Sun Enterprise™ 10000 System Service Manual

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Preface

The *Sun Enterprise 10000 System Service Manual* provides detailed instructions for replacing field replaceable components on the Sun Enterprise™ 10000 system.

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 one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook™ online documentation for the Solaris™ software environment
- Other software documentation that you received with your system

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

Shell	Prompt
C shell	*machine-name*`%`
C shell superuser	*machine-name*`#`
Bourne shell and Korn shell	`$`
Bourne shell and Korn shell superuser	`#`

Related Documents

Application	Title	Part Number
Service	*Sun Enterprise 10000 System Read Me First*	805-2913
	Sun Enterprise 10000 System Unpacking Guide	805-2915
	Sun Enterprise 10000 System Overview	805-0310
	Sun Enterprise 10000 System Site Planning Guide	805-2914
	Sun Enterprise 10000 Hardware Installation and De-Installation Guide	805-4651
	Sun Enterprise 10000 System Service Guide	805-2917
	Sun Enterprise 10000 System Service Reference I	805-3622
	Sun Enterprise 10000 System Service Reference II	805-3623
	Sun Enterprise 10000 System Service Processor Quick Reference	805-3827

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CHAPTER 1

Component Replacement Guidelines, Indicators, and Nomenclatures

In the Sun Enterprise 10000 system, *hot-swapping* a component refers to physically removing a component while the remaining system components are operational. However, prior to hot-swapping, the component must be removed as a resource for the operating system.

The basic procedures for hot-swapping a component include:

1. Using `dr`(1M) or `hostview`(1M) on components that can be hot-swapped to remove the component as a resource for the system.

Caution – Do not turn off power to a system board with the system board circuit breaker. It is possible to arbstop the entire platform when the board is powered on again.

2. Removing power from the component using either the `power`(1M) or `fan`(1M) command or `hostview`(1M).

Caution – If the possibility exists for tools or people to come in contact with power connectors, remove power from the component through the AC input module breakers.

3. Removing and replacing the component.

Caution – Do not remove any component that has a yellow LED lit. These critical components also contain the "hand" graphic shown in FIGURE 1-1. Prior to removal, extinguish the yellow LEDs by using either `hostview`(1M) or the `power`(1M) command.

FIGURE 1-1 Caution Graphic on Critical System Components

4. Applying power to the component or to the cabinet in cases where power does not automatically resume.
5. Using `dr`(1M) or `hostview`(1M) to re-introduce the hot-swapped component as a resource for the system.

Allocating components as resources is covered in the following documents:

- *Sun Enterprise 10000 Dynamic Reconfiguration User Guide*
- *Sun Enterprise 10000 Dynamic Reconfiguration Reference Manual*
- *Sun Enterprise 10000 DR Configuration Guide*
- *Sun Enterprise Server Alternate Pathing 2.3.1 User Guide*
- *Sun Enterprise Server Alternate Pathing 2.3.1 Reference Manual*
- *Sun Enterprise Server Alternate Pathing 2.3.1 Installation Guide and Release Notes*

1.1 Configuration Rules

The following rules apply when configuring components on the Sun Enterprise 10000 system:

- When installing peripherals into the Sun Enterprise 10000 cabinet:
  - RSM trays are the only peripherals used in the Sun Enterprise 10000 cabinet.
  - Only three RSM trays can be used in the Sun Enterprise 10000 cabinet.
- All supported peripherals are listed in the Computer Systems price list and International Configuration Guide.
- A second control board is optional.
- Two centerplane support boards are required to utilize a 144-bit data bus and four address buses.
- The system is shipped with two centerplane support boards. Should one fail, the system will function with only a 72-bit data bus and two address buses.
- Systems ordered with eight or less system boards are configured with fans, power supplies, AC input modules, and with all boards on the same side (back), *plus* a centerplane support board, AC input module, power supply, and two fans on the front.

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

- All processor modules in the system must be the same speed.
- All processor modules on a system board must have the same cache size.
- For increased processor performance, avoid populating processors 0 and 1 together and processors 2 and 3 together.
- For increased I/O performance, avoid populating SBus 00 and 01 together and SBus 10 and 11 together.
- When configuring memory on a system board:
  - All sockets within a bank must be fully populated.
  - All DIMM sizes must be equal.
  - For increased performance on partially populated memory boards, do not use banks 0 and 2 together or banks 1 and 3 together.
- It is necessary to run `autoconfig`(1M) on the SSP when any system board or system board module (processor, memory, I/O) is installed for the first time.
- It is necessary to run `autoconfig`(1M) on the SSP when any replacement system board or system board module (processor, memory, I/O) with a different part number than the original is installed.

1.2 Testing the System

It might be necessary to run `autoconfig(1M)` after the Sun Enterprise 10000 system is powered on and before performing diagnostic testing of the system. Information about `autoconfig(1M)` is located in `/opt/share/man/autoconfig1m`.

The Sun Enterprise 10000 uses `hpost(1M)` to diagnose system problems. To use `hpost(1M)`, you must be logged in the SSP as `ssp`. Information on `hpost(1M)` is located in `/opt/share/man/hpost1m`.

Sun's `sunvts(1M)` diagnostic can be used as a verification of the system. To use `sunvts(1M)`, you must be logged into the host as `superuser`. Information on `sunvts(1M)` is located in `/opt/share/man/man1m`.

1.3 Reviewing System Temperatures

Use the `hostinfo -t` command to examine the temperature data being reported. The output should be similar to the following sample:

```
Starfire MIBs
=============

Ambient temperature readings(C): Sen0    Sen1    Sen2     Average
-------------------------------------------------------------------
                                 19.336  20.654  19.971   19.987

System Brd   CIC0    CIC1    MC      XDB2    XDB3    PROC0   PROC1   PROC2   PROC3   3p3VDC  VDCCore 5VDC
-------------------------------------------------------------------------------------------------------------
    0        29.203  29.72   30.306  25.905  27.41   44.747  47.566  45.919  49.049  47.435  43.65   39.134
    2        25.672  24.733  25.836  23.407  22.716  39.227  41.796  40.566  44.984  41.087  41.575  31.077
   13        29.092  29.461  29.448  24.463  26.644  42.177  44.925  42.051  46.264  42.918  42.918  29.734

Control Brd  5VDC    5VDCPer 5VDCFan Sen0    Sen1    Sen2
-------------------------------------------------------------
    0        32.664  27.049  31.443  19.336  20.654  19.971
    1        33.274  21.312  27.293  19.141  8.105   18.897

Centerplane  TMP0    TMP1    TMP2    TMP3    TMP4    TMP5    TMP6    TMP7    TMP8    TMP9
-------------------------------------------------------------------------------------------
    0        25.997  25.886  24.522  22.582  26.258  25.722  23.448  23.098  23.502  23.358
    1        25.002  24.261  21.924  21.671  24.724  24.07   21.737  21.322  21.768  21.656

Support Brd  3p3VDC1 3p3VDC2
---------------------------
    0        24.852  27.415
    1        26.683  34.251
```

The following temperature specifications (TABLE 1-1) must not be exceeded:

TABLE 1-1 Temperature Levels

	Warning Level	Maximum Level	Fatal Level
ASIC[1]	80° C	85° C	90° C
Processors[2]	80° C	85° C	90° C
Power Supply[3]	80° C	85° C	90° C
Ambient Temperature[4]	30° C	35° C	38° C

1. This includes CICs, MC, XDBs, and all centerplane entries.
2. This includes all PROC entries.
3. This includes all VDC entries.
4. This includes all SEN entries.

1.4 Hardware Indicators

The purpose of the LED indicators is to provide a method of isolating errors should the SSP or the SSP's communication path be faulty. The purpose of the LEDs is limited to four primary categories as listed in TABLE 1-2.

TABLE 1-2 LED Categories

LED Color	Purpose
Yellow 	Each hot-swappable device has at least two yellow LEDs. If any yellow LED is on, then it is NOT safe to be removed or serviced. Two LEDs are used for redundancy. On each applicable component, all yellow LEDs will be enclosed in a rectangle on the silkscreen. In addition to the functional identification of each yellow LED, a silkscreen legend will be placed near the LEDs (refer to left). These yellow LEDs are, in many cases, indicators of the state of the software-controlled power supplies.
Green	Indicates the status of housekeeping power supplies.
Green	Provides status indications valuable to determine the state of the boards or interfaces prior to having full communication with the SSP.
Green	Displays the state of generally programmable registers useful for debug.

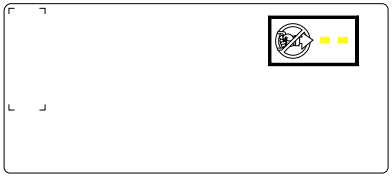
1.4.1 Fans

Fan components and LEDs are listed in TABLE 1-3 and TABLE 1-4.

TABLE 1-3 Fan Components

Total maximum # of fan shelves per system	# of fan trays per fan shelf	# of yellow LEDs per fan tray	# of fans per fan tray
4	4	4	2

TABLE 1-4 Fan Tray LEDs

LED Name	Color	Purpose
PWR1	Yellow	When lit, 24 VDC is present and this fan tray is NOT safe to service. 

1.4.2 Centerplane Support Boards

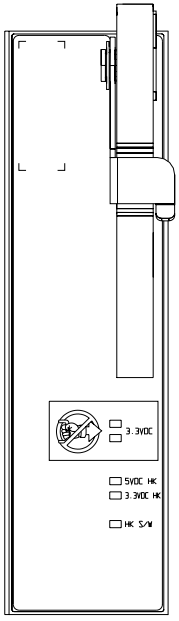
Centerplane support board components and LEDs are listed in TABLE 1-5 and TABLE 1-6.

TABLE 1-5 Centerplane Support Board

Total maximum # per system	Total # per side	# of green LEDs per board	# of yellow LEDs per board
2	1	4	2

TABLE 1-6 Centerplane Support Board LEDs

LED Name	Color	Purpose
5VDC HK	Green	5.0 VDC housekeeping
3.3VDC HK	Green	3.3 VDC housekeeping
3.3VDC	Yellow	VDD *signal* on the control board is on indicating 3.3 volts DC is present and the control board is NOT safe to service.
HK S/W	Green	Displays the state of a designated bit position on the power control JTAG ring of this board.



1.4.3 Control Board

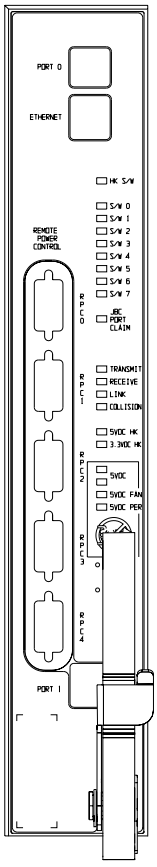
Control board components and LEDs are listed in TABLE 1-7 and TABLE 1-8.

TABLE 1-7 Control Board

Total maximum # per system	Total # per side	# of green LEDs per board	# of yellow LEDs per board
2	1	17	2

TABLE 1-8 Control Board LEDs

LED Name	Color	Purpose
5VDC HK	Green	5.0 VDC housekeeping
3.3VDC HK	Green	3.3 VDC housekeeping
5VDC	Yellow	VDC on the control board is present and the control board is NOT safe to service.
5VDC	Yellow	
5VDC FAN	Green	5.0 VDC fan control power is present
5VDC PER	Yellow	5.0 VDC peripheral cabinet power control voltage is present
HK S/W	Green	Displays the state of bit 8 on the power control JTAG ring of this board.
S/W 7- S/W 0	Green	Programmable bits that indicate the state of an 8-bit read/write register located in the SPARClite's address space. When the Control Board Executive is operating correctly, a marching 1s pattern can be seen on S/W0-S/W6. S/W7 indicates the network is operational.
XMIT	Green	Ethernet interface transmit status
REC	Green	Ethernet interface receive status
LINK	Green	Ethernet interface link status
COLL	Green	Ethernet interface collision status
JTAG MASTER	Green	Indicates that this control board is the system JTAG Master



1.4.4 System Board

System board components and LEDs are listed in TABLE 1-9 and TABLE 1-10.

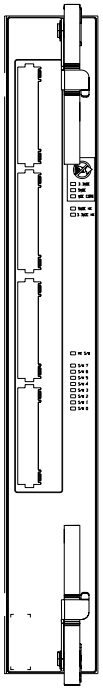
TABLE 1-9 System Boards

Total maximum # per system	Total # per side	# of green LEDs per board	# of yellow LEDs per board
16	8	11	3

HK S/W was used for hardware debug and was not programmed for use by the software. S/W 7- S/W 0 indicate the state of an 8-bit read/write register located in the SPARClite's address space. When the Control Board Executive is operating correctly, a marching 1s pattern can be seen on S/W0-S/W6. S/W7 indicates the network is operational.

TABLE 1-10 System Board LEDs

LED Name	Color	Purpose
5VDC HK	Green	Indicates that 5.0 VDC housekeeping power is present.
3.3VDC HK	Green	Indicates that 3.3 VDC housekeeping power is present.
3.3VDC	Yellow	VCC on the system board is present and the system board is NOT safe to service.
5VDC	Yellow	VDD signal on the system board is on, indicating 5 volts DC is present, and the system board is NOT safe to service.
VDD_Core	Yellow	VDD_Core on the system board is present and that the system board is NOT safe to service.
HKS/W	Green	Displays the state of a designated bit position on the power control JTAG ring of this board.
S/W 7- S/W 0	Green	Eight LEDs that are programmable through a register in the bootbus space of the PC ASIC connected to the I?O module, which can be read and written either by JTAG or by resident software.



1.5 Inserting a Board

These are general guidelines for inserting boards into the Sun Enterprise 10000 system. To reduce the risk of damage to the centerplane connector, take the following precautions:

- Thoroughly inspect (visually) both the centerplane connector and the daughter board connector before insertion.
  - Look for damage to either the male or female connector plastic housing.
  - Look for foreign material in both the male and female connector plastic housing.
  - Look for bent or damaged pins on all mating connectors.

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.
- Never touch or probe the centerplane connector pins.
- When inserting a board into a centerplane slot:
  - Firmly press the board in by hand with evenly distributed pressure across the front panel until the resistance is too high for manual insertion.
  - Use the insertion/ejection handles to evenly apply pressure until the connector is fully seated.
- Always use the ejection handles when removing boards from the centerplane.
- Never try to force the connector using the insertion/ejection handles if the board becomes cocked or jammed.
- Never use damaged components.

1.6 Standard Torque Settings

Components requiring specific torque settings when being secured, such as the processor module in FIGURE 1-2, are listed in TABLE 1-11.

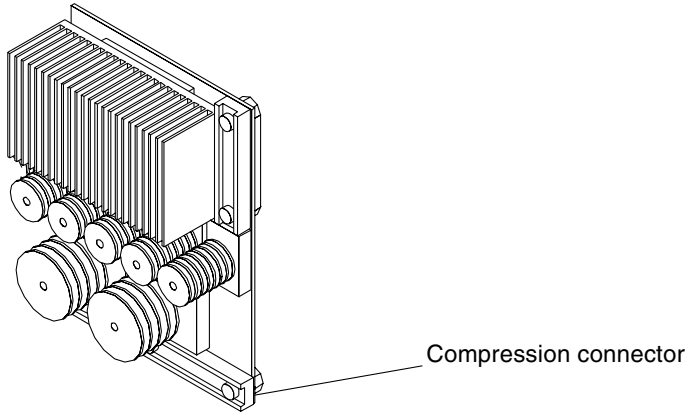


FIGURE 1-2 Compression Connector

Always follow the standard torquing procedures listed in the processor, I/O, and memory mezzanine replacement procedures. When retorquing a part, remember to loosen or back out the screw before retightening it. This will assure the proper torque is applied and will also reduce the chances of breaking a screw.

Note – A torque wrench has been included with the system in the document pouch.

TABLE 1-11 Torque Specifications

	Torque Specification for Manufacturing	Use of 6.0 in/lbs Permitted In the Field
Tolerance range:		
Relative to spec	+/- 0.06 Nm[1]	N/A
Unless range stated	+/- 0.5 in/lbs	N/A
Non-specified component screws:		
M3	7.0 in/lbs (0.8 Nm)	Yes
M5	33.3 in/lbs (3.76 Nm)	Yes
Specific Components:		
Captive compression connections, #4-40 hex		
Low torque (approx.)	3.0 in/lbs (0.34 Nm)	No, tighten less than 6.0 in/lbs
Final torque	6.0 in/lbs (0.68 Nm)	Yes
I/O, processor, and memory module #4-40 hex		
Captive, low torque (approx.)	3.0 in/lbs (0.34 Nm)	No, tighten less than 6.0 in/lbs
Captive, final torque	6.0 in/lbs (0.68 Nm)	Yes
Circuit breaker		
M3 screw	5 in/lbs (0.6 Nm)	Yes
System board cover		
M3 screw	7.0 - 8.8 in/lbs (0.798 - 0.998 Nm)	Yes
I/O memory module		
M3 screw	7.0 in/lbs (0.8 Nm)	Yes
Fan centerplane		
M3 screw	5.3 in/lbs (0.6 Nm)	Yes
Centerplane		
M5 screw	33.3 in/lbs (3.76 Nm)	No, hand tighten

1. Newton meters

1.7 Field Replaceable Units

TABLE 1-12 lists the estimated time required for replacement of the field-replaceable units (FRUs) in the Sun Enterprise 10000 system, provided the new component is on-site and properly configured. The estimates do not include any time required by software for system reconfiguration (power cycling, autoconfig) or the shutdown and bring up required for the nonconcurrent service items.

Caution – The control board and centerplane support board are different from other hot-swappable items in that the others can be dynamically reconfigured out of the system without rebooting. However, if a control board or a centerplane support board is in use by a running domain, you must halt the domain to hot-swap it.

TABLE 1-12 Customer Availability and MTTR Objectives

Field Replaceable Unit	Mean time to repair	Online Service
Control board	10 min.	Yes, if two configured and not in use by system
Centerplane support board	5 min.	Yes, if not in use by system
Centerplane	1 hour	No
System board	30 min.	Yes
UltraSPARC module	20 min.	Yes
Dual in-line memory module (DIMM)	10 min.	Yes
Memory module	30 min.	Yes
I/O module	20 min.	Yes
SBus cards	10 min.	Yes
I/O cables	15 min.	Yes
Fan tray	5 min.	Yes
System Service Processor (SSP)	30 min.	Yes
SSP keyboard	5 min.	Yes
SSP monitor	10 min.	Yes
SSP peripheral	30 min.	Yes
SSP modem	10 min.	Yes
48-volt power supply	5 min.	Yes, if not in use by system

TABLE 1-12 Customer Availability and MTTR Objectives *(Continued)*

Field Replaceable Unit	Mean time to repair	Online Service
AC input unit	5 min.	Yes, if not in use by system
Exterior cosmetic panel	5 min.	Yes
Power control module	5 min.	Yes
DC breaker	15 min.	Yes, if not in use by system
AC sequencer	15 min.	Yes, if not in use by system
Power shelf	60 min.	No
Fan centerplane	20 min.	No
Air filter	5 min.	Yes
I/O power cord	5 min.	Yes
RSM tray	30 min.	Yes

1.8 Component Numbering

All addressable components are identified by a standard set of numbering as listed in TABLE 1-13 and TABLE 1-14. Locations of all the components are shown in FIGURE 1-3 and FIGURE 1-4 .

TABLE 1-13 Processor Numbering

Component	Solaris ID	Hostview ID	POST ID
System Board 0		SB0	sysbd 0
Proc. Mod. 0	/SUNW,UltraSPARC@0,0	00	proc 0.0
Proc. Mod. 1	/SUNW,UltraSPARC@1,0	01	proc 0.1
Proc. Mod. 2	/SUNW,UltraSPARC@2,0	02	proc 0.2
Proc. Mod. 3	/SUNW,UltraSPARC@3,0	03	proc 0.3
System Board 1		SB1	sysbd 1
Proc. Mod. 0	/SUNW,UltraSPARC@4,0	04	proc 1.0
Proc. Mod. 1	/SUNW,UltraSPARC@5,0	05	proc 1.1
Proc. Mod. 2	/SUNW,UltraSPARC@6,0	06	proc 1.2
Proc. Mod. 3	/SUNW,UltraSPARC@7,0	07	proc 1.3
System Board 2		SB2	sysbd 2
Proc. Mod. 0	/SUNW,UltraSPARC@8,0	08	proc 2.0
Proc. Mod. 1	/SUNW,UltraSPARC@9,0	09	proc 2.1
Proc. Mod. 2	/SUNW,UltraSPARC@a,0	10	proc 2.2
Proc. Mod. 3	/SUNW,UltraSPARC@b,0	11	proc 2.3
System Board 3		SB3	sysbd 3
Proc. Mod. 0	/SUNW,UltraSPARC@c,0	12	proc 3.0
Proc. Mod. 1	/SUNW,UltraSPARC@d,0	13	proc 3.1
Proc. Mod. 2	/SUNW,UltraSPARC@e,0	14	proc 3.2
Proc. Mod. 3	/SUNW,UltraSPARC@f,0	15	proc 3.3
System Board 4		SB4	sysbd 4
Proc. Mod. 0	/SUNW,UltraSPARC@10,0	16	proc 4.0
Proc. Mod. 1	/SUNW,UltraSPARC@11,0	17	proc 4.1
Proc. Mod. 2	/SUNW,UltraSPARC@12,0	18	proc 4.2
Proc. Mod. 3	/SUNW,UltraSPARC@13,0	19	proc 4.3
System Board 5		SB5	sysbd 5
Proc. Mod. 0	/SUNW,UltraSPARC@14,0	20	proc 5.0
Proc. Mod. 1	/SUNW,UltraSPARC@15,0	21	proc 5.1
Proc. Mod. 2	/SUNW,UltraSPARC@16,0	22	proc 5.2
Proc. Mod. 3	/SUNW,UltraSPARC@17,0	23	proc 5.3
System Board 6		SB6	sysbd 6
Proc. Mod. 0	/SUNW,UltraSPARC@18,0	24	proc 6.0
Proc. Mod. 1	/SUNW,UltraSPARC@19,0	25	proc 6.1
Proc. Mod. 2	/SUNW,UltraSPARC@1a,0	26	proc 6.2
Proc. Mod. 3	/SUNW,UltraSPARC@1b,0	27	proc 6.3
System Board 7		SB7	sysbd 7
Proc. Mod. 0	/SUNW,UltraSPARC@1c,0	28	proc 7.0
Proc. Mod. 1	/SUNW,UltraSPARC@1d,0	29	proc 7.1
Proc. Mod. 2	/SUNW,UltraSPARC@1e,0	30	proc 7.2
Proc. Mod. 3	/SUNW,UltraSPARC@1f,0	31	proc 7.3

TABLE 1-13 Processor Numbering *(Continued)*

Component	Solaris ID	Hostview ID	POST ID
System Board 8		SB8	sysbd 8
Proc. Mod. 0	/SUNW,UltraSPARC@20,0	32	proc 8.0
Proc. Mod. 1	/SUNW,UltraSPARC@21,0	33	proc 8.1
Proc. Mod. 2	/SUNW,UltraSPARC@22,0	34	proc 8.2
Proc. Mod. 3	/SUNW,UltraSPARC@23,0	35	proc 8.3
System Board 9		SB9	sysbd 9
Proc. Mod. 0	/SUNW,UltraSPARC@24,0	36	proc 9.0
Proc. Mod. 1	/SUNW,UltraSPARC@25,0	37	proc 9.1
Proc. Mod. 2	/SUNW,UltraSPARC@26,0	38	proc 9.2
Proc. Mod. 3	/SUNW,UltraSPARC@27,0	39	proc 9.3
System Board 10		SB10	sysbd 10
Proc. Mod. 0	/SUNW,UltraSPARC@28,0	40	proc 10.0
Proc. Mod. 1	/SUNW,UltraSPARC@29,0	41	proc 10.1
Proc. Mod. 2	/SUNW,UltraSPARC@2a,0	42	proc 10.2
Proc. Mod. 3	/SUNW,UltraSPARC@2b,0	43	proc 10.3
System Board 11		SB11	sysbd 11
Proc. Mod. 0	/SUNW,UltraSPARC@2c,0	44	proc 11.0
Proc. Mod. 1	/SUNW,UltraSPARC@2d,0	45	proc 11.1
Proc. Mod. 2	/SUNW,UltraSPARC@2e,0	46	proc 11.2
Proc. Mod. 3	/SUNW,UltraSPARC@2f,0	47	proc 11.3
System Board 12		SB12	sysbd 12
Proc. Mod. 0	/SUNW,UltraSPARC@30,0	48	proc 12.0
Proc. Mod. 1	/SUNW,UltraSPARC@31,0	49	proc 12.1
Proc. Mod. 2	/SUNW,UltraSPARC@32,0	50	proc 12.2
Proc. Mod. 3	/SUNW,UltraSPARC@33,0	51	proc 12.3
System Board 13		SB13	sysbd 13
Proc. Mod. 0	/SUNW,UltraSPARC@34,0	52	proc 13.0
Proc. Mod. 1	/SUNW,UltraSPARC@35,0	53	proc 13.1
Proc. Mod. 2	/SUNW,UltraSPARC@36,0	54	proc 13.2
Proc. Mod. 3	/SUNW,UltraSPARC@37,0	55	proc 13.3
System Board 14		SB14	sysbd 14
Proc. Mod. 0	/SUNW,UltraSPARC@38,0	56	proc 14.0
Proc. Mod. 1	/SUNW,UltraSPARC@39,0	57	proc 14.1
Proc. Mod. 2	/SUNW,UltraSPARC@3a,0	58	proc 14.2
Proc. Mod. 3	/SUNW,UltraSPARC@3b,0	59	proc 14.3
System Board 15		SB15	sysbd 15
Proc. Mod. 0	/SUNW,UltraSPARC@3c,0	60	proc 15.0
Proc. Mod. 1	/SUNW,UltraSPARC@3d,0	61	proc 15.1
Proc. Mod. 2	/SUNW,UltraSPARC@3e,0	62	proc 15.2
Proc. Mod. 3	/SUNW,UltraSPARC@3f,0	63	proc 15.3

TABLE 1-14 I/O Numbering

		SBus			PCI		
Component	**POST**	**Solaris ID**	**Front Panel Label**	**Cable Label**	**Solaris ID**	**Front Panel Label**	**Cable Label**
System Board 0	sysbd 0		SB0	SB0		SB0	SB0
I/O Port 0	scard 0.0.0	/sbus@40	SBUS 0 SLOT 0	SB0.0.0	/pci@40	PCI 0.0	PCI0.0.0
I/O Port 1	scard 0.0.1	/sbus@40	SBUS 0 SLOT 1	SB0.0.1			
I/O Port 2	scard 0.1.0	/sbus@41	SBUS 1 SLOT 0	SB0.1.0	/pci@41	PCI 1.0	PCI0.1.0
I/O Port 3	scard 0.1.1	/sbus@41	SBUS 1 SLOT 1	SB0.1.1			
System Board 1	sysbd 1		SB1	SB1		SB1	SB1
I/O Port 0	scard 1.0.0	/sbus@44	SBUS 0 SLOT 0	SB1.0.0	/pci@44	PCI 0.0	PCI1.0.0
I/O Port 1	scard 1.0.1	/sbus@44	SBUS 0 SLOT 1	SB1.0.1			
I/O Port 2	scard 1.1.0	/sbus@45	SBUS 1 SLOT 0	SB1.1.0	/pci@45	PCI 1.0	PCI1.1.0
I/O Port 3	scard 1.1.1	/sbus@45	SBUS 1 SLOT 1	SB1.1.1			
System Board 2	sysbd 2		SB2	SB2		SB2	SB2
I/O Port 0	scard 2.0.0	/sbus@48	SBUS 0 SLOT 0	SB2.0.0	/pci@48	PCI 0.0	PCI2.0.0
I/O Port 1	scard 2.0.1	/sbus@48	SBUS 0 SLOT 1	SB2.0.1			
I/O Port 2	scard 2.1.0	/sbus@49	SBUS 1 SLOT 0	SB2.1.0	/pci@49	PCI 1.0	PCI2.1.0
I/O Port 3	scard 2.1.1	/sbus@49	SBUS 1 SLOT 1	SB2.1.1			
System Board 3	sysbd 3		SB3	SB3		SB3	SB3
I/O Port 0	scard 3.0.0	/sbus@4c	SBUS 0 SLOT 0	SB3.0.0	/pci@4c	PCI 0.0	PCI3.0.0
I/O Port 1	scard 3.0.1	/sbus@4c	SBUS 0 SLOT 1	SB3.0.1			
I/O Port 2	scard 3.1.0	/sbus@4d	SBUS 1 SLOT 0	SB3.1.0	/pci@4d	PCI 1.0	PCI3.1.0
I/O Port 3	scard 3.1.1	/sbus@4d	SBUS 1 SLOT 1	SB3.1.1			
System Board 4	sysbd 4		SB4	SB4		SB4	SB4
I/O Port 0	scard 4.0.0	/sbus@50	SBUS 0 SLOT 0	SB4.0.0	/pci@50	PCI 0.0	PCI4.0.0
I/O Port 1	scard 4.0.1	/sbus@50	SBUS 0 SLOT 1	SB4.0.1			
I/O Port 2	scard 4.1.0	/sbus@51	SBUS 1 SLOT 0	SB4.1.0	/pci@51	PCI 1.0	PCI4.1.0
I/O Port 3	scard 4.1.1	/sbus@51	SBUS 1 SLOT 1	SB4.1.1			
System Board 5	sysbd 5		SB5	SB5		SB5	SB5
I/O Port 0	scard 5.0.0	/sbus@54	SBUS 0 SLOT 0	SB5.0.0	/pci@54	PCI 0.0	PCI5.0.0
I/O Port 1	scard 5.0.1	/sbus@54	SBUS 0 SLOT 1	SB5.0.1			
I/O Port 2	scard 5.1.0	/sbus@55	SBUS 1 SLOT 0	SB5.1.0	/pci@55	PCI 1.0	PCI5.1.0
I/O Port 3	scard 5.1.1	/sbus@55	SBUS 1 SLOT 1	SB5.1.1			
System Board 6	sysbd 6		SB6	SB6		SB6	SB6
I/O Port 0	scard 6.0.0	/sbus@58	SBUS 0 SLOT 0	SB6.0.0	/pci@58	PCI 0.0	PCI6.0.0
I/O Port 1	scard 6.0.1	/sbus@58	SBUS 0 SLOT 1	SB6.0.1			
I/O Port 2	scard 6.1.0	/sbus@59	SBUS 1 SLOT 0	SB6.1.0	/pci@59	PCI 1.0	PCI6.1.0
I/O Port 3	scard 6.1.1	/sbus@59	SBUS 1 SLOT 1	SB6.1.1			

TABLE 1-14 I/O Numbering *(Continued)*

			SBus			PCI	
Component	**POST**	**Solaris ID**	**Front Panel Label**	**Cable Label**	**Solaris ID**	**Front Panel Label**	**Cable Label**
System Board 7	sysbd 7		SB7	SB7		SB7	SB7
I/O Port 0	scard 7.0.0	/sbus@5c	SBUS 0 SLOT 0	SB7.0.0	/pci@5c	PCI 0.0	PCI7.0.0
I/O Port 1	scard 7.0.1	/sbus@5c	SBUS 0 SLOT 1	SB7.0.1			
I/O Port 2	scard 7.1.0	/sbus@5d	SBUS 1 SLOT 0	SB7.1.0	/pci@5d	PCI 1.0	PCI7.1.0
I/O Port 3	scard 7.1.1	/sbus@5d	SBUS 1 SLOT 1	SB7.1.1			
System Board 8	sysbd 8		SB8	SB8		SB8	SB8
I/O Port 0	scard 8.0.0	/sbus@60	SBUS 0 SLOT 0	SB8.0.0	/pci@60	PCI 0.0	PCI8.0.0
I/O Port 1	scard 8.0.1	/sbus@60	SBUS 0 SLOT 1	SB8.0.1			
I/O Port 2	scard 8.1.0	/sbus@61	SBUS 1 SLOT 0	SB8.1.0	/pci@61	PCI 1.0	PCI8.1.0
I/O Port 3	scard 8.1.1	/sbus@61	SBUS 1 SLOT 1	SB8.1.1			
System Board 9	sysbd 9		SB9	SB9		SB9	SB9
I/O Port 0	scard 9.0.0	/sbus@64	SBUS 0 SLOT 0	SB9.0.0	/pci@64	PCI 0.0	PCI9.0.0
I/O Port 1	scard 9.0.1	/sbus@64	SBUS 0 SLOT 1	SB9.0.1			
I/O Port 2	scard 9.1.0	/sbus@65	SBUS 1 SLOT 0	SB9.1.0	/pci@65	PCI 1.0	PCI9.1.0
I/O Port 3	scard 9.1.1	/sbus@65	SBUS 1 SLOT 1	SB9.1.1			
System Board 10	sysbd 10		SB10	SB10		SB10	SB10
I/O Port 0	scard 10.0.0	/sbus@68	SBUS 0 SLOT 0	SB10.0.0	/pci@68	PCI 0.0	PCI10.0.0
I/O Port 1	scard 10.0.1	/sbus@68	SBUS 0 SLOT 1	SB10.0.1			
I/O Port 2	scard 10.1.0	/sbus@69	SBUS 1 SLOT 0	SB10.1.0	/pci@69	PCI 1.0	PCI10.1.0
I/O Port 3	scard 10.1.1	/sbus@69	SBUS 1 SLOT 1	SB10.1.1			
System Board 11	sysbd 11		SB11	SB11		SB11	SB11
I/O Port 0	scard 11.0.0	/sbus@6c	SBUS 0 SLOT 0	SB11.0.0	/pci@6c	PCI 0.0	PCI11.0.0
I/O Port 1	scard 11.0.1	/sbus@6c	SBUS 0 SLOT 1	SB11.0.1			
I/O Port 2	scard 11.1.0	/sbus@6d	SBUS 1 SLOT 0	SB11.1.0	/pci@6d	PCI 1.0	PCI11.1.0
I/O Port 3	scard 11.1.1	/sbus@6d	SBUS 1 SLOT 1	SB11.1.1			
System Board 12	sysbd 12		SB12	SB12		SB12	SB12
I/O Port 0	scard 12.0.0	/sbus@70	SBUS 0 SLOT 0	SB12.0.0	/pci@70	PCI 0.0	PCI12.0.0
I/O Port 1	scard 12.0.1	/sbus@70	SBUS 0 SLOT 1	SB12.0.1			
I/O Port 2	scard 12.1.0	/sbus@71	SBUS 1 SLOT 0	SB12.1.0	/pci@71	PCI 1.0	PCI12.1.0
I/O Port 3	scard 12.1.1	/sbus@71	SBUS 1 SLOT 1	SB12.1.1			

TABLE 1-14 I/O Numbering *(Continued)*

			SBus			PCI	
Component	**POST**	**Solaris ID**	**Front Panel Label**	**Cable Label**	**Solaris ID**	**Front Panel Label**	**Cable Label**
System Board 13	sysbd 13		SB13	SB13		SB13	SB13
I/O Port 0	scard 13.0.0	/sbus@74	SBUS 0 SLOT 0	SB13.0.0	/pci@74	PCI 0.0	PCI13.0.0
I/O Port 1	scard 13.0.1	/sbus@74	SBUS 0 SLOT 1	SB13.0.1			
I/O Port 2	scard 13.1.0	/sbus@75	SBUS 1 SLOT 0	SB13.1.0	/pci@75	PCI 1.0	PCI13.1.0
I/O Port 3	scard 13.1.1	/sbus@75	SBUS 1 SLOT 1	SB13.1.1			
System Board 14	sysbd 14		SB14	SB14		SB14	SB14
I/O Port 0	scard 14.0.0	/sbus@78	SBUS 0 SLOT 0	SB14.0.0	/pci@78	PCI 0.0	PCI14.0.0
I/O Port 1	scard 14.0.1	/sbus@78	SBUS 0 SLOT 1	SB14.0.1			
I/O Port 2	scard 14.1.0	/sbus@79	SBUS 1 SLOT 0	SB14.1.0	/pci@79	PCI 1.0	PCI14.1.0
I/O Port 3	scard 14.1.1	/sbus@79	SBUS 1 SLOT 1	SB14.1.1			
System Board 15	sysbd 15		SB15	SB15		SB15	SB15
I/O Port 0	scard 15.0.0	/sbus@7c	SBUS 0 SLOT 0	SB15.0.0	/pci@7c	PCI 0.0	PCI15.0.0
I/O Port 1	scard 15.0.1	/sbus@7c	SBUS 0 SLOT 1	SB15.0.1			
I/O Port 2	scard 15.1.0	/sbus@7d	SBUS 1 SLOT 0	SB15.1.0	/pci@7d	PCI 1.0	PCI15.1.0
I/O Port 3	scard 15.1.1	/sbus@7d	SBUS 1 SLOT 1	SB15.1.1			

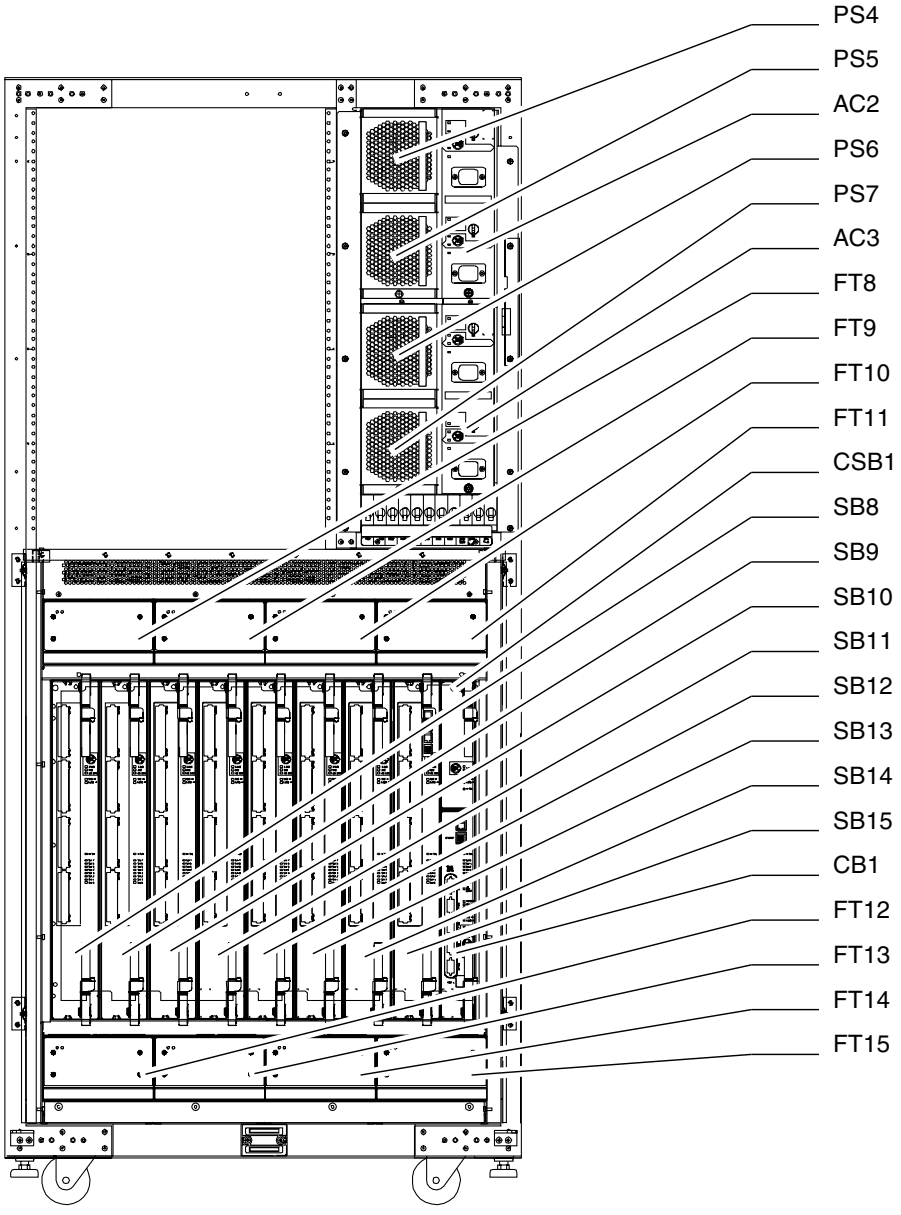


FIGURE 1-3 Component Numbering—Front

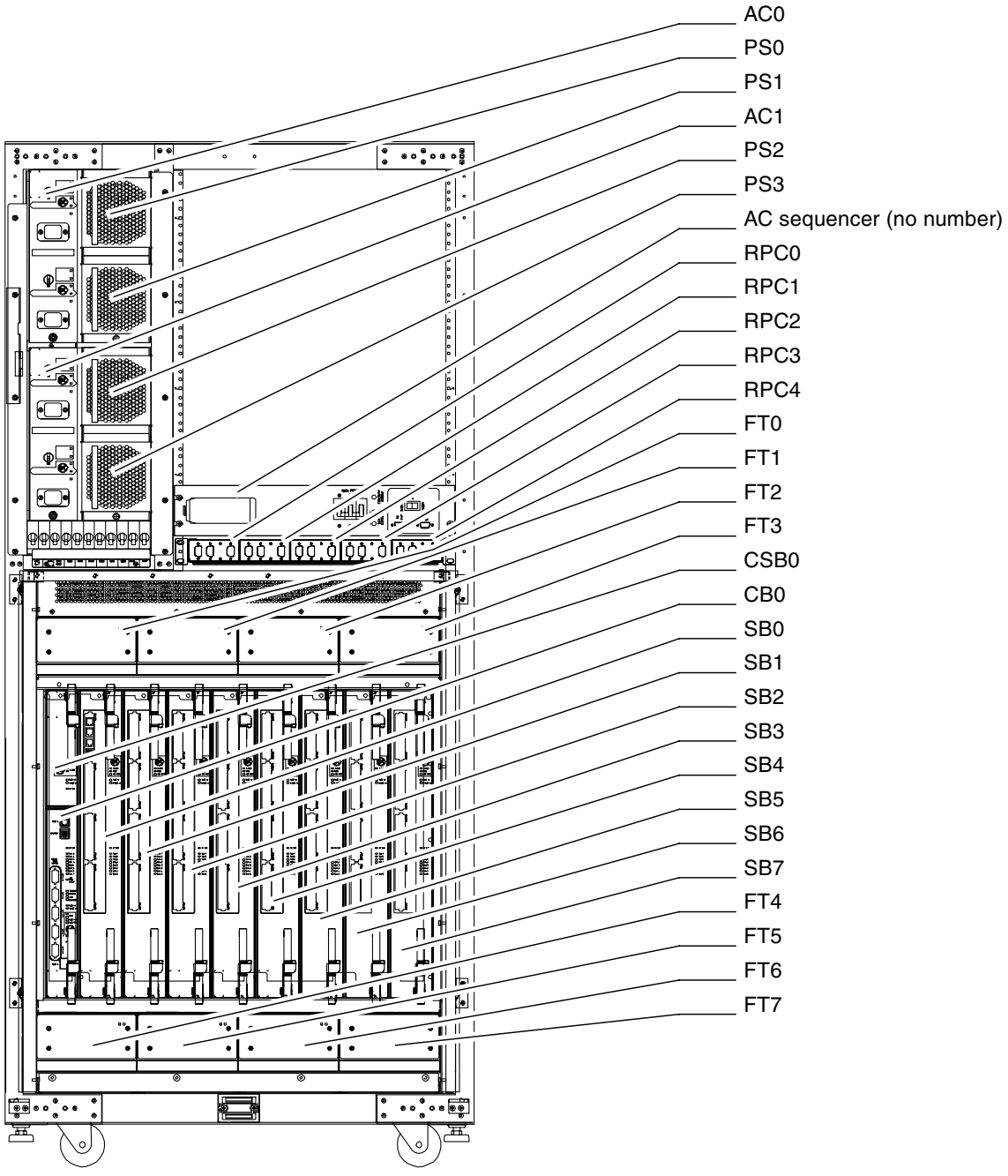


FIGURE 1-4 Component Numbering—Back

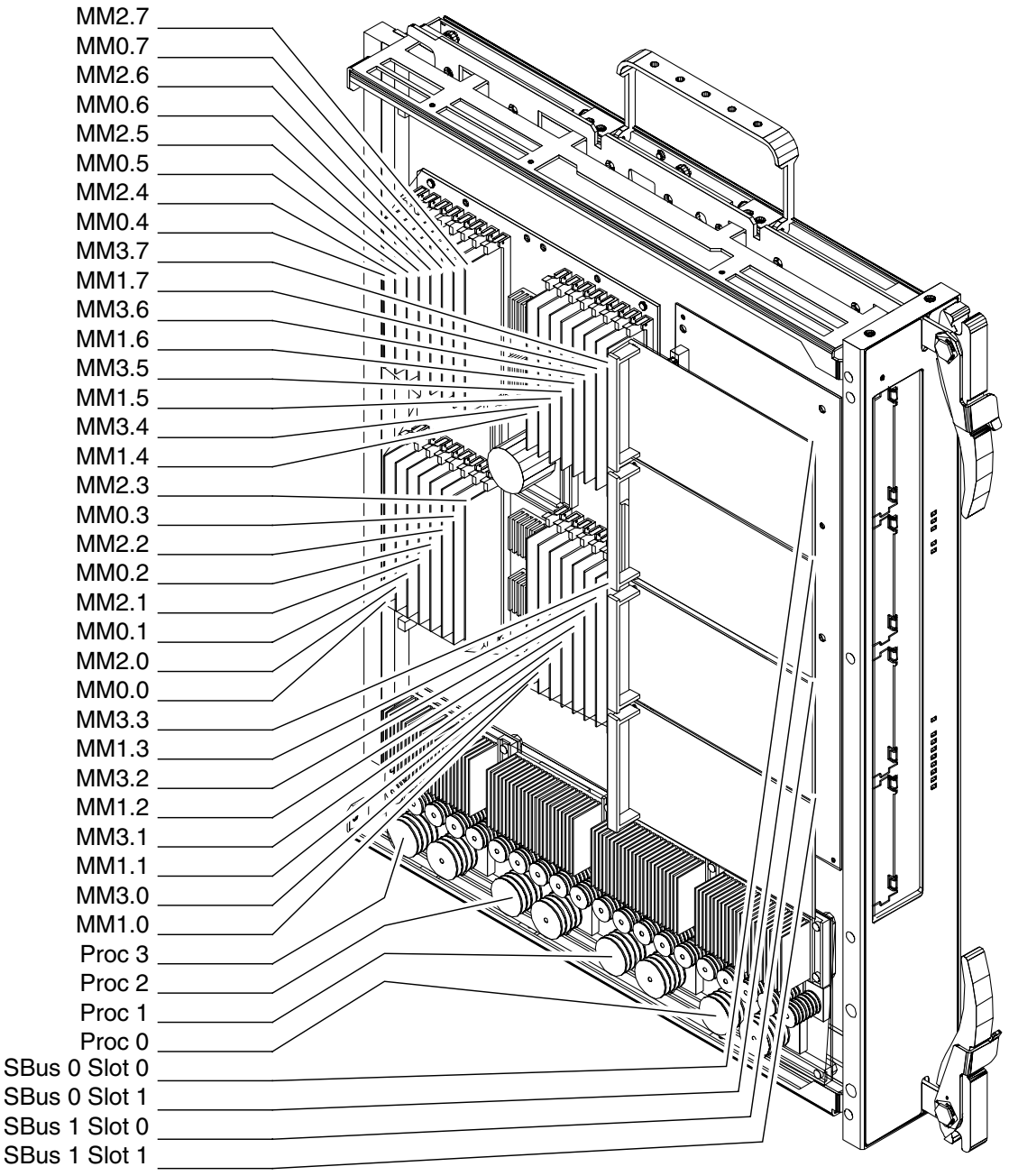


FIGURE 1-5 System Board Component Numbering

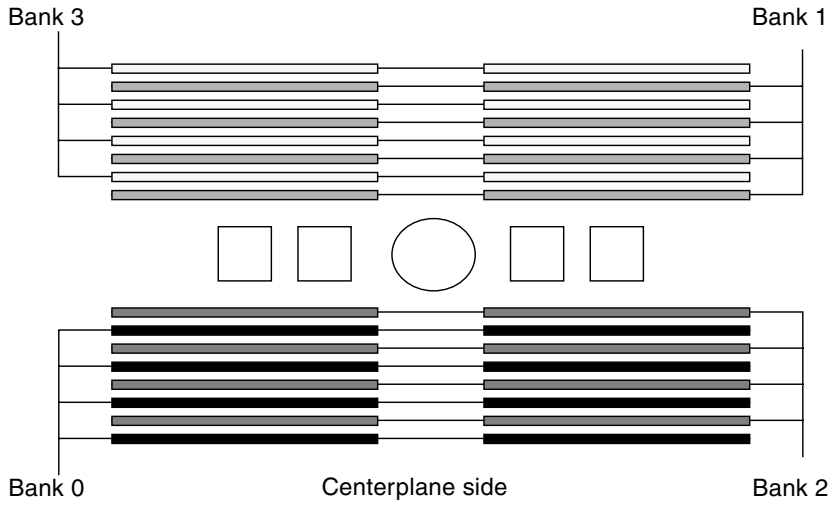


FIGURE 1-6 Memory Bank Locations

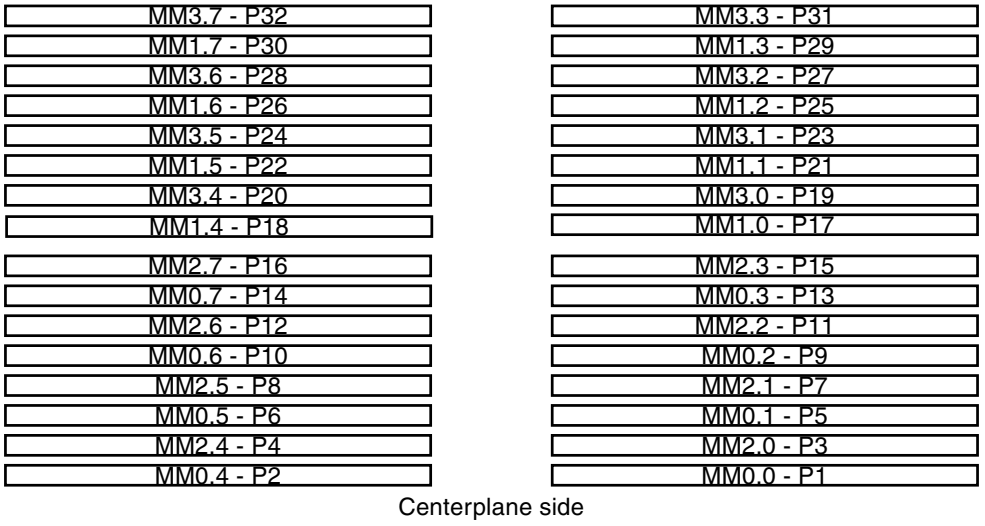


FIGURE 1-7 Memory DIMM Locations

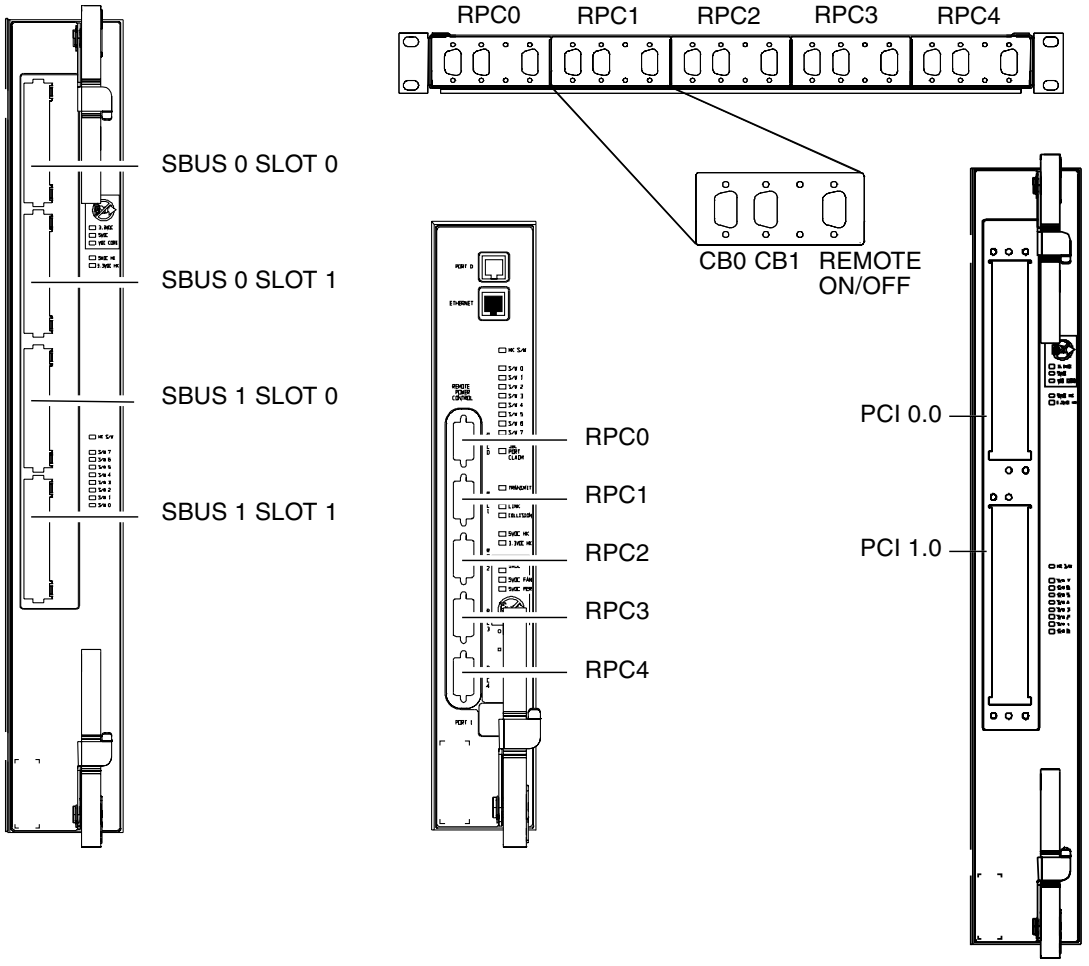


FIGURE 1-8 SBus Slot and Remote Power Control Numbering

1.9 System Block Diagrams

Use FIGURE 1-9, FIGURE 1-10, FIGURE 1-11, and FIGURE 1-12 when diagnosing failed components.

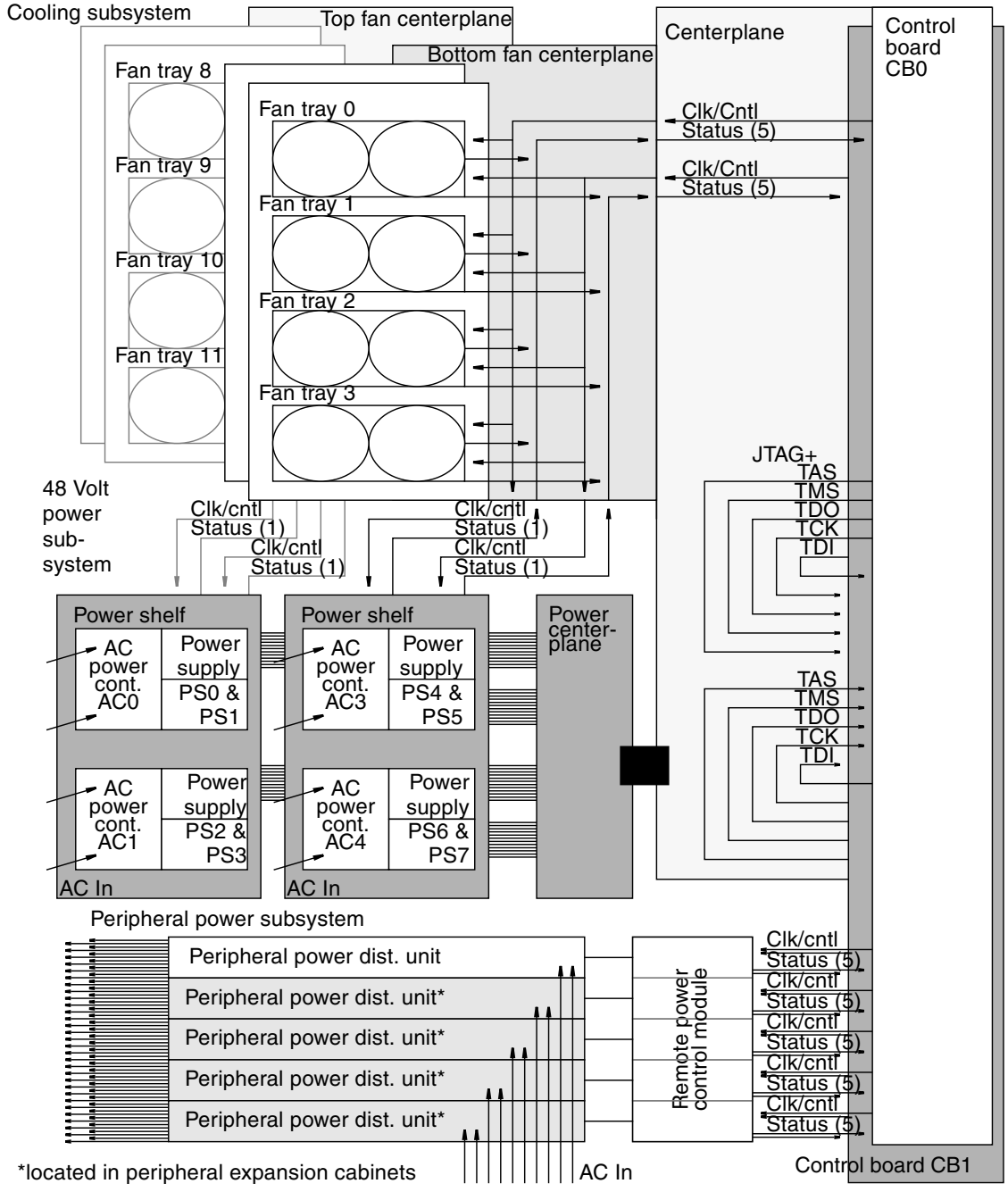


FIGURE 1-9 Fan, Power, and Control Block Diagram I

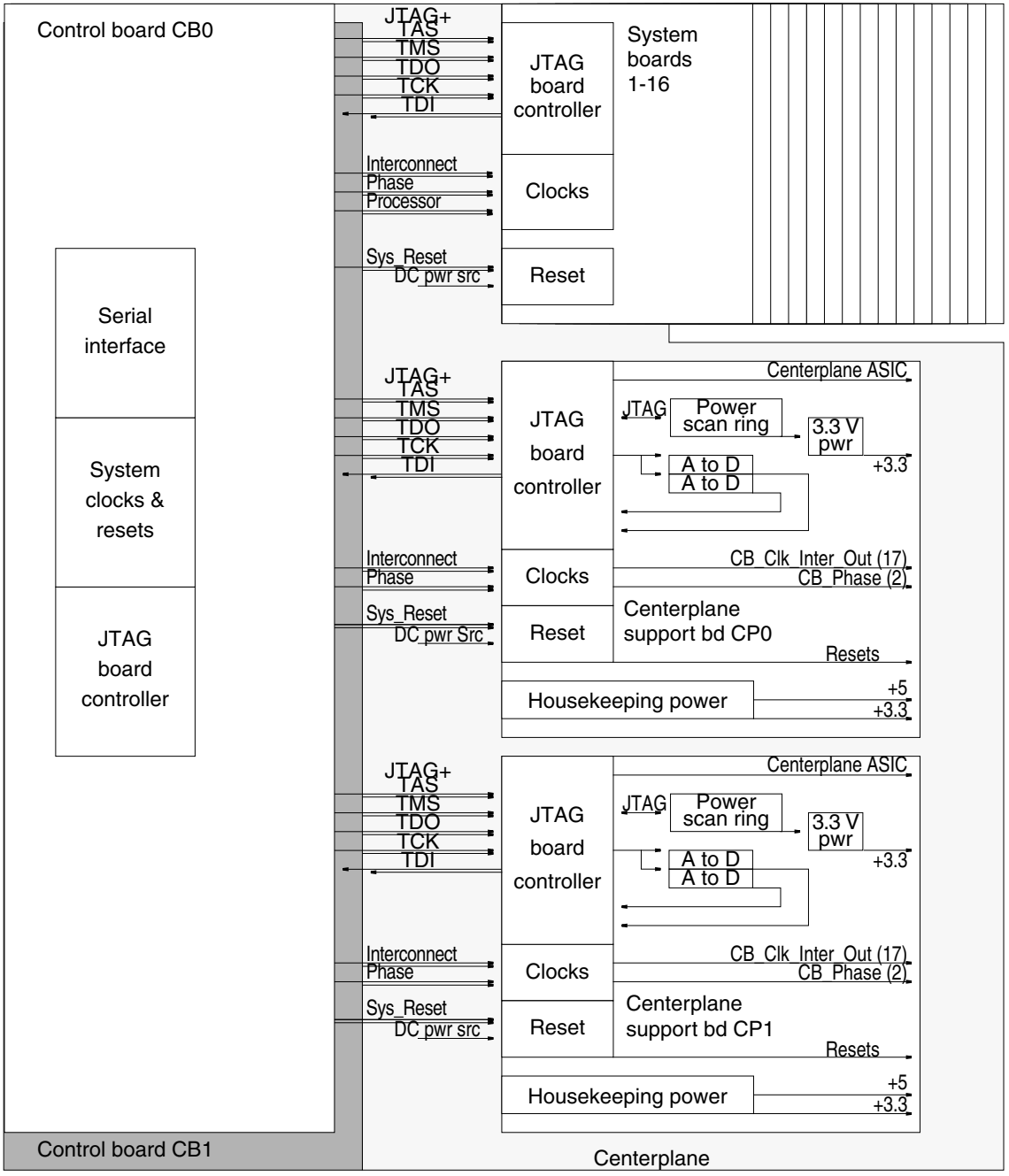


FIGURE 1-10 Fan, Power, and Control Block Diagram II

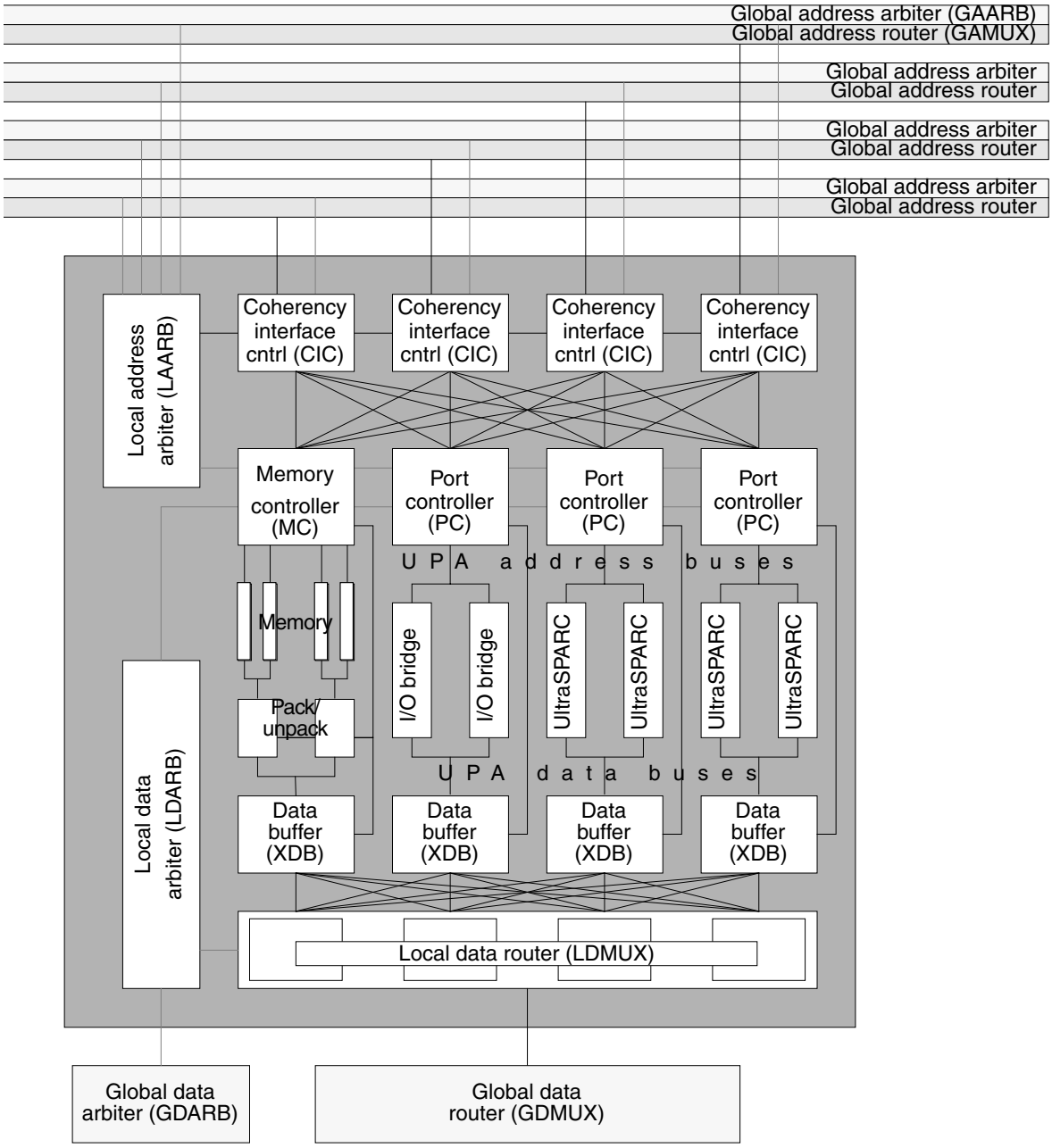


FIGURE 1-11 System Board Block Diagram

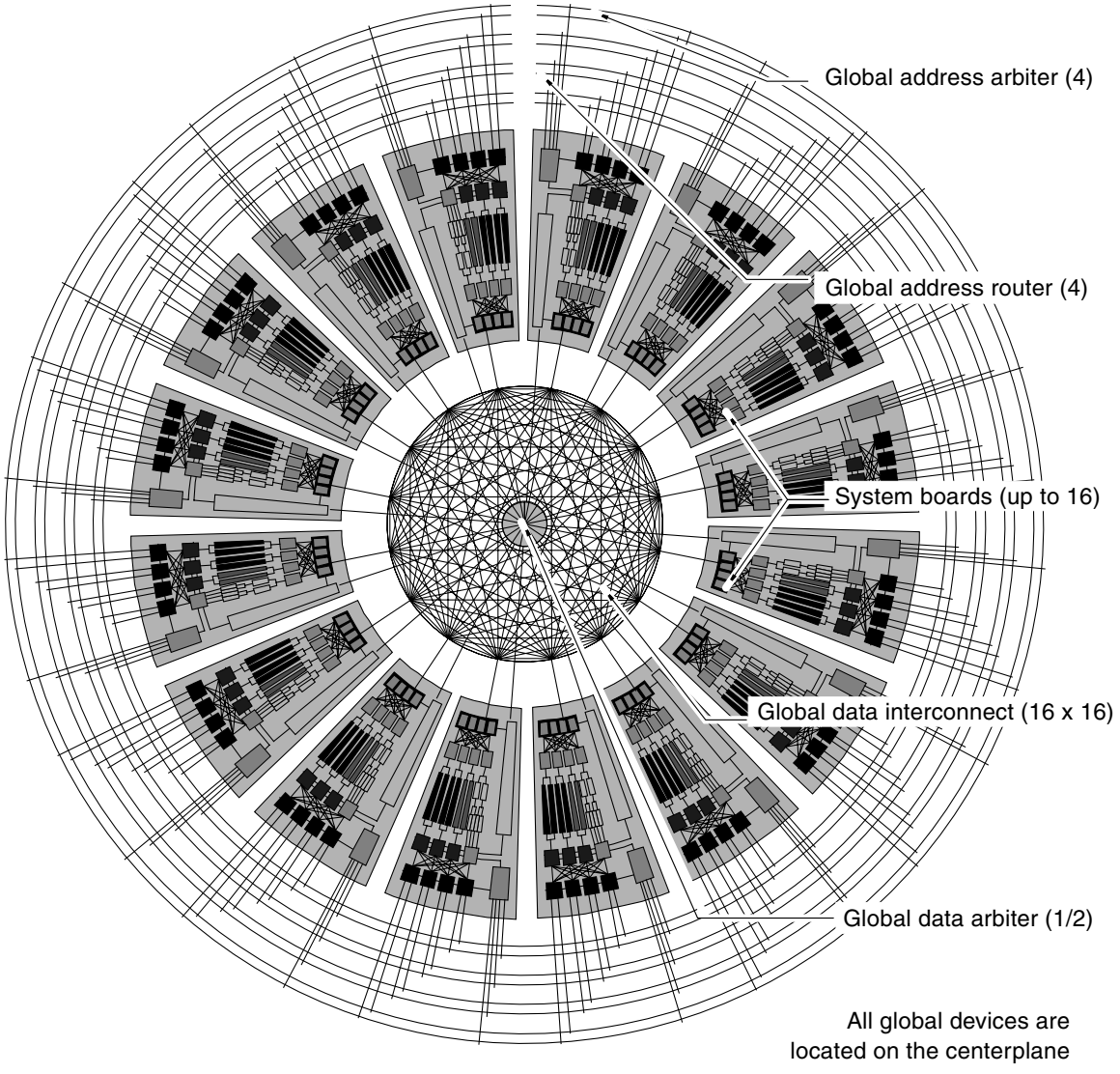


FIGURE 1-12 Sun Enterprise 10000 System Interconnect Diagram

CHAPTER 2

Power and Cooling Component Replacement Procedures

Note – All commands performed through the Hostview GUI (`hostview`(1M)) can also be performed by other SSP user commands such as the `power`(1M) command or the `fan`(1M) command.

2.1 SSP Replacement

Procedures for replacing the SSP are covered in the *Sun Enterprise 10000 Hardware Installation and De-Installation Guide*, part number 805-4651.

2.2 Disk Replacement

Refer to the most recent version of the *Hardware Configuration Guide* for a listing of supported devices. Procedures for replacing supported devices are listed in the service manuals that accompany those devices.

2.3 AC Input Module Replacement

2.3.1 Isolating a Failed AC Input Module

Use the following checklist to assist with fault isolation.

- Verify that the system has sufficient power by typing:

```
ssp# power

Number of Good 48V Power Supplies       : 8
Required Number of 48V Power Supplies   : 8
.
.
.
```

- Check that the breakers are on.
- Check that the LEDs on the AC input module are on.
- Verify that the cables in the back and front of the AC input module are inserted properly.
- Verify that the AC input module is firmly seated.
- Check for error messages in `/var/opt/SUNWssp/adm/domainname/messages`.

If all else is all right, but the LEDs are not on, this is a failed item.

2.3.2 Powering Off an AC Input Module

1. **Verify that the system has sufficient power, even with two power supplies powered off, by using `hostview`(1M) or by typing:**

```
ssp# power
```

2. **Using** TABLE 2-1**, determine if additional system boards must be powered off prior to powering off two 48-volt power supplies.**

   Use TABLE 2-1 to confirm that the amount of available power is sufficient for the number of system boards installed. If additional system boards must be powered off, see Section 3.2.2, "Powering Off a System Board" on page 3-9.

TABLE 2-1 Power Redundancy

Number of System Boards	Required Power Supplies for N+2 Power Supply or N+1 AC Input Unit Redundancy	Required 200V, 30A single-phase circuits
1—2	4	2
3—5	5	3
6—8	6	3
9—12	7	4
13—16	8[1]	4

1. If two supplies are failing, no AC module may be removed unless the two failed supplies are under the same AC module control.

3. **Power off both power supplies controlled by the AC input module to be changed by using** `hostview`**(1M) or by typing:**

```
ssp# power -off -ps x
ssp# power -off -ps y
```

Where *x* and *y* are the pairs of power supplies 0/1, 2/3, 4/5, and 6/7 that are controlled by an AC input module (TABLE 2-2).

TABLE 2-2 AC Input Module Control of Power Supplies

AC Input Module	Top 48-Volt Power Supply	Bottom 48-Volt Power Supply
AC0 controls:	PS0	PS1
AC1 controls:	PS2	PS3
AC2 controls:	PS4	PS5
AC3 controls:	PS6	PS7

Refer to `power`(1M) for additional information.

2.3.3 Removing an AC Input Module

Caution – If the yellow LEDs are lit, do not remove the component. See Section 2.3.2, "Powering Off an AC Input Module" on page 2-2.

1. **Open the access door.**
2. **Open the door to the power shelf.**
3. **Disconnect the power cord from the AC input module and the wall receptacle.**
4. **Loosen the captive one-half-turn screw latch until it releases.**
5. **Pull out the AC input module and place on a flat, sturdy, ESD-protected surface.**

2.3.4 Installing an AC Input Module

1. **Insert the AC input module into the power shelf.**
2. **Tighten the captive one-half-turn screw latch.**
3. **Connect the power cord to the AC input module and the AC wall receptacle.**

2.3.5 Powering On an AC Input Module

1. **Power on the two breakers located on the AC input module.**
2. **Close the door to the power shelf.**
3. **Close the access door.**

2.3.6 Verifying an AC Input Module

Use the following checklist to confirm that a component is operational.

- Confirm that the fans on the adjacent power supplies are on.
- Use `hostview` or the `power` command to check the power status.
- Verify that the power supply on status was detected by `/var/opt/SUNWssp/adm/`*domain-name*`/messages`.

2.4 48-Volt Power Supply Replacement

2.4.1 Isolating a Failed Power Supply

Use the following checklist to assist with fault isolation.

- Check that the power supply fans are on.
- Confirm that the power supply is properly seated.
- Check the power status on `hostview`.
- Check for error messages in `/var/opt/SUNWssp/adm/`*domain-name*`/messages`.

2.4.2 Powering Off a 48-Volt Power Supply

- **Power off the 48-volt power supply by using `hostview`(1M) or by typing:**

```
ssp# power -off -ps x
```

Where *x* = 0–7. Refer to `power`(1M) for additional information.

2.4.3 Removing a 48-Volt Power Supply

Caution – If the yellow LEDs are lit on the power supply, do not remove the component. See Section 2.4.2, "Powering Off a 48-Volt Power Supply" on page 2-5.

1. **Open the access door.**
2. **Open the door to the power shelf.**
3. **Pull out the 48-volt power supply and place on a flat, sturdy, ESD-protected surface.**

2.4.4 Installing a 48-Volt Power Supply

1. **Insert the 48-volt power supply into the power shelf.**

2. **Push firmly to engage the rear connectors.**

2.4.5 Powering On a 48-Volt Power Supply

1. **Locate the AC input module for the power supply that is off (see** TABLE 2-2**).**
2. **On the AC input module, power both breakers on.**
3. **Close the door to the power shelf.**
4. **Close the access door.**

2.4.6 Verifying a Power Supply

Use the following checklist to confirm that a component is operational.

- Check that the power supply fans are on.
- Check the power status using `hostview` or the `power` command.
- Check for error messages in `/var/opt/SUNWssp/adm/`*domain-name*`/messages`.

2.5 Power Shelf Replacement

2.5.1 Removing a Power Shelf

Caution – The power shelves are NOT considered hot-swappable. This procedure requires powering off the AC power to the system and disconnecting the AC power cords. Also, the side panel nearest the power shelves must be removed. Therefore, it might be necessary to move the cabinet to provide work space in this area.

Since the system must be powered off, the operating system and all of the domains must be systematically brought down and then halted.

1. **Power off the system by typing:**

```
ssp# power -off -all
```

2. **Power off the AC circuit breakers at the AC input modules in the power shelf to be removed.**
3. **Disconnect the AC power cords from the AC input modules and allow them to hang loose.**
4. **Remove the AC input modules and DC power supplies from the power shelf.**
5. **Remove the access door by retracting the hinge pins located at the top and bottom of the front (or rear) access door, enabling it to be removed from the cabinet.**

   Remove the door and set aside.
6. **Remove the three M4 flat-head Phillips screws securing the vertical trim strip to the frame.**

   Pull the trim strip off its brackets and set it aside.
7. **Remove the AC power cords from in front of the side mounting flange for the power shelf.**
8. **Remove the two M4 panhead Phillips screws securing the door catch bracket to the frame.**

   Remove the door catch and set aside.
9. **Remove the two screws attaching the power shelf to the frame.**
10. **Remove the door assembly from the power shelf by opening the door for the power shelf and removing the four M4 panhead Phillips screws securing the door to the frame.**

    Set the door assembly aside and retain the screws and washers.
11. **Remove the side panel on the cabinet.**

    a. **Disengag the magnets securing the side panel to the cabinet.**

    b. **Pull the panel out from the cabinet at the bottom.**

    c. **Lift the side panel up and off its support brackets.**

    Set the side panel aside.
12. **Verify that the cables at the rear of the power shelf are properly identified.**

    See Section 8.2, “Cable Replacement” on page 8-3 for proper connection of cables.
13. **Disconnect the power cables from the rear of the power shelf.**

    The #4-40 panhead Phillips screws and washers securing connectors to the power shelf are not captive to the connectors. Be careful not to lose this hardware.
14. **Disconnect the rear support brackets by removing the two M4 panhead Phillips screws securing the two support brackets to the cabinet at the rear of the power shelf.**

15. **Slide the power shelf out of the cabinet.**
16. **Once free from the cabinet, remove the two rear support brackets from the old power shelf and install the two rear support brackets on the new power shelf.**

2.5.2 Installing a Power Shelf

1. **Slide the power shelf into the cabinet.**
2. **Secure the rear support brackets with the two M4 panhead Phillips screws secure to the cabinet at the rear of the power shelf.**
3. **Connect the power cables to the power shelf. Tighten the thumbscrews or the #4-40 panhead Phillips screws and washers as necessary.**

   If necessary see Section 8.2, "Cable Replacement" on page 8-3 for proper connection of cables.
4. **Secure the power shelf to the cabinet.**
5. **Connect the door assembly to the power shelf using the four M4 panhead Phillips screws.**
6. **Install the vertical trim strip.**
7. **Install the AC input modules and DC power supplies.**
8. **Connect the AC power cords to the AC input modules.**
9. **Route the power cords through the vertical trim strip.**
10. **Using the breakers on the AC input module, power on the AC input modules.**
11. **Power on the system by typing:**

```
ssp# power -on -all
```

12. **Replace the access and side doors.**
13. **Move the cabinet to its original position.**
14. **Run diagnostics to verify the operation of the system.**

2.6 DC Breaker Module Replacement

2.6.1 Isolating a Failed DC Breaker

Use the following checklist to assist with fault isolation.

- Referring to the circuit breaker labels (FIGURE 2-1) determine which component or components remained off, following a power-on command.
  - If a group of four fan trays are off, suspect the associated circuit breaker.
  - If a control board and centerplane support board are off, suspect the associated circuit breaker.
  - If a single system board is off, suspect the associated circuit breaker.

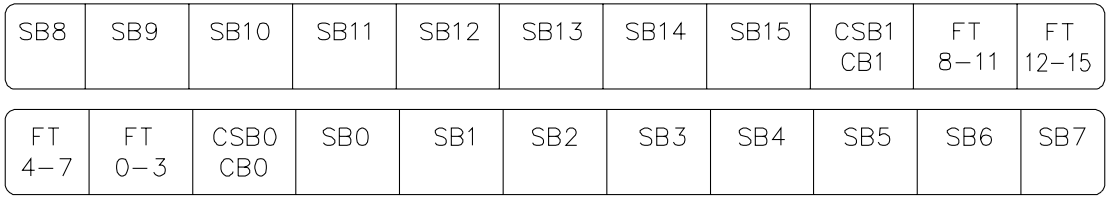


FIGURE 2-1 Circuit Breaker Labels

2.6.2 Removing a Circuit Breaker

1. **Open the access door.**
2. **Remove the two M4 panhead Phillips screws securing the circuit breaker panel to the power shelf.**

   Retain the screws.

Caution – When the system is powered on, there is 48VDC available at the circuit breakers. This does not create an electric shock hazard, however, there is considerable energy in these circuits.
Use caution to prevent any bare circuit breaker terminals or exposed wire terminals from coming in contact with the frame.

3. **Remove the circuit breaker panel by gently working it toward you.**

   Once loose, pull it out with the cable assemblies attached.

4. **Power off the circuit breaker(s) to be removed.**

5. **Remove the two M3 flat-head Phillips screws that attach the circuit breaker to the panel.**

   Retain the screws.

6. **Loosen and remove the circuit breaker from the panel by gently pushing it back and through the panel.**

   Cut and remove the tie-wraps as needed.

7. **Remove the circuit breaker(s).**

   The wire attached to the upper terminal of the circuit breakers is connected to the 48 VDC power bus. This wire should be removed first, followed by the remaining wires.

2.6.3 Installing a Circuit Breaker

1. **Use** TABLE 2-3 **to connect the wires to the breaker in their respective positions.**

TABLE 2-3 Circuit Breaker Wiring

Primary Power Shelf:		Secondary Power Shelf:	
Slot#	**Wire label#[1]**	**Slot#**	**Wire label#**
FT4-7	W1	SB8	W1
FT0-3	W2	SB9	W12
CSB0/CB0	W3	SB10	W3
SB0	W5	SB11	W2
SB1	W4	SB12	W5
SB2	W7	SB13	W4
SB3	W6	SB14	W7
SB4	W9	SB15	W9
SB5	W8	CSB1/CB1	W8
SB6	W11	FT8-11	W6
SB7	W10	FT12-15	W11

1. The source wires are all common, and therefore unlabeled, and can be connected to any circuit breaker.

Caution – Verify breaker alignment prior to insertion to prevent possible damage of the breaker mating slot.

2. **Insert the circuit breaker into the available circuit breaker slot.**
3. **Install the two M3 flat-head Phillips screws to attach the breaker to the panel.**
4. **Torque the M3 flat-head Phillips screws to 0.6 Nm (5 inch pounds).**
5. **Bundle the wires neatly using tie-wraps as needed.**
6. **Insert the cable bundle into the power shelf and push the circuit breaker panel back into place on the power shelf.**
7. **Replace the two M4 panhead Phillips screws to fasten the panel to the power shelf.**
8. **Torque the M4 panhead Phillips screws to 1.0 Nm (9 inch pounds).**
9. **Close the access door.**

2.6.4 Verifying a DC Breaker

Use the following checklist to verify that a DC breaker(s) are operational.

- Check that the component or components powered on.
- Check the power status using `hostview` or the `power` command.
- Check for error messages in `/var/opt/SUNWssp/adm/`*domain-name*`/messages`.

2.7 Universal AC Sequencer Replacement

2.7.1 Isolating a Failed AC Sequencer

Use the following checklist to assist with fault isolation.

- Verify that the LEDs are on.
- Confirm that the components powered by the AC sequencer are on.
- Check cables.
- Check the REMOTE/LOCAL switch.
- For remotely controlled AC sequencers, issue a `power -P` command.

- If the AC sequencer still is not on, switch to LOCAL to determine if it will power on. If it powers on in LOCAL, suspect the configuration, the control board, the cables, or the remote power control module.
- On remotely controlled I/O cabinets, check that the keyswitch is in the OFF position.

2.7.2 Powering Off a Remotely Controlled AC Sequencer

- **Type:**

```
ssp# power -off -p x
```

Where *x* = 0-4. This command powers off the AC sequencers that are controlled by the remote power control module indicated by *x*, and all peripherals powered by this AC sequencer will power off. Refer to `power`(1M) for more information.

2.7.3 Removing an AC Sequencer

Caution – If the switched outlet green lights are lit, do not remove the component. See Section 2.7.2, "Powering Off a Remotely Controlled AC Sequencer" on page 2-12.

1. **Open the access door.**
2. **Note the origination of all power cords connected to the AC sequencer.**
3. **Power off the AC circuit breaker on the AC sequencer.**
4. **Disconnect all cables from the AC sequencer and the remote power control modules.**
5. **Remove the four Phillips screws that secure the AC sequencer.**
6. **Remove and place the unit on a flat, sturdy, ESD-protected surface.**

2.7.4 Installing an AC Sequencer

1. **Place the AC sequencer into the cabinet and align the attachment slots to the holes on the RETMA rails.**

2. **Use the four Phillips screws to secure the AC sequencer to the RETMA rails.**
3. **Connect the power cord to the AC sequencer and to the wall receptacle.**
4. **Connect the cables from the peripherals to the AC sequencer and the remote power control modules.**
5. **Power on the AC circuit breaker on the AC sequencer.**
6. **Close the access door.**

2.7.5 Configuring an AC Sequencer

I/O cabinets can be controlled remotely from the control board using the `power`(1M) command. To do this, the control board must be connected to the AC sequencer. To facilitate multiple control boards, this connection is done with remote power cables and a remote power control module.

The control board has five remote power control connections, RPC0-RPC4. These are connected from both control board 0 (CB0) and control board 1 (CB1) to the remote power control modules located in the processor cabinet I/O space. The output of a remote power control module is then connected to an AC sequencer located either in the processor cabinet I/O space or an I/O expansion cabinet (see FIGURE 2-2).

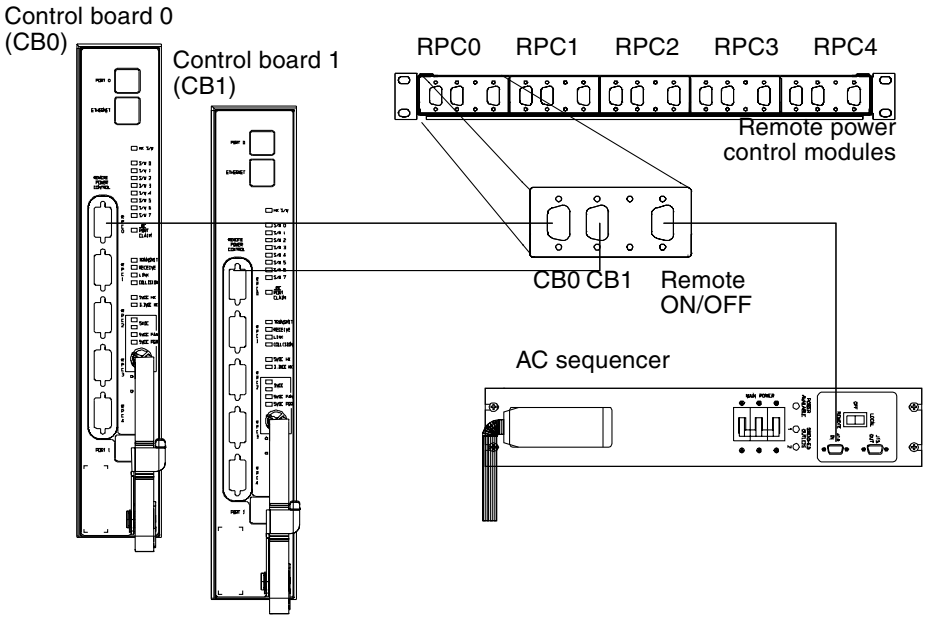


FIGURE 2-2 Remote Power Control

Remote power control modules can be programmed to addresses 0–5. When the control board issues a command and address, each remote power control module programmed for that address will respond.

You can connect a remote power control module address to a single AC power sequencer or to a string of AC power sequencers. When the command `power -p 3 -off` is issued, the remote power control module or modules that are programmed for address 3 will power off (see FIGURE 2-3). Subsequently, all AC power sequencers attached to those remote power control modules and their associated peripherals will also power off.

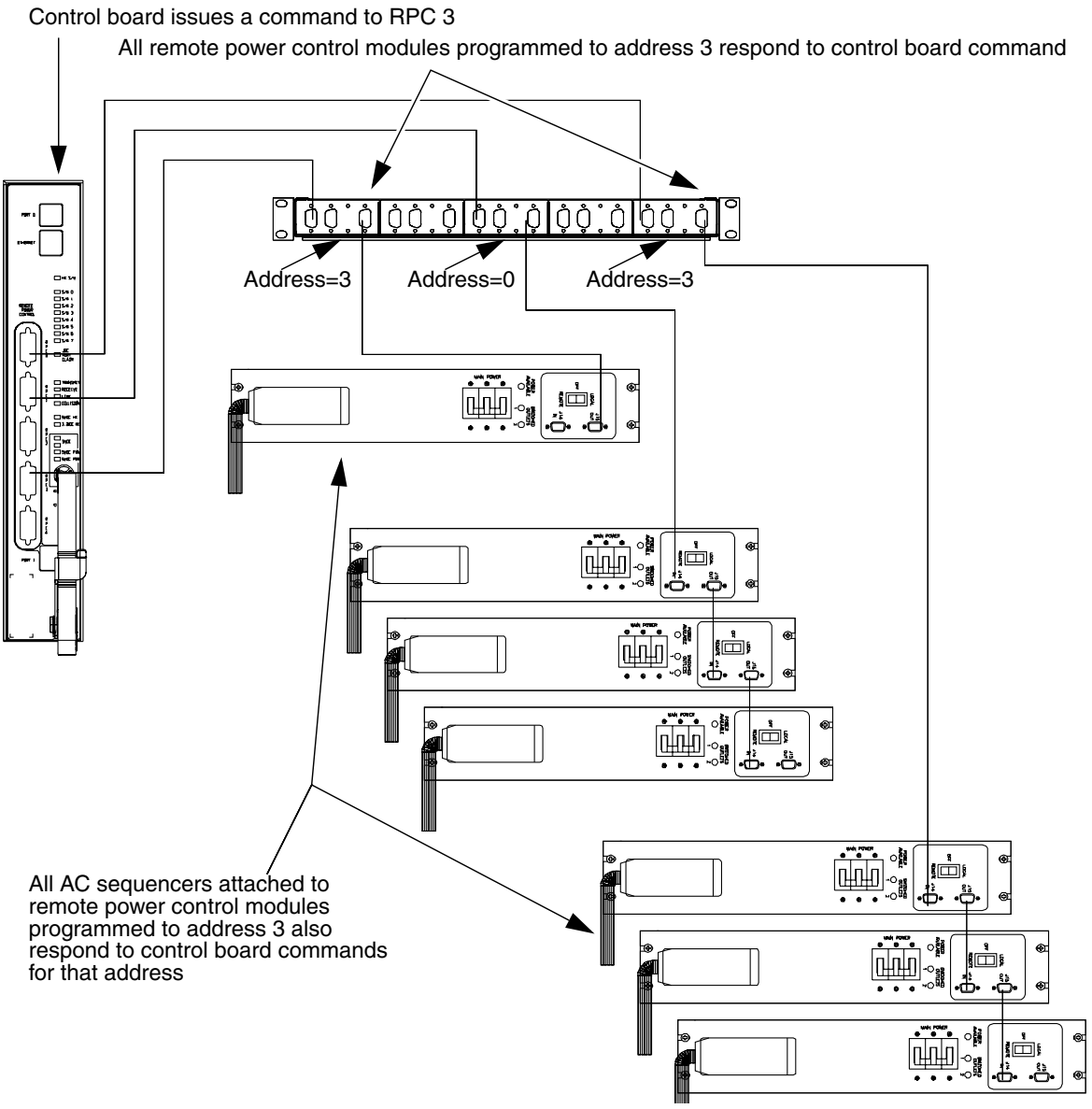


FIGURE 2-3 Remote Power Control Addressing

Note the following rules when configuring the AC sequencers (see FIGURE 2-4):

- To remotely control an AC sequencer in the Sun Enterprise 10000 system cabinet, set the REMOTE switch to the REMOTE position.
- To remotely control AC sequencers in the I/O expansion cabinet that have system interface cables connecting them, set all the REMOTE switches to the REMOTE position and turn the key switch in the front of the I/O expansion cabinet to the OFF position.
- To remotely control AC sequencers in the I/O expansion cabinet that *do not* have system interface cables connecting them, set all REMOTE switches to the REMOTE position, daisy-chain the AC sequencers, and turn the key switch in the front of the I/O expansion cabinet to the OFF position.

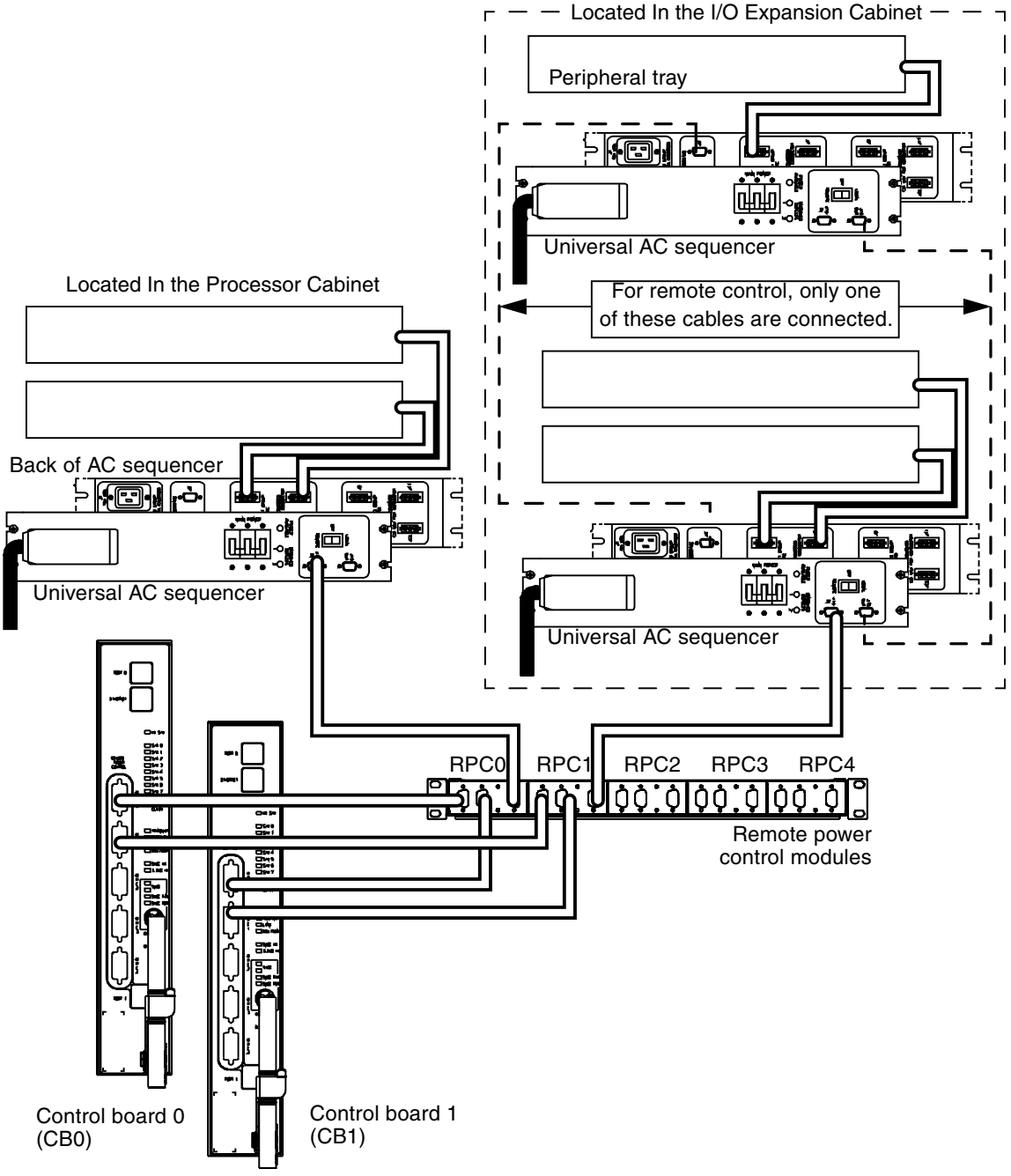


FIGURE 2-4 Basic Remote Power Connection

2.7.6 Powering On a Remotely Controlled AC Sequencer

- **Type:**

```
ssp# power -on -p x
```

Where *x* = 0-4. This command powers on the AC sequencers that are controlled by the remote power control module indicated by *x*. All peripherals powered by this AC sequencer will power on. Refer to `power`(1M) for more information.

2.7.7 Verifying an AC Sequencer

Use the following checklist to confirm that a component is operational.

- Confirm that components powered by sequencer are on.

2.8 Fan Tray Replacement

2.8.1 Isolating a Failed Fan Tray

Use the following checklist to assist with fault isolation.

- Check that the LEDs are on.
- Check the fan status using `hostview` or execute a `hostinfo -F` command.
- Check the `/var/opt/SUNWssp/adm/`*domain-name*`/messages` file for fan error messages.

2.8.2 Powering Off a Single Fan Tray or a Group of Fan Trays

Note – SSP version 3.0 does not properly detect power when an SSP command restores power. Therefore, remove and reinsert the fan with power on.

- **Power off a fan tray by using `hostview`(1M) or by typing:**
  - For a single fan tray, where *x* = 0-15:

```
ssp# fan -t x -p off
```

  - For a group of trays, where x = front (ft8-15), rear (ft0-7):

```
ssp# fan -1 x -p off
```

Refer to `fan`(1M) for more information.

Caution – To maintain adequate system cooling, limit the amount of time a fan is off to less than 10 minutes.

2.8.3 Removing a Fan Tray

Caution – If the yellow LEDs are lit, do not remove the component. See Section 2.8.2, "Powering Off a Single Fan Tray or a Group of Fan Trays" on page 2-18.

1. **Open the access door.**
2. **Grasp the handle and pull the fan tray straight out.**

   Initially, you will encounter higher resistance due to the retention mechanism; this is normal.
3. **Set the fan tray aside.**

2.8.4 Installing a Fan Tray

1. **Place the bottom surface of the fan tray onto the top of the support of the fan shelf angle bracket.**
2. **Slide the fan tray in until initial engagement begins with the mating connector.**
3. **Using firm, steady pressure, fully insert the fan tray into the fan tray slot.**
4. **Close the access door.**

2.8.5 Powering On a Fan Tray or a Group of Fan Trays Using SSP Version 3.0

Note – SSP version 3.0 does not properly detect power when an SSP command restores power. Therefore, remove and reinsert the fan with power on.

- **Power on a fan tray by using** `hostview`**(1M) or by typing:**
  - For a single fan tray, where *x* = 0-15:

```
ssp# fan -t x -p on
```

  - For a group of trays, where x = front (ft8-15), rear (ft0-7):

```
ssp# fan -l x -p on
```

In future releases of the software, power will be reinstated to a fan tray upon insertion. Refer to `fan`(1M) for more information.

2.8.6 Powering On the Fan Trays Using SSP Version 3.1 or Subsequent Compatible Version

- **Power on all of the fan trays by using** `hostview`**(1M) or by typing:**

```
ssp# fan -p on
```

Power will be reinstated to a fan tray upon insertion. Refer to `fan`(1M) for more information.

2.8.7 Verifying a Fan Tray

Use the following checklist to confirm that a component is operational.

- Check that the LEDs are on.
- Check the fan status using `hostview` or execute a `hostinfo -F` command.

2.9 Replacing an Air Filter

The Sun Enterprise 10000 system has four front and four rear air filters which provide approximately 150 CFMs per system board. These air filters require periodic replacing. To prevent restricted air flow and possible equipment failure, perform this procedure when the filters contain trapped particles, or every three months.

Note – Do not try to clean the air filters. They deteriorate over time and are easily damaged. Replace dirty air filters with new ones.

Note – The air filters can be changed without powering off the Sun Enterprise 10000 system. However, the integrity of the I/O cable connections is put at risk when the I/O cables are moved to change the air filters. This must be considered if the Sun Enterprise 10000 system is not powered off to change the air filters.

---

1. **Open the front and rear cabinet doors to get access to the filters shown in** FIGURE 2-5**.**

2. **Look at the underside of the filters with an inspection mirror and flashlight to determine if they are dirty.**

   Look at the surrounding area for evidence of excessive amounts of dirt and dust. Large amounts of dirt and dust might indicate that the filters are loading up quickly and require more frequent inspections and changes.

Caution – Large amounts of dirt and dust might indicate that the Sun Enterprise 10000 system must be powered off to change the filters. Dust and dirt can be drawn into the Sun Enterprise 10000 system cabinet when the filters are removed and the cooling fans are running.

---

3. **Remove the faceplate by removing four screws.**

4. **With one hand, reach under the cabinet and slide the filter toward you.**

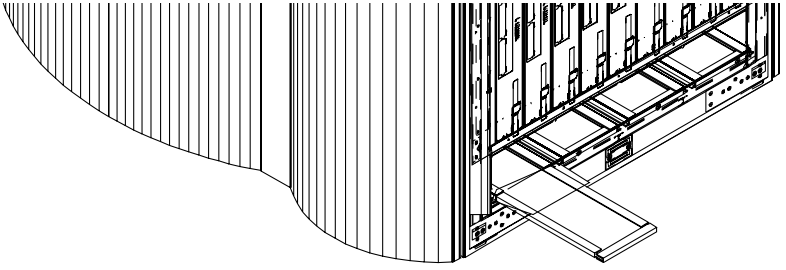


FIGURE 2-5 Air Filter Replacement

5. **Remove the filter and discard.**
6. **Insert a clean air filter into the air filter slot, pushing toward the center of the cabinet until it stops.**
7. **Reinstall the faceplate with the four screws.**
8. **Close the access door.**

CHAPTER 3

Control and System Board Replacement Procedures

Note – All commands performed through the Hostview GUI (`hostview`(1M)) can also be performed by other SSP user commands such as the `power`(1M) command or the `fan`(1M) command.

3.1 Control Board Replacement

3.1.1 Isolating a Failed Control Board

Use the following checklist to assist with fault isolation.

- Check for any error messages during `post`.
- On the SSP, check for any error messages in `/var/opt/SUNWssp/adm/messages`.
- On the SSP, if available, use `redx` to examine any arbstop dump files or record stop dump files located in `/var/opt/SUNWssp/adm/`*domain-name*.
- On specific domains, if system call dump files are available, use `ADB` to examine `/var/crash/`*domain-name*.

3.1.2 Setting Up the Network for a Replacement Control Board

Modify the host SSP network files with the Ethernet address of the replacement control board. To verify that the host SSP network files are correctly set up, view the `/etc/ethers`, `/etc/hosts`, and `/etc/nsswitch.conf` files for the appropriate entries.

- `/etc/hosts` requires IP address and hostname of control boards.
- `/etc/ethers` requires MAC address of control boards.
- `/etc/nsswitch.conf` must point to files for all entries.

1. **Log in to the SSP as** `root`**.**

2. **Manually edit the `/etc/hosts` file with the domain(s) and control board(s) IP address if this information is not already in an NIS database.**

   This procedure is dependent on whether local files or NIS are used. The control board(s) IP address is customer-supplied. Correct entries should look similar to the following `/etc/hosts` sample. Differences due to the spare SSP are commented.

Note – SSP software only supports standard class C addresses for the control board subnet.

CODE EXAMPLE 3-1 Sample `/etc/hosts` File

```
# Entries for dom_subnet.
xxx.xxx.xx.xxx  domain1_hostname
xxx.xxx.xx.xxx  domain2_hostname
...
xxx.xxx.xx.xxx  domainn_hostnname
(n is the number of domains)
#
# Entries on both ssp's.
# NOTE : On the spare SSP,make sure "loghost"
# belongs to the spare.
#
xxx.xxx.xx.xxx  main_ssp_hostname loghost
xxx.xxx.xx.xxx  spare_ssp_hostname
#
# The next three entries need to be on cb0_subnet.
#
xxx.xxx.xx.xxx  main_ssp_hostname-le0
xxx.xxx.xx.xxx  spare_ssp_hostname-le0
xxx.xxx.xx.xxx  cb0_hostname
#
# The next three entries need to be on cb1_subnet.
#
xxx.xxx.xx.xxx  main_ssp_hostname-hme1
xxx.xxx.xx.xxx  spare_ssp_hostname-hme1
xxx.xxx.xx.xxx  cb1_hostname
```

CODE EXAMPLE 3-2 shows an example of a main SSP `/etc/hosts` file is given assuming:

- `xf4` and `xf4-b3` are host domains.
- `xf4-ssp` is the main SSP and `xf4-ssp1` is the spare SSP.
- `xf4-cb0` and `xf4-cb1` are the hostnames for the two control boards.

CODE EXAMPLE 3-2 Sample Main SSP `/etc/hosts` File

```
#/etc/hosts
#
#dom_subnet (xxx.yyy.49.zzz). The 49 subnet
#
129.153.49.8    xf4
129.153.49.9    xf4-b3
127.0.0.1       localhost
129.153.49.113  xf4-ssp loghost
129.153.49.114  xf4-ssp1
#
#cb0_subnet (xxx.yyy.151.zzz). The 151 subnet
#
129.153.151.113 xf4-ssp-le0
129.153.151.114 xf4-ssp1-le0
129.153.151.123 xf4-cb0
#
#cb0_subnet (xxx.yyy.152.zzz). The 152 subnet
#
129.153.152.113 xf4-ssp-hme1
129.153.152.114 xf4-ssp1-hme1
129.153.152.127 xf4-cb1
```

Note – The `/etc/hosts` file is actually a link to `./inet/hosts`.

---

3. **Manually edit the `/etc/ethers` file with the domain(s), control board(s), and SSP(s) Ethernet address if this information is not already in the NIS database. Correct entries should look similar to the following `/etc/ethers` sample:**

```
8:0:20:87:58:a5         xf4-ssp
0:0:be:01:00:1e         xf4-cb0
0:0:be:01:00:57         xf4-cb1
0:0:be:a6:50:2f         xf4-b3
8:0:20:87:58:aa         xf4-ssp1
```

Note – The control board(s) Ethernet address is located on the front of each control board.

---

4. **Edit the /`etc/nsswitch.conf` file on both the main and the spare SSP.**

   - If using local configuration files, the files should appear as in the following example:

```
hosts:      files
ethers:     files
netmasks:   files
bootparams: files
```

   - If using NIS, the files should appear as in the following example:

```
hosts:      nis [NOTFOUND=return] files
ethers:     nis [NOTFOUND=return] files
netmasks:   nis [NOTFOUND=return] files
bootparams: nis files
```

Note – The name information server (`nis`) is customer-network configuration dependent.

3.1.3 Powering Off a Control Board

1. **Use `hostview`(1M) to confirm that the control board is not the clock or JTAG master.**

   If the control board to be changed has a "J" and a "C" in its `hostview` icon, you must switch the primary control board to the alternate control board. See either Section 9.2 "Configuring a Control Board Using SSP Version 3.0" on page 9-3 or Section 9.3 "Configuring a Control Board Using SSP Version 3.1 and Subsequent Compatible Versions" on page 9-6.

2. **Power off the control board either by using `hostview`(1M) or by typing:**

```
ssp% power -off -cb x
```

Where *x* = 0-1, the alternate control board. Refer to `power`(1M) for more information.

Caution – Do not turn off a primary control board or system problems will occur.

Note – A warning message queries the user to continue to power off or not. This warning message ensures that the user is physically present to power "on" or "off" the control board. A remote power-on command does not exist.

3.1.4 Removing a Control Board

Caution – If the yellow LEDs are lit, do not remove the component. See Section 3.1.3, "Powering Off a Control Board" on page 3-5.

1. **Open the Sun Enterprise 10000 system cabinet access door that is enclosing the control board to be replaced.**

Note – The control board to be removed will have its yellow LEDs off. If the yellow power LEDs are on, do not remove the board. Check the other control board to see if its yellow LEDs are off. If they are off, then that is the control board that has been powered off for replacement.

2. **Note the location of all cables connected to the control board to be replaced.**
3. **Attach a wrist strap.**
4. **Disconnect the cables from the control board.**
5. **Unlock the control board handle by placing one hand on the handle to hold it in place while using the other hand to pull down on the locking lever that rests on the handle.**
6. **Pull down on the handle carefully and remove the board.**
7. **Place the removed control board on a flat, sturdy, ESD-protected surface.**

3.1.5 Installing a Control Board

1. **Confirm that the event monitoring daemon is running by typing:**

```
ssp% edd_cmd
```

The returned message should show `State = started-monitoring`. If not, you must restart the event monitoring daemon by typing:

```
ssp% edd_cmd -x start
```

Refer to `edd`(1M) and `edd_cmd`(1M) for additional information.

2. **Reinstall the control board:**

Caution – Do not install the control board completely until Step a—Step g have been performed and all cables are attached.

   a. **Firmly grasp the board by the handle and position it into the appropriate control board slot.**

   b. **Insert the control board part way to ensure it will not fall.**

   c. **Reconnect all cables that were removed in Step 2 of Section 3.1.4, "Removing a Control Board" on page 3-6.**

   d. **With the handle extended, slide the board into the slot until it begins to mate with the centerplane connector.**

   e. **Apply firm pressure to the faceplate to engage the board with the centerplane connