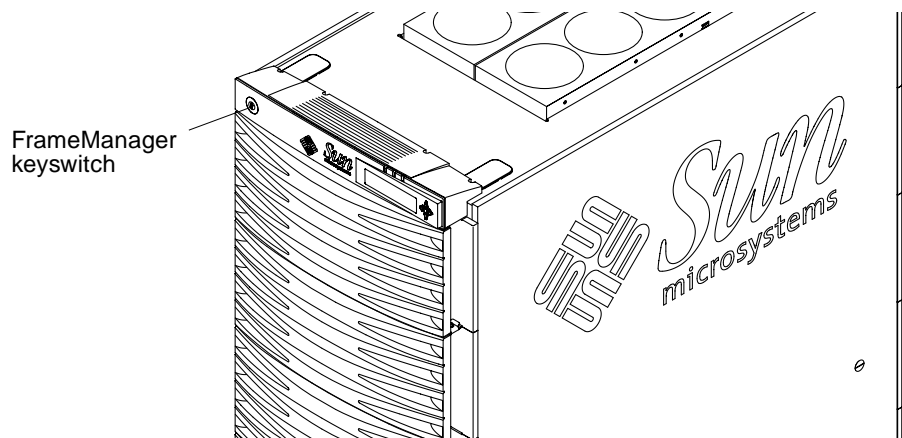


FIGURE 2-1 Sun Fire System Cabinet Showing FrameManager—Top View

3. Turn off the AC input box(es) (FIGURE 2-2, FIGURE 2-3).

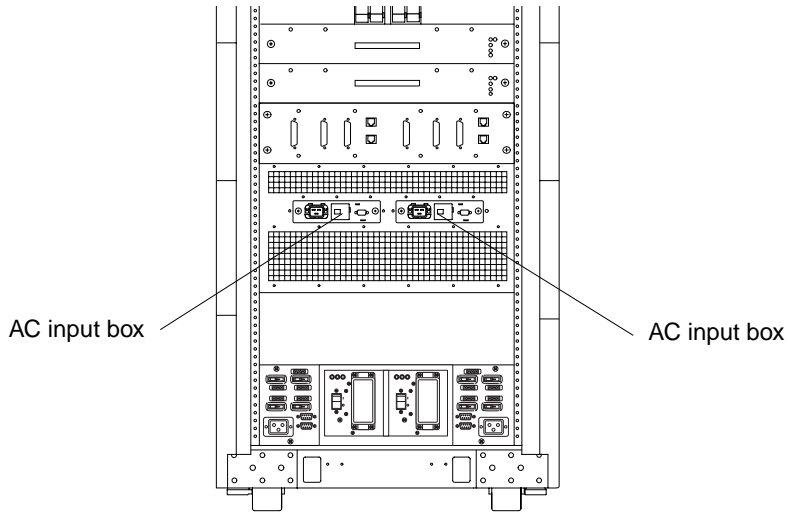


FIGURE 2-2 AC Input Boxes—Sun Fire E6900 System—Rear View

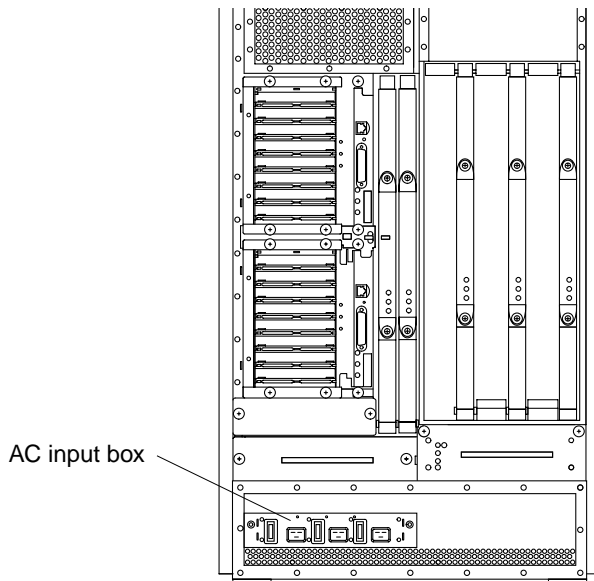
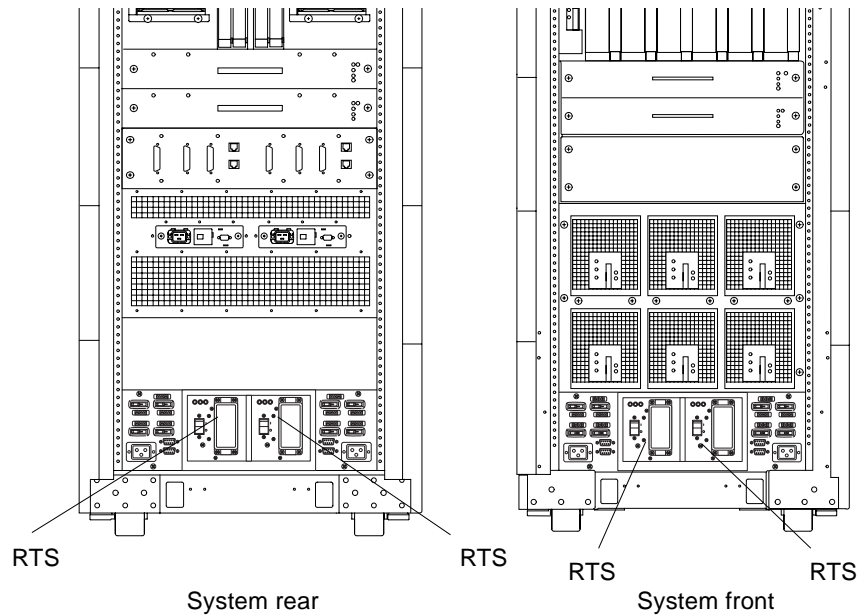


FIGURE 2-3 AC Input Box—Sun Fire E4900 System—Rear View

4. For Sun Fire E6900 system or Sun Fire E4900 system mounted in a Sun Fire cabinet, turn off the redundant transfer switches (RTS) (FIGURE 2-4).



**FIGURE 2-4** Redundant Transfer Switches (RTS)—Sun Fire E6900 System

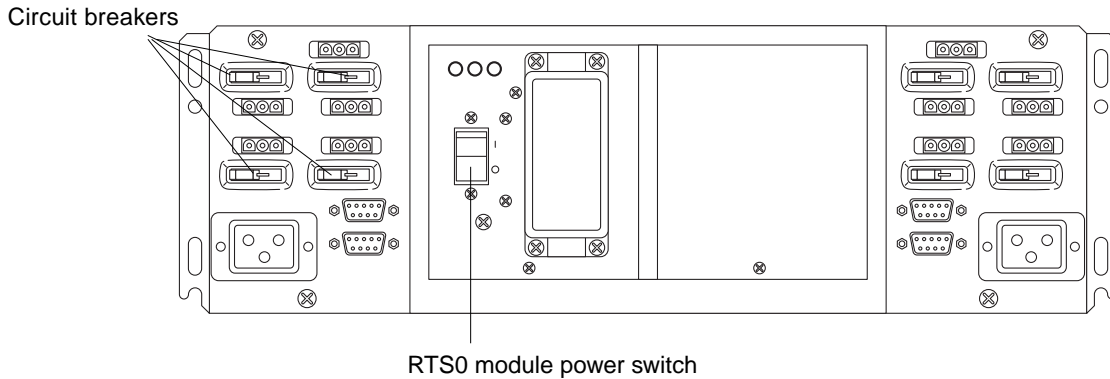
---

## 2.2 Powering On the System

1. If your Sun Fire E4900 system is not in a Sun Fire cabinet, skip to Step 3. For the Sun Fire E6900 system or Sun Fire cabinet, turn on the RTS modules (FIGURE 2-5).

It will take 30 seconds to one minute for the RTS modules to power on.

2. Check that all of the circuit breakers on each side of the RTU are on.



**FIGURE 2-5** Sun Fire Cabinet RTU Circuit Breakers and RTS Power Switch

3. Turn on the AC input box(es).

See FIGURE 4-7 on page 4-10 or FIGURE 4-8 on page 4-11..

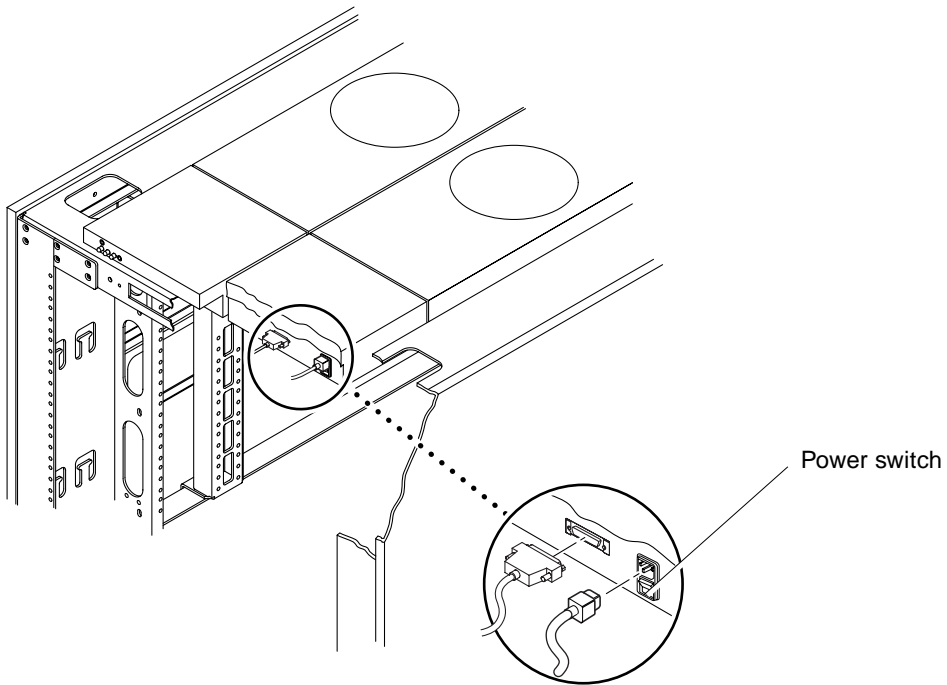
4. For Sun Fire E6900 system or Sun Fire E4900 systems mounted in a Sun Fire cabinet, make sure that the rack fan trays are switched on.

This switch is located in the back of the cabinet, below the power cord socket on each rack fan tray (FIGURE 2-6).

5. If your Sun Fire E4900 system is not in a Sun Fire cabinet, skip this step. For Sun Fire E6900 system or Sun Fire E4900 systems mounted in a Sun Fire cabinet, turn the keyswitch on the FrameManager to the on position (FIGURE 2-1).

6. Power on the system.

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on the system.



**FIGURE 2-6** Cabinet Fan Tray Power Switch—Sun Fire E6900 System Rear View





# FrameManager

---

This chapter provides procedures for field-replaceable FrameManager units within a Sun Fire E6900 system cabinet. The following sections are included in this chapter:

- Section 3.1 “FrameManager Description” on page 3-1
- Section 3.2 “FrameManager LEDs” on page 3-2
- Section 3.3 “Replacing the FrameManager” on page 3-2

---

## 3.1 FrameManager Description

The FrameManager is a set of hardware and software integrated into the Sun Fire cabinet and the Sun Fire E6900 system. It performs concurrent monitoring and control of the fan trays, RTS modules, and RTU assemblies. The FrameManager is located on the top front of the cabinet (FIGURE 3-1).

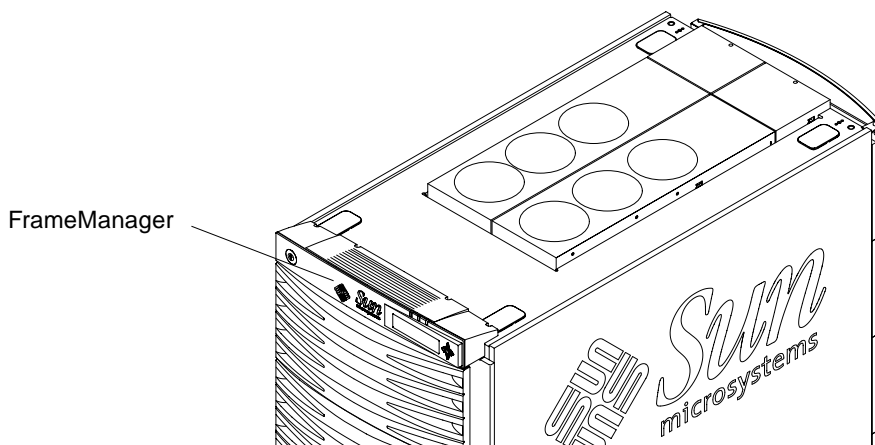





FIGURE 3-1 FrameManager

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## 3.2 FrameManager LEDs

The LEDs indicate the status of the individual device. The FrameManager has three LEDs: power, fault, and service (TABLE 3-1).

**TABLE 3-1** FrameManager LED Major Functions

LED		Function	Operation
Green LED		Power	On when the RTS has been commanded to enable switched power.
Amber LED		Fault	On when a fault condition exists in the FrameManager, fan trays, RTS module, or RTU assembly.
Amber LED		Service	FrameManager, fan trays, RTS module, or RTU assembly can safely be removed from a powered-on system when the Service LED is lit.

---

## 3.3 Replacing the FrameManager

1. Loosen the screws at the back of the assembly (FIGURE 3-2).

---

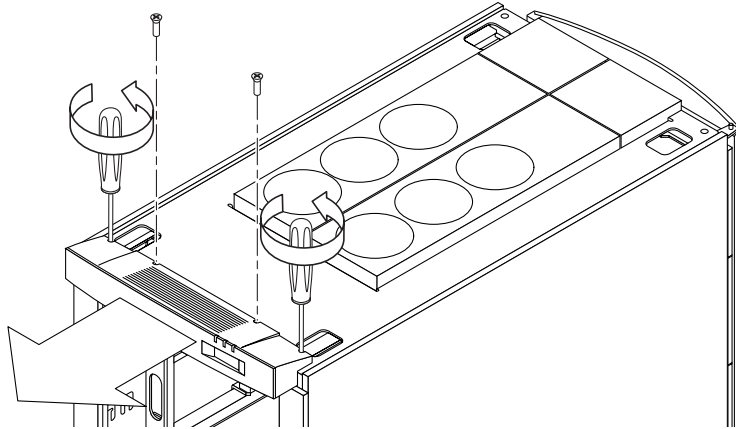
**Note** – You may have to remove the two middle screws and reinstall them after you slide the replacement assembly into place.

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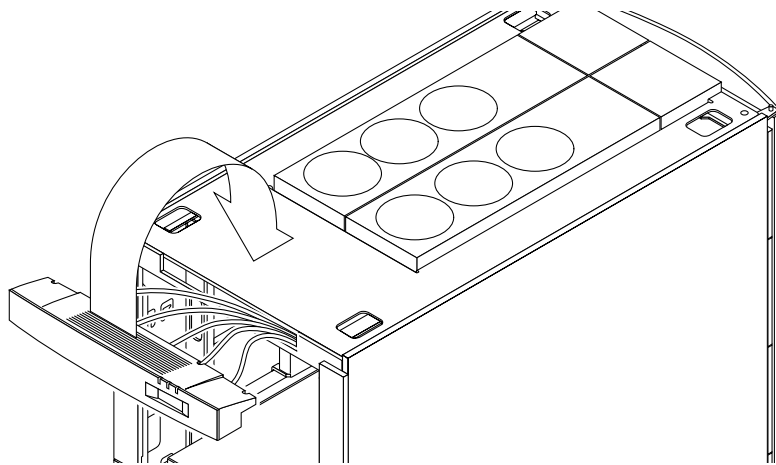
**Note** – Note the current position of the keyswitch before removing the FrameManager. The replacement FrameManager keyswitch must be in the same position.

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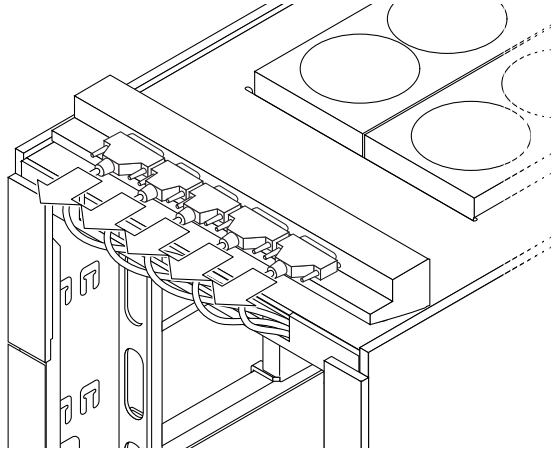
**FIGURE 3-2** FrameManager Removal—Step 1

2. Slide the assembly forward and carefully flip it onto the top of the cabinet to access the cable connector on the rear of the assembly (FIGURE 3-3).



**FIGURE 3-3** FrameManager Removal—Step 2

3. Disconnect the five cables from the assembly (FIGURE 3-4).



**FIGURE 3-4** FrameManager Cable Location

**4. Remove the assembly from the top of the cabinet.**



---

**Caution** – Make sure that the keyswitch of the replacement FrameManager is in the same position as the keyswitch of the removed FrameManager. Not doing so could cause the system to be inadvertently powered off when the replacement FrameManager is reconnected to the five cables.

---

**5. Install the replacement assembly by reversing Step 1 through Step 4.**

# Power

---

This chapter describes how to remove and replace power supplies and the AC input box. Location information on the RTS modules is also provided.

To protect both yourself and the equipment, make sure you follow the safety precautions in Chapter 1 “Safety and Tools Requirements.”

This chapter contains the following sections:

- Section 4.1 “Power Supplies” on page 4-1
  - Section 4.1.1 “Power Supply Slot Locations” on page 4-2
  - Section 4.1.2 “Power Supply LEDs” on page 4-5
  - Section 4.1.3 “Replacing a Sun Fire E6900 System Power Supply” on page 4-6
  - Section 4.1.4 “Replacing a Sun Fire E4900 System Power Supply” on page 4-7
- Section 4.2 “AC Input Box” on page 4-9
  - Section 4.2.1 “Replacing the AC Input Box” on page 4-11
- Section 4.3 “Redundant Transfer Unit (RTU) and Redundant Transfer Switch (RTS)” on page 4-13
  - Section 4.3.1 “Replacing the RTS Modules” on page 4-15
  - Section 4.3.2 “Replacing the RTU Assembly” on page 4-16

---

## 4.1 Power Supplies

The Sun Fire E6900 system and the Sun Fire E4900 system each have specialized power supplies that cannot be interchanged with each other.

TABLE 4-1 lists the specifications for the power supplies.

**TABLE 4-1** Specifications for the Power Supplies

<b>System Type</b>	<b>Power Supplies per System</b>	<b>Main Voltage Output DC</b>	<b>Auxiliary Voltage Output DC</b>
Sun Fire E6900	6	56	56
Sun Fire E4900	3	56	56

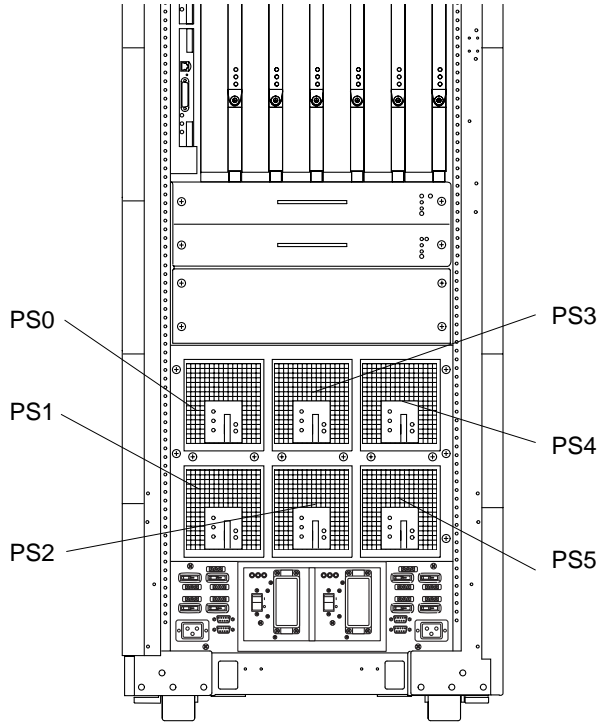
There are four alternating current (AC) power cords for the Sun Fire E6900 system. There are three AC power cords for the Sun Fire E4900 systems. The software monitors the status of the AC power source. For more information on the power supplies, see Appendix A.

## 4.1.1 Power Supply Slot Locations

**TABLE 4-2** Power Supply Slot Locations

<b>System</b>	<b>Slot Numbers</b>	<b>Slot Location</b>
Sun Fire E6900	PS0 to PS5	Front
Sun Fire E4900	PS0, PS1, PS2	Front

The Sun Fire E6900 system has two independent power grids, grid 0 and grid 1. For the Sun Fire E6900 system, power supplies PS0, PS1, and PS2 are assigned to power grid 0 and power supplies PS3, PS4, and PS5 are assigned to power grid 1. See (FIGURE 4-1).



**FIGURE 4-1** Power Supply Locations—Sun Fire E6900 System—Front View

FIGURE 4-2 illustrates the power supplies in power grid 0 and power grid 1.

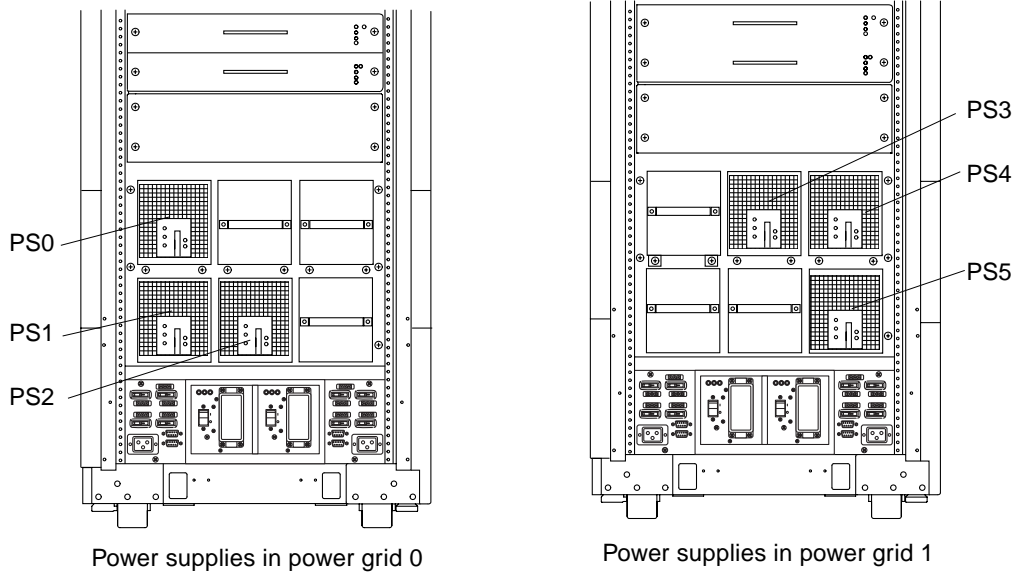
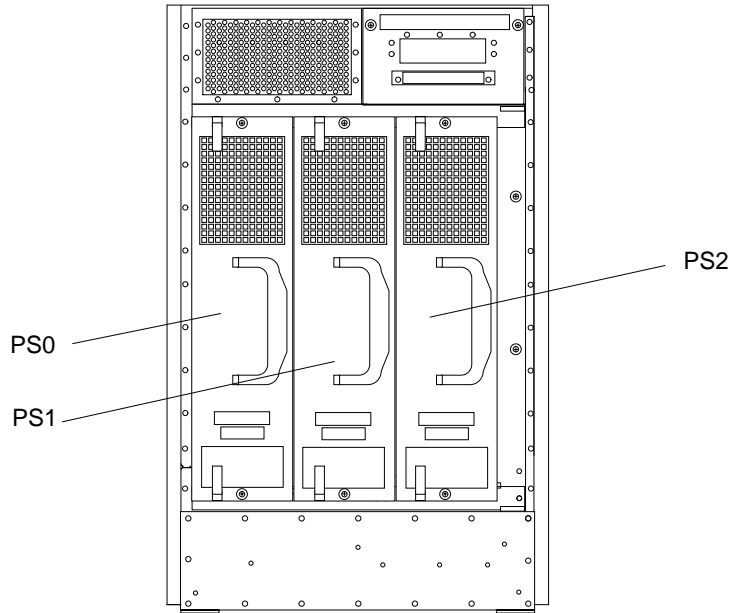


FIGURE 4-2 Power Supplies in Power Grid 0 and Power Grid 1—Sun Fire E6900 System



In the Sun Fire E4900, install the power supplies in this order: PS0, PS1, and PS2.



**FIGURE 4-3** Power Supply Locations—Sun Fire E4900 System—Front View

## 4.1.2 Power Supply LEDs

There are three LEDs on each power supply. TABLE 4-3 notes the LED functions.

**TABLE 4-3** Power Supply LED Functions

LED Name and Location	On	Off
Activated LED (green)	Power supply activated and operating normally	Power supply deactivated
Fault LED (amber)	Internal fault	No internal fault
OK to remove LED (amber or blue)	Power supply can be removed	Power supply cannot be removed

## 4.1.3 Replacing a Sun Fire E6900 System Power Supply

### 4.1.3.1 Removing a Sun Fire E6900 System Power Supply

**1. Power off the appropriate power supply.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the power supply.

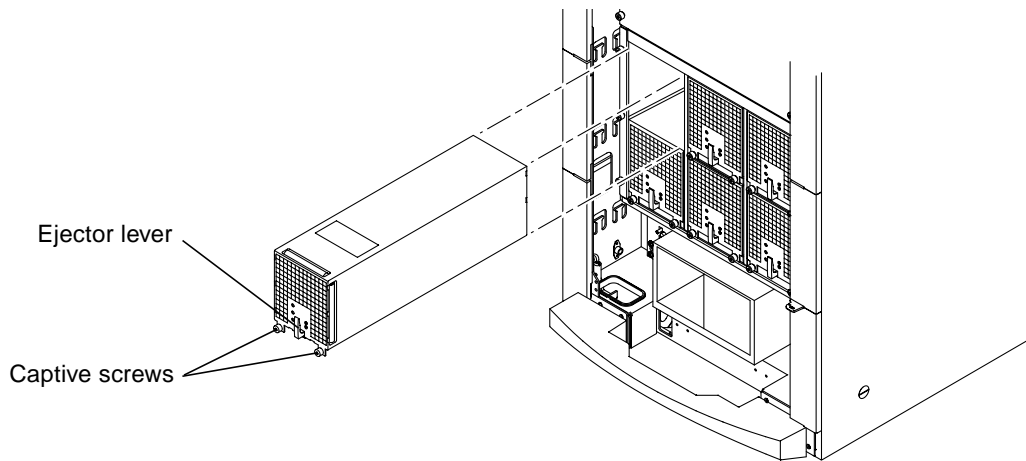
---

**Note** – When the green Activated LED on the power supply is off (not lit) and the amber or blue OK to remove LED is on (lit), it is safe to continue. You do not have to power off the power grids, AC input box, or RTS module(s).

---

**2. Have a power supply filler panel or replacement power supply available.**

**3. Loosen the two captive screws (FIGURE 4-4).**



**FIGURE 4-4** Removing or Replacing a Power Supply—Sun Fire E6900 System

**4. Unlock the ejector by pulling the ejector down.**

**5. Slide the power supply out.**

**6. If no replacement, install a power supply filler panel to cover the empty slot. Tighten the captive screws.**

### 4.1.3.2 Installing a Sun Fire E6900 System Power Supply

1. Remove the power supply filler panel if present.
2. Slide the power supply into the slot (FIGURE 4-4).
3. Lock the ejector by pushing the ejector up.
4. Tighten the two captive screws.

---

**Note** – Install power supply filler panels to cover any empty slots.

---

5. Make sure that the appropriate power switch on the AC input box for the new power supply is on.
6. Turn on the power supply using the system controller software.

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on the power supply.

---

**Note** – Make sure the Activated LED is on (lit). If the Activated LED is not on, check to see if the power supply is seated properly and the power supply is turned on.

---

## 4.1.4 Replacing a Sun Fire E4900 System Power Supply

### 4.1.4.1 Removing a Sun Fire E4900 System Power Supply

1. Power off the appropriate power supply.

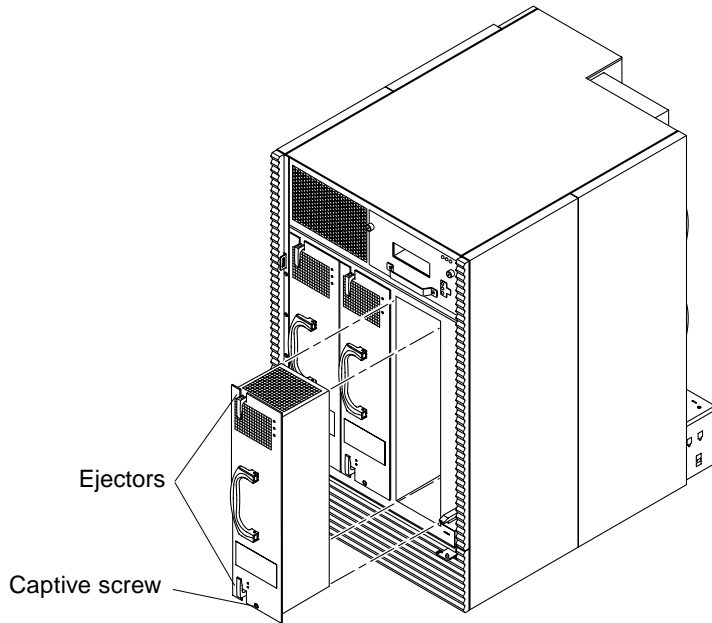
Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the power supply.

---

**Note** – When the Activated LED on the power supply is off (not lit) and the OK to remove LED is on (lit), it is safe to continue. You do not have to power off the power grids, AC input box, or RTS module(s).

---

2. Have a power supply filler panel available.
3. Loosen the two captive screws, one on the top of the power supply and one on the bottom of the power supply (FIGURE 4-5).



**FIGURE 4-5** Removing or Replacing a Power Supply—Sun Fire E4900 System

4. Unlock the ejectors by pushing the ejectors outward.
5. Slide the power supply out.
6. If no replacement, install a power supply filler panel to cover the empty slot.

#### 4.1.4.2 Installing a Sun Fire E4900 System Power Supply

1. Remove the power supply filler panel if present.
2. Remove the protective cover from the power supply connector.
3. Hold the power supply vertically, with one hand gripping the bottom of the unit, and the other hand gripping the handle, (FIGURE 4-5) slide the power supply into the chassis until it stops.
4. Lock the ejectors by pushing them inward.
5. Tighten the two captive screws.
6. Make sure that the appropriate power switch on the AC input box for the new power supply is on.

**7. Turn on the power supply by using the system controller software.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on the power supply.

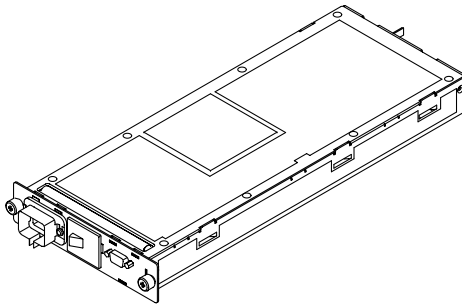
**8. Make sure the green Activated LED is lit.**

If the green Activated LED is not on, check to see if the power supply is seated properly and the power supply is turned on.

