Sun Fire™ 15K/12K Systems

Service Manual

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Declaration of Conformity

Compliance Model Number: 2080
Product Name: Sun Fire 15K/12K Systems

EMC

European Union

This equipment complies with the following requirements of the EMC Directive 89/336/EEC:

EN55022:1995/CISPR22:1997		Class A
EN55024:1998	EN61000-4-2	4 kV (Direct), 8 kV (Air)
	EN61000-4-3	3 V/m
	EN61000-4-4	1.0 kV Power Lines, 0.5 kV Signal Lines
	EN61000-4-5	1 kV Line-Line, 2 kV Line-Gnd Power Lines
	EN61000-4-6	3 V
	EN61000-4-8	3 A/m
	EN61000-4-11	Pass
EN61000-3-2:1995		Pass
EN61000-3-3:1995		Pass

Safety

This equipment complies with the following requirements of the Low Voltage Directive 73/23/EEC:
EC Type Examination Certificates:

EN60950:1992, 2nd Edition, Amendments 1,2,3,4,11	TÜV Product Service Certificate No. Z1A 01 07 17641 013
IEC 950:1991, 2nd Edition, Amendments 1,2,3,4	
Evaluated to all CB Countries	CB Scheme Certificate No. CB 01 07 17641 014

Supplementary Information

This product was tested and complies with all the requirements for the CE Mark.

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Preface

The *Sun Fire 15K/12K Systems Service Manual* provides guidelines and detailed instructions for replacing field-replaceable components on the Sun™ Fire 15K/12K Systems.

How This Book Is Organized

Chapter 1 provides component replacement guidelines, indicator descriptions, and hardware nomenclature.

Chapter 2 details the replacement procedures for the FrameManager assembly and the FrameManager extension.

Chapter 3 details the replacement procedures for the system power module and the 4 kW dual AC–DC power supplies.

Chapter 4 details the replacement procedures for the system fan trays.

Chapter 5 details the replacement procedures for the System Control (SC) CPU board and installation of the cPCI memory.

Chapter 6 details the replacement procedures for the System Control (SC) board.

Chapter 7 details the replacement procedures for the System Control peripheral board containing the DVD-ROM, hard drive, and audio tape peripherals.

Chapter 8 details the replacement procedures for the CPU (slot 0) board.

Chapter 9 details the replacement procedures for the I/O (slot 1) assemblies.

Chapter 10 details the replacement procedures for the board set carrier plate and identifies the carrier-plate configurations.

Chapter 11 details the replacement procedures for the centerplane support board of the system control expander board set.

Chapter 12 details the replacement procedures for the expander board of the system expander board set.

Chapter 13 details the replacement procedures for the Sun Fireplane interconnect assembly.

Chapter 14 details the replacement procedures for the fan backplane.

Chapter 15 details the replacement procedures for the power centerplane.

Chapter 16 details the replacement procedures for the system cables.

Chapter 17 details the replacement procedures for the mechanical components.

Chapter 18 provides procedures for the system components requiring periodic maintenance.

Appendix A provides a component serial number worksheet.

Appendix B details the information and safety labels used in the Sun Fire 15K/12K systems.

Appendix C provides a pictorial review of the Sun Fire 15K/12K systems components.

Using UNIX Commands

This document may not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See the following for this information:

- Documentation for the Solaris™ operating environment, which is at:

    `http://docs.sun.com`

- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1   Typographic Conventions

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`%` **`su`** `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename*.

Shell Prompts

TABLE P-2   Shell Prompts

Shell	Prompt
System Control (SC) Command	`sc%`
SC superuser, main SC	`sc#`
Domain superuser	`domain_name#`
SC superuser, spare SC	`sc_spare#`

Related Documentation

TABLE P-3   Related Documentation

Application	Title
Service	*Sun Fire 15K/12K Systems Read Me First*
Service	*Sun Fire 15K/12K Systems Getting Started*
Service	*Sun Fire 15K/12K Systems Unpacking Guide*
Service	*Sun Fire 15K/12K Systems Site Planning Guide*
Service	*Sun Fire 15K/12K Systems Hardware Installation and De-Installation Guide*
Service	*Sun Fire 15K/12K Systems Service Manual*
Service	*Sun Fire 15K/12K Systems Service Reference I–Nomenclature*
Service	*Sun Fire 15K/12K Systems Service Reference II–Component Numbering*
Service	*Sun Fire 15K/12K Systems Carrier Plate Configurations*

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Please include the title and part number of your document with your feedback:

Sun Fire 15K/12K Systems Service Manual, part number 806-3512-12

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CHAPTER **1**

Guidelines, Indicators, and Nomenclature

This chapter provides the following introductory information for the Sun Fire 15K/12K systems:

1.1 System Component Hot-Swap Guidelines

In the Sun Fire 15K/12K systems, hot-swapping a component refers to physically removing and replacing a component while the remaining system components are operational.

Note – The System Management Software (SMS) requires 30 seconds to recognize the removal of a hot-swappable component. The user should wait for a system response before installing a new replacement board.

The hot-swappable components in the system are listed as follows.

- System Control board
- Centerplane support board
- CPU board
- MaxCPU board
- hsPCI assembly
- System expander board
- Fan trays
- Power supplies
- System control peripheral board

1.2 Configuration Rules

The following rules apply when configuring components of the Sun Fire 15K/12K systems:

- Every system must be equipped with two centerplane support boards (CSB) in order to utilize full-width data, address, and response paths. If one CSB fails, there is an interruption in service. However, SMS recovers the domains and the remaining CSB runs in a degraded mode.
- Every system must be equipped with two System Control (SC) boards.
- Every system must be equipped with two SC peripheral boards.
- Every system must be equipped with eight fan trays.
- Every system must be equipped with six power supplies.

The following rules apply when configuring components on the CPU board:

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.

The United States government sets limits as to the server configuration exportable to certain destinations or certain customers. Server CPU upgrades must be ordered as standalone CPU upgrade options rather than spares. All upgrades must first be approved by Sun International Trade Services to ensure the system does not exceed

the legal limit for the destination (customer). The following message appears on the label on all CPU FRUs to alert all concerned that this FRU is for maintenance of the system only and should not be used to upgrade a system:

This assembly is for maintenance use only.
Not to be used to upgrade systems.
Use as system upgrades could violate
United States export regulations.

- All CPU modules must be the same speed.
- All external cache modules must be the same size.
- When configuring memory:
  - All sockets within a bank must be fully populated.
  - All DIMM sizes within a bank must be equal.

1.3 Testing the System

The Sun Fire 15K/12K systems use `setkeyswitch` to diagnose system problems by running `hpost`(1M) when posting a domain. The `hpost`(1M) diagnostic probes, configure and test the domain hardware, preparing the system to run OpenBoot™ PROM and subsequently the Solaris operating environment.

The Sun VTS™ diagnostics suite can be used as a verification of a dynamic system domain or an SC. To use the `sunvts`(1M) command, you must be logged into the host as superuser. Information about `sunvts`(1M) is located in `/opt/share/man/man1m.`

Verify the SMS is up and running by typing:

```
sc% showfailover -r
MAIN
```

This command explains the role of the SC. The value returned should be `MAIN` indicating that this SC is providing all resources for the Sun Fire 15K/12K systems. If you do not get this value, consult the *SMS Administration Guide*.

1.4 Reviewing System Temperatures

The temperature status can be checked at any time by using Sun™ Management Center software or the showenvironment command. At the command line type:

```
sc% showenvironment -p temps
```

See the showenvironment(1M) man page for further details.

TABLE 1-1   Temperature Levels

Component			Optimum	High Warning	High Critical	Overlimit
ASICs						
	Category I:	AR, SDC, DX, SBBC, CBH: IOA	< 80ºC	> 85ºC to 95ºC	> 95ºC to 105ºC	> 105ºC
	Category II:	PROC	< 80ºC	> 85ºC to 90ºC	> 90ºC to 95ºC	> 95ºC
	Category III:	SDI, AXQ, RMX, AMX, DMX, WCI, DARB	< 65ºC	> 70ºC to 80ºC	> 80ºC to 85ºC	> 85ºC
		Power supplies	< 65ºC	> 70ºC to 75ºC	> 75ºC to 80ºC	> 80ºC
		Proximity sensors	< 40ºC	> 45ºC to 50ºC	> 50ºC to 55ºC	> 55ºC

TABLE 1-2   Ambient Thermal Levels

Component	Low Critical	Low Warning	Optimum	High Warning	High Critical	Overlimit
Ambient	≤ 5ºC	> 5ºC to 15ºC	> 20ºC to 25ºC*	> 25ºC to 35ºC	> 35ºC	> 40ºC

* Fan reset point

1.5   Reviewing System Power

- Check the power status by using Sun™ Management Center software or the `showenvironment` command. To review, at the command line type:

```
sc% showenvironment -p volts
```

See the `showenvironment`(1M) man page for further details.

TABLE 1-3   Voltage and Current Limits

Voltage and Current	Low–Minimum	Acceptable Range	High–Maximum
PROC Core	-5%	Core voltage*	+5%
+1.5 V	x ≤ +1.4	+1.4 < x < +1.6	+1.6 ≤ x
+2.5 V	x ≤ +2.3	+2.3 < x < +2.7	+2.7 ≤ x
+3.3 V	x ≤ +3.0	+3.0 < x < +3.5	+3.5 ≤ x
+3.3 HK	x ≤ +3.0	+3.0 < x < +3.5	+3.5 ≤ x
+5.0 V	x ≤ +4.75	+4.75 < x < +5.25	+5.25 ≤ x
+12 V	x ≤ +11.4	+11.4 < x < +12.6	+12.6 ≤ x
-12 V	x ≤ -12.6	-12.6 < x < -11.4	-11.4 ≤ x
+5 V current		Each component must be within ± 50% of the average of all components in the group.	
+3.3 V current		Each component must be within ± 50% of the average of all components in the group.	
+1.5 V converter		Each component must be within ± 50% of the average of all components in the group.	

* Core voltage is processor-version dependent.

1.6 Hardware Indicators

The LED indicators provide current status information about the component directly associated with the indicator array. Indicators are arranged in a straight line, horizontal or vertical, with the green LED on the left or top (TABLE 1-4).

TABLE 1-4   LEDs

Symbol	LED Color	Indication	Operation
⏻	Green	Activation indicator	Component is powered on.
🔧	Amber	Service indicator	Service indicator is only used during initial startup.
◁▯	Amber	Removal indicator	Component may be removed.

1.7 Field-Replaceable Units (FRU)—Mean Time to Repair (MTTR)

TABLE 1-5 lists the estimated time required for replacement of the FRUs in the Sun Fire 15K/12K systems. These times assume the new component is on site and properly configured. They do not include any time required by software for system reconfiguration or the shutdown and bring-up time required for the non-concurrent service items.

TABLE 1-5   Customer Availability and Mean Time to Repair

FRU	MTTR	Online Service
4 kW dual AC–DC power supply	10 min	Yes
Fan tray	10 min	Yes
Centerplane support board	30 min	Yes
System Control board	10 min	Yes
SC CPU board	10 min	Yes
SC peripheral board	10 min	Yes
Expander board	30 min	Yes
Dual in-line memory module (DIMM)	10 min	Yes
CPU board	10 min	Yes
hsPCI I/O assembly	10 min	Yes
MaxCPU board	10 min	Yes
Sun Fireplane interconnect	90 min	No
Power centerplane	180 min	No
Fan backplane	70 min	No
I/O cables	15 min	Yes
Power module	60 min	No
FrameManager or TopCap	10 min	Yes
Side panel	5 min	Yes
Access doors	5 min	Yes
Air filter	5 min	Yes
AC power cord	5 min	Yes

See the front and rear system component numbering (FIGURE 1-1, FIGURE 1-2 and FIGURE 1-3). See FIGURE 1-4 for cassette component numbering.

FT1, fan tray

FT0, fan tray

SB8, standard CPU or CPU filler panel

SB7, standard CPU or CPU filler panel

SB6, standard CPU or CPU filler panel

SB5, standard CPU or CPU filler panel

SB4, standard CPU or CPU filler panel

SB3, standard CPU or CPU filler panel

SB2, standard CPU or CPU filler panel

SB1, standard CPU or CPU filler panel

SB0, standard CPU or CPU filler panel

SC0, System Control CPU and spare cPCI port

SCPER0, DVD-ROM, hard drive, tape drive peripherals

IO options: hsPCI, MaxCPU, I/O filler panel

IO0

IO1

IO2

IO3

IO4

IO5

IO6

IO7

IO8

Cassette Numbering

hsPCI

C5V1 C5V0

(See additional hsPCI diagrams in this document for further detail.)

C5V1
C5V0

C3V1
C3V0

C3V1 C3V0

FT2, fan trays

FT3, fan trays

LINK (0, 1), remote power to I/O expansion racks
(not used)

PS0 (AC0, AC1), power supplies

PS1 (AC0, AC1), power supplies

PS2 (AC0, AC1), power supplies

FrameManager or TopCap

Fan Trays

Slot 0

Slot 1

Fan Trays

Air Vent

Power Supplies

FIGURE 1-1   Sun Fire 15K/12K Systems Component Numbering—Front
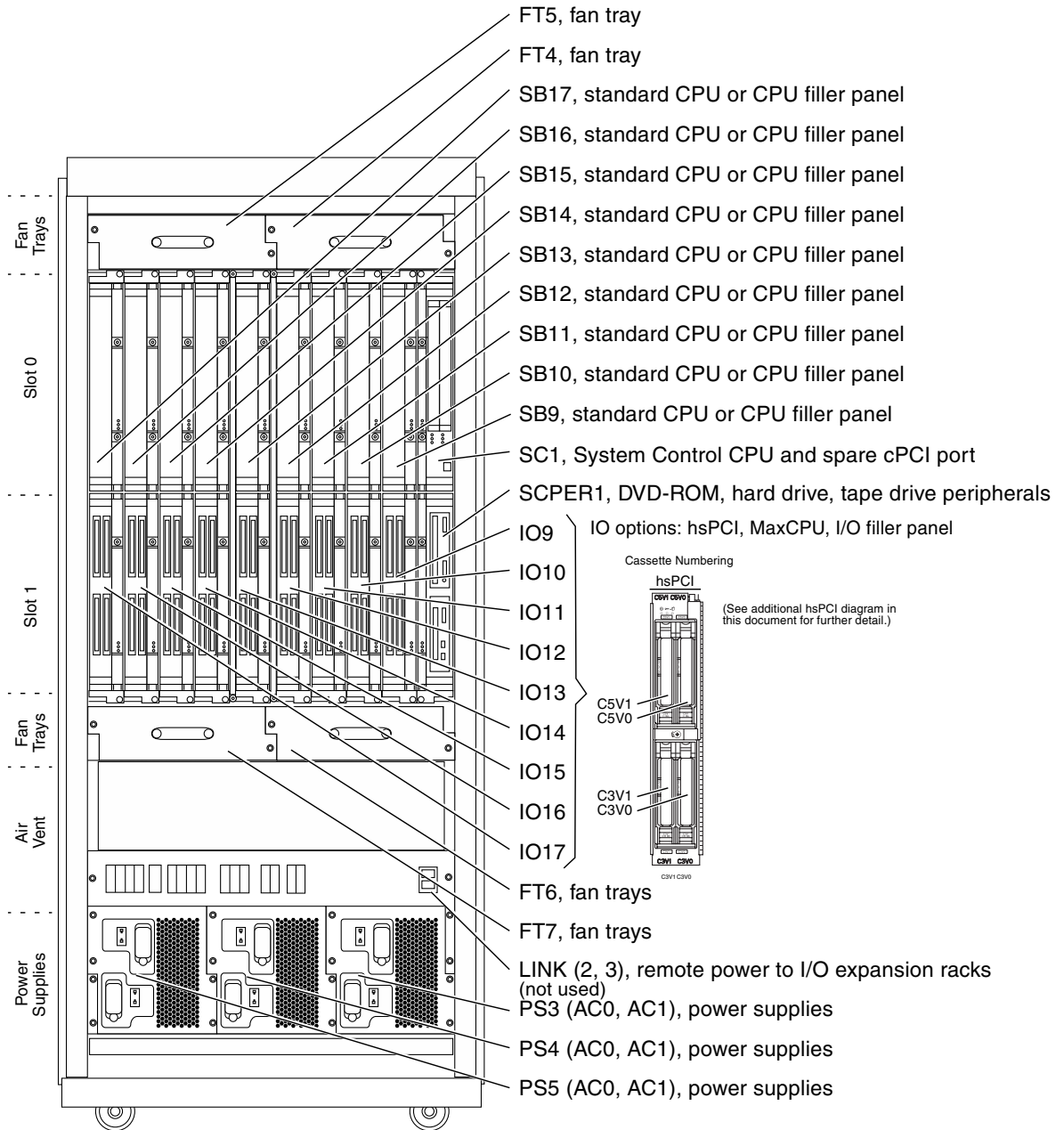
FIGURE 1-2   Sun Fire 15K System Component Numbering—Rear
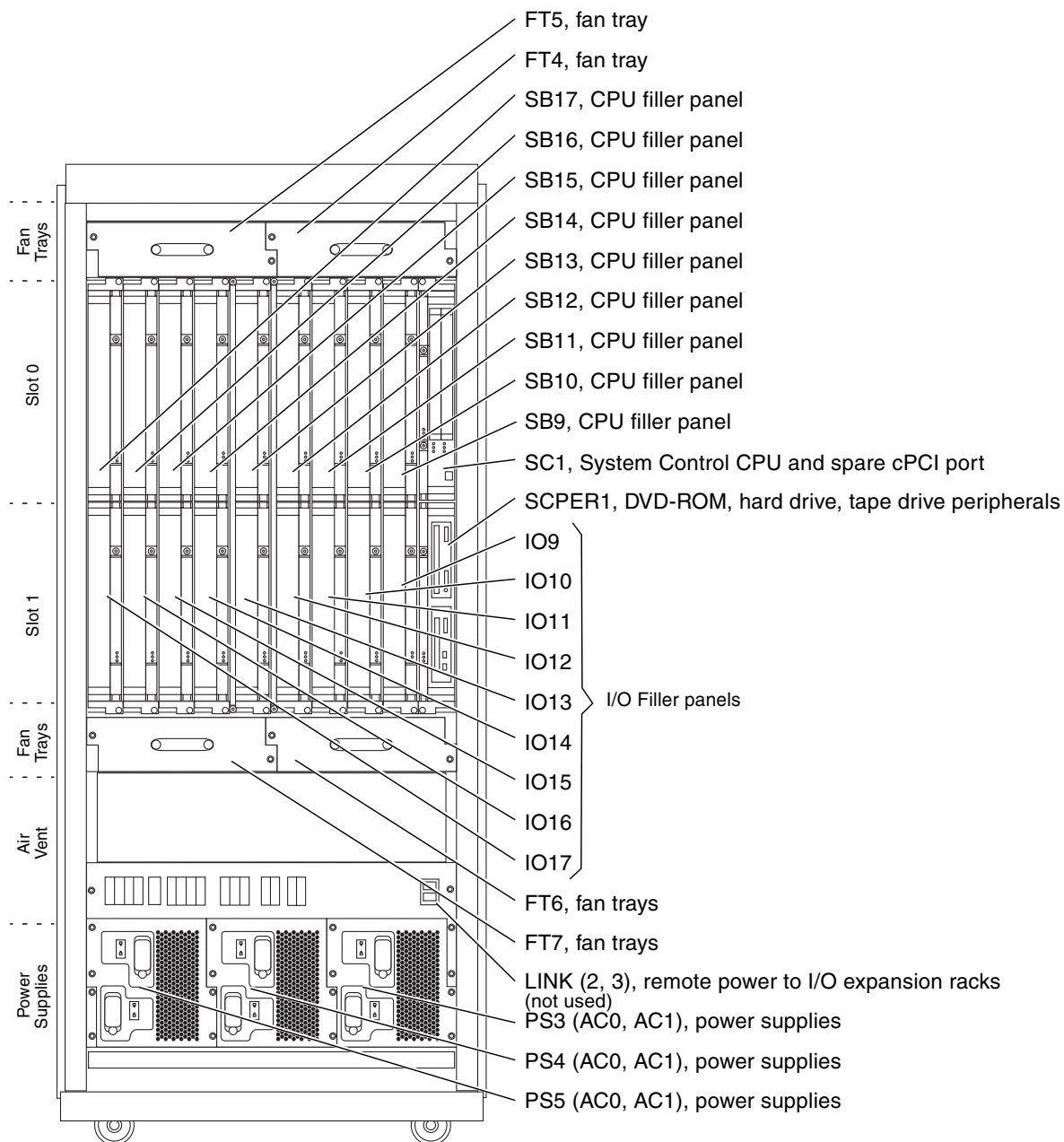
FIGURE 1-3 Sun Fire 12K System Component Numbering—Rear

The figure labels, from top to bottom:

- FT5, fan tray
- FT4, fan tray
- SB17, CPU filler panel
- SB16, CPU filler panel
- SB15, CPU filler panel
- SB14, CPU filler panel
- SB13, CPU filler panel
- SB12, CPU filler panel
- SB11, CPU filler panel
- SB10, CPU filler panel
- SB9, CPU filler panel
- SC1, System Control CPU and spare cPCI port
- SCPER1, DVD-ROM, hard drive, tape drive peripherals
- IO9
- IO10
- IO11
- IO12
- IO13
- IO14
- IO15
- IO16
- IO17
- I/O Filler panels
- FT6, fan trays
- FT7, fan trays
- LINK (2, 3), remote power to I/O expansion racks (not used)
- PS3 (AC0, AC1), power supplies
- PS4 (AC0, AC1), power supplies
- PS5 (AC0, AC1), power supplies

Left side labels (top to bottom):

- Fan Trays
- Slot 0
- Slot 1
- Fan Trays
- Air Vent
- Power Supplies

Cassette interchange diagram | Actual I/Os

hsPCI

C5V1, hsPCI 33 MHz, blue
C5V0, hsPCI 33 MHz, blue

3.3V and 5.0V
cassettes

C3V1, hsPCI 66 or 33 MHz, yellow
C3V0, hsPCI 66 or 33 MHz, yellow

3.3V cassettes

FIGURE 1-4 Cassette Component Numbering—Sun Fire 15K Front and Rear, and Sun Fire 12K Front

Note – The 3.3V cassette positions are interchangeable and the 5.0V cassette positions are interchangeable.

1.8 Safety Precautions

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

- Follow all cautions and instructions marked on the equipment.
- Never push objects of any kind through openings in the equipment as they might 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 safety precautions outlined in TABLE 1-6.

TABLE 1-6   Safety Precautions

Item	Problem	Precaution
ESD wrist strap	Electro-Static Discharge (ESD)	There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.
ESD mat	ESD	An approved ESD mat provides protection from static damage when used with a wrist strap. The mat also cushions and protects parts that are attached to the printed circuit boards.

1.9 Special Tools and Shipping Kit Items

The following list represents the special tools and items supplied in the shipping kit box at the time of system delivery:

Special Tools and Shipping Kit Items

Special Tools in Right-Front Door

Two (2) preset 18 in.-lbs (2.2 Nm) torque screwdrivers

Special Tools in Shipping Kit:

Two (2) system control console cables

One (1) 11 in. (27.9 cm) magnetic, replaceable-tip screwdriver

One (1) No. 1 Phillips head bit

One (1) No. 2 Phillips head bit

Other Shipping Kit Items:

I/O cable labels

Power cable labels

Velcro straps for I/O cables

ESD Kit with large mat:
 Wrist strap
 Static mat, 24 in. (61.0 cm) x 24 in. (61.0 cm)
 Envelope, plastic bag
 ESD kit instructions

1.10   System Block Diagrams

FIGURE 1-5 defines the Sun Fire 15K/12K systems architecture.

FIGURE 1-6 defines the power control system circuitry from the System Control boards to the individual power supplies and the fan trays.

FIGURE 1-7 defines the power distribution circuitry. This diagram represents the 48 VDC power distribution from the individual power supplies to the various boards through the designated circuit breakers.
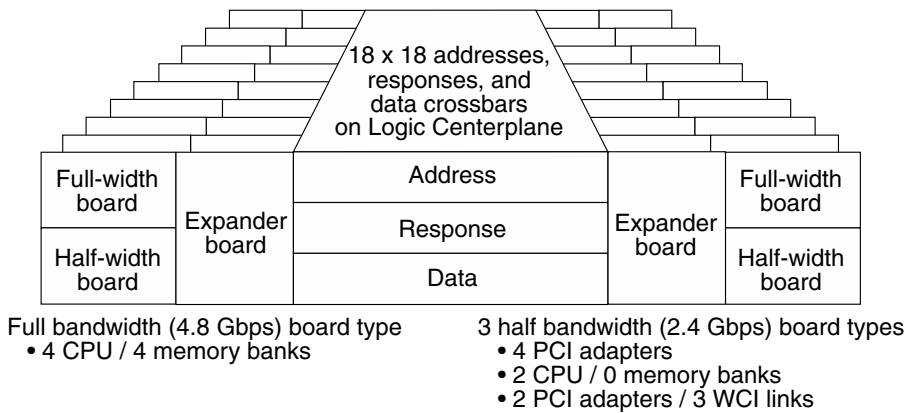
FIGURE 1-5   System Architecture Block Diagram
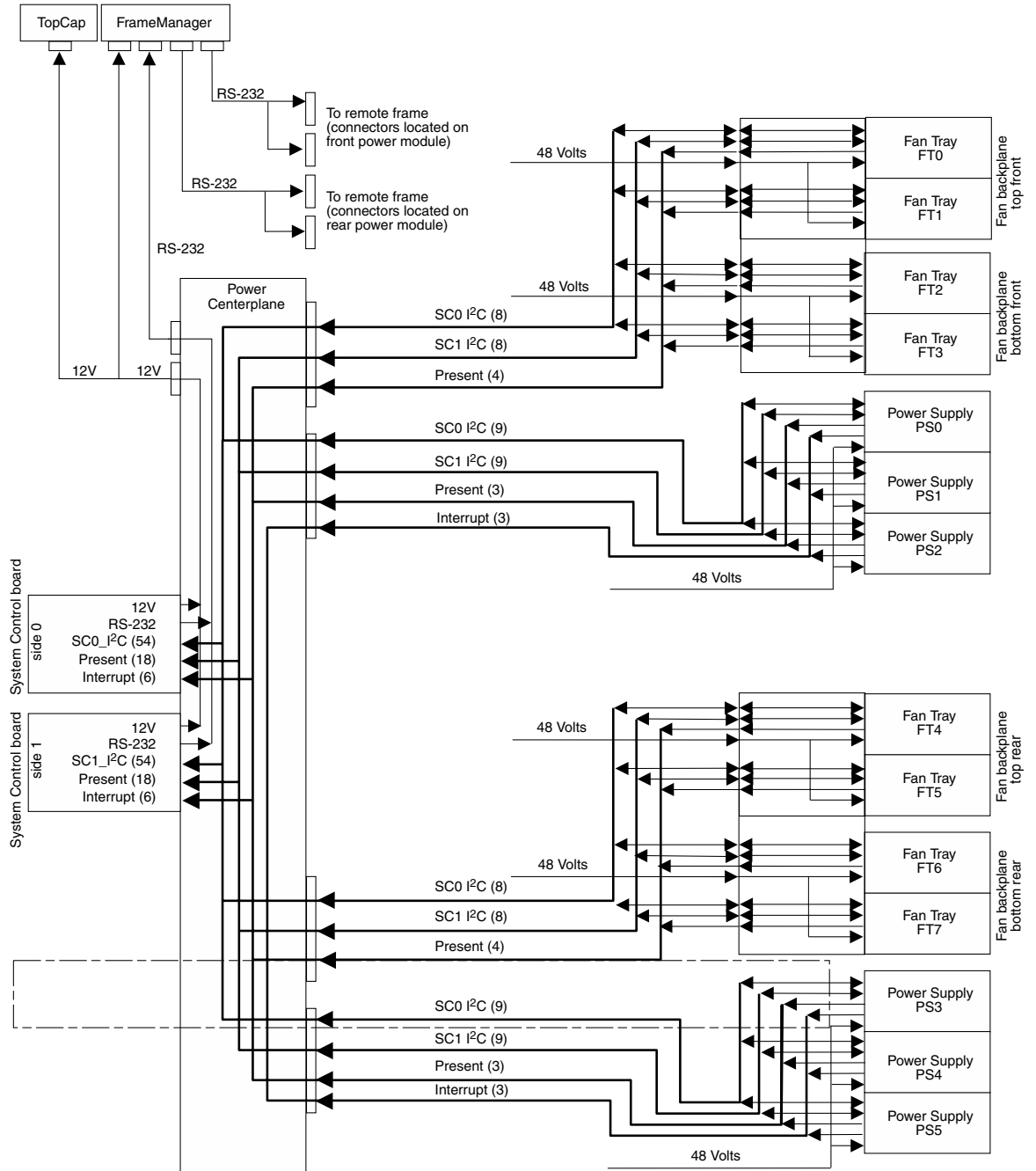
FIGURE 1-6 Control Distribution Block Diagram

Fan Bottom Side1
Fan Top Side1
Fan Bottom Side0
Fan Top Side0
System Control Peripheral 0
System Control Board 0
Centerplane Support Board 0
System Expander 0
System Expander 1
System Expander 2
System Expander 3
System Expander 4
System Expander 5
System Expander 6
System Expander 7
System Expander 8

Power Supply PS0
Power Supply PS1
Power Supply PS2

+48 Volts
+48 Volts
+48 Volts

Front

Breakers

System Expander 8
System Expander 7
System Expander 6
System Expander 5
System Expander 4
System Expander 3
System Expander 2
System Expander 1
System Expander 0
Centerplane Support 0
System Control Board 0
System Control Peripheral 0
Fan Backplane 0.0
Fan Backplane 0.1

+48 volt return

System Component

Fan Bottom Side 1
Fan Top Side 1
Fan Bottom Side 0
Fan Top Side 0
System Control Peripheral 1
System Control 1
Centerplane Support Board 1
System Expander 9
System Expander 10
System Expander 11
System Expander 12
System Expander 13
System Expander 14
System Expander 15
System Expander 16
System Expander 17

Power Supply PS3
Power Supply PS4
Power Supply PS5

+48 Volts
+48 Volts
+48 Volts

Breakers

Rear

System Expander 17
System Expander 16
System Expander 15
System Expander 14
System Expander 13
System Expander 12
System Expander 11
System Expander 10
System Expander 9
Centerplane Support 1
System Control Board 1
System Control Peripheral 1
Fan Backplane 1.0
Fan Backplane 1.1

+48 volt return

System Component

FIGURE 1-7 Power Distribution Block Diagram

FrameManager and Extension, and TopCap and Extension Replacement Procedures

The FrameManager assembly and FrameManager extension appear on some of the Sun Fire 15K/12K systems and the TopCap assembly and TopCap extension appear on other Sun Fire 15K/12K systems. For those systems, this chapter contains the replacement procedures for both assemblies and their extensions.

The chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

2.1 FrameManager Replacement

2.1.1 Removing the FrameManager

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Remove the four (4) M4x12 panhead screws attaching the FrameManager assembly to the chassis.**

2. **Disconnect the four (4) cable connectors from the rear of the FrameManager assembly.**

3. **Remove the FrameManager assembly.**

2.1.2 Installing the FrameManager

1. **Install a new FrameManager assembly.**

2. **Connect the four (4) cable connectors to the rear of the FrameManager assembly.**

3. **Secure the FrameManager assembly with four (4) M4x12 panhead screws.**

2.2 FrameManager Extension Replacement

2.2.1 Removing the FrameManager Extension

1. **Remove the two (2) M4x12 panhead screws attaching the FrameManager extension to the chassis.**

2. **Remove the FrameManager extension.**

2.2.2   Installing the FrameManager Extension

1. **Install a new FrameManager extension.**

2. **Secure the FrameManager extension with two (2) M4x12 panhead screws.**

2.3   TopCap Replacement

2.3.1   Removing the TopCap

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Remove the four (4) M4x12 panhead screws attaching the TopCap assembly to the chassis.**

2. **Disconnect the 12V cable connector from the rear of the TopCap assembly.**

3. **Remove the TopCap assembly.**

2.3.2   Installing the TopCap

If you are removing a FrameManager assembly prior to installing a replacement TopCap assembly, see Section 2.1.1, "Removing the FrameManager" on page 2-2.

Note – If you are replacing a FrameManager assembly with a TopCap, follow the procedure outlined in the documentation that accompanies the TopCap FRU package.

1. **Install a new TopCap assembly.**

2. **Connect the 12V cable connector to the rear of the TopCap assembly.**

3. **Secure the TopCap assembly with four (4) M4x12 panhead screws.**

2.4 TopCap Extension Replacement

2.4.1 Removing the TopCap Extension

1. **Remove the two (2) M4x12 panhead screws attaching the TopCap extension to the chassis.**

2. **Remove the TopCap extension.**

2.4.2 Installing the TopCap Extension

1. **Install the new TopCap extension.**

2. **Secure the TopCap extension with two (2) M4x12 panhead screws.**

System Power

The Sun Fire 15K/12K systems have two power modules, each holding three hot-swappable power supplies. One module is on the front of the system and the other module is on the rear of the system. This chapter contains the replacement procedures for the power modules and the 4 kW dual AC–DC power supplies.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

3.1 Power Module Replacement Procedures

3.1.1 Power Module Replacement

The Sun Fire 15K/12K systems have two power modules, each holding three power supplies. One module is on the front of the system and the other module is on the rear of the system. See FIGURE 3-2.

3.1.2 Powering Off for Power Module Removal

⚠ **Caution –** The power module is NOT a hot-swappable component. This procedure requires a complete shutdown of the domains and SCs, and disconnection of all AC power to the system.

There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

⚠ **Caution –** The seven (7) power cables and the three (3) control cables MUST BE REMOVED from the side of the system where the power module is being removed.

1. **As a** `superuser` **on the domains, systematically shut down all running domains by typing:**

```
domain_name# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

2. **On the main SC, power off the domain hardware by typing:**

```
sc% poweroff
```

This command powers off the entire system with the exception of the power supplies, fans, and the SCs. Refer to `poweroff`(1M) for more information.

3. **Shut down the System Control boards by doing the following:**

   ■ As a `superuser` on the spare SC, shut down the spare SC by typing:

   ```
   sc_spare# shutdown -y -g seconds -i 0
   ```

   where *seconds* = amount of time before shutdown.

   ■ On the main SC, power off the spare SC by typing:

   ```
   sc% poweroff SCx
   ```

   where *x* = 0-1, dependent upon which SC is the spare.

   ■ As a `superuser` on the main SC, shutdown the main SC by typing:

   ```
   sc# shutdown -y -g seconds -i 0
   ```

   where *seconds* = amount of time before shutdown.

4. **Open the Sun Fire 15K/12K system cabinet access doors.**

   Note – All DC circuit breakers are to remain in the on position at all times.

5. **Power off the AC0 and AC1 circuit breakers for all power supplies in the system.**

   Note – Observe the following warning message displayed at the right side of the circuit breakers on the circuit breaker panel above the AC power supplies:

   > WARNING
   > FAN TRAYS HAVE REDUNDANT DC POWER SOURCES.
   > CIRCUIT BREAKERS ON BOTH SIDES, FRONT AND REAR,
   > MUST BE OPERATED TO TURN OFF FAN TRAYS.
   >
   > POWER SUPPLIES HAVE DUAL AC INPUTS.
   > BOTH CIRCUIT BREAKERS, AC0 AND AC1 MUST BE
   > OPERATED TO TURN OFF A POWER SUPPLY.

3.1.3   Removing a Power Module

Caution – Be sure you are properly grounded before you begin the hardware removal and installation of the board.

There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Label and disconnect the twelve (12, six per side) AC power cords with the labels provided in the shipping kit.**

2. **Remove the power supplies from the power module.**

   See Section 3.2.2.3, "Removing a 4 kW Dual AC–DC Power Supply" on page 3-11.

3. **Remove the air-plenum cover by removing the eighteen (18) M4x35 panhead screws from the top, sides, and bottom of the air-inlet screen (**FIGURE 3-1**).**

4. **Remove the four (4) M4x8 panhead screws from the side and bottom of the air plenum panel, at the circuit breaker level.**
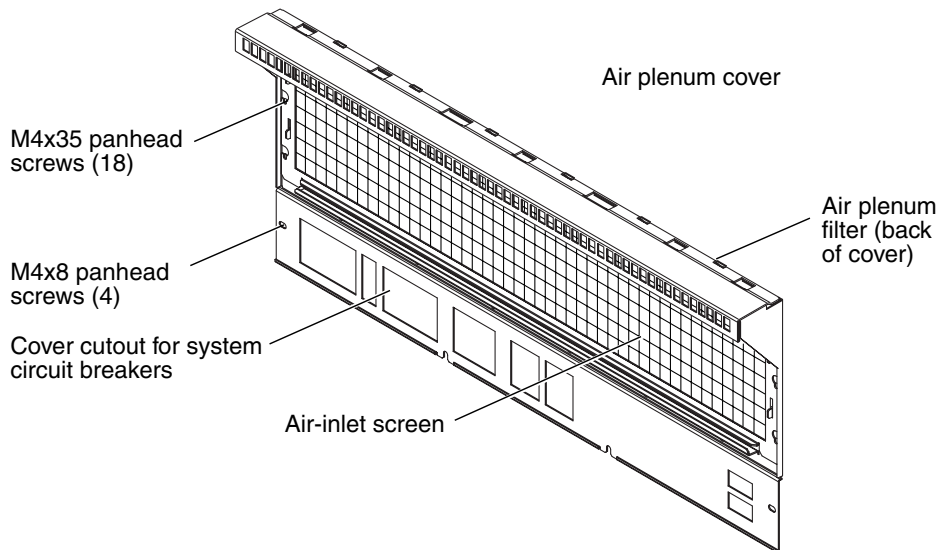
FIGURE 3-1   Air-Plenum Cover

Caution – Handle the EMI honeycomb panel carefully to prevent damage to the screen.

5. **Remove the air plenum cover and its air-inlet EMI honeycomb panel and air filter. Place on a flat sturdy surface.**

⚠ **Caution –** The seven (7) power cables and the three (3) control cables MUST BE REMOVED from the system chassis on both the front and rear sides of the system prior to removing the power module.

6. **With a flat-blade screwdriver (if needed), loosen the jackscrews on the seven (7) 8W8 Combo-D 8-pin DC power connectors (on the left side) and the three (3) DB-25 control connectors (on the right side).**

7. **Disconnect the cables from the mounting bulkhead of the system chassis.**

8. **Remove the four (4) M4x10 panhead screws attaching the power module front flanges to the system chassis, as shown in** **.**

⚠ **Caution –** The power module weighs 48 lb (21.82 kg). Although the unit can be lifted by one person, it is suggested that two people, one on each side, maneuver the power module into position. Use proper heavy-lifting procedures when removing this unit.

9. **With one person on each side of the power module, grasp the front (at the power supply opening) and the bottom and slide the power module outward from the cabinet.**

10. **Place the power module on a flat sturdy surface.**

11. **From the top rear of the power module, loosen the seven (7) 8W8 Combo-D 8-pin DC power connectors (on the left side) and the three (3) DB-25 control connectors (on the right side).**

12. **Disconnect the cables, and set aside.**
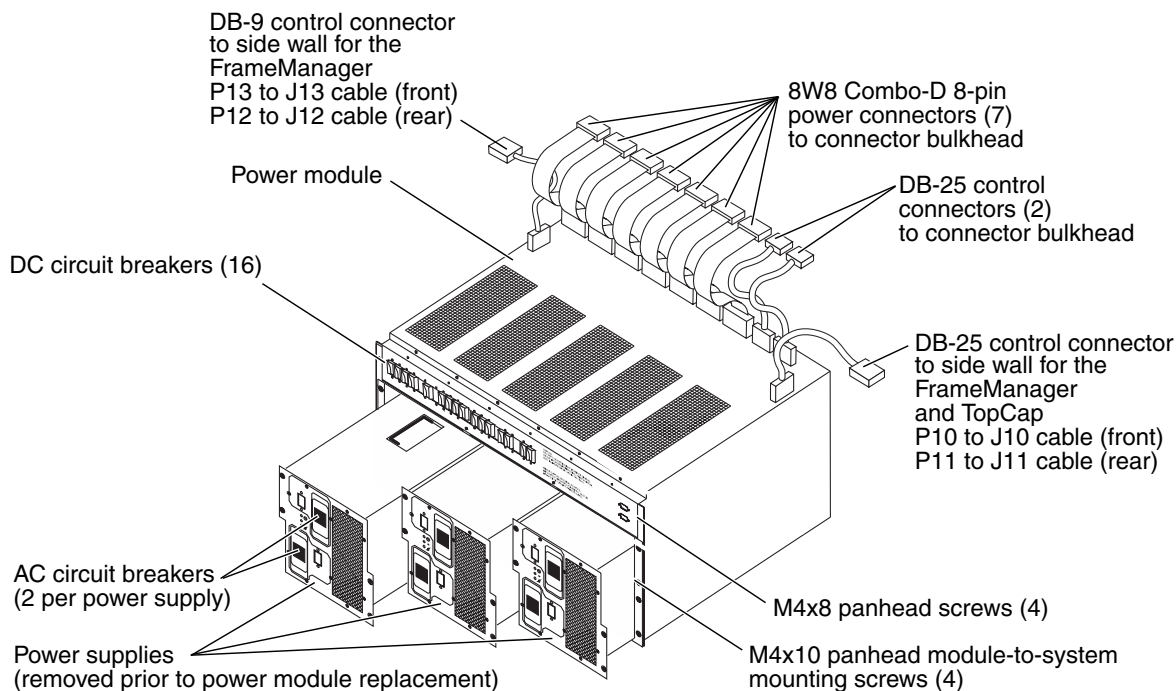
FIGURE 3-2   Power Module

3.1.4   Installing a Power Module

1. **At the top rear of the power module, connect and hand tighten the jackscrews of the seven (7) 8W8 Combo-D 8-pin DC power connectors on the left side and the three (3) DB-25 control connectors on the right side.**

Note – The power module weighs 48 lb (21.82 kg). Although the unit can be lifted by one person, it is suggested that two people, on each side, maneuver the power module into position. Use proper heavy-lifting procedures when installing this unit.

---

2. **With one person on each side of the power module, grasp the front (at the power supply opening) and the bottom and slide the power module into the system chassis.**

3. **Secure the power module to the system chassis with the four (4) M4x10 panhead module-to-system mounting screws, as shown in** FIGURE 3-2**.**

4. **Connect the seven (7) 8W8 Combo-D 8-pin DC power connectors (on the left side) and the three (3) DB-25 control connectors (on the right side) to the mounting bulkhead of the system chassis, as shown in** FIGURE 3-2**, and hand tighten the jackscrews.**

⚠ **Caution –** Handle the EMI honeycomb panel carefully to prevent damage to the screen.

5. **Install the air-plenum cover and its air-inlet EMI honeycomb panel and air filter.**

6. **Secure with the eighteen (18) M4x35 panhead screws at the top, sides, and bottom around the air-inlet screen, and the four (4) M4x8 panhead screws at the side and bottom of the air plenum panel, at the circuit breaker level.**

Note – All power supply units are fully interchangeable.

7. **Install the 4 kW dual AC input power supplies.**

   See Section 3.2.2.4, "Installing a 4 kW Dual AC–DC Power Supply" on page 3-12.

8. **Ensure that all DC circuit breakers are in the on position.**

9. **Ensure that all AC circuit breakers are in the off position.**

3.1.5   Powering On After Power Module Installation

1. **Connect the AC power cords to the 4 kW dual AC–DC power supplies.**

2. **Power on the AC0 and AC1 circuit breakers for all power supplies in the system.**

3. **Close the Sun Fire 15K/12K system cabinet access doors.**

4. **Once the main SC is booted, start the domain(s) by typing:**

```
sc% setkeyswitch -d domain_id  on
```

   where *domain_id* is the domain letter A-R. Execute one setkeyswitch command for each domain to be started.

3.2　4 kW Dual AC–DC Power Supply Replacement Procedures

The Sun Fire 15K/12K systems have three 4 kW dual AC–DC hot-swappable power supplies at the front of the system and three at the rear of the system. See FIGURE 3-3.

Top view

Activation indicator (green)
Service indicator (amber)
Removal indicator (amber)

AC0
200-240 VAC
47-63 Hz, 24A

AC1
200-240 VAC
47-63 Hz, 24A

Front view

Right-side view

Rear view
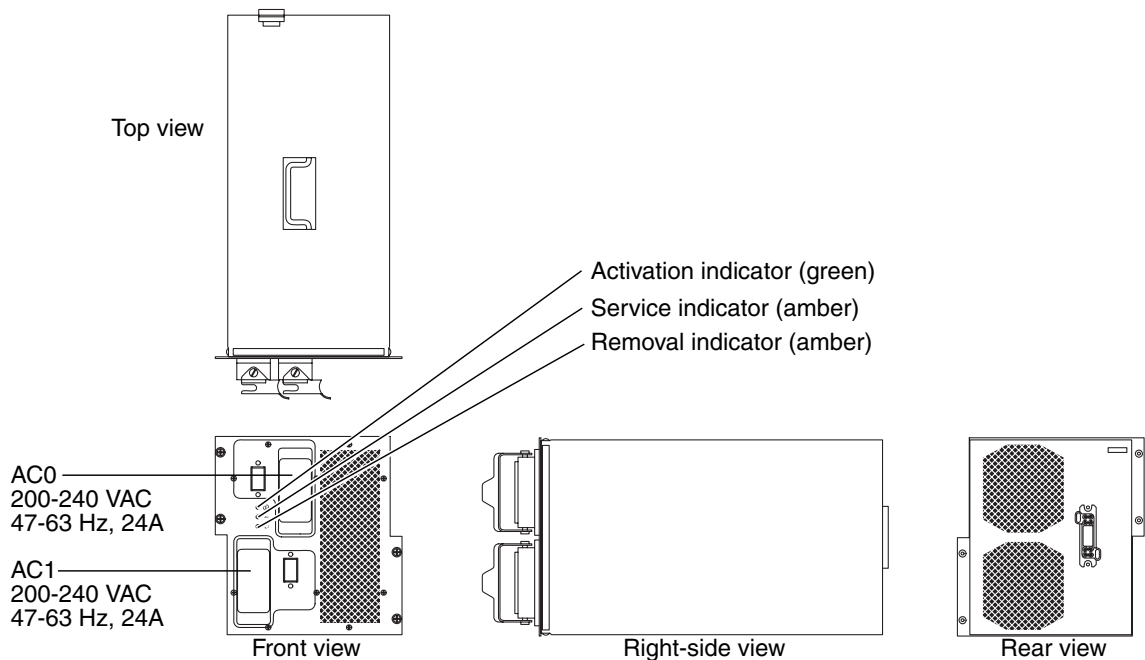
FIGURE 3-3　Sun Fire 15K/12K Systems Power Supply

3.2.1 4 kW Dual AC–DC Power Supply LEDs

4 kW Dual AC–DC power supply components and LEDs are listed in TABLE 3-1 and TABLE 3-2.

TABLE 3-1 4 kW Dual AC–DC Power Supply Components

Total Number of Power Supplies Per System	Total Number of LEDs Per Power Supply
6	3

TABLE 3-2 4 kW Dual AC–DC Power Supply Valid LED Status

LEDs after Insertion or Initial System Power On			LEDs After PRESENCE is Detected			Component Powered On*			Component Powered Off†		
Active	Service	Remove	Active	Service	Remove	Active	Service	Remove	Active	Service	Remove
on	off	off	off	off	on	on	off	off	off	off	on

* ON = AC0_FAIL_L = H or AC1_FAIL_L = H

† OFF = AC0_FAIL_L = L and AC1_FAIL_L = L

Failure of the active LED to transition from ON to OFF within 60 seconds after insertion indicates a power-status control fault.

FIGURE 3-4 illustrates the power supply and the LED locations.
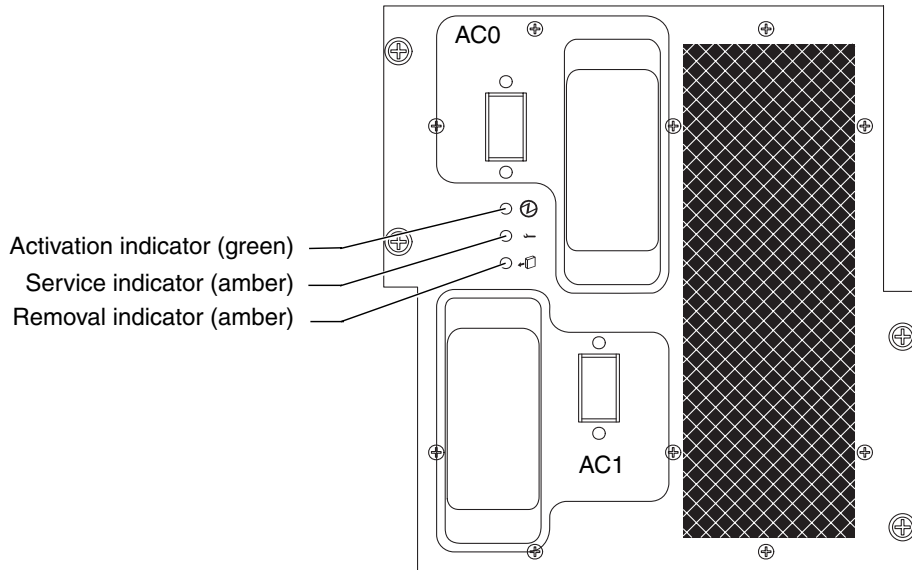
FIGURE 3-4   4 kW Dual AC–DC Power Supply LEDs

3.2.2   4 kW Dual AC–DC Power Supply Replacement

3.2.2.1   Isolating a Failed Power Supply

1. **Check that the power supply fans are on.**

2. **Verify the status of the LEDs.**

3. **Confirm that the power supply is properly seated.**

4. **Check the power status by using the Sun Management Center or by typing the following SMS command:**

```
sc% showenvironment -p powers
```

5. **On the SC, check for error messages in**
   /var/opt/SUNWSMS/adm/platform/messages.

3.2.2.2 Powering Off a 4 kW Dual AC–DC Power Supply

● **Power off the AC–DC power supply by using the Sun Management Center or by typing the following SMS command:**

```
sc% poweroff psx
```

where *x* is the power supply 0-5. Refer to poweroff(1M) for more information.

This should cause the AC0 and AC1 circuit breakers to go into the off position.

3.2.2.3 Removing a 4 kW Dual AC–DC Power Supply

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

Caution – Before removing the power supply from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 3.2.2.2, "Powering Off a 4 kW Dual AC–DC Power Supply" on page 3-11.

Note – Observe the following warning message displayed at the right of the circuit breakers on the circuit breaker panel above the AC power supplies.

> WARNING
> FAN TRAYS HAVE REDUNDANT DC POWER SOURCES.
> CIRCUIT BREAKERS ON BOTH SIDES, FRONT AND REAR,
> MUST BE OPERATED TO TURN OFF FAN TRAYS.
>
> POWER SUPPLIES HAVE DUAL AC INPUTS.
> BOTH CIRCUIT BREAKERS, AC0 AND AC1 MUST BE
> OPERATED TO TURN OFF A POWER SUPPLY.

2. **Ensure power is off at the circuit breakers, AC0 (top breaker) and AC1 (bottom breaker), on the front panel of the power supply.**

Note – Ensure all AC power cords are labeled before removing.

3. **Label and remove both AC power cords from the front panel of the power supply.**

<div>⚠</div> **Caution –** The power supply unit weighs 43.0 lb (19.5 kg). Use proper heavy-lifting procedures when removing this unit.

4. **Use a Phillips No. 2 screwdriver to release the four (4) front panel captive fasteners.**

5. **To pull out the 4 kW dual AC–DC power supply, use the power connector insert-ejector bracket as a handle and slide the power supply forward until the handle on the top of the power supply is exposed.**

6. **Use one hand to hold the power supply by the handle as you pull it the rest of the way out of the power module.**

7. **Place the power supply on a flat, sturdy, ESD-protected surface.**

3.2.2.4   Installing a 4 kW Dual AC–DC Power Supply

<div>⚠</div> **Caution –** The power supply unit weighs 43.0 lb (19.5 kg). Use proper heavy-lifting procedures when removing this unit.

1. **Insert the 4 kW dual AC–DC power supply into its appropriate location in the power module.**

2. **Slide the power supply smoothly inward to a point where contact is made with the power module connector.**

3. **Secure the power supply with the four (4) front panel captive fasteners.**

Note – Failure of the active LED to transition from on to off within 60 seconds after insertion indicates a power-status control fault.

4. **Verify the LED status per** TABLE 3-2**.**

5. **Connect the AC power cords into their appropriate AC connectors on the front panel of the power supply.**

   See FIGURE 3-5 to determine the proper part number and orientation for connection.

   - The strain relief for the AC0 power cable housing is positioned downward when connected.
   - The strain relief for the AC1 power cable housings is positioned upward when connected.

- Power source A cord will normally connect into AC0.
- Power source B cord will normally connect into AC1.
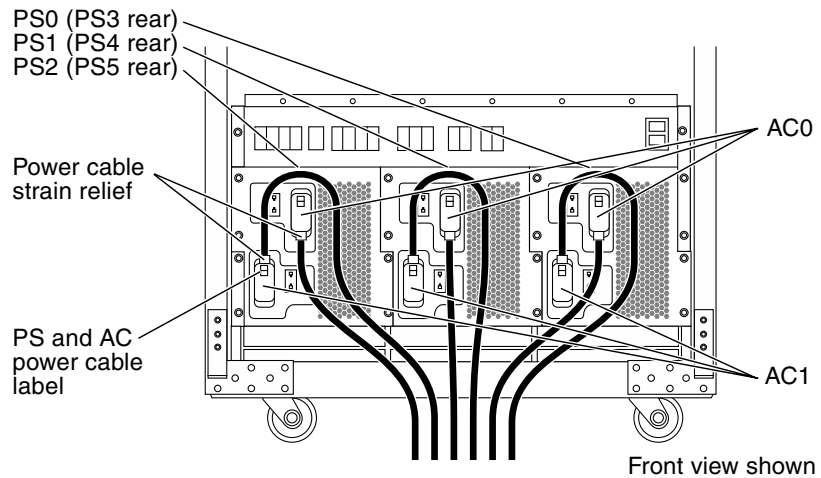
FIGURE 3-5   AC Power Cord Installation

6. Affix the appropriate power supply component label to the back of the power cable connector housing.

3.2.2.5   Powering On a 4 kW Dual AC–DC Power Supply

1. Power on the circuit breakers, AC0 (top breaker) and AC1 (bottom breaker), on the front panel of the power supply.

2. Close the Sun Fire 15K/12K system cabinet access doors.

3.2.2.6   Verifying a 4 kW Dual AC–DC Power Supply

1. On the SC, check for error messages in /var/opt/SUNWSMS/adm/platform/messages.

2. Check the power supply status by using the Sun Management Center or by typing the following SMS command:

```
sc% showenvironment -p powers
POWER      UNIT    AC0     AC1     DC0     DC1     FAN0    FAN1
------     ------  ----    ----    ----    ----    ----    ----
PS0        OK      OK      OK      ON      ON      OK      OK
...
```

Fan Trays

The Sun Fire 15K/12K systems have eight hot-swappable fan trays. Each fan tray has two layers of six fans for a total of twelve fans per tray. There are two fan trays at the top and two fan trays at the bottom on both the front and rear of the system. See FIGURE 4-1. This chapter contains the replacement procedures for the fan trays.

Guide pin
(left side only)
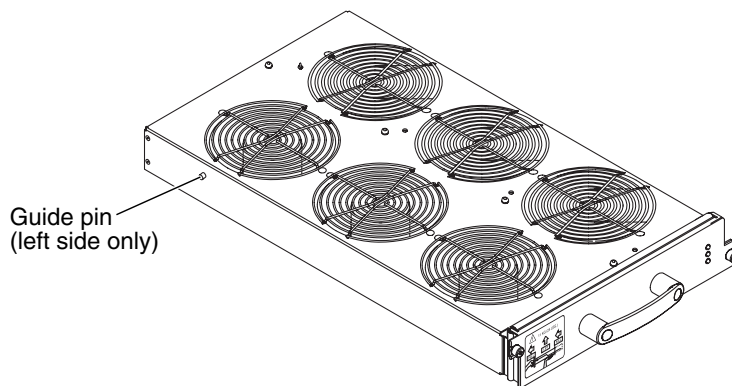
FIGURE 4-1   Fan Tray

All fan trays are interchangeable.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

4.1 Fan Tray LEDs

Fan tray components and LEDs are listed in TABLE 4-1 and TABLE 4-2.

TABLE 4-1   Fan Tray Components

Total Number of Fan Trays Per System Per Side	Total Number of Fan Trays Per Fan Shelf Per Side	Number of LEDs Per Fan Tray	Number of Fans Per Fan Tray
4	2	3	12

TABLE 4-2   Fan Tray Valid LED Status

LEDs after Insertion or Initial System Power On			LEDs After PRESENCE is Detected			Component Powered On			Component Powered Off		
Active	Service	Remove	Active	Service	Remove	Active	Service	Remove	Active	Service	Remove
on	off	off	on	off	off	on	off	off	off	off	on

FIGURE 4-2 illustrates the fan tray and the LED locations.

This system contains
four fan trays per side and
twelve fans per tray.

Activation indicator (green)

Service indicator (amber)

Removal indicator (amber)
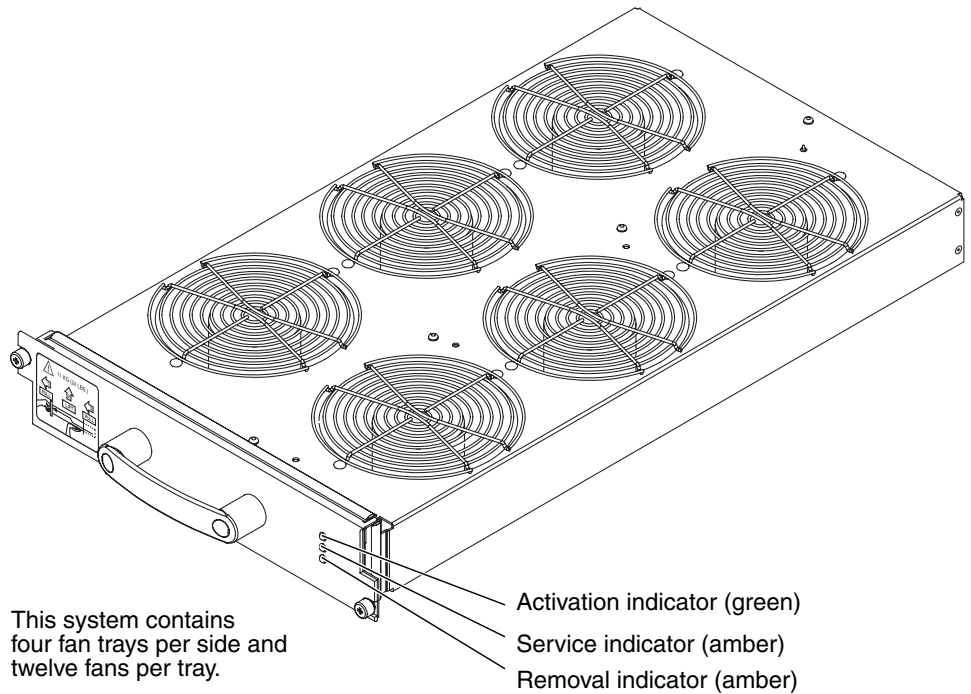
FIGURE 4-2   Fan Tray LEDs

4.2   Fan Tray Replacement Procedures

4.2.1   Isolating a Failed Fan Tray

1. **Check that the fans are on.**

2. **Verify the status of the LEDs.**

3. **Check the fan status by using the Sun Management Center or by typing the following SMS command:**

```
sc% showenvironment -p fans
```

4. **Check the** /var/opt/SUNWSMS/adm/platform/messages **file for fan error messages.**

4.2.2   Powering Off a Fan Tray

● **Power off a fan tray by using the Sun Management Center or by typing the following SMS command:**

```
sc% poweroff ftx
```

where *x* is the Fan Tray 0-7. Refer to poweroff(1M) for more information.

Caution – To maintain adequate system cooling during fan tray replacement, limit the amount of time a fan is off. DO NOT remove a failed fan tray from the system until the replacement tray is ready for installation.

4.2.3   Removing a Fan Tray

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

Note – When removing the upper fan trays, remember the bottom system kick plate is NOT A STEP. DO NOT use the kick plate to gain access to the top fan trays. Obtain a proper stool if required. Excessive weight on the kick plate will bend the door support brackets.

1. Open the Sun Fire 15K/12K system cabinet access doors.

Caution – Before removing the fan tray from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 4.2.2, "Powering Off a Fan Tray" on page 4-4.

2. Release the two (2) fan tray front panel No. 2 Phillips captive screw fasteners.

Caution – The fan tray weighs 24.0 lb (11.0 kg). Use proper heavy-lifting procedures when removing this unit.

3. **Grasp the handle and pull the fan tray outward.**

   As the tray slides forward, the guide pin on the left side of the tray comes up to a 45-degree upward angle on the bi-level groove approximately 3/4ths of the way out. This is a safety feature alerting you to stop pulling and to place the other hand *under* the fan tray.

4. **Continue lifting up and pulling outward on the guide rail pulling the fan tray out with both hands away from the system chassis.**

5. **Place the fan tray on a flat sturdy surface.**

4.2.4   Installing a Fan Tray

Caution – The fan tray weighs 24.0 lb (11.0 kg). Use proper heavy-lifting procedures when removing this unit.

1. **Grasp the fan tray by the handle with one hand and support the bottom of the fan tray with the other hand.**

2. **Insert the fan tray into the system chassis aligning the guide pin on the left side of the tray with the left guide rail of the angled guide ramp and slide the fan tray into the chassis.**

   It will go in approximately one fourth of the way and drop down about 0.2 in. (.5 cm).

3. **Slide the fan tray inward until it connects with the connector of the fan backplane.**

4. **Using firm, steady pressure, fully insert the fan tray until it is fully seated with the fan backplane connector.**

5. **Secure the two (2) front panel captive screw fasteners.**

   Note – Failure of the service LED to transition from on to off within 60 seconds after insertion indicates a power-status control fault.

6. **Verify the LED status per** TABLE 4-2**.**

7. **Close the Sun Fire 15K/12K system cabinet access doors.**

4.2.5   Verifying a Fan Tray

1. On the SC, check for error messages in
`/var/opt/SUNWSMS/adm/platform/messages`**.**

2. Check the fan tray status by using the Sun Management Center or by typing the following SMS command:

```
sc% showenvironment -p fans
FANTRAY   POWER   SPEED   FAN0  FAN1  FAN2  FAN3  FAN4  FAN5  FAN6
------    ------  -----   ----  ----  ----  ----  ----  ----  ----
FT0       ON      HIGH    OK    OK    OK    OK    OK    OK    OK
...
```

System Control (SC) CPU Board and cPCI Memory Board

The System Control (SC) board (slot 0) for the Sun Fire 15K/12K systems support the SC CPU board and its cPCI memory board. This chapter contains the replacement procedures for the SC CPU board and the installation procedures for the cPCI memory board onto the SC CPU.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

5.1 System Control (SC) CPU Board Replacement Procedures

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

The SC CPU is not a hot swappable component. Damage can occur to the board if all power down procedures are not followed as detailed in this manual.

Caution – Before removing a board from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 6.1.2.2, "Powering Off a System Control (SC) Board" on page 6-4.

5.1.1 Powering Off the SC Board

● **Powering off the SC Board.**

See Section 6.1.2.2, "Powering Off a System Control (SC) Board" on page 6-4.

5.1.2 Removing the SC Board

● **Removing the SC Board.**

See Section 6.1.2.3, "Removing a System Control (SC) Board" on page 6-7.

5.1.3 Removing the System Control (SC) CPU Board

1. **Release the two (2) captive screws holding the SC CPU to the SC board.**

2. **Remove the SC CPU board by using the insert-eject levers on the board.**

5.2 System Control (SC) Board cPCI Memory Board Installation Procedures

Inspect the new board before inserting it into the Sun Fire 15K/12K systems.

1. **Remove the connector protective cover from the board being installed and inspect the connector for any damaged or gaps between the pins.**

2. **Ensure any board alignment tabs are not bent.**

3. **Inspect the mating connector before inserting the new board.**

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

5.2.1 Installing cPCI Memory Boards on the SC CPU

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

The SC CPU board can support up to two memory boards and two possible configurations. One installation configuration consists of two 128-Mbyte modules. The first memory board (memory board A) is installed directly onto the SC CPU board. The second memory board (memory board B) is installed directly on top of memory board A (FIGURE 5-1). The second configuration is a single 256-Mbyte module (memory board A).

1. **Determine if one or two memory boards are being installed for this installation and locate the 2-56 x 3/8 in. or 2-56 x 3/16 in. screws, the M2 flat washers, the M2 split-lock washers, and the 2-56 x 3/16 in. spacers, as required.**

Note – If you are installing only one memory board, do not use the plastic spacers and the 2-56 x 3/8 in. screws. Install the board using the washers and 2-56 x 3/16 in. screws directly into the metal mounting posts.

■ If you are installing the single memory board configuration, follow Step 2 through Step 4.
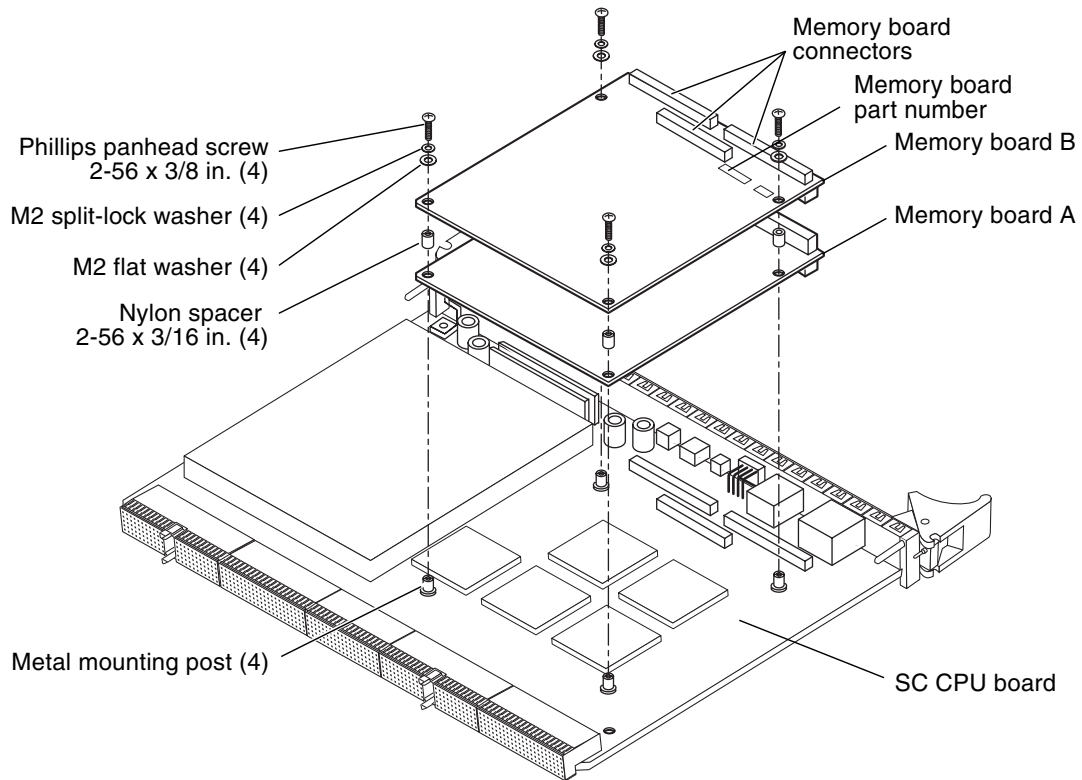
FIGURE 5-1 System Control (SC) CPU cPCI Memory Board Installation

- If you are installing the double memory board configuration, follow Step 2, and Step 4 through Step 8.

2. **Align the three memory board A connectors above the memory board connector sockets on the SC CPU board and press down firmly, ensuring the three connectors are properly seated.**

3. **Align the flat washers and the split-lock washers on top of memory board A, and secure into the metal mounting posts with the 2-56 x 3/16 in. Phillips panhead screws.**

Note – To avoid micro-fracture damage to the SC CPU board, do not apply excessive pressure on any of the connectors.

---

4. **Press on the third, or middle, connector to ensure it is properly seated.**

> **Note –** The remaining steps are for the two memory-board installation.

5. **Place the round nylon spacers on top of the mounting holes on memory board A.**

6. **Align the three memory board B connectors on top of the memory board A connector sockets and press down firmly ensuring the three connectors are properly seated in memory board B.**

7. **Align the flat washers and the split-lock washers on top of memory board B, secure with the 2-56 x 3/8 in. Phillips panhead screws, ensuring the spacers are secure between memory board A and memory board B.**

8. **Press on the third, or middle connector on memory board B to ensure it is properly seated.**

5.2.2 Installing the System Control (SC) CPU Board

1. **Install the correctly configured SC CPU board and lock the insert-eject levers into position.**

2. **Secure the SC CPU to the SC board with the two (2) captive screws.**

3. **Connect all I/O cables.**

4. **Power on the SC by using the Sun Management Center or from the main SC by typing the following SMS command:**

```
sc% resetsc

About to reset other SC. Are you sure you
want to continue? (yes/no)? yes
```

5. **Verify the SC board.**

   See Section 6.1.2.5, "Verifying a System Control (SC) Board" on page 6-10.

5.2.3 Installing the System Control (SC) Board

● **Installing the SC board.**

   See Section 6.1.2.4, "Installing a System Control (SC) Board" on page 6-8.

5.2.4 Verifying the cPCI Memory Boards on the SC CPU

1. **Verifying the SC board.**

   See Section 6.1.2.5, "Verifying a System Control (SC) Board" on page 6-10.

Note – Memory failure might occur due to the installation of an incorrect memory board, memory board failure, or improper installation.

---

2. **After the installation of the SC board, the system goes through SCPOST and OpenBoot PROM (OBP). Review the messages on the console.**

   If a problem is found with the memory, an error message is displayed. The memory configuration is recognized in groups indicated as Group 0, Group 1, Group 2, and Group 3. For two memory boards, 128 Mbytes double-sided, single stuffed, the OBP displays the following configuration information:

   ```
   Memory Group #0, 64 + 64 : 128 Megabytes
   Memory Group #1, 0 + 0 : 0 Megabytes
   Memory Group #2, 64 + 64 : 128 Megabytes
   Memory Group #3, 0 + 0 : 0 Megabytes
   ```

3. **If an error is found, check the following for a solution:**

   ■ Ensure the right memory board is installed in the proper slot and properly seated.
   ■ If two memory boards are installed, ensure each board is installed in the proper position.
   ■ Ensure the total memory on the memory board(s) does not exceed the total memory limit for the processor board.

System Control (SC) Board

The System Control (SC) board for the Sun Fire 15K/12K systems is a hot-swappable board at SC0 (front) and SC1 (rear). This chapter contains the replacement procedures for the SC board.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

6.1 System Control (SC) Board Replacement

6.1.1 System Control Board LEDs

System Control (SC) board components and LEDs are listed in TABLE 6-1 and TABLE 6-2.

TABLE 6-1 System Control Board Components

Total Number of System Control Boards Per System	Total Number of System Control Boards Per side	Number of LEDs Per System Control Board
2	1	9

TABLE 6-2 System Control Board Valid LED Status

LEDs after Insertion or Initial System Power On			LEDs After PRESENCE is Detected			Component Powered On			Component Powered Off		
Active	Service	Remove	Active	Service	Remove	Active	Service	Remove	Active	Service	Remove
on	on	off	on	off	off	on	off	off	off	off	on

The SC CPU slot and SC 6U/3U spare slot on the SC board do not have unique bits, referred to as *presence* bits. Failure of the service LED to transition from ON to OFF within 60 seconds after insertion indicates a power-status control fault.

TABLE 6-3 describes the SC CPU board indicator functions.

TABLE 6-3 System Control CPU Board Indicator Function Descriptions

Indicator Functions	Description
Alarm	Not used
Ready	Component ON and board is READY
Reset button	Global reset to the SC CPU and PCI reset to the SC
Abort button	Resets the CPU

FIGURE 6-1 illustrates the System Control board and the LED locations.

SC CPU board
  Alarm indicator (green)
  Ready indicator (green)
    Reset button
    Abort button

Main SC board
  Activation indicator (green)
  Service indicator (amber)
  Removal indicator (amber)

Spare 6U/3U slot*
  Activation indicator (green)
  Service indicator (amber)
  Removal indicator (amber)

SC CPU board
  Activation indicator (green)
  Service indicator (amber)
  Removal indicator (amber)

* The SC 6U/3U spare slot is
  not supported at this time.

FIGURE 6-1   System Control Board LEDs (3U to 6U Conversion Board Option)

Caution – Using the SC CPU reset and SC CPU abort hardware buttons might corrupt the operating system disk if the operating system has not been properly shut down.

- SC CPU Reset Button

  When the RESET button on the front panel of the SC CPU (CP1500) board is pressed, a Power-on-reset (POR) is generated to the SC CPU board and a peripheral component interconnect (PCI) reset is generated to the PCI devices on the SC main board. This results in a general clearing of the SC CPU board to a power on state, and a reset of the PCI bus on the SC main board.

  Using the RESET button will reboot the operating system on the SC if the appropriate OpenBoot PROM (OBP) environment variables have been set.

- SC CPU Abort Button

  When the ABORT button on the front panel of the SC CPU (CP1500) board is pressed, an external initiated reset (XIR) is generated to the CPU module, returning the CPU to a known start-up state. No other devices are affected by this reset.

6.1.2 System Control Board (SC) Replacement Procedures

6.1.2.1 Isolating a Failed System Control Board

1. **Check for any error messages during SCPOST.**

   SCPOST messages are output to an SMS console. To read SC SMS console messages, you must attach a console cable and terminal to the SC.

2. **On the SC, check for any error messages in** `/var/adm/messages` **and** `/var/opt/SUNWSMS/adm/platform/messages`.

3. **Use** `adb` **to examine any core files in** `/var/crash/`*sc_name*.

6.1.2.2 Powering Off a System Control (SC) Board

1. **If the System Control board is to be replaced in the spare SC, go to Step 6, as follows. If the System Control board is to be replaced in the main SC, ensure the spare SC is available. Synchronize the main SC to the spare SC by typing:**

   ```
   sc% setdatasync backup
   ```

   If no messages are reported in `/var/opt/SUNWSMS/adm/platform/messages` and the command completes, the `setdatasync` backup was successful.

2. **As a** `superuser` **on the main SC, make a backup copy of the SMS configuration:**

   ```
   sc# smsbackup directory
   ```

   This `smsbackup` file can be used to recover the SMS configuration in the event of another failure during the replacement.

3. **From the main SC, failover (switch over) to the spare SC by typing:**

```
sc% setfailover force
```

4. **Monitor the SMS log at** /var/opt/SUNWSMS/adm/platform/messages **on the spare SC for messages similar to the following:**

```
 sc% tail /var/opt/SUNWSMS/adm/platform/messages
Jul 25 11:14:20 2001 xc12-sc1 fomd[378]: [8570 351292396349 NOTICE
FailoverMgr.cc 1846] Reset the remote SC
Jul 25 11:14:20 2001 xc12-sc1 fomd[378]: [8573 351293425787 NOTICE
FailoverMgr.cc 1860] Taking over the main role because the remote SC (current
Main) has a fault - Forced Failover
Jul 25 11:14:21 2001 xc12-sc1 ssd[322]: [1304 351936455728 NOTICE
StartupManager.cc 2146] software component start-up initiated: name=pcd
Jul 25 11:14:21 2001 xc12-sc1 ssd[322]: [1304 351990720428 NOTICE
StartupManager.cc 2146] software component start-up initiated: name=tmd
Jul 25 11:14:21 2001 xc12-sc1 ssd[322]: [1304 352013091113 NOTICE
StartupManager.cc 2146] software component start-up initiated: name=esmd
.
.
.
Jul 25 11:14:27 2001 xc12-sc1 esmd[2401]: [6143 357922367375 ERR
Slot0PowerControl.cc 957] Failed to get SCM Console Bus port configuration
setting, status = 1173 on CPU at SB12
Jul 25 11:14:27 2001 xc12-sc1 hwad[340]: [1173 358098116693 ERR PciComm.cc 205]
console bus illegal access  error at address 5c000000
Jul 25 11:14:27 2001 xc12-sc1 esmd[2401]: [1173 358098116693 ERR PciComm.cc 205]
console bus illegal access  error at address 5c000000
Jul 25 11:14:27 2001 xc12-sc1 esmd[2401]: [6143 358099878028 ERR
Slot0PowerControl.cc 957] Failed to get SCM Console Bus port configuration
setting, status = 1173 on CPU at SB15
Jul 25 11:14:30 2001 xc12-sc1 fomd[378]: [8576 361695126570 NOTICE
FailoverMgr.cc 1963] SC configured as Main
```

This indicates that the failover operation has completed successfully. The spare SC is now the main SC.

5. **On the main SC, verify that it has assumed the main role and that failover is disabled by typing:**

```
sc% showfailover -r
MAIN
sc% showfailover
SC Failover Status:    DISABLED
```

If failover is disabled, go to Step 8.

6. **On the main SC, disable the failover mechanism by typing:**

```
sc% setfailover off
```

7. **Verify the failover is DISABLED by typing:**

```
sc% showfailover
SC Failover Status:    DISABLED
```

8. **If the spare SC is running Solaris software, as** superuser, **shut down the spare (inactive) SC by typing:**

```
sc_spare# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

9. **Power off the spare (inactive) SC by using the Sun Management Center or from the main SC by typing the following SMS command:**

```
sc% poweroff scx
```

where *x* is 0 or 1. Refer to poweroff(1M) for more information.

The poweroff command will query the user to continue.

Note – The poweroff command only supports poweroff of the other SC (poweroff SC0 at SC1 or SC1 at SC0). If the user executes poweroff of SC0 from SC0, the command will fail.

6.1.2.3   Removing a System Control (SC) Board

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

Caution – Before removing a board from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 6.1.2.2, "Powering Off a System Control (SC) Board" on page 6-4.

2. **Label and remove the I/O cables from the SC board.**

3. **Insert a Phillips No. 1 screwdriver into the pawl latches turning counterclockwise to release the lever and lift the carrier insert-eject lever.**

4. **Apply equal pressure to both insert-eject levers in the unlocking direction and pull the board outward to release it from the centerplane support board. (**FIGURE 6-2**).**

5. **Use the front handle to extract the SC board, supporting the bottom with the other hand, and place it on a flat sturdy ESD-protected surface with the component side up.**

6. **Review the platform message log to verify SMS has received the message that the component has been removed, by typing:**

```
sc% showlogs -F
```

Review the board removal message. You will see a message similar to the one below.

```
Jun 16 14:28:05 2003 sun15-sc0: esmd[7167]: [0 4824421445907014
NOTICE Boards.cc 1646] SC at IOx removed
```

where *x* is the SC assembly 0-1.

Guide rail

3U top screw

Pawl latch

Insert-eject levers

SC CPU insert-eject handle

Front handle

Pawl latch

* Spare cPCI slot with two 3U filler panel assemblies

SC CPU board

Front panel

* The SC 6U/3U spare slot is not supported at this time.
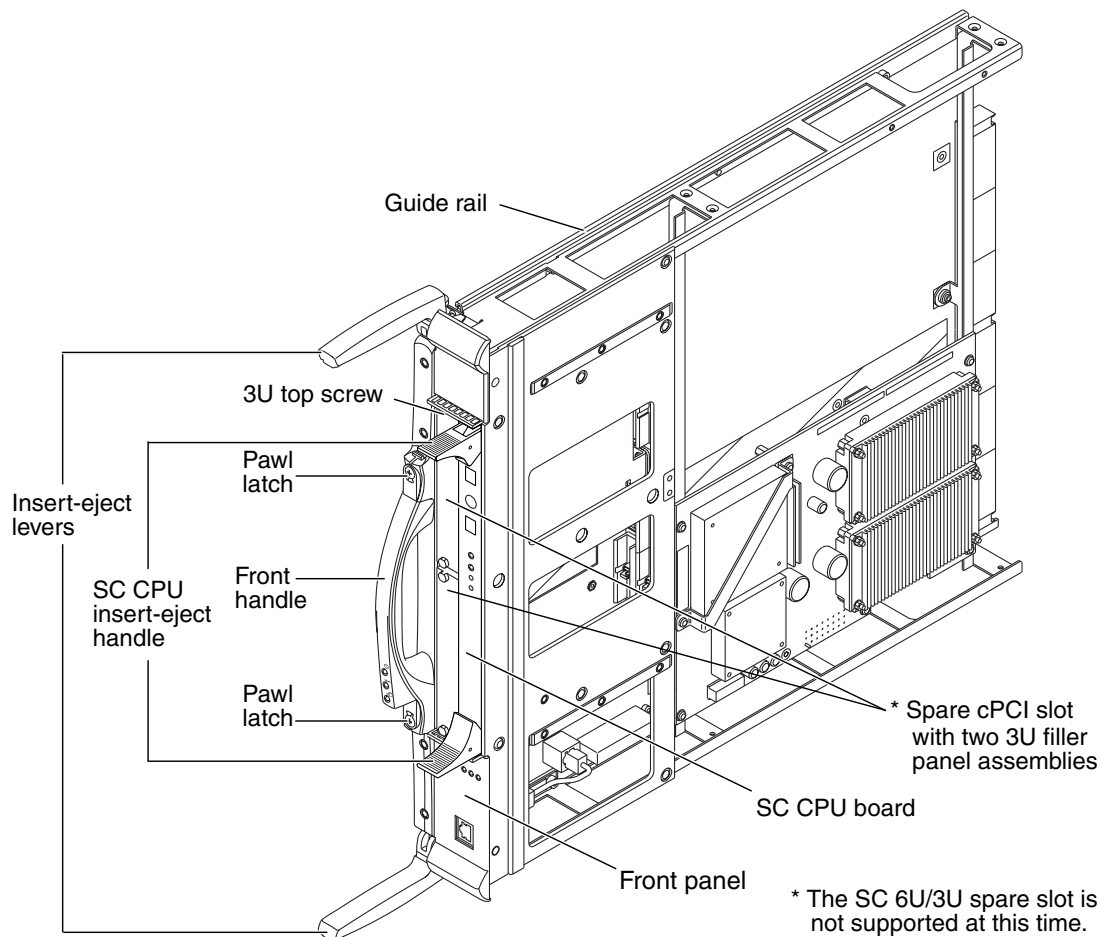
FIGURE 6-2   System Control Board

6.1.2.4   Installing a System Control (SC) Board

Inspect the new board before inserting it into the Sun Fire 15K/12K systems.

1. **Remove the connector protective cover from the board being installed and inspect the connector for any damaged or gaps between the pins.**

2. **Ensure any board alignment tabs are not bent.**

3. **Inspect the mating connector before inserting the new board.**

⚠️ **Caution –** Do not force any board into a slot; it can cause damage to the board and the 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. **To install a System Control board, firmly grasp the board by the front handle, supporting the bottom with the other hand, and position it onto the carrier rail.**

   For proper installation of the SC Board, the SC board carrier plate must be completely installed.

5. **Align the guide rails on the SC control carrier with the guide rails on the SC board carrier plate.**

6. **Apply firm pressure on the front panel of the SC control carrier to connect with the connector on the centerplane support board.**

7. **Complete the installation by applying pressure to the top and bottom insert-eject levers simultaneously to ensure the board is properly seated. When the board is fully seated, both insert-eject levers will simultaneously lock into place automatically.**

   Failure of the service LED to transition from on to off within 60 seconds after insertion indicates a power-status control fault.

   The SC board is powered on upon insertion; therefore, power-on commands are not required.

8. **Verify the LED status per** **.**

9. **Review the platform message log to verify SMS has received the message that the component has been inserted, by typing:**

```
sc% showlogs -F
```

   Review the board insertion message. You will see a message similar to the one as follows.

```
Jun 16 14:30:05 2003 sun15-sc0: esmd[7167]: [0 4824421445907014
NOTICE Boards.cc 1646] SC at IOx inserted
```

   where *x* is the SC assembly 0-1.

10. **Close the Sun Fire 15K/12K system cabinet access doors.**

6.1.2.5 Verifying a System Control (SC) Board

1. **Monitor SSCPOST for any error messages.**

   SSCPOST messages are output to an SMS console. To read SC SMS console messages, you must attach a console cable and terminal to the SC.

   Note – SSCPOST might not be present if a new SC CPU board has been installed.

   ---

2. **Confirm that SMS sees the SC when powered on by using the Sun Management Center or by typing the following SMS command:**

   ```
   sc% showboards -v |grep SC
   SC0          On       SC              Spare           -               -
   SC1          On       SC              Main            -               -
   ```

3. **Ensure the SC boots properly and no errors are reported to the SMS console or** /var/adm/messages.

   An example message is displayed below.

   ```
   ...
   Oct 10 19:40:12 2001 Print services started.
   Oct 10 19:40:16 2001 volume management starting.
   Oct 10 19:40:17 2001 The system is ready.
   ```

4. Check that the SC CPU board flash PROMs match the level on the disk:

```
sc% flashupdate -f /opt/SUNWSMS/firmware/SCOBPimg.di SC0/FP0

Current SC FPROM Information
============================
SC at SC0, FPROM 0:
Name: SSCOBP-dropins, Version: 1.1
Size: 144, Check Sum: 52295
Date Flashed: 09/17/01
Date Created: 09/17/01

SC Flash Image Information
==========================
Name: SSCOBP-dropins, Version: 1.1
Size: 144, Check Sum: 52795
Date Flashed: 08/23/01
Date Created: 08/23/01

Do you wish to update the SC User FPROM (yes/no)?

sc% flashupdate -f /opt/SUNWSMS/firmware/SSCPOST.di SC0/FP1

Current SC FPROM Information
============================
SC at SC0, FPROM 1:
Name: ExtPOST, Version: 1.15
Size: 207169, Check Sum: 44872
Date Flashed: 09/17/01
Date Created: 09/17/01

SC Flash Image Information
==========================
Name: ExtPOST, Version: 1.15
Size: 207161, Check Sum: 62276
Date Flashed: 08/23/01
Date Created: 08/23/01

Do you wish to update the SC User FPROM (yes/no)?
```

■ If different, answer yes to update the PROM(s).

■ If the PROM(s) are updated, reboot the SC.

5. **Ensure SMS starts properly and no errors are reported in**
   /var/opt/SUNWSMS/adm/platform/messages.

   Check the platform message log for any errors. Once the SMS starts, the following message is displayed:

   ```
   Oct 12 11:58:11 2001 star7sc1 fomd[348]: [8577 118844134283
   NOTICE
    FaliloverMgr.cc 2785] SC configured as Spare
   ```

   The spare could be either Spare or Main, depending on the state of the opposite SC.

6. **Re-enable failover on the main SC by typing:**

   ```
   sc% setfailover on
   ```

7. **Verify failover is enabled by typing:**

   ```
   sc% showfailover
   SC Failover Status:   ACTIVE
   ```

System Control (SC) Peripheral Board

The System Control (SC) hot-swappable peripheral board (slot 1) for the Sun Fire 15K/12K systems support the DVD-ROM, hard drive, and digital audio tape (DAT) peripherals. This chapter contains the replacement procedures for the SC peripheral board, and the DVD-ROM, hard drive, and digital audio tape (DAT) peripherals.

This chapter contains the following sections:

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

- Follow all cautions 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 might 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 System Control Peripheral Board LEDs

System Control (SC) peripheral board components and LEDs are listed in TABLE 7-1 and TABLE 7-2.

TABLE 7-1 System Control (SC) Peripheral Board Components

Total Number of System Control Peripheral Boards Per System	Total Number of System Control Peripheral Boards Per Side	Number of LEDs Per System Control Peripheral Board
2	1	6

TABLE 7-2   System Control (SC) Peripheral Board Valid LED Status

LEDs after Insertion or Initial System Power On			LEDs After PRESENCE is Detected			Component Powered On			Component Powered Off		
Active	Service	Remove	Active	Service	Remove	Active	Service	Remove	Active	Service	Remove
on	on	off	on	off	off	on	off	off	off	off	on

System Control must be present and powered on before the SC peripheral board can be powered on. Failure of the service LED to transition from ON to OFF within 60 seconds after insertion indicates a power-status control fault.

FIGURE 7-1 illustrates the System Control peripheral board and the LED locations.

Peripheral DVD-ROM
Ejection indicator (amber)

Activation indicator (green)
Service indicator (amber)
Removal indicator (amber)

Peripheral Tape Drive
Tape drive *Clean* indicator (amber)
Tape drive activation (green)
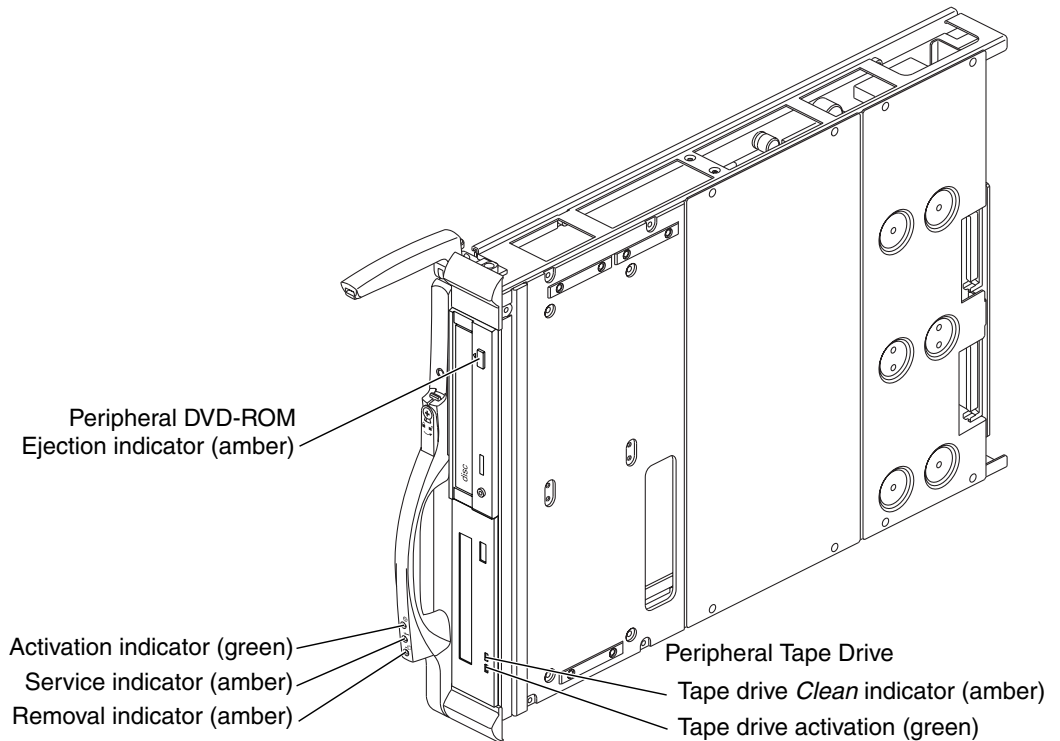
FIGURE 7-1   System Control Peripheral Board LEDs

TABLE 7-3 describes the DVD indicator function, and TABLE 7-4 describes the tape indicator functions.

TABLE 7-3 System Control DVD Peripheral Indicator Function Descriptions

Indicator Functions	Description
Blinking (0.8 second intervals)	Busy
OFF	Idle
OFF	No disk
ON	Error
Blinking (1.6 second intervals)	Audio playback
ON	Data transfer

TABLE 7-4 System Control Tape Peripheral Indicator Function Descriptions

Indicator Functions	Description
Tape Indicator	
Green flashing and amber OFF	Loading or unloading
Green fast flashing and amber OFF	Reading and writing
Green ON and amber OFF	Tape is loaded and ready
Green ON or OFF and amber flashing	Clean tape drive
Green ON or OFF and amber ON	Error
Cleaning Mode	
Green fast flashing and amber OFF	Cleaning in progress
Firmware Upgrade Mode	
Green fast flashing and amber fast flashing	Firmware is downloading (auto ejection when complete)

7.2 System Control Peripheral Board Replacement Procedures

The system control peripheral board is a hot-swap component board. The following sections provide instructions for removing and installing the peripheral board and the DVD-ROM, hard drive, and digital audio tape peripheral components:

7.2.1 Isolating a Failed System Control (SC) Peripheral Board

1. **Check for any error messages during SCPOST.**

   SCPOST messages are output to an SMS console. To read SC SMS console messages, you must attach a console cable and terminal to the SC.

2. **On the SMS, check for any error messages in** `/var/adm/messages` **and** `/var/opt/SUNWSMS/adm/platform/messages`**, specifically those dealing with the onboard peripherals (disk, tape).**

7.2.2 Powering Off a System Control (SC) Peripheral Board

● **Power off the SC Board.**

   See Section 6.1.2.2, "Powering Off a System Control (SC) Board" on page 6-4.

7.2.3 Removing a System Control (SC) Peripheral Board

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

Caution – Before removing a board from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 7.2.2, "Powering Off a System Control (SC) Peripheral Board" on page 7-5.

2. **Insert a Phillips No. 1 screwdriver into the pawl latches turning counterclockwise to release the lever and lift the carrier insert-eject lever.**

3. **Use the front handle to extract the SC peripheral board, supporting the bottom with the other hand, and place it on a flat, sturdy, ESD-protected surface with the component side up.**

4. **To access the internal components of the SC peripheral board, remove the four (4) M3x6 flathead screws from the center SCSI access panel, as shown in** FIGURE 7-2.
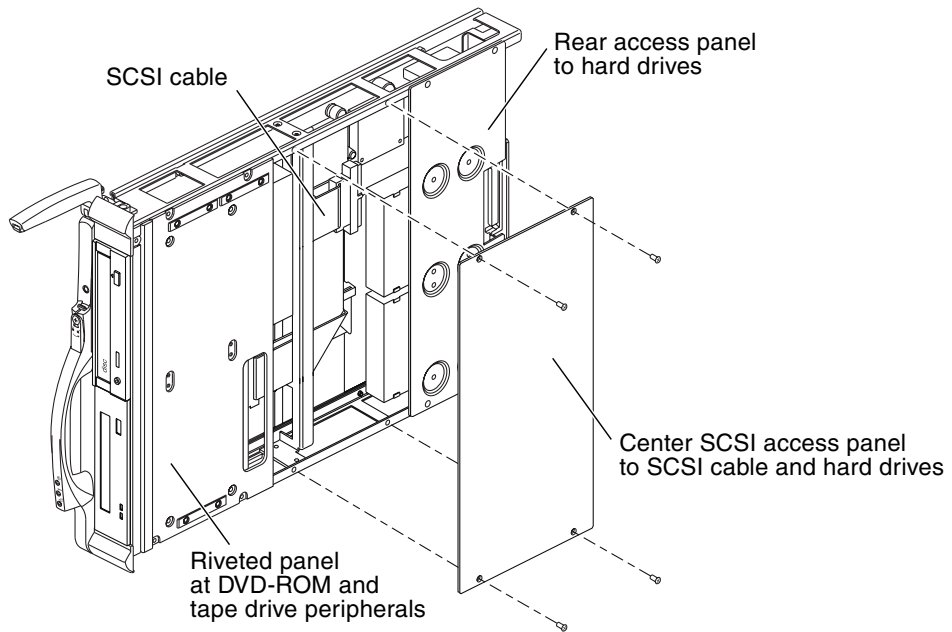
FIGURE 7-2   SC Peripheral Board and Center Access Panel—Exploded

7.2.4 Installing a System Control (SC) Peripheral Board

Inspect the new board before inserting it into the Sun Fire 15K/12K systems.

1. **Remove the connector protective cover from the board being installed and inspect the connector for any damaged or gaps between the pins.**

2. **Ensure any board alignment tabs are not bent.**

3. **Inspect the mating connector before inserting the new board.**

> ⚠ **Caution –** Do not force any board into a slot; it can cause damage to the board and the 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. **To install a SC peripheral board, firmly grasp the board by the front handle, supporting the bottom with the other hand, and position it onto the carrier rail.**

5. **With the insert-eject lever extended, slide the board into the slot until it begins to connect with the centerplane support board connector.**

6. **Apply firm pressure to the face plate to fully seat the board with the connector.**

7. **Fold the insert-eject lever inward to fully seat the board ensuring the lever is nested within the front handle.**

   Failure of the service LED to transition from on to off within 60 seconds after insertion indicates a power-status control fault.

8. **Verify the LED status per** TABLE 7-2**.**

9. **Close the Sun Fire 15K/12K system cabinet access doors.**

7.2.5 Powering On a System Control (SC) Peripheral Board

● **Power on the SC by using the Sun Management Center or from the main SC by typing the following SMS command:**

```
sc% resetsc

About to reset other SC. Are you sure you
want to continue? (yes/no)? yes
```

7.2.6 Verifying a System Control (SC) Peripheral Board

1. **Monitor SCPOST for any error messages during SC boot.**

   SCPOST messages are output to an SMS console. To read SC SMS console messages, you must attach a console cable and terminal to the SC.

2. **Ensure that Solaris software can communicate to all the peripheral devices.**

   - For the DVD-ROM, insert a CD and ensure it mounts properly.
   - For hard disks, check that the `/dev/dsk` and `/dev/rdsk` entries are correct and that the Solaris software can access the disks (`format`, `prtvtoc`).
   - For the DAT drive, check that the `/dev/rmt` entries are correct and that the Solaris software can access the tape device (`mt status`).

3. **Verify the SC Board.**

   See Section 6.1.2.5, "Verifying a System Control (SC) Board" on page 6-10.

7.3 DVD-ROM Peripheral Replacement Procedures

All backup procedures and any other customer administrative procedures must be completed by the responsible system administrator prior to DVD-ROM peripheral replacement by field personnel.

7.3.1 Removing the Failed DVD-ROM Peripheral From the System Control (SC) Peripheral Board

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

2. **Power off the SC board.**

   See Section 6.1.2.2, "Powering Off a System Control (SC) Board" on page 6-4.

3. **Remove the SC peripheral board.**

   See Section 7.2.3, "Removing a System Control (SC) Peripheral Board" on page 7-5.

4. **At the center SCSI access panel, remove the four (4) M3x6 flathead screws and remove the panel.**

5. **Disconnect the SCSI ribbon cable connector and the DVD PWR connector from the DVD-ROM peripheral.**

6. **To access the internal DVD component of the SC peripheral board, remove the four (4) M3x6 panhead screws from the forward mounting panel, as shown in** **.**
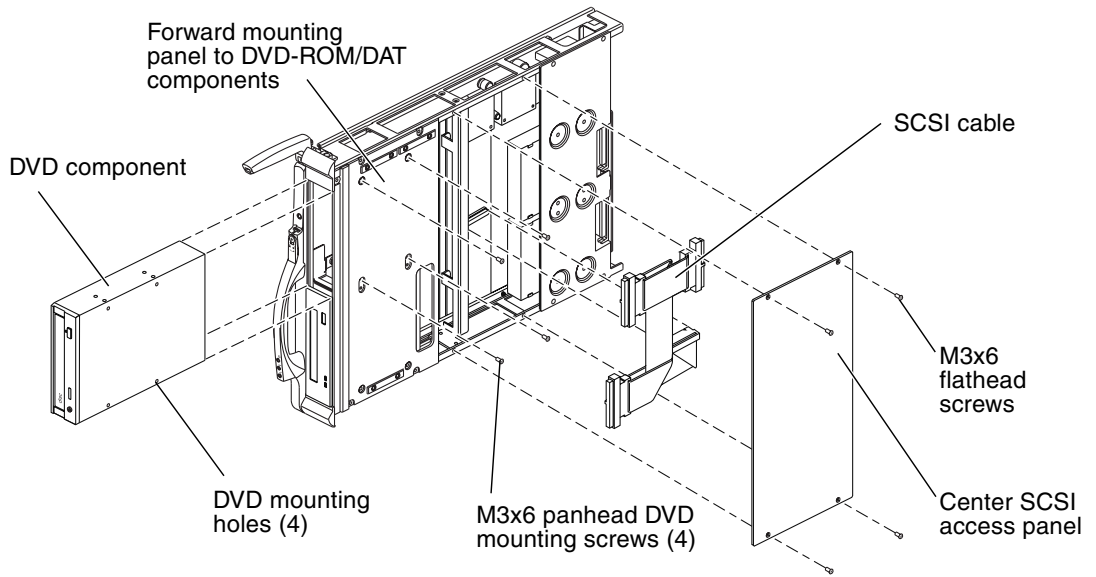
FIGURE 7-3   SC Peripheral Board DVD Removal and Access Panel—Exploded

7. **From the front of the SC peripheral board, pull out the failed DVD-ROM peripheral and place on an ESD-protected surface.**

7.3.2 Installing the DVD-ROM Peripheral on the System Control (SC) Peripheral Board

1. **With the SC peripheral board in horizontal position, insert a new DVD-ROM peripheral into the top bay with the mounting holes aligned upward.**

2. **Push the DVD-ROM peripheral inward until the front-panel bezel meets the SC peripheral board housing.**

3. **Align the four (4) holes of the side-panel sheet metal with the four (4) holes of the DVD-ROM peripheral.**

4. **Secure the DVD-ROM peripheral to the SC peripheral board housing with the four (4) M3x6 panhead screws.**

5. **Connect the DVD PWR cable and the SCSI ribbon cable connectors.**

6. **Install the center SCSI access panel and secure with the four (4) M3x6 flathead screws.**

7. **Install the SC peripheral board.**

   See Section 7.2.4, "Installing a System Control (SC) Peripheral Board" on page 7-7.

8. **Close the Sun Fire 15K/12K system cabinet access doors.**

7.3.3 Powering On a DVD-ROM Peripheral

● **Power on the SC by using the Sun Management Center or from the main SC by typing the following SMS command:**

```
sc% resetsc

About to reset other SC. Are you sure you
want to continue? (yes/no)? yes
```

7.3.4 Verifying a DVD-ROMDVD-ROM Peripheral

● **Verify the DVD-ROM.**

   See Section 7.2.6, "Verifying a System Control (SC) Peripheral Board" on page 7-8.

7.4 Hard Drive Peripheral Replacement Procedures

All backup procedures and any other customer administrative procedures must be completed by the responsible system administrator prior to hard drive peripheral replacement by field service personnel.

7.4.1 Removing the Failed Hard Drive Peripheral From the System Control (SC) Peripheral Board

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

2. **Power off the SC board.**

   See Section 6.1.2.2, "Powering Off a System Control (SC) Board" on page 6-4.

3. **Remove the SC peripheral board.**

   See Section 7.2.3, "Removing a System Control (SC) Peripheral Board" on page 7-5.

4. **At the center SCSI access panel, remove the four (4) M3x6 flathead screws and remove the panel (FIGURE 7-4).**

5. **To access the internal hard drive(s) component, remove the four (4 per drive) 6-32 2A UNC screws holding the hard drive(s) to the rear panel of the SC peripheral.**

Caution – Support the hard drive during removal to prevent damage to the SC peripheral board and its components.

6. **Holding the front end of the failed hard drive, remove by pulling outward to disconnect from the J2 (upper drive), or J3 (lower drive), connector of the SCSI backplane that is attached to the back of the rear panel. Pull outward and up to clear the rear panel.**

To J2 SCSI
backplane connector
(target ID 3)

To J3 SCSI
backplane connector
(target ID 2)

Upper hard
drive to J2

Lower hard
drive to J3

DVD-ROMDVD-ROM

Tape
drive

Rear panel
(remove only
as required)

SC peripheral
SCSI backplane
J2 connector

SC peripheral
SCSI backplane
J3 connector

6-32 UNC 2A panhead
screws (4)
upper hard drive at J2

6-32 UNC 2A panhead
screws (4)
lower hard drive at J3

Center SCSI access panel

M3x6 panhead screws (4)
on rear access panel
(outer edge)

M3x6 panhead screws (4)
on SCSI access panel

FIGURE 7-4 SC Peripheral Board Hard Drive Removal and Access Panel—Exploded

7.4.2 Installing the Hard Drive Peripheral on the System Control (SC) Peripheral Board

⚠ **Caution –** Support the hard drive during installation to prevent damage to the SC peripheral board and its components.

1. **Holding the front end of the new hard drive(s), insert under the rear panel and connect to the J2 (upper drive), or J3 (lower drive), connector of the SC peripheral SCSI backplane.**

2. **Secure the hard drive(s) to the SC peripheral board with the four (4 per drive) 6-32 2A UNC screws.**

3. **Replace the SCSI access panel and secure with the four (4) M3x6 flathead screws.**

4. **Install the SC peripheral board.**

   See Section 7.2.4, "Installing a System Control (SC) Peripheral Board" on page 7-7.

5. **Close the Sun Fire 15K/12K system cabinet access doors.**

7.4.3 Powering On a Hard Drive Peripheral

● **Power on the SC by using the Sun Management Center or from the main SC by typing the following SMS command:**

```
sc% resetsc

About to reset other SC. Are you sure you
want to continue? (yes/no)? yes
```


7.4.4 Verifying a Hard Drive Peripheral

● **Verify the hard drive.**

   See Section 7.2.6, "Verifying a System Control (SC) Peripheral Board" on page 7-8.

7.5 Digital Audio Tape (DAT) Peripheral Replacement Procedures

All backup procedures and any other customer administrative procedures must be completed by the responsible system administrator prior to DAT peripheral replacement by Field Service personnel.

Caution – Before removing a board from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 7.2.2, "Powering Off a System Control (SC) Peripheral Board" on page 7-5.

7.5.1 Removing the Failed DAT Peripheral From the System Control (SC) Peripheral Board

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

2. **Power off the SC Board.**

   See Section 6.1.2.2, "Powering Off a System Control (SC) Board" on page 6-4.

3. **Remove the SC Peripheral board.**

   See Section 7.2.3, "Removing a System Control (SC) Peripheral Board" on page 7-5.

4. **At the center SCSI access panel, remove the four (4) M3x6 flathead screws and remove the access panel.**

5. **Disconnect the SCSI ribbon cable connector and the DAT PWR cable connector from the DAT peripheral.**

6. **To access the internal DAT component of the SC peripheral board, remove the four (4) M3x6 panhead screws from the forward mounting panel, as shown in** FIGURE 7-5.

7. **From the front of the SC peripheral board, pull out the failed DAT peripheral and place on an ESD-protected surface.**
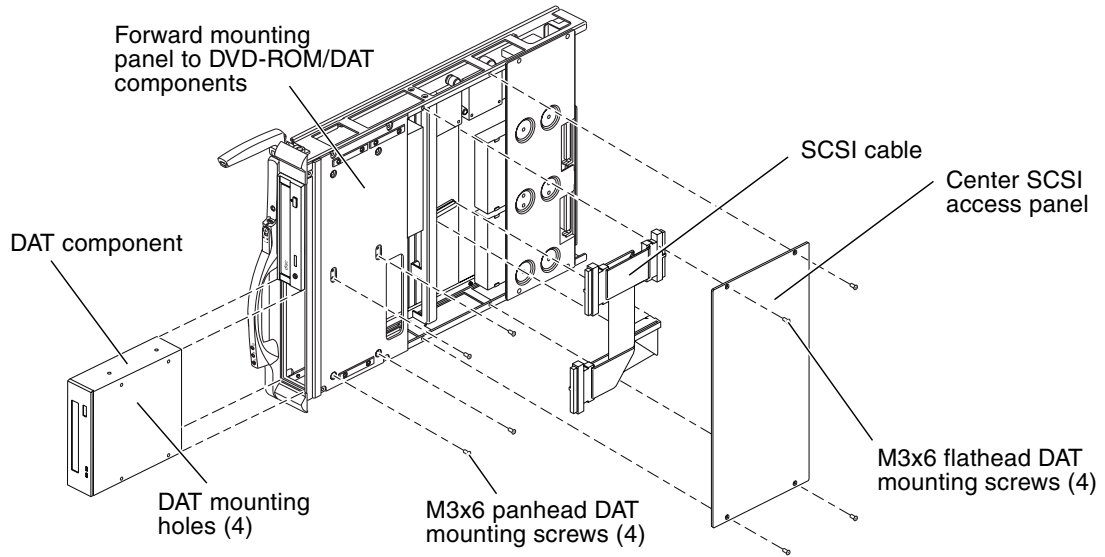
FIGURE 7-5 SC Peripheral Board DAT Removal and Access Panel—Exploded

7.5.2 Installing the DAT Peripheral on the System Control (SC) Peripheral Board

1. **With the SC peripheral board in horizontal position, insert a new DAT into the bottom bay with the mounting holes aligned upward.**

2. **Push the DAT peripheral inward until the front-panel bezel meets the SC peripheral board housing.**

3. **Align the four (4) holes of the side-panel sheet metal with the four (4) holes of the DAT peripheral.**

4. **Secure the DAT peripheral to the SC peripheral board housing with the four (4) M3x6 panhead screws.**

5. **Connect the DAT PWR cable and the SCSI ribbon cable connectors.**

6. **Install the center SCSI access panel and secure with the four (4) M3x6 flathead screws.**

7. **Install the SC peripheral board.**

   See Section 7.2.4, "Installing a System Control (SC) Peripheral Board" on page 7-7.

8. **Close the Sun Fire 15K/12K system cabinet access doors.**

7.5.3 Powering On a Digital Audio Tape (DAT) Peripheral

● **Power on the SC by using the Sun Management Center or from the main SC by typing the following SMS command:**

```
sc% resetsc

About to reset other SC. Are you sure you
want to continue? (yes/no)? yes
```

7.5.4 Verifying a Digital Audio Tape (DAT) Peripheral

● **Verify the DAT.**

See Section 7.2.6, "Verifying a System Control (SC) Peripheral Board" on page 7-8.

CPU (Slot 0) Board

The standard hot-swappable CPU boards or CPU filler panels for the Sun Fire 15K/12K systems are inserted into slot 0, expander 0 through 8 (front), and slot 0, expander 9 through 17 (rear). This chapter contains the replacement procedures for the standard CPU board, the CPU board DIMMs, and the CPU filler panels.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

The following configuration rules apply when configuring components of the Sun Fire 15K/12K systems:

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.

- All CPU modules must be the same speed.
- All external cache modules must be the same size.
- When configuring memory:
  - All sockets within a bank must be fully populated.
  - All DIMM sizes within a bank must be equal.

8.1 CPU (Slot 0) Board LEDs

CPU Board components and LEDs are listed in TABLE 8-1 and TABLE 8-2.

TABLE 8-1 CPU Board Components

Total Number of CPU Boards Per System	Total Number of CPU Boards Per Side	Number of LEDs Per CPU Board
1-18	0-9	3

TABLE 8-2 CPU Board Valid LED Status

LEDs after Insertion or Initial System Power On			Component Powered On			Component Powered Off		
Active	Service	Remove	Active	Service	Remove	Active	Service	Remove
off	off	on	on	off	off	off	off	on

FIGURE 8-1 illustrates the CPU board and the LED locations.

Activation indicator (green)
Service indicator (amber)
Removal indicator (amber)
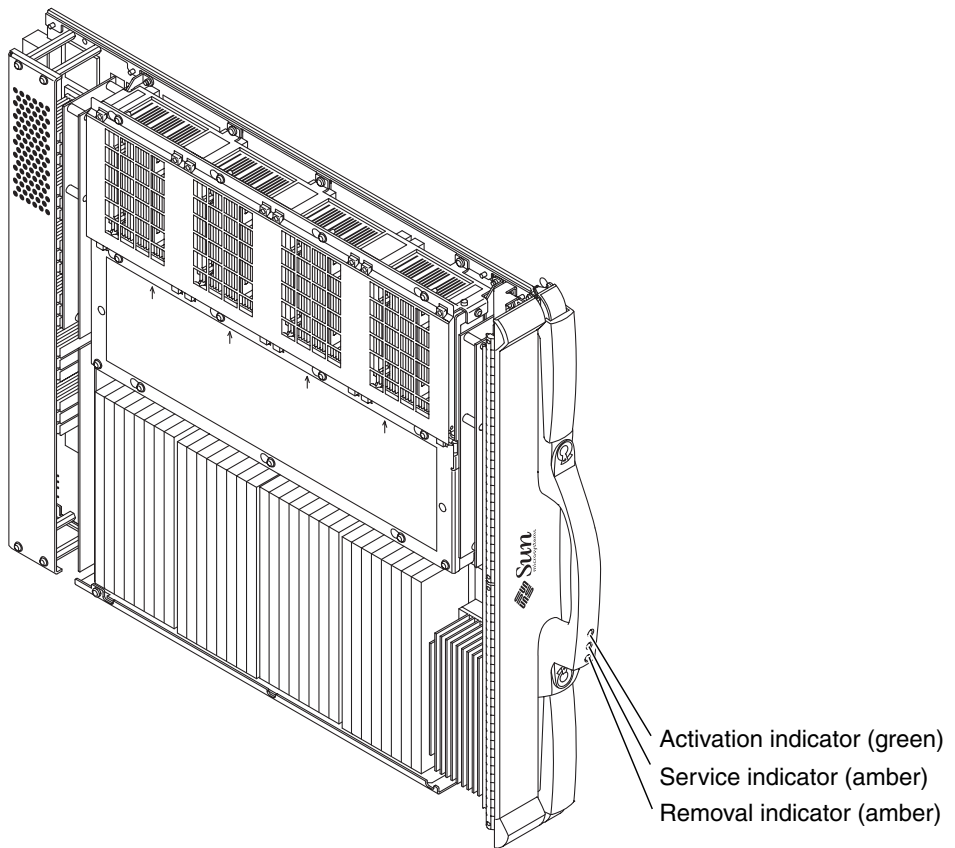
FIGURE 8-1 CPU Board LEDs

8.2 CPU (Slot 0) Board Replacement Procedures

8.2.1 Isolating a Failed CPU (Slot 0) Board

1. **Check for any error messages during POST.**

2. **On the SC, check for any error messages in**
   `/var/opt/SUNWSMS/adm/platform/messages` and
   `/var/opt/SUNWSMS/adm/`*domain_id*`/messages`.

where *domain_id* = domain letter.

If available, examine any DStop or RStop files located in
`/var/opt/SUNWSMS/adm/`*domain_id*`/dump`.

where *domain_id* = domain letter.

3. **On the specific domain(s), use** `adb` **to examine any core files in**
`/var/crash/`*hostname***.**

8.2.2 Powering Off a CPU (Slot 0) Board

1. **Check the power state of the board to be removed by typing:**

```
sc% showboards | grep SBx
```

where *x* is the CPU board 0-17.

- If the board is powered `off`, go to Section 8.2.3, "Removing a CPU (Slot 0) Board" on page 8-5.
- If the power state is `On` and the board status is `Isolated` and not part of the domain, power off the CPU board by using the Sun Management Center or by typing the following SMS command:

```
sc% poweroff SBx
```

where *x* is the CPU Board 0-17. Go to Section 8.2.3, "Removing a CPU (Slot 0) Board" on page 8-5.

2. **If the board is part of a multi-board domain or a single-board domain, do the following:**

- For a multi-board domain, use dynamic reconfiguration to deconfigure the CPU from the running domain by using the Sun Management Center or by typing the following SMS command:

```
sc% deleteboard SBx
```

where *x* is the CPU Board 0-17. Go to Section 8.2.3, "Removing a CPU (Slot 0) Board" on page 8-5.

■ If you have a single-board domain and the operating system is up, log into the domain as the domain administrator and shut down the operating system by typing the following sequence:

```
domain_name# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

■ Power off the hardware associated with the domain by typing:

```
sc% setkeyswitch -d domain_id off
```

8.2.3   Removing a CPU (Slot 0) Board

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

Caution – After the board is removed, carry the board to a work area holding it vertically by the front handle with the connector downward. Lift the board and place the other hand under the bottom, or back, of the board placing the bottom, or back, on an ESD-protected surface. Never place the weight of a board on its connector as it is easily damaged.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

Caution – Before removing a board from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 8.2.2, "Powering Off a CPU (Slot 0) Board" on page 8-4.

2. **Insert a Phillips No. 1 screwdriver into top and bottom pawl latches turning counterclockwise to release the levers operating the two (2) board carrier insert-eject levers simultaneously (**FIGURE 8-2**).**

3. **Use the front handle to extract the CPU board, supporting the bottom with the other hand, and place it on a flat, sturdy, ESD-protected surface with the component side up.**

Extended cache DIMMs (not visible in diagram)
(8 x 2 per processor)

CPU processor 1

CPU processor 0

CPU processor 3

CPU processor 2

Insert-eject lever

Pawl latch (top)

Memory module DIMMs (32 total)

Pawl latch (bottom)
Insert-eject lever
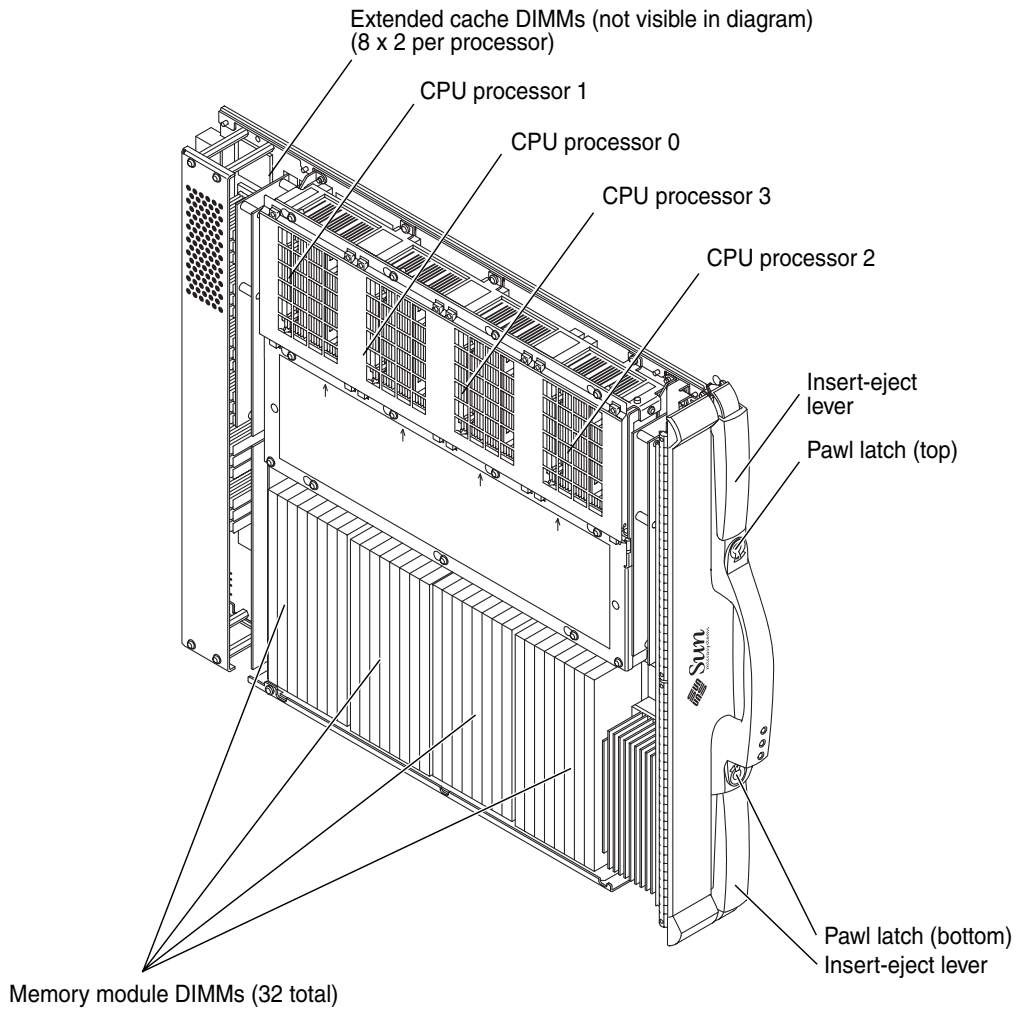
FIGURE 8-2   CPU Board Components

4. **Review the platform message log to verify SMS has received the message that the component has been removed, by typing:**

```
sc% showlogs -F
```

Review the board removal message. You will see a message similar to the one below.

```
Jun 16 14:28:05 2003 sun15-sc0: esmd[7167]: [0 4824421445907014
NOTICE Boards.cc 1646] CPU at SBxx removed
```

where *xx* is the CPU assembly 0-17.

5. **Remove the memory module DIMMs from the board and set aside.**

See Section 8.3.1, "Removing the CPU DIMMs" on page 8-9.

8.2.4 Installing a CPU (Slot 0) Board

Inspect the new board before inserting it into the Sun Fire 15K/12K systems.

1. **Remove the connector protective cover from the board being installed and inspect the connector for any damaged or gaps between the pins.**

2. **Ensure any board alignment tabs are not bent.**

3. **Inspect the mating connector before inserting the new board.**

⚠ **Caution –** Do not force any board into a slot; it can cause damage to the board and the 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. **Install the memory module DIMMs removed from the board.**

See Section 8.3.2, "Installing the CPU DIMMs" on page 8-11.

5. **To install a CPU (slot 0) board, firmly grasp the board by the front handle, supporting the bottom with the other hand, and position it onto the carrier rail.**

See FIGURE 8-2 detailing the CPU board components.

6. **With the insert-eject levers extended, slide the board into the slot until it begins to connect with the expander connector.**

7. **Apply firm pressure to the face plate to fully seat the board with the expander connector.**

8. **Use the insert-eject lever to fully seat and automatically lock the board into position.**

   The usual failure of the service LED to transition from on to off within 60 seconds after insertion, indicating a power-status control fault, does not apply for the CPU board.

9. **Verify the LED status per** TABLE 8-2**.**

10. **Review the platform message log to verify SMS has received the message that the component has been inserted, by typing:**

    ```
    sc% showlogs -F
    ```

    Review the board insertion message. You will see a message similar to the one below.

    ```
    Jun 16 14:30:05 2003 sun15-sc0: esmd[7167]: [0 4824421445907014
    NOTICE Boards.cc 1646] CPU at SBxx inserted
    ```

    where *xx* is the CPU assembly 0-17.

11. **Close the Sun Fire 15K/12K system cabinet access doors.**

8.2.5 Verifying a CPU (Slot 0) Board

1. **Using dynamic reconfiguration, configure the CPU board into the domain(s) by using the Sun Management Center or by typing the following SMS command:**

   ```
   sc% addboard -d domain_id SBx
   ```

   where *x* is the CPU Board 0-17.

   domain_id is the letter A-R of the target domain(s) for the component.

   OR

   If the domain was shut down prior to the expander replacement, start the domain by typing:

   ```
   sc% setkeyswitch -d domain_id  on
   ```

2. **Examine the POST messages reported by the** `addboard` **or** `setkeyswitch` **for any errors. Also monitor the message logs on the SC, specifically** `/var/opt/SUNWSMS/adm/platform/messages` **and** `/var/opt/SUNWSMS/adm/`*domain_id*`/messages`**.**

8.3 CPU (Slot 0) Board DIMM Replacement Procedures

8.3.1 Removing the CPU DIMMs

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

2. **Remove the CPU board requiring a DIMM replacement by following the procedures in:**
   - Section 8.2.2, "Powering Off a CPU (Slot 0) Board" on page 8-4
   - Section 8.2.3, "Removing a CPU (Slot 0) Board" on page 8-5

3. **Locate the slot for the CPU DIMM requiring replacement. DIMM location numbers are shown in** FIGURE 8-3**.**

4. **Eject the faulty CPU DIMM by pressing down on the ejection levers on both sides of the DIMM connector as shown in** FIGURE 8-4**.**

5. **Remove the CPU DIMM by holding the edges and place on an ESD-protected surface.**

103
113
102
112
101
111
100
110

003
013
002
012
001
011
000
010

303
313
302
312
301
311
300
310

203
213
202
212
201
211
200
210

DIMM 1
bank 1, 0

DIMM 0
bank 1, 0

DIMM 3
bank 1, 0

DIMM 2
bank 1, 0

DIMM
Bank
Processor
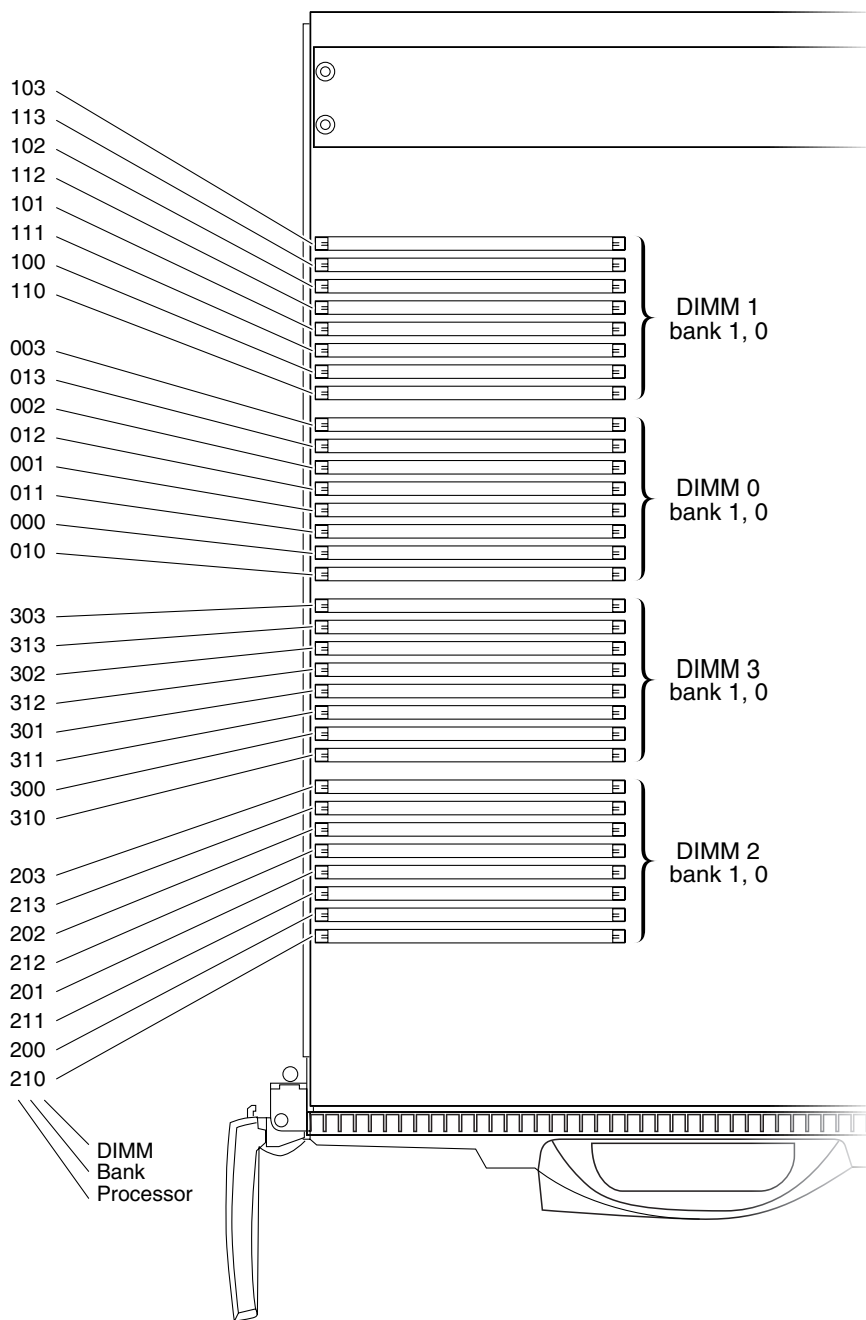
FIGURE 8-3 CPU Board Memory DIMM Locations
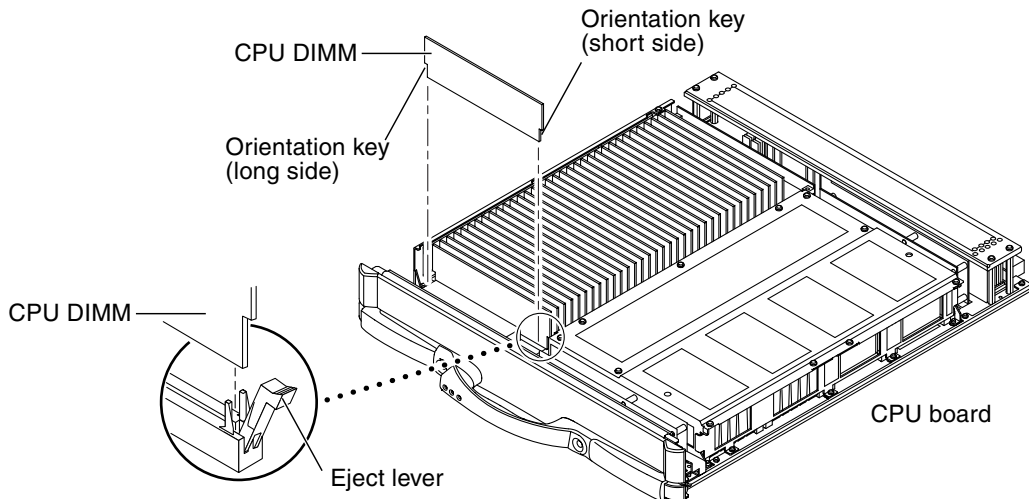
FIGURE 8-4 CPU DIMM Removal

8.3.2   Installing the CPU DIMMs

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

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

All banks must have the same size DIMMs. DIMMs from different manufacturers are interchangeable in a single bank if the DIMMs have the same capacity and speed. Sort the DIMMs into banks by DIMM size.

1. **Ensure the CPU board is on an ESD-protected surface.**

2. **Carefully remove the new CPU DIMM from its protective packaging and place it on an ESD-protected surface.**

3. **Press down on the ejector levers at both ends of the DIMM connector slot to set them in the insert-ready position.**

4. **Align the short-side and the long-side orientation key of the CPU DIMM with the short side and long side orientation position of the DIMM connector (**FIGURE 8-4**).**

Note – If four DIMMs are being installed, insert the DIMMs into the same bank.

5. **Push firmly on the top edge of the CPU DIMM to insert into the DIMM connector.**

6. **Install the remaining new CPU DIMMs.**

7. **After installation of the new CPU DIMMs, follow the procedures in:**
   - Section 8.2.4, "Installing a CPU (Slot 0) Board" on page 8-7
   - Section 8.2.5, "Verifying a CPU (Slot 0) Board" on page 8-8

8. **Close the Sun Fire 15K/12K system cabinet access doors.**

8.4 CPU (Slot 0) Filler Panel Replacement Procedures

8.4.1 Removing a CPU (Slot 0) Filler Panel

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

2. **Insert a Phillips No. 1 screwdriver into the top and bottom pawl latches turning counterclockwise to release the levers operating the two (2) board carrier insert-eject levers simultaneously.**

3. **Use the front handle to extract the CPU filler panel, supporting the bottom with the other hand, and place on a flat sturdy surface.**

8.4.2 Installing a CPU (Slot 0) Filler Panel

1. **To install a CPU filler panel, firmly grasp the panel by the front handle, supporting the bottom with the other hand, and position it onto the carrier rail.**

2. **With the insert-eject levers extended, slide the panel into the slot until it is even with the other boards.**

3. **Use the front handle to fully seat the board.**

4. **Lock the CPU filler panel by sliding the insert-eject levers into position until they are fully nested with the front handle.**

5. **Close the Sun Fire 15K/12K system cabinet access doors.**

I/O (Slot 1) Assemblies

The hot-swappable hsPCI assembly, hot-swappable MaxCPU board, or I/O filler panels for the Sun Fire 15K/12K systems are inserted into slot 1, expander 0 through 8 (front), and slot 1, expander 9 through 17 (rear). This chapter contains the replacement procedures for the standard hsPCI assembly, the MaxCPU board, and the I/O filler panels.

This chapter contains the following sections:

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

- Follow all cautions 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 might 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 hsPCI (Slot 1) Assembly

9.1.1 hsPCI (Slot 1) Assembly LEDs

Hot-swap PCI (hsPCI) assembly components and LEDs are listed in TABLE 9-1 and TABLE 9-2.

TABLE 9-1 hsPCI Assembly Components

Total Number of hsPCI Assemblies Per System	Total Number of hsPCI Assemblies Per Side	Number of LEDs Per hsPCI Assembly
1-18	0-9	15

TABLE 9-2 hsPCI Assembly Valid LED Status

LEDs after Insertion or Initial System Power On			LEDs After PRESENCE is Detected			Component Powered On			Component Powered Off		
Active	Service	Remove	Active	Service	Remove	Active	Service	Remove	Active	Service	Remove
off	on	on	off	off	on	on	off	off	off	off	on

Failure of the service LED to transition from ON to OFF within 60 seconds after insertion indicates a power-status control fault.

FIGURE 9-1 illustrates the hsPCI assembly and the LED locations.
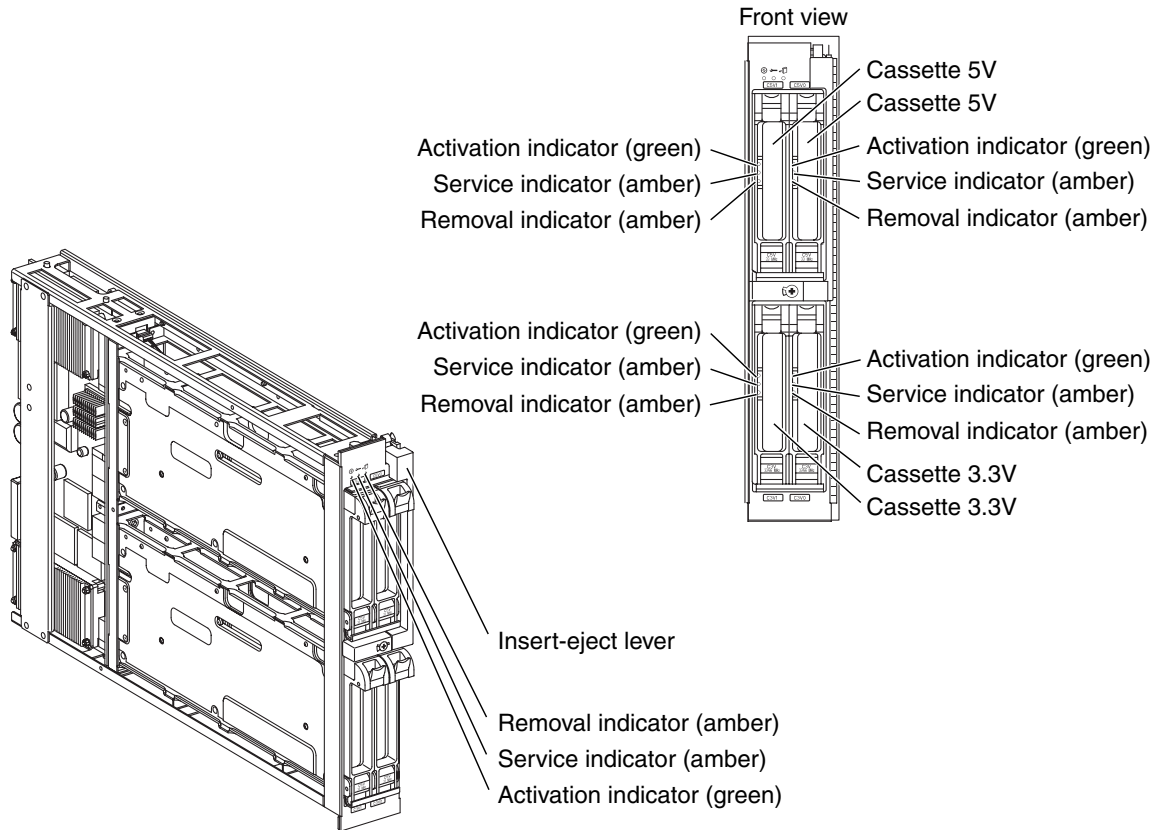
FIGURE 9-1 hsPCI Board LEDs

9.1.2 hsPCI I/O (Slot 1) Assembly Replacement Procedures

9.1.2.1 Isolating a Failed hsPCI (Slot 1) Assembly

1. **Check for any error messages during POST.**

2. **On the SC, check for any error messages in**
   `/var/opt/SUNWSMS/adm/platform/messages` and
   `/var/opt/SUNWSMS/adm/`*domain_id*`/messages`.

   where *domain_id* = domain letter.

3. **If available, examine any DStop or RStop files located in**
   `/var/opt/SUNWSMS/adm/`*domain_id*`/dump`**.**

   where *domain_id* = domain letter.

4. **On the specific domain(s), use** `adb` **to examine any core files in**
   `/var/crash/`*hostname***.**

9.1.2.2 Powering Off an hsPCI (Slot 1) Assembly

1. **Check the power state of the board to be removed by typing:**

   ```
   sc% showboards | grep IOx
   ```

   where *x* is the hsPCI assembly 0-17.

   - If the board is powered off, go to Section 9.1.2.3, "Removing an hsPCI (Slot 1) Assembly" on page 9-5.

   - If the power state is `On` and the board status is `Isolated` and not part of the domain, power off the hsPCI by using the Sun Management Center or by typing the following SMS command:

   ```
   sc% poweroff IOx
   ```

   where *x* is the hsPCI assembly 0-17, and go to Section 9.1.2.3, "Removing an hsPCI (Slot 1) Assembly" on page 9-5.

2. **If the board is part of a multi-board domain or a single-board domain, do the following:**

   - Terminate all input/output device operations associated with the I/O board to be deconfigured.

   - For multi-board domain, using dynamic reconfiguration, deconfigure the hsPCI from the running domain by using the Sun Management Center or by typing the following SMS command:

   ```
   sc% deleteboard IOx
   ```

   where *x* is the hsPCI assembly 0-17, and go to Section 9.1.2.3, "Removing an hsPCI (Slot 1) Assembly" on page 9-5.

- If you have a single-board domain and the operating system is running, log into the domain as the domain administrator and shut down the operating system by typing the following sequence:

```
domain_name# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

- Power off the hardware associated with the domain by typing:

```
sc% setkeyswitch -d domain_id off
```

9.1.2.3   Removing an hsPCI (Slot 1) Assembly

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

Caution – After the board is removed, carry the board to a work area holding it vertically by the front handle with the connector downward. Lift the board and place the other hand under the bottom, or back, of the board placing the bottom, or back, on an ESD-protected surface. Never place the weight of a board on its connector as it is easily damaged.

1. Open the Sun Fire 15K/12K system cabinet access doors.

Caution – Before removing a board from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 9.1.2.2, "Powering Off an hsPCI (Slot 1) Assembly" on page 9-4.

2. Label and remove the I/O cables from the hsPCI assembly.

3. Insert a Phillips No. 1 screwdriver into the pawl latches turning counterclockwise to release the lever and lift the carrier insert-eject lever.

4. Use the front handle to extract the hsPCI (slot 1) assembly, supporting the bottom with the other hand, and place it on a flat, sturdy, ESD-protected surface with the component side up.

5. **Review the platform message log to verify SMS has received the message that the component has been removed, by typing:**

```
sc% showlogs -F
```

Review the board removal message. You will see a message similar to the one below.

```
Jun 16 14:28:05 2003 sun15-sc0: esmd[7167]: [0 4824421445907014
NOTICE Boards.cc 1646] HPCI at IOxx removed
```

where *xx* is the hsPCI assembly 0-17.

9.1.2.4 Installing an hsPCI (slot 1) Assembly

1. **To install a hsPCI (slot 1) assembly, firmly grasp the board assembly, supporting the bottom with the other hand, and position it onto the carrier rail.**

2. **With the insert-eject lever extended, slide the board into the slot until it begins to connect with the expander connector.**

3. **Apply firm pressure to the face plate to properly seat the board with the expander connector.**

4. **Use the insert-eject lever to fully seat and automatically lock the board into position.**

   Failure of the service LED to transition from on to off within 60 seconds after insertion indicates a power-status control fault.

5. **Verify the LED status per** TABLE 9-2**.**

6. **Install all I/O cables.**

7. **Review the platform message log to verify SMS has received the message that the component has been inserted, by typing:**

```
sc% showlogs -F
```

Review the board insertion message. You will see a message similar to the one below.

```
Jun 16 14:30:05 2003 sun15-sc0: esmd[7167]: [0 4824421445907014
NOTICE Boards.cc 1646] HPCI at IOxx inserted
```

where *xx* is the hsPCI assembly 0-17.

8. **Close the Sun Fire 15K/12K system cabinet access doors.**

9.1.2.5 Powering On an hsPCI (Slot 1) Assembly

● **Power on the hsPCI Assembly by using the Sun Management Center or by typing the following SMS command:**

```
sc% poweron IOx
```

where *x* is the hsPCI Assembly 0-17.

9.1.2.6 Verifying an hsPCI (Slot 1) Assembly

1. **Using dynamic reconfiguration, configure the hsPCI Assembly into the domain by using the Sun Management Center or by typing the following SMS command:**

```
sc% addboard -d domain_id IOx
```

where *x* is the hsPCI Assembly 0-17.

domain_id is the letter A-R of the target domain(s) for the board.

OR

If the domain was shut down prior to the expander replacement, start the domain by typing:

```
sc% setkeyswitch -d domain_id  on
```

2. **Examine the POST messages reported by the** `addboard`/`setkeyswitch` **for any errors. Also monitor the message logs on the SC, specifically** `/var/opt/SUNWSMS/adm/platform/messages` **and** `/var/opt/SUNWSMS/adm/`*domain_id*`/messages`.

9.2   PCI Cassette Replacement Procedures

The cassettes in the hsPCI are hot-swap components.

9.2.1   PCI Cassette Replacement

9.2.1.1   Removing the PCI Cassette

⚠️ **Caution –** Before removing a cassette, the green activation LED must be off and the amber removal OK LED must be on. See TABLE 9-2 for hsPCI LED descriptions.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

2. **Ensure that the adapter in the cassette to be removed has terminated all input/output operations. Refer to the man pages for** `ifconfig` **or** `umount` **for more information.**

3. **The customer domain administrator should power off the cassette by typing the following** `rcfgadm` **command:**

```
sc% rcfgadm -d domain_id -c disconnect ap_id
```

where *ap_id* is a DR attachment point identifier for the PCI cassette. Refer to the `rcfgadm` man page for attachment point identifier details.

4. **Wait for the amber removal indicator LED to illuminate.**

5. **Label and remove the I/O cables from the cassette.**

6. **Press down the ejector latch at the top front of the cassette to release the ejector handle (**FIGURE 9-2**) and carefully remove the cassette.**

EMI cap

Ejector handle

Ejector latch
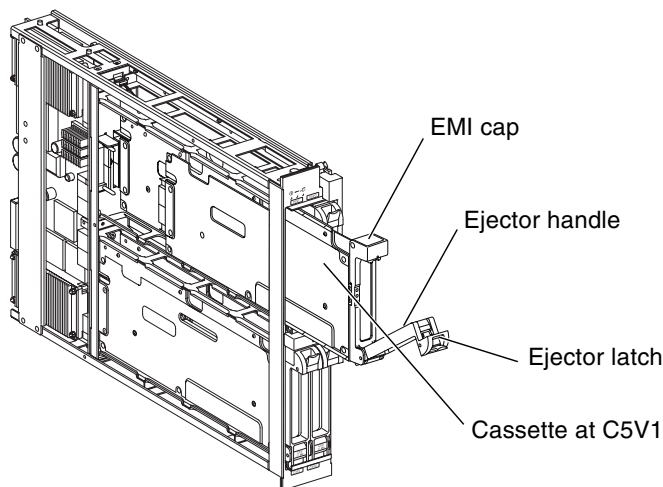
Cassette at C5V1

FIGURE 9-2 PCI Cassette Removal

7. **Grab the handle and pull forward to release the cassette from the hsPCI.**

9.2.1.2   Installing the PCI Cassette

1. **Insert the PCI cassette into the appropriate slot (C5V0, C5V1, C3V0, or C3V1).**

2. **Push the cassette inward and push the eject handle upward into position seating the cassette into the connector.**

3. **Reconnect the I/O cables to the cassette.**

4. **To power on the board, the customer domain administrator should type:**

```
sc% rcfgadm -d domain_id -c configure ap_id
```

where *ap_id* is a DR attachment point identifier for the PCI cassette. Refer to the rcfgadm man page for attachment point identifier details.

5. **Verify that the activation LED is green.**

6. **Close the Sun Fire 15K/12K system cabinet access doors.**

9.3 PCI Cassette Card Replacement Procedures

9.3.1 PCI Cassette Card Replacement

9.3.1.1 Removing the PCI Card from the Cassette

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

2. **Remove the 3.3v or 5.0v PCI card cassette.**

3. **To access the PCI slot, remove the two (2) M3x5 flathead screws and remove the EMI cap.**

4. **Remove the one (1) M3x4 panhead screw securing the PCI card to the front panel.**

> ⚠ **Caution –** Avoid damaging components on the PCI card when removing.

5. **From the top of the cassette, carefully grab each edge of the PCI card at the notches provided on the PCB board, avoid the components, and pull to release the card from the connector.**

9.3.1.2 Installing the PCI Card into the Cassette

1. **To access the PCI slot, remove the two (2) M3x5 flathead screws and remove the EMI cap.**

2. **For a new PCI card installation, remove the one (1) M3x4 panhead screw and discard the filler panel.**

3. **Install the new PCI card, inserting vertically into the PCI slot of the cassette. Push firmly until the PCI card is fully seated with the connector.**

4. **Reinstall the EMI cap.**

5. **Secure the PCI card with the two (2) M3x5 flathead screws.**

6. **Insert the PCI cassette into the hsPCI assembly.**

7. **Close the Sun Fire 15K/12K system cabinet access doors.**

9.4　MaxCPU (Slot 1) Board Replacement Procedures

9.4.1　MaxCPU (Slot 1) Board LEDs

MaxCPU board components and LEDs are listed in TABLE 9-3 and TABLE 9-4.

TABLE 9-3　MaxCPU (Slot 1) Board Components

Total Number of MaxCPU Boards Per System	Total Number of MaxCPU Boards Per Side	Number of LEDs Per MaxCPU Board
1-18	0-9	3

TABLE 9-4　MaxCPU (Slot 1) Board Valid LED Status

LEDs after Insertion or Initial System Power On			LEDs After PRESENCE is Detected			Component Powered On			Component Powered Off		
Active	Service	Remove	Active	Service	Remove	Active	Service	Remove	Active	Service	Remove
off	on	on	off	off	on	on	off	off	off	off	on

Failure of the service LED to transition from ON to OFF within 60 seconds after insertion indicates a power-status control fault.

FIGURE 9-3 illustrates the MaxCPU board and the LED locations.

Activation indicator (green)
Service indicator (amber)
Removal indicator (amber)
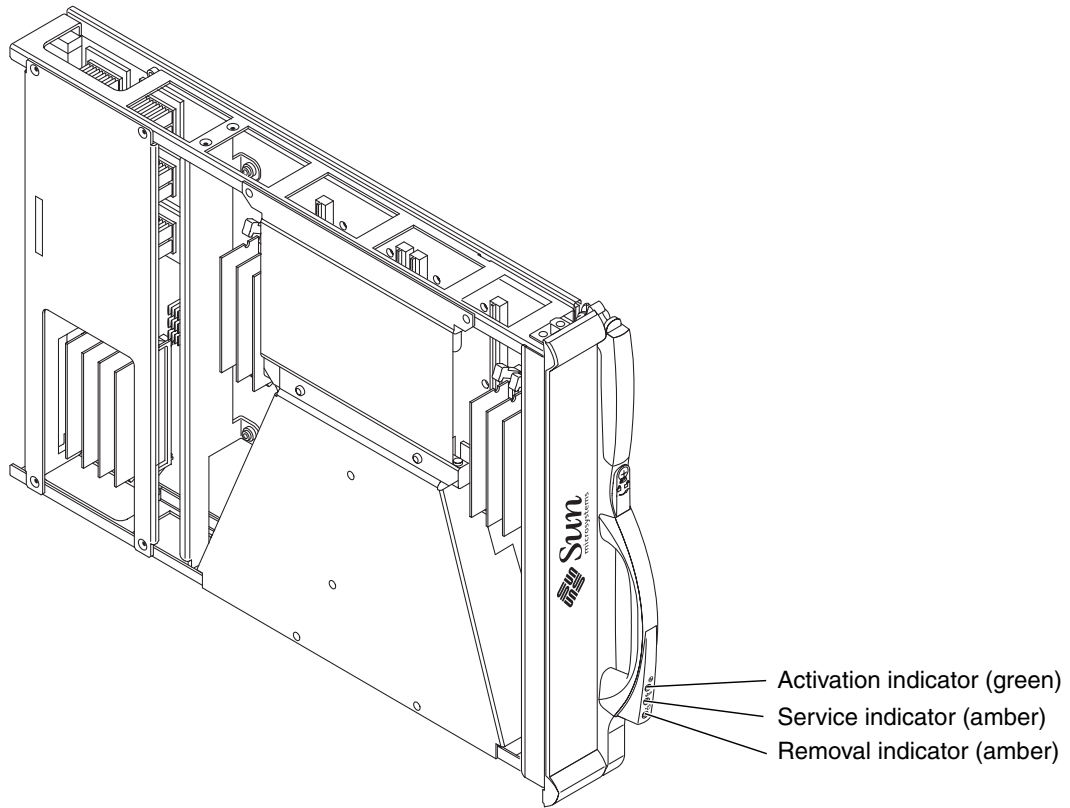
FIGURE 9-3   MaxCPU Board LEDs

9.4.2   MaxCPU (Slot 1) Board Replacement

9.4.2.1   Isolating a Failed MaxCPU (Slot 1) Board

1. Check for any error messages during POST.

2. On the SC, check for any error messages in
`/var/opt/SUNWSMS/adm/platform/messages` and
`/var/opt/SUNWSMS/adm/`*domain_id*`/messages.`

where *domain_id* = domain letter.

3. If available, examine any DStop or RStop files located in
`/var/opt/SUNWSMS/adm/`*domain_id*`/dump.`

where *domain_id* = domain letter.

4. **On the specific domain(s), use** `adb` **to examine any core files in**
`/var/crash/`*hostname***.**

9.4.2.2   Powering Off a MaxCPU (Slot 1) Board

1. **Check the power state of the board to be removed by typing:**

```
sc% showboards | grep IOx
```

- If the board is powered off, go to Section 9.4.2.3, "Removing a MaxCPU (Slot 1) Board" on page 9-13.

- If the power state is `On` and the board status is `Isolated` and not part of the domain, power off the MaxCPU board by using the Sun Management Center or by typing the following SMS command:

```
sc% poweroff IOx
```

where *x* is the MaxCPU board 0-17 and go to Section 9.4.2.3, "Removing a MaxCPU (Slot 1) Board" on page 9-13.

2. **If the board is part of a running domain, do the following:**

- Using dynamic reconfiguration, deconfigure the MaxCPU from the running domain by using the Sun Management Center or by typing the following SMS command:

```
sc% deleteboard IOx
```

where *x* is the MaxCPU board 0-17 and go to Section 9.4.2.3, "Removing a MaxCPU (Slot 1) Board" on page 9-13.

9.4.2.3   Removing a MaxCPU (Slot 1) Board

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

⚠️ **Caution –** After the board is removed, carry the board to a work area holding it vertically by the front handle with the connector downward. Lift the board and place the other hand under the bottom, or back, of the board placing the bottom, or back, on an ESD-protected surface. Never place the weight of a board on its connector as it is easily damaged.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

⚠️ **Caution –** Before removing a board from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 9.4.2.2, "Powering Off a MaxCPU (Slot 1) Board" on page 9-13.

2. **Insert a Phillips No. 1 screwdriver into the pawl latches, turning counterclockwise to release the lever, and lift the carrier insert-eject lever.**

3. **Use the front handle to extract the MaxCPU (slot 1) board, supporting the bottom with the other hand, and place it on a flat, sturdy, ESD-protected surface with the component side up.**

4. **Review the platform message log to verify SMS has received the message that the component has been removed, by typing:**

```
sc% showlogs -F
```

Review the board removal message. You will see a message similar to the one below.

```
Jun 16 14:28:05 2003 sun15-sc0: esmd[7167]: [0 4824421445907014
NOTICE Boards.cc 1646] MCPU at IOxx removed
```

where *xx* is the MaxCPU assembly 0-17.

9.4.2.4   Installing a MaxCPU (Slot 1) Board

1. **Firmly grasp the MaxCPU (slot 1) board by the front handle, supporting the bottom with the other hand, and position it onto the carrier rail.**

2. **With the insert-eject lever extended, slide the board into the slot until it begins to connect with the expander connector.**

3. **Apply firm pressure to the face plate to properly seat the board with the expander connector.**

4. **Use the insert-eject lever to fully seat the board.**

Note – Failure of the service LED to transition from on to off within 60 seconds after insertion indicates a power-status control fault.

---

5. **Verify the LED status per** TABLE 9-4**.**

6. **Review the platform message log to verify SMS has received the message that the component has been inserted, by typing:**

```
sc% showlogs -F
```

Review the board insertion message. You will see a message similar to the one below.

```
Jun 16 14:30:05 2003 sun15-sc0: esmd[7167]: [0 4824421445907014
NOTICE Boards.cc 1646] MCPU at IOxx inserted
```

where *xx* is the MaxCPU assembly 0-17.

7. **Close the Sun Fire 15K/12K system cabinet access doors.**

9.4.2.5   Powering On a MaxCPU (Slot 1) Board

● **Power on the MaxCPU Board by using the Sun Management Center or by typing the following SMS command:**

```
sc% poweron IOx
```

where *x* is the MaxCPU Board 0-17.

9.4.2.6 Verifying a MaxCPU (Slot 1) Board

1. **Using dynamic reconfiguration, configure the MaxCPU Board into the domain by using the Sun Management Center or by typing the following SMS command:**

```
sc% addboard -d domain_id IOx
```

where *x* is the MaxCPU Board 0-17.

domain_id is the letter A-R of the target domain(s) for the board.

2. **Examine the POST messages reported by the** `addboard`/`setkeyswitch` **for any errors. Also monitor the message logs on the SC, specifically** `/var/opt/SUNWSMS/adm/platform/messages` **and** `/var/opt/SUNWSMS/adm/`*domain_id*`/messages`**.**

9.5 I/O (Slot 1) Filler Panel Replacement Procedures

9.5.1 Removing an I/O (Slot 1) Filler Panel

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

2. **Insert a Phillips No. 1 screwdriver into the pawl latches, turning counterclockwise to release the lever, and lift the carrier insert-eject lever.**

3. **Use the front handle to extract the I/O (slot 1) filler panel, supporting the bottom with the other hand, and place on a flat sturdy surface.**

9.5.2 Installing an I/O (Slot 1) Filler Panel

1. **Firmly grasp the I/O (slot 1) filler panel by the front handle, supporting the bottom with the other hand, and position it onto the carrier rail.**

2. **With the insert-eject lever extended, slide the panel into the slot until it is even with the other boards.**

3. **Use the front handle to fully position the panel.**

4. **Lock the I/O (slot 1) filler panel by sliding the insert-eject lever into position until it is fully nested with the front handle.**

5. **Close the Sun Fire 15K/12K system cabinet access doors.**

Board Set Carrier Plates

The board set carrier plates inside the Sun Fire 15K/12K systems require special handling. There are also three different configuration setups depending on the board sets the carrier plate is assigned to carry. For increased thermal control, a carrier plate with an air dam has been designed for slots 4, 5, 13, and 14. This chapter contains the replacement procedures for these three configurations.

This chapter contains the following sections:

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

- Follow all cautions 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 might 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 Inserting a Board Set Carrier Plate

The following are general guidelines for inserting a board carrier into the Sun Fire 15K/12K systems. To reduce the risk of damage to the connectors, take the following precautions:

- Thoroughly inspect the male and female connectors before making connections.
  - Look for damage to the plastic housings.
  - Look for foreign material in the plastic housings.
  - Look for bent or damaged pins or ground shields.

Note – If any of these conditions exist, do not try to repair or replace parts unless you have been trained to do so.

- **NEVER**
  - Set or bump a connector against another surface.
  - Place the weight of a board on its connector as it is easily damaged.
  - Insert or remove carrier plates with any slot 0 and slot 1 boards installed.
  - Try to force a connector using an insertion/ejection mechanism if the carrier becomes cocked or jammed.
  - Use damaged components.
- See Section 10.2, "Carrier Plate Replacement and Modifications" on page 10-5 for additional details regarding removal and installation of carriers.

⚠ **Caution –** It is **critical** that careful handling and seating of the carrier plate is maintained during the insertion process. It is imperative that the simultaneous insertion of the ejector screws be followed to avoid damage to the Sun™ Fireplane interconnect connectors.

When inserting a carrier plate into the card cage:

⚠ **Caution – Extreme caution must be used when inserting the board set into the card cage of the Sun Fire 15K/12K systems. The top-right leading edge of the board set must be aligned properly in the card guide before insertion into the system to prevent any component parts from being damaged if hit by the edge of the carrier plate which can result in catastrophic failures to the system operation.**

---

1. **Hold the bottom edge of the carrier plate horizontally parallel and vertically perpendicular with the top and bottom of the card cage and insert the bottom edge into the bottom of the card guide, aligning with the top card guide avoiding any angled insertion of the carrier plate (**FIGURE 10-1**).**

Ejector bracket alignment tabs

Captive ejector screw

Alignment tab

Ejector bracket alignment slots

Slot 0 boards on top

Slot 1 boards on bottom

System board carrier plate (various) (SB1 through SB17, front and rear)

System Control carrier plate (SC0 and SC1, front and rear)

Carrier Plate Location Placement

C A U T I O N

AVOID ANGLED INSERTION

Slot 0

Slot 1

NO HANDS HERE

Press inward here to seat plate

NO HANDS HERE

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | SC0 | front expander |
| 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | SC1 | rear expander |

part number 540-4085   part number 540-4427

part number 540-4428   part number 540-3993
part number 540-5736
(with air dam)

FIGURE 10-1 System Carrier Plates
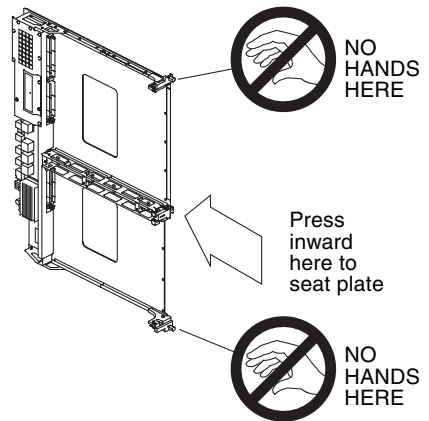
2. **Locate the two (2) 0.5 in. hex socket-fixed torque drivers provided in the torque tool holder brackets on the inside of the front right-side door and torque the carrier plate captive ejector screws until the driver clicks or slips (equal to 18.0 in.-lbs or 2.2 Nm). Ensure the two torque drivers are returned to the torque tool holder brackets after use.**

3. **Firmly press the carrier plate inward at the center edge with evenly distributed pressure until the captive ejection screws seat against the card cage and the top and bottom alignment tabs on the carrier plate are inserted into the top and bottom alignment slots on the chassis. If you feel resistance, check for proper alignment of the tabs and the slots (**FIGURE 10-1**).**

⚠ **Caution –** DO NOT use the torque drivers to secure the carrier plate until the hand insertion process has been completed.

---

4. **Secure the captive ejector screws simultaneously into the threaded inserts of the top and bottom of the card cage by hand until the back of the captive ejector screws meet the top and bottom face place of the carrier plate.**

5. **Firmly press inward at the center edge of the carrier plate to manually seat the carrier plate again.**

6. **Manually secure the captive ejector screws simultaneously until the back of the screws meet the face plate.**

7. **Repeat this process several times until the carrier plate is fully seated and the top and bottom carrier plate ejector bracket alignment tabs (not visible from the front) are evenly set.**

8. **Use two (2) 0.5 in. hex socket-fixed torque drivers to secure the carrier plate captive ejector screws. Simultaneously secure the top and bottom captive ejector screws until the connector is fully seated and the ejector brackets are flush with the card cage.**

The Sun Fire 15K/12K systems hold various carrier plate types. The System Control carrier plate is part number 540-3993. The system board carrier plates are different depending upon their location within the system, part number 540-4427, 540-4428, and 540-4085. Review the location placement in FIGURE 10-1. For slots 4, 5, 13, and 14, there is also a carrier plate with an air dam, part number 540-5736.

10.2 Carrier Plate Replacement and Modifications

The Sun Fire 15K/12K systems have three varieties of system carrier plate configurations to accommodate the connector locations on the Sun Fireplane interconnect. This field-replaceable unit (FRU) contains the reconfigurable parts to be used with the standard carrier plate for the three types of carrier plate slots (FIGURE 10-2).

- Standard configuration for slots 1-3, 6-8, 10-12, and 15-17, part number 540-4085
- Configuration modification for system slots 0 and 9, part number 540-4427
- Configuration modification for system slots 4, 5, 13, and 14, part number 540-4428

Review Section 10.1, "Inserting a Board Set Carrier Plate" on page 10-2 prior to handling the system carrier plates.
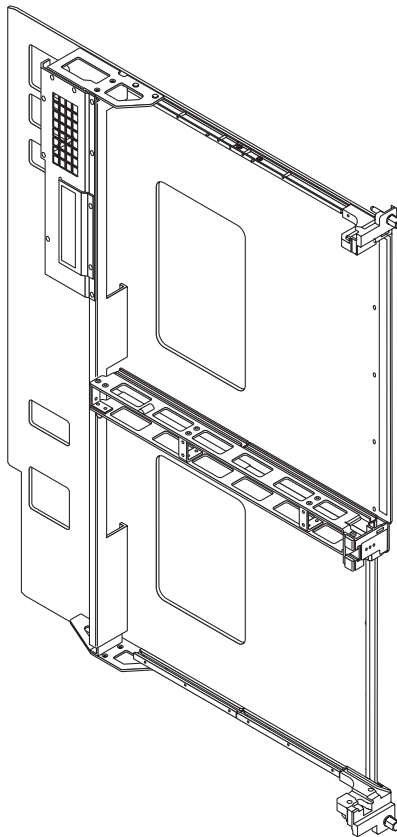
FIGURE 10-2 Standard Configuration Carrier Plate

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

10.2.1 Carrier Plate FRU Modification Contents

TABLE 10-1 lists the contents of the FRU package.

TABLE 10-1 Carrier Plate FRU Modification Contents

Part Number	Qty.	Description
816-0768	1	FRU Service Document for Carrier Plate Configurations
540-4085	1	Carrier plate assembly carrier plate at slots 1,2,3,6,7,8, 10,11,12,15,16,17
240-3998	9	M3x8 mm flathead screws
240-4013	2	M3x35 mm flathead screws
250-1620	1	EMI metal gasket

10.2.2 Carrier Plate Replacement for Standard Configurations of Slots 1, 2, 3, 6, 7, 8, 10, 11, 12, 15, 16, and 17

1. **Remove the carrier plate from the system.**

   Note – Follow the instructions in Section 12.2.3, "Removing an Expander Board" on page 12-5 and Section 12.2.4, "Installing an Expander Board" on page 12-7.

2. **Remove the expander board from the carrier plate, as required, and set aside. No modifications are required for standard carrier plate configurations.**

   Note – The Sun Fire 15K system has an expander board installed on each carrier plate. The Sun Fire 12K system only has an expander installed on the slot 0 through slot 8 carrier plates. Slots 9 through 17 are filled with filler panels.

3. **Re-install the expander board, as required, on the new carrier plate.**

4. Install the new carrier plate into the system.

5. Discard any remaining hardware supplied with the FRU package.

10.2.3 Carrier Plate Replacement for Configuration of Slots 0 and 9

This configuration is for the slots on the left sides of the System Controllers.

1. Remove the carrier plate from the system.

Note – Follow the instructions in Section 12.2.3, "Removing an Expander Board" on page 12-5 and Section 12.2.4, "Installing an Expander Board" on page 12-7.

---

2. Remove the expander board from the carrier plate, as required, and set aside.

No changes are required for standard carrier plate configurations.

3. Remove the two (2) M3x20 flathead screws securing the T rail guide of the new carrier plate to the center guide bracket of the new carrier plate and discard (FIGURE 10-3).

These items are not needed for this configuration.

T rail guide

M3x20 flathead screws
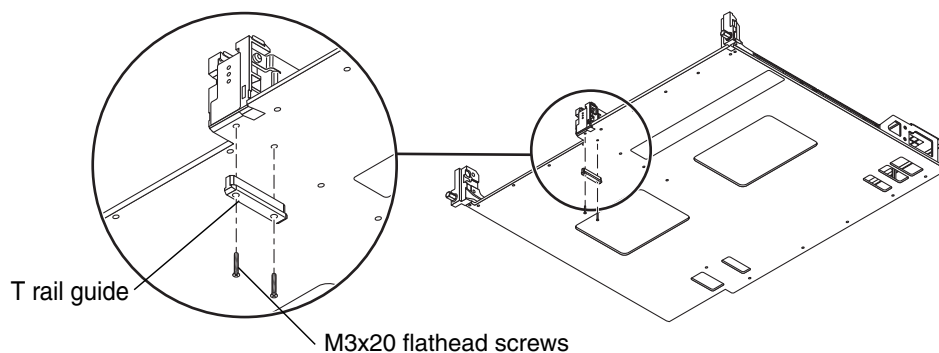
FIGURE 10-3 Removing the T Rail Guide

4. Install one (1) M3x8 flathead screw from the FRU package to secure the center guide bracket to the new carrier plate (FIGURE 10-4).

Discard the remaining eight screws.

5. Re-install the expander board, as required, on the new carrier plate.

6. Install the carrier plate into the system.

M3x8 flathead screw
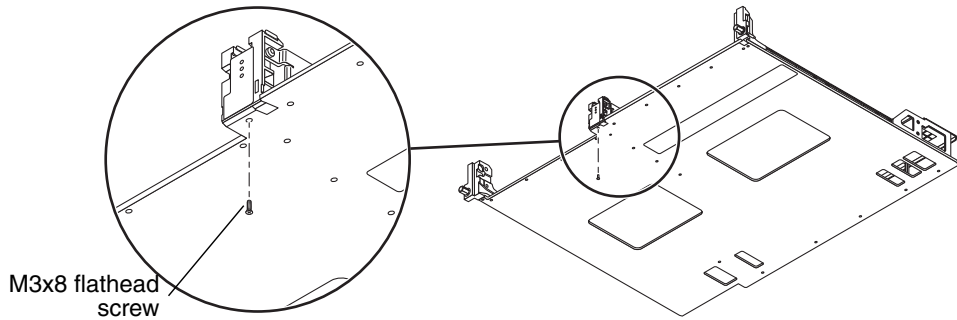
FIGURE 10-4 Securing the Center Guide Bracket After the T Rail Guide Removal

7. Discard any remaining hardware supplied with the FRU package.

10.2.4   Carrier Plate Replacement for Configuration of Slots 4, 5, 13, and 14

This configuration is for the slots in the center of the carrier plate card cage.

1. Remove the carrier plate from the system.

Note – Follow the instructions in Section 12.2.3, "Removing an Expander Board" on page 12-5 and Section 12.2.4, "Installing an Expander Board" on page 12-7.

2. Remove the expander board, as required, from the carrier plate and set aside.

No changes are required for standard carrier plate configurations.

3. Remove the two (2) M3x20 flathead screws securing the T rail guide of the new carrier plate to the center guide bracket of the new carrier plate and discard.

These items are not needed for this configuration (FIGURE 10-3).

4. Remove the card cage filler panel assembly from the existing carrier plate and set aside (FIGURE 10-5**).**

5. Secure the card cage filler panel assembly with the nine (9) M3x8 flathead screws to the new package carrier plate.

6. Assemble the T rail guide and secure with the two (2) M3x35 flathead screws.

7. Check the EMI metal gasket for any rips, tears, large creases, or any sharp edges that might cause injury. If no damages are present, go to Step 10.
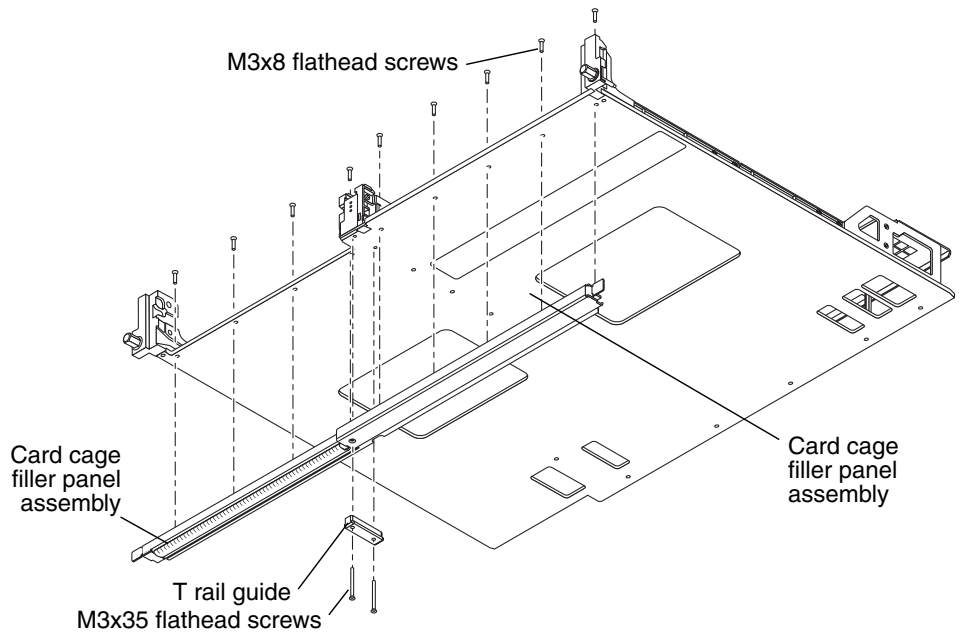
FIGURE 10-5 Removing the Card Cage Filler Panel

⚠️ **Caution –** The EMI metal gasket has sharp edges. Handle carefully to prevent bodily injury.

8. **If the EMI metal gasket is to be replaced, remove the old gasket by pulling upward from one end, using pliers to avoid injury, until the plastic snaps are released.**

9. **Install the new gasket by aligning the nine (9) plastic snaps with the row of nine (9) holes at the front edge of the carrier plate (**FIGURE 10-6**). Using your thumb and forefinger, apply pressure to the snaps until each snap is fully seated into the nine (9) holes and no visible bumps or ridges are showing on the new carrier plate.**

10. **Install the carrier plate into the system.**

11. **Discard any remaining hardware supplied with the FRU package.**
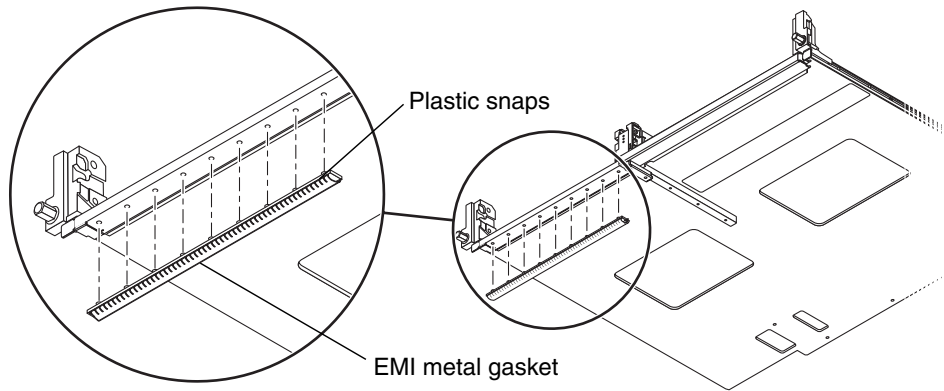
FIGURE 10-6 Installing the EMI Metal Gasket

10.3 Carrier Plate (With Air Dam) Replacement

The Sun Fire 15K/12K systems also provide a carrier plate configuration that has an air dam for better thermal control. As with the other carrier plate configurations, this carrier plate accommodates the connector locations on the Sun Fireplane interconnect for Slots 4 and 5 on the front of the system, and slots 13 and 14 on the rear of the system (FIGURE 10-7).

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

Right side   Left side
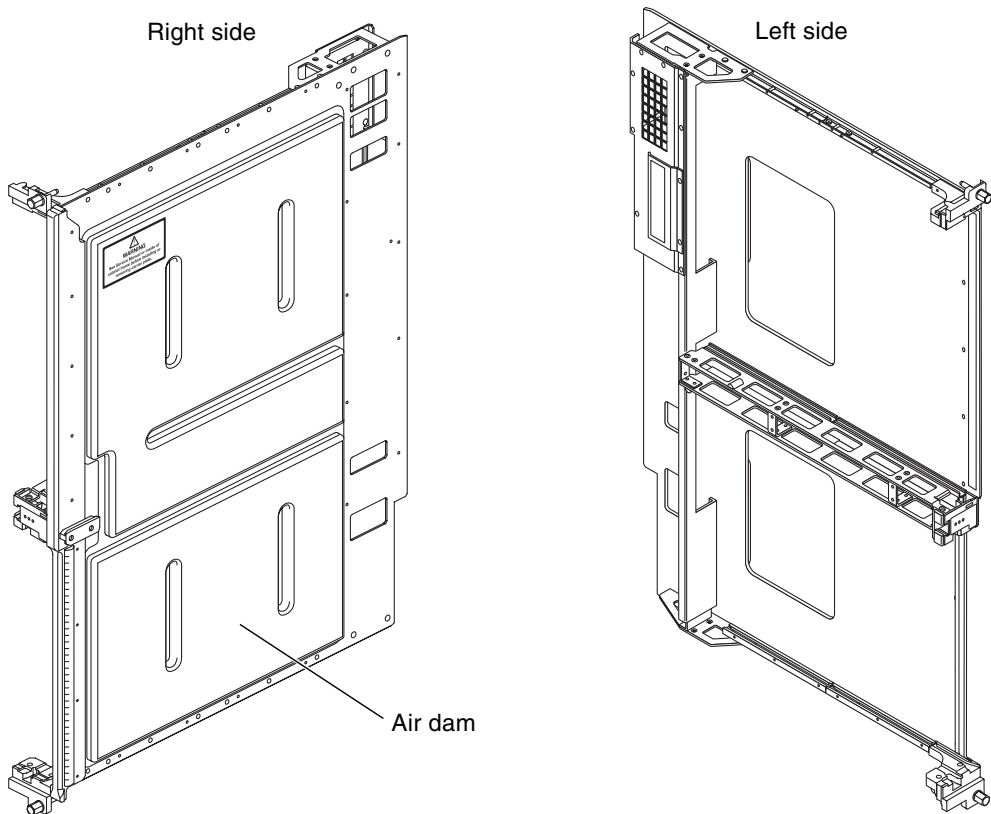
Air dam

FIGURE 10-7 Air-Dam Configuration Carrier Plate

10.3.1 Carrier Plate (With Air Dam) Replacement for Standard Configurations of Slots 4, 5, 13, and 14

1. **Review Section 10.1, "Inserting a Board Set Carrier Plate" on page 10-2 prior to handling the system carrier plates.**

2. **Remove the carrier plate from the system.**

   Note – Follow the instructions in Section 12.2.3, "Removing an Expander Board" on page 12-5 and Section 12.2.4, "Installing an Expander Board" on page 12-7.

3. **Remove the expander board from the carrier plate, as required, and set aside. No modifications are required for this standard carrier plate configuration.**

> **Note –** The Sun Fire 15K system has an expander board installed on each carrier plate (with air dam) at slots 4, 5, 13 and 14. The Sun Fire 12K system only has an expander installed on the slot 4 through slot 5 carrier plates. Slot 13 and slot 14 are filled with filler panels.

4. **Re-install the expander board, as required, on the new carrier plate.**

5. **Install the new carrier plate into the system.**

System Control Expander Board Set

The system control expander board set for the Sun Fire 15K/12K systems consists of a carrier plate that holds the hot-swappable centerplane support board and the hot-swappable System Control (SC) board at SC0 (front) and SC1 (rear). This chapter contains the replacement procedures for the centerplane support board. See Chapter 6 for the SC replacement procedures.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

11.1 Centerplane Support Board Replacement

11.1.1 Centerplane Support Board LEDs

Centerplane support board (CSB) components and LEDs are listed in TABLE 11-1 and TABLE 11-2.

TABLE 11-1 Centerplane Support Board Components

Total Number of Centerplane Support Boards Per System	Total Number of Centerplane Support Boards Per Side	Number of LEDs Per Centerplane Support Board
2	1	3

TABLE 11-2 Centerplane Support Board Valid LED Status

LEDs after Insertion or Initial System Power On			LEDs After PRESENCE is Detected			Component Powered On			Component Powered Off		
Active	Service	Remove	Active	Service	Remove	Active	Service	Remove	Active	Service	Remove
off	on	on	off	off	on	on	off	off	off	off	on

Failure of the service LED to transition from ON to OFF within 60 seconds after insertion indicates a power-status control fault.

FIGURE 11-1 illustrates the centerplane support board and the LED locations.
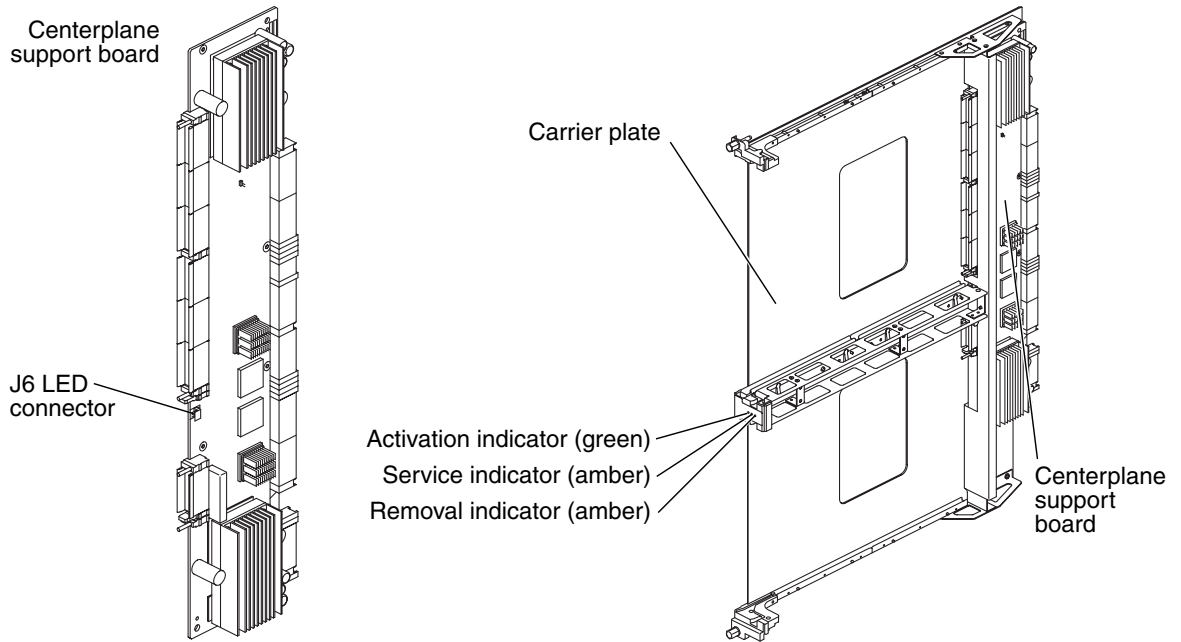
FIGURE 11-1 Centerplane Support Board LEDs

11.2 Centerplane Support Board Replacement Procedures

⚠ **Caution –** The centerplane support board and mounting system (carrier plate) are also used as the electrical interface and mounding mechanism for the system controller. Therefore, prior to removal of the centerplane support board, the System Control board and System Control peripheral modules MUST BE deconfigured, powered off, and REMOVED. The references to those procedures are included in the following steps:

11.2.1 Isolating a Failed Centerplane Support Board

1. **Check for any error messages during POST.**

2. **On the SC, check for any error messages in**
   `/var/opt/SUNWSMS/adm/platform/messages`**.**

   On the SC, if available, examine any DStop dump files or record stop dump files
   located in `/var/opt/SUNWSMS/adm/`*domain_id*`/dump`.

   where *domain_id* = domain letter.

11.2.2 Powering Off a Centerplane Support Board

Powering off a centerplane support board also powers off one-half of the Sun
Fireplane interconnect assembly.

1. **Use dynamic bus reconfiguration to specify the Sun Fireplane interconnect
   assembly half that will remain active. Failure to do so will DStop all running
   domains. Type the following command:**

   ```
   sc% setbus -c x
   ```

   where *x* is CS0 or CS1. This represents the centerplane support board that will
   remain powered on (or the one that will not be powered off).

2. **Power off a centerplane support board by using the Sun Management Center or
   by typing the following SMS command:**

   ```
   sc% poweroff csx
   ```

   where *x* is 0 or 1. Refer to `poweroff`(1M) for more information.

11.2.3 Removing a Centerplane Support Board

Remove boards by pulling outward using the front handle with one hand and
placing the other hand underneath the bottom guide rail for additional support.
Carry the board to a work area holding vertically, with the connector downward, by
the front handle. Lift the board and place the other hand under the bottom, or back,
of the board placing the bottom, or back, on an ESD-protected surface.

Note – Never place the weight of a board on its connector as it is easily damaged.

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

Caution – Before removing a board from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 11.2.2, "Powering Off a Centerplane Support Board" on page 11-4.

2. **Power off and remove the SC.**

   See Section 6.1.2.2, "Powering Off a System Control (SC) Board" on page 6-4.

   See Section 6.1.2.3, "Removing a System Control (SC) Board" on page 6-7.

3. **Remove the SC peripheral board that occupies the same carrier plate as the centerplane support board being replaced.**

   See Section 7.2.3, "Removing a System Control (SC) Peripheral Board" on page 7-5.

Caution – Never remove the carrier plate while it contains slot 0 or slot 1 boards as this will cause SEVERE DAMAGE TO THE CONNECTOR system. Review Section 10.1, "Inserting a Board Set Carrier Plate" on page 10-2.

4. **Be sure to read the label on the inside corner trims of the chassis and then use the two (2) 0.5 in. (13 mm) nut drivers to release the carrier plate captive ejector screws simultaneously until they are fully disengaged.**

5. **Use the front handle to extract the carrier plate, supporting the bottom with the other hand, and place it on a flat, sturdy, ESD-protected surface with the component side up.**

6. **Disconnect the LED ribbon cable from the connector (J6) on the centerplane support board.**

7. **Using a Phillips No. 2 screwdriver, remove the two (2) M3 cross-slotted shoulder panhead screws.**

8. **Remove the eight (8) M3x8 panhead screws.**

9. **Firmly grasp the centerplane support board lifting upward and pulling out away from the carrier plate standoffs (**FIGURE 11-2**).**
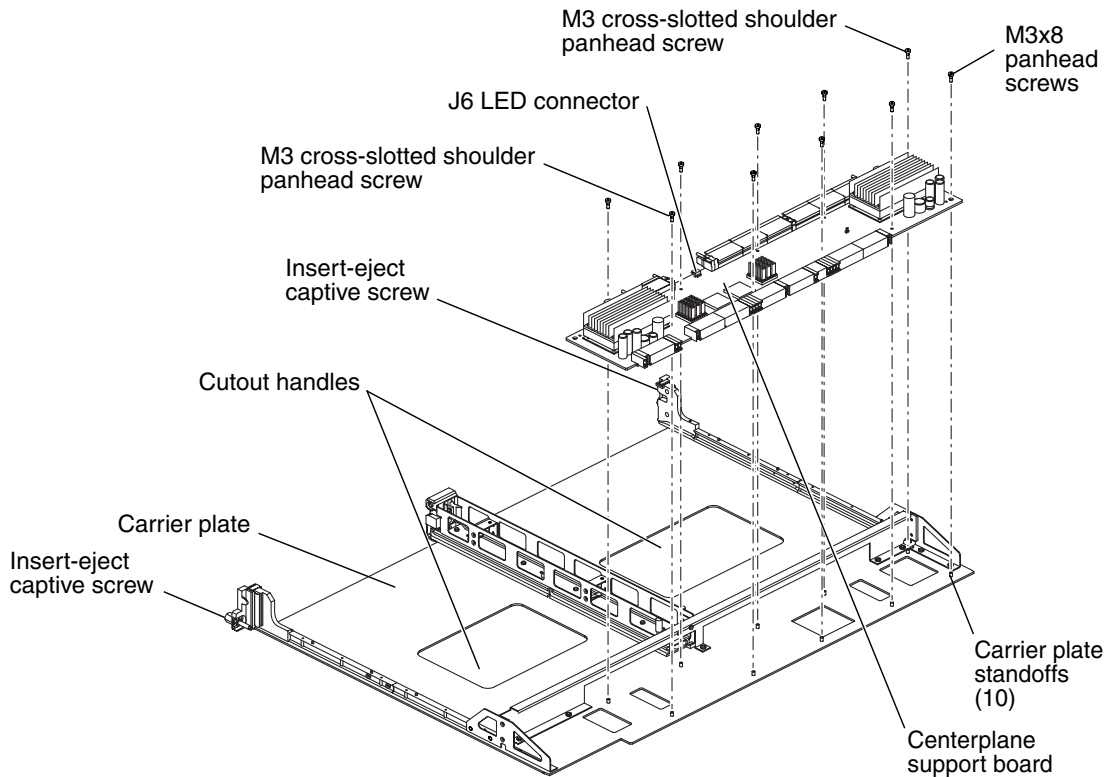
FIGURE 11-2 Centerplane Support Board and Carrier Plate

11.2.4   Installing a Centerplane Support Board

1. **Holding the centerplane support board close to the carrier plate, connect the LED cable into the connector (J6) on the centerplane support board.**

2. **Install the centerplane support board aligning the mounting holes with the standoffs.**

3. **Using a Phillips No. 2 screwdriver, loosely secure the centerplane support board with the two (2) M3 cross-slotted shoulder panhead screws through the board and into the standoffs on the carrier plate, until the board is evenly positioned with the screws.**

4. **Secure the eight (8) M3x8 panhead screws.**

5. **Firmly secure the centerplane support board to the carrier plate with the two (2) M3 cross-slotted shoulder panhead screws.**

6. **Install the carrier plate.**

   See Section 10.1, "Inserting a Board Set Carrier Plate" on page 10-2.

7. **Verify the LED status per** TABLE 11-2.

   Failure of the service LED to transition from on to off within 60 seconds after insertion indicates a power-status control fault.

8. **Install the SC.**

   See Section 6.1.2.4, "Installing a System Control (SC) Board" on page 6-8.

9. **Install the SC peripheral.**

   See Section 7.2.4, "Installing a System Control (SC) Peripheral Board" on page 7-7.

10. **Close the Sun Fire 15K/12K system cabinet access doors.**

11.2.5 Powering On a Centerplane Support Board

1. **Power on the centerplane support board by using the Sun Management Center or by typing the following SMS command:**

```
sc% poweron csx
```

   where *x* is 0 or 1. Refer to poweron(1M) for more information.

2. **If previously deconfigured, use the dynamic bus reconfiguration to enable both halves of the Sun Fireplane interconnect assembly.**

```
sc% setbus -c cs0,cs1
```

11.2.6 Verifying a Centerplane Support Board

● **Address any errors reported by** setbus **and confirm the centerplane support board is powered on by using the Sun Management Center or by typing the following SMS command:**

```
sc% showboards -v |grep CS
CS0         On     CSB             –           –          –
CS1         On     CSB             –           –          –
```

System Expander Board Set

The system expander board set for the Sun Fire 15K/12K systems consists of a carrier plate that holds the hot-swappable system expander board and optional system boards or I/O filler panels. This board set is inserted at I/O expander 0 through 8 (front) and I/O expander 9 through 17 (rear). This chapter contains the replacement procedures for the expander board.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

12.1 System Expander Board LEDs

System expander board components and LEDs are listed in TABLE 12-1 and TABLE 12-2.

TABLE 12-1 Expander Board Components

Total Number of System Expander Boards Per System (front-rear)	Total Number of System Expander Boards Per Side	Number of LEDs Per System Expander Board
1-18	0-9	3

TABLE 12-2 Expander Board Valid LED Status

LEDs after Insertion or Initial System Power On			LEDs After PRESENCE is Detected			Component Powered On			Component Powered Off		
Active	Service	Remove	Active	Service	Remove	Active	Service	Remove	Active	Service	Remove
off	on	on	off	off	on	on	off	off	off	off	on

Failure of the service LED to transition from ON to OFF within 60 seconds after insertion indicates a power-status control fault.

FIGURE 12-1 illustrates the expander board and the LED locations.

Any slot 0 or slot 1 board present in the expander being replaced must be deconfigured, powered off, and removed prior to removing or replacing the expander. If the expander is configured as a split slot, up to two domains can be affected.
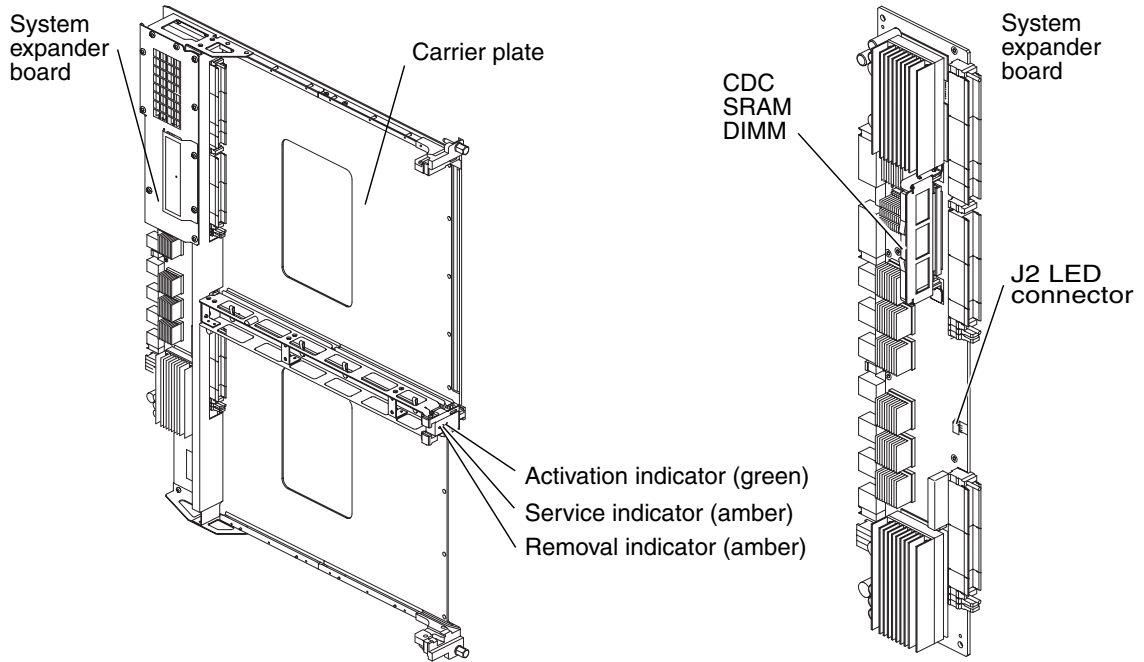
FIGURE 12-1 System Expander Board LEDs

12.2 Expander Board Replacement Procedures

12.2.1 Isolating a Failed Expander Board

1. **Check for any error messages during POST.**

2. **On the SC, check for any error messages in**
   `/var/opt/SUNWSMS/platform/adm/messages` and
   `/var/opt/SUNWSMS/adm/`*domain_id*`/messages`.

   where *domain_id* = domain letter.

3. **If available, examine any DStop or RStop files located in**
   `/var/opt/SUNWSMS/adm/`*domain_id*`/dump`.

   where *domain_id* = domain letter.

4. **On the specific domain(s), use** `adb` **to examine any core files in**
   `/var/crash/`*hostname***.**

12.2.2 Powering Off an Expander Board

1. **Check the power state of the expander to be removed by typing:**

```
sc% showboards -v | grep EXx
```

where *x* is the expander number 0-17.

If the expander is powered off, go to .

2. **If the expander board is part of a multi-board domain(s), use dynamic reconfiguration to deconfigure the slot 0 and slot 1 boards by using the Sun Management Center or by typing the following SMS commands:**

```
sc% deleteboard SBx
sc% deleteboard IOx
sc% poweroff EXx
```

where *x* is the expander number 0-17 and go to .

3. **If the expander board is part of a single-board domain(s), as a** `superuser` **on the domain, shut down the operating system by typing:**

```
domain_name# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

Note – You might need to shut down more than one domain if the expander is part of a split-slot domain.

4. **Power off the hardware associated with the domain(s) by typing:**

```
SC% setkeyswitch -d domain_id off
```

Note – You might need to power off more than one domain if the expander is part of a split-slot domain.

12.2.3 Removing an Expander Board

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

Caution – The expander board and mounting system (carrier plate) are used as the electrical interface and mounting mechanism for the slot 0 and slot 1 modules or filler panels. Therefore, prior to removal of the expander board, the slot 0 and slot 1 modules MUST BE deconfigured, powered off, and REMOVED. The references to those procedures are included in the following steps:

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

Caution – Before removing a board from the system, the green activation LED must be off and the amber removal OK LED must be on. See Section 12.2.2, "Powering Off an Expander Board" on page 12-4.

2. **Remove any slot 0 boards, slot 1 boards, or filler panels. Follow the appropriate directions for each board type as outlined in later sections of this document.**

Caution – Never remove the carrier plate while it contains slot 0 or slot 1 boards as this will cause SEVERE DAMAGE TO THE CONNECTOR system.

3. **Using two (2) 0.5 in. (13 mm) nut drivers, simultaneously release the carrier plate captive ejector screws until they are fully disengaged.**

4. **Using a Phillips No. 2 screwdriver, loosen the two (2) M3x8 panhead screws on the access cover of the coherence directory cache (CDC) DIMM and remove the cover and set aside.**

5. **Using a Phillips No. 2 screwdriver, loosen the remaining eight (8) M3x8 screws and remove the expander cover plate and set aside.**

6. **Disconnect the LED ribbon cable from the connector on the expander board.**

7. Use a 0.25 in. (6mm) nut driver to remove the three (3) threaded hex standoffs.

8. Remove the two (2) M3 cross-slotted shoulder screws from the expander.

9. Remove the six (6) M3x8 panhead screws from the expander.

10. Firmly grasp the expander board lifting upward and pulling out away from the carrier plate standoffs (FIGURE 12-2).

Expander cover plate

CDC DIMM access plate

M3 cross-slotted shoulder panhead screw

CDC SRAM DIMM

Insert-eject captive screw (2)

J2 LED Connector

M3x8 panhead screw (6)

M3 cross-slotted shoulder panhead screw

Hex standoffs (3) and M3x8 panhead screws (3)

Expander DIMMs

Expander board

M3x8 panhead screws (7)
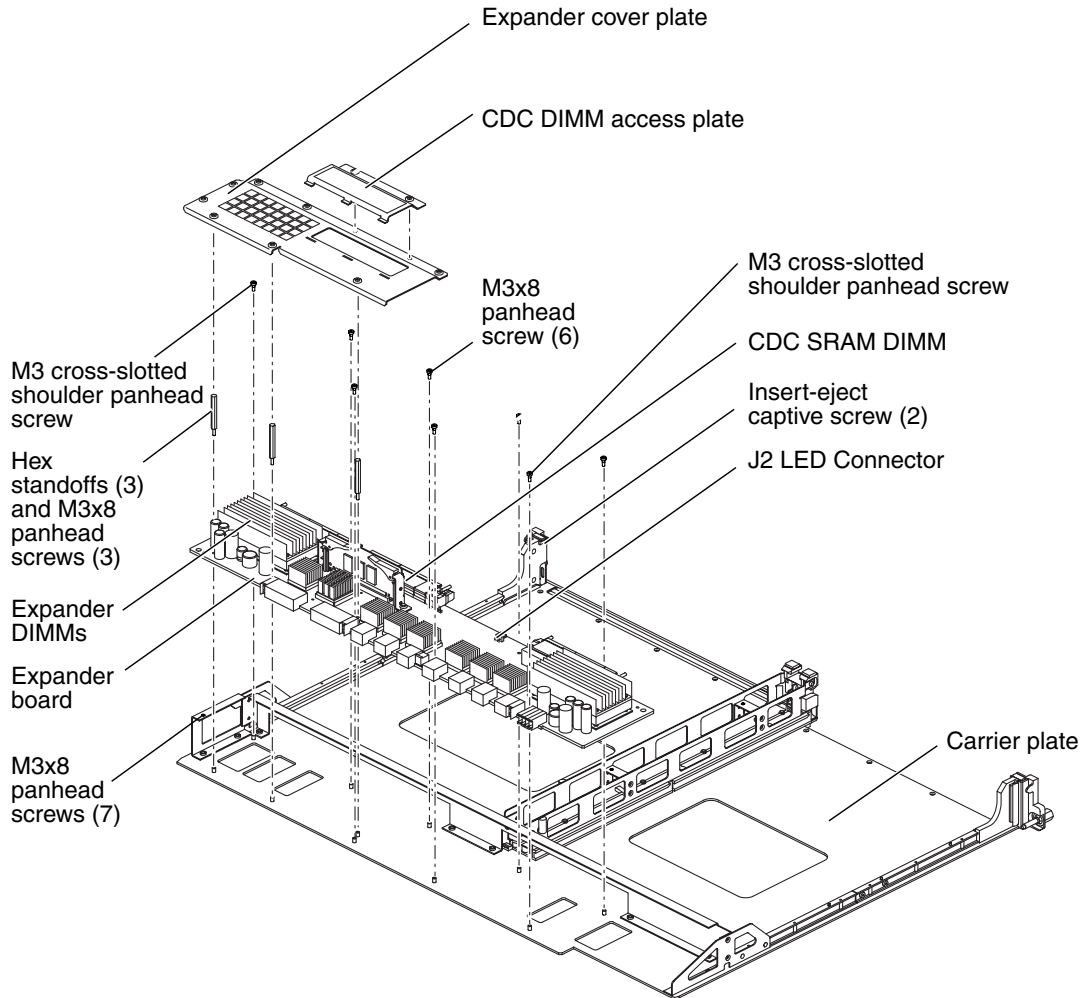
Carrier plate

FIGURE 12-2   Expander Board and Carrier Plate—Exploded

11. Place the expander board on an ESD-protected surface, component side up.

12. **Review the platform message log to verify SMS has received the message that the component has been removed, by typing:**

```
sc% showlogs -F
```

Review the board removal message. You will see a message similar to the one as follows.

```
Jun 16 14:28:05 2003 sun15-sc0: esmd[7167]: [0 4824421445907014
NOTICE Boards.cc 1646] EXB at EXxx removed
```

where *xx* is the expander assembly 0-17.

12.2.4   Installing an Expander Board

1. **Firmly grasp the expander board with the components upward and the LED connector toward the LED board of the carrier plate. Position the expander board onto the carrier plate aligning the eleven (11) mounting holes with the eleven (11) mounting standoffs on the carrier plate.**

2. **Review FIGURE 12-2 for the threaded hex standoff mounting locations and install the three (3) threaded hex standoffs onto the board.**

3. **Connect the LED ribbon cable (P2) into the connector (J2) on the expander board.**

4. **Use a Phillips No. 2 screwdriver to secure the expander board to the carrier plate with the two (2) M3 cross-slotted shoulder screws.**

5. **Use a Phillips No. 2 screwdriver to secure the expander board to the carrier plate with the remaining eight (8) M3 cross-slotted shoulder screws.**

6. **Install the expander cover plate aligning the vertical stiffener of the cover plate and the threaded hex standoffs.**

7. **Secure the expander cover plate to the expander board with the eight (8) M3 captive screws. See FIGURE 12-2.**

8. **Install the CDC DIMM access plate onto the expander cover plate aligning the three tabs into the insertion slots on the expander cover plate and secure with the two (2) M3 captive screws. See FIGURE 12-2.**

9. **Install the carrier plate.**

   See Section 10.1, "Inserting a Board Set Carrier Plate" on page 10-2.

10. **Verify the LED status per TABLE 12-2.**

11. **Install any slot 0 boards, slot 1 boards, or filler panels previously removed. Follow the appropriate directions for each board type as outlined in later sections of this document.**

12. **Review the platform message log to verify SMS has received the message that the component has been inserted, by typing:**

```
sc% showlogs -F
```

Review the board insertion message. You will see a message similar to the one as follows.

```
Jun 16 14:30:05 2003 sun15-sc0: esmd[7167]: [0 4824421445907014
NOTICE Boards.cc 1646] EXB at EXxx inserted
```

where *xx* is the expander assembly 0-17.

13. **Close the Sun Fire 15K/12K system cabinet access doors.**

12.2.5   Powering On an Expander Board

● **Power on the expander by using the Sun Management Center or by typing the following SMS command:**

```
sc% poweron EXx
```

where *x* is the expander number 0-17.

12.2.6   Verifying an Expander Board

1. **Using dynamic reconfiguration, configure the slot 0 and slot 1 boards occupying the expander into the domain(s) by using the Sun Management Center or by typing the following SMS command:**

```
sc% addboard -d domain_id SBx
sc% addboard -d domain_id IOx
```

where *SB* is for slot 0 boards.

IO is for slot 1 boards.

x is the expander number 0-17.

domain_id is the letter A-R of the target domain(s) for the component.

OR

If the domain(s) were shut down prior to the expander replacement, start the domain(s) with:

```
sc% setkeyswitch -d domain_id  on
```

Note – You might need to use setkeyswitch for more than one domain if the expander is part of a split-slot domain.

2. **Examine the POST messages reported by the** addboard/setkeyswitch **for any errors. Also monitor the message logs on the SC, specifically** /var/opt/SUNWSMS/adm/platform/messages **and** /var/opt/SUNWSMS/adm/*domain_id*/messages**.**

CHAPTER **13**

Sun Fireplane Interconnect Replacement Procedure

The Sun Fireplane interconnect is designed with a coherent shared-memory protocol and resides in the center of the Sun Fire 15K/12K systems. This chapter contains the replacement procedures for the Sun Fireplane interconnect.

This chapter contains the following sections:

- Section 13.1, "Isolating a Failed Sun Fireplane Interconnect" on page 13-2
- Section 13.2, "Setting Up the System Prior to Replacing the Sun Fireplane Interconnect" on page 13-2
- Section 13.3, "Powering Off the System for Sun Fireplane Interconnect Replacement" on page 13-4
- Section 13.4, "Removing the Sun Fireplane Interconnect From the Chassis" on page 13-5
- Section 13.5, "Installing the Sun Fireplane Interconnect into the Chassis" on page 13-8
- Section 13.6, "Powering On the System After the Sun Fireplane Interconnect Installation" on page 13-9

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

13.1 Isolating a Failed Sun Fireplane Interconnect

Caution – The Sun Fireplane interconnect assembly is NOT a hot-swappable component. This procedure requires powering off the AC power to the system.

1. **Check for any error messages during POST.**

2. **On the SC, check for any error messages in** `/var/opt/SUNWSMS/adm/platform/messages.`

3. **If available, examine any DStop or RStop files located in** `/var/opt/SUNWSMS/adm/`*domain_id*`/dump`**.**

   where *domain_id* = domain letter.

13.2 Setting Up the System Prior to Replacing the Sun Fireplane Interconnect

1. **Locate all required tools; two Phillips screwdrivers (No. 1 and No. 2), one small flat-bladed screwdriver, and one small flashlight.**

2. **Secure or remove all loose clothing, jewelry, and watches that might get caught on internal mechanical components.**

3. **Verify that all I/O cables are properly labeled.**

4. **Set up an ESD-protected surface for all control expander board sets and system expander board sets.**

5. **Attach a wrist strap.**

Note – System Control boards, System Control peripheral boards, system expander boards, I/O boards, CPU boards, centerplane support boards, and the Sun Fireplane interconnect assembly are all very susceptible to static. Therefore, all possible precautions should be taken to protect these boards against static damage. Transport board assemblies on an ESD static-protected cart whenever possible. Use a static wrist strap when handling.

6. **Open and remove all Sun Fire 15K/12K system cabinet access doors.**

7. **Use the *Component Serial Numbers Worksheet* to note the serial numbers and locations of the existing boards as well as the serial number and revision of the new Sun Fireplane interconnect assembly (**TABLE 13-1**). A larger version of this table is located in Appendix A for use during component replacement.**

TABLE 13-1   Component Serial Numbers Worksheet

Expander	S/N	Slot 0 Board Type	S/N	Slot 1 Board Type	S/N
CSB0					
EXB0					
EXB1					
EXB2					
EXB3					
EXB4					
EXB5					
EXB6					
EXB7					
EXB8					
CSB1					
EXB9					
EXB10					
EXB11					
EXB12					
EXB13					
EXB14					
EXB15					
EXB16					
EXB17					

New Sun Fireplane interconnect assembly S/N: Rev:

13.3 Powering Off the System for Sun Fireplane Interconnect Replacement

⚠️ **Caution –** The Sun Fireplane interconnect is NOT a hot-swappable component. This procedure requires a complete shutdown of the domains and SCs, and disconnection of all AC power to the system.

1. **As a** `superuser` **on the domains, systematically shut down all running domains by typing:**

```
domain_name# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

2. **On the main SC, power off the domain hardware by typing:**

```
sc% poweroff
```

This command powers off the entire system with the exception of the power supplies, fans, and the SCs. Refer to `poweroff`(1M) for more information.

3. **Shut down the System Control boards by doing the following:**
   - As a `superuser` on the spare SC, shut down the spare SC by typing:

```
sc_spare# shutdown -y -g seconds -i 0
```

   where *seconds* = amount of time before shutdown.
   - On the main SC, power off the spare SC by typing:

```
sc% poweroff SCx
```

   where x = 0-1, dependent upon which SC is the spare.

- As a `superuser` on the main SC, shutdown the main SC by typing:

```
sc# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

Note – All DC circuit breakers are to remain in the on position at all times.

4. **Power off the AC0 and AC1 circuit breakers for all power supplies in the system.**

5. **Label and disconnect the twelve (12, six per side) AC power cords with the labels provided in the ship kit.**

6. **Label and disconnect all I/O cables from the front and rear of the system and set aside.**

13.4 Removing the Sun Fireplane Interconnect From the Chassis

The Sun Fireplane interconnect assembly can only be removed from the front of the Sun Fire 15K/12K systems. Follow the front and rear notations in this procedure carefully.

Caution – The Sun Fireplane interconnect assembly weighs 30.0 lb (13.6 kg). Use proper heavy-lifting procedures when removing this unit.

- From the rear of the system:

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Remove all slot 0 and slot 1 boards and place each on an ESD-protected surface.**

Caution – Never remove the carrier plate while it contains slot 0 or slot 1 boards as this will cause SEVERE DAMAGE TO THE CONNECTOR system.

2. **Remove all system expander boards and the centerplane support board carrier assemblies from the connectors by pulling each carrier plate forward approximately six inches.**

   ■ From the front of the system:

1. **Remove all slot 0 and slot 1 boards and place on an ESD-protected surface.**

2. **Remove all centerplane support boards carrier assemblies and the system expander boards from the connectors by pulling each carrier plate forward and place each on an ESD-protected surface following the procedures in:**

   ■ Section 11.1, "Centerplane Support Board Replacement" on page 11-2
   ■ Section 12.2, "Expander Board Replacement Procedures" on page 12-3

⚠ **Caution –** The Sun Fireplane interconnect has **sharp edges** at the top guide rails. When the board is fully installed, the top guide rails are at head-level for the average person. Use care when working inside the cabinet chassis to avoid hitting the rails and causing bodily injury.

3. **Fully release the twenty-two (22) Phillips captive screws from the perimeter of the Sun Fireplane interconnect assembly stiffener (**FIGURE 13-1**).**

   After the Sun Fireplane interconnect assembly is moved away from the chassis guide pins, the assembly will slightly drop and hang by the Sun Fireplane interconnect assembly sheet metal guide brackets to ride along the sheet metal guide rails in the system chassis.

⚠ **Caution –** The Sun Fireplane interconnect assembly weighs 30.0 lb (13.6 kg). Use proper heavy-lifting procedures when removing this unit.

4. **Grasp the Sun Fireplane interconnect assembly by pulling the sheet metal insertion guide handles (located in the center of the Sun Fireplane interconnect assembly) and gently slide the assembly forward along the top sheet metal guide rails of the card cage.**

5. **After the assembly drops onto the sheet metal guide rails, continue to slide the Sun Fireplane interconnect assembly forward.**

6. **To remove the Sun Fireplane interconnect assembly from the system card cage, lift and tilt the assembly to the bottom left to release the top guide bracket from the guide rail at the top of the card cage. Continue to pull the assembly forward to clear the system chassis.**

Front View

Insertion guide rails

Stiffener

Phillips
captive screws (22)

Insertion guide handles

Rear View

Insertion guide rails

Stiffener

Chassis guide pins

Power centerplane
alignment pins
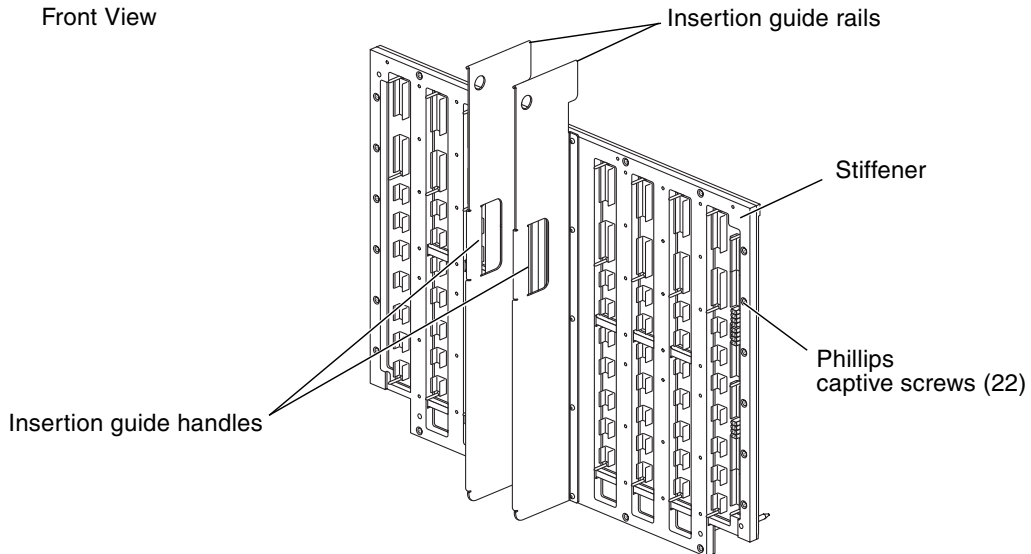
FIGURE 13-1 Sun Fireplane Interconnect—Front and Rear View

⚠ **Caution –** The ASICs on the Sun Fireplace interconnect assembly are easily damaged. Be careful when placing the assembly on an ESD-protected surface.
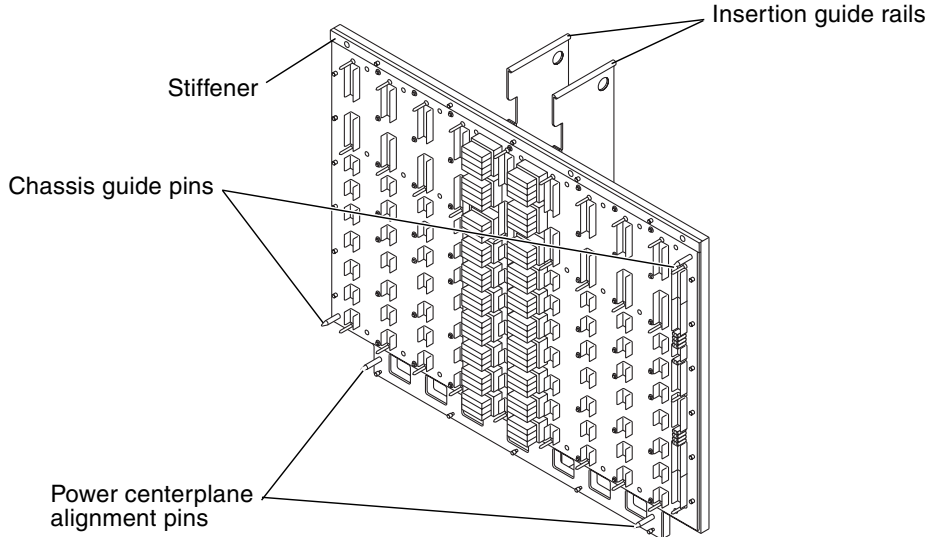
13.5 Installing the Sun Fireplane Interconnect into the Chassis

The Sun Fireplane interconnect assembly can only be removed from the front of the Sun Fire 15K/12K systems. Follow the front and rear notations in this procedure carefully.

Caution – The Sun Fireplane interconnect assembly weighs 30.0 lb (13.6 kg). Use proper heavy-lifting procedures when removing this unit.

■ From the front of the system:

1. **Place the top of the Sun Fireplane interconnect assembly sheet metal guide brackets onto the sheet metal guide rail at the top center of the card cage of the system chassis.**

2. **Using the sheet metal insertion guide handles of the Sun Fireplane interconnect assembly, slide the assembly into the card cage of the chassis aligning the two (2) chassis guide pins and two (2) power centerplane alignment pins (**TABLE 13-1**) through the center mid-plane panel of the system chassis.**

3. **Ensure the edges are flush against the chassis and secure the Sun Fireplane interconnect assembly with the twenty-two (22) Phillips captive screws around the perimeter of the Sun Fireplane interconnect assembly stiffener. Follow the tightening pattern defined to ensure proper alignment.**

   a. **Secure the bottom center captive screw.**

   b. **Secure the immediate right and left of bottom center captive screw.**

   c. **Secure the upper top left corner captive screw.**

   d. **Secure the upper top right corner captive screw.**

   e. **Secure the remaining screws going around the perimeter in a counterclockwise direction.**

4. **Install all centerplane support boards and system expander boards by following the procedures in:**

   ■ Section 11.2, "Centerplane Support Board Replacement Procedures" on page 11-3
   ■ Section 12.2, "Expander Board Replacement Procedures" on page 12-3

5. **Install all slot 0 and slot 1 boards. See the *Component Serial Number Worksheet*,** TABLE 13-1**, used to verify board position.**

■ From the rear of the system:

1. **Seat the system expander boards and the centerplane support board into the Sun Fireplane interconnect assembly.**

2. **Install all slot 0 and slot 1 boards.**

   See the *Component Serial Number Worksheet*, TABLE 13-1, used to verify board position.

13.6 Powering On the System After the Sun Fireplane Interconnect Installation

1. **Connect the AC power cords to the 4 kW dual AC–DC power supplies.**

2. **Connect all I/O cables referencing the cable label for proper identification.**

3. **Power on the AC0 and AC1 circuit breakers for all power supplies in the system.**

4. **Close the Sun Fire 15K/12K system cabinet access doors.**

5. **Once the main SC is booted and SMS is running, start the domain(s) by typing:**

```
sc% setkeyswitch -d domain_id  on
```

   where *domain_id* is the domain letter A-R.

6. **Verify all required components are on by typing:**

```
sc% showboards -v
```

7. **Execute one** setkeyswitch **command for each domain to be started.**

Fan Backplane Replacement Procedure

There are four fan backplanes mounted above the Sun Fireplane interconnect and four below the power centerplane. The fan backplane provides the power distribution to the eight fan trays in the Sun Fire 15K/12K systems. This chapter contains the replacement procedures for the fan backplanes.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

14.1 Powering Off for Fan Backplane Removal

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

Caution – The fan backplane is NOT a hot-swappable component. This procedure requires a complete shutdown of the domains and SCs, and disconnection of all AC power to the system.

Since the system must be powered off, the operating system and all of the domains must be systematically brought down and then halted.

1. **As a** `superuser` **on the domains, systematically shut down all running domains by typing:**

```
domain_name# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

2. **On the main SC, power off the domain hardware by typing:**

```
sc% poweroff
```

This command powers off the entire system with the exception of the power supplies, fans, and the SCs. Refer to `poweroff`(1M) for more information.

3. **Shut down the System Control boards by doing the following:**

   ■ As a `superuser` on the spare SC, shut down the spare SC by typing:

```
sc_spare# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

■ On the main SC, power off the spare SC by typing:

```
sc% poweroff SCx
```

where *x* = 0-1, dependent upon which SC is the spare.

■ As a superuser on the main SC, shutdown the main SC by typing:

```
sc# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

4. **Open the Sun Fire 15K/12K system cabinet access doors.**

Note – All DC circuit breakers are to remain in the on position at all times.

---

5. **Power off the AC0 and AC1 circuit breakers for all power supplies in the system.**

6. **Label and disconnect the twelve (12, six per side) AC power cords with the labels provided in the ship kit.**

14.2 Removing a Fan Backplane

There are two fan backplanes on the front of the Sun Fire 15K/12K systems and two on the rear. The front fan backplane locations are shown in FIGURE 14-1.

Note – All DC circuit breakers are to remain in the on position at all times.

Take care when removing the carrier plates. Ensure proper temporary storage for the carrier plates.

1. **Power off the AC circuit breakers on the power supply front panel.**

2. **Disconnect the AC power cords.**

3. **Remove the two fan trays connected to the fan backplane being removed.**

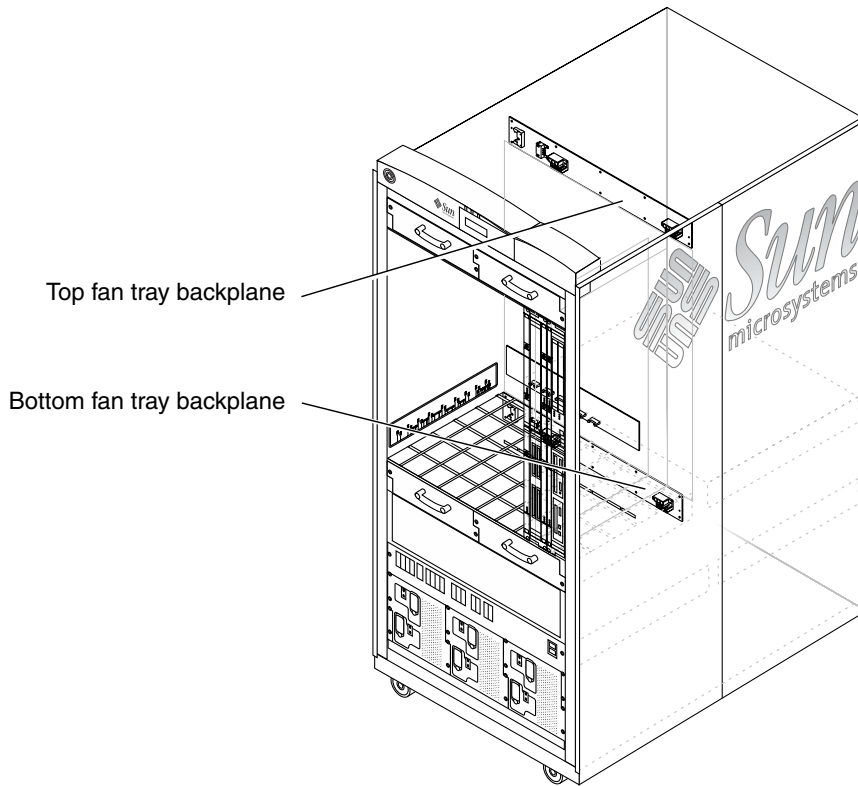   See Section 4.2.3, "Removing a Fan Tray" on page 4-4.

Top fan tray backplane

Bottom fan tray backplane

FIGURE 14-1 Fan Backplane Locations—Front

Note – Boards should be removed by pulling outward using the front handle with one hand and placing the other hand underneath the bottom guide rail for additional support. Carry the board by the front handle to a work area holding it vertically, with the connector downward. Lift the board and place the other hand under the bottom, or back, of the board placing the bottom, or back, on an ESD-protected surface. Never place the weight of a board on its connector as it is easily damaged.

---

4. **To gain additional access to the power cable, remove board sets and carrier plates from slots 5, 6, 7, and 8 front (side 0) or slots 14, 15, 16, and 17 rear (side 1). Remove additional carrier plates, as needed.**

5. **Disconnect the power cable connector and the control ribbon cable connector from the fan backplane. See** FIGURE 14-2**.**
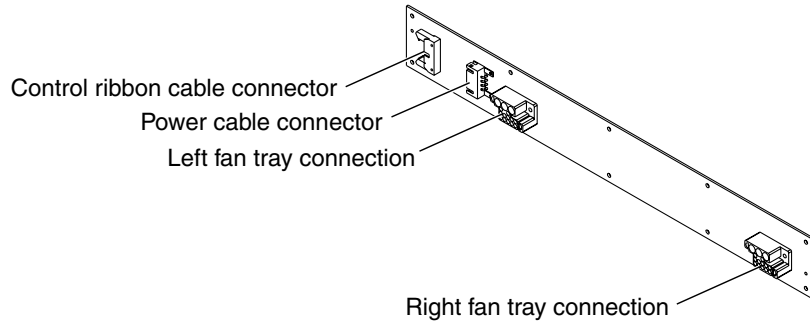
Control ribbon cable connector
Power cable connector
Left fan tray connection

Right fan tray connection

FIGURE 14-2 Fan Backplane Connections

Note – Avoid dropping screws into system cabinet during removal.

6. **Remove the ten (10) M4x6 panhead screws by using a Phillips No. 2 extra long (11 in. (27.9 cm) minimum) magnetic tip screwdriver, provided in the shipping kit.**

7. **From the left side of the card cage, grasp the left fan tray connector and pull forward and angle the backplane around the fan tray slots.**

8. **Remove the fan backplane from the cabinet.**

14.3   Installing a Fan Backplane

Note – When removing the upper fan trays, remember the bottom system kick plate is NOT A STEP. DO NOT use the kick plate to gain access to the top fan trays. Obtain a proper stool if required. Excessive weight on the kick plate will bend the door support brackets.

1. **Orienting the fan backplane with the power connector and the control connector on the left (FIGURE 14-2), insert the board at an angle into the cabinet around the fan tray slot separator (center of the double fan tray location) and set into position over the mounting holes.**

Note – Avoid dropping screws into system cabinet during installation.

2. **Secure the fan backplane with the ten (10) M4x6 panhead screws by using a Phillips No. 2 extra long (11 in. (27.9 cm) minimum) magnetic-tip screwdriver, provided in the shipping kit.**

3. **Connect the power cable connector and the control ribbon cable connector to the fan backplane. See** FIGURE 14-2**.**

4. **Install the boards and carrier plates in slots 5, 6, 7, and 8 front (side 0) or 14, 15, 16, and 17 rear (side 1), and any additional boards removed for access.**

5. **Install the two fan trays.**

   See Section 4.2.4, "Installing a Fan Tray" on page 4-5.

6. **Connect the AC power cables.**

7. **Power on the AC circuit breakers at the power supply front panel.**

14.4 Powering On After Fan Backplane Installation

1. **Ensure all DC circuit breakers are in the on position.**

2. **Connect the AC power cords to the 4 kW dual AC–DC power supplies.**

3. **Power on the AC0 and AC1 circuit breakers for all power supplies in the system.**

4. **Close the Sun Fire 15K/12K system cabinet access doors.**

5. **Once the main SC is booted, start the domain(s) by typing:**

```
sc% setkeyswitch -d domain_id on
```

where *domain_id* is the domain letter A-R. Execute one setkeyswitch command for each domain to be started.

Power Centerplane Replacement Procedure

Power is distributed to all board sets through the power centerplane which is located beneath the Sun Fireplane interconnect. The power centerplane can be removed only from the front of the Sun Fire 15K/12K systems. Access must be obtained by also removing all boards from the rear. Follow the front and rear notations in this procedure carefully. This chapter contains the replacement procedures for the power centerplane.

Note – The Sun Fireplane interconnect assembly overlaps the top of the power centerplane; therefore, the Sun Fireplane interconnect assembly must be removed first.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

15.1 Powering Off the System for Power Centerplane Replacement

⚠️ **Caution –** The power centerplane is NOT a hot-swappable component. This procedure requires a complete shutdown of the domains and SCs, and disconnection of all AC power to the system.

Since the system must be powered off, the operating system and all of the domains must be systematically brought down and then halted.

1. **As a** `superuser` **on the domains, systematically shut down all running domains by typing:**

```
domain_name# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

2. **On the main SC, power off the domain hardware by typing:**

```
sc% poweroff
```

This command powers off the entire system with the exception of the power supplies, fans, and the SCs. Refer to `poweroff`(1M) for more information.

3. **Shut down the System Control boards by doing the following:**

   ■ As a `superuser` on the spare SC, shut down the spare SC by typing:

```
sc_spare# shutdown -y -g seconds -i 0
```

   where *seconds* = amount of time before shutdown.

   ■ On the main SC, power off the spare SC by typing:

```
sc% poweroff SCx
```

   where *x* = 0-1, dependent upon which SC is the spare.

■ As a `superuser` on the main SC, shutdown the main SC by typing:

```
sc# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

4. **Open the Sun Fire 15K/12K system cabinet access doors.**

Note – All DC circuit breakers are to remain in the on position at all times.

---

5. **Power off the AC0 and AC1 circuit breakers for all power supplies in the system.**

6. **Label and disconnect the twelve (12, six per side) AC power cords with the labels provided in the ship kit.**

7. **Label and disconnect all I/O cables from the front and rear of the system and set aside.**

15.2 Removing the Power Centerplane

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

The actual removal of the power centerplane is from the front of the system but the initial removal procedures starts at the rear of the system.

■ From the rear of the system:

Note – Boards should be removed by pulling outward using the front handle with one hand and placing the other hand underneath the bottom guide rail for additional support. Carry the board to a work area holding vertically, with the connector downward, by the front handle. Lift the board and place the other hand under the bottom, or back, of the board placing the bottom, or back, on an ESD-protected surface. Never place the weight of a board on its connector as it is easily damaged.

---

1. **Remove all system expander and the centerplane support board sets by following the procedures in:**

   - Section 12.2.3, "Removing an Expander Board" on page 12-5
   - Section 11.2.3, "Removing a Centerplane Support Board" on page 11-4

2. **Remove the Sun Fireplane interconnect prior to removing the power centerplane.**

   See Section 13.4, "Removing the Sun Fireplane Interconnect From the Chassis" on page 13-5.

3. **Remove fan tray F7, to access the two (2) lower M4x8 Phillips screws of the DC cable cover, and place on a flat sturdy surface.**

   See Section 4.2.3, "Removing a Fan Tray" on page 4-4.

4. **Remove the DC cable cover by removing the nine (9) M4x8 Phillips screws from the DC cable cover.**

5. **Remove the five (5) ribbon cable power control connectors from the power centerplane (**FIGURE 15-1**).**
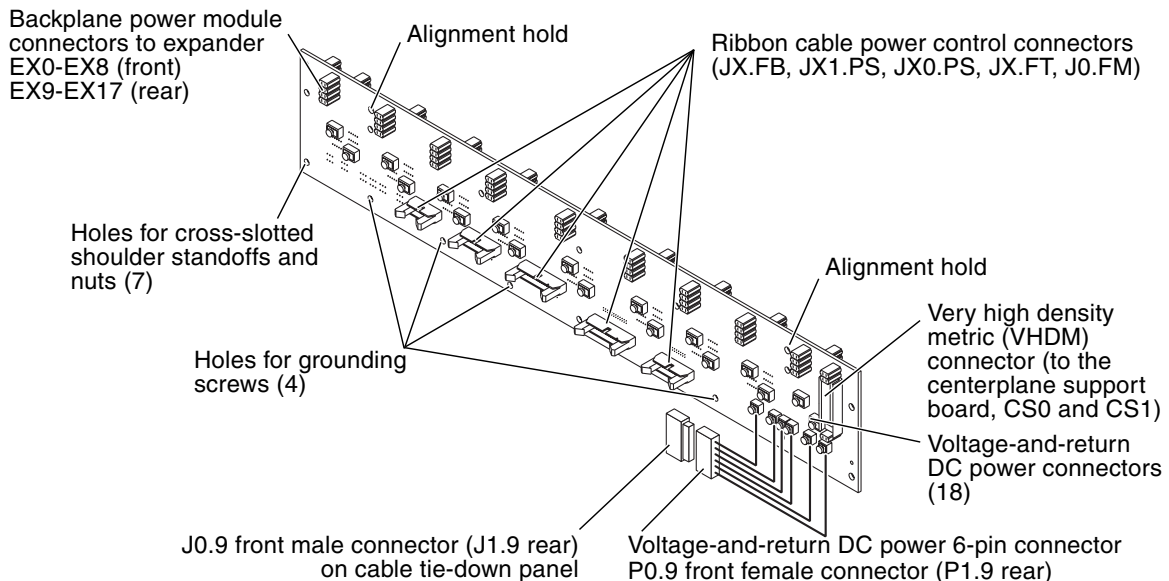

FIGURE 15-1 Power Centerplane Power Control Connections

6. **From the cable tie-down panel beneath the power centerplane, disconnect the P1.9 six-wire friction-fit 48V power connector from J1.9 by depressing the end clips.**

7. **Remove the eighteen (18) voltage-and-return DC power cables from the power centerplane by releasing the captive screw of each cable while pulling back on the lug.**

8. **Remove the seven (7) cross-slotted shoulder standoff nuts from the power centerplane.**

   ■ From the front of the system:

1. **Remove all system expander boards and the centerplane support board by following the procedures in:**
   ■ Section 12.2.3, "Removing an Expander Board" on page 12-5
   ■ Section 11.2.3, "Removing a Centerplane Support Board" on page 11-4

2. **Remove fan tray F3, to access the lower two (2) remaining M4x8 Phillips screws of the DC cable cover, and place on a flat sturdy surface.**

   See Section 4.2.3, "Removing a Fan Tray" on page 4-4.

3. **Remove the DC cable cover by removing the nine (9) M4x8 Phillips screws.**

4. **Remove the five (5) ribbon cable power control connections from the power centerplane. See** FIGURE 15-1**.**

5. **From the cable tie-down panel beneath the power centerplane, disconnect the P0.9 six-wire friction-fit 48V power connector from J0.9 by depressing the end clips.**

6. **Remove the eighteen (18) voltage-and-return DC power cables from the power centerplane by releasing the captive screw of each cable while pulling back on the lug.**

7. **Remove the four (4) M4x10 panhead grounding screws from the power centerplane.**

   The four grounding screws are only on the front side of the power centerplane.

8. **Remove the seven (7) cross-slotted shoulder standoff screws from the front of the power centerplane.**

9. **Remove the power centerplane and place on an ESD-protective surface.**

15.3 Installing the Power Centerplane Assembly into the Chassis

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

■ From the front of the system:

1. **Install the power centerplane and attach it with the seven (7) cross-slotted shoulder standoff screws.**

   The power centerplane will float on the shoulder standoff until the four remaining screws secure it into position after the installation of the Sun Fireplane interconnect in Step 8 as follows.

   Note – Securing of the ground screws at this time (after installation of the power centerplane and the cross-slotted shoulder screws) is not advised until after the installation of the Sun Fireplane interconnect, in Step 7 as follows. Do not secure the ground screws at this time.

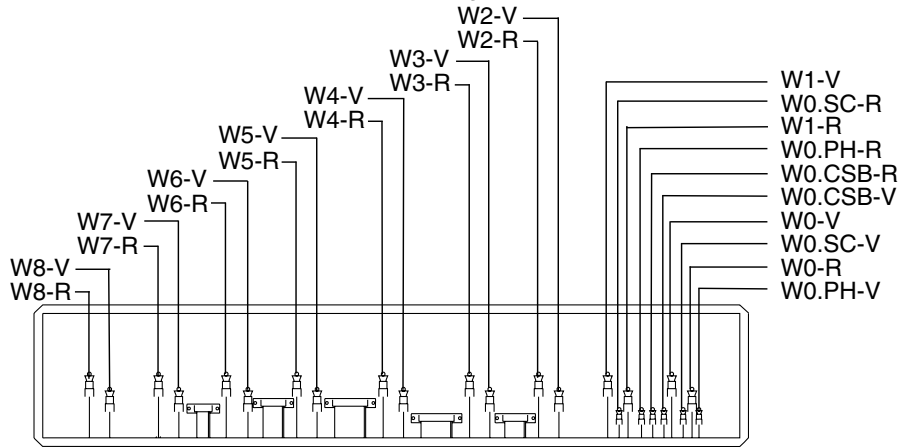   **Note –** Verify the red wires are installed in the top row and the black wires are installed in the bottom row.

2. **Install the eighteen (18) voltage-and-return DC power cables to the power centerplane.**

   See Section 16.2.2, "48 VDC Power Cable Replacement" on page 16-10.

   FIGURE 15-2 shows the voltage-and-return reference designations on the internal cabinet label. These labels are located inside the chassis above the lower fan trays on the left side, respectively.

3. **Connect the P0.9 six-wire friction-fit 48V power connector of the power centerplane to J0.9 on the cable tie-down panel.**

4. **Connect the five (5) ribbon cable connectors to the power centerplane.**

5. **Install the DC cable cover and secure with nine (9) M4x8 Phillips screws.**

Internal label of power centerplane voltage-and-return connection—front

W2-V
W2-R
W3-V
W3-R
W4-V
W4-R
W5-V
W5-R
W6-V
W6-R
W7-V
W7-R
W8-V
W8-R

W1-V
W0.SC-R
W1-R
W0.PH-R
W0.CSB-R
W0.CSB-V
W0-V
W0.SC-V
W0-R
W0.PH-V

Internal label of power centerplane voltage-and-return connections—rear

W11-V
W11-R
W12-V
W12-R
W13-V
W13-R
W14-V
W14-R
W15-V
W15-R
W16-V
W16-R
W17-V
W17-R

W10-V
W1.SC-R
W10-R
W1.PH-R
W1.CSB-R
W1.CSB-V
W9-V
W1.SC-V
W9-R
W1.PH-V
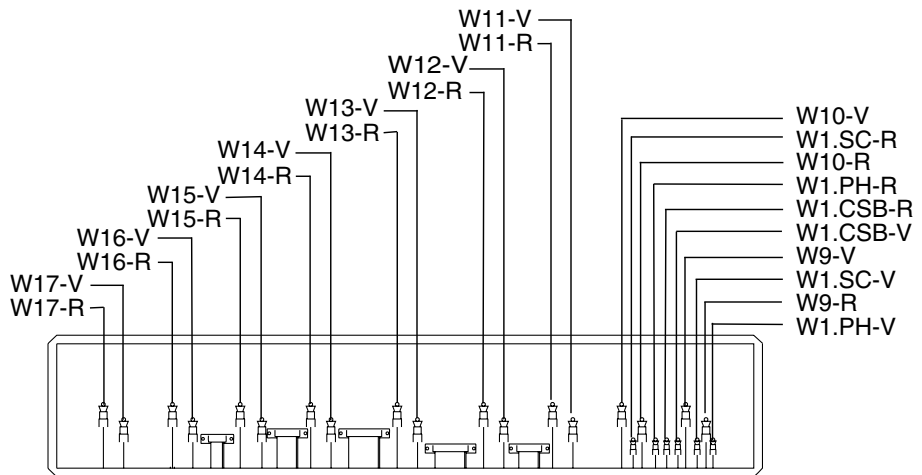
FIGURE 15-2 Voltage-and-Return Reference Designation Labels—Front and Rear

6. **Reinstall fan tray F3.**

   See Section 4.2.4, "Installing a Fan Tray" on page 4-5.

7. **Install the Sun Fireplane interconnect assembly, if not previously installed.**

   See Section 13.5, "Installing the Sun Fireplane Interconnect into the Chassis" on page 13-8.

⚠ **Caution –** Ensure the Sun Fireplane interconnect assembly is installed prior to securing the four (4) grounding screws.

---

8. **Secure the power centerplane into position with the four (4) M4x10 panhead grounding screws to the power centerplane.**

9. **Install all system expander and the centerplane support board sets by following the procedures in:**

   ■ Section 12.2.4, "Installing an Expander Board" on page 12-7
   ■ Section 11.2.4, "Installing a Centerplane Support Board" on page 11-6

   ■ From the rear of the system:

1. **Install the seven (7) cross-slotted standoff nuts onto the male threads of the cross-slotted shoulder standoff screws.**

2. **Connect the eighteen (18) voltage-and-return AC power cables to the power centerplane.**

   See Section 16.2.2, "48 VDC Power Cable Replacement" on page 16-10.

3. **Connect the P1.9 six-wire friction-fit 48V power connector at the power centerplane to J1.9 on the cable tie-down panel.**

4. **Connect the five (5) ribbon cable connectors to the power centerplane.**

5. **Install the DC cable cover and secure with nine (9) M4x8 Phillips screws.**

6. **Reinstall fan tray F7.**

   See Section 4.2.4, "Installing a Fan Tray" on page 4-5.

7. **Install all system expander and the centerplane support board sets by following the procedures in:**

   ■ Section 12.2.4, "Installing an Expander Board" on page 12-7
   ■ Section 11.2.4, "Installing a Centerplane Support Board" on page 11-6

15.4 Powering On the System After Power Centerplane Installation

1. **Connect the AC power cords to the 4 kW dual AC–DC power supplies.**

2. **Connect all I/O cables referencing the cable label for proper identification.**

3. **Power on the AC0 and AC1 circuit breakers for all power supplies in the system.**

4. **Close the Sun Fire 15K/12K system cabinet access doors.**

5. **Once the main SC is booted, start the domain(s) by typing:**

```
sc% setkeyswitch -d domain_id  on
```

where *domain_id* is the domain letter A-R.

6. **Execute one `setkeyswitch` command for each domain to be started.**

Cable Replacement Procedures

FIGURE 16-1 shows the locations of the internal system cable connections for the Sun Fire 15K/12K systems. Cable functions are further defined in the diagrams shown in FIGURE 16-2. FIGURE 16-3, FIGURE 16-4, FIGURE 16-5, FIGURE 16-6, FIGURE 16-7, FIGURE 16-8 and FIGURE 16-9 that identify the silkscreen numbers on the cabinet that corresponds to the cable connections. Review TABLE 16-1 for cable termination wire color definitions. This chapter contains the replacement procedures specifically for the internal cabinet cables.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
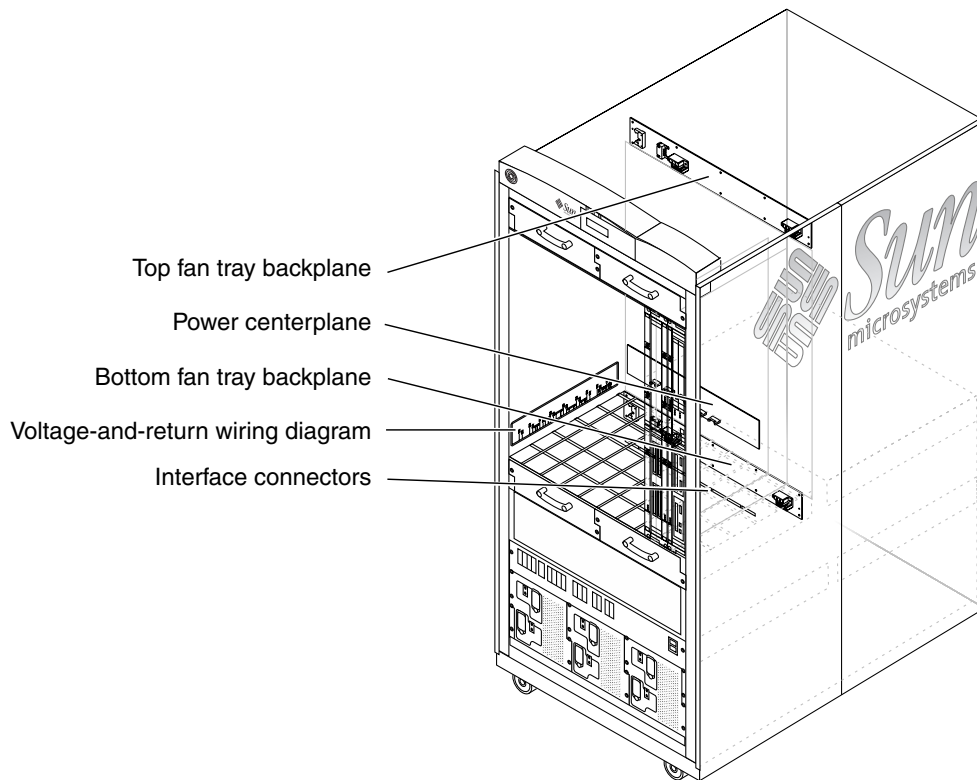- Refer servicing of equipment to qualified personnel.

Top fan tray backplane

Power centerplane

Bottom fan tray backplane

Voltage-and-return wiring diagram

Interface connectors

FIGURE 16-1 Sun Fire 15K/12K Systems Internal Cable Connections

Power centerplane
grounding screws

Top fan tray backplane

Power centerplane

Cable tie down panel

Bottom fan tray backplane

Interface connectors

Wiring Locations
  48V high-current wires:
    Red, top
    Black, bottom
  48V low-current wires:
    Black, left
    Red, right

Reference designators on wires
near terminal lugs should match
reference designators silk-screened
on the power centerplane.

Centerplane support, system control, and
system control peripheral power connector
(six wire), J0.9 (front), J1.9 (rear)

P0.9 connector (front)
P1.9 connector (rear)

FIGURE 16-2 System Cable Layout Diagram—Typical for Front (Side 0) and Rear (Side 1)
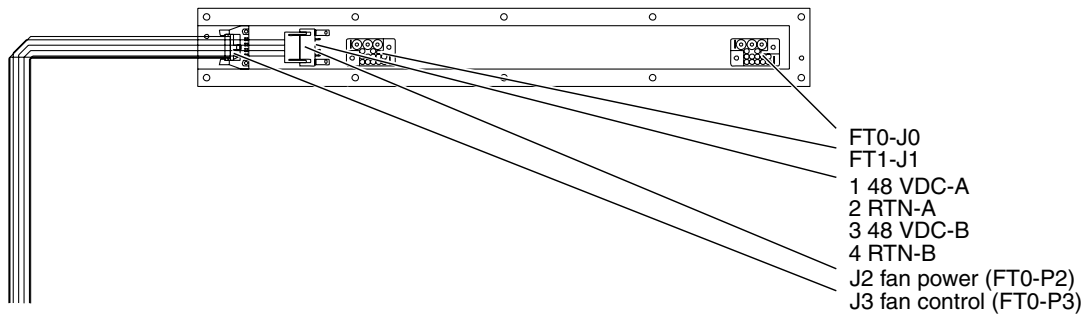
FIGURE 16-3 Fan Tray Backplane FRU Cable Diagram—Top Front, Side 0

The following labels appear in FIGURE 16-3:

- FT0-J0
- FT1-J1
- 1 48 VDC-A
- 2 RTN-A
- 3 48 VDC-B
- 4 RTN-B
- J2 fan power (FT0-P2)
- J3 fan control (FT0-P3)

The following labels appear in FIGURE 16-4:

- W2-V
- W2-R
- W3-V
- W3-R
- W4-V
- W4-R
- W5-V
- W5-R
- W6-V
- W6-R
- W7-V
- W7-R
- W8-V
- W8-R
- W1-V
- W0.SC-R
- W1-R
- W0.PH-R
- W0.CSB-R
- W0.CSB-V
- W0-V
- W0.SC-V
- W0-R
- W0.PH-V
- J0.9 (P0.9)
- FT1
- FT0
- 1 48 VDC-A
- 2 RTN-A
- 3 48 VDC-B
- 4 RTN-B
- J2 fan power (FB0-P2)
- J3 fan control (FB0-P3)
- Bottom fan tray backplane
- J0.8
- J0.7
- J0.6
- J0.5
- J0.4
- J0.3
- J0.2
- J0.1
- J0.0
- Power shelf I^2C, control 0, J0.0
- Power shelf I^2C, control 1, J0.1
- FT0-3, J0.2
- Crossover, J0.3
- CSB-SC-SCPER, J0.4
- Crossover, J0.5
- EXP 2-1-0, J0.6
- EXP 5-4-3, J0.7
- EXP 8-7-6, J0.8

FIGURE 16-4 Power Centerplane Cable Diagram—Bottom Front, Side 0

FT1-J0
FT1-J1
1 48 VDC-A
2 RTN-A
3 48 VDC-B
4 RTN-B
J2 fan power (FT1-P2)
J3 fan control (FT1-P3)
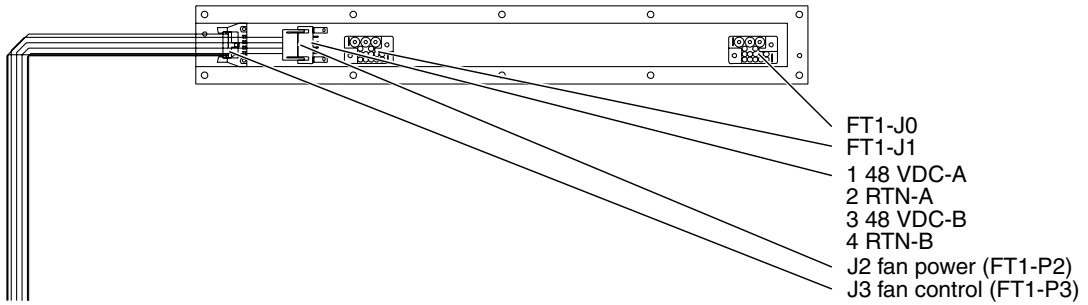
FIGURE 16-5 Fan Tray Backplane FRU Cable Diagram—Top Front, Side 1

W11-V
W11-R
W12-V
W12-R
W13-V
W13-R
W14-V
W14-R
W15-V
W15-R
W16-V
W16-R
W17-V
W17-R

W10-V
W1.SC-R
W10-R
W1.PH-R
W1.CSB-R
W1.CSB-V
W9-V
W1.SC-V
W9-R
W1.PH-V

J1.9 (P1.9)

FT1
FT0
1 48 VDC-A
2 RTN-A
3 48 VDC-B
4 RTN-B
J2 fan power (FB1-P2)
J3 fan control (FB1-P3)

Bottom fan tray backplane

J1.8 J1.7 J1.6 J1.5 J1.4 J1.3 J1.2 J1.1 J1.0

Power shelf I^{2}C, control 0, J1.0
Power shelf I^{2}C, control 1, J1.1
FT4-7, J1.2
Crossover, J1.3
CSB-SC-SCPER, J1.4
Crossover, J1.5
EXP 2-1-0, J1.6
EXP 5-4-3, J1.7
EXP 8-7-6, J1.8

FIGURE 16-6 Power Centerplane Cable Diagram—Bottom Rear, Side 1
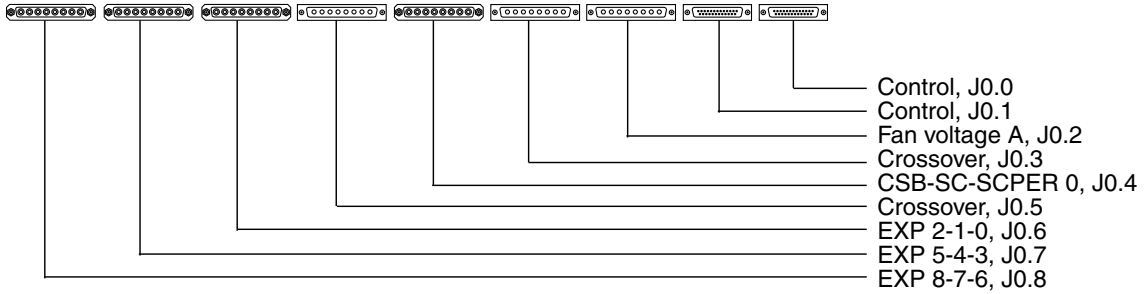
FIGURE 16-7 Cable Schematic Diagram for Interface Connectors—Side 0

Control, J0.0
Control, J0.1
Fan voltage A, J0.2
Crossover, J0.3
CSB-SC-SCPER 0, J0.4
Crossover, J0.5
EXP 2-1-0, J0.6
EXP 5-4-3, J0.7
EXP 8-7-6, J0.8
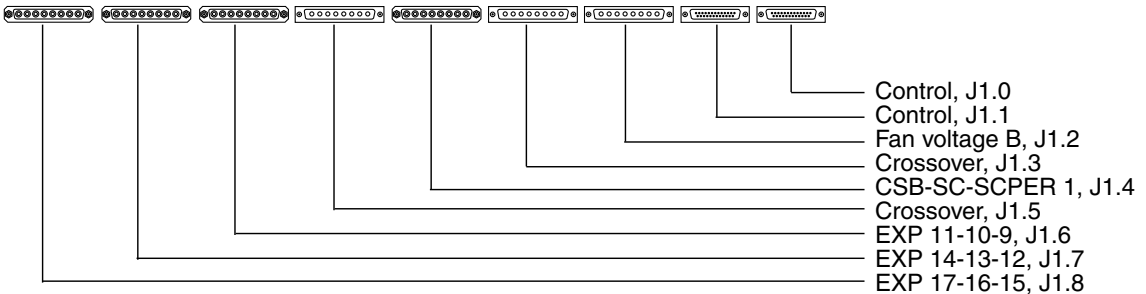
FIGURE 16-8 Cable Schematic Diagram for Interface Connectors—Side 1

Control, J1.0
Control, J1.1
Fan voltage B, J1.2
Crossover, J1.3
CSB-SC-SCPER 1, J1.4
Crossover, J1.5
EXP 11-10-9, J1.6
EXP 14-13-12, J1.7
EXP 17-16-15, J1.8

Power module to connector
bulkhead cable assembly (7)

Power module to connector
bulkhead cable assembly (3)

Crossover cable assembly (2)

Power module to connector
bulkhead cable assembly (7)

Power module to connector
bulkhead cable assembly (3)

Connector
bulkhead
power module

Internal wiring

Power supply

Internal wiring

Power supply

Side 0

Side 1

FIGURE 16-9 DC Power Distribution Cables—Side 0 and Side 1

TABLE 16-1 Cable Termination Table

From Power CP	To Interface	AWG & Color	Function	From Power CP	To Interface	AWG & Color	Function
F R O N T (S I D E 0)				R E A R (S I D E 1)			
W8-R	J0.8-8	10 BLK	EXP 8 RETURN	W17-R	J1.8-8	10 BLK	EXP 17 RETURN
W8-V	J0.8-7	10 RED	EXP 8 48VDC	W17-V	J1.8-7	10 RED	EXP 17 48VDC
NC	J0.8-6		NO CONNECTION	NC	J1.8-6		NO CONNECTION
W7-R	J0.8-5	10 BLK	EXP 7 RETURN	W16-R	J1.8-5	10 BLK	EXP 16 RETURN
W7-V	J0.8-4	10 RED	EXP 7 48VDC	W16-V	J1.8-4	10 RED	EXP 16 48VDC
NC	J0.8-3		NO CONNECTION	NC	J1.8-3		NO CONNECTION
W6-R	J0.8-2	10 BLK	EXP 6 RETURN	W15-R	J1.8-2	10 BLK	EXP 15 RETURN
W6-V	J0.8-1	10 RED	EXP 6 48VDC	W15-V	J1.8-1	10 RED	EXP 15 48VDC
W5-R	J0.7-8	10 BLK	EXP 5 RETURN	W14-R	J1.7-8	10 BLK	EXP 14 RETURN
W5-V	J0.7-7	10 RED	EXP 5 48VDC	W14-V	J1.7-7	10 RED	EXP 14 48VDC
NC	J0.7-6		NO CONNECTION	NC	J1.7-6		NO CONNECTION
W4-R	J0.7-5	10 BLK	EXP 4 RETURN	W13-R	J1.7-5	10 BLK	EXP13 RETURN
W4-V	J0.7-4	10 RED	EXP 4 48VDC	W13-V	J1.7-4	10 RED	EXP13 48VDC
NC	J0.7-3		NO CONNECTION	NC	J1.7-3		NO CONNECTION
W3-R	J0.7-2	10 BLK	EXP 3 RETURN	W12-R	J1.7-2	10 BLK	EXP 12 RETURN
W3-V	J0.7-1	10 RED	EXP 3 48VDC	W12-V	J1.7-1	10 RED	EXP 12 48VDC
W2-R	J0.6-8	10 BLK	EXP 2 RETURN	W11-R	J1.6-8	10 BLK	EXP 11 RETURN
W2-V	J0.6-7	10 RED	EXP 2 48VDC	W11-V	J1.6-7	10 RED	EXP 11 48VDC
NC	J0.6-6		NO CONNECTION	NC	J1.6-6		NO CONNECTION
W1-R	J0.6-5	10 BLK	EXP 1 RETURN	W10-R	J1.6-5	10 BLK	EXP 10 RETURN
W1-V	J0.6-4	10 RED	EXP 1 48VDC	W10-V	J1.6-4	10 RED	EXP 10 48VDC
NC	J0.6-3		NO CONNECTION	NC	J1.6-3		NO CONNECTION
W0-R	J0.6-2	10 BLK	EXP 0 RETURN	W9-R	J1.6-2	10 BLK	EXP 9 RETURN
W0-V	J0.6-1	10 RED	EXP 0 48VDC	W9-V	J1.6-1	10 RED	EXP 9 48VDC
W0-CSB-R	P0.9-1	16 BLK	CP SUPT BD 0 RETURN	W1-CSB-R	P1.9-1	16 BLK	CP SUPT BD1 RETURN
J0.9-1	J0.4-8	16 BLK	CP SUPT BD 0 RETURN	J1.9-1	J1.4-8	16 BLK	CP SUPT BD 1 RETURN
W0-CSB-V	P0.9-6	16 RED	CP SUPT BD 0 48VDC	W1-CSB-V	P1.9-6	16 RED	CP SUPT BD 1 48VDC
J0.9-6	J0.4-7	16 RED	CP SUPT BD 0 48VDC	J1.9-6	J1.4-7	16 RED	CP SUPT BD 1 48VDC
NC	J0.4-6		NO CONNECTION	NC	J1.4-6		NO CONNECTION
W0.SC-R	P0.9-3	16 BLK	SYST CNTLR 0 RETURN	W1.SC-R	P1.9-3	16 BLK	SYST CNTLR 1 RETURN
J0.9-3	J0.4-5	16 BLK	SYST CNTLR 0 RETURN	J1.9-3	J1.4-5	16 BLK	SYST CNTLR 1 RETURN
W0.SC-V	P0.9-5	16 RED	SYST CNTLR 0 48VDC	W1.SC-V	P1.9-5	16 RED	SYST CNTLR 1 48VDC
J0.9-5	J0.4-4	16 RED	SYST CNTLR 0 48VDC	J1.9-5	J1.4-4	16 RED	SYST CNTLR 1 48VDC
NC	J0.4-3		NO CONNECTION	NC	J1.4-3		NO CONNECTION
W0.PH-R	P0.9-2	16 BLK	SYST CNTLR PER 0 RET	W1.PH-R	P1.9-2	16 BLK	SYST CNTLR PER1 RET
J0.9-2	J0.4-2	16 BLK	SYST CNTLR PER 0 RET	J1.9-2	J1.4-2	16 BLK	SYST CNTLR PER 1 RET
W0.PH-V	P0.9-4	16 RED	SYST CNTLR PER 0 48VDC	W1.PH-V	P1.9-4	16 RED	SYST CNTLR PER 1 48VDC
J0.9-4	J0.4-1	16 RED	SYST CNTLR PER 0 48VDC	J1.9-4	J1.4-1	16 RED	SYST CNTLR PER 1 48VDC

16.1　AC Power Cord

To hot-swap an AC power cord, see Section 3.2.2.3, "Removing a 4 kW Dual AC–DC Power Supply" on page 3-11.

16.2　Internal Cabinet Cable Replacement Procedures

If a failure is in the cable harness set (includes the front and rear cable tie-down panels), the complete harness set should be replaced. See Section 16.2.6, "Internal Cable Harness Set Replacement" on page 16-16.

⚠ **Caution –** The internal cabinet cables are NOT hot-swap components. These procedures require turning off the AC power to the system prior to cable replacement.

16.2.1　Powering Off the System for Cable Replacement

⚠ **Caution –** The cable harness set is NOT a hot-swap component. This procedure requires a complete shutdown of the domains and SCs, and disconnection of all AC power to the system.

1. **As a** `superuser` **on the domains, systematically shut down all running domains by typing:**

```
domain_name# shutdown -y -g seconds -i 0
```

where *seconds* = amount of time before shutdown.

2. **On the main SC, power off the domain hardware by typing:**

```
sc% poweroff
```

This command powers off the entire system with the exception of the power supplies, fans, and the SCs. Refer to poweroff(1M) for more information.

3. **Shut down the System Control boards by doing the following:**

   ■ As a superuser on the spare SC, shut down the spare SC by typing:

```
sc_spare# shutdown -y -g seconds -i 0
```

   where *seconds* = amount of time before shutdown.

   ■ On the main SC, power off the spare SC by typing:

```
sc% poweroff SCx
```

   where *x* = 0-1, dependent upon which SC is the spare.

   ■ As a superuser on the main SC, shutdown the main SC by typing:

```
sc# shutdown -y -g seconds -i 0
```

   where *seconds* = amount of time before shutdown.

4. **Open the Sun Fire 15K/12K systems cabinet access doors.**

Note – All DC circuit breakers are to remain in the on position at all times.

---

5. **Power on the AC0 and AC1 circuit breakers for all power supplies in the system.**

6. **Label and disconnect the twelve (12, six per side) AC power cords with the labels provided in the ship kit.**

16.2.2   48 VDC Power Cable Replacement

16.2.2.1   Removing the 48 VDC Power Cable

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Power off the system.**

   See Section 16.2.1, "Powering Off the System for Cable Replacement" on page 16-8.

2. **Remove the twenty-two (22) M4x30 panhead screws retaining the air plenum cover, and remove both the plenum cover and the honeycomb EMI filter panel.**

3. **Reach inside the system, below the fan trays, and release the four (4 per cable) male jackscrews holding the 48 VDC cable assemblies to both the top of the power shelf assembly and the cable retaining bracket (**FIGURE 16-10**).**

P12 connects to J12 cable of the FrameManager chassis side panel (rear)

Power crossover cables (2)

Connector bulkhead (2)

P13 connects to J13 cable of the FrameManager chassis side panel (front)

P11 connects to J11 cable of the FrameManager or TopCap chassis side panel (rear)

48 VDC power cables (7)

J0.8
J0.7
J0.6
J0.5
J0.4
J0.3
J0.2
J0.1
J0.0
J0.9

J1.9
J1.0
J1.1
J1.2
J1.3
J1.4
J1.5
J1.6
J1.7
J1.8

Rear power module

P10 connects to J10 cable of the FrameManager chassis side panel (front)

Front power module

Power shelf I^{2}C cables (3) (front and rear)

FIGURE 16-10 48 VDC Power Cables

4. **Remove the cable(s).**

16.2.2.2 Installing the 48 VDC Power Cable

1. **Install the new cable.**

2. **Secure the four (4 per cable) jackscrews holding the 48 VDC cable assemblies to both the top of the power shelf assembly and the cable retaining bracket.**

3. **Install the honeycomb EMI Filter panel and air plenum cover and secure with the twenty-two (22) M4x30 panhead screws.**

4. **Power on the system.**

   See Section 16.3, "Powering On the System" on page 16-22.

16.2.3 Power Shelf I^{2}C or FrameManager and TopCap Cable Replacement

⚠ **Caution –** Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

16.2.3.1 Removing the Power Shelf I^{2}C or FrameManager and TopCap Cable

1. **Power off the system.**

   See Section 16.2.1, "Powering Off the System for Cable Replacement" on page 16-8.

2. **Remove the twenty-two (22) M4x30 panhead screws retaining the air plenum cover, and remove both the plenum cover and the honeycomb EMI filter panel.**

3. **Reach inside the system, below the fan trays, and release the four (4 per cable) male jackscrews holding the power shelf I^{2}C cable assemblies to both the top of the power shelf assembly and the cable retaining bracket.**

   Similarly, there is a third cable connecting to the side panel that eventually goes to the FrameManager assembly that can be replaced in the same manner. See FIGURE 16-10.

4. **Remove the cable.**

16.2.3.2 Installing the Power Shelf I^{2}C or FrameManager and TopCap Cable

1. Install the new cable.

2. Secure the four (4 per cable) male jackscrews holding the power shelf I^{2}C cable assemblies to both the top of the power shelf assembly and the cable retaining bracket.

3. Install the honeycomb EMI Filter panel and air plenum cover and secure with the twenty-two (22) M4x30 panhead screws.

4. Power on the system.

See Section 16.3, "Powering On the System" on page 16-22.

16.2.4 Power Crossover Cable Replacement

16.2.4.1 Removing the Power Crossover Cable

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. Power off the system.

See Section 16.2.1, "Powering Off the System for Cable Replacement" on page 16-8.

2. Remove the twenty-two (22) M4x30 panhead screws retaining the air plenum cover, and remove both the plenum cover and the honeycomb EMI filter panel.

3. Remove at least three (3) center system board components and their associated carrier plate assemblies from both the front and the rear of the system to allow access to the cables below the lower card guide assembly.

Review the board set carrier plate instructions for proper handling. See Section 10.1, "Inserting a Board Set Carrier Plate" on page 10-2.

4. Remove the two (2) lower fan trays and set aside.

See Section 4.2.3, "Removing a Fan Tray" on page 4-4.

5. Reach inside the system, below the fan tray shelf, and release the four (two (2) per connector) male jackscrews (front and rear) holding the 48 VDC power cable assemblies (two (2) per side) to the two (2) power crossover cables.

See FIGURE 16-10.

6. Using a 3/16 inch nut driver, carefully remove the four (4) female jack screws (two (2) per connector) holding the crossover cable connectors to the horizontal connector bracket.

7. Reaching through the lower card guide assembly, remove the cable(s).

16.2.4.2 Installing the Power Crossover Cable

1. Install the new cable(s).

2. Secure the four (4) female jack screws (two per connector) holding the crossover cable connectors to the horizontal connector bracket by using a 3/16 inch nut driver.

3. Secure the four (4) (two per connector) jackscrews holding the 48 VDC power cable assemblies (front and rear) to the two (2) power crossover cables.

4. Install the lower fan trays.

   See Section 4.2.4, "Installing a Fan Tray" on page 4-5.

5. Install the center system board components and their associated carrier plate assemblies to both the front and the rear of the system previously removed to enable access to the cables below the lower card guide assembly.

   Review the board set carrier plate instructions for proper handling. See Section 10.1, "Inserting a Board Set Carrier Plate" on page 10-2.

6. Install the honeycomb EMI Filter panel and air plenum cover and secure with the twenty-two (22) M4x30 panhead screws.

7. Power on the system.

   See Section 16.3, "Powering On the System" on page 16-22.

16.2.5 Fan Tray Power Cable Replacement

16.2.5.1 Removing the Fan Tray Power Cable

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Power off the system.**

   See .

2. **Remove the system board modules and their associated carrier plate assemblies from the front and rear of the system.**

3. **Remove the twenty-two (22) M4x30 panhead screws retaining the air plenum cover, and remove both the plenum cover and the honeycomb EMI filter panel.**

4. **Reach inside the system, below the fan trays, and release the four (4) (two per connector) male jackscrews holding the 48 VDC power cable assemblies to the two (2) fan tray power cable connectors attached to the connector bracket (FIGURE 16-11).**

Fan tray power cables

Cables not shown for clarity
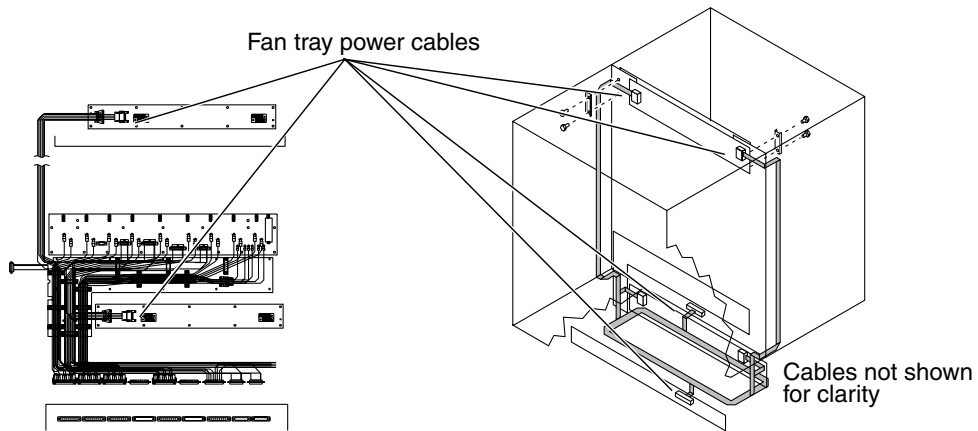
FIGURE 16-11 Fan Tray Power Cable

5. **Using a 3/16 inch nut driver, carefully remove the four (4) female jack screws (two (2) per connector) holding the fan tray cable connectors to the horizontal connector bracket on the front and rear of the system.**

6. **Remove the sixteen (16) M4x6 panhead screws (eight (8) per cover) holding the vertical cable wireway covers on the front and rear of the system.**

7. **Remove the two (2) upper cable clamps (each with two (2) locknuts (one (1) per side) from the front and rear of the system.**

8. **Remove the thirty-eight (38) (nineteen (19) per side) M4x6 panhead screws retaining the black plastic cable cover attached to the center bulkhead on the front and rear of the system.**

9. Reach through the upper and lower card guide assembly and remove the blue colored connectors attaching the fan power cable to the four (4) fan backplanes.

10. Remove the fan power cable assembly from the system.

16.2.5.2 Installing the Fan Tray Power Cable

1. Install the new cable(s), carefully routing the cable(s) as originally installed.

2. Replace the blue colored connectors attaching the fan power cable to the four (4) fan backplanes.

   See FIGURE 16-3 and FIGURE 16-5 for reference designators.

3. Secure the black plastic cable covers, on the front and rear of the system, to the center bulkhead with the thirty-eight (38) (nineteen (19) per side).

4. Replace the two (2) upper cable clamps (each with two (2) locknuts on the front and rear of the system).

5. Secure the vertical cable wireway covers, on the front and rear of the system, with the sixteen (16) M4x6 panhead screws (eight (8) per cover).

6. Secure the four (4) female jack screws (two (2) per connector) holding the fan tray cable connectors to the horizontal connector bracket by using a 3/16 inch nut driver.

7. Secure the four (two (2) per connector) jackscrews holding the 48 VDC power cable assemblies to the two (2) fan tray power cable connectors on the front and rear of the system.

8. Install the honeycomb EMI Filter panel and air plenum cover and secure with the twenty-two (22) M4x30 panhead screws.

9. Install the system board modules and their associated carrier plate assemblies into the front and rear of the system.

10. Power on the system.

    See Section 16.3, "Powering On the System" on page 16-22.

16.2.6 Internal Cable Harness Set Replacement

16.2.6.1 Removing the Internal Cable Harness Set

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Power off the system.**

   See Section 16.2.1, "Powering Off the System for Cable Replacement" on page 16-8.

2. **Remove the system board modules and their associated carrier plate assemblies from the front and rear of the system.**

3. **Remove the lower fan trays from the front and rear of the system.**

4. **Remove the twenty-two (22) M4x30 panhead screws retaining the air plenum cover, and remove both the plenum cover and the honeycomb EMI filter panel from the front and rear of the system.**

5. **Reach inside the system, below the fan trays, and release the four (two (2) per connector) male jackscrews holding the 48 VDC power cable assemblies to the 48 VDC power cables and power shelf I^{2}C cables.**

6. **Using a 3/16 inch nut driver, carefully remove the four (4) female jack screws (two (2) per connector, three (3) on the front and three (3) on the rear)) holding the Internal Harness Set connectors to the horizontal connector bracket.**

7. **Remove the sixteen (16) M4x6 panhead screws (eight (8) per cover), on the front and rear of the system, holding the vertical cable wireway covers and remove the two (2) upper cable clamps (each with two (2) locknuts (one (1) per side) from the front and rear of the system.**

8. **Remove the thirty-eight (38) (nineteen (19) per side) M4x6 panhead screws retaining the black plastic cable cover attached to the center bulkhead on the front and rear of the system.**

9. **Reach through the upper and lower card guide assembly and remove the grey colored connectors attaching the I^{2}C fan cable to the four (4) fan backplanes (FIGURE 16-12).**

10. **Disconnect all forty-eight (48) discrete screw lugs and ten (10) ribbon cable connectors from the power centerplane at the front and rear of the system.**

Fan control cable

Some cables not shown for clarity
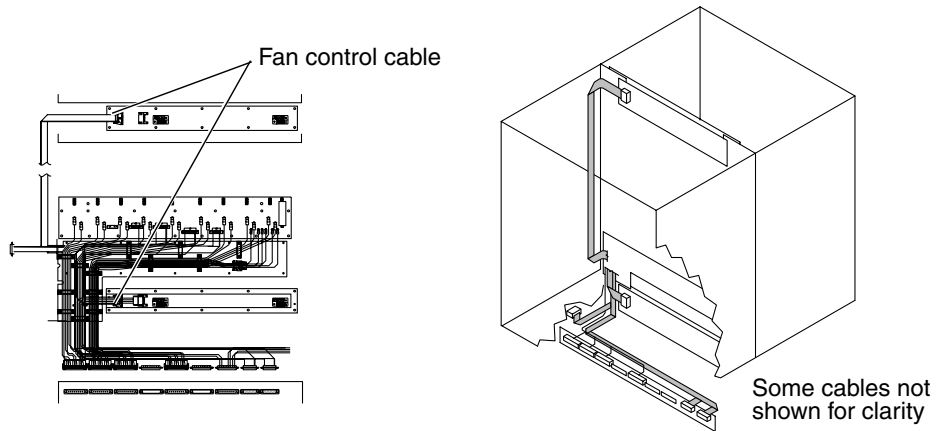
FIGURE 16-12 Internal Cable Harness Set

11. **Carefully remove the internal cable harness set assembly from the system.**

16.2.6.2 Installing the Internal Cable Harness Set

1. **Install a new internal cable harness set assembly routing the cables as originally installed.**

   See the FIGURE 16-3 and FIGURE 16-5 for reference designators.

2. **Install all forty-eight (48) discrete and ten (10) ribbon cable connectors to the power centerplane at the front and rear of the system.**

3. **Replace the grey colored connectors attaching the I^{2}C fan cable to the four(4) fan backplanes.**

   See FIGURE 16-4 and FIGURE 16-6 for reference designators.

4. **Secure the black plastic cable cover to the center bulkhead with the thirty-eight (38) (nineteen (19) per side) to the front and rear of the system.**

5. **Replace the two (2) upper cable clamps (each with two (2) locknuts, on the front and rear of the system.**

6. **Secure the vertical cable wireway covers with the sixteen (16) M4x6 panhead screws (eight (8) per cover) on the front and rear of the system.**

7. **Secure the four (4) female jack screws (two (2) per connector) holding the fan tray cable connectors to the horizontal connector bracket by using a 3/16 inch nut driver.**

8. Secure the four (4) (four per cable) male jackscrews holding the 48 VDC power cables and power shelf I^{2}C cables.

9. Install the honeycomb EMI filter panel and air plenum cover and secure with the twenty-two (22) M4x30 panhead screws.

10. Replace the lower fan trays at the front and rear of the system.

11. Install the system board modules and their associated carrier plate assemblies into the front and rear of the system.

12. Power on the system.

   See Section 16.3, "Powering On the System" on page 16-22.

16.2.7 FrameManager Cable Replacement

16.2.7.1 Removing the FrameManager Cable

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. Power off the system.

   See Section 16.2.1, "Powering Off the System for Cable Replacement" on page 16-8.

2. Remove the three (3) M4x12 panhead screws holding the FrameManager to the chassis.

3. Disconnect the four (4) cables from the rear of the FrameManager.

4. Remove the four external side panels by releasing the lower captive screws on each panel by a quarter turn, and lift upward off the chassis.

5. At each panel section, remove the four (4) M4x12 panhead screws holding the four (4) cable clamps that secure the FrameManager cables to the chassis.

6. From the front and rear of the system, remove the twenty-two (22) M4x30 panhead screws retaining the air plenum cover, and remove both the plenum cover and the honeycomb EMI filter panel.

7. Reach inside the air plenum and release the eight (8) (two per connector) male jackscrews holding the internal cable connectors to the internal chassis side panels.

8. **To remove the four (4) right-angle connectors, release the two (2) female jack screws (two per connector) using a 3/16-inch nut driver.**

9. **Remove the four (4) external right-angle connectors (P/J10, P/J11, P/J12, and P/J13) from the chassis side panels (**FIGURE 16-13**).**
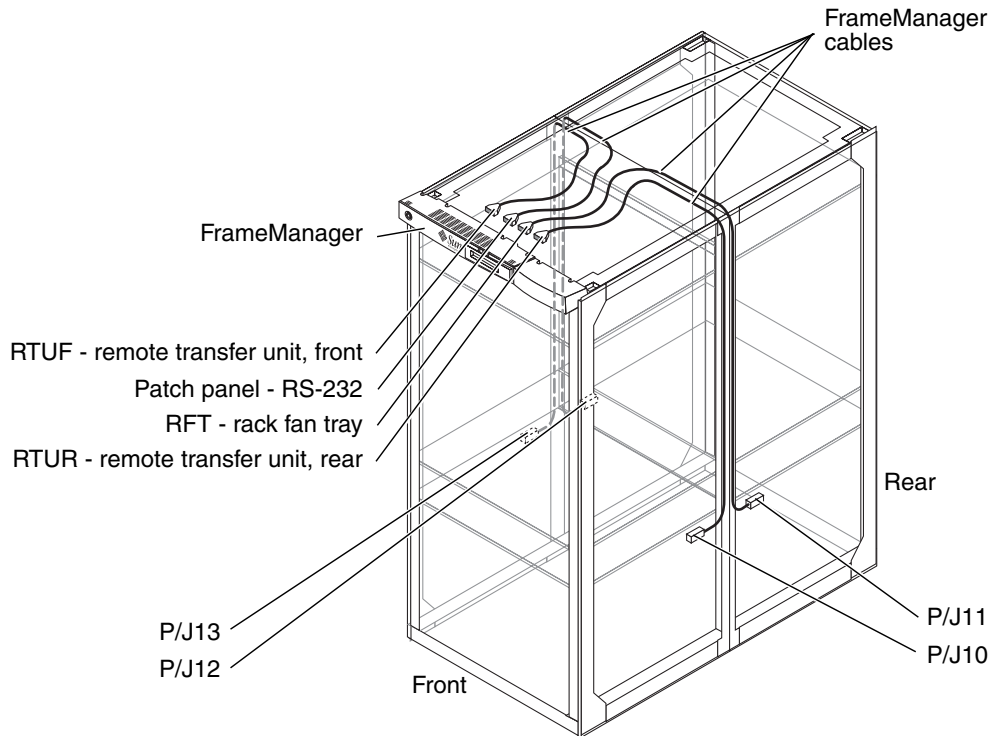
FIGURE 16-13 FrameManager Cable

10. **Remove the four (4) FrameManager cable(s).**

16.2.7.2   Installing the FrameManager Cable

1. **Place the four (4) new FrameManager cable(s) on top of the system.**

2. **Install the four (4) external right-angle connectors (P/J10, P/J11, P/J12, and P/J13) at the end of the cables to the chassis side panels.**

3. **Secure the four (4) right-angle connectors with the two (2) female jack screws (two per connector) using a 3/16-inch nut driver.**

4. **Secure the four (4) (two per connector) jackscrews that hold the internal FrameManager cables to the bulkhead on the internal chassis side panels.**

5. **Install the honeycomb EMI Filter panel and air plenum cover and secure with the twenty-two (22) Mx30 panhead screws at the front and rear of the system.**

6. **At each section, secure the four (4) cable clamps with the four (4) M4x12 panhead screws to mount the FrameManager cables to the chassis.**

7. **Install the four external side panels by placing each panel on the turn-screw and set each panel into its proper position.**

8. **Connect the four (4) cables to the appropriate connectors on the rear of the FrameManager.**

9. **Secure the FrameManager to the chassis with three (3) M4x12 panhead screws.**

10. **Power on the system.**

   See Section 16.3, "Powering On the System" on page 16-22.

16.2.8   TopCap Cable Replacement

16.2.8.1   Removing the TopCap Cable

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Power off the system.**

   See Section 16.2.1, "Powering Off the System for Cable Replacement" on page 16-8.

2. **Remove the three (3) M4x12 panhead screws holding the TopCap to the chassis.**

3. **Disconnect the 12V power cable from the rear of the TopCap.**

4. **Remove the right-rear external side panel by releasing the lower captive screws on the panel by a quarter turn, and lift upward off the chassis.**

5. **Remove the four (4) M4x12 panhead screws holding the four (4) cable clamps that secure the TopCap cable to the chassis.**

6. **At the rear of the system, remove the twenty-two (22) M4x30 panhead screws retaining the air plenum cover, and remove both the plenum cover and the honeycomb EMI filter panel.**

7. **Reach inside the air plenum and release the two (2) male jackscrews holding the internal cable connector to the internal chassis side panel.**

8. **To remove the right-angle connector, release the two (2) female jack screws using a 3/16-inch nut driver.**

9. **Remove the external right-angle connector (P/J11) from the chassis side panel (FIGURE 16-14).**
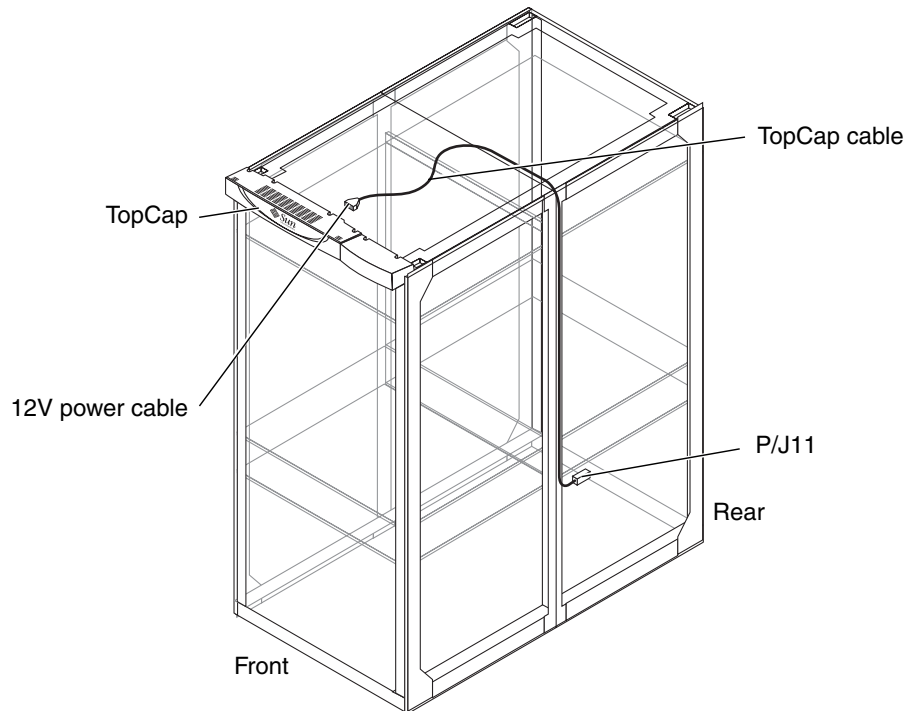
FIGURE 16-14 TopCap Cable

10. **Remove the TopCap cable.**

16.2.8.2   Installing the TopCap Cable

1. **Place the new TopCap cable on top of the system.**

2. **Install the external right-angle connector (P/J11) at the end of the cable to the chassis side panel.**

3. Secure the right-angle connector with the two (2) female jack screws using a 3/16-inch nut driver.

4. Secure the two (2) jackscrews that hold the internal TopCap cable to the bulkhead on the internal chassis side panel.

5. Install the honeycomb EMI Filter panel and air plenum cover and secure with the twenty-two (22) Mx30 panhead screws at the rear of the system.

6. Secure the four (4) cable clamps with the four (4) M4x12 panhead screws to mount the TopCap cable to the chassis.

7. Install the external side panel by placing the panel on the turn-screw and setting the panel into its proper position.

8. Connect the 12V power cable to the connector on the rear of the TopCap.

9. Secure the TopCap to the chassis with three (3) M4x12 panhead screws.

10. Power on the system.

   See Section 16.3, "Powering On the System" on page 16-22.

16.3   Powering On the System

1. Connect the AC power cords to the 4 kW dual AC–DC power supplies.

2. Connect all I/O cables referencing the cable label for proper identification.

3. Power on the AC0 and AC1 circuit breakers for all power supplies in the system.

4. Close the Sun Fire 15K/12K system cabinet access doors.

5. Once the main SC is booted, start the domain(s) by typing:

```
sc% setkeyswitch -d domain_id  on
```

where *domain_id* is the domain letter A-R.

6. Execute one **setkeyswitch** command for each domain to be started.

Mechanical Components Replacement Procedures

The mechanical components of the Sun Fire 15K/12K systems consist of the side panels, the front and rear access doors, the six air filters, and the two kick plate assemblies. This chapter contains the replacement procedures for these mechanical components.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

17.1   Side Panel Replacement

The Sun Fire 15K/12K systems have four panels, two per side.

17.1.1   Removing a Side Panel

1. **Release the two (2) spring-loaded captive fasteners by pushing inward and making a counterclockwise turn.**

2. **Using both hands, firmly grasp the panel on each side, near the top, and lift straight up and then outward to remove the panel away from the cabinet.**

17.1.2   Installing a Side Panel

1. **Using both hands, firmly grasp the panel on each side, near the top.**

2. **Lift the panel holding at an angle, approximately one (1) foot out from the base.**

3. **Hang the panel on the side skin-hanger features at the left outer corner and right inner post (or right outer corner and left inner post for other panel, depending on which panel is being replaced) of the chassis.**

17.2   Access Door Replacement

The Sun Fire 15K/12K systems have four access doors.

- one 22-inch wide ventilated front-left door
- one 10 1/4-inch ventilated front-right door (side 0)
- one 22-inch wide perforated rear-left door
- one 10 1/4-inch perforated rear-right door (side 1).

17.2.1 Removing an Access Door

1. **At the top of the door, pull up the spring-loaded pin and remove the peg of the door from the top hinge bracket of the cabinet.**

2. **Lift the bottom peg out of the bottom hinge bracket and remove the door from the cabinet.**

3. **Repeat Step 1 and Step 2 for each door, as required.**

17.2.2 Installing an Access Door

1. **Insert the door onto the bottom peg of the bottom hinge bracket of the cabinet.**

2. **At the top of the door, pull down the spring-loaded pin and insert the peg of the door into the top hinge bracket of the cabinet.**

17.3 Kick Plate Assembly Replacement

Note – The bottom system kick plate is NOT A STEP. DO NOT use the kick plate to gain access to the high-level components. Obtain a proper stool if required. Excessive weight on the kick plate will bend the door support brackets.

17.3.1 Removing a Kick Plate Assembly

1. **Use a pull-turn motion to release the spring-loaded captive locking pin on the left side of the mounting tube and pull the kick plate assembly outward from the mounting bracket (FIGURE 17-1).**

Inner support tabs connected
to cabinet frame base

Outer support tabs connected
to cabinet frame base

Spring-loaded captive locking
pin (not visible in diagram)

Mounting bracket

Spring-loaded
locking pin

Mounting tube

Kick plate

Support guides
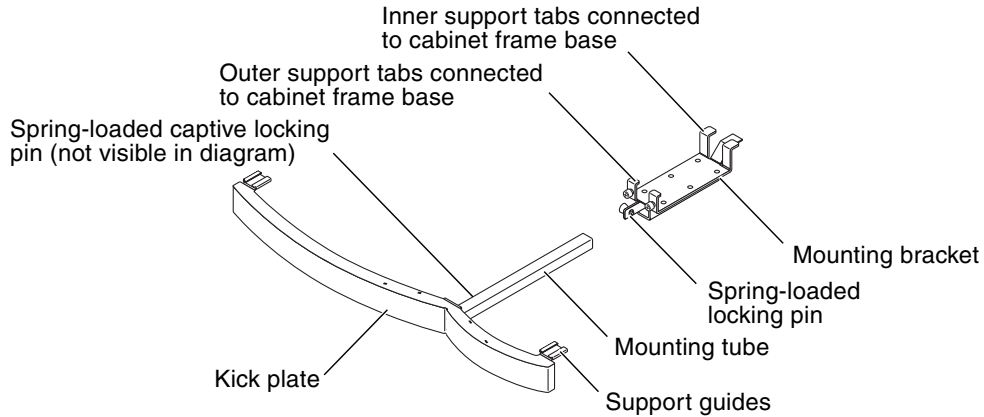
FIGURE 17-1 Kick Plate Assembly

2. Loosen the two captive panel fasteners of the kick plate mounting bracket assembly.

3. Remove the kick plate assembly by pulling forward and tipping downward to release the inner support tabs from their mounting holes at the cabinet frame base.

17.3.2 Installing a Kick Plate Assembly

1. Insert the inner support tabs of the kick plate mounting bracket at the base of the cabinet.

2. Align the two outer tabs at the front mounting holes of the cabinet frame and slide the bracket inward to align the inner support tabs into the two mounting holes of the horizontal support structure under the cabinet.

3. Secure the mounting bracket with the two captive panel fasteners.

4. Insert the square mounting tube of the kick plate mounting bracket assembly until it is flush with the cabinet.

5. Secure the kick plate with the spring-loaded captive locking pin at the left side of the mounting tube.

Periodic Maintenance

The periodic maintenance of the Sun Fire 15K/12K systems consists of the air plenum air-intake filter below the lower fan trays and the six air filters located below the power supplies. This chapter contains the procedures for the maintenance of these components.

This chapter contains the following sections:

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

- Follow all cautions 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 might touch dangerous voltage points or short out components that can result in fire or electric shock.
- Refer servicing of equipment to qualified personnel.

18.1 Cleaning the Air Plenum Panel Air-Intake Screens

You can clean the air intake screens 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 enough, use a high pressure air hose with a nozzle attachment for blowing air.

18.1.1 Air Plenum Panel Air-Intake Screen for Sun Fire 15K/12K Systems

The air plenum of the air-intake screens of the Sun Fire 15K/12K systems is located below the bottom fan trays on the front and rear of the system (FIGURE 18-1).
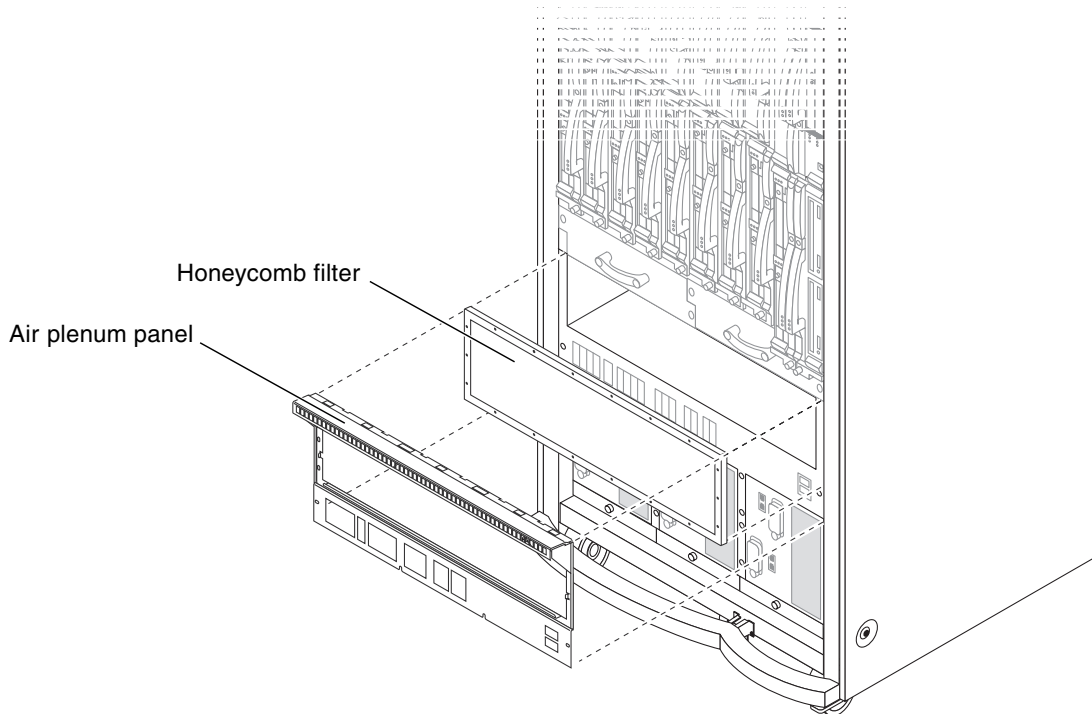
FIGURE 18-1 Air Plenum Panel and Air-Intake Screen for the Sun Fire 15K/12K Systems

18.1.2 Cleaning the Air Plenum Air-Intake Screens

1. **Remove the twenty-two (22) M4x30 panhead screws from the air plenum panel to access the honeycomb filter air-intake screen at the front or rear of the system.**

2. **Remove the old honeycomb filter air-intake screen from the system.**

3. **Clean the honeycomb filter air-intake screen.**

   See Section 18.1, "Cleaning the Air Plenum Panel Air-Intake Screens" on page 18-2.

4. **Install the clean air plenum air-intake screen and the air plenum panel.**

5. **Secure the air plenum panel to the system with the twenty-two (22) M4x30 screws.**

6. **Repeat Step 1 thorough Step 5 for the other side of the system.**

18.2 Air Filter Replacement

The Sun Fire 15K/12K systems have three front and three rear air filters, which allow approximately 3500 CFMs per system, that require periodic cleaning or replacing. To prevent restricted air flow and possible equipment failure, perform this procedure when the filters contain trapped particles, or every three months.

18.2.1 Replacing an Air Filter

Caution – Be sure you are properly grounded before you begin the hardware removal and installation. There are four ground points on the system cabinet, two at the front top left and top right, and two at the rear top left and top right.

1. **Open the Sun Fire 15K/12K system cabinet access doors.**

2. **Route I/O cables away from the filter being replaced, ensuring not to disconnect any cables from its slot 0 or slot 1 board. Do this on both the front and rear of the chassis.**

3. **Remove the face plates by releasing the front panel captive thumbscrew from both the front and rear of the three filter chambers on the power chassis.**

   There are three front and three rear face plates for each of the three filter chambers.

4. **Take two (2) new filters and insert one behind the other in one of the filter chambers, pushing the old filters out through the other side of the chassis.**

   Bend the power cable upward and out of the way on one side of the chassis to gain access and on the other side to provide space for the filter to slide outward, as necessary (FIGURE 18-2).
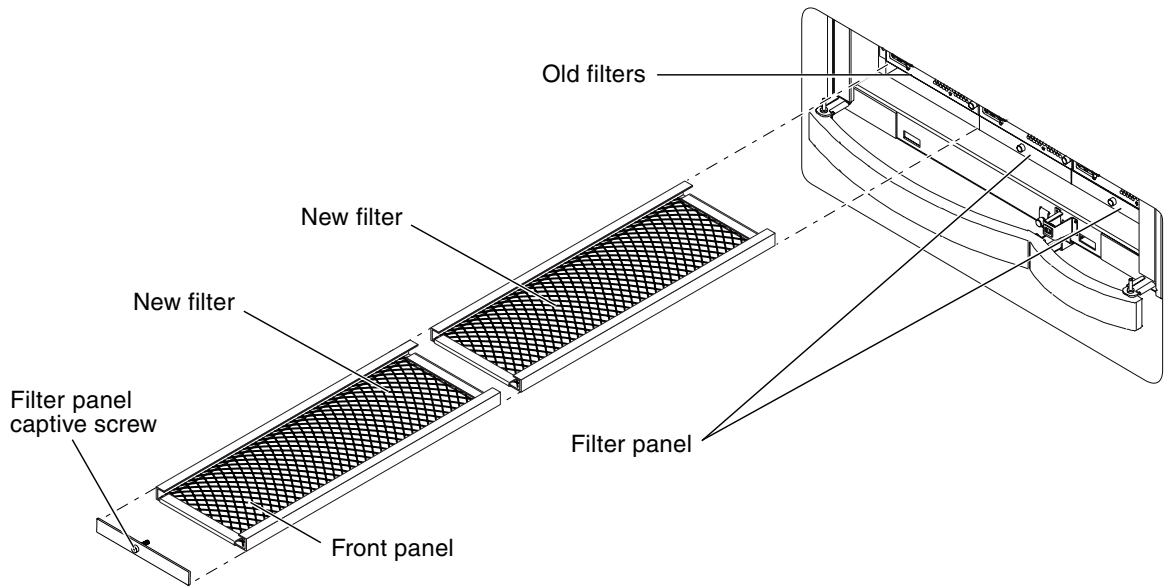
FIGURE 18-2 Filter Replacement—Front and Rear

   Replacing filters in this manner prevents an unfiltered area from opening up through which debris can be ingested into the powered up system.

5. **Repeat Step 2, Step 3, and Step 4 for the two remaining filter chambers.**

6. **After the six (6) new filters have been replaced, install the faceplates and tighten the captive screws.**

7. **Close the Sun Fire 15K/12K system access doors.**

8. **Place the dirty filters on a flat surface away from air vents that might dislodge the dust particles which can become airborne.**

9. **If the filters are to be reused, vacuum both sides by using a brush and vacuum cleaner equipped with a crevice tool. If filters are not to be reused, discard the filters.**

   For reused filters, it is suggested that an additional set of six be acquired in order to replace the filters as described in this procedure and ensure debris does not get into the powered up system while cleaning the filters.

Component Serial Number Worksheet

A larger version of the Component Serial Number Worksheet, introduced in Chapter 13, TABLE 13-1 "Component Serial Numbers Worksheet" on page 13-3 of this document has been provided in this appendix on page A-3. You can use this page to record your serial numbers for retention for your records.

Component Serial Number Worksheet

Record Date _____

Expander	S/N	Slot 0 Board Type	S/N	Slot 1 Board Type	S/N
CSB0					
EXB0					
EXB1					
EXB2					
EXB3					
EXB4					
EXB5					
EXB6					
EXB7					
EXB8					
CSB1					
EXB9					
EXB10					
EXB11					
EXB12					
EXB13					
EXB14					
EXB15					
EXB16					
EXB17					

New Sun Fireplane interconnect S/N: Rev:

System Labels

Various labels appear on the Sun Fire 15K/12K systems to reference a specific component by its assigned component number. There are also caution and instruction labels that are visible inside the access doors as well as internally within the system. The following paragraphs provide a description and indicate the physical location for these labels:

B.1 ESD GROUND and Top Fan Tray Component Number Labels

The four (4) electrostatic device (ESD) grounding connections and the top fan tray component numbers (FT0, FT1, FT4, and FT5, right-to-left) are combined into one label for each of the four top positions (FIGURE B-1).

Front left

ESD GROUND **FT1**

Front right

FT0 ESD GROUND

Rear left

ESD GROUND **FT5**

Rear right
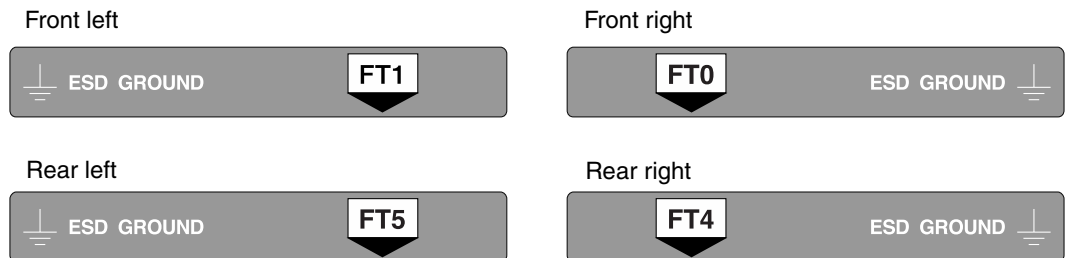
FT4 ESD GROUND

FIGURE B-1   ESD GROUND and Top Fan Tray Component Number Labels

B.2 System Chassis and Carrier Plate Labels

The label in FIGURE B-2 is displayed on the inside left and right side of the frame of the chassis inside the doors on the front and rear sides of the system. It also appears on each carrier plate. **FOLLOW THESE DIRECTIONS CAREFULLY TO AVOID DAMAGED CONNECTORS**. See Section 10.1, "Inserting a Board Set Carrier Plate" on page 10-2 for complete instructions on the handling of the system carrier plates.
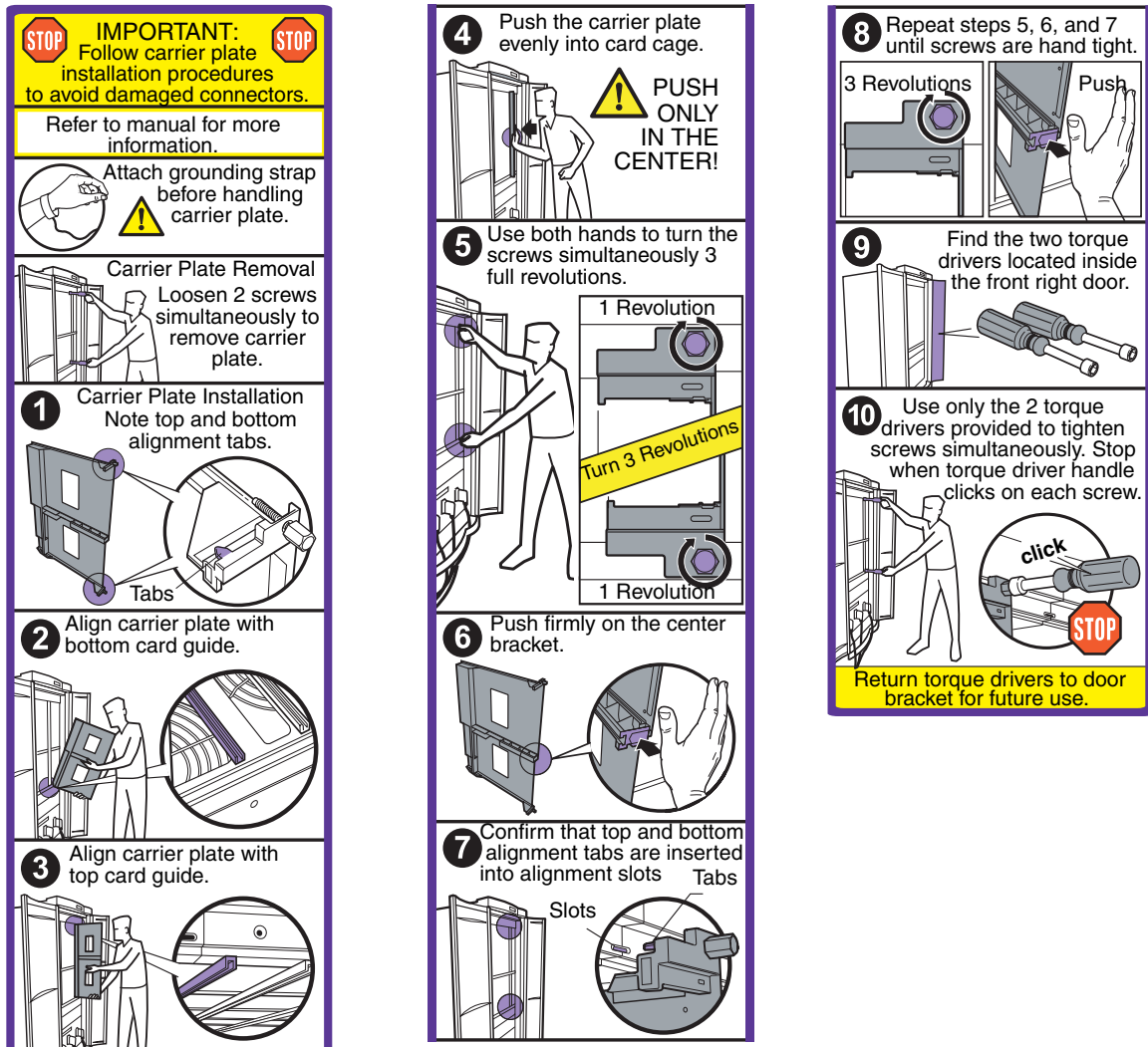
FIGURE B-2 System Chassis and Carrier Plate Label—Carrier Plate Installation Procedures

The warning label, shown in FIGURE B-3, is located on each carrier plate.

FIGURE B-3   Carrier Plate Warning Label

B.3   Fan Tray Labels

B.3.1   Fan Tray Removal Label

The fan tray removal label, shown in FIGURE B-4, is located at the upper-left outside front corner of each of the four (4) fan trays.
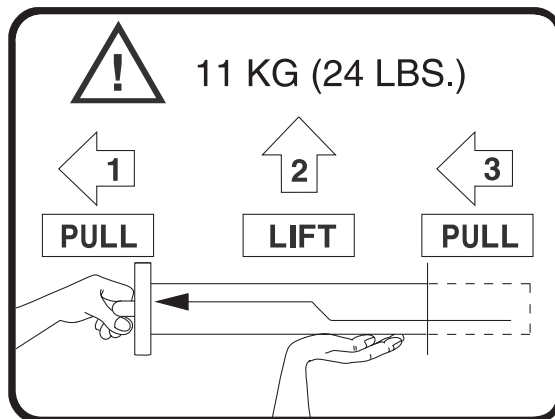
FIGURE B-4   Fan Tray Removal Label

B.3.2　Bottom Fan Tray Component Number Labels

The bottom fan tray component number labels (FT2, FT3, FT6, and FT7, right-to-left), have been placed on the I/O cable retention bracket (FIGURE B-5).

Front center left

FT3

Front center right

FT2

Rear center left

FT7

Rear center right

FT6

FIGURE B-5　Bottom Fan Tray Component Number Labels

B.4　Board Carrier Slot Component Number Labels

The system and I/O boards are numbered sequentially right-to-left. See FIGURE 1-1 and FIGURE 1-2 in Chapter 1 for more details.

B.4.1　Front Component Number Labels

The labels shown in FIGURE B-6 indicate the system CPU boards SB0 through SB8 (left-to right) and the System Control board SC0 for slot 0; and the I/O boards IO0 through IO8 (right-to-left) and the system control peripheral board SCPER0 for slot 1.

Slot 0, front

SB8　•　•　•　SB0　SC0

Slot 1, front

IO8　•　•　•　IO0　SCPER0
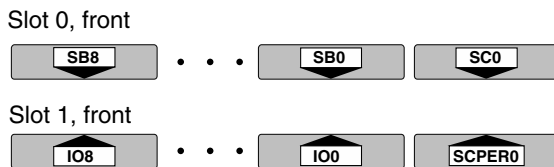
FIGURE B-6　Front Component Number Labels

B.4.2 Rear Component Number Labels

The labels shown in FIGURE B-7 indicate the system CPU boards SB9 through SB17 (left-to right) and the System Control board SC1 for Slot 0; and the I/O boards IO9 through IO17 (right-to-left) and the System Control peripheral board SCPER1 for slot 1.

Slot 0, rear

| SB17 | • • • | SB9 | SC1 |

Slot 1, rear

| IO17 | • • • | IO9 | SCPER1 |
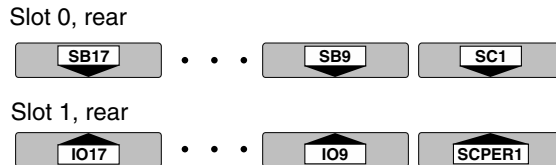
FIGURE B-7 Rear Component Number Labels

B.5 Expander Label

The expander label (EX), shown in FIGURE B-8, is located at the center bracket for each eighteen (18) expander carrier panels on the front and rear of the system.
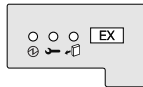
FIGURE B-8 Expander Label

B.6 Centerplane Support Label

The centerplane support (CS) label, shown in FIGURE B-9, is located at the center bracket for the two (2) centerplane support carrier panels on the front and rear of the system.
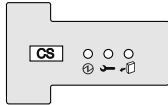
FIGURE B-9   Centerplane Support Label

B.7 Sun Fireplane Interconnect Label

Two (2) identical Sun Fireplane interconnect labels, shown in FIGURE B-10, are located on the lower right side of each Sun Fireplane interconnect insertion handle visible from the rear of the system.

FIGURE B-10 Sun Fireplane Interconnect Label

B.8 Power Supply Labels

B.8.1 Power Supply Component Labels

The six power supplies (PS0 through PS5) each have two AC power connections (AC0 and AC1) with labels as shown in FIGURE B-11.

FIGURE B-11 Power Supply Component Labels

B.8.2 External Power Supply Handle-Instruction Label

An external power supply label providing handle rotation and forward pull instructions, as shown in FIGURE B-12, appears at the upper left corner of each of the six (6) power supplies.

FIGURE B-12 External Power Supply Label

B.8.3 Power Supply Weight-Information Label

The power supply weight-information label, shown in FIGURE B-13, is placed at the internal top-front of each of the six (6) power supply units.
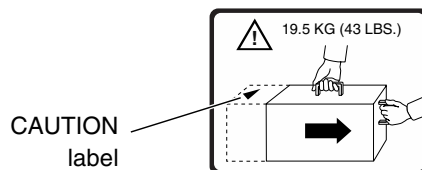
FIGURE B-13 Power Supply Weight-Information Label

B.8.4 Power Supply CAUTION Label

A CAUTION label, indicating *APPROACHING END OF UNIT!* (due to extensive weight), is located internally at the top end of the power supply unit (FIGURE B-14).

FIGURE B-14 Power Supply CAUTION Label

Sun Fire 15K/12K Systems Field-Replaceable Units (FRU)

The illustrations and tables in this chapter supplement the removal and replacement procedures described in previous chapters. FIGURE C-1 identifies the FRU replacement categories listed in this chapter.

For information about additional capacity drives and other replacement options, contact your sales representative.

FRU Categories

- Access doors and side panels
- FrameManager or TopCap assembly
- System board assemblies and carrier plates
- Fan tray cooling components
- Power supplies and air filters
- System Cables
- Options

System cabinet
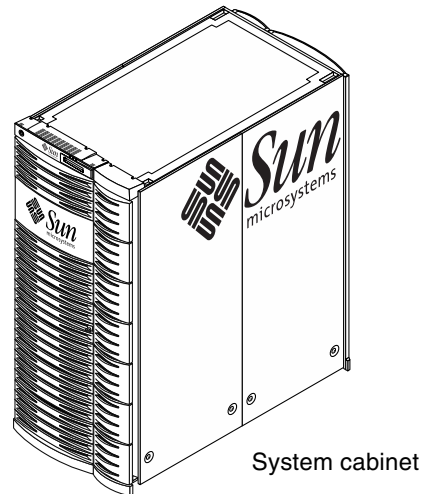
FIGURE C-1   System FRU Component Categories

C.1 Access Doors and Side Panels

TABLE C-1 lists the Sun Fire 15K/12K systems front and rear access doors and side panels. FIGURE C-2 illustrates each item.

TABLE C-1 Access Doors and Side Panels

Description
Front access door (left)
Front access door (right)
Rear access door (left)
Rear access door (right)
Side panel
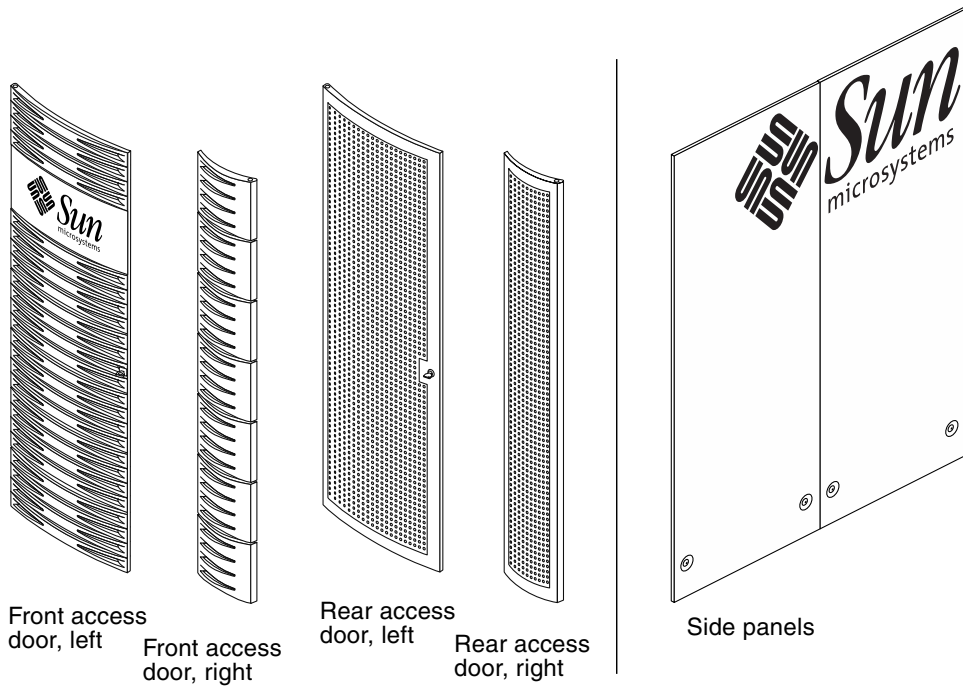
FIGURE C-2 Access Doors and Side Panels

C.2 FrameManager Assembly and TopCap Assembly

C.2.1 FrameManager Assembly

TABLE C-2 lists the Sun Fire 15K/12K systems FrameManager assembly parts. FIGURE C-3 illustrates each item.

TABLE C-2   FrameManager Assembly Components

Description
FrameManager
FrameManager extension
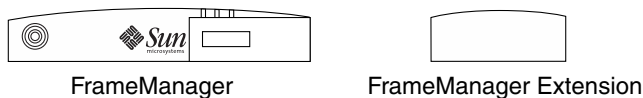
FIGURE C-3   FrameManager Assembly Components

The keyswitch shown in the upper left of the FrameManager assembly is a non-functional switch.

C.2.2 TopCap Assembly

TABLE C-3 lists the Sun Fire 15K/12K systems TopCap assembly parts. FIGURE C-4 illustrates each item.

TABLE C-3   TopCap Assembly Components

Description
TopCap
TopCap extension
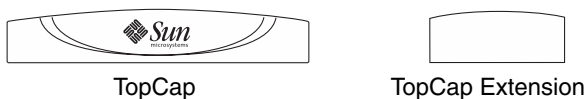
FIGURE C-4   TopCap Assembly Components

C.3 Kick Plate Assembly

TABLE C-4 lists the Sun Fire 15K/12K systems kick plate assembly. FIGURE C-5 illustrates this item.

TABLE C-4 Kick Plate Assembly Components

Description
Kick plate
Kick plate mounting bracket
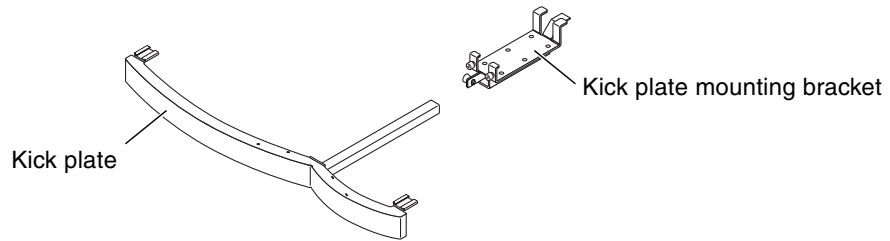
FIGURE C-5 Kick Plate Assembly Components

C.4 System Board Assemblies and Carrier Plates

TABLE C-5 lists the Sun Fire 15K/12K systems board assemblies and filler panels. TABLE C-6 lists the system board assembly carrier plates with part numbers. FIGURE C-6 through FIGURE C-20 illustrate each component.

TABLE C-5   System Board Assemblies

Description
Centerplane support board
System controller carrier plate (TABLE C-6)
System Control board
System control peripheral board
System expander board
System and modified system expander carrier plate (TABLE C-6)
CPU board
Hot-swap PCI (hsPCI) assembly
MaxCPU board
I/O filler panel (used as required)
CPU filler panel (used as required)
Sun Fireplane interconnect
Power centerplane
Fan backplane

TABLE C-6   System Board Carrier Plates

Description	Part Number
System controller carrier plate at SC0 (front) and SC1 (rear)	540-3993
System expander carrier plate at slots 1,2,3,6,7,8 (front) and 10,11,12,15,16,17 (rear)	540-4085
Modified system expander carrier plate at slots 4,5 (front) and 13,14 (rear)	540-4428
Modified system expander carrier plate at slots 0 (front) and 9 (rear)	540-4427
System expander carrier plate (with air dam) at slots 4, 5, 13, and 14	540-5736

See the carrier plate location placement diagram in FIGURE 10-1.
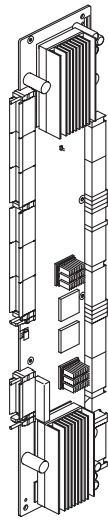
FIGURE C-6   Centerplane Support Board
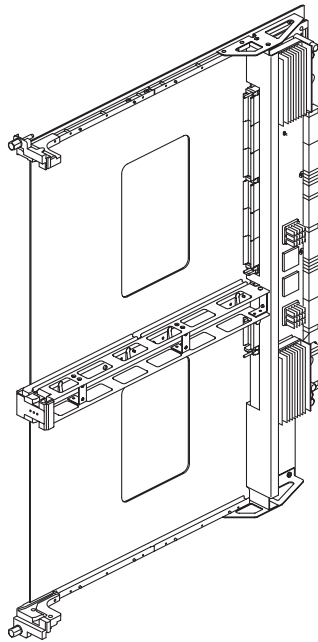
FIGURE C-7   System Controller Carrier Plate
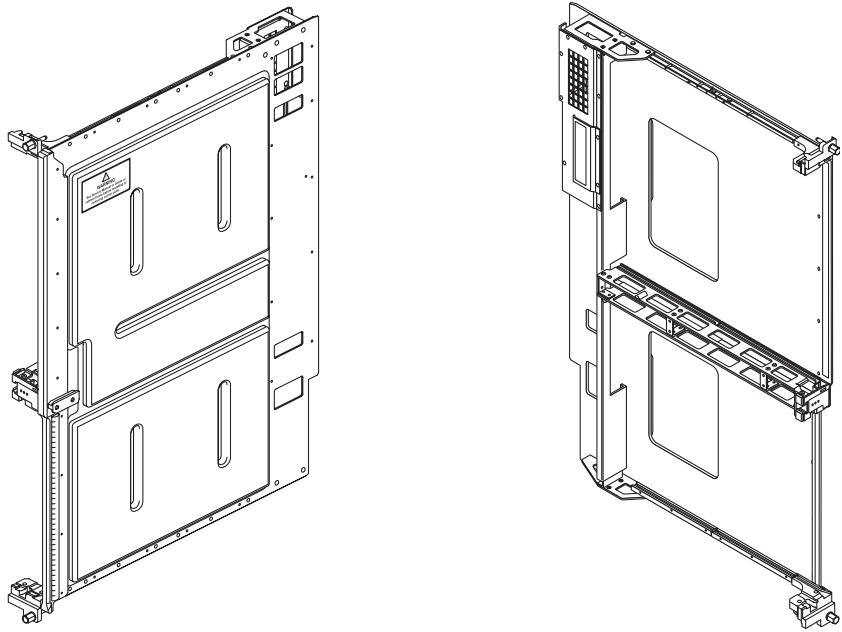
FIGURE C-8 System Expander Carrier Plate (With Air Dam)
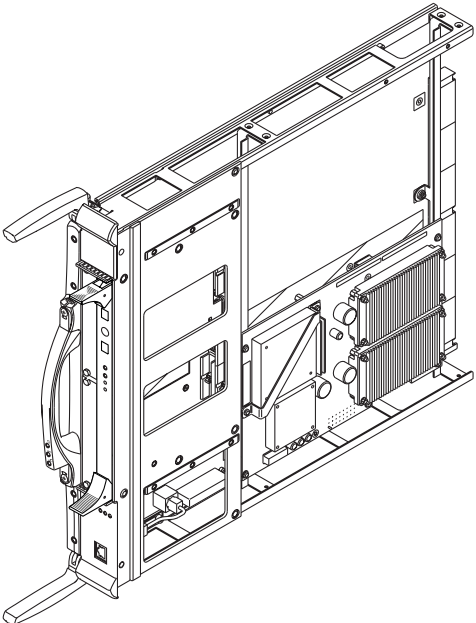
FIGURE C-9 System Control Board—3U to 6U Conversion Board Option
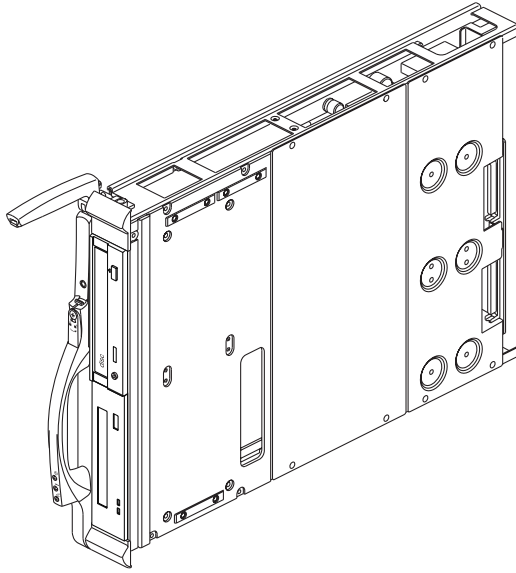
FIGURE C-10 System Control Peripheral Board
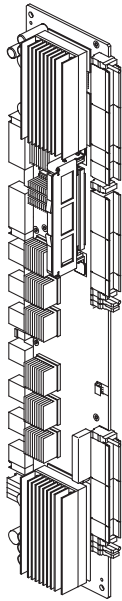
FIGURE C-11 System Expander Board
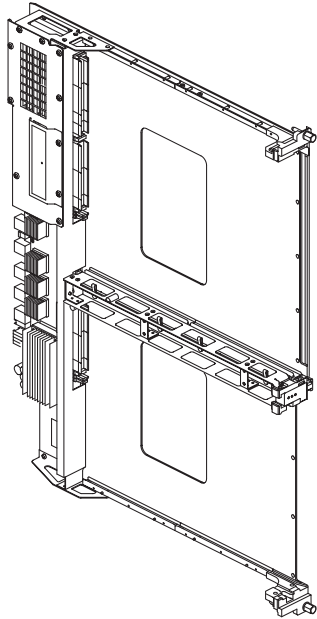
FIGURE C-12 System Expander Carrier Plate (with or without air dam)
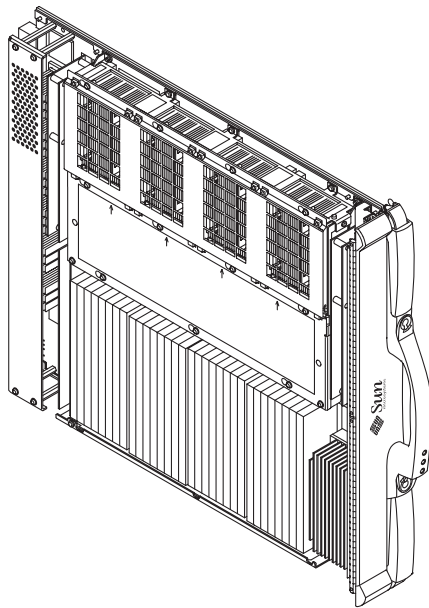
FIGURE C-13 CPU Board
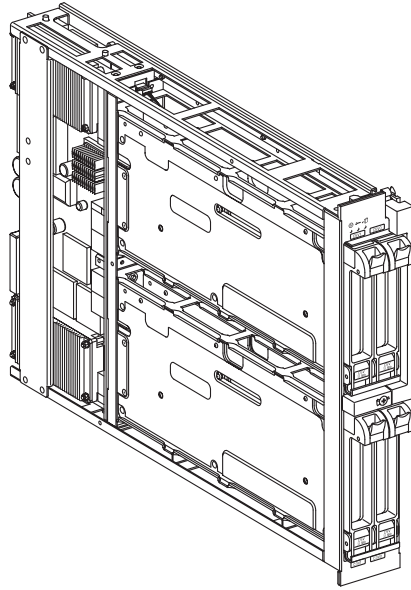
FIGURE C-14 Hot-swap PCI (hsPCI) I/O Board
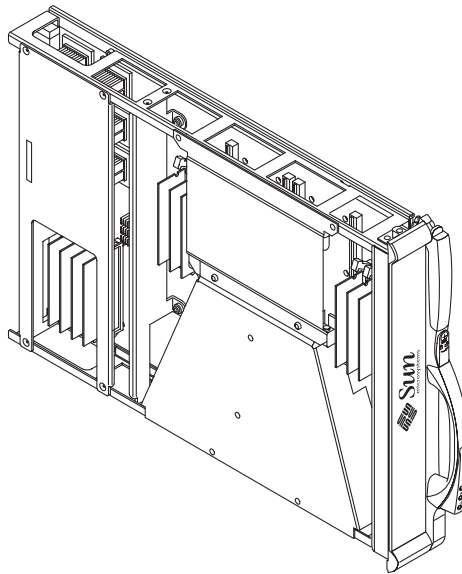
FIGURE C-15 MaxCPU Board
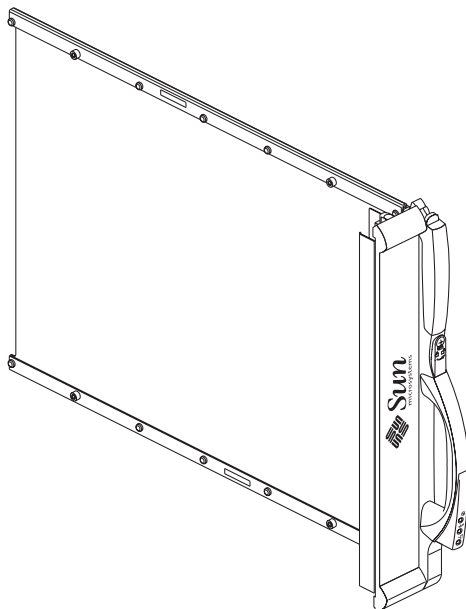
FIGURE C-16 I/O Filler Panel (used as required)
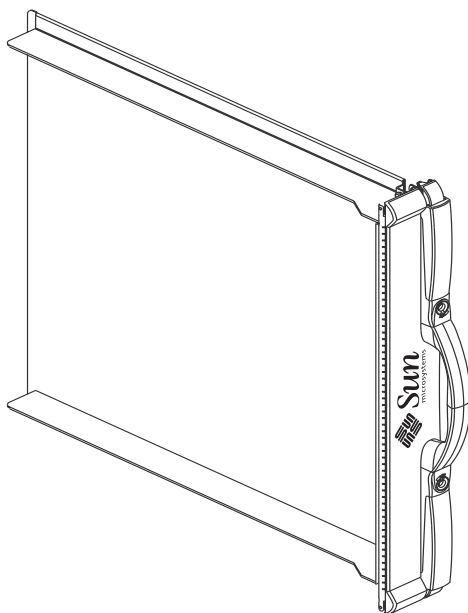
FIGURE C-17 CPU Filler Panel (used as required)
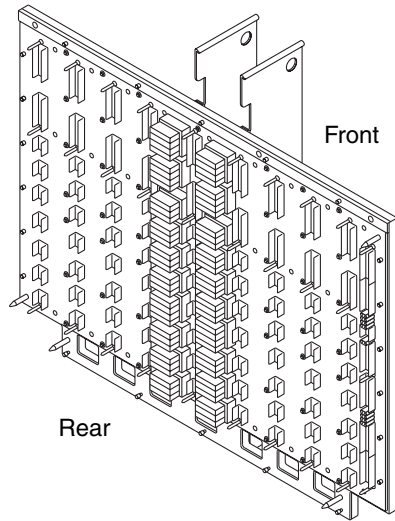
FIGURE C-18 Sun Fireplane Interconnect
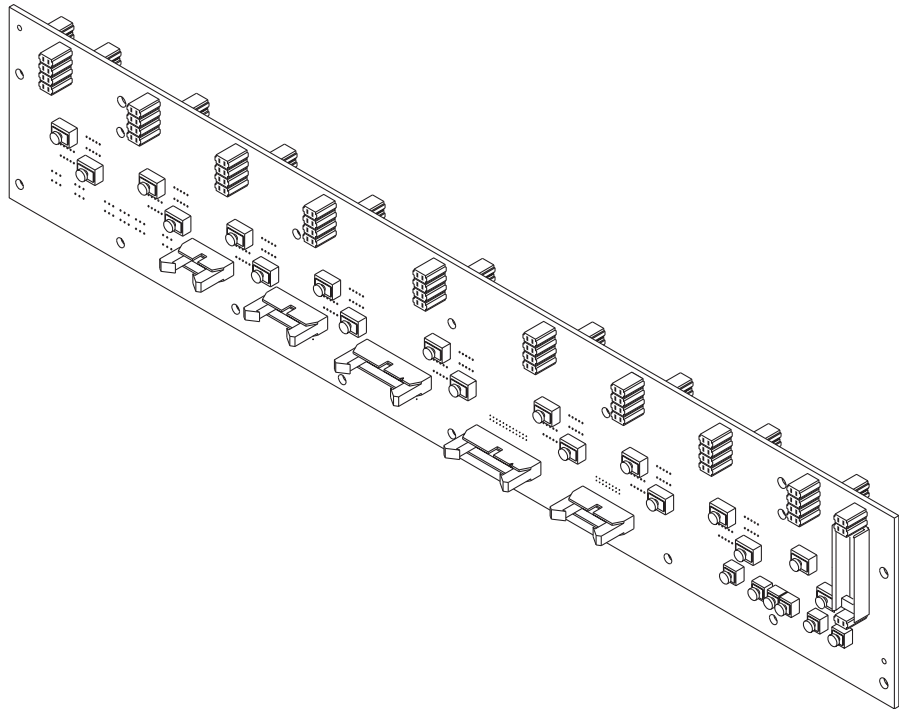
FIGURE C-19 Power Centerplane
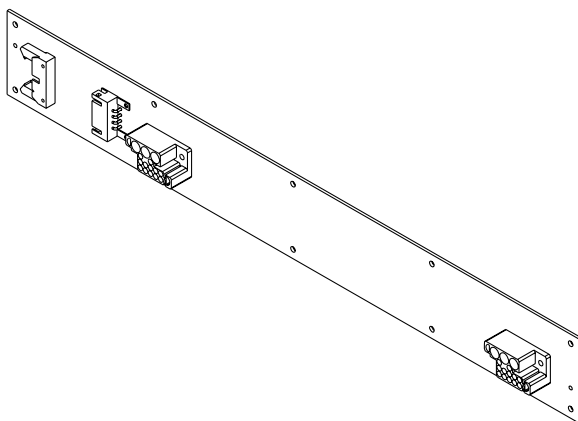
FIGURE C-20 Fan Backplane

C.5   Fan Tray Cooling Components

TABLE C-7 lists the Sun Fire 15K/12K systems fan tray components. FIGURE C-21 illustrates each item.

TABLE C-7   Fan Tray Cooling Components

Description
Fan tray
Fan backplane
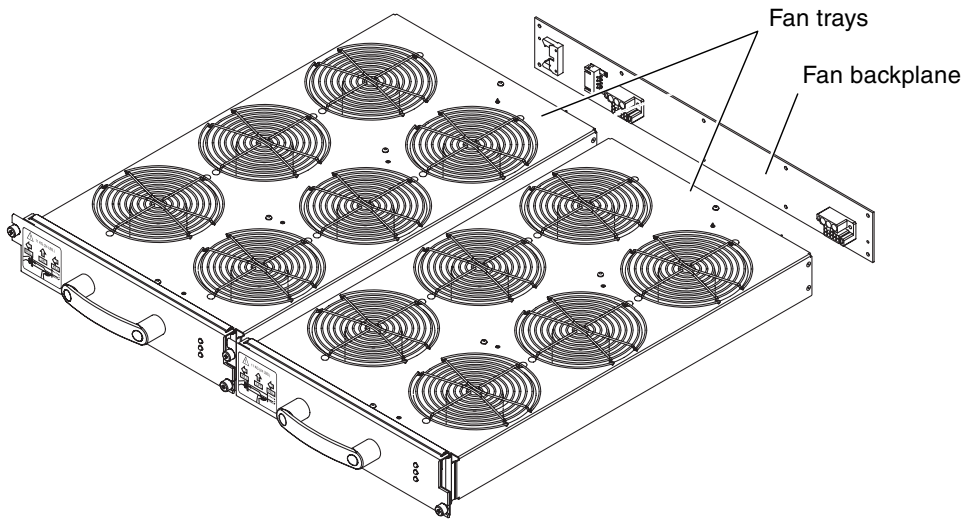
FIGURE C-21 Fan Tray Cooling Component

C.6 Power Supplies and Air Filters

TABLE C-8 lists the Sun Fire 15K/12K systems power supply components and air filters. FIGURE C-22, FIGURE C-23, and FIGURE C-24 illustrate each item.

TABLE C-8   Power Supplies and Air Filters

Description
Power supply
Power module
Air filter

Top view

Front view   Right-side view   Rear view

FIGURE C-22 Power Supply

Power module to ZEE
bracket (9)
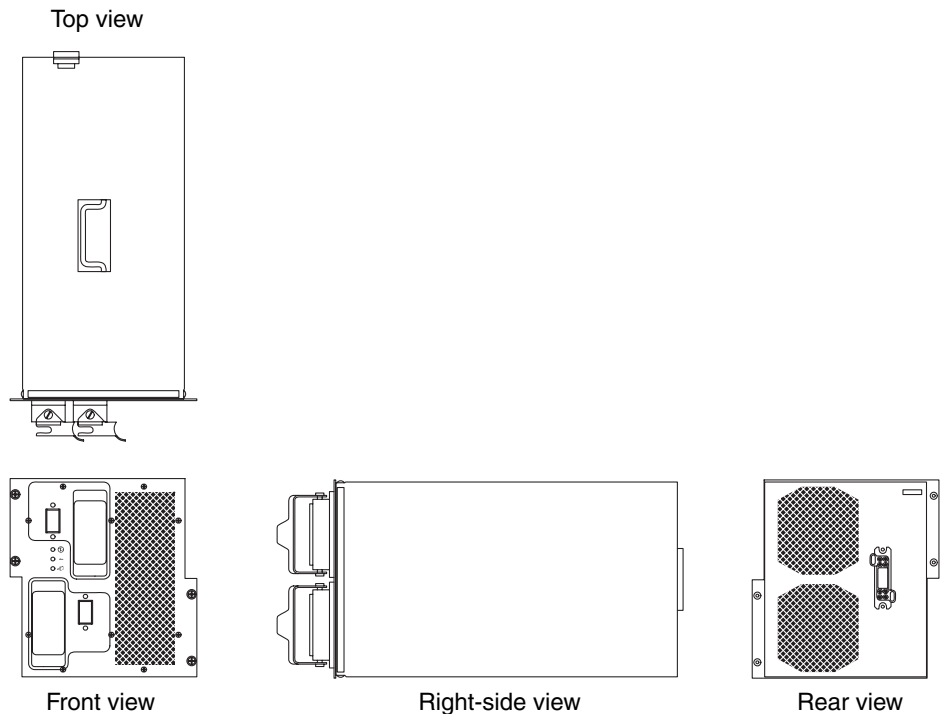
Power module to
side panel
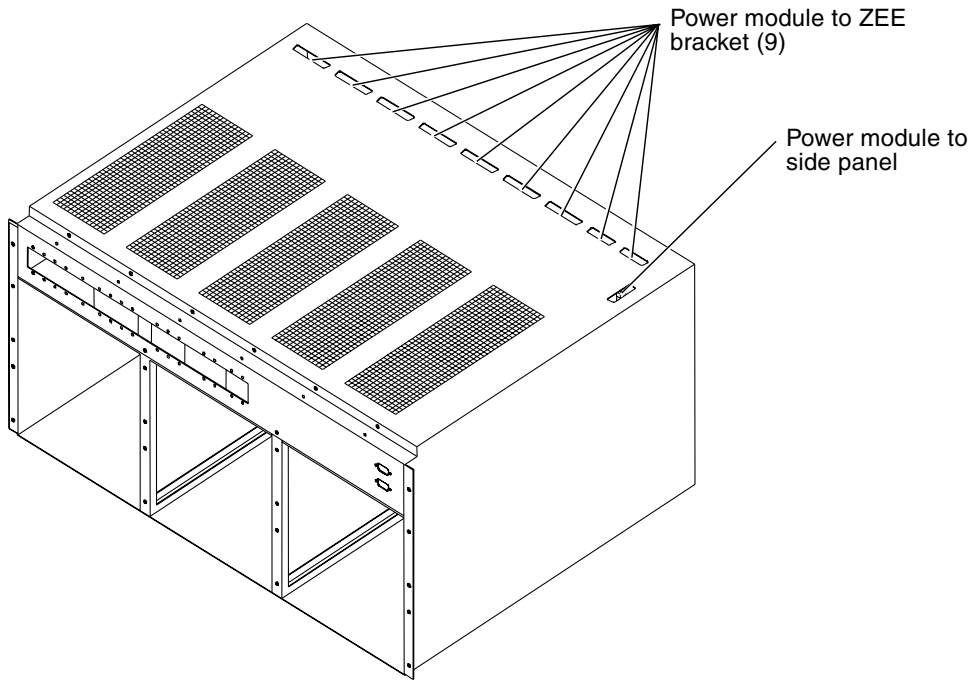
FIGURE C-23 Power Module
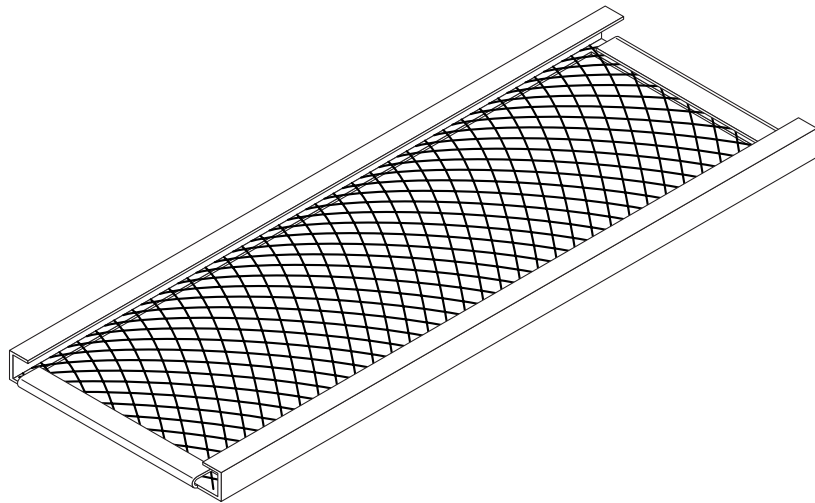
FIGURE C-24 Air Filter

C.7 System Cables

lists the Sun Fire 15K/12K systems cables. through , on the following pages, illustrate each item:

TABLE C-9   System Cables

Description
AC power cable, domestic
AC power cable, domestic 2
AC power cable, international
AC power cable, international 2
Fan power cable
Fan I^{2}C cable, front upper
Fan I^{2}C cable, front lower
Fan I^{2}C cable, rear upper
Fan I^{2}C cable, rear lower
Power module to connector bulkhead, 48 VDC power
Connector bulkhead to connector bulkhead, 48 VDC crossover
Power module to connector bulkhead, I^{2}C signals
Control 0 front cable
Control 1 front cable
Control 0 rear cable
Control 1 rear cable
Power control front cable
Power control rear cable
FrameManager and TopCap power cable, internal
FrameManager and TopCap power cable, external
RS-232 cable, internal
RS-232 cable, external
SC-CPU cable
SC-laptop cable
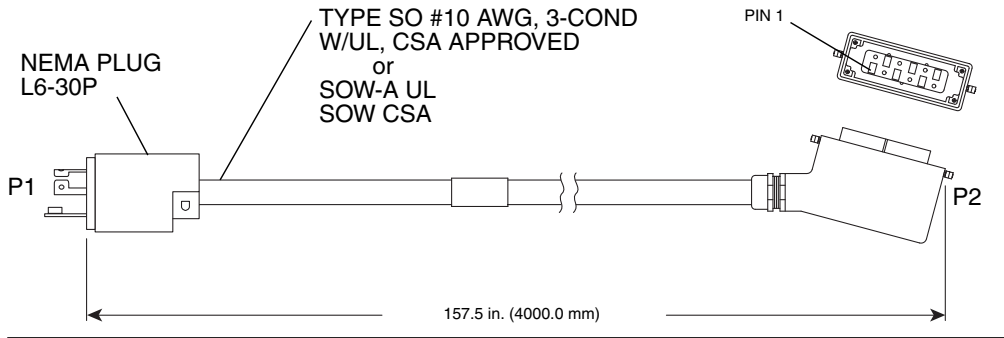
FIGURE C-25 AC Power Cable, Domestic

TABLE C-10 AC Power Cable, Domestic, Wire List

Wire #	Color	From	To	Signal
1	BLK	P1-X	P2-2	Line 1
2	WHT	P1-Y	P2-4	Line 2
3	GRN	P1-G	P2-3	Earth
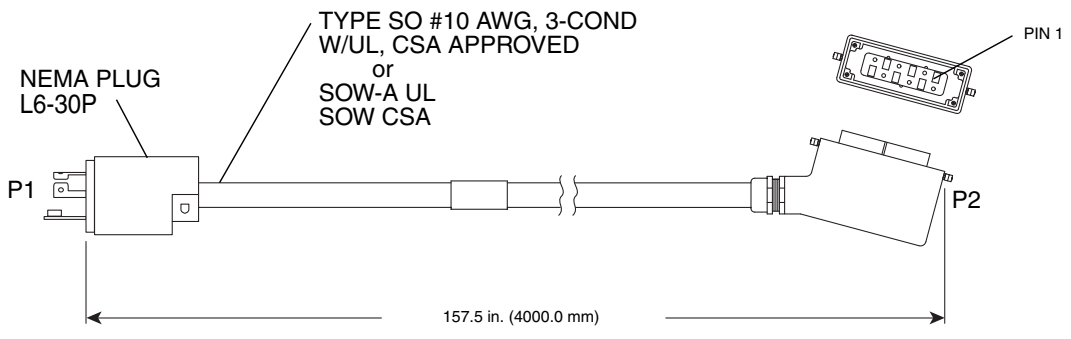
FIGURE C-26 AC Power Cable, Domestic 2

TABLE C-11 AC Power Cable, Domestic 2, Wire List

Wire #	Color	From	To	Signal
1	BLK	P1-X	P2-2	Line 1
2	WHT	P1-Y	P2-4	Line 2
3	GRN	P1-G	P2-3	Earth
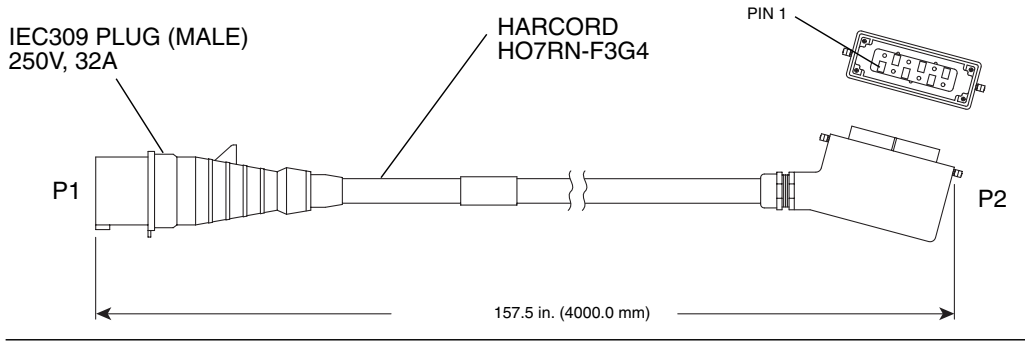
FIGURE C-27 AC Power Cable, International

TABLE C-12 AC Power Cable, International, Wire List

Wire #	Color	From	To	Signal
1	BLK	P1-L	P2-2	Line
2	WHT	P1-N	P2-4	NEU
3	YEL/GRN	P1-GND	P2-3	Earth
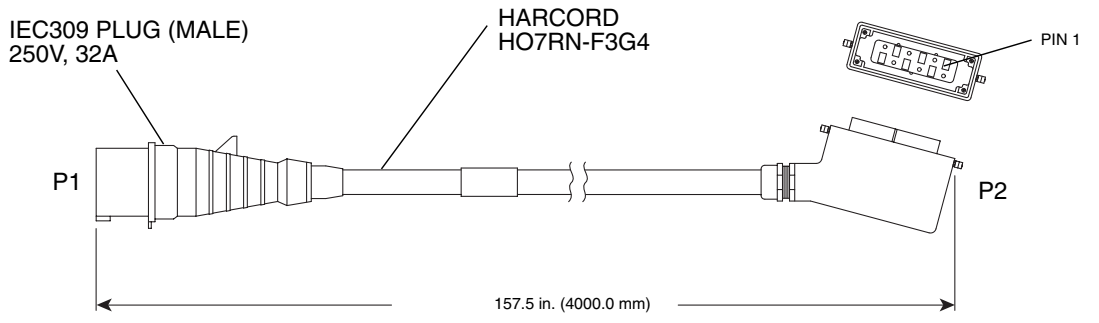
FIGURE C-28 AC Power Cable, International 2

TABLE C-13 AC Power Cable, International 2, Wire List

Wire #	Color	From	To	Signal
1	BLK	P1-L	P2-2	Line
2	WHT	P1-N	P2-4	NEU
3	YEL/GRN	P1-GND	P2-3	Earth
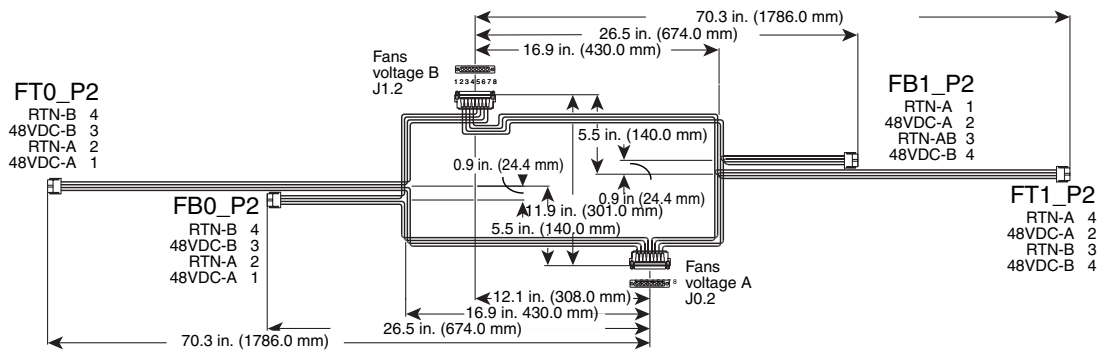
FIGURE C-29 Fan Power Cable

TABLE C-14 Fan Power Cable (Side 0) Termination Table 0

From Connector Bulkhead Side 0 Voltage A	To Fan BP	Wire Size AWG & Color UL1213	Function
J0.2-8	FT0_P2-2	14 BLK	Fan trays, top side 0, return A
J0.2-7	FT0_P2-1	14 RED	Fan trays, top side 0, 48VDC-A
J0.2-6	FB0_P2-2	14 BLK	Fan trays, bottom side 0, return A
J0.2-5	FB0_P2-1	14 RED	Fan trays, bottom side 0, 48VDC-A
J0.2-4	FT1_P2-2	14 BLK	Fan trays, top side 1, return A
J0.2-3	FT1_P2-1	14 RED	Fan trays, top side 1, 48VDC-A
J0.2-2	FB1_P2-2	14 BLK	Fan trays, bottom side 1, return A
J0.2-1	FB1_P2-1	14 RED	Fan trays, bottom side 1, 48VDC-A

TABLE C-15 Fan Power Cable (Side 1) Termination Table 1

From Connector Bulkhead Side 1 Voltage B	To Fan BP	Wire Size AWG & Color UL1213	Function
J1.2-8	FT0_P2-4	14 BLK	Fan trays, top side 0, return B
J1.2-7	FT0_P2-3	14 RED	Fan trays, top side 0, 48VDC-B
J1.2-6	FB0_P2-4	14 BLK	Fan trays, bottom side 0, return B
J1.2-5	FB0_P2-3	14 RED	Fan trays, bottom side 0, 48VDC-B
J1.2-4	FT1_P2-4	14 BLK	Fan trays, top side 1, return B

TABLE C-15 Fan Power Cable (Side 1) Termination Table 1 *(Continued)*

From Connector Bulkhead Side 1 Voltage B	To Fan BP	Wire Size AWG & Color UL1213	Function
J1.2-3	FT1_P2-3	14 RED	Fan trays, top side 1, 48 VDC-B
J1.2-2	FB1_P2-4	14 BLK	Fan trays, bottom side 1, return B
J1.2-1	FB1_P2-3	14 RED	Fan trays, bottom side 1, 48 VDC-B
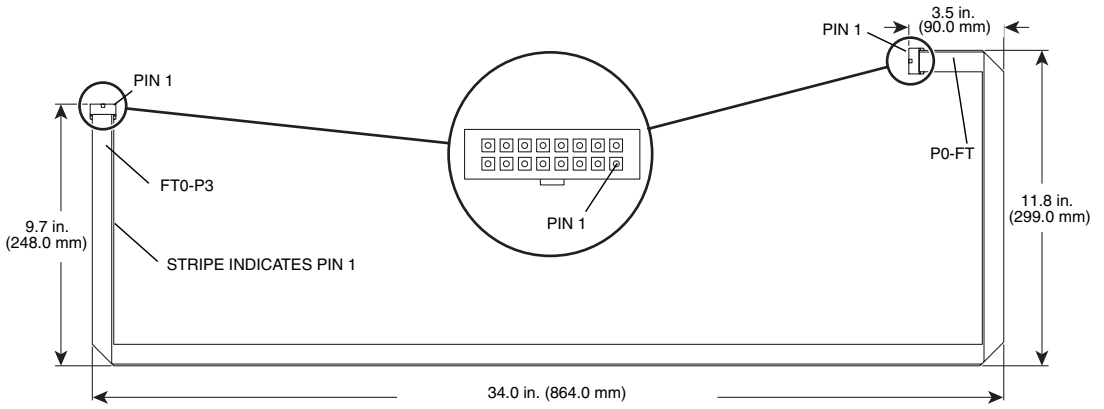
FIGURE C-30 Fan I^{2}C Cable, Front Upper
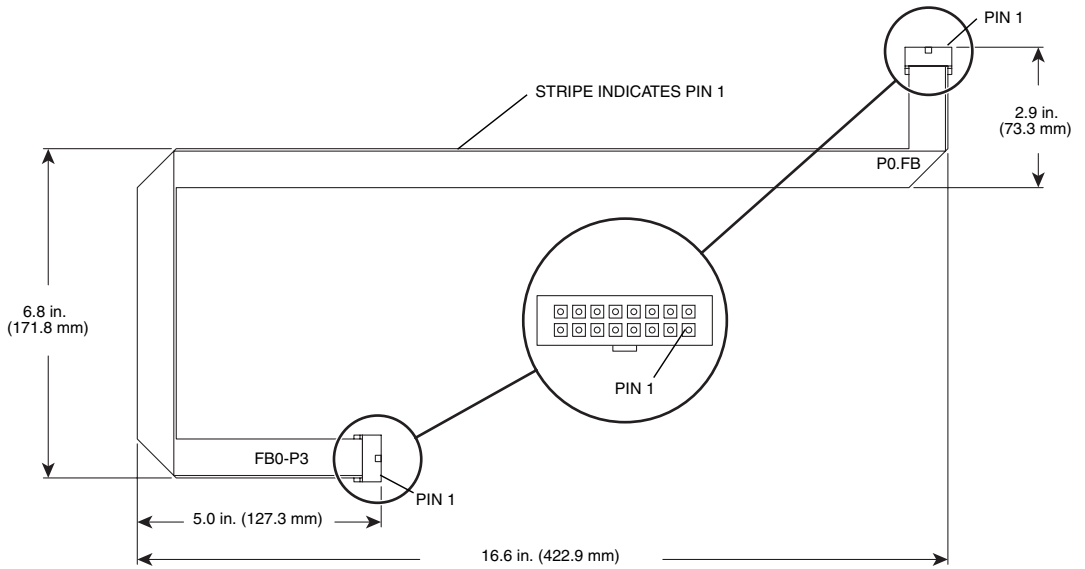
FIGURE C-31 Fan I^{2}C Cable, Front Lower
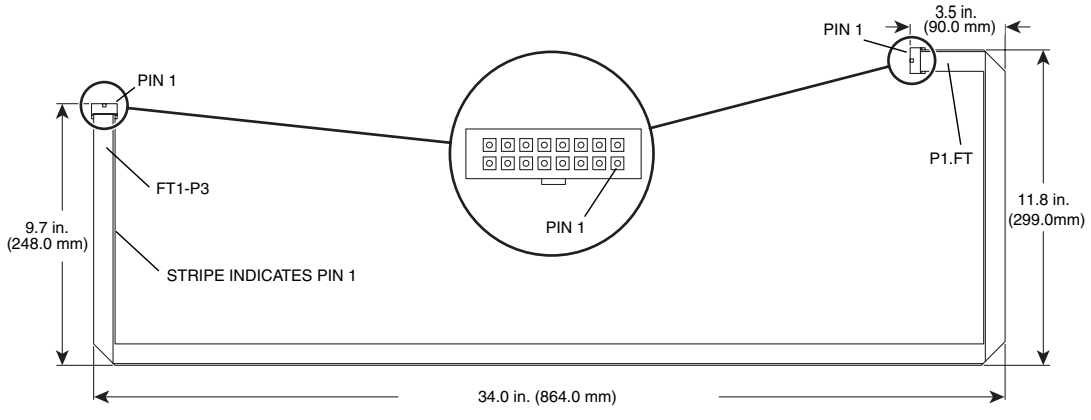
FIGURE C-32 Fan I^{2}C Cable, Rear Upper
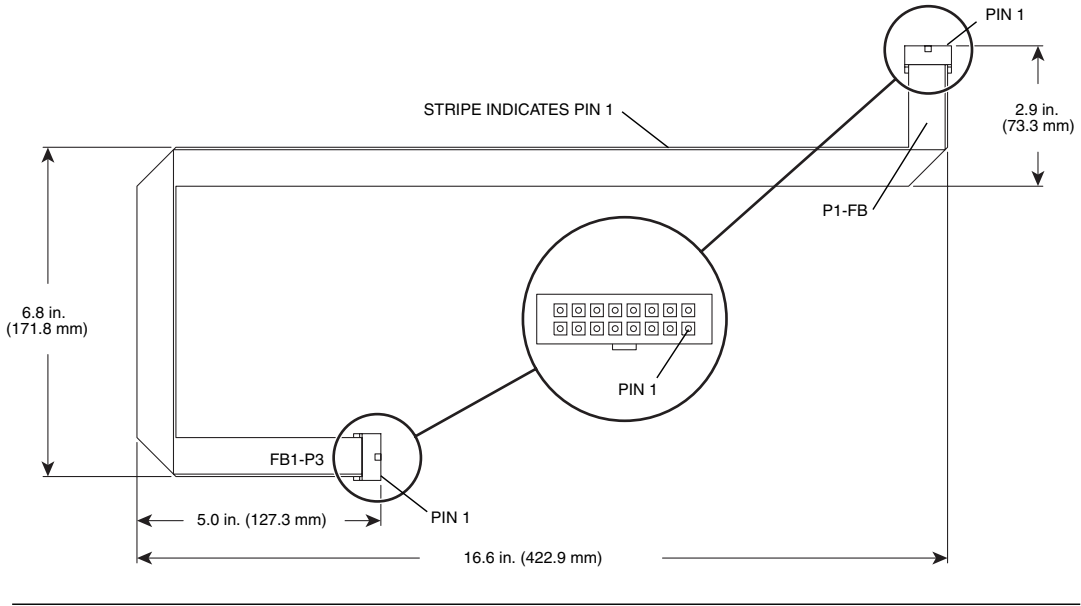
FIGURE C-33 Fan I^{2}C Cable, Rear Lower
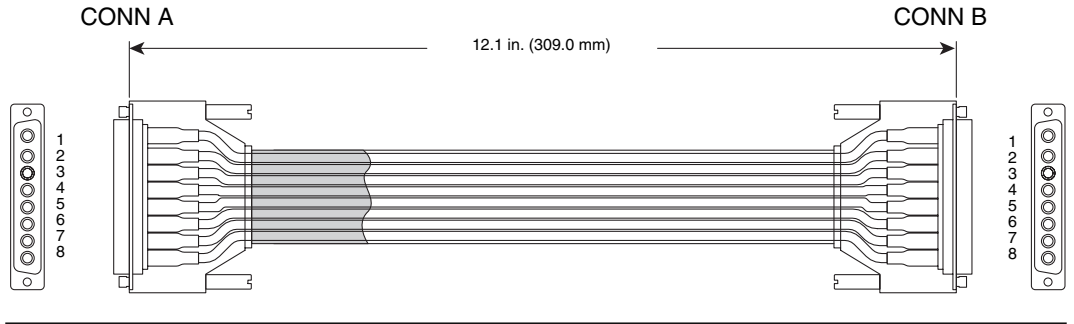
FIGURE C-34 Power Module to Connector Bulkhead, 48 VDC Power

TABLE C-16 Power Module to Connector Bulkhead Cable, 48 VDC Power, Termination Table

From CONN A	To CONN B
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
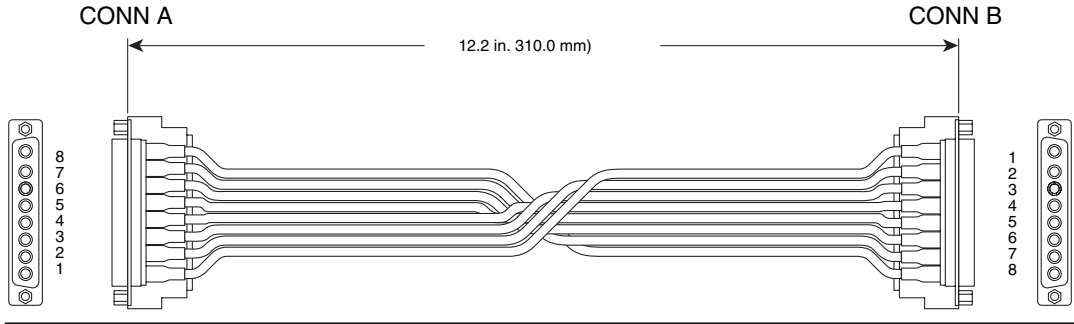
FIGURE C-35 Connector Bulkhead to Connector Bulkhead, 48 VDC Crossover

TABLE C-17 Connector Bulkhead to Connector Bulkhead, 48 VDC Crossover, Termination Table

From CONN A	To CONN B	Wire Color
1	1	RED
2	2	BLK
3	3	RED
4	4	BLK
5	5	RED
6	6	BLK
7	7	RED
8	8	BLK
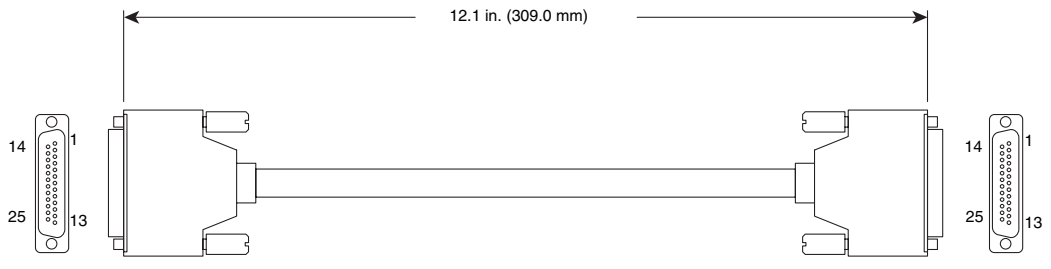
FIGURE C-36 Power Module to Connector Bulkhead, I^{2}C Signals
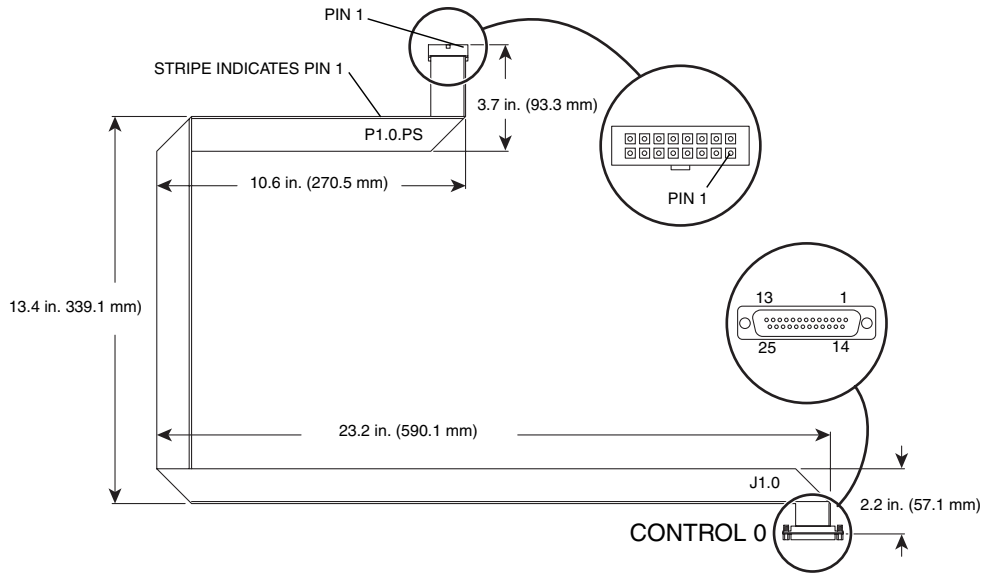
FIGURE C-37 Control 0 Cable, Front
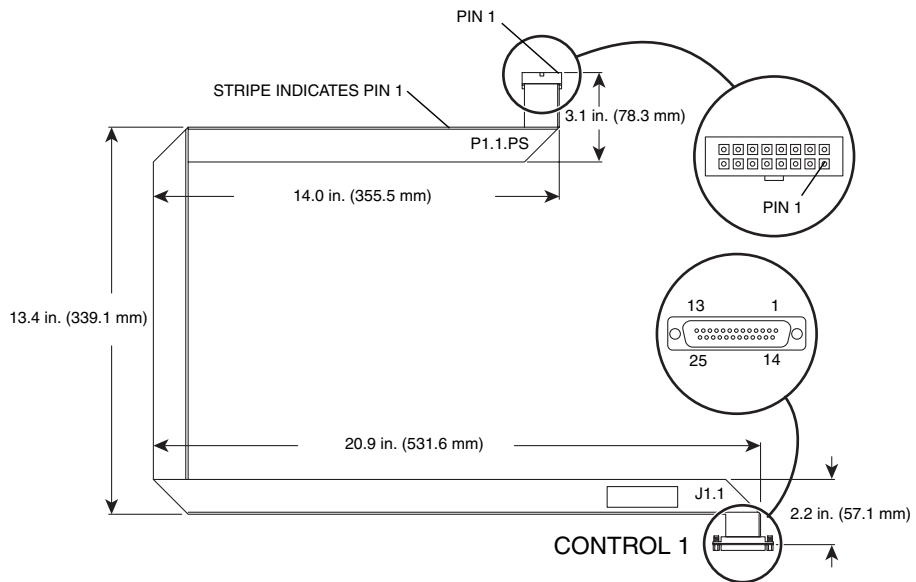
FIGURE C-38 Control 1 Cable, Front
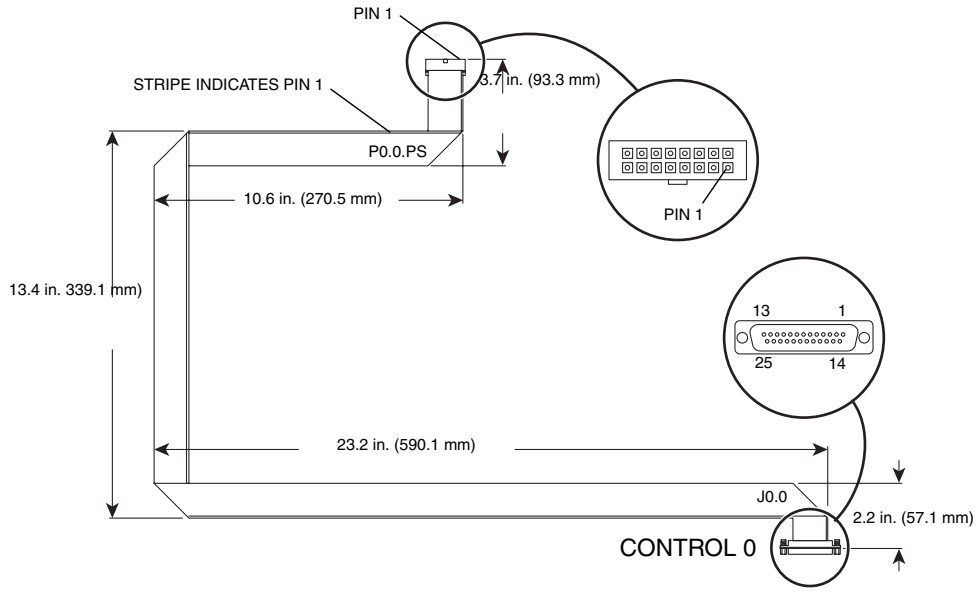
FIGURE C-39 Control 0 Cable, Rear
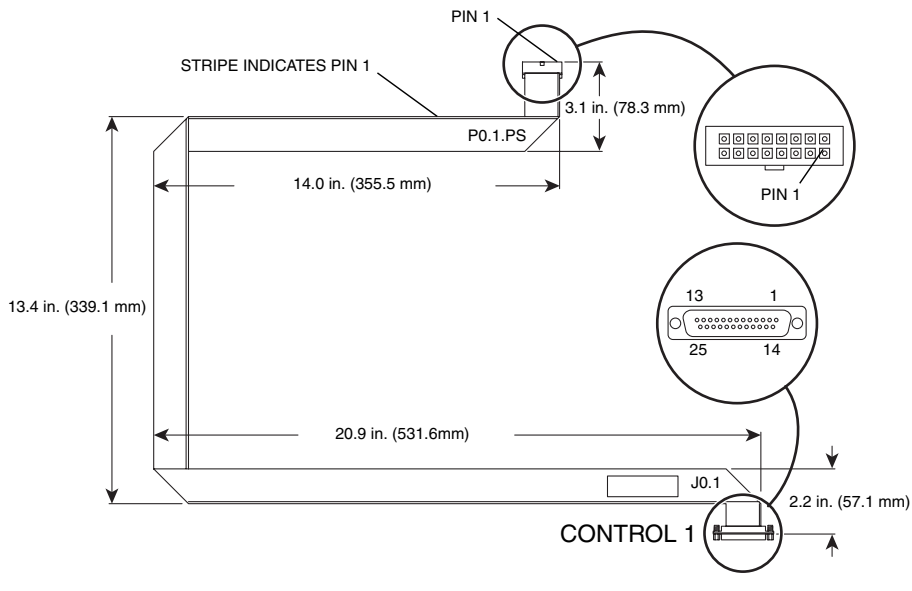
FIGURE C-40 Control 1 Cable, Rear
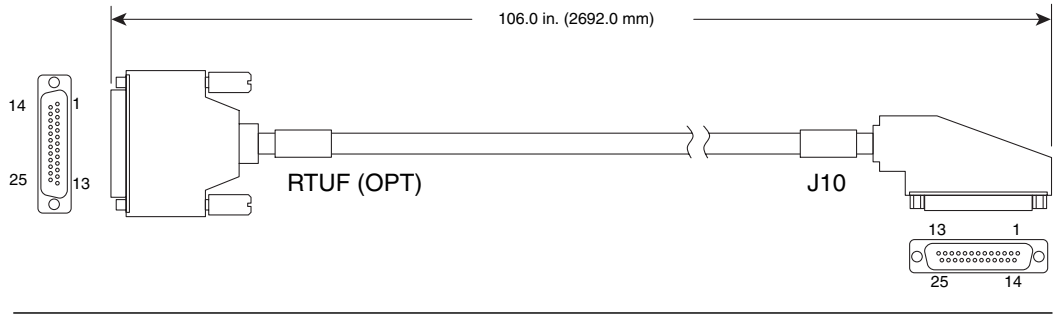
FIGURE C-41 Power Control Cable, Front
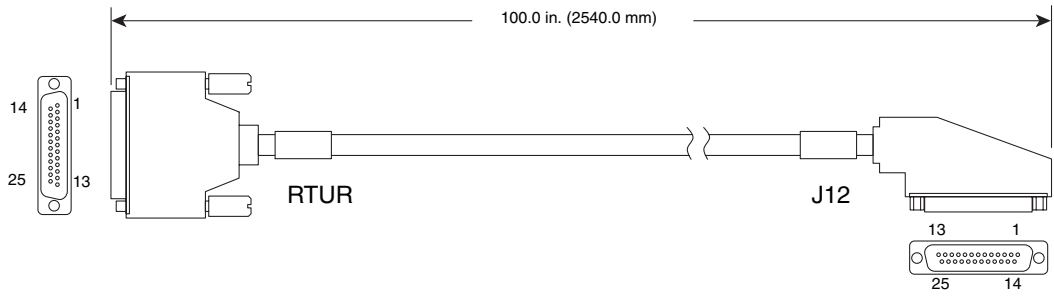
FIGURE C-42 Power Control Cable, Rear
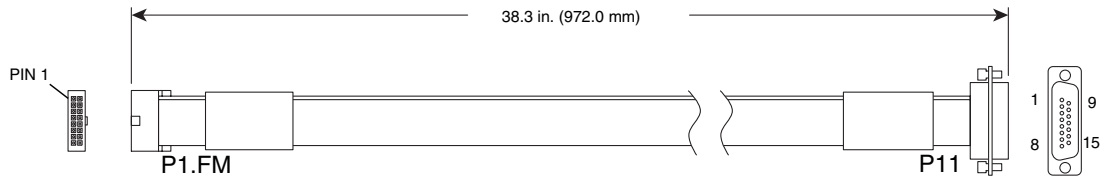
FIGURE C-43 FrameManager and TopCap Power Cable, Internal
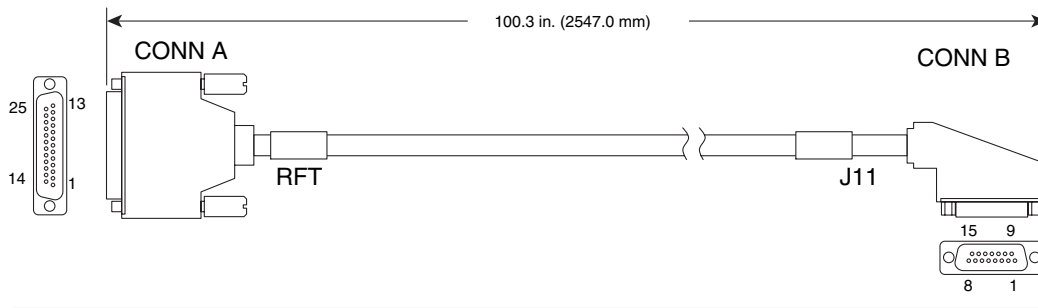
FIGURE C-44 FrameManager and TopCap Power Cable, External

TABLE C-18 FrameManager and TopCap Power Cable, External, Termination Specifications

From CONN A (DB25P)	To CONN B (DB-15P)
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
14	9
15	10
16	11
17	12
18	13
19	14
20	15
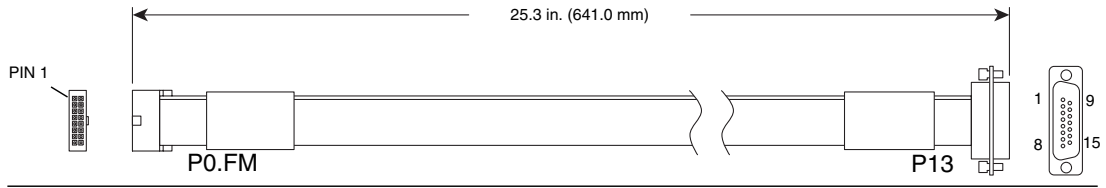
FIGURE C-45 RS-232 Cable, Internal
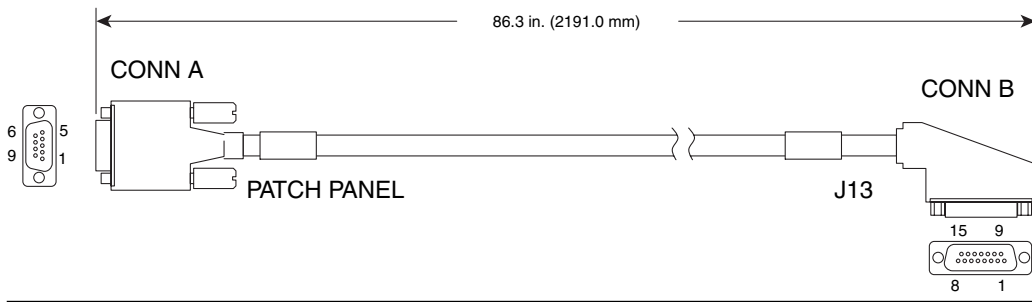
FIGURE C-46 RS-232 Cable, External

TABLE C-19 RS-232 Cable, External, Termination Specifications

From CONN A (DB9S)	To CONN B (DB-15P)
1	1
2	2
3	3
4	4
5	5
6	9
7	10
8	11
9	12
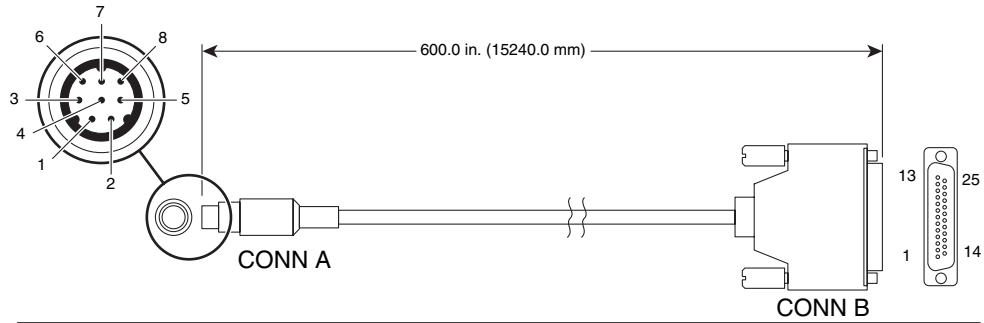
FIGURE C-47 SC-CPU Cable

TABLE C-20   SC-CPU Cable Termination Specifications

From CONN A (Mini DIN-8P)	To CONN B (DB-25P)
1	6, jumper to 8
2	20
3	3
4	7
5	2

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