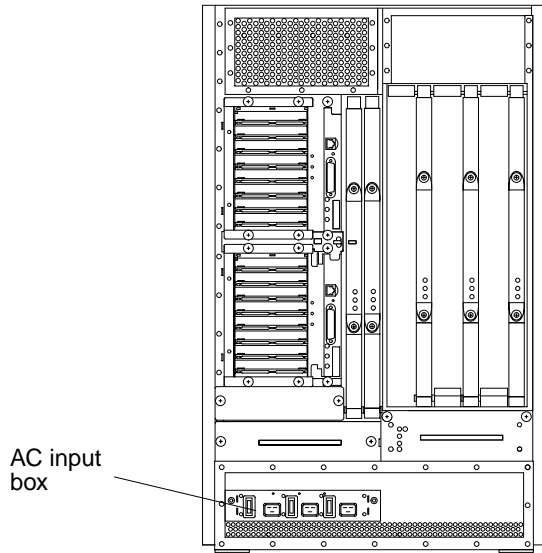
---

## 4.2 AC Input Box

There are two AC input box types. The single input type AC input box is in the Sun Fire E6900 system (FIGURE 4-6), and the multiple input type AC input box is in the Sun Fire E4900 systems. For the location of the AC input boxes, see FIGURE 4-7 and FIGURE 4-8.



**FIGURE 4-6** AC Input Box—Sun Fire E6900 System



**FIGURE 4-7** AC Input Box—Sun Fire E4900 System

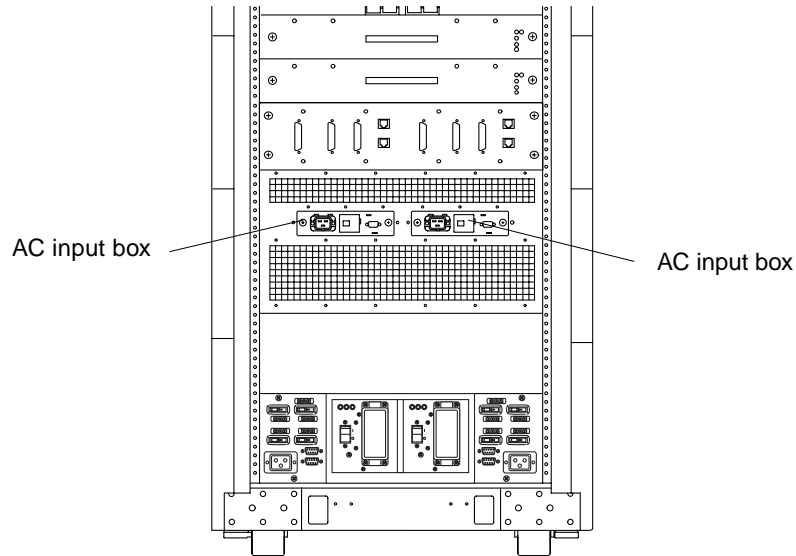


FIGURE 4-8 AC Input Boxes—Sun Fire E6900 System—Rear View

## 4.2.1 Replacing the AC Input Box

### 4.2.1.1 Removing the AC Input Box

**1. Power off the system.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the system.

---

**Note** – The Sun Fire E4900 AC input box has three power cord locks.

---

**2. Loosen the power cord lock(s).**

**3. Disconnect the power cord(s).**

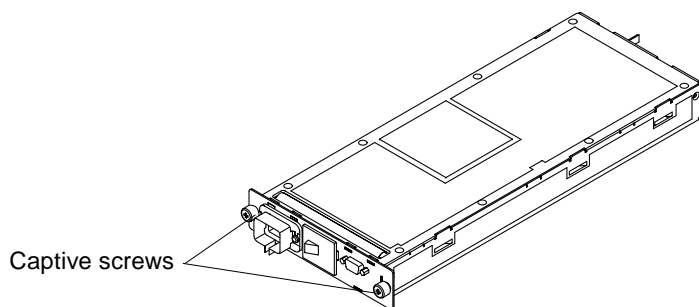
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**Caution** – Disconnecting the power cord removes system ground.

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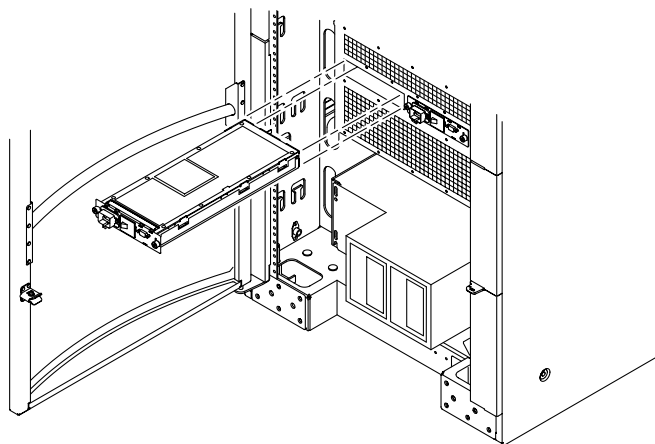


**4. Loosen the two captive screws on the AC input box (FIGURE 4-9).**



**FIGURE 4-9** Two Captive Screws on the AC Input Box—Sun Fire E6900 System

5. Slide the AC input box out of the chassis (FIGURE 4-10).



**FIGURE 4-10** Removing the AC Input Box—Sun Fire E6900 System

#### 4.2.1.2 Installing the AC Input Box

1. Slide the AC input box into the system.
2. Tighten the two captive screws.
3. Connect the power cord to the AC input box.



#### 4. Power on the system.

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on the system.

---

## 4.3 Redundant Transfer Unit (RTU) and Redundant Transfer Switch (RTS)

The Sun Fire E6900 system has two RTUs. Each RTU contains two RTS modules. The primary configuration is the left RTS module with the right RTS module as secondary for redundancy. The RTUs function as power sequencers.

Each RTS module within an RTU is connected to a separate power source.

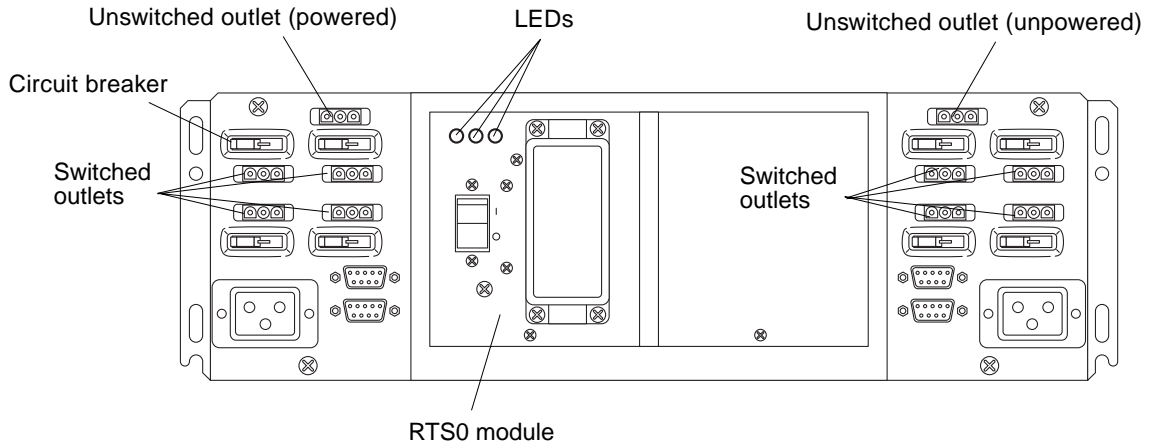
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**Note** – If two separate AC power sources (primary and secondary) are not available, and a single AC power source is used, connect ONLY RTS0 (and RTS2 for Sun Fire E6900 systems) to the power source. Connecting all RTSs to a single AC power source (even if separate circuit breakers are used) is not supported and will adversely affect reliability.

---

Each RTS module has three LEDs (FIGURE 4-11 and TABLE 4-4).

The unswitched outlet on each side of the RTU is active only if an RTS is installed on the same side. If only one RTS is installed, the unswitched outlet on the same side will have power and the unswitched outlet on the other side will not have power. These outlets are normally reserved to power the system cabinet fan trays at the top of the cabinet. If only one RTS is installed then one fan tray must be powered by an unswitched outlet and the other fan tray by a switched outlet (FIGURE 4-11).



**FIGURE 4-11** RTU and RTS Modules

TABLE 4-4 describes the RTS LED functions.

**TABLE 4-4** RTS LED Functions

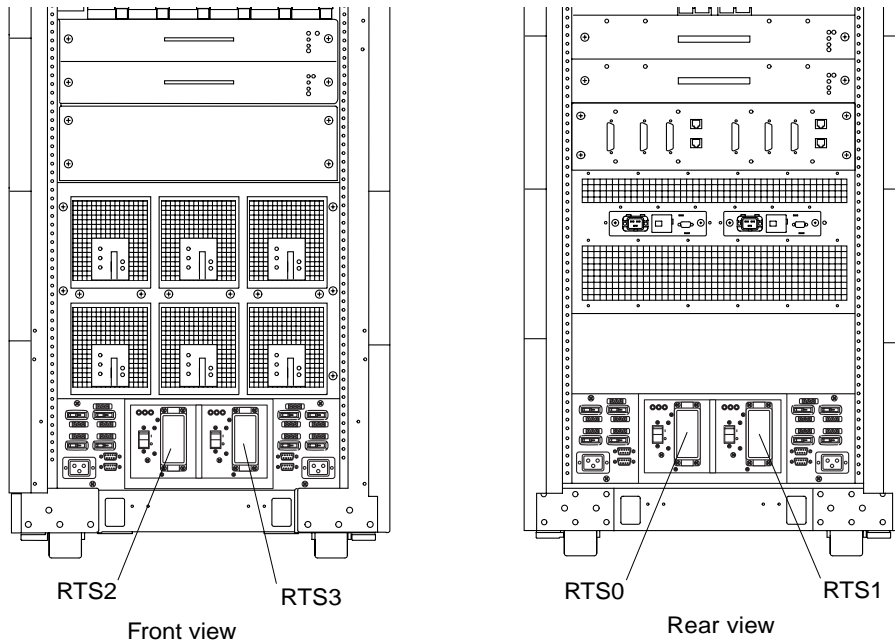
LED Position	Color	Status	Meaning
Left	Green	On	The source is present and is within specifications.
		Off	The source either is not present or is below specifications.
		Flashing	The source is above specifications.
Middle	Green	On	The module relay is energized and the module is connected to the outlets.
		Off	The module relay is de-energized and the module is seated.
		Flashing	The module relay is de-energized and the module is not properly seated.
Right	Amber	On	The module has a fault.
		Off	The module does not have a fault.

During a self-test when you power on the system, the LEDs function as described in TABLE 4-5.

**TABLE 4-5** Self-Test LED Functions

LEDs Flashing	Pattern	Meaning
All	Three times	Self-test is complete
All	Right, middle, left	LED test is complete
Middle	Flashing for three seconds	Seating test in progress

FIGURE 4-12 show the location and numbering of the RTS modules.

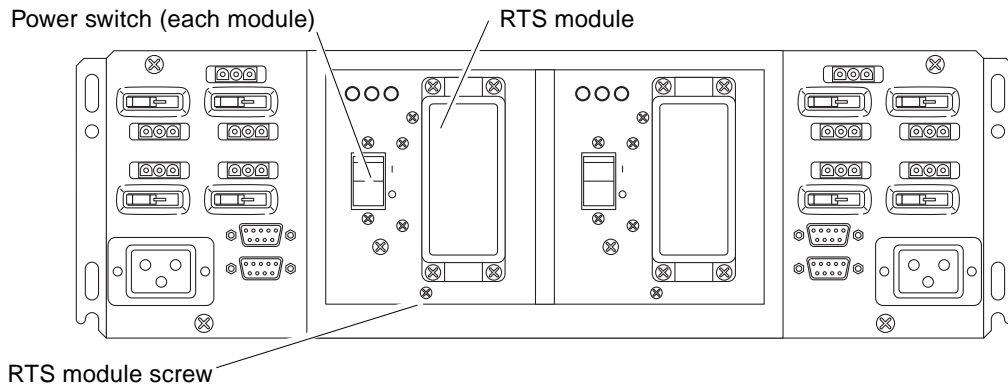


**FIGURE 4-12** RTS Modules—Sun Fire E6900 System

### 4.3.1 Replacing the RTS Modules

1. For systems with redundant RTS modules, skip to Step 3.
2. For systems with non-redundant RTS modules, power off the system.

3. Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the system.
4. Power off the RTS module that is to be replaced (FIGURE 4-13).
5. Power off the wall circuit breaker connected to the RTS module that is to be replaced.
6. Remove the power cord from the RTS module that is to be replaced.
7. Loosen the screw on the bottom of the RTS module.



**FIGURE 4-13** RTU Assembly

8. Pull the module straight out.
9. Install the replacement unit by reversing Step 1 through Step 7.  
Ensure proper engagement of the connector in the rear of the module when inserting the replacement module into the RTU.

## 4.3.2 Replacing the RTU Assembly

1. Notify users that the system will be powered off.
2. Power off the system.
3. Power off the wall circuit breaker connected to the RTS module(s) that are to be removed.
4. Label and remove all cabling.
5. Remove the RTS module(s), see previous section.

---

**Note** – Do not attempt to remove the RTU without first removing the RTS modules.

---

6. **Remove the four screws holding the RTU to the cabinet (FIGURE 4-13).**
7. **Firmly pull out the RTU.**
8. **Install the replacement RTU Assembly by reversing Step 1 through Step 6.**  
The assembly is self-aligning.



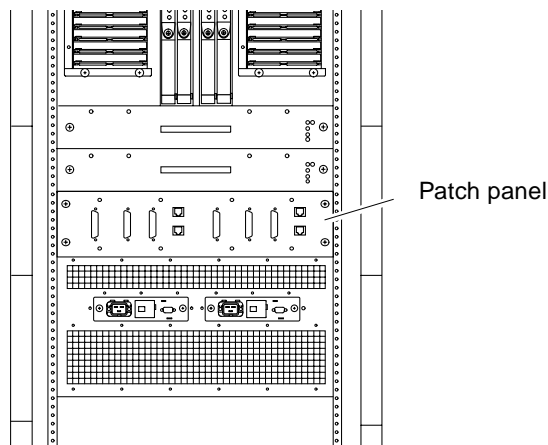
# Patch Panel

This chapter provides procedures for the field-replaceable patch panel within the Sun Fire E6900 system cabinet. The following sections are included in this chapter:

- Section 5.1 “Patch Panel” on page 5-1
- Section 5.2 “Replacing the Patch Panel” on page 5-2

## 5.1 Patch Panel

There is one patch panel in the Sun Fire E6900 system cabinet. The patch panel provides an interface between the system controllers and the system. The patch panel is located in the rear of the cabinet directly above the AC input boxes and RTU.



**FIGURE 5-1** Patch Panel Location—Rear View

---

## 5.2 Replacing the Patch Panel

1. Label and remove all cabling.
2. Loosen the four captive screws.
3. Remove the Patch Panel unit.
4. Install the replacement unit by reversing Step 1 through Step 3.



## Fan Trays

---

This chapter describes how to remove and replace fan trays. To protect both yourself and the equipment, make sure you follow the safety precautions in Chapter 1.

This chapter contains the following sections:

- Section 6.1 “Fan Tray Slot Numbering” on page 6-2
- Section 6.2 “Fan Tray LEDs” on page 6-3
- Section 6.3 “Replacing Fan Trays in Sun Fire E6900/E4900 Systems” on page 6-4
- Section 6.4 “Cabinet Fan Trays” on page 6-6

All systems have multiple fan trays that provide redundant cooling if one fan tray fails. The Sun Fire E6900 system has four fan trays that collectively cool the system. The Sun Fire E4900 system has three fan trays that also collectively cool the system. The power supplies of all the systems have their own fans for internal cooling. The Sun Fire E6900 system and the Sun Fire cabinet also have two fan trays mounted on top of the cabinets.

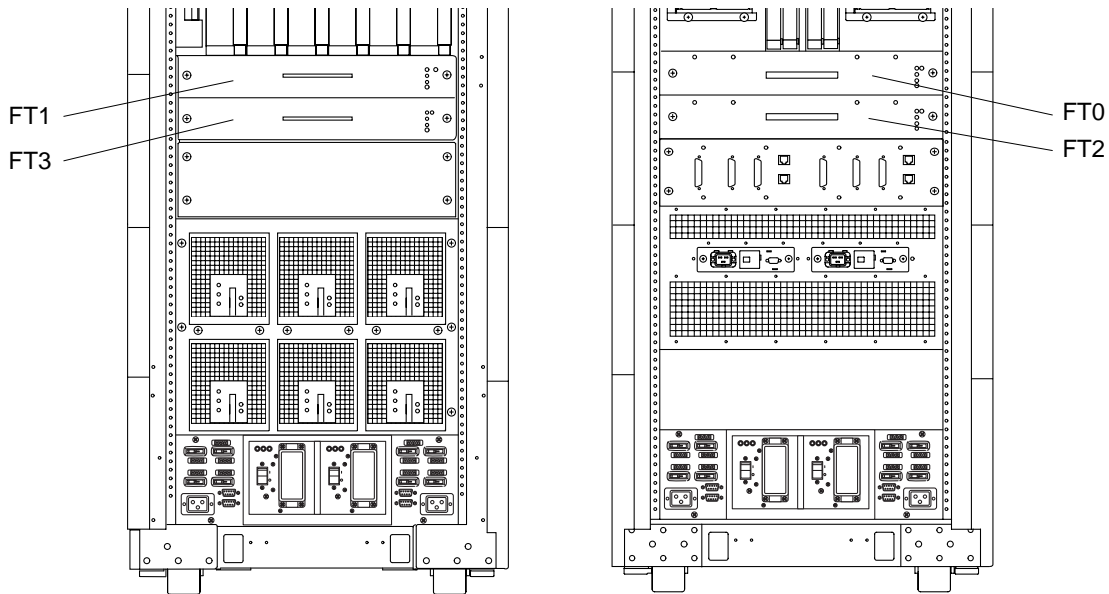
# 6.1 Fan Tray Slot Numbering

TABLE 6-1 lists the fan trays, their slot numbers, and identifies the redundant fan tray for each system.

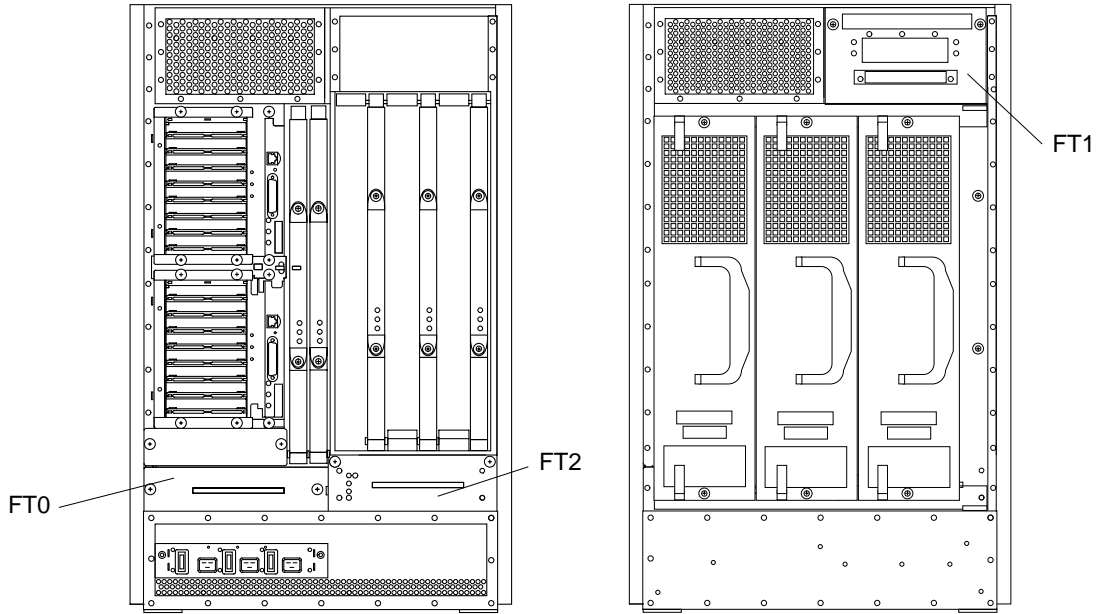
**TABLE 6-1** Fan Trays and Their Slot Numbers

System	Fan Tray	Location
Sun Fire E6900 system	FT0	Rear
	FT1	Front
	FT2	Rear
	FT3	Front (redundant)
Sun Fire E4900 system	FT0	Rear (redundant)
	FT1	Front
	FT2	Rear

FIGURE 6-1 and FIGURE 6-2 illustrate the locations of the fan trays in each system.



**FIGURE 6-1** Front and Rear Fan Trays—Sun Fire E6900 System



**FIGURE 6-2** Rear and Front Fan Trays—Sun Fire E4900 System

## 6.2 Fan Tray LEDs

There are three LEDs on each fan tray. TABLE 6-2 describes the LED functions.

**TABLE 6-2** Fan Tray LED Functions

LED	On	Off
Activated LED (green)	Device is activated; you cannot remove the fan tray when this LED is on.	Device is deactivated; you can remove the fan tray when this LED is off.
Fault LED (amber)	Internal fault.	No internal fault.
OK to remove LED (amber or blue)	Device is deactivated; you can remove the fan tray when this LED is on.	Device is activated; you cannot remove the fan tray when this LED is off.

---

## 6.3 Replacing Fan Trays in Sun Fire E6900/ E4900 Systems

### 6.3.1 Removing a Fan Tray



---

**Caution** – Within one minute of removing the fan tray, install a filler panel to prevent the system from overheating.

---

1. **Make sure you have a replacement fan tray or filler panel available.**
2. **Power off the defective fan tray.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the fan tray.

---

**Note** – When the Activated LED on the fan tray is off (not lit) and the OK to remove LED is on (lit), it is safe to continue.

---

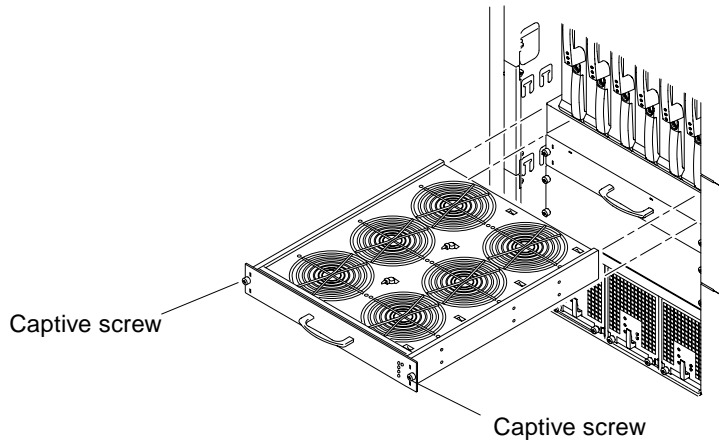
3. **If you are removing the top fan tray, FT1, from a Sun Fire E4900 system, remove the bezel by snapping it off.**
4. **Loosen the captive screws.**
5. **Slide the fan tray out (FIGURE 6-3).**
6. **If no replacement, install a filler panel.**

---

**Note** – For the Sun Fire E4900, only FT0 has a filler panel.

---

7. **Tighten the captive screws.**



**FIGURE 6-3** Removing or Replacing a Front Fan Tray—Sun Fire E6900 System

## 6.3.2 Installing a Fan Tray



---

**Caution** – Within one minute of removing the filler panel, install a fan tray to prevent the system from overheating.

---

1. **Loosen the captive screws on the filler panel.**
2. **Remove the filler panel and save it.**
3. **Slide the replacement fan tray into the slot.**
4. **Tighten the captive screws.**

If you are installing the top fan tray, FT1, into a Sun Fire E4900 system, replace the bezel by snapping it on.

5. **Turn on the fan tray using the system controller software.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on the fan tray.

## 6.4 Cabinet Fan Trays

Two fan trays provide additional cooling for the Sun Fire E6900 system. Both are located on the cabinet top immediately behind the FrameManager (FIGURE 6-4).

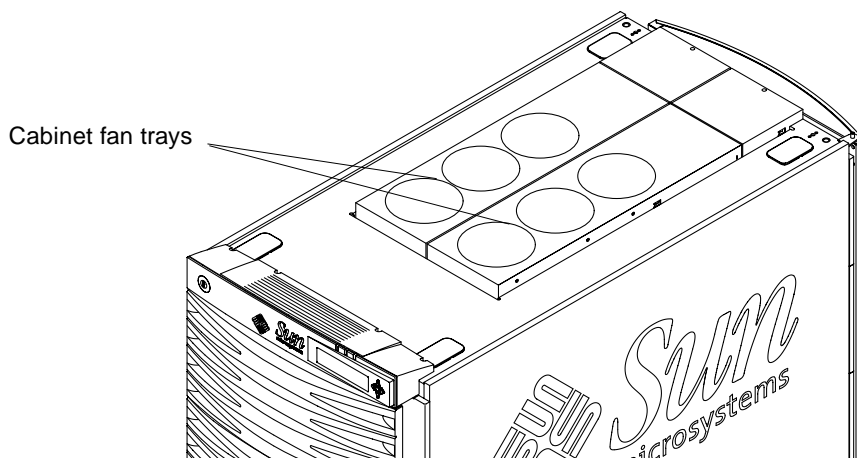


FIGURE 6-4 Cabinet Fan Trays

### 6.4.1 Sun Fire Cabinet Fan Tray Power Switches

If the Sun Fire cabinet fan trays are not operating, make sure that the fan trays are switched on. The fan tray power switches are located in the back of each cabinet fan tray, below the power cord socket.

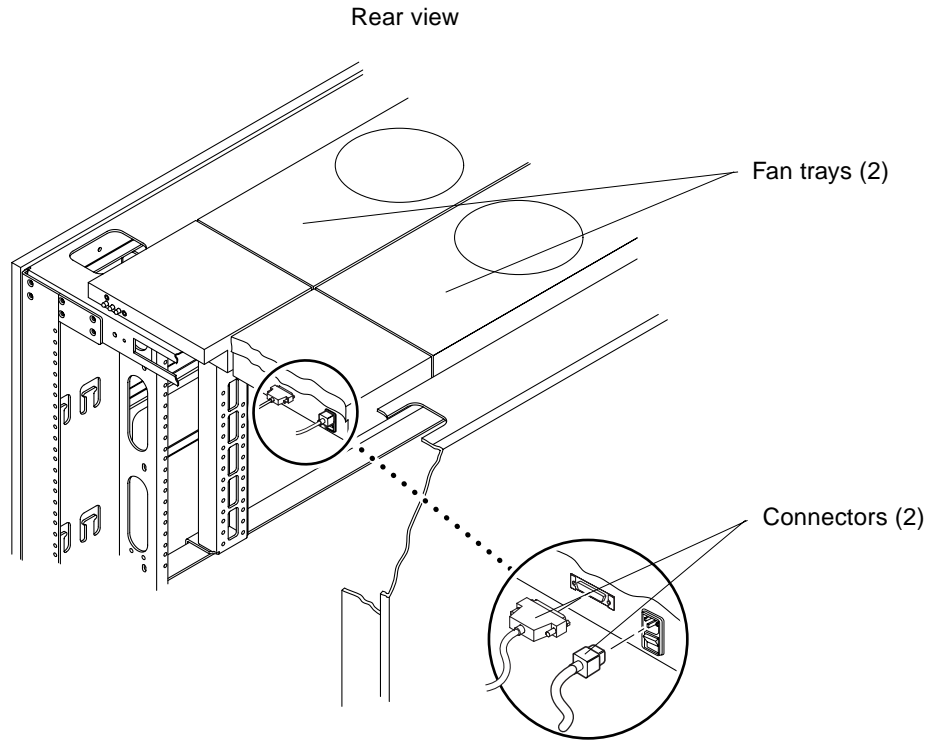
---

**Note** – Each RTU has two “unswitched” power outlets (the topmost outlets on each side of the RTU). By default these unswitched outlets provide power to the fan trays. If a cabinet has only one RTS installed, then only the associated unswitched outlet will have power and the remaining fan tray must be connected to one of the “switched” power outlets.

---

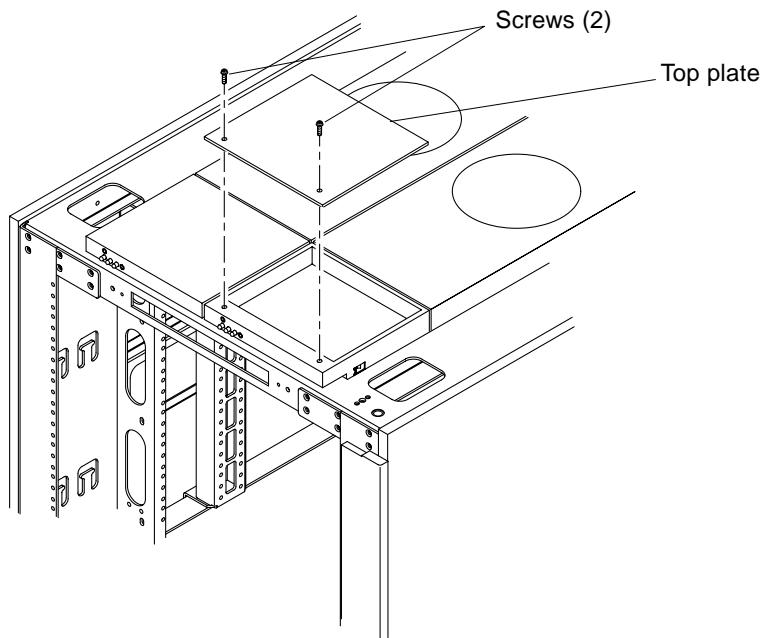
### 6.4.2 Replacing the Cabinet Fan Trays

1. Ensure that the power switch is set to off (FIGURE 6-5).



**FIGURE 6-5** Cabinet Fan Tray Power Switch and Connectors

- 2. Open the rear door for easier access.**
- 3. Disconnect and then remove the two connectors from the rear of the fan tray (FIGURE 6-5).**
- 4. Loosen and then remove the two screws from the fan assembly top plate (FIGURE 6-6).**



**FIGURE 6-6** Cabinet Fan Tray Top Plate

- 5. Remove the fan assembly top plate.**  
This will reveal two captive screws.
- 6. Loosen the two captive screws.**
- 7. Remove the fan tray assembly by supporting the fan tray with one hand while raising the end containing the connectors and then pulling slightly forward.**
- 8. Install the replacement unit by reversing Step 1 through Step 7.**



# System Controller Board

---

This chapter describes how to remove and replace the system controller board.

To protect both yourself and the equipment, make sure you follow the precautions in Chapter 1 “Safety and Tools Requirements.”

This chapter contains the following sections:

- Section 7.1 “Handling Boards and Assemblies” on page 7-1
- Section 7.2 “System Controller Board” on page 7-2
  - Section 7.2.1 “System Controller Board Slot Locations” on page 7-3
  - Section 7.2.2 “System Controller Board LEDs” on page 7-5
  - Section 7.2.4 “Replacing a System Controller Board” on page 7-7

For your protection, also observe the following safety precautions when setting up your equipment:

- Follow all cautions, warnings, and instructions marked on the equipment.
- Never push objects of any kind through openings in the equipment, as they may touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

---

## 7.1 Handling Boards and Assemblies



---

**Caution** – The chassis AC power cord(s) must remain connected to ensure a proper ground.

---



---

**Caution** – The system is sensitive to static electricity. To prevent damage to the board, connect an antistatic wrist strap or foot strap between you and the system.

---



---

**Caution** – The System Controller board and its modules have surface-mount components that can be broken if you flex the board.

---

To minimize the amount of board flexing, observe the following precautions:

- Hold the board by the edges and by the rear panel, which is attached to the board.
- When removing the board from an antistatic bag, keep the board vertical until you lay it on the Sun ESD mat.
- Do not place the board on a hard surface. Use a cushioned antistatic mat. The board connectors and components have very thin pins that bend easily.
- Do not use an oscilloscope probe on the components. The soldered pins are easily damaged or shorted by the probe point.
- Transport the board in an antistatic bag.

---

## 7.2 System Controller Board

The System Controller board contains the system clock and a system controller. One System Controller board is required per system. Two System Controller boards are supported in all systems.

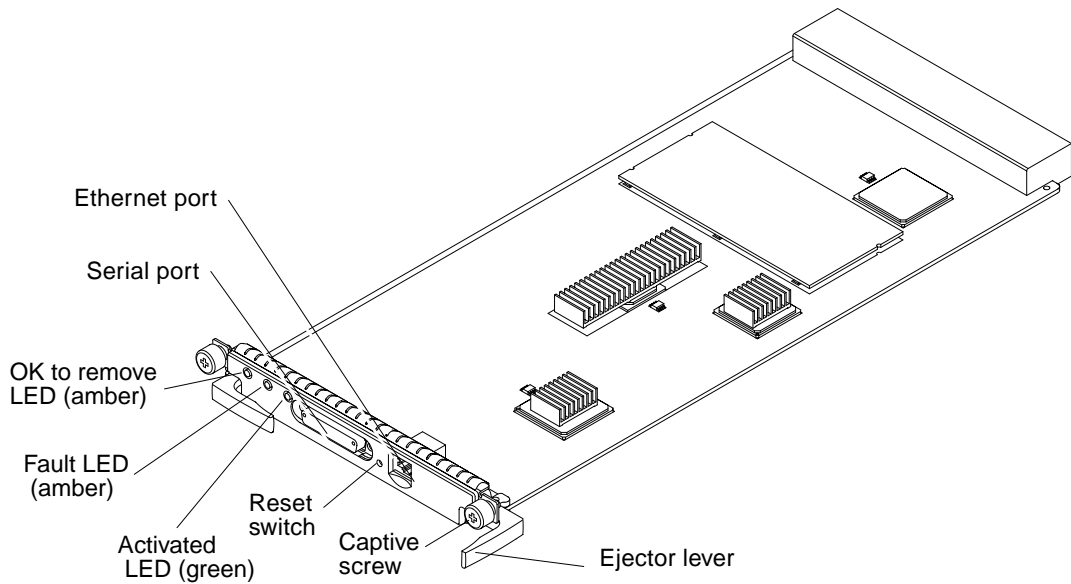
The System Controller board provides:

- Programmable system and processor clock
- Serial port
- RJ-45 Ethernet port
- Redundant System Controller board that can take over from the main System Controller board
- Centralized time-of-day (TOD) chip
- Centralized reset logic
- Status and control of power supplies

The System Controller board consists of the following subsystems:

- Console Bus
- Clocks
- Reset logic
- Centerplane connector signals

For the connector, captive screw, ejector lever, and reset switch locations, see FIGURE 7-1.



**FIGURE 7-1** System Controller Board for Sun Fire E6900/E4900 Systems

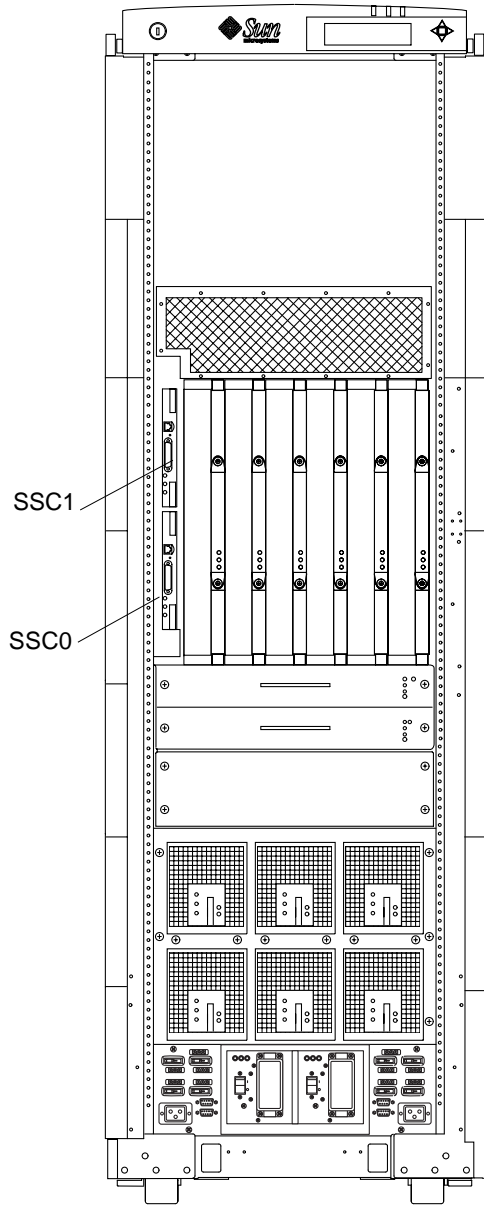
## 7.2.1 System Controller Board Slot Locations

**TABLE 7-1** System Controller Board Slot Locations for All Systems

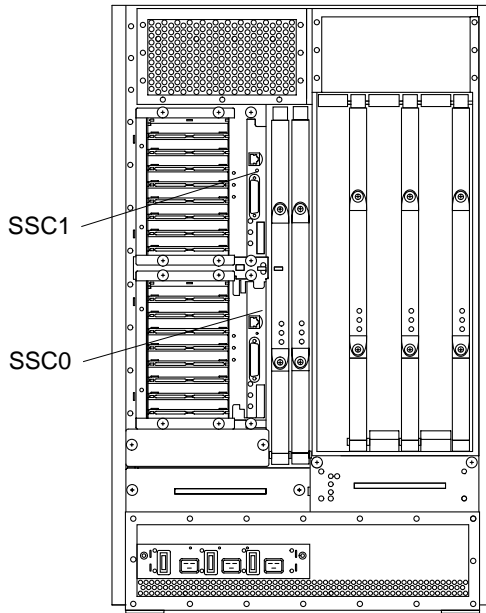
System	Slot Numbers	Location
Sun Fire E6900 system	SSC0 (master) and SSC1 (redundant controller)	Front
Sun Fire E4900 system	SSC0 (master) and SSC1 (redundant controller)	Rear

FIGURE 7-2 and FIGURE 7-3 illustrate the System Controller board slot assignments.

For all systems, the System Controller board in the lower slot, SSC0, is the master System Controller board. The System Controller board in the top slot, SSC1, is the redundant System Controller board.



**FIGURE 7-2** System Controller Board Slot Assignments for the Sun Fire E6900 System—Front View



**FIGURE 7-3** System Controller Board Slot Assignments for the Sun Fire E4900 System—Rear View

## 7.2.2 System Controller Board LEDs

There are three LEDs on the System Controller board. TABLE 7-2 notes the LED functions.

**TABLE 7-2** System Controller Board LED Functions

LED Name and Location	On	Off
Activated LED (green)	Board is activated	Board is deactivated.
Fault LED (amber)	Internal fault	No internal fault
OK to remove LED (amber or blue)	Assembly can be removed	Assembly cannot be removed

## 7.2.3

# Resetting the System Controller Board

---



**Caution** – For all SC-App versions, resetting a System Controller should be an absolute last resort, it is always preferable to try the `reboot` command first. If the System Controller can not be rebooted, it is safer to take all the domains down before attempting to reset it.

---

**Note** – System Controllers with firmware Versions 5.16.x and later have automatic System Controller failover implemented for systems with two System Controllers. The main System Controller puts out a signal which the spare System Controller monitors. If the spare System Controller does not see this signal, due to a unresponsive main System Controller, it will automatically initiate a failover and become the main System Controller. This will happen only if failover has been enabled and is active, otherwise you may risk domain crashes.

---



**Caution** – If a System Controller board is still unresponsive to commands after first attempting to use the `reboot` command, take all the domains down before attempting to use the reset switch located on the board itself.

---

- **Press the Reset switch (FIGURE 7-4) by using a pen tip to reset the System Controller board so that it reboots.**

Pressing the reset switch reloads the system controller software.

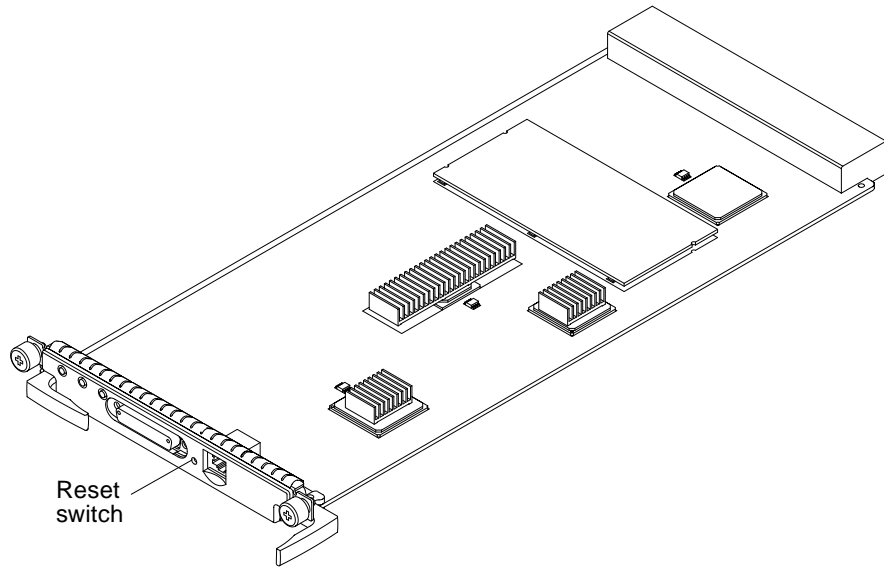


FIGURE 7-4 Reset Switch on a System Controller Board

## 7.2.4 Replacing a System Controller Board

### 7.2.4.1 Removing the System Controller Board with Firmware 5.16.x or Later Versions.

1. **Complete the software procedures for preparing to remove the System Controller board.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual*, Chapter "Removing and Replacing Boards."

2. **Attach a wrist strap or foot strap. Connect the ESD strap to the system. Place a grounded ESD mat close to the system.**



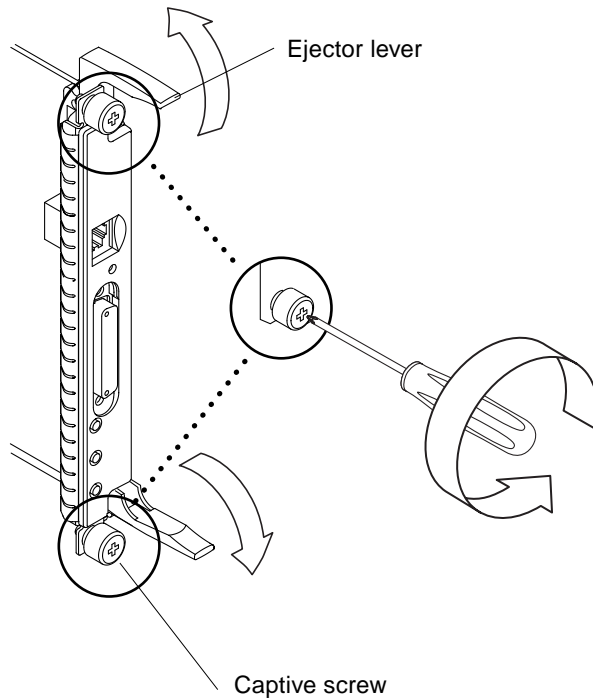
---

**Caution** – The system is sensitive to static electricity.

---

3. **Disconnect the serial or network cable from the board.**

4. Loosen the two captive screws (FIGURE 7-5) on the System Controller board by using a Phillips No. 2 screwdriver.  
These screws are springloaded. They will pop out when completely unfastened.
5. Pull outward on the board ejectors to unseat the board (FIGURE 7-5).

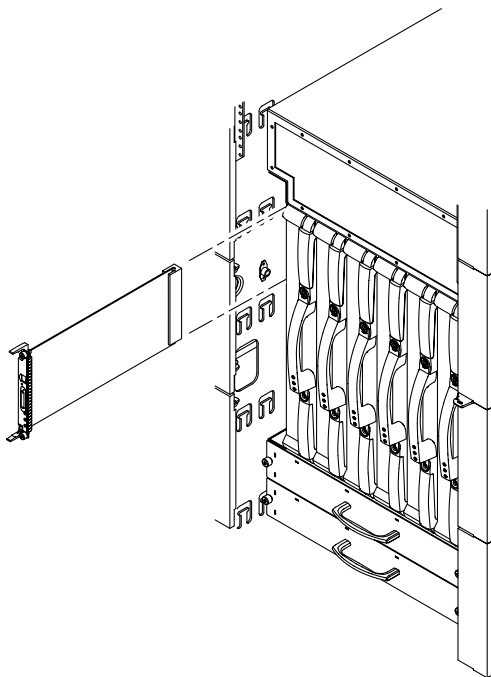


**FIGURE 7-5** Loosening the Captive Screws and Ejector Levers



**6. Slide the board out (FIGURE 7-6).**

FIGURE 7-6 illustrates how to install or remove the board for a Sun Fire E6900 system. This is similar also to the Sun Fire E4900 system.



**FIGURE 7-6** Removing and Replacing a System Controller Board—Sun Fire E6900 System

### 7.2.4.2 Installing the System Controller Board

1. **Attach a wrist strap or foot strap. Connect the ESD strap to the system. Place a grounded ESD mat close to the system.**



---

**Caution** – The system is sensitive to static electricity.

---

2. **Turn both board ejectors outward before you insert the board into the card cage.**
3. **Line up the board with the slots.**
  - For the Sun Fire E6900/E4900 systems, slide the board into the card cage slot (FIGURE 7-6).

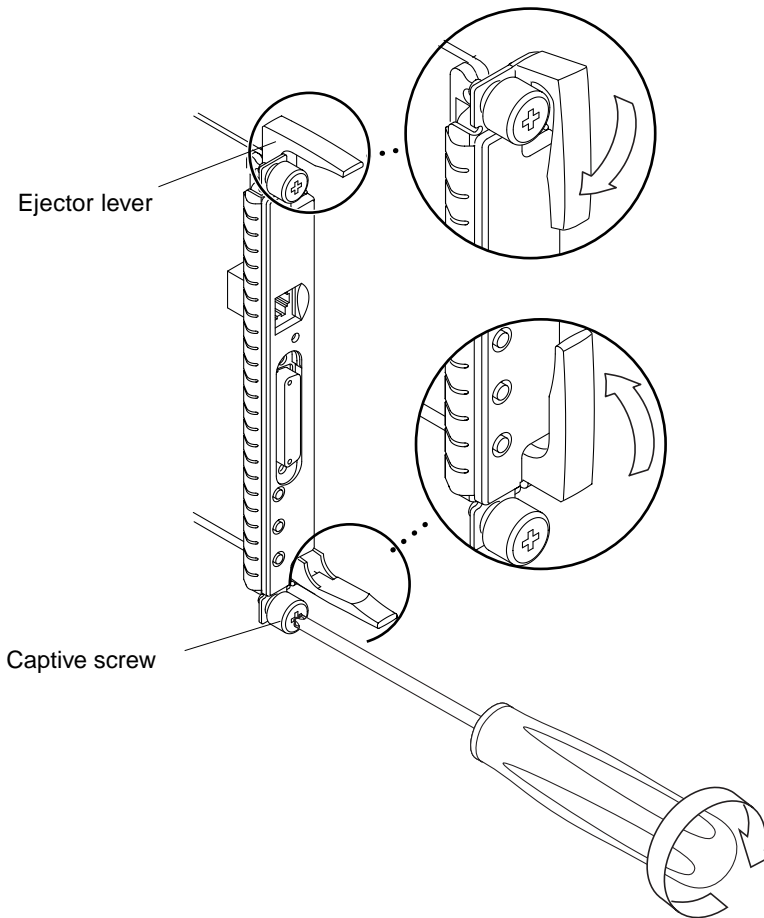


---

**Caution** – *Do Not Force* any board into a slot; this can cause damage to the board and system. The board should insert and seat smoothly. If it binds, remove the board and inspect the card cage slot for any obvious obstructions.

---

4. After the board is completely into the card cage, simultaneously push inward on both board ejectors (FIGURE 7-7).
5. Tighten the two captive screws using a Phillips No. 2 screwdriver (FIGURE 7-7).



**FIGURE 7-7** Tightening the Captive Screws and Locking the Ejector Levers

6. Connect the serial or network cable to the board.

- 7. Complete the software procedures for installing the System Controller board.**  
Refer to the *Sun Fire Midrange Systems Platform Administration Manual*, Chapter "Removing and Replacing Boards."



# CPU/Memory Boards and Components

---

To protect both yourself and the equipment, make sure you follow the precautions in Chapter 1.

This chapter contains the following sections:

- Section 8.1 “Handling Boards and Assemblies” on page 8-1
- Section 8.2 “Filler Panels and Filler Boards” on page 8-3
  - Section 8.3 “CPU/Memory Boards” on page 8-3
  - Section 8.3.1 “Replacing CPU/Memory Boards” on page 8-6
  - Section 8.3.2 “Replacing DIMMs” on page 8-11

For your protection, also observe the following safety precautions when setting up your equipment:

- Follow all cautions, warnings, and instructions marked on the equipment.
- Always use proper ESD equipment and procedures when handling boards and components.
- Never push objects of any kind through openings in the equipment as they may touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

---

## 8.1 Handling Boards and Assemblies



---

**Caution** – The chassis AC power cord(s) must remain connected to ensure a proper ground.

---



---

**Caution** – The system is sensitive to static electricity. To prevent damage to the board, connect an antistatic wrist strap between you and the system.

---



---

**Caution** – The CPU/Memory boards have surface-mount components that can be broken if you flex the boards.

---

To minimize the amount of board flexing, observe the following precautions:

- Hold the board only by the handle and by the edges near the middle of the board, where the board stiffener is located. Do not hold the board *only* at the ends.
- When removing the board from an antistatic bag, keep the board vertical until you lay it on the ESD mat.
- Do not place the board on a hard surface. Use a cushioned antistatic mat. The board connectors and components have very thin pins that bend easily.
- Be careful of small component parts located on both sides of the board.
- Do not use an oscilloscope probe on the components. The soldered pins are easily damaged or shorted by the probe point.
- Transport the board in an antistatic bag.



---

**Caution** – The CPU/Memory board is heavy and weighs approximately 17 to 22 pounds (7.7 to 9.0 kg). Take care when removing the board from the system.

---



---

**Caution** – The heatsinks on the board can be damaged by incorrect handling. Do not touch the heatsinks while replacing or removing the board. If a heatsink is loose or broken, obtain a replacement board.

---



---

**Caution** – The heatsinks on the board can be damaged by improper packaging. When storing or shipping the board, ensure that the heatsinks have sufficient protection.

---

---

**Note** – The CPU/Memory board can be inserted into a powered-on system. The board will not be recognized by the system until the domain has been dynamically reconfigured to include the board or re-initialized and rebooted. Refer to *Sun Fire Midrange Systems Dynamic Reconfiguration User Guide* for complete DR procedures or the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for re-initializing a domain.

---

---

## 8.2 Filler Panels and Filler Boards

In order to prevent the system from overheating, see Section 1.4 “Filler Boards and Filler Panels” on page 1-5 for procedures you must follow when removing CPU/Memory boards from a system.

---

## 8.3 CPU/Memory Boards

All systems support the following:

- Up to four CPU processors with each processor supporting two DIMM (dual inline memory module) banks of four DIMMs per bank
- Eight Ecache modules (two per CPU processor)
- Up to 8 Gbytes of memory per CPU processor
- Up to 32 DIMMs

On the CPU/Memory board, the memory controller is integrated in the CPU processor. The CPU/Memory board has a metal cover that covers the CPU processors and Ecache.

CPU/Memory board types available are:

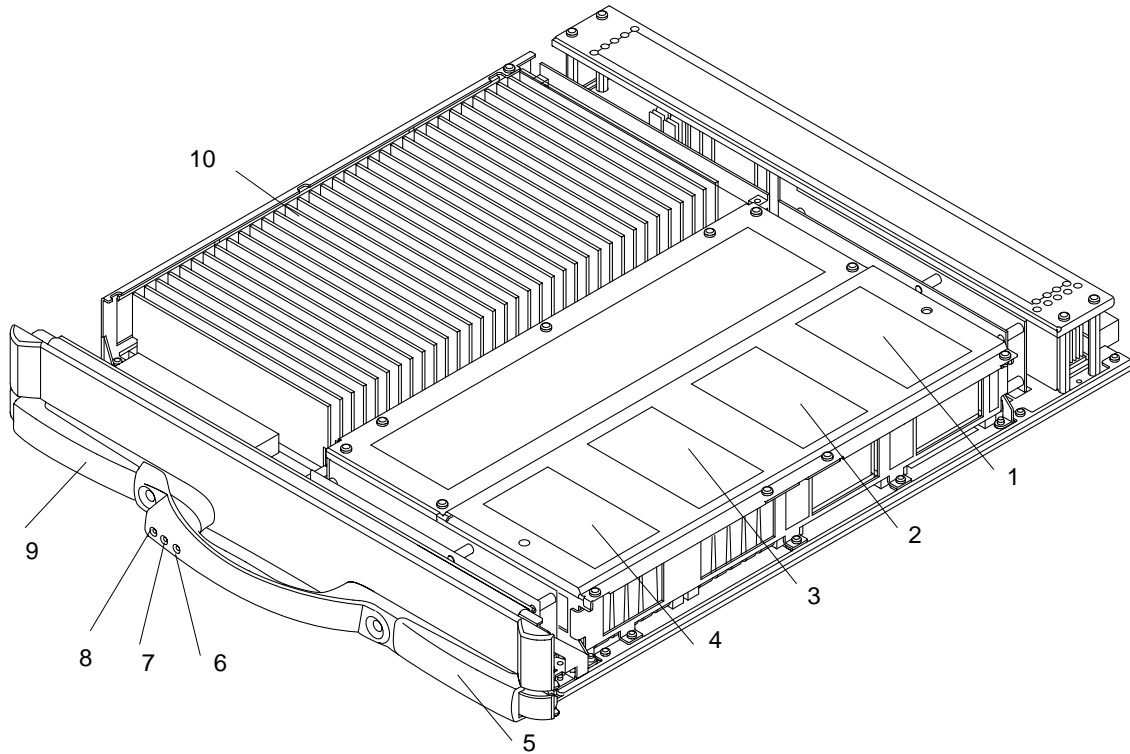
- Ultra SPARC IV (Cu) 1.05-GHz processor—known as CPU/Memory 1.05 board
- Ultra SPARC IV (Cu) 1.2-GHz processor—known as CPU/Memory 1.2 board

There are three LEDs on the CPU/Memory board. TABLE 8-1 notes the LED functions.

**TABLE 8-1** CPU/Memory Board LED Functions

LED	On	Off
Activated LED (green)	Device is activated.	Device is deactivated
Fault LED (amber)	Internal fault	No internal fault
OK to remove (amber or blue)	Assembly can be removed	Assembly cannot be removed

FIGURE 8-1 illustrates the CPU/Memory board LEDs and major components.



**FIGURE 8-1** CPU/Memory Board With the Cover Installed

Key	Description
1	CPU processor 1 land area
2	CPU processor 0 land area
3	CPU processor 3 land area
4	CPU processor 2 land area
5	Ejector lever
6	Activated LED (green)
7	Fault LED (amber)
8	OK to remove LED (amber or blue)
9	Ejector lever
10	DIMMs

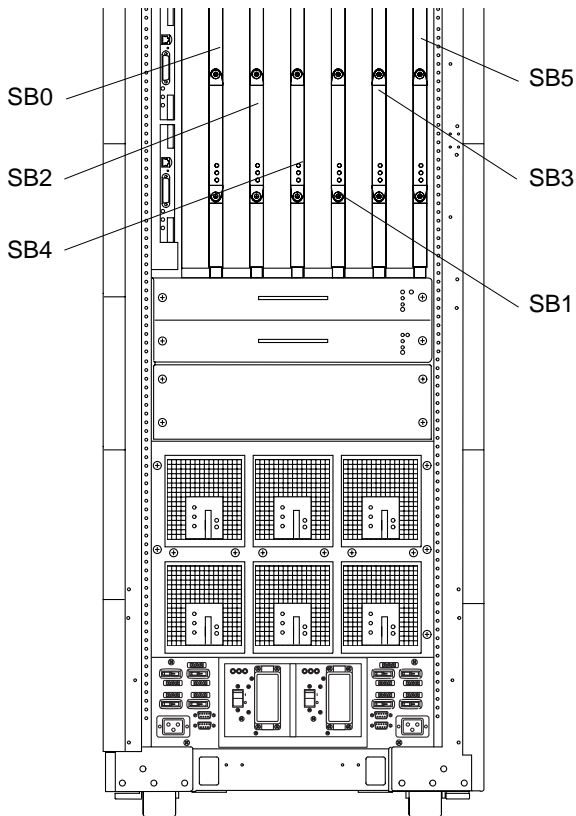


TABLE 8-2 shows the CPU/Memory board slot locations.

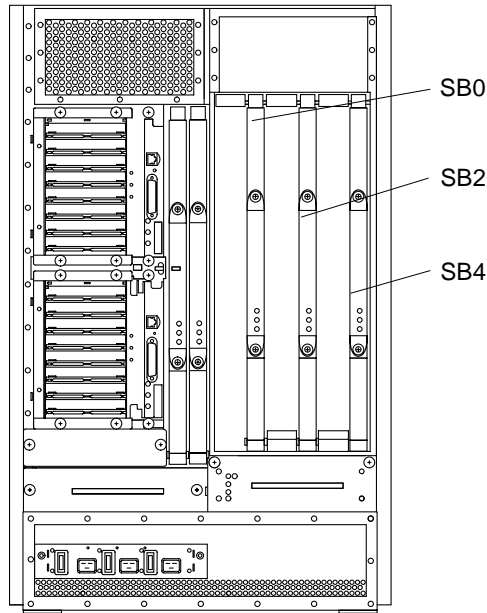
**TABLE 8-2** CPU/Memory Board Slot Locations

System	Number of Slots	Slot Numbers	Location
Sun Fire E6900	6	SB0, SB1, SB2, SB3, SB4, SB5	Front
Sun Fire E4900	3	SB0, SB2, SB4	Rear

FIGURE 8-2 and FIGURE 8-3 illustrate the slot numbers for the CPU/Memory boards for all systems.



**FIGURE 8-2** CPU/Memory Board Slot Assignments—Sun Fire E6900 System—Front View



**FIGURE 8-3** CPU/Memory Board Slot Assignments—Sun Fire E4900 System—Rear View

## 8.3.1 Replacing CPU/Memory Boards




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**Caution** – Remove a board from a powered-on system only after the Solaris operating environment dynamic reconfiguration (DR) software has disabled the board. Refer to the *Sun Fire Midrange Systems Dynamic Reconfiguration User Guide* for complete procedures.

---



---

**Note** – Make sure all the fan trays are installed in the system and are operating normally. The fan trays cool the CPU/Memory boards.

---



---

**Note** – The CPU/Memory board field-replaceable unit (FRU) is for maintenance use only. FRUs must not be used to upgrade CPU performance in systems. Usage as such can violate United States export regulations.

---

### 8.3.1.1 Removing the CPU/Memory Board



---

**Caution** – The CPU/Memory board is heavy and weighs approximately 17 to 22 pounds (7.7 to 9.0 kg). Take care when removing the board from the system.

---

**1. Prepare the system to remove the CPU/Memory board.**

Two methods can be used to prepare the board:

- Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the board.
- If the board is being used by the Solaris operating environment, identify the board to be removed and dynamically reconfigure it out of the domain. Refer to the *Sun Fire Midrange Systems Dynamic Reconfiguration User Guide* for complete procedures before removing the I/O assembly.

---

**Note** – When the Activated LED on the board is off and the OK to remove LED is on, it is safe to continue. Be sure that you have a filler board, filler panel, or replacement board ready.

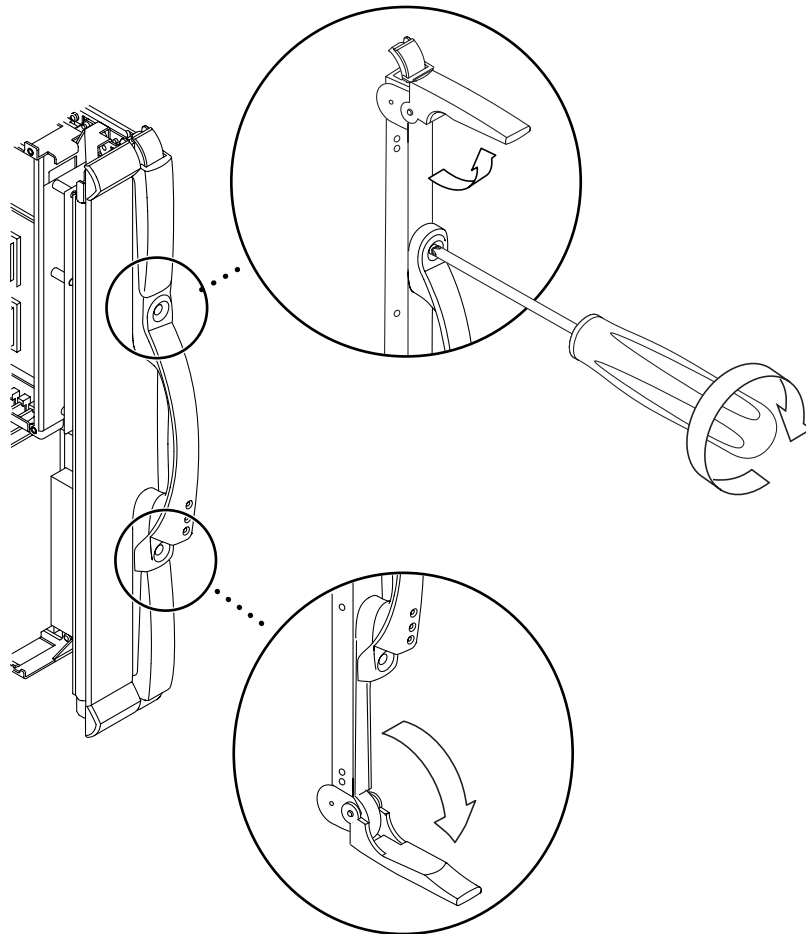
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**2. Attach a wrist strap or foot strap. Connect the ESD strap to the system.**

**3. Place a grounded ESD mat near the system, or have the CPU/Memory shipping carton open near the system.**

4. **Unlock the ejector levers on the CPU/Memory board with a Phillips No. 2 screwdriver (FIGURE 8-4).**

The ejectors will pop out slightly.



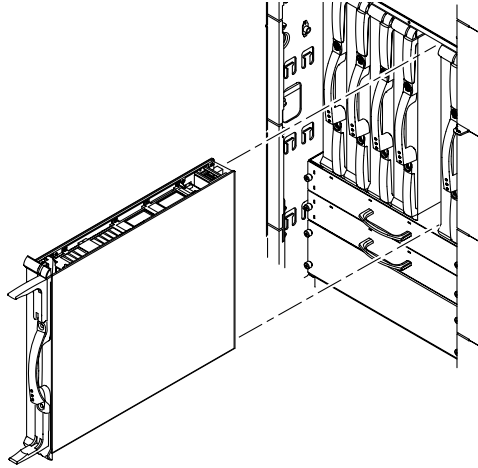
**FIGURE 8-4** Unlocking the Ejector Levers

5. **Manually rotate the ejector levers until they are 90 degrees straight out from the board (FIGURE 8-4).**

This action unseats the board from the connector.

6. **Remove the CPU/Memory board.**

Remove the board from the card cage by holding the handle and grasping the bottom rail with your other hand. Slide the board along the track until the board is out of the card cage, being careful not to touch neighboring boards (FIGURE 8-5).



**FIGURE 8-5** Removing or Replacing a CPU/Memory Board—Sun Fire E6900 System

7. Place the board on a grounded ESD mat or the open shipping carton.



---

**Caution** – To prevent overheating when the system is powered back on, install a filler board or filler panel in the empty slot if no replacement board is going to be installed.

---

See Section 1.4 “Filler Boards and Filler Panels” on page 1-5.

### 8.3.1.2 Preparing to Install the CPU/Memory Board

---

**Note** – The CPU/Memory board can be inserted into a powered-on system. The board will not be recognized by the system until the domain has been re-initialized and rebooted or dynamically reconfigured to include the board. Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for initializing a domain. Refer to *Sun Fire Midrange Systems Dynamic Reconfiguration User Guide* for complete DR procedures.

---

1. Attach a wrist strap or foot strap. Connect the ESD strap to the system. Place a grounded ESD mat or the open shipping carton near the system.
2. Inspect the new CPU/Memory board before inserting it into the system:

**a. Inspect the connector on the board being installed.**

Remove the connector protective cover. Check to see if the plastic is deformed or damaged, including both the pin holes and the fins. Insure there are no major (out of the normal) gaps between each pin row.

**b. Insure the CPU/Memory board alignment tabs are not bent.**

**c. Check the CPU/Memory board springfingers for damage.**

**d. Check the chassis springfingers for damage (SB5 for Sun Fire E6900 and SB4 for Sun Fire E4900 systems.)**

### 8.3.1.3 Installing the CPU/Memory Board

**1. Remove the CPU/Memory board filler board or filler panel.**



---

**Caution** – You must insert a CPU/Memory board into the system within one minute of removing the filler board or filler panel or overheating will occur.

---

**2. Make sure that the ejector levers of the CPU/Memory board are in the open position. They should be 90 degrees straight out from the board (FIGURE 8-4).**



---

**Caution** – *Do Not Force* any board into a slot; it can cause damage to the board and system. The board should insert and seat smoothly. If it binds, remove the board and inspect the card cage slot for any obvious obstructions. Also inspect both the board and the centerplane for bent pins or other damage.

---

**3. Gently insert the CPU/Memory board into the grooves into the proper slot (see TABLE 8-2 for slot locations).**

The top of the board is noted by the thin rail. The bottom of the board has a thicker rail. The board LEDs should be at the bottom of the handle when the board is inserted properly into the card cage for the E6900/E4900 systems.

**a. Hold the board by the handle with one hand. Place the other hand on the bottom mounting rail holding the board vertically.**

**b. Install the board in the chassis by tipping the handle of the board down so that the bottom rail meets the bottom chassis guide rail.**

**c. When the bottom board rail is in the chassis guide rail, tip the board back up and align the top rail into the chassis rail guide.**

**d. Slide the board into the chassis slowly until the ejector lever handles start to collapse inward.**

4. **Simultaneously rotate both ejectors until they are in the closed position (flush with the board).**

When the board is properly installed, the ejectors will lock automatically.

---

**Note** – The board will not be recognized until the domain has been dynamically reconfigured to include the board.

---

5. **Reconfigure the CPU/Memory board back into the system by either of the two following procedures:**

- Dynamically reconfigure the CPU/Memory board into the domain.

Refer to the *Sun Fire Midrange Systems Dynamic Reconfiguration User Guide*.

- Power on the board and initialize the domain.

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on and initializing the board.

---

**Note** – The Activated LED is on (lit).

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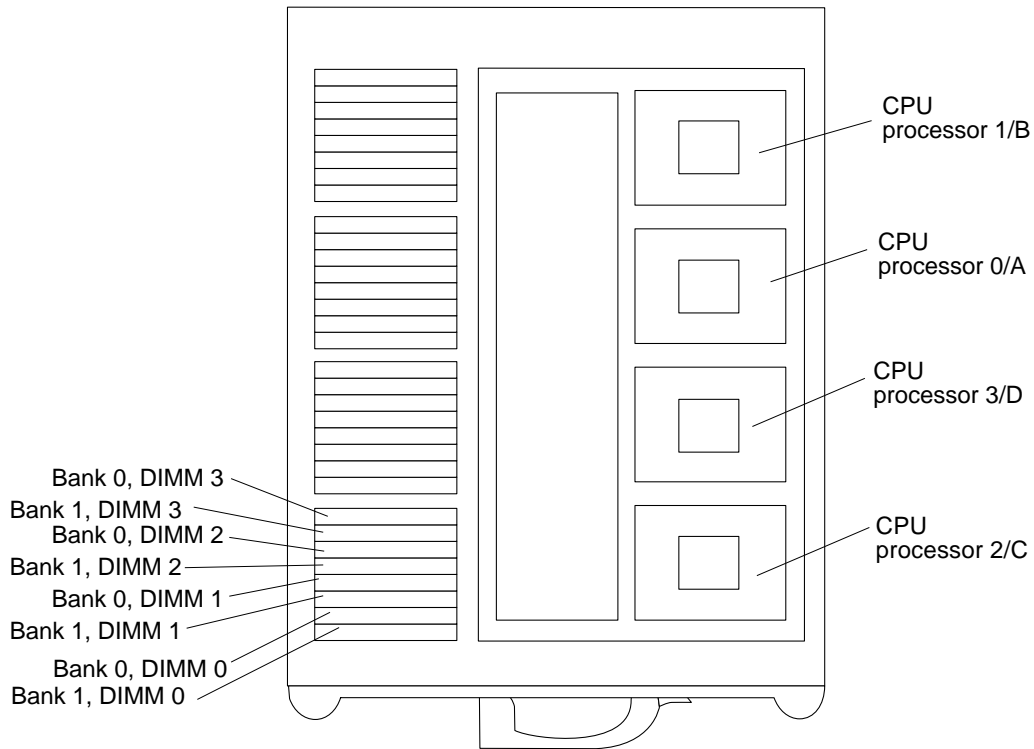
## 8.3.2 Replacing DIMMs

The CPU/Memory board has 32 DIMM sockets, which are divided into eight banks of four DIMMs per bank. Each CPU processor has two corresponding DIMM banks. It is possible that a CPU processor does not have any DIMMs installed in its corresponding DIMM bank. However, a populated DIMM bank must have a corresponding CPU processor installed.

These types of DIMMs can be used in the DIMM banks:

- 512 Mbyte
- 1 Gbyte

FIGURE 8-6 illustrates the DIMM numbers for the eight DIMM banks.



**FIGURE 8-6** DIMM Slot Numbers

The DIMM numbers and bank numbers are repeated in the same order for all the CPUs as shown for CPU processor 2/C. The CPU processor I.D. is noted on the metal cover.



### 8.3.2.1 DIMM Bank Configuration Guidelines

Follow these DIMM configuration guidelines:

- Each DIMM bank must be fully populated with the same capacity DIMM.
- Install the larger capacity DIMMs into banks before installing the smaller capacity DIMMs into banks.
- The minimum number of DIMMs you can install per CPU processor is four DIMMs or one bank.
- If the number of CPU processors on each CPU/Memory board are the same, place DIMM banks on CPU/Memory boards that have fewer populated DIMM banks before placing DIMMs on CPU/Memory boards that already have more populated DIMM banks.
- If some CPU/Memory boards have more CPU processors than others, place DIMMs in DIMM banks on the board with the most CPU processors. There may be CPU processors without corresponding DIMMs on other boards.

### 8.3.2.2 Removing DIMMs

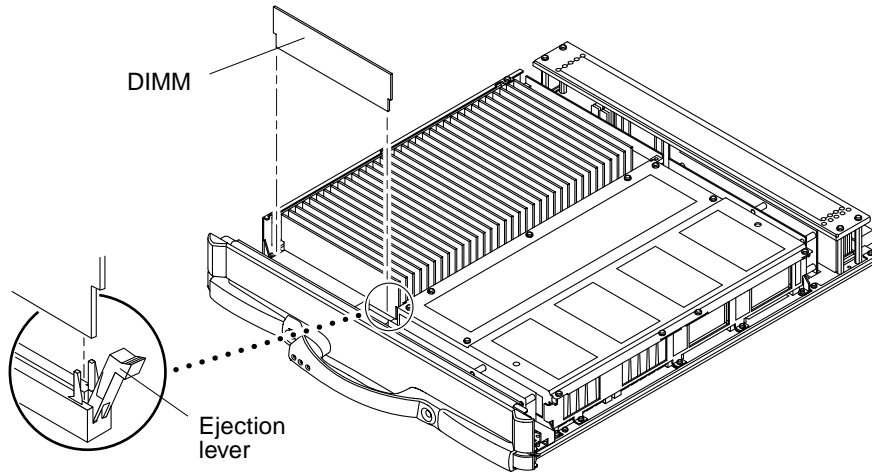


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**Caution** – The system is sensitive to static electricity. Make sure you are wearing a grounded wrist strap when handling system components. Always place components on a grounded ESD mat near the system or in a static-safe bag.

---

1. **Remove the applicable CPU/Memory board.**  
See Section 8.3.1 “Replacing CPU/Memory Boards” on page 8-6.
2. **Place the CPU/Memory board on the ESD mat on a work surface.**
3. **Locate the slot for the DIMM you need to replace.**
4. **Eject the faulty DIMM by pressing down on the ejection levers on both sides of the DIMM connector (FIGURE 8-7).**



**FIGURE 8-7** Removing a DIMM

5. Holding the DIMM by its edges, remove it from the slot and place it on an antistatic surface.

### 8.3.2.3 Installing DIMMs

Install one bank completely on each board before installing the remaining banks on any board.

---

**Note** – All banks must have the same size DIMMs. Sort the DIMMs into banks using the same size DIMMs.

---

---

**Note** – Memory banks associated with CPU0 and CPU2 are oriented in the same direction, while banks for CPU1 and CPU3 are rotated 180 degrees.

---



---

**Caution** – The system and DIMMs are sensitive to static electricity. To prevent damage to the DIMMs, make sure you are wearing a grounded wrist strap when handling them. Always place components on a grounded ESD mat near the system.

---

1. **Remove the applicable CPU/Memory board.**  
See Section 8.3.1 “Replacing CPU/Memory Boards.”
2. **Place the CPU/Memory board on an ESD mat on a work surface.**

3. Carefully remove the new DIMM from its protective packaging and place it on an antistatic surface.

The bag that the DIMM is packed in makes a good antistatic surface.

4. Press down on the ejector levers at both ends of the DIMM connector slot that will receive the new DIMM.

The connector slot will not accept the DIMM unless the levers are in the insert (open) position.

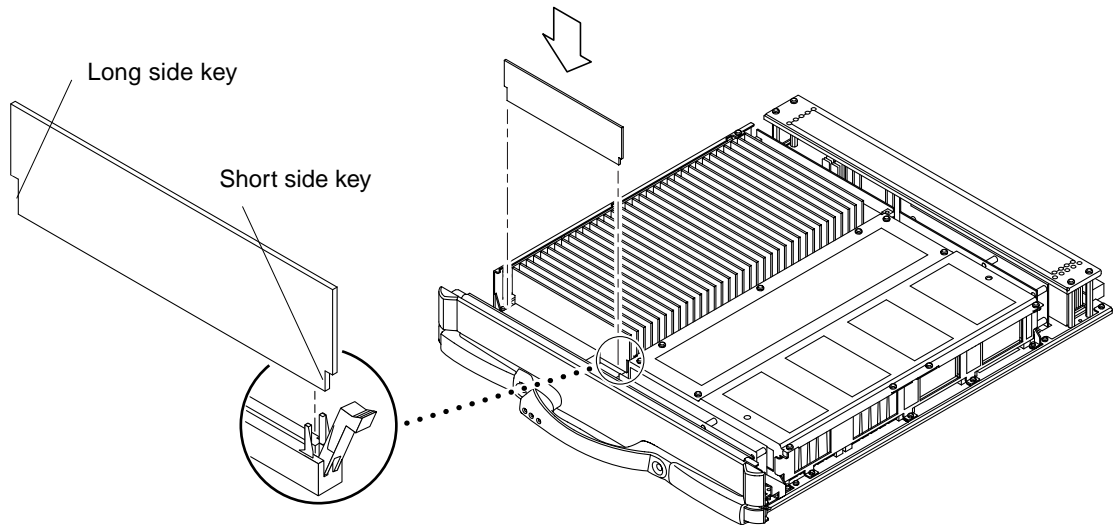
5. Align the short-side key on the DIMM and the long-side key on the DIMM with the short side and long side of the DIMM connector.

---

**Note** – If you are installing four DIMMs, insert the DIMMs into the same bank.

---

6. Place your thumbs on the top edge of the DIMM, and push the DIMM firmly into its connector (FIGURE 8-8).



**FIGURE 8-8** Installing a DIMM

7. Press down firmly on the entire edge of the DIMM.

When installed correctly, the ejector levers will be in the upright position.

8. Continue installing DIMMs in the same manner.

9. Reinstall the CPU/Memory board and detach the wrist strap.

See Section 8.3.1.3 "Installing the CPU/Memory Board."

---

## 8.4 CPU/Memory Board EMI Springfingers Clip

### 8.4.1 Replacing the EMI Springfingers Clip for E6900/E4900 Systems

The CPU/Memory EMI springfingers clip can be installed in one orientation only, with the rivets towards the sheet metal flange on the chassis. The clip is symmetrical, the top and bottom orientation is the same. A straight slot screwdriver and needlenose pliers are needed to remove the existing springfingers clip. No special tools are required for installation.

#### 8.4.1.1 Removing a CPU/Memory Board EMI Springfingers Clip

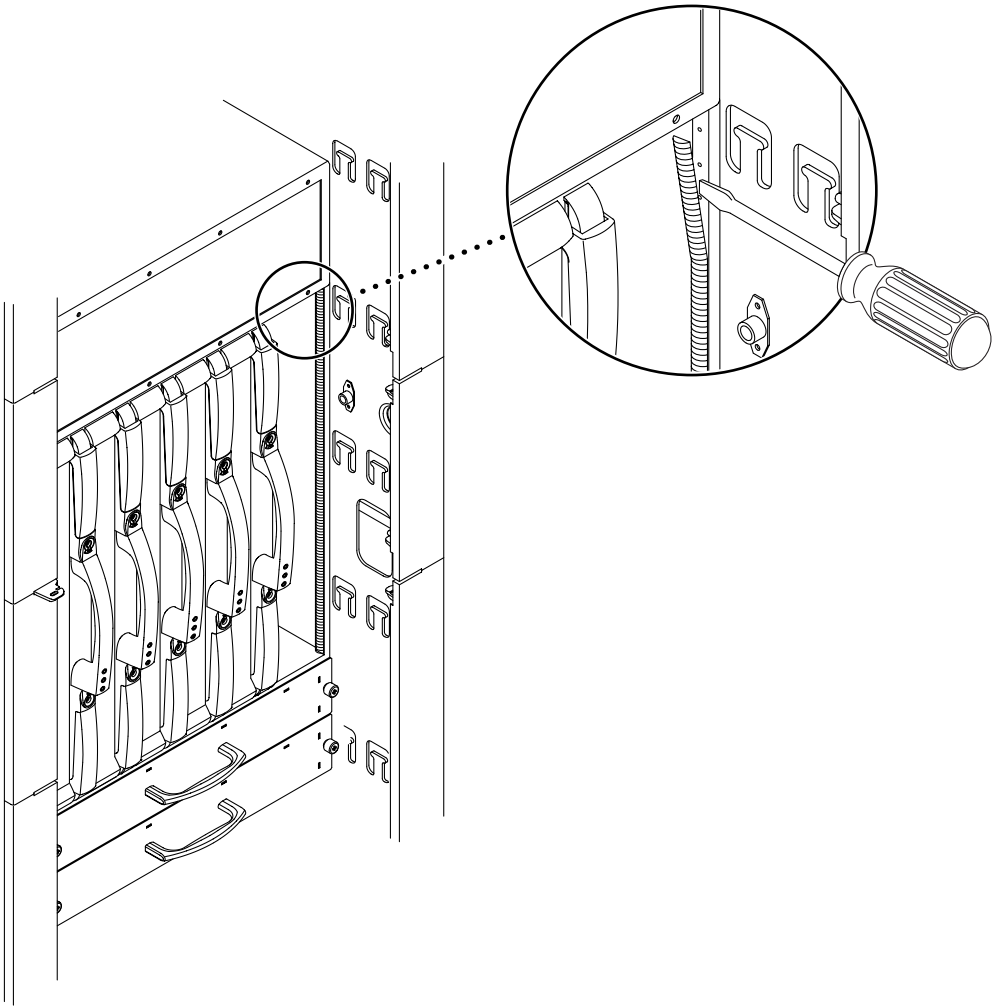
1. **Remove CPU/Memory board SB5 (Sun Fire E6900 system) or SB4 (Sun Fire E4900 systems).**

See Section 8.3.1.1 "Removing the CPU/Memory Board."

2. **Pry the top rivet of the springfingers clip away from the chassis with the blade of a straight slot screwdriver.**

See FIGURE 8-9.

3. **Pull the springfingers clip away from the chassis, popping out the remaining rivets, with the needlenose pliers.**
4. **Discard the old springfingers clip.**



**FIGURE 8-9** Removing a CPU/Memory Board EMI Springfingers Clip

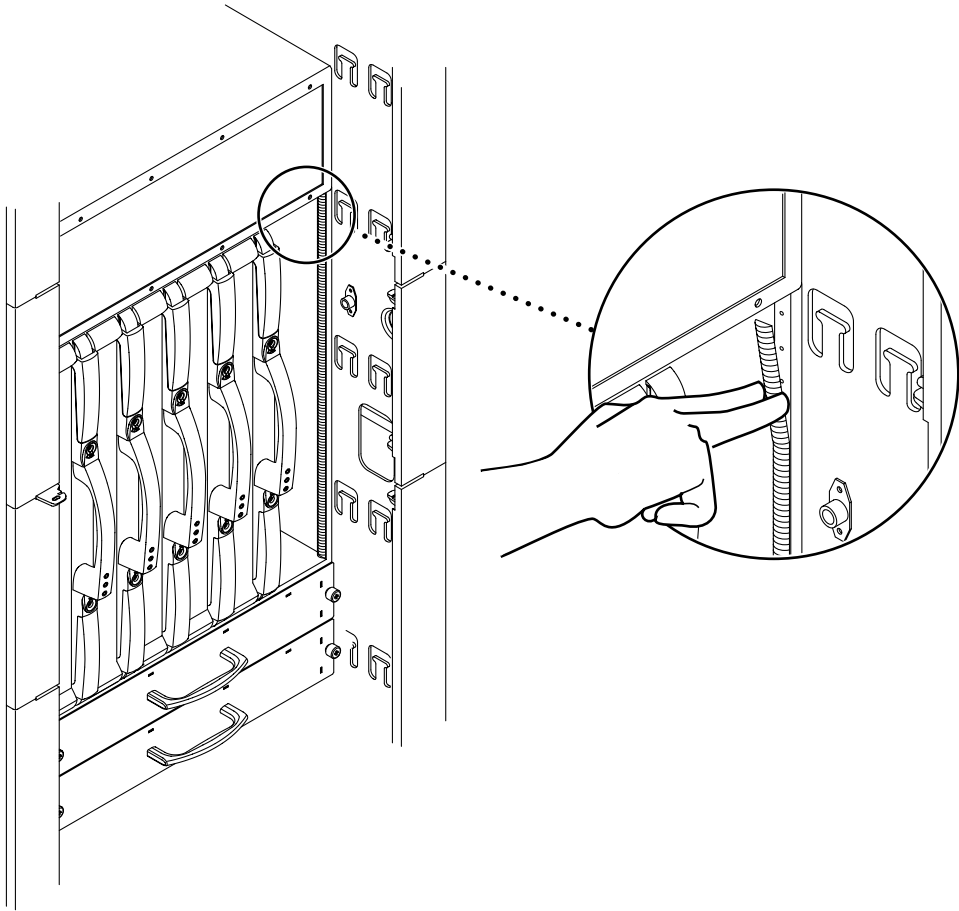
## 8.4.1.2 Installing a CPU/Memory Board EMI Springfingers Clip

1. **Starting at the top or bottom of the clip, press the plastic rivet into its corresponding hole in the chassis. You can feel the plastic rivet seating into its hole.**

See FIGURE 8-10.

2. **Repeat Step 1 for each of the succeeding rivets until they are all properly seated.**
3. **Reinstall the CPU/Memory board and detach the wrist strap.**

See Section 8.3.1.3 "Installing the CPU/Memory Board."



**FIGURE 8-10** Installing a CPU/Memory Board EMI Springfingers Clip





# PCI/PCI+ I/O Assemblies and Components

---

The PCI/PCI+ I/O assembly is supported in the E6900/E4900 systems.

This chapter provides an overview of the PCI/PCI+ I/O assembly, including how to remove and install the PCI/PCI+ I/O assembly and PCI cards.

This chapter contains the following sections:

- Section 9.1 “Handling Boards and Assemblies” on page 9-1
- Section 9.2 “Filler Boards and Filler Panels” on page 9-3
  - Section 9.3.2 “Replacing PCI/PCI+ I/O Assemblies” on page 9-7
  - Section 9.3.3 “Replacing PCI Cards” on page 9-10

To protect both yourself and the equipment, make sure you follow the precautions in Chapter 1. Also observe the following safety precautions when setting up your equipment:

- Follow all cautions, warnings, and instructions marked on the equipment.
- Never push objects of any kind through openings in the equipment, as they may touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

---

## 9.1 Handling Boards and Assemblies



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**Caution** – The chassis AC power cord must remain connected to ensure a proper ground.

---



---

**Caution** – The system is sensitive to static electricity. To prevent damage to the assembly, connect an antistatic wrist strap between you and the system.

---



---

**Caution** – The PCI/PCI+ I/O assemblies, their modules, and cards have surface-mount components that can be broken by flexing the assemblies.

---

To minimize the amount of board flexing, observe the following precautions:

- Hold the board only by the edges near the middle of the board, where the board stiffener is located. Do not hold the board *only* at the ends.
- When removing the board from an antistatic bag, keep the board vertical until you lay it on the ESD antistatic mat.
- Do not place the board on a hard surface. Use a cushioned antistatic mat. The board connectors and components have very thin pins that bend easily.
- Be careful of small parts located on the component side of the board.
- Do not use an oscilloscope probe on the components. The soldered pins are easily damaged or shorted by the probe point.
- Transport the board in an antistatic bag.



---

**Caution** – The heat sinks on the board can be damaged by incorrect handling. Do not touch the heatsinks while replacing or removing the board. Hold the board only by the edges. If a heatsink is loose or broken, obtain a replacement board.

---



---

**Caution** – The heatsinks on the board can be damaged by improper packaging. When storing or shipping the board, ensure that the heatsinks have sufficient protection.

---

---

**Note** – The PCI/PCI+ I/O assembly can be inserted into a powered-on system. The assembly will not be recognized by the system until the domain has been re-initialized and rebooted or dynamically reconfigured into the domain. Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for initializing a domain. Refer to the *Sun Fire Midrange Systems Dynamic Reconfiguration User Guide* for complete DR procedures.

---

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## 9.2 Filler Boards and Filler Panels

To prevent the system from overheating, see Section 1.4 “Filler Boards and Filler Panels” on page 1-5 for procedures you must follow when removing the I/O assembly from a powered-on system.



---

**Caution** – You must install a filler panel that covers only the front of the assembly slot, if the system is to be powered up without the I/O assembly installed. Make sure ALL slots in the I/O assemblies are filled—by cards OR filler boards.

---

## 9.3 PCI/PCI+ I/O Assemblies

**TABLE 9-1** Description of the PCI I/O Assembly

I/O Assembly	Description
PCI I/O Assembly	<p>Eight PCI slots. Six slots for full-length PCI I/O cards, and two short slots for short PCI I/O cards. Short PCI cards can be installed in any of the six full-length slots as well.</p> <p>Peak I/O throughput for the full-length PCI I/O slots (0, 1, 2, 4, 5, and 6) is 33 MHz, 64-bit, and 5V I/O. Peak I/O throughput for the short PCI I/O slots (3 and 7) is 66/33 MHz, 64-bit, and 3.3V I/O.</p>

**TABLE 9-2** Description of the PCI+ I/O Assembly

I/O Assembly	Description
PCI+ I/O Assembly	<p>Eight PCI+ slots. Six slots for full-length PCI I/O cards, and two short slots for short PCI I/O cards. Short PCI cards can be installed in any of the six full-length slots as well.</p> <p>Peak I/O throughput for the full-length PCI I/O slots (2, 3, 4, 5, 6, and 7) is 66/33 MHz, 64-bit, and 3.3V I/O. Peak I/O throughput for the short PCI+ I/O slots (0 and 1) is 33 MHz, 64-bit, and 3.3V I/O.</p>

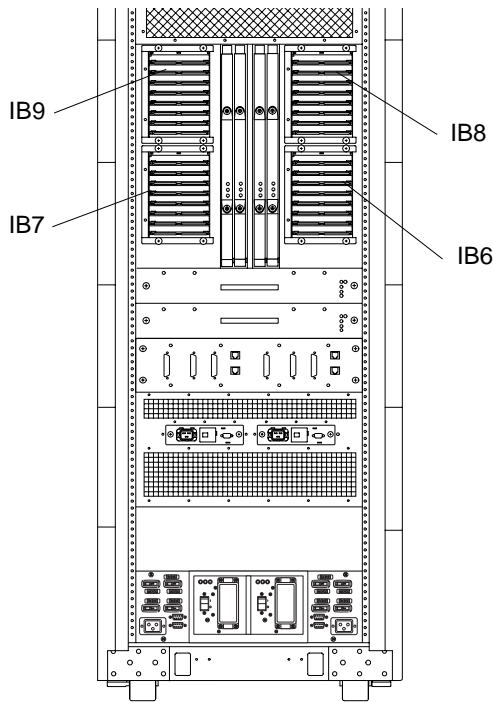
**TABLE 9-3** Location of the I/O Assemblies

System	Slot Numbers	Location
Sun Fire E6900	IB6, IB7, IB8, IB9	Rear
Sun Fire E4900	IB6, IB8	Rear

FIGURE 9-1 and FIGURE 9-2 illustrate the locations of the I/O assemblies for all systems.

### 9.3.0.1 Location Requirements for the Sun Fire E6900 System

FIGURE 9-1 illustrates the I/O assembly locations in the Sun Fire E6900 system.



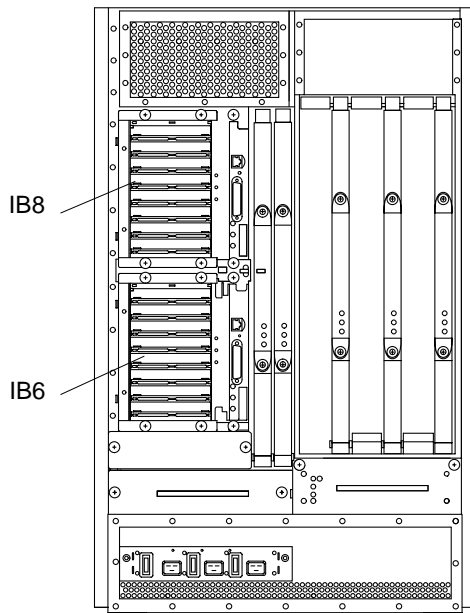
**FIGURE 9-1** I/O Assemblies for the Sun Fire E6900 System—Rear View

When you install PCI/PCI+ I/O assemblies into the Sun Fire E6900 system, you can install them in either the top or bottom I/O locations.

Populate the PCI/PCI+ I/O assemblies from right to left. That is, populate I/O locations IB6 and IB8 before you populate the left I/O locations, IB7 and IB9.

### 9.3.0.2 Location Requirements for the Sun Fire E4900 System

FIGURE 9-2 illustrates the I/O assembly locations in the Sun Fire E4900 system.



**FIGURE 9-2** I/O Assemblies for the Sun Fire E4900 System—Rear View

## 9.3.1 I/O Assembly LEDs

There are three I/O assembly status LEDs on the PCI/PCI+ I/O assembly (TABLE 9-4).

**TABLE 9-4** I/O Assembly Status LED Functions

LED	On	Off
Activated LED (green)	Device is activated	Device is deactivated
Fault LED (amber)	Internal fault	No internal fault
OK to remove (amber or blue)	Assembly can be removed	Assembly cannot be removed

## 9.3.2 Replacing PCI/PCI+ I/O Assemblies



**Caution** – Remove an assembly from a powered-on system only after the Solaris operating environment dynamic reconfiguration (DR) software has disabled that assembly. Refer to the *Sun Fire Midrange Systems Dynamic Reconfiguration User Guide* for complete procedures.

### 9.3.2.1 Removing a PCI/PCI+ I/O Assembly

**1. Prepare the system for removal of the PCI/PCI+ I/O assembly.**

- Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the assembly.
- If the assembly is being used by the Solaris operating environment, identify the assembly to be removed and dynamically reconfigure the assembly out of the domain. Refer to the *Sun Fire Midrange Systems Dynamic Reconfiguration User Guide* for complete procedures before removing the I/O assembly.

**Note** – In order to safely remove the I/O assembly from the system, the green Activated LED on the board must be off (not lit) and the amber OK to remove LED must be on (lit).

2. Wait until the LEDs indicate that the assembly is out of the domain.
3. Make sure you have a filler panel available.
4. Attach a wrist strap or foot strap. Connect the ESD strap to the system.
5. Place a grounded ESD mat close to the system.

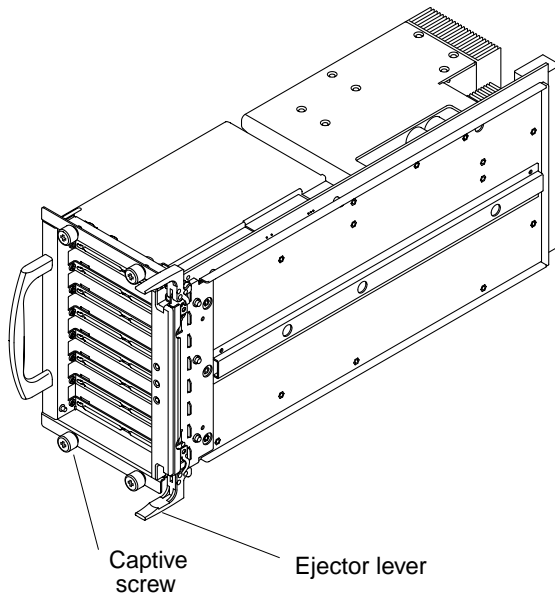


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**Caution** – The system is sensitive to static electricity.

---

6. Completely loosen the four captive Phillips screws (FIGURE 9-3).



**FIGURE 9-3** PCI/PCI+ I/O Assembly

7. Simultaneously pull the two ejector levers outward to unseat the I/O assembly.  
This action releases the board from the connectors.



---

**Caution** – You must install the filler panel within one minute of removing the I/O assembly to prevent overheating.

---

8. Slide the I/O assembly out of the I/O assembly opening.
9. Place the I/O assembly on an ESD mat that is on a work surface.



## 10. Install a filler panel.

### 9.3.2.2 Installing a PCI/PCI+ I/O Assembly

---

**Note** – The PCI/PCI+ I/O assembly can be inserted into a powered-on system. The assembly will not be recognized by the system until the domain has been re-initialized and rebooted or dynamically reconfigured to include the assembly. Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for initializing a domain. Refer to *Sun Fire Midrange Systems Dynamic Reconfiguration User Guide* for complete DR procedures.

---

1. **Attach a wrist strap or foot strap. Connect the ESD strap to the system. Place a grounded ESD mat close to the system.**



---

**Caution** – You must install the I/O assembly within one minute of removing the filler panel to prevent overheating.

---

2. **Remove the filler panel from the front of the I/O assembly location.**
3. **Line up the I/O assembly with the I/O assembly opening.**
4. **Slide the I/O assembly into the I/O assembly opening** (FIGURE 9-3).

The ejector levers should be on the inside of the I/O assembly and in the open position.



---

**Caution** – DO NOT FORCE any assembly into a opening; this can cause damage to the assembly and system. The assembly should insert and seat smoothly. If it binds, remove the assembly and inspect the I/O assembly opening for any obvious obstructions.

---

5. **Simultaneously press the two ejector levers inward.**
6. **Tighten the four captive Phillips screws.** (FIGURE 9-3).

---

**Note** – The assembly will not be recognized by the system until the domain has been reconfigured to include the board.

---

7. **Reconfigure the I/O assembly back into the system by either of the two following procedures:**
  - Dynamically reconfigure the I/O assembly back into the domain.  
Refer to the *Sun Fire Midrange Systems Dynamic Reconfiguration User Guide*.

- Power on the I/O assembly and initialize the domain.  
Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete system procedures for powering on the assembly.

---

**Note** – The Activated LED should be on (lit).

---

## 9.3.3 Replacing PCI Cards

To remove and replace PCI cards, you must remove the PCI/PCI+ I/O assembly from the system and place it on an ESD mat.

### 9.3.3.1 Removing a PCI Card

1. **Attach a wrist strap or foot strap. Connect the ESD strap to the system. Place a grounded ESD mat close to the system.**
2. **Remove the I/O assembly from the system and place it on an ESD mat.**  
See Section 9.3.2.1 “Removing a PCI/PCI+ I/O Assembly” on page 9-7.”

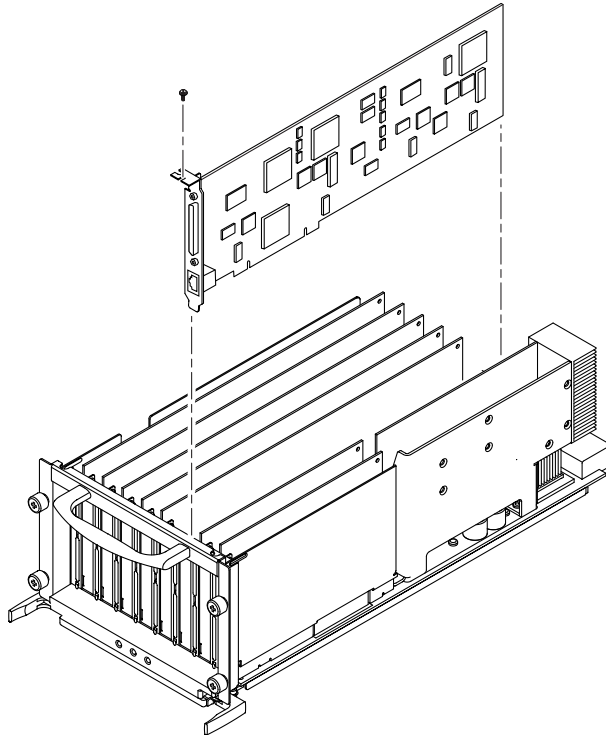


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**Caution** – To prevent the system from overheating, insert a filler panel to cover the open I/O slot.

---

3. **Remove the PCI card by removing the Phillips screw and pulling the PCI card out of the slot (FIGURE 9-4).**



**FIGURE 9-4** Removing a PCI Card From the I/O Assembly

4. If you are not going to replace the PCI card, insert a filler board into the empty slot.

### 9.3.3.2 Installing a PCI Card



---

**Caution** – PCI cards longer than 6.6 inches (167 mm) must be installed in a long slot.

---

1. Attach a wrist strap or foot strap. Connect the ESD strap to the system. Place a grounded ESD mat close to the system.



---

**Caution** – The system is sensitive to static electricity.

---

2. Remove the I/O assembly from the system and place it on an ESD mat.  
See Section 9.3.2.1 “Removing a PCI/PCI+ I/O Assembly” on page 9-7.”

3. **Line up the screw hole on the mounting bracket with the mounting hole.**
4. **Slide the card down vertically between the two embossed fixtures on the front of the PCI panel.**  
Look for bumps between the slots on the rear panel. Slide the card in between the bumps.
5. **Apply equal pressure on both sides of the card until the card is seated in the connector.**
6. **Insert and tighten the Phillips screw.**
7. **Make sure that filler boards are in all unused slots on the PCI/PCI+ I/O assembly.**
8. **Replace the PCI/PCI+ I/O assembly.**  
See Section 9.3.2.2 "Installing a PCI/PCI+ I/O Assembly" on page 9-9."

# Repeater Board

---

To protect both yourself and the equipment, make sure you follow the precautions in Chapter 1 “Safety and Tools Requirements.”

This chapter explains the following topics:

- Section 10.1 “Handling Boards and Assemblies” on page 10-1
- Section 10.2 “Filler Boards” on page 10-2
- Section 10.3 “Repeater Board” on page 10-2
  - Section 10.3.1 “Replacing Repeater Boards” on page 10-6

For your protection, also observe the following safety precautions when setting up your equipment:

- Follow all cautions, warnings, and instructions marked on the equipment.
- Never push objects of any kind through openings in the equipment, as they may touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

---

## 10.1 Handling Boards and Assemblies



---

**Caution** – The chassis AC power cord must remain connected to ensure a proper ground.

---



---

**Caution** – The Repeater boards have surface-mount components that can be broken if you flex the boards.

---

To minimize the amount of board flexing, observe the following precautions:

- Hold the board only by the handle and the edges near the middle of the board, where the board stiffener is located. Do not hold the board *only* at the ends.
- When removing the board from an antistatic bag, keep the board vertical until you lay it on the Sun ESD mat.
- Do not place the board on a hard surface. Use a cushioned antistatic mat. The board connectors and components have very thin pins that bend easily.
- Do not use an oscilloscope probe on the components. The soldered pins are easily damaged or shorted by the probe point.
- Transport the board in an antistatic bag.



---

**Caution** – The system is sensitive to static electricity. To prevent damage to the unit, connect an antistatic wrist strap or foot strap between you and the system.

---

---

**Note** – The Repeater board can be inserted into a powered-on system. The board will not be recognized by the system until the domain has been re-initialized and rebooted. Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for initializing a domain.

---

---

## 10.2 Filler Boards

All empty board slots in the systems must have filler boards installed for cooling purposes and for EMI protection. To prevent the system from overheating, see Section 1.4 “Filler Boards and Filler Panels” on page 1-5 for procedures you must follow when removing Repeater boards from a system.

---

## 10.3 Repeater Board

The Repeater board acts as a switch and connects multiple CPU and I/O boards. In the Sun Fire E4900 system, Repeater boards work as single boards. However, in the Sun Fire E6900 system, the Repeater boards work in pairs.

To remove a Repeater board from the system and install a replacement board, you must halt the Solaris operating environment (either the entire system or only the affected domains).

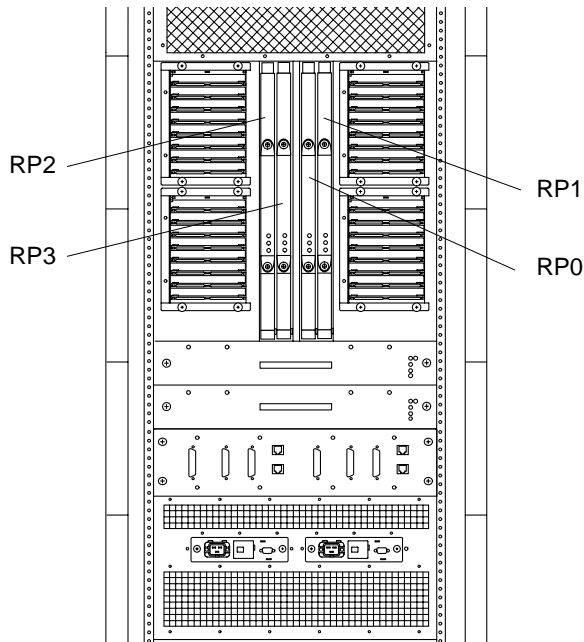
For more information on the Repeater board functionality, see the *Sun Fire E6900/E4900 Systems Overview Manual*.

TABLE 10-1 shows the Repeater board locations.

**TABLE 10-1** Repeater Board Slot Locations

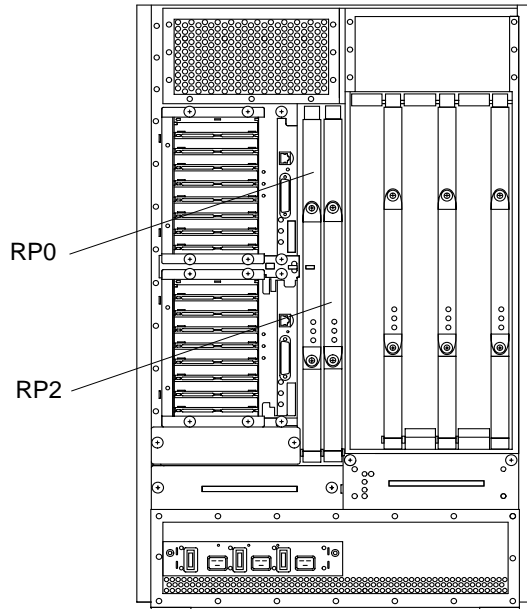
System	Slot Number	Location
Sun Fire E6900	RP2, RP3, RP0, RP1	Rear
Sun Fire E4900	RP0, RP2	Rear

FIGURE 10-1 and FIGURE 10-2 illustrate the Repeater board slot assignments for the E6900/E4900 systems.



**FIGURE 10-1** Repeater Board Slot Assignments for the Sun Fire E6900 System—Rear View

In the Sun Fire E6900 system, Repeater boards work in pairs: RP0 with RP1, and RP2 with RP3. Populate Repeater board pairs on the Sun Fire E6900 system from right to left, beginning with RP0 and RP1.



**FIGURE 10-2** Repeater Board Slot Assignments for the Sun Fire E4900 System—Rear View

In the Sun Fire E4900 systems, there are two Repeater boards: RP0 and RP2. Populate the Repeater boards from left to right.

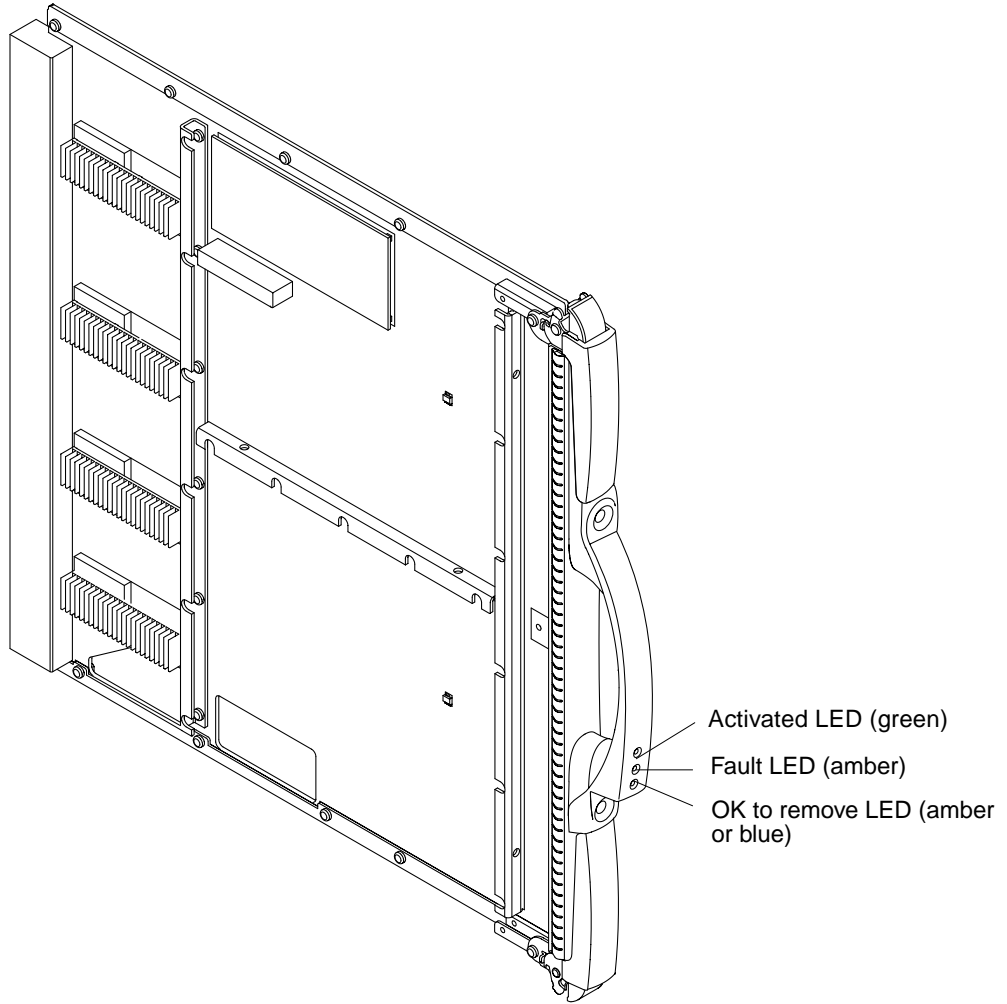
There are three LEDs on the Repeater board. TABLE 10-2 notes the LED functions.

**TABLE 10-2** Repeater Board LED Functions

LED Name and Location	On	Off
Activated LED (green)	Board is activated	Board is deactivated
Fault LED (amber)	Internal fault	No internal fault
OK to remove LED (amber or blue)	Board can be removed	Board can not be removed

FIGURE 10-3 illustrates the Repeater board LEDs.





**FIGURE 10-3** Repeater Board LEDs

## 10.3.1 Replacing Repeater Boards

### 10.3.1.1 Removing a Repeater Board

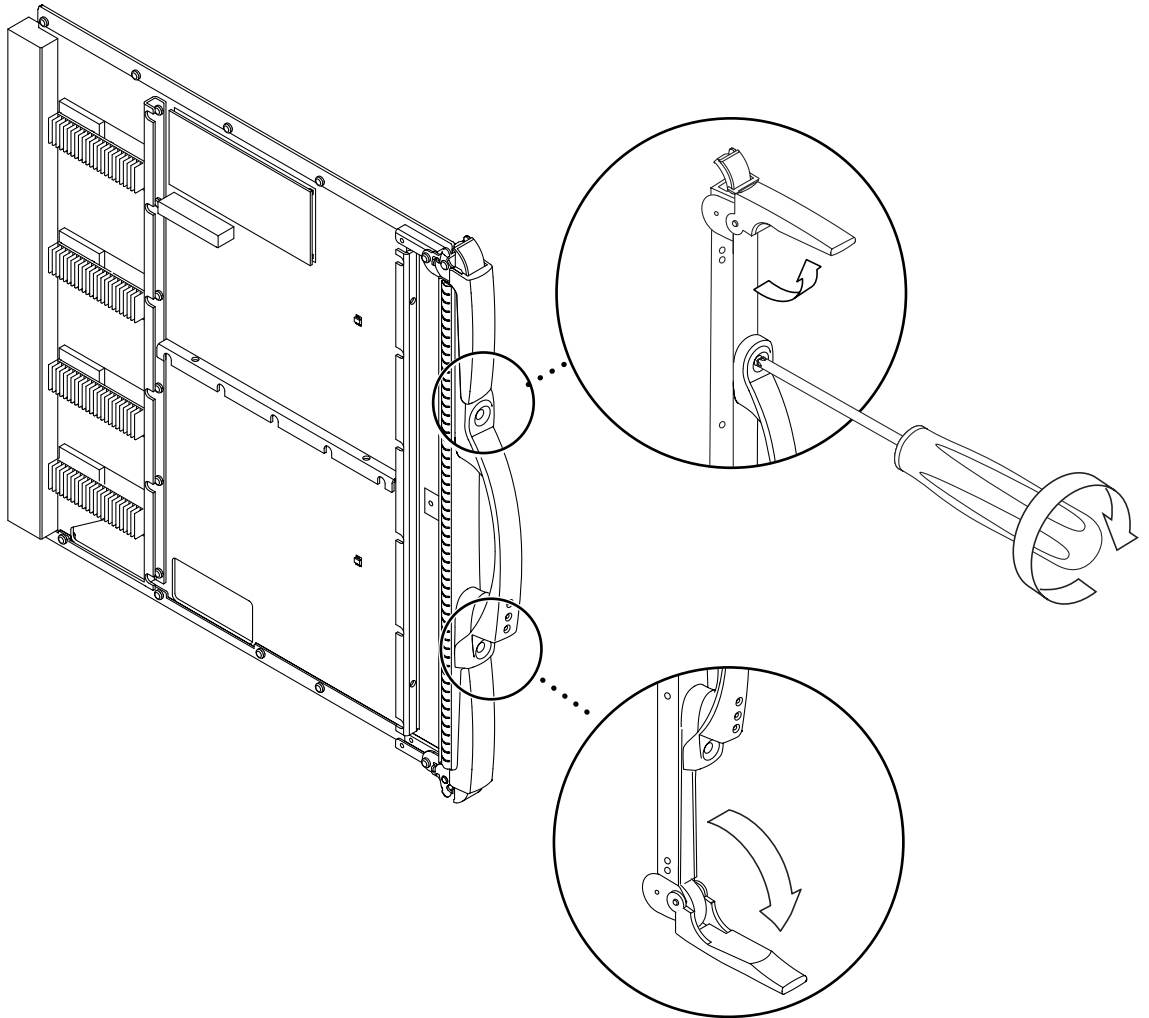
- 1. Halt the domain and power off the board.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the board.

- 2. Attach a wrist strap or foot strap. Connect the ESD strap to the system. Place a grounded ESD mat close to the system.**

- 3. Unlock the ejectors on the Repeater board by using a Phillips No. 2 screwdriver (FIGURE 10-4).**

The ejectors will pop out slightly.



**FIGURE 10-4** Unlocking the Ejector Levers

4. Rotate the ejector levers simultaneously until they are 90 degrees from the board (straight out) (FIGURE 10-4).

This action unseats the board from the connector.

5. Remove the board from the card cage by grabbing the handle and sliding the board along the track until the board is out of the card cage (FIGURE 10-5).

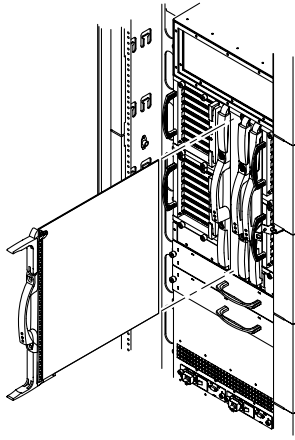


FIGURE 10-5 Removing and Replacing a Repeater Board—Sun Fire E6900 System

6. Place the board on an ESD mat that is on a work surface.

### 10.3.1.2 Installing a Repeater Board

1. Attach a wrist strap or foot strap. Connect the ESD strap to the system. Place a grounded ESD mat close to the system.
2. Make sure that the ejector levers are in the open position. They should be 90 degrees straight out from the board.



---

**Caution** – *Do Not Force* any board into a slot; it can cause damage to the board and system. The board should insert and seat smoothly. If it binds, remove the board and inspect the card cage slot for any obvious obstructions. Also inspect both the board and the centerplane for bent pins or other damage.

---

3. Gently insert the Repeater board into the grooves of the proper slot (see TABLE 10-1 on page 10-3 for slot locations) until the board stops (FIGURE 10-5).

**4. Simultaneously rotate both ejectors until they are in the closed position, flush with the board.**

When properly installed, the ejectors will lock automatically.

**5. Power on the board.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on the board.

**6. Initialize the domain.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for initializing a domain.



## Centerplane and ID Boards

---

This chapter describes how to replace the centerplanes in the E6900/E4900 systems. Also described is how to replace the ID board from these systems.

- Section 11.1 “Replacing the Centerplanes in a Sun Fire E6900 System” on page 11-1
- Section 11.2 “Replacing the Centerplane in a Sun Fire E4900 System” on page 11-13
- Section 11.3 “Replacing the ID Boards” on page 11-24

To protect both yourself and the equipment, make sure you follow the precautions in Chapter 1 “Safety and Tools Requirements.”

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### 11.1 Replacing the Centerplanes in a Sun Fire E6900 System

The Sun Fire E6900 system has three centerplanes that can be removed separately. These procedures require adequate front and rear access.

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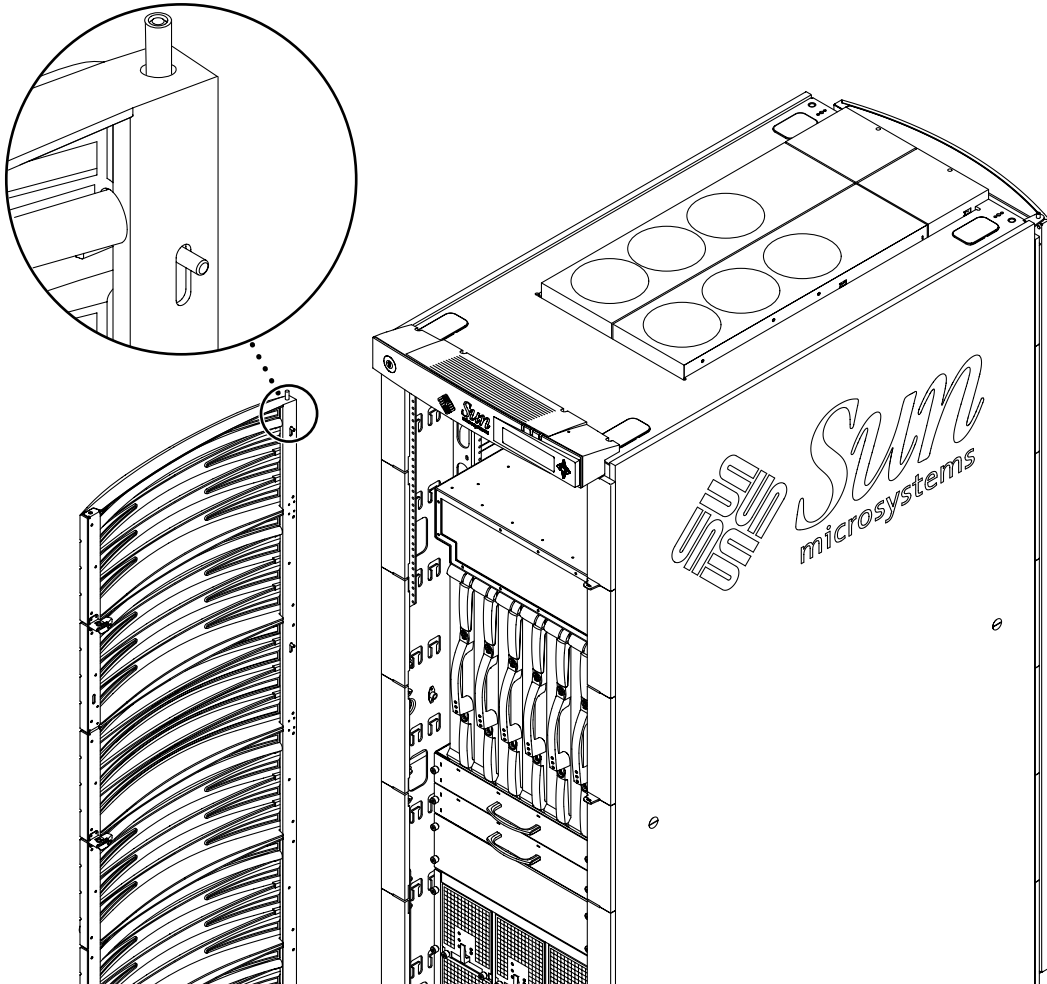
**Note** – A grounding wrist strap must be available from both the front and the rear of the system.

---

#### 11.1.1 Removing the System Centerplane

1. Refer to the *Sun Fire Midrange Systems Platform Administration Manual*, “**Removing and Replacing Boards**” before powering off the system.

2. **Halt the Solaris operating environment in each domain and power off the system.**  
Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the system.
3. **Remove the front and rear doors by lifting the door panels off the hinges (FIGURE 11-1).**

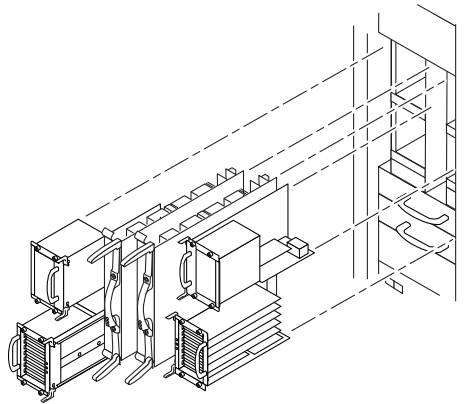


**FIGURE 11-1** Removing the Door—Sun Fire E6900 System

4. **Disconnect all I/O cables.**
5. **Attach a wrist strap or foot strap. Connect the ESD jack from the system to your wrist strap or foot strap. Place a grounded ESD mat close to the system.**

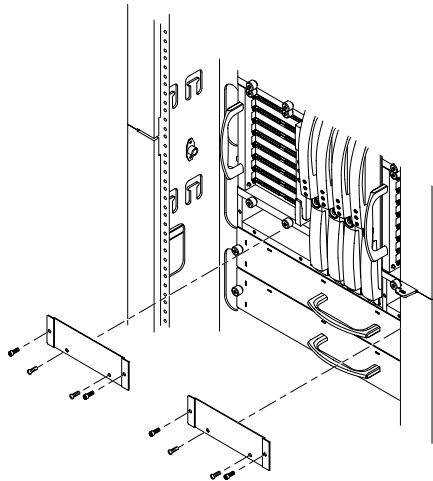


6. Remove all CPU/Memory boards, Repeater boards, I/O assemblies, System Controller boards, and filler boards or filler panels from the front and rear of the system (FIGURE 11-2).



**FIGURE 11-2** Removing All Components From the Front of the Sun Fire E6900 System

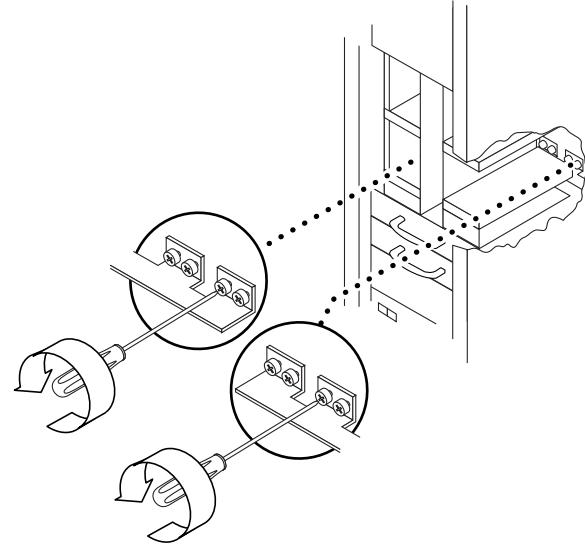
7. Remove the ID board from the centerplane. See Section 11.3.1 “Removing the ID Board From the Sun Fire E6900 System”, Step 5.
8. Remove the bus bar access panels at the rear of the system.



**FIGURE 11-3** Removing the Bus Bar Access Panels

9. Loosen the upper-right and upper-left bus bar captive screws, by reaching through the access area (FIGURE 11-4).

There are four captive screws at each location.



**FIGURE 11-4** Loosening the Bus Bar Captive Screws—Sun Fire E6900 System

10. Disconnect the two cables from the system centerplane (FIGURE 11-5).

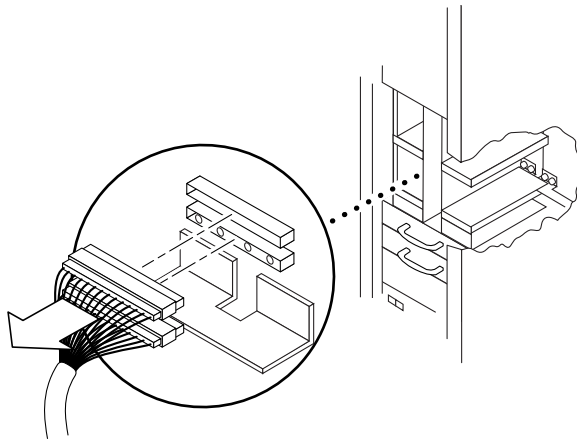


FIGURE 11-5 Disconnecting the Two Cables From the System Centerplane—Sun Fire E6900 System

11. At the front of the system, remove the 19 screws securing the centerplane to the chassis (FIGURE 11-6).

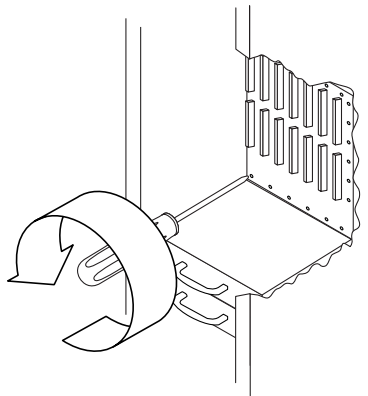


FIGURE 11-6 Removing the Screws Securing the System Centerplane—Sun Fire E6900 System

12. Move the centerplane forward off the guide pins (FIGURE 11-7).

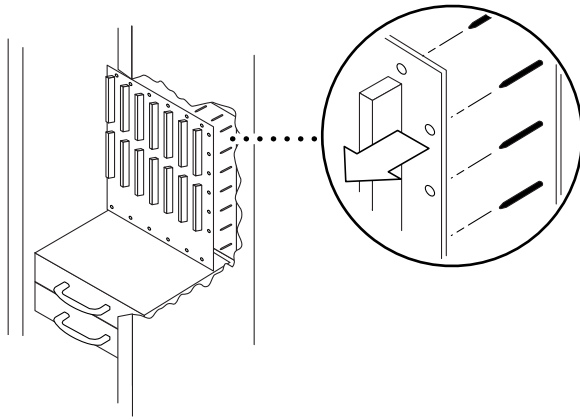


FIGURE 11-7 Moving the System Centerplane Forward Off the Guide Pins—Sun Fire E6900 System

13. Tilt the top of the centerplane forward about 30 degrees.

14. Remove the centerplane (FIGURE 11-8) as follows:

- a. Rotate the right side forward about 30 degrees, and then rotate it forward and around the wall. Take care not to hit the corner.
- b. As soon as one side passes around the wall, tilt the top edge of the centerplane forward to allow additional clearance.

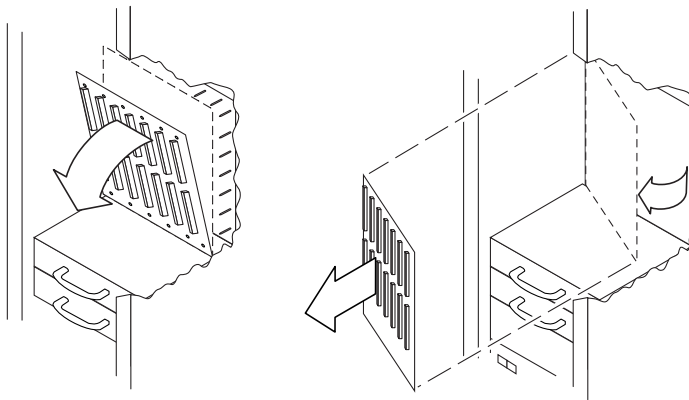
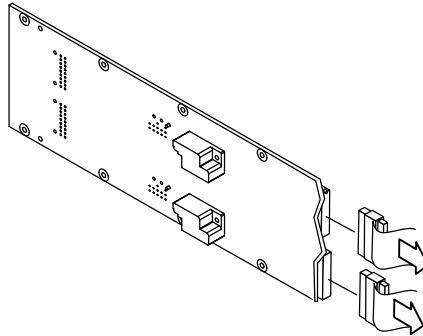


FIGURE 11-8 Removing the System Centerplane—Sun Fire E6900 System

## 11.1.2 Removing the Fan Centerplane

1. **Halt the Solaris operating environment in each domain, and power off the system.**  
Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the system.
2. **Attach a wrist strap or foot strap. Connect the ESD jack from the system to your wrist strap or foot strap. Place a grounded ESD mat close to the system.**
3. **Remove the front fan trays.**
4. **Remove the fan tray plenum panel mounted to the bottom of the centerplane mounting bracket.**
5. **Remove the rear fan trays.**
6. **Disconnect the cables to the rear fan tray centerplane (FIGURE 11-9).**



**FIGURE 11-9** Disconnecting the Fan Tray Centerplane Cables

7. **Remove the 10 screws securing the fan centerplane to the system (FIGURE 11-10).**

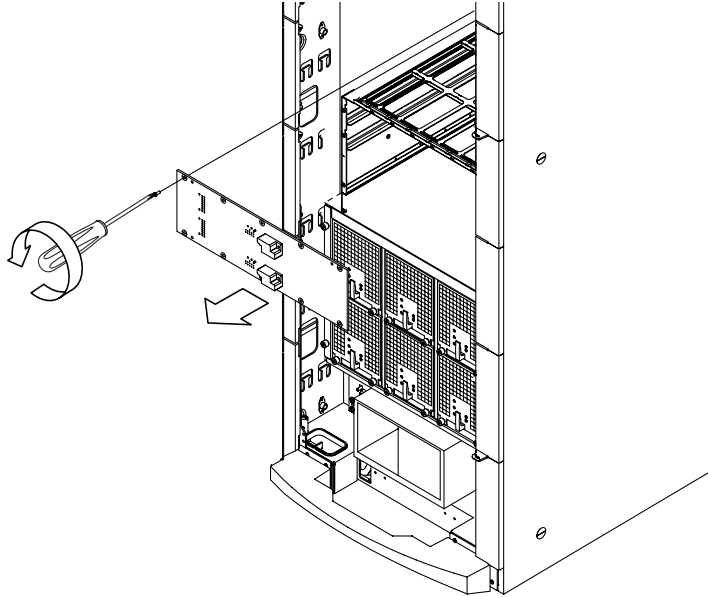


FIGURE 11-10 Removing the Screws Securing the Fan Centerplane

8. Remove the fan centerplane.

## 11.1.3 Removing the Power Centerplane

1. **Halt the Solaris operating environment in each domain and power off the system.**  
Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the system.



---

**Caution** – Use a grounding wrist strap to prevent static damage. Attach a wrist strap or foot strap. Connect the ESD jack from the system to your wrist strap or foot strap. Place a grounded ESD mat close to the system.

---

2. **Remove the CPU/Memory boards.**  
See Chapter 8 for information about removing CPU/Memory boards. Note the slot numbers that the boards are removed from.
3. **Remove the power supplies.**
4. **Remove the power supply subchassis.**  
This enclosure houses the power supplies.

5. Remove the two front fan trays.
6. Remove the two AC input boxes from the rear of the system by loosening the captive screws and sliding the AC input boxes out of their slots.
7. Remove the plenum.
8. Disconnect the centerplane cables as follows:
  - a. Cut the tie strap holding the power cable to the system.
  - b. Disconnect the system cable that connects the power centerplane to the system centerplane.
  - c. Disconnect the power cable that connects the power centerplane to the fan centerplane (FIGURE 11-11).

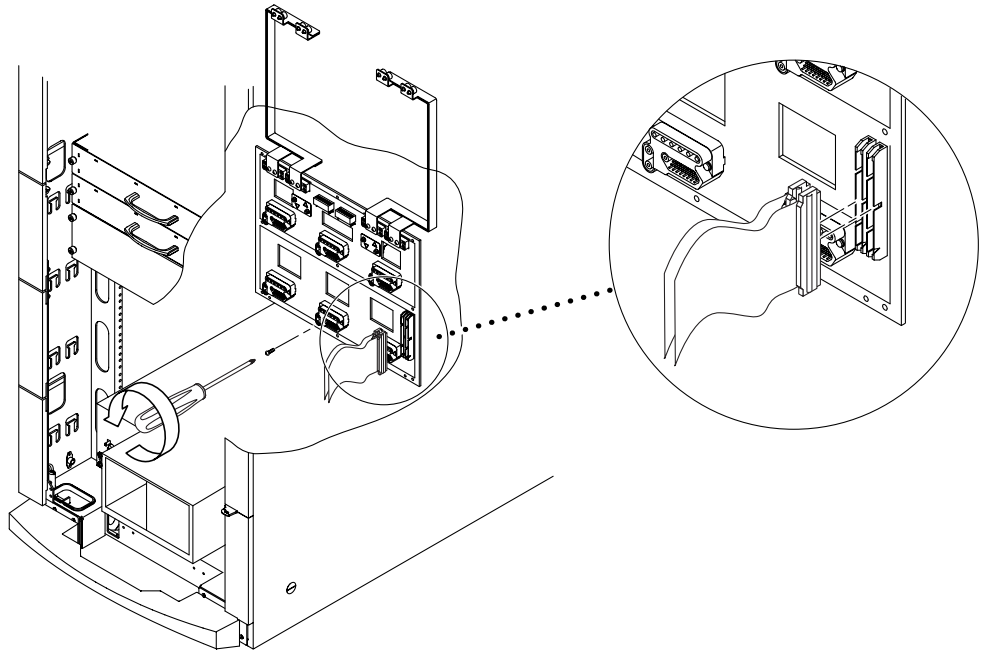


FIGURE 11-11 Centerplane Cables—Sun Fire E6900 System

9. Remove the left and right bus bars as follows:
  - a. From the rear of the cabinet, remove the bus bar access panels.
  - b. With a long-shaft Phillips screwdriver, loosen the panel captive screws for both bus bars at the top.

- c. From the system front, remove the eight screws attaching the bus bar to the power centerplane.

There are four screws on the right and four screws on the left.

- d. Remove the bus bar (FIGURE 11-12).

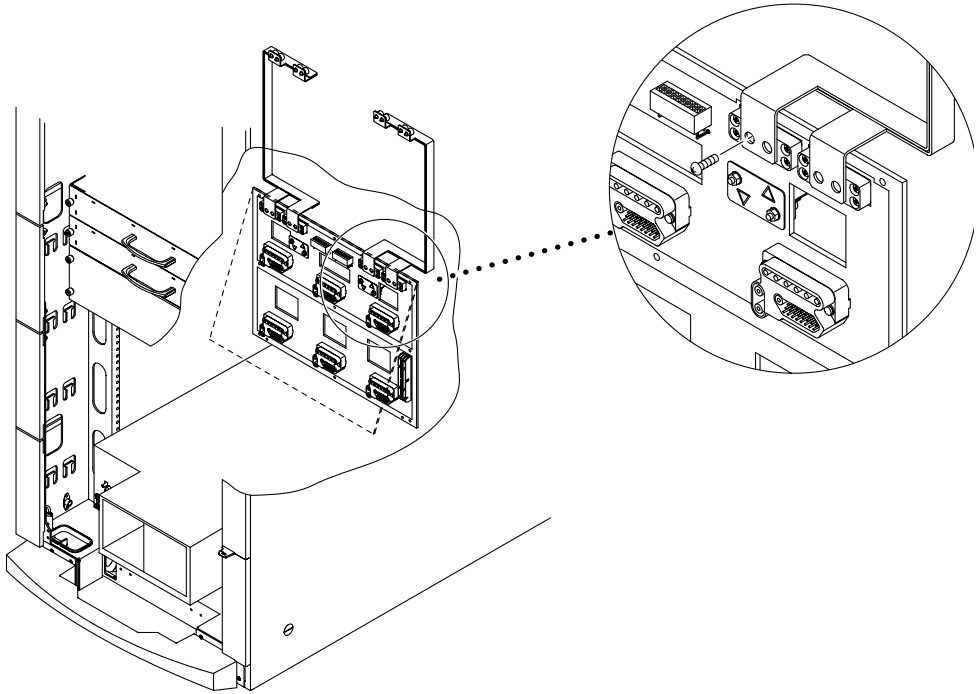


FIGURE 11-12 Disconnecting the Screws Securing the Power Centerplane Bus Bars

10. Remove the nine screws securing the centerplane to the cabinet.
11. Remove the centerplane.



## 11.1.4 Installing the System Centerplane

1. Insert and align the centerplane within the chassis cabinet (FIGURE 11-8).
2. At the front of the system, install the 19 screws securing the centerplane to the chassis.
3. Connect the system cable to the centerplane.
4. Fasten the upper-right and upper-left bus bar panel captive screws.  
There are four captive screws at each location.
5. Install the bus bar access panels.
6. Reinstall the ID board from the old centerplane. See Section 11.3.2 “Installing the ID Board in the Sun Fire E6900 System”, Step 2.
7. Install all CPU boards, Repeater boards, I/O assemblies, and System Controller boards from the front and rear of the system.  
Install filler boards or panels in all empty slots.
8. Connect all cables.
9. Install the side panel behind the hinge.
10. Install the front and rear doors.

## 11.1.5 Installing the Fan Centerplane

1. Insert and align the centerplane within the chassis cabinet and replace the 10 screws securing the centerplane to the system chassis (FIGURE 11-10).
2. Connect the fan tray cable (FIGURE 11-9).
3. Install the rear fan trays.
4. Install the plenum and the fan tray plenum panel.
5. Install the front fan trays.

## 11.1.6 Replacing the Power Centerplane

1. **Insert and align the power centerplane within the chassis cabinet and replace the nine screws securing the centerplane to the cabinet (FIGURE 11-10).**
2. **Install the left and right bus bars as follows (FIGURE 11-12):**
  - a. **From the front of the system, align the bus bar and install the eight screws attaching the bus bar to the power centerplane.**

There are four screws on the right and four screws on the left.
  - b. **Install the panel fasteners for both bus bars at the top.**
  - c. **From the rear of the system, install the bus bar access panels.**
3. **Connect the centerplane cables as follows (FIGURE 11-11):**
  - a. **Connect the power cable going from the power centerplane to the fan centerplane.**
  - b. **Connect the system cable going from the power centerplane to the system centerplane.**
  - c. **Install the tie strap that holds the power cable to the system.**
4. **Install the plenum.**
5. **Install the AC input box and fasten the captive screws.**
6. **Install the two fan trays.**
7. **Install the power supply subassembly that houses the power supplies.**
8. **Install the power supplies.**
9. **Install the CPU/Memory boards.**
10. **Power on the system.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on the system.

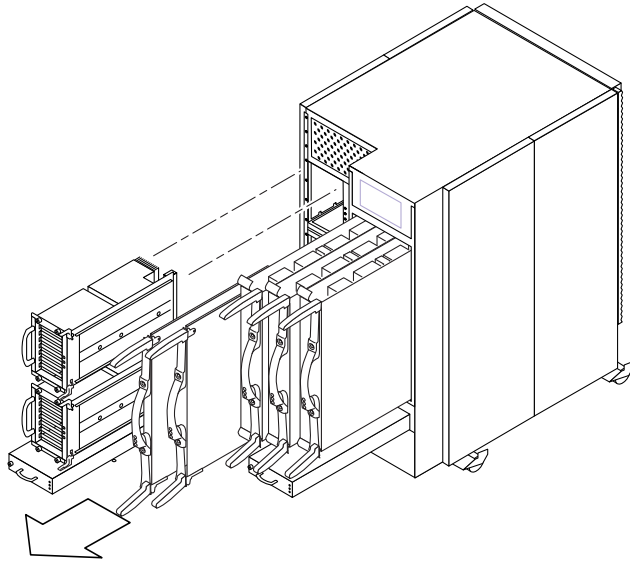
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## 11.2 Replacing the Centerplane in a Sun Fire E4900 System

There is one centerplane in the Sun Fire E4900 system.

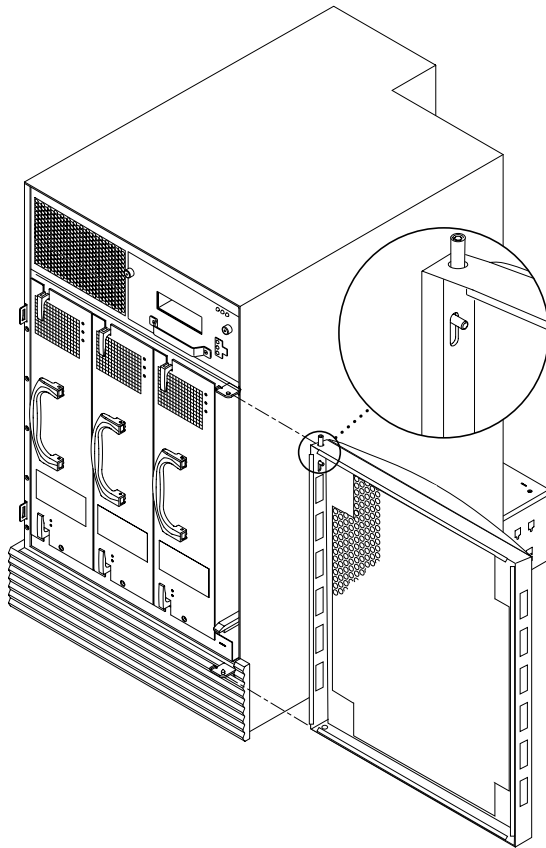
### 11.2.1 Removing the Centerplane

1. **Refer to the *Sun Fire Midrange Systems Platform Administration Manual*, “Removing and Replacing Boards” before powering off the system.**
2. **Halt the Solaris operating environment in each domain and power off the system.**  
Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the system.
3. **Remove the power cord.**
4. **Attach a wrist strap or foot strap to the ESD jack on the system. Place a grounded ESD mat close to the system.**
5. **At the back of the system, remove the two bottom fan trays, I/O assemblies, and all system boards (FIGURE 11-13).**



**FIGURE 11-13** Removing the Bottom Fan Tray, CPU/Memory Boards, and I/O Assemblies—Sun Fire E4900 System

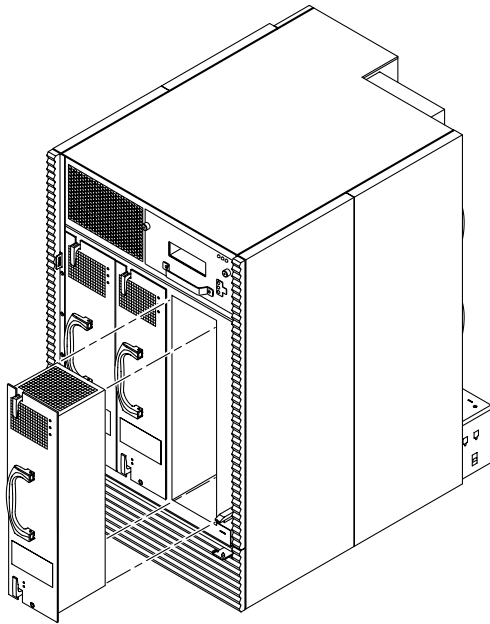
- 6. Remove the front door (FIGURE 11-14).**
  - a. Open the door.**
  - b. Push down on the spring latch inside the top cover of the door.**
  - c. Remove the door.**



**FIGURE 11-14** Removing the Front Door—Sun Fire E4900 System

**7. At the front of the system, remove all power supplies.**

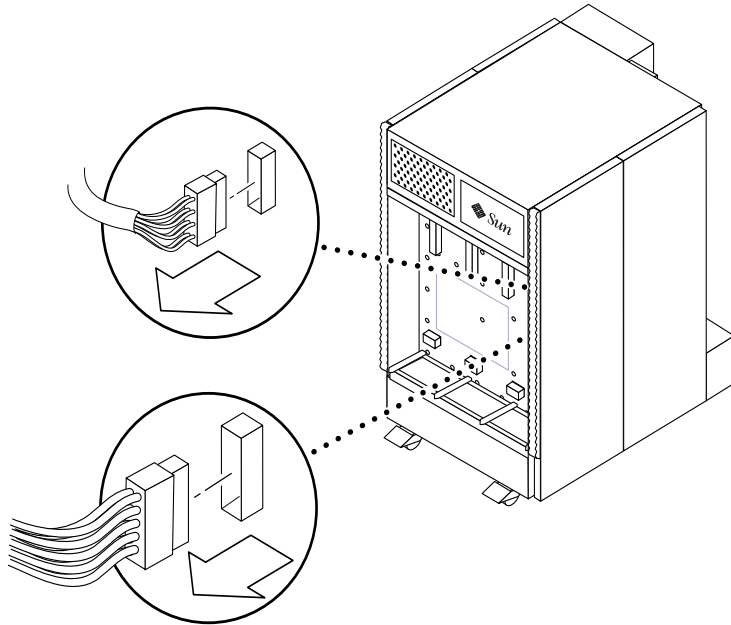
FIGURE 11-15 shows removing one power supply from the system.



**FIGURE 11-15** Removing a Power Supply at the Front of the Sun Fire E4900 System

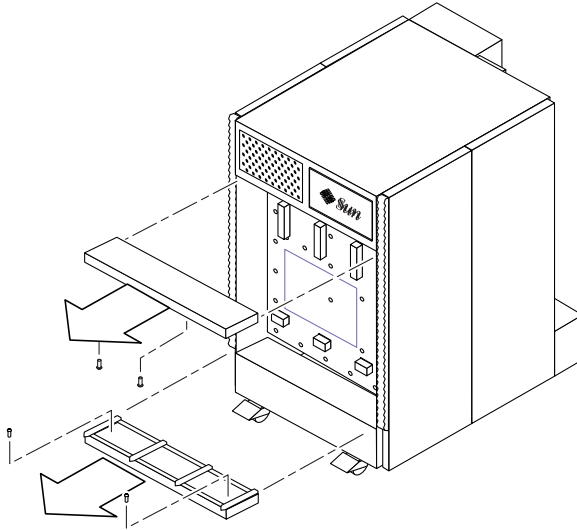
**8. Disconnect the two cables from the connectors on the centerplane.**

Both cables are on the right. You will need to use force to disconnect the cables.



**FIGURE 11-16** Disconnecting Cables From the Connectors on the Centerplane—Sun Fire E4900 System

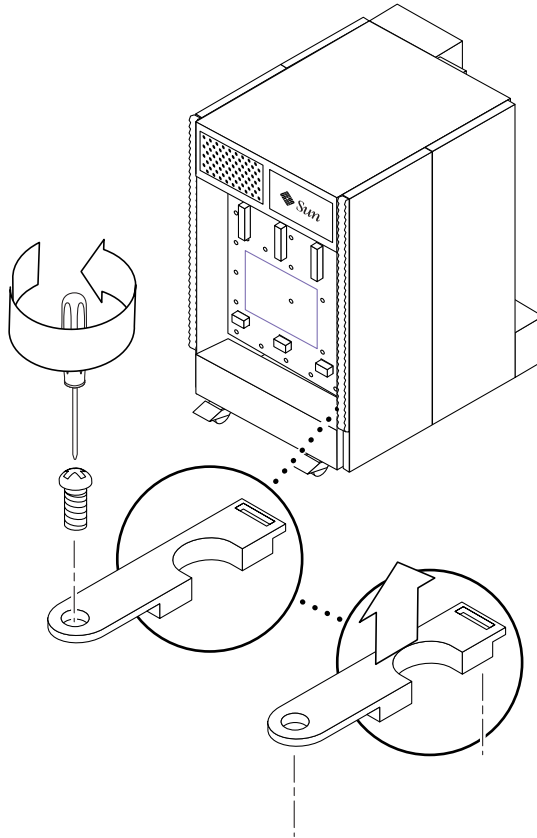
9. Remove the lower and upper power supply supports as follows:
  - a. Remove the two screws securing the lower power support to the system enclosure.
  - b. Remove the two screws securing the upper power supply support to the system enclosure.
  - c. With both hands, firmly pull the upper power supply support away from the centerplane and rotate the front of the upper power supply support downward, and then remove it.



**FIGURE 11-17** Removing the Top and Bottom Power Supply Supports—Sun Fire E4900 System



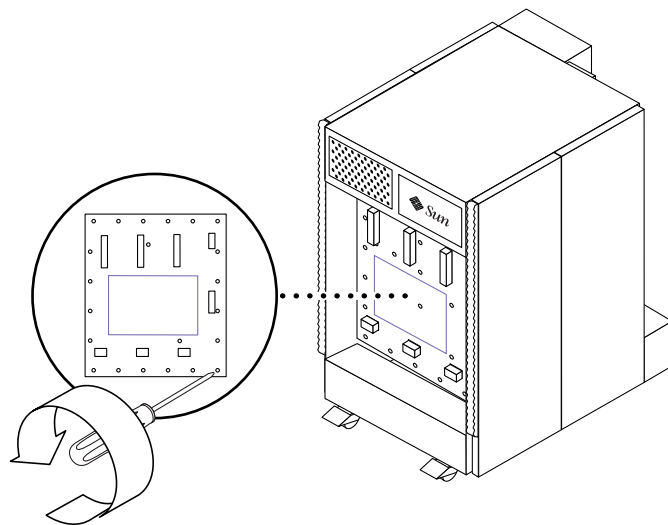
10. Remove the plastic cable guide located on the bottom of the power supply bay, next to the right wall.



**FIGURE 11-18** Removing the Cable Guide—Sun Fire E4900 System

11. Remove the ID board from the centerplane. See Section 11.3.3 “Removing the ID board From the Sun Fire E4900 System”, Step 4.

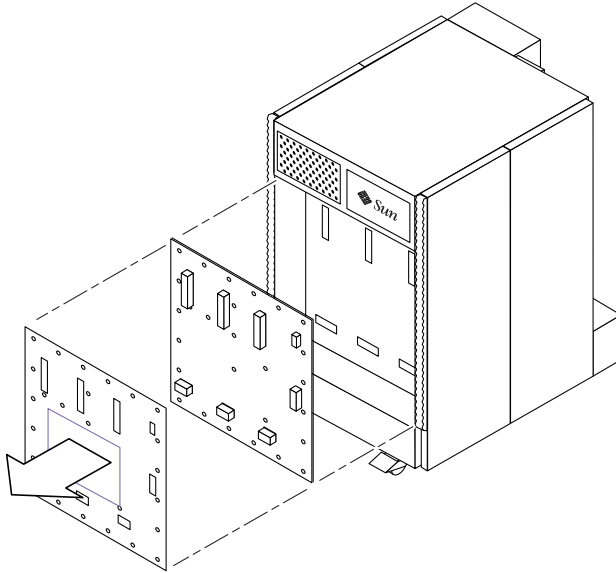
- Using a long-shaft Phillips screwdriver, remove the 30 screws securing the centerplane to the system enclosure.



**FIGURE 11-19** Removing the Screws Securing the Centerplane to the System—Sun Fire E4900 System

**13. Remove the insulator and the centerplane together (FIGURE 11-20).**

It may be necessary to rotate the centerplane to clear cables along the right-hand wall.



**FIGURE 11-20** Removing the Centerplane and Insulator—Sun Fire E4900 System

## 11.2.2 Installing the Centerplane

1. Align the centerplane insulator on the connectors on the centerplane.
2. Align the insulator and the centerplane with the three guide pins that are on the interior flange (FIGURE 11-20).

There is one guide pin at the upper edge and two guide pins at the lower edge.
3. Replace the 30 screws securing the insulator and centerplane to the system enclosure (FIGURE 11-19).
4. Replace the plastic cable guide (FIGURE 11-18).
5. Replace the upper and lower power supply support (FIGURE 11-17).

---

**Note** – Push the power supply supports in as far as they will go, so that they contact the centerplane. If you do not push them in far enough, they will not make contact with the centerplane.

---

- a. Replace the two screws securing the upper power supply support to the system enclosure.
  - b. Replace the lower power supply support by replace the two screws securing the support to the system enclosure.
6. Connect the cables to the centerplane (FIGURE 11-16).
  7. Replace the power supplies (FIGURE 11-15).
  8. Replace the front door (FIGURE 11-14).
    - a. Position the door so that it is only slightly less than 90 degrees open.
    - b. At the bottom of the door, insert the hole into the post.
    - c. At the top of the door, push down on the spring latch located on the upper-inside cover of the door.
    - d. Align the pin with the pivot hole.
  9. Attach a wrist strap or foot strap. Connect the ESD jack from the system to your wrist strap or foot strap.
  10. Reinstall the ID board from the old centerplane. See Section 11.3.4 “Installing the ID board in the Sun Fire E4900 System”, Step 2.
  11. At the back of the system, replace the bottom two fan tray assemblies, I/O assemblies, and all system boards (FIGURE 11-13).

## **12. Power on the system.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on the system.

---

## 11.3 Replacing the ID Boards

The purpose of the ID board is to associate nonvolatile system identification with the chassis and centerplane. It also provides a location where the system controller configuration and other data can be written. The data written includes the chassis and centerplane serial numbers, the system type, and the Ethernet addresses. Additionally, there is some circuitry that will be used to arbitrate bus control between the two system controllers. The ID board is connected to the centerplane at the front of the system. The ID board should only be removed if it is determined to be at fault or if the centerplane is at fault. The ID board should then be removed and reinstalled onto the new centerplane.

### 11.3.1 Removing the ID Board From the Sun Fire E6900 System

1. **Refer to the *Sun Fire Midrange Systems Platform Administration Manual*, “**Removing and Replacing Boards**” chapter before powering off the system.**
2. **Halt the Solaris operating environment in each domain and power down the entire system.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the system.

3. Facing the rear of the system, remove the upper left I/O assembly IB9, from the system (FIGURE 11-21).

See Chapter 9 for I/O assembly removal procedures.

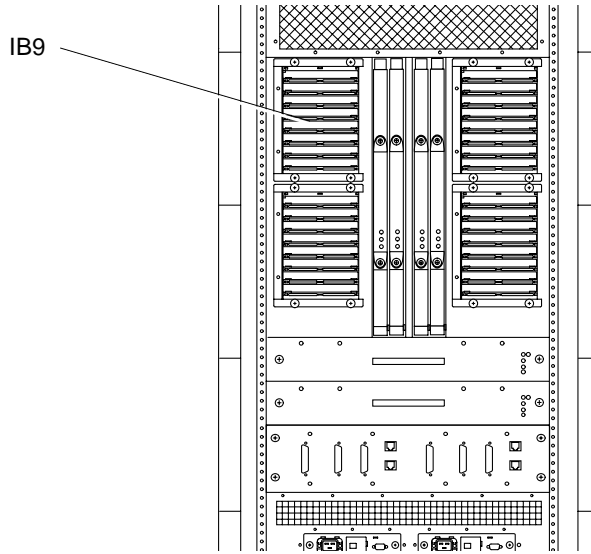
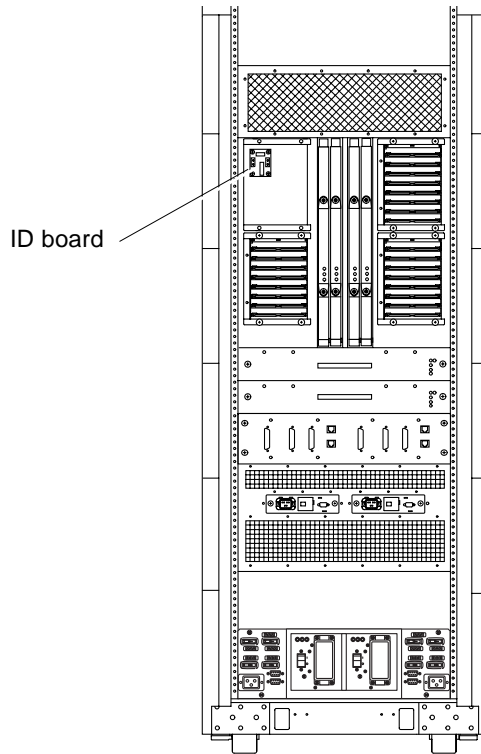


FIGURE 11-21 Removing IB9 I/O Assembly—Sun Fire E6900 System

4. Attach a wrist strap or foot strap. Connect the ESD jack from the system to your wrist strap or foot strap. Place a grounded ESD mat close to the system.
5. Reaching into the opening created by removing the I/O assembly, grasp the ID board by the edges and remove it from the centerplane (FIGURE 11-22).



**FIGURE 11-22** Removing the ID Board From the Centerplane—Sun Fire E6900 System

## 11.3.2 Installing the ID Board in the Sun Fire E6900 System

1. Attach a wrist strap or foot strap. Connect the ESD jack from the system to your wrist strap or foot strap.
2. Reach into the opening created by removing the I/O assembly and connect the ID board to the connectors on the centerplane (FIGURE 11-22).
3. Install the upper left I/O assembly into the system.
4. Power on the system.

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on the system.



5. **Enter the system data information into the new ID board.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual*, “Removing and Replacing Boards” chapter.

### 11.3.3 Removing the ID board From the Sun Fire E4900 System

1. **Halt the Solaris operating environment in each domain and power down the entire system.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering off the system.

2. **Attach a wrist strap or foot strap. Connect the ESD jack from the system to your wrist strap or foot strap. Place a grounded ESD mat close to the system.**
3. **At the rear of the system, remove I/O assembly IB8 and the upper System Controller board.**

See Chapter 9 for I/O assembly, and Chapter 7 for System Controller board removal procedures.

4. **Reach into the opening created by removing the boards and grasp the ID board by the edges and remove it from the centerplane.**

### 11.3.4 Installing the ID board in the Sun Fire E4900 System

1. **Attach a wrist strap or foot strap. Connect the ESD jack from the system to your wrist strap or foot strap.**
2. **Reach into the opening created by removing the boards and connect the ID board to the connectors on the centerplane.**
3. **Replace the top System Controller board and the top I/O assembly.**

See Chapter 9 for I/O assembly, and Chapter 7 for System Controller board replacement procedures.

4. **Power on the system.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual* for complete procedures for powering on the system.

**5. Enter the system data information into the new ID board.**

Refer to the *Sun Fire Midrange Systems Platform Administration Manual*, “Removing and Replacing Boards” chapter.

## Periodic Maintenance

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This chapter provides procedures for cleaning and replacing the air intake screens of the E6900/E4900 systems. The following sections are included in this chapter:

- Section 12.1 “Cleaning the Air Intake Screen” on page 12-2
- Section 12.2 “Air Intake Screen for the Sun Fire E6900 System” on page 12-2
- Section 12.3 “Air Intake Screen for the Sun Fire E4900 System” on page 12-4

The air intake screens are a honeycomb type that act as electro-magnetic interference (EMI) and radio frequency interference (RFI) filters, blocking both EMI and RFI emissions from the system. These screens also collect and trap dust and debris particles.

The E6900/E4900 systems have been designed for maximum availability so the air intake screens can be cleaned or changed without the need to power off the system.

The E6900/E4900 systems each have one air intake screen that requires periodic inspection and cleaning. The air intake screen should be inspected for debris and trapped particles every three months of operation. The level of debris found on the screen and surrounding area should be considered in the decision of when to remove and clean the air intake screen.

If the air intake screen collects a substantial amount of debris in less than three months, investigate the air supply system for sources of contamination and take corrective action. In addition, notify and update account management as required.

Have spare air intake screens onsite so that replacements are available when needed for cleaning.

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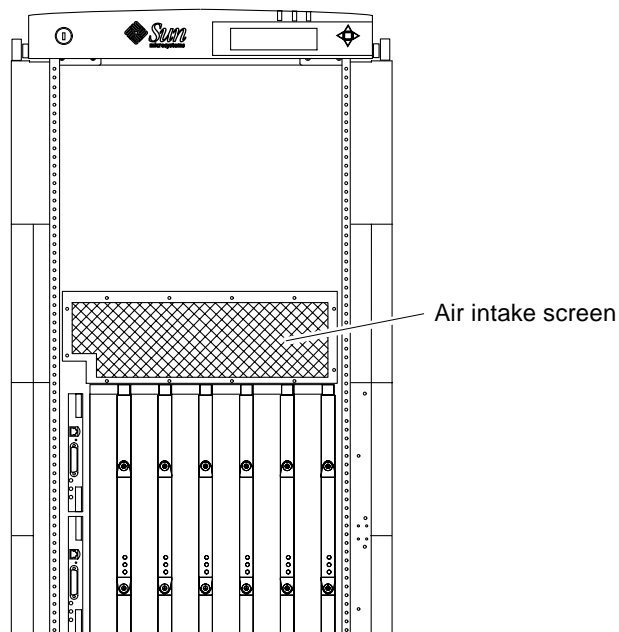
## 12.1 Cleaning the Air Intake Screen

You can clean the air intake screen by using various methods. The front and back side of the screen can be vacuumed using a brush attachment on a vacuum cleaner. Take care not to damage the honeycomb of the screen. If this does not clean the screen sufficiently, use a high pressure air hose with a nozzle attachment for blowing air.

---

## 12.2 Air Intake Screen for the Sun Fire E6900 System

The air intake screen for the Sun Fire E6900 system is located at the front of the system.



**FIGURE 12-1** Air Intake Screen Location for the Sun Fire E6900—Front View

## 12.2.1 Replacing the Sun Fire E6900 Air Intake Screen



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**Caution** – Use care when handling air intake screens. The honeycomb structure can easily be damaged.

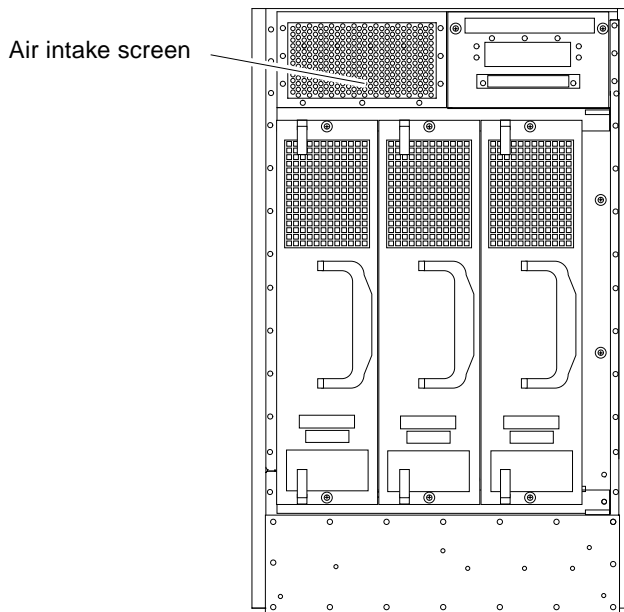
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1. Remove the 12 screws from the screen.
2. Pry the top of the screen from the system using a small flat-bladed screwdriver.
3. Remove the air intake screen from the system.
4. Clean the air intake screen as described in Section 12.1 “Cleaning the Air Intake Screen.”
5. Install the clean air intake screen by applying equal pressure along all sides of the screen.
6. Install all 12 screws to secure the screen to the system.

---

## 12.3 Air Intake Screen for the Sun Fire E4900 System

The air intake screen for the Sun Fire E4900 system is located at the front of the system.



**FIGURE 12-2** Air Intake Screen Location for the Sun Fire E4900—Front View

## 12.3.1 Replacing the Sun Fire E4900 Air Intake Screen



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**Caution** – Use care when handling air intake screens. The honeycomb structure can easily be damaged.

---

1. Remove the 9 screws from the screen.
2. Remove the air intake screen from the system.
3. Clean the air intake screen as described in Section 12.1 “Cleaning the Air Intake Screen.”
4. Install the clean air intake screen by applying equal pressure along all sides of the screen.
5. Install all 9 screws to secure the screen to the system.





# Functional Description

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This appendix provides functional descriptions of the hardware and software components and contains the following sections:

- Section A.1 “System Overview” on page A-1
- Section A.2 “System Packaging” on page A-2
- Section A.3 “Software” on page A-5
- Section A.4 “Device Hot-Plug Procedures” on page A-6
- Section A.5 “CPU/Memory Board” on page A-7
- Section A.6 “I/O Assemblies” on page A-9
- Section A.7 “Power Supplies” on page A-12
- Section A.8 “Fan Trays” on page A-13
- Section A.9 “System Controller Board” on page A-14

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## A.1 System Overview

The Sun Fire E6900 system has card cage slots for the System Controller boards and the CPU/Memory boards in the front of the system. In the rear of the system are slots for the I/O boards and the Repeater boards (FIGURE A-1).

In the Sun Fire E4900 system, all boards are located in the rear of the system (FIGURE A-2).

All systems feature shared-memory multiprocessors and most of the same boards and operating software.

The power supplies of the Sun Fire E6900 and Sun Fire E4900 systems are different and not interchangeable..

Information about various boards in the system is presented later in this appendix.

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## A.2 System Packaging

This section describes the features of the system enclosures.

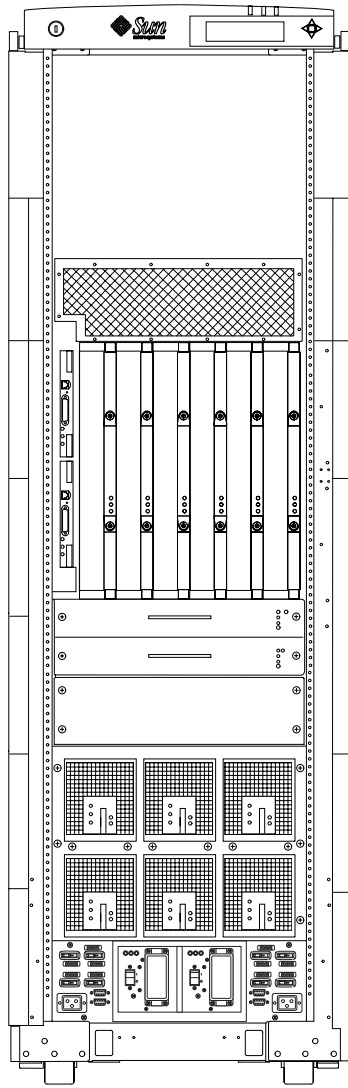
### A.2.1 Sun Fire E6900 System

TABLE A-1 lists the parts of the system in the front view and rear view.

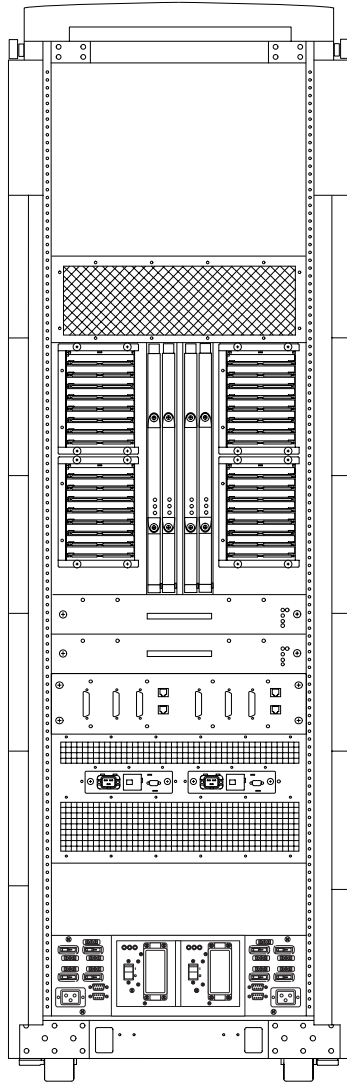
**TABLE A-1** Sun Fire E6900 System Components

<b>Front of the system</b>	<b>Rear of the System</b>
Up to 6 CPU/Memory boards	Up to 4 I/O assemblies
2 fan trays	Up to 4 Repeater boards
2 to 6 power supplies	2 fan trays
Up to 2 System Controller boards	

FIGURE A-1 shows the front and rear views of the Sun Fire E6900 system.



Front view



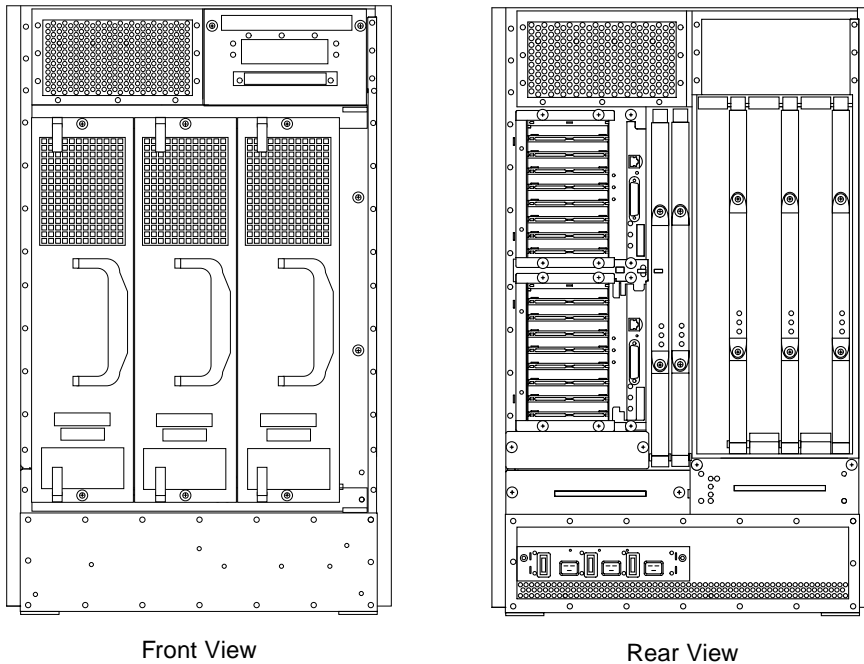
Rear view

**FIGURE A-1** Sun Fire E6900 System—Front and Rear Views

## A.2.2 Sun Fire E4900 System

At the rear of the system there are slots for the following:

- Up to two I/O assemblies
- Up to two System Controller boards
- Two Repeater boards
- Up to three CPU/Memory boards
- Up to three fan trays
- AC input box



**FIGURE A-2** Sun Fire E4900 System—Front and Rear Views

---

## A.3 Software

### A.3.1 System Controller Software

The system controller software is new to this product. Some of the functionality of the system controller software includes:

- Powering on boards, fan trays, power grids, or the entire system
- Hot-plugging or hot-swapping components
- Providing configuration control
- Providing environmental status
- Rearranging domains
- Changing the system controller password

### A.3.2 FrameManager Software

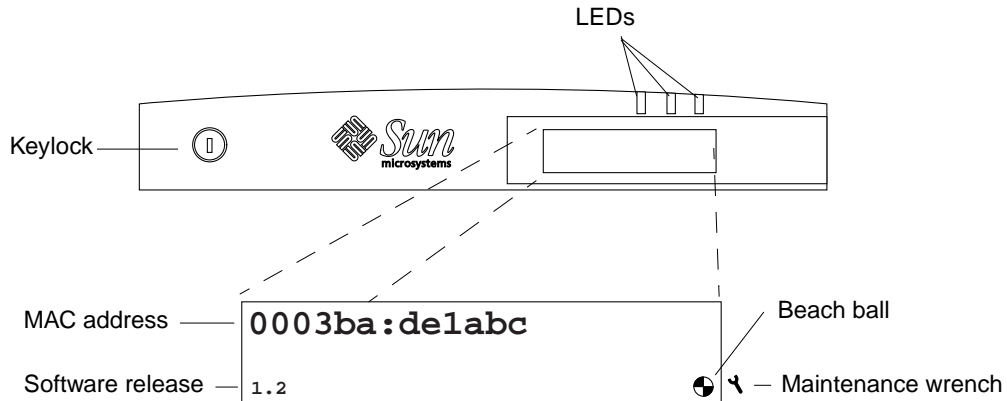
The FrameManager is an LCD display that is located in the top of the system cabinet. The primary function of the FrameManager is to display the faults or alerts of the RTUs/RTSs, cabinet fan trays, and the FrameManager in the cabinet.

The LCD display shows the following information:

- FrameManager MAC-address
- FrameManager software version
- Beach ball or wrench

**TABLE A-2** FrameManager LCD Displays

LCD display	Meaning
Spinning beach ball	FrameManager is successfully booted and is running in operating mode.
Frozen beach ball	FrameManager booted but then failed. FrameManager will start rebooting in about 4 seconds.
Spinning wrench	FrameManager or software fault and the FrameManager is now in maintenance mode or the FrameManager booted up in maintenance mode. Reboot FrameManager by powering off both cabinet fan trays, wait 10 seconds and power the fan trays back on. If wrench is still in the display, replace the FrameManager.



**FIGURE A-3** FrameManager Software Release 1.2 LCD Display

The FrameManager manages three LEDs: power, fault, and service (TABLE A-3)

**TABLE A-3** FrameManager LED Functions

LED	Function	Operation
Activated LED (green)	Power	On when the RTS has been commanded to enable switched power.
Fault LED (amber)	Fault	On only when a fault condition exists somewhere in the frame.
OK to remove LED (amber)	Service	On when any of the following conditions are met: <ul style="list-style-type: none"> <li>• A fan tray is detected and its service indicator is lit.</li> <li>• An RTS module is detected and it has a fault.</li> <li>• A fault is detected in the top cap or a remote command caused the service LED to be lit.</li> </ul>

## A.4 Device Hot-Plug Procedures

The power supplies and fan trays are hot-pluggable. When a device is hot-pluggable, it does not require intervention from the Solaris operating environment. As long as you power off the device using the system controller software and the amber OK to remove LED is lit, you can safely remove the device from the system.

When you hot-plug a fan tray or power supply, you must install a replacement within one minute of removing the component from the system. The amber OK to remove LED must be on before you can safely remove the device.

---

## A.5 CPU/Memory Board

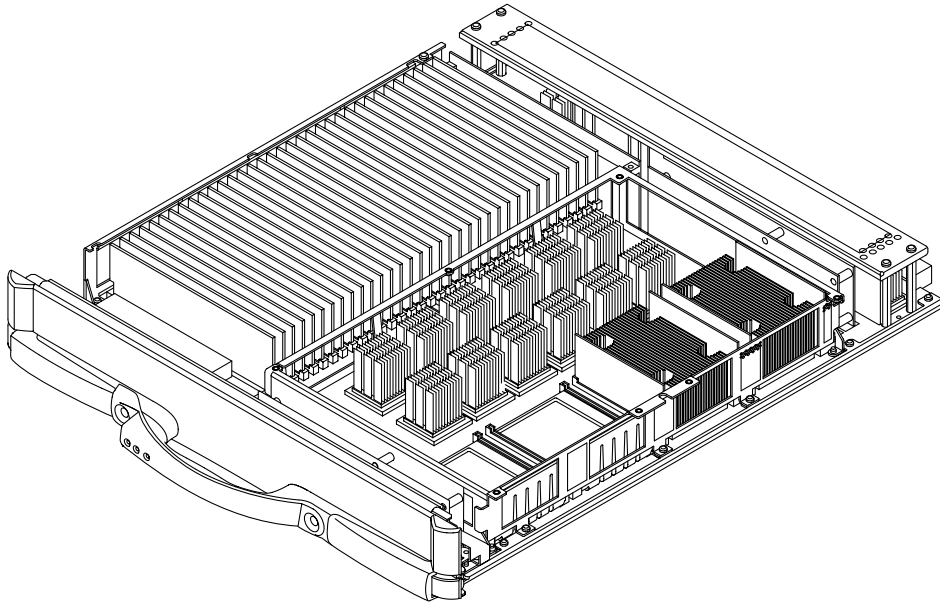
The CPU/Memory board supports up to four CPUs, eight banks of Ecache, and 32 DIMMs (two DIMM banks of four DIMMs per bank for each CPU).

When you remove the CPU/Memory board to install components on it, you must install a CPU/Memory filler panel (which covers the board slot) or a filler board into the board slot within one minute of removing the board. The filler board or filler panel prevents the system from overheating.

If you remove two CPU/Memory boards to swap components between the two boards, you must install a filler panel, which covers one board slot, and install a filler board in the other CPU/Memory board slot.

You must install a filler board in all other empty CPU/Memory board slots.

FIGURE A-4 illustrates the CPU/Memory board with the CPU processor and Ecache module cover removed. Note that two Ecache modules flank each side of the CPU processor.



**FIGURE A-4** CPU/Memory Board With the Cover Removed

TABLE A-4 shows the CPU/Memory board slot locations.

**TABLE A-4** CPU/Memory Board Slot Locations

System	Number of CPU/Memory Board Slots	Slot Numbers	Location
Sun Fire E6900 system	6	SB0–SB5	Front
Sun Fire E4900 system	3	SB0, SB2, SB4	Rear

**Note** – Board slot numbers are marked on the chassis.



## A.5.1 CPU Processors

Each CPU/Memory board supports four CPU processors. If you do not have all four CPU processors installed, you must have a CPU processor filler panel to cover the unused CPU processor land area. This special filler panel prevents overheating of the installed CPU processors by creating an air baffle. These are factory installed and are not field FRUs or field servicable.

## A.5.2 Ecache Modules

Each CPU processor is flanked by two Ecache modules, totaling eight Ecache modules per CPU/Memory board. These are not FRUs or field servicable

## A.5.3 DIMMs

The CPU/Memory board has 32 DIMM (dual inline memory module) slots, organized as eight banks of four DIMMs per bank. You must install DIMMs in full banks. There are eight DIMMs (two banks of DIMMs) per corresponding CPU processor.

---

## A.6 I/O Assemblies

Two types of I/O assemblies are available: the PCI/PCI+ I/O assembly and the Sun Fire Link™ I/O assembly. The Sun Fire E6900 system is the only system which will supports the Sun Fire Link. The Sun Fire Link assemble supports only the CompactPCI I/O boards, as well as the Sun Fire Link. TABLE A-5 shows the I/O assembly slot locations for all systems.

**TABLE A-5** I/O Assembly Slot Locations

System	Slot Numbers	Slot Location
Sun Fire E6900 system	IB6, IB7, IB8, and IB9	Rear
Sun Fire E4900 system	IB6, IB8	Rear

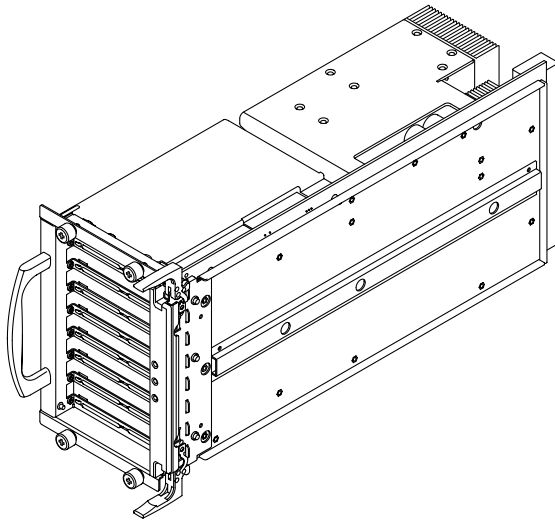
When you remove the PCI I/O assembly to install components on it, you must install a PCI I/O assembly filler panel, which covers the assembly slot and prevents the system from overheating. The card slots in the PCI I/O assembly must have either a card or a filler board installed in them.

When you install an I/O assembly into the system, you must install the PCI I/O assembly in the bottom slots and the Sun Fire Link assembly in the top slots for cooling purposes.

## A.6.1 PCI/PCI+ I/O Assembly

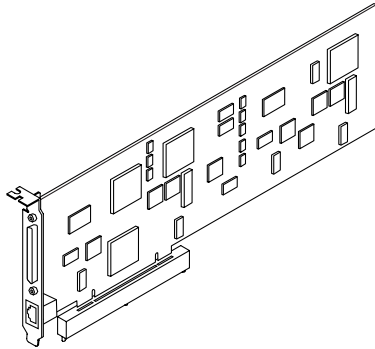
The PCI/PCI+ I/O assembly has eight slots. Six slots accommodate full-length PCI I/O cards. Two slots accommodate short PCI cards. You can install short PCI I/O cards in any of the full-length PCI I/O slots as well.

FIGURE A-5 shows the PCI/PCI+ I/O assembly.



**FIGURE A-5** PCI/PCI+ I/O Assembly

FIGURE A-6 shows a PCI card.



**FIGURE A-6** PCI Card

TABLE A-6 describes the PCI I/O assemblies.

**TABLE A-6** PCI I/O Assemblies

I/O Assembly	Description
PCI I/O Assembly	<p>8 PCI slots. The PCI I/O assembly has 6 slots for full-length PCI I/O cards and 2 short slots for short PCI I/O cards. You can install short PCI cards in any of the 6 full-length slots as well.</p> <p>Peak I/O throughput for the full-length PCI I/O slots (0, 1, 2, 4, 5, and 6) is 33 MHz, 64-bit and 5V I/O. Peak I/O throughput for the short PCI I/O slots (3 and 7) is 66/33 MHz, 64-bit, and 3.3V I/O.</p>

TABLE A-7 describes the PCI+ I/O assemblies.

**TABLE A-7** PCI+ I/O Assemblies

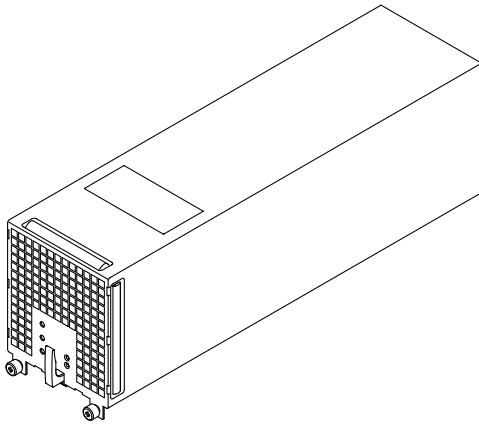
I/O Assembly	Description
PCI+ I/O Assembly	<p>8 PCI+ slots. Six slots for full-length PCI I/O cards, and two short slots for short PCI I/O cards. Short PCI cards can be installed in any of the six full-length slots as well.</p> <p>Peak I/O throughput for the full-length PCI I/O slots (2, 3, 4, 5, 6, and 7) is 66/33 MHz, 64-bit, and 3.3V I/O. Peak I/O throughput for the short PCI+ I/O slots (0 and 1) is 33 MHz, 64-bit, and 3.3V I/O.</p>

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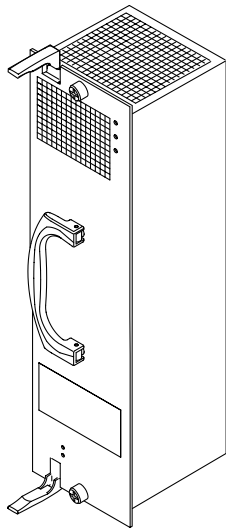
## A.7 Power Supplies

There are two types of power supplies. The Sun Fire E6900 has one type of power supply and the Sun Fire E4900 system has the another type of power supply. The two systems power supplies are not interchangeable. Both types are hot-pluggable and, depending on the configuration, are redundant power supplies.

The power supplies provide 56 VDC to all system boards, except the system controller. The power supplies provide 55 VDC to the system controller, and 56 VDC is distributed to the fan trays. Current sharing between power supplies provides redundant power.



**FIGURE A-7** Power Supply for the Sun Fire E6900 Systems



**FIGURE A-8** Power Supply for the Sun Fire E4900 System

## A.8 Fan Trays

All systems have fan trays that cool all components in the system. TABLE A-8 lists the number of fan trays in the systems.

**TABLE A-8** Number of Fan Trays, CPU Fan Trays, and Blower Assemblies

System Type	Total Number of Fan Trays and Blower Assemblies
Sun Fire E6900 system	4 fan trays
Sun Fire E4900 system	3 fan trays

The Sun Fire E4900 system has three fan trays: a CPU fan tray, an I/O fan tray (which cools all components in the system except for the CPU) and a third redundant fan tray (which provides cooling if either the CPU fan tray or I/O fan tray fails.)

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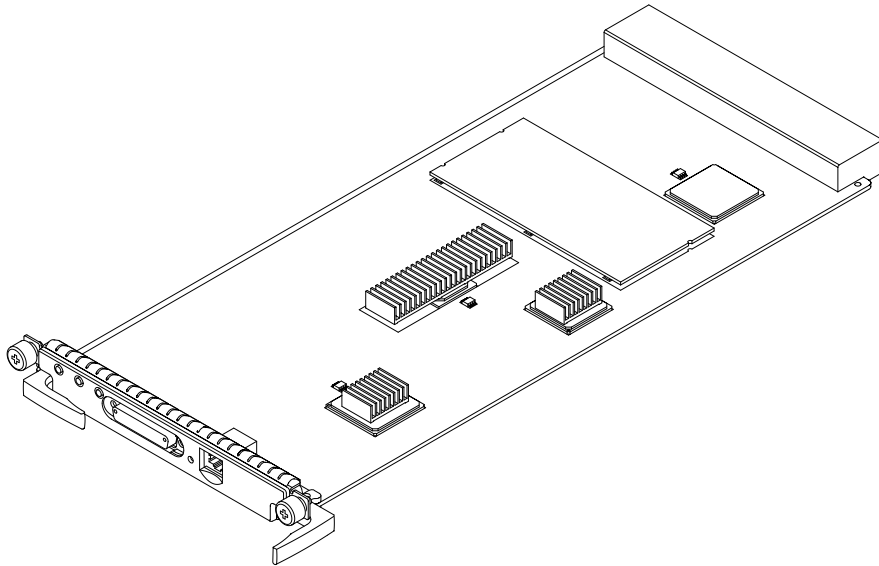
## A.9 System Controller Board

The System Controller board contains the system clock and a system controller. One System Controller board is required per system. One additional System Controller board can be installed for redundancy in all systems.

The System Controller board has the following features:

- Redundant System Controller board
- Virtual domain keyswitches
- Network Solaris console for each domain
- Virtual time-of-day for each domain
- Environmental monitoring

FIGURE A-9 illustrates the System Controller board for the E6900/E4900 systems.



**FIGURE A-9** System Controller Board—E6900/E4900 Systems

# System Serial Number Locations and Rules for System Configuration

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Some of the following rules are suggestions for optimizing your system. Other rules are strictly required and are marked with the notation “Requirement” or “Maximum.”

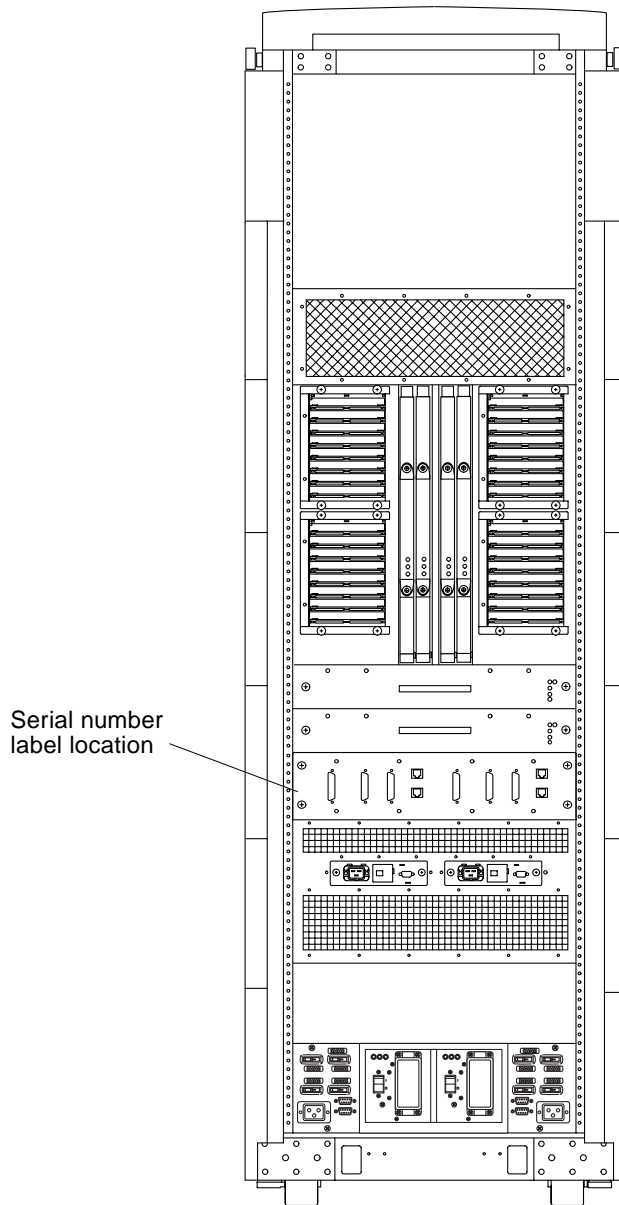
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## B.1 System Serial Number Locations

Your system serial number is needed whenever you make a service call.

### B.1.1 Location for the Sun Fire E6900 System

The serial number location is in the rear of the system, to the left of the patch panel (FIGURE B-1).

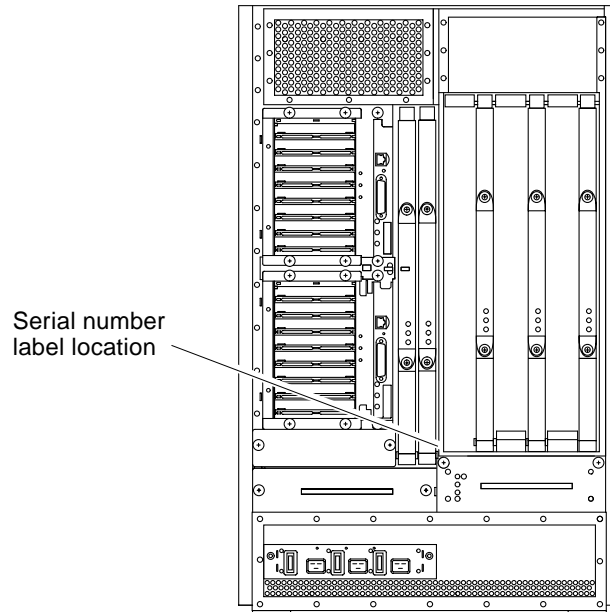


**FIGURE B-1** Serial Number Location for the Sun Fire E6900 System—Rear

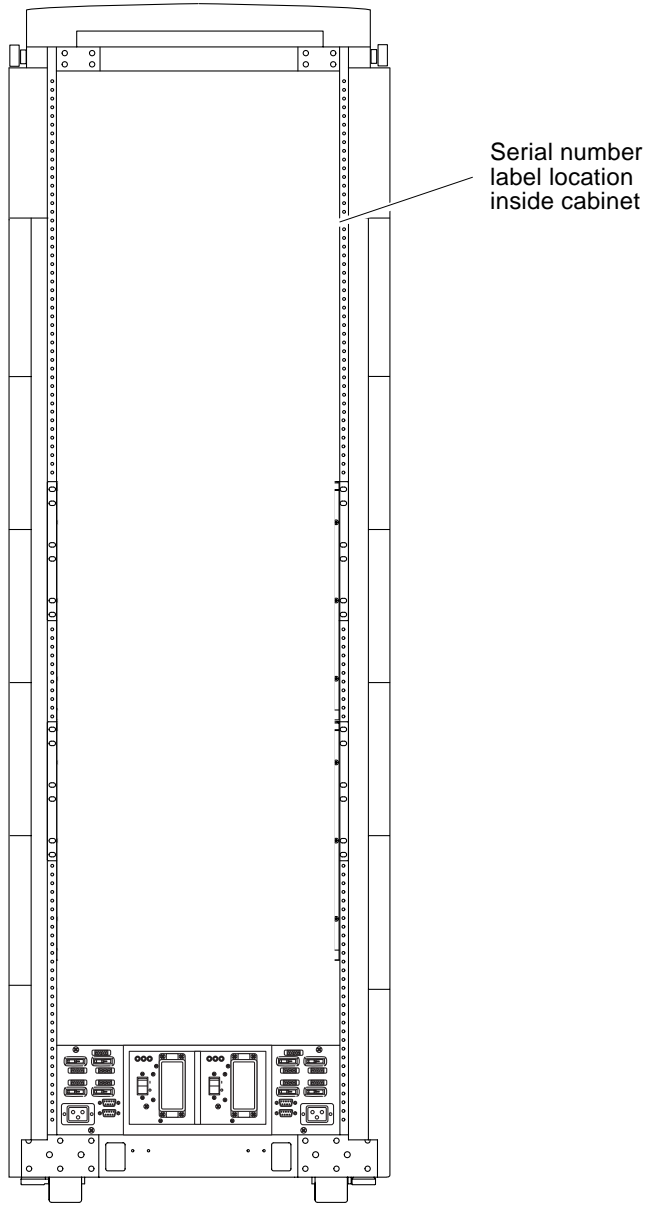


## B.1.2 Location for the Sun Fire E4900 System

The serial number location is in the rear of the system, on the side of the chassis, between the Repeater boards and the CPU/Memory boards.



**FIGURE B-2** Serial Number Location for the Sun Fire E4900 System—Rear



**FIGURE B-3** Sun Fire Cabinet System Serial Number Location—Rear

---

## B.2 Boards and Assemblies

### B.2.1 CPU/Memory Boards

1. **Requirement**—Install CPU/Memory boards in their designated slots:
  - Slots SB0–SB5 for the Sun Fire E6900 system
  - Slots SB0, SB2, and SB4 in the Sun Fire E4900 systems
2. **Requirement**—For the Sun Fire E6900 system, the CPU/Memory boards are populated from right to left, beginning with SB5 and ending with SB0. For the Sun Fire E4900 systems, the CPU/Memory boards are populated from right to left, beginning with SB2 and ending with SB0.
3. **Requirement**—For the Sun Fire E4900 systems, if you remove two CPU/Memory boards, you must install a filler board in one board slot and install a filler panel covering the second board slot within one minute of removing the boards to prevent overheating. You must not install two filler panels.
4. **Requirement**—Mixing CPU/Memory board in the same chassis is supported.

#### B.2.1.1 Memory Modules

1. **Requirement**—Use the DIMM part number assigned to these systems. Do not use other types of memory modules.
2. **Requirement**—Insert DIMMs in a bank across from the controlling CPU processor.
3. **Requirement**—Each DIMM bank must be fully populated with the same capacity DIMM.
4. **Requirement**—Install the larger capacity DIMMs into banks before installing the smaller capacity DIMMs into banks.
5. **Requirement**—The minimum number of DIMMs you can install per CPU processor is four DIMMs or one bank.
6. **Requirement**—If the number of CPU processors on each CPU/Memory board are the same, place DIMM banks on CPU/Memory boards that have fewer populated DIMM banks before placing DIMMs on CPU/Memory boards that already have more populated DIMM banks.

7. **Requirement**—If some CPU/Memory boards have more CPU processors than others, place DIMMs in DIMM banks on the board with the most CPU processors. There will be CPU processors without corresponding DIMMs on other boards.

## B.2.2 I/O Assemblies

1. **Requirement**—Install I/O assemblies in their designated slots:
  - Slots IB6 – IB9 in the Sun Fire E6900 system
  - Slots IB6 and IB8 in the Sun Fire E4900 systems
2. **Requirement**—For the Sun Fire E6900 system, you must install the PCI/PCI+ I/O assembly in the bottom locations, IB7 and IB6, and the Sun Fire Link I/O assembly in the top locations, IB9 and IB8, for cooling purposes. If you have four I/O assemblies of the same type, you can install them in either the top or bottom I/O locations, IB6 - IB9. Populate the I/O assemblies from right to left. That is, populate I/O locations IB6 and IB8 before you populate the left I/O locations, IB7 and IB9.
3. **Requirement**—For the Sun Fire E4900 systems, you may install the PCI/PCI+ I/O assembly in either the top or bottom I/O locations, IB6 or IB8.
4. **Requirement**—If you are not replacing the I/O assembly, install a filler panel to cover the slot before powering on, when you remove the I/O assembly.

### B.2.2.1 PCI Cards

1. **Requirement**—Install full-length PCI cards in the six full-length PCI card slots.
2. **Requirement**—Install short PCI cards in the two short PCI card slots. Additionally, you can install short PCI cards in any of the six full-length PCI card slots.
3. **Requirement**—PCI boards longer than 6.6 inches (167 mm) must be installed in a long PCI card slot.
4. **Requirement**—Install PCI filler cards in all empty PCI slots.

### B.2.2.2 CompactPCI Cards

The Sun Fire Link I/O assembly supports up to two CompactPCI cards. The Sun Fire E6900 systems support up to two Sun Fire Link I/O assemblies.

1. **Requirement**—Install CompactPCI filler cards in all empty CompactPCI slots.

2. **Requirement**—Install CompactPCI cards in their proper slots, 3.3V I/O cards in slots 0 and 1.

## B.2.3 Repeater Boards

1. **Requirement**—Install the Repeater boards in their designated slots:
  - Slots RP0–RP3 in the Sun Fire E6900 system
  - Slots RP0 and RP2 in the Sun Fire E4900 system
2. **Requirement**—In the Sun Fire E6900 system, Repeater boards work in pairs, pair RP0 and RP1 and pair RP2 and RP3. A minimum of one pair of Repeater boards must be installed.
3. **Requirement**—For the Sun Fire E4900 system, Repeater boards work individually, rather than in pairs, install a minimum of two Repeater boards, RP0 and RP2.

## B.2.4 System Controller Board

1. **Requirement**—You must have at least one System Controller board in the system.
2. **Requirement**—Install the System Controller boards in their designated slots: SSC0 (lower slot for the master System Controller board) and SSC1 (upper slot for the redundant System Controller board). The second System Controller board is a redundant System Controller board that supports clock and administrative failover if the primary System Controller board fails.

---

## B.3 Filler Boards and Filler Panels

For a description of the functionality of filler boards and filler panels, see Section 1.4 “Filler Boards and Filler Panels” on page 1-5. TABLE B-1 describes the rules you must follow when you hot-plug boards or devices, using filler boards and filler panels.

**TABLE B-1** Overheating Precautions Using Filler Panels and Filler Boards

<b>If you have</b>	<b>Do the following</b>
I/O assembly	Install a filler panel within one minute when removing the assembly from a system, in order to prevent the system from overheating.
Empty PCI card slots	Install PCI filler boards in all empty PCI card slots.
Empty CompactPCI slots	Install CompactPCI filler boards in all empty CompactPCI card slots.
CPU/Memory board	If the system is to be operating without the CPU/Memory board installed, install a filler board or panel within one minute in order to prevent the system from overheating. If two CPU/ Memory boards must be removed, use a CPU filler panel over one board slot and a filler board in the second board slot to prevent the system from overheating.
System Controller board	A filler board covers the empty slot for one of the System Controller boards. If you install a redundant System Controller board, remove the System Controller filler board.
All other system boards	Replace boards in order to prevent the system from overheating.
All other system boards	Install a filler board for EMI protection and for cooling purposes.
Empty power supply slots	Install power supply filler boards in empty power supply slots in order to prevent overheating.
Fan trays	Replace fan trays or install a filler panel, if removing the fan tray from a system, to avoid overheating the system.

---

## B.4 Fan Trays

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**Note** – If the redundant fan tray is not installed, the other fans will run at high speed. This is normal operation, not an indication of a fault.

---

1. **Requirement** —You must replace a defective fan tray assembly in order to prevent the system from overheating in non-redundant configured systems.
2. **Requirement** —The Sun Fire E6900 system needs a minimum of one fan tray in the front (FT1) and two fan trays in the rear (FT0 and FT2). The bottom CPU fan tray (FT3) is redundant.
3. **Requirement** —The Sun Fire E4900 system needs two of the three fan trays to collectively cool the system, FT1 and FT2. The third fan tray, FT0, is redundant.

---

## B.5 Power Supplies

The power supplies provide 56 VDC to the system.

1. **Requirement**—You must install power supply filler boards in all empty power supply slots for all systems.
2. **Requirement**—The Sun Fire E6900 system has two power grids, grid 0 and grid 1. Power supplies PS0, PS1, and PS2 are assigned to power grid 0, and power supplies PS3, PS4, and PS5 are assigned to power grid 1. You must have a minimum of two power supplies for each power grid, for a minimum of four power supplies installed.
3. **Requirement**—The Sun Fire E4900 system have only one power grid, grid 0. You must have a minimum of two power supplies installed. PS2 is the redundant power supply.

---

## B.6 Connecting Cables

### B.6.1 Ethernet

The only Ethernet port is on the System Controller board. The Ethernet connector (RJ-45) allows access to the chassis port and the domain break shell with 10/100 Mbps Ethernet. To provide the system with external Ethernet connections, you must install a network I/O card in an I/O assembly.

### B.6.2 Serial Port

1. **Requirement**—The only serial port is on the System Controller board. The serial port connector (DB-25) allows console access from a terminal or modem. For the Sun Fire E4900 system, you must attach a Y serial cable to the master System Controller board serial port to access TTYa and TTYb ports. TTYa is used for console access use and TTYb is to be connected to the FrameManager. The Sun Fire E6900 system uses the patch panel to provide access to TTYa and TTYb ports.



## Illustrated Parts Breakdown

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This appendix lists and illustrates the replacement parts (field-replaceable units or FRUs) covered in this document and the jumper settings for the System Controller boards.

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### C.1 List of Replacement Parts

The following sections list the part numbers of the replacement parts for all systems, their part numbers, and illustrations.

## C.1.1 Sun Fire E6900 System Replacement Parts

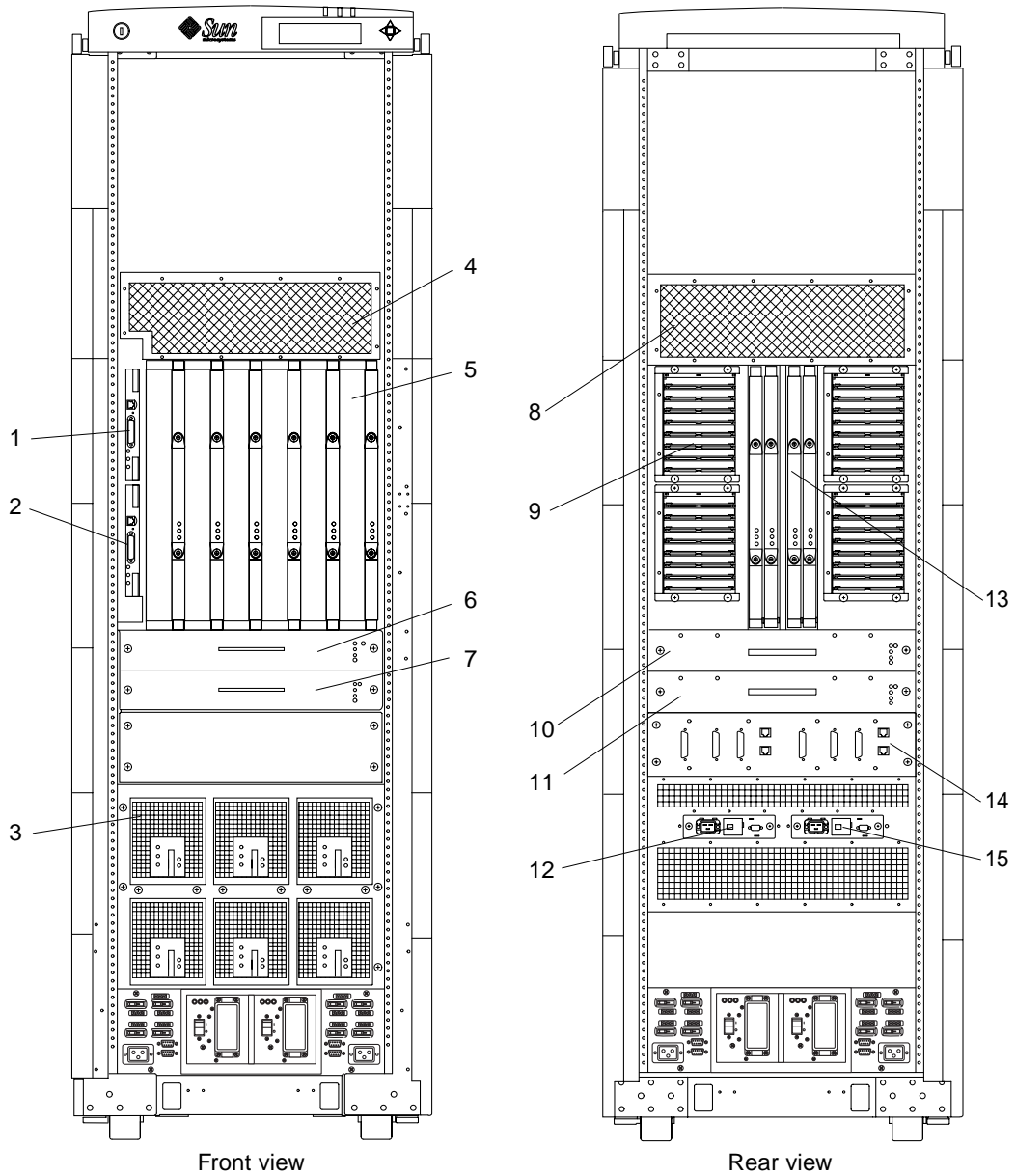
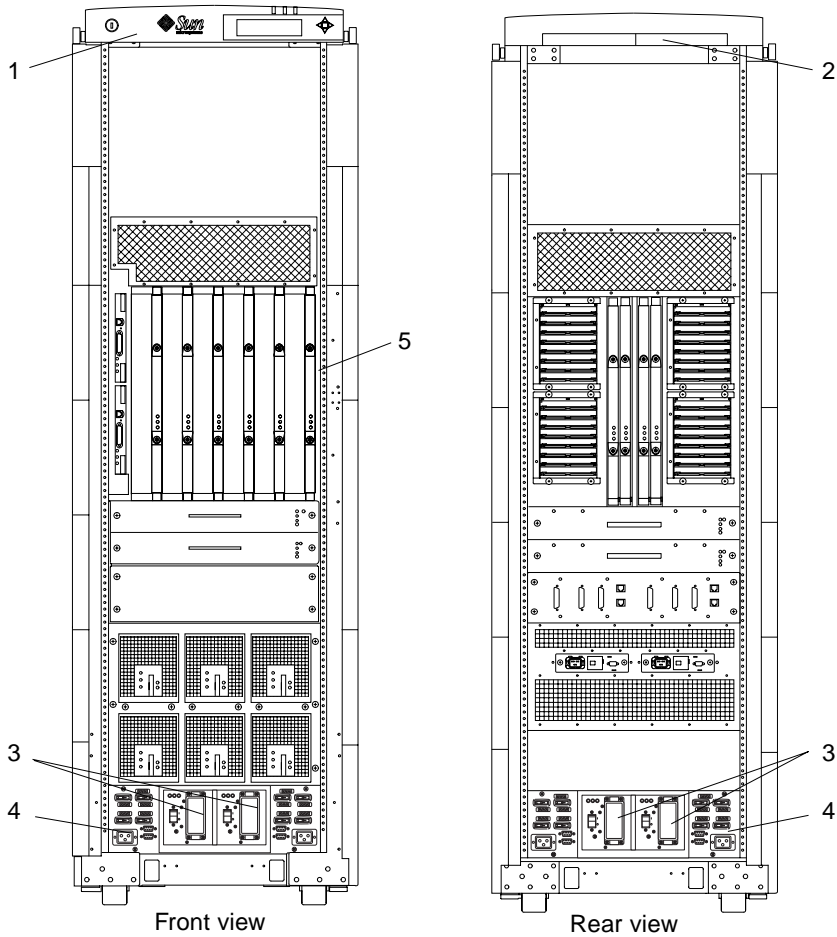


FIGURE C-1 Sun Fire E6900 System—Front and Rear Views

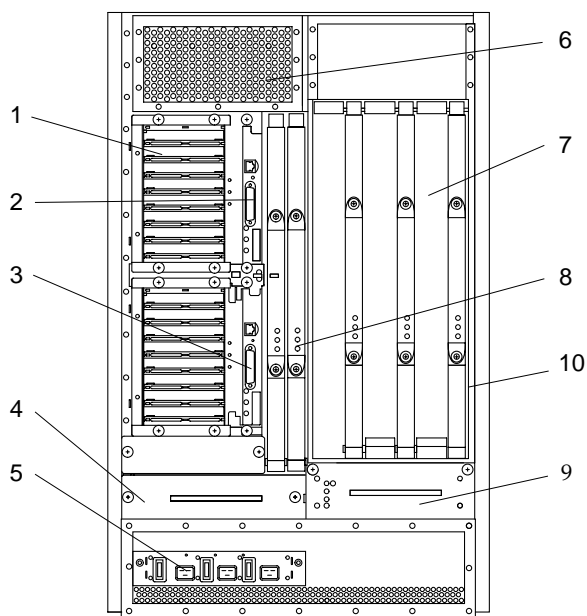
Key	Description
1	System Controller board, SSC1
2	System Controller board, SSC0
3	Power supplies (up to 6), PS0 - PS5
4	Air inlet screen
5	CPU/Memory boards w/ 2 CPUs, 1.05 GHz, 0 MB memory (up to 6), SB0-SB5 CPU/Memory boards w/ 4 CPUs, 1.05 GHz, 0 MB memory CPU/Memory boards w/ 2 CPUs, 1.2 GHz, 0 MB memory CPU/Memory boards w/ 4 CPUs, 1.2 GHz, 0 MB memory
6	Fan tray, FT1
7	Fan tray, FT3
8	Air outlet screen
9	I/O assemblies (up to 4), IB6-IB9, PCI
10	Fan tray, FT0
11	Fan tray, FT2
12	AC input box, AC1
13	Repeater boards (up to 4), RP0-RP3
14	Patch panel
15	AC input box, AC0 System centerplane Power centerplane Fan centerplane ID source board Cable, system centerplane power Cable, fan tray centerplane power Cable, AC input tray Cable, peripherals Cable, RJ-45 shielded Ethernet



**FIGURE C-2** Sun Fire E6900 System Cabinet

Key	Description
1	FrameManager
2	Fan trays (up to 2)
3	RTS Module
4	RTU Assembly
5	EMI Clip (hidden by SB5, on right side of chassis)

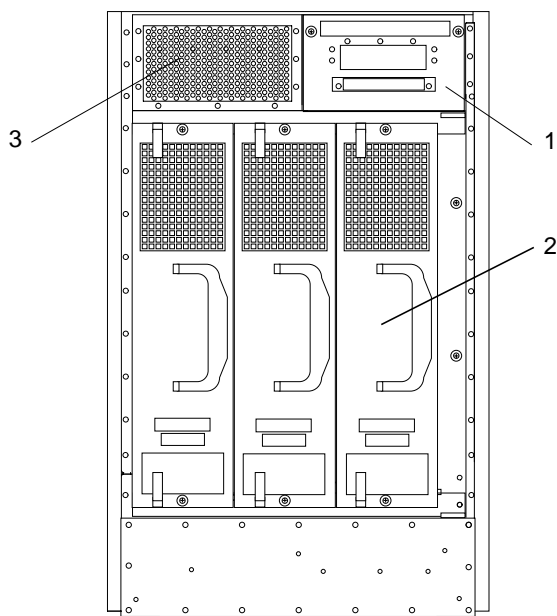
## C.1.2 Sun Fire E4900 System Replacement Parts



**FIGURE C-3** Sun Fire E4900 System—Rear View

Key	Description
1	I/O assemblies (up to 2), IB6, IB8, PCI
2	System Controller board, SSC1
3	System Controller board, SSC0
4	Fan tray, FT0
5	AC input box, AC
6	Air outlet screen
7	CPU/Memory boards w/ 2 CPUs, 1.05 GHz, 0 MB memory (up to 3), SB0, SB2, SB4 CPU/Memory boards w/ 4 CPUs, 1.05 GHz, 0 MB memory CPU/Memory boards w/ 2 CPUs, 1.20 GHz, 0 MB memory CPU/Memory boards w/ 4 CPUs, 1.20 GHz, 0 MB memory

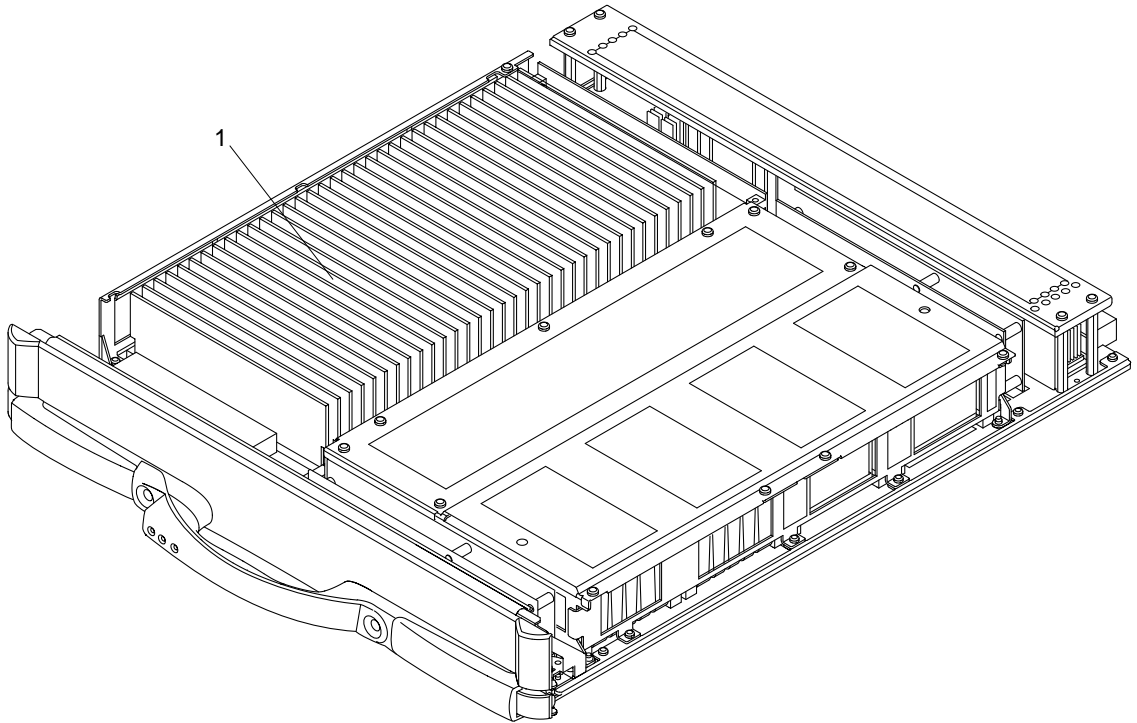
Key	Description
8	Repeater boards (up to 2), RP0, RP2
9	Fan tray, FT2
10	EMI Clip (hidden by SB4, on right side of chassis)



**FIGURE C-4** Sun Fire E4900 System—Front View

Key	Description
1	Fan tray, FT1
2	Power supplies (up to 3), PS0–PS2
3	Air inlet screen
	Centerplane
	ID source board
	Cable, system centerplane power
	Cable, fan, and I/O centerplane

## C.1.3 CPU/Memory Board Replacement Parts



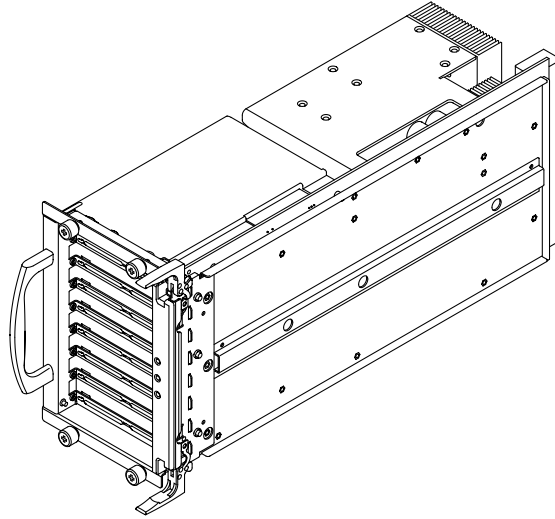
**FIGURE C-5** CPU/Memory Board

Key	Description
1	DIMMs

Description	Size
DIMM	512 MB
DIMM	1.0 GB

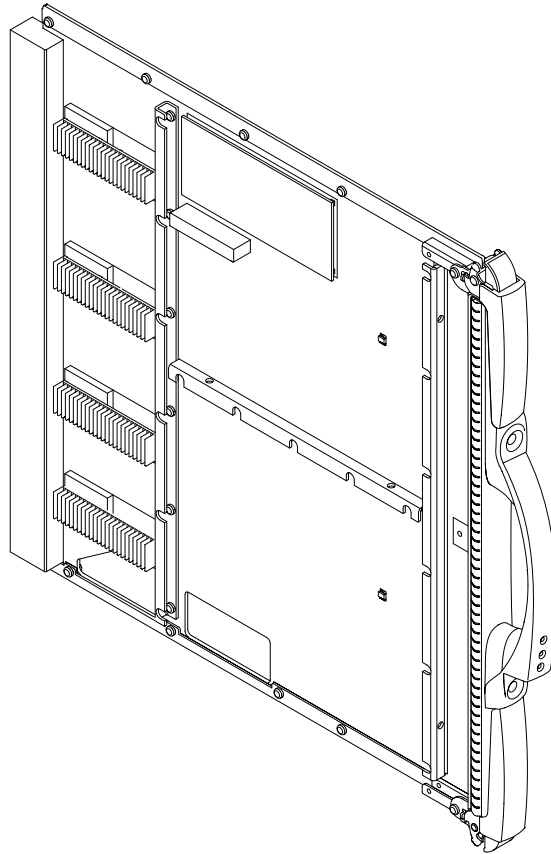
## C.1.4 I/O Assembly Replacement Parts



**FIGURE C-6** PCI/PCI+ I/O Assembly

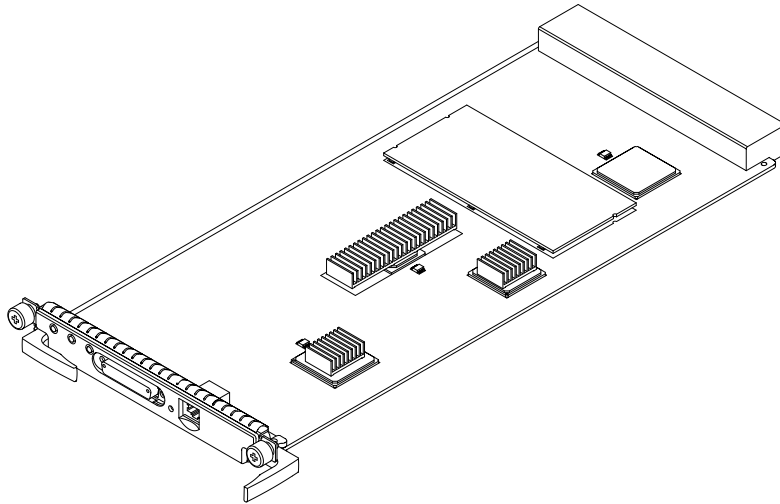


## C.1.5 Repeater Board Replacement Part



**FIGURE C-7** Repeater Board

## C.1.6 System Controller Board

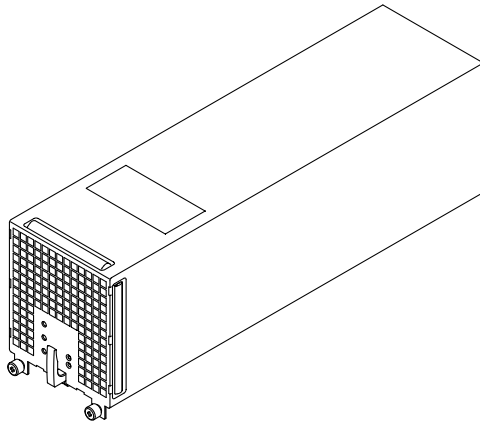


**FIGURE C-8** System Controller Board—E6900/E4900 Systems

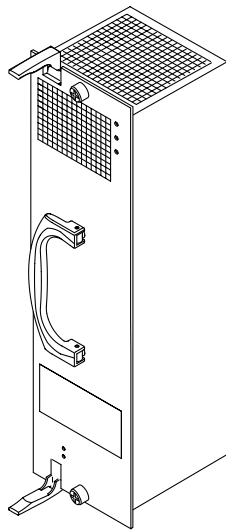
### System Controller board (F501-5407) Jumper Settings

Jumper	Pins	Settings	Description
J1301	1-2	In	Select ROMBO
J1301	2-3	In	Select FEPROM (default)
J1303	1-2	In	FEPROM write enable (default)
J1303	1-2	Out	FEPROM write protect
J2303	1-2	In	RS232
J2303	2-3	In	RS423 (default)
J2304	1-2	In	RS232
J2304	2-3	In	RS423 (default)

## C.1.7 Power Supply Replacement Parts



**FIGURE C-9** Power Supply for the Sun Fire E6900 Systems



**FIGURE C-10** Power Supply for the Sun Fire E4900 System

## C.1.8 Filler Boards and Filler Panels Replacement Parts

See the related chapters of this document for removal and installation instructions for the board or device.

<b>Filler Board or Filler Panel</b>	<b>System</b>
CPU/Memory board filler board	All systems
Service CPU/Memory board filler panel	All systems
System Controller filler panel	All systems
Service I/O assembly filler panel	All systems
Short PCI card filler board	All systems
Long PCI card filler board	All systems
Fan filler panel	Sun Fire E4900 system
Power supply filler panel	Sun Fire E6900 systems
Power supply filler panel	Sun Fire E4900 system

## C.1.9 Cables Replacement Parts

<b>Cable</b>	<b>System</b>
Cable, universal power cord	Sun Fire E4900 system and Sun Fire cabinet
Cable, universal power cord Y-splitter, 300 cm	Sun Fire cabinet
Cable, AC input power (North American, Asian), 350 cm	Sun Fire E6900 system and Sun Fire cabinet
Cable, AC input power (international), 350 cm	Sun Fire E6900 system and Sun Fire cabinet
Cable, AC power, 61 cm	Sun Fire E6900 system
Cable, AC power, 150 cm	Sun Fire E6900 system
Cable, AC power, 300cm	Sun Fire E6900 system
Cable, power, 230V 6 to 15 pin IEC	Sun Fire E4900 system (USA only)
Cable, serial breakout 25M to 25F, 25F	Sun Fire E4900 system
Cable, ID box/Sequencer	Sun Fire E6900 system and Sun Fire cabinet
Cable, Keyswitch	Sun Fire E6900 system and Sun Fire cabinet

# Glossary

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<b>CPU</b>	Central processing unit. An Ultra SPARC IV processor.
<b>CPU/Memory board</b>	The board containing up to four Ultra SPARC IV processors, eight Ecache modules, and four memory banks.
<b>DIMM</b>	Dual inline memory module. A small card with DRAM chips on its, used as main memory on the CPU/Memory board.
<b>domain</b>	A set of CPU/Memory boards and I/O assemblies that can freely communicate with each other. However, access to other boards is limited.
<b>DRAM</b>	Dynamic random access memory. The type of memory chip is used as main memory.
<b>dual inline memory module</b>	See DIMM.
<b>Ecache module</b>	External cache memory.
<b>FRU</b>	Field-replaceable unit or replacement part.
<b>I/O assembly</b>	The I/O assembly contains I/O cards such as network cards. There are two styles of I/O assemblies: PCI and CompactPCI. There are four I/O assemblies in the Sun Fire E6900 system and two I/O assemblies in the Sun Fire E4900 system.
<b>memory module</b>	See DIMM.
<b>POST</b>	Power-on self-test. This is the program that takes uninitialized system hardware and probes and tests its components, configures what seems worthwhile into a coherent initialized system, and hands it off to the OpenBoot™ PROM.
<b>Repeater board</b>	This board acts as a switch and connects multiple CPU/Memory boards and I/O assemblies together. In the Sun Fire E4900 system, you need only one Repeater board. However, in the Sun Fire E6900 system, the Repeater boards work in pairs.

**Sun Fire E6900 system** A 24-processor system installed in a cabinet.

**Sun Fire E4900 system** A 12-processor system.

**SRAM** Static random access memory. A type of high-speed memory device used for Ecache modules.

**System Controller board** A board containing a microSPARC® processor, which oversees operation of the system and provides clocks and the console bus.

**Ultra SPARC IV** The processor used in all systems comprising this family of systems.

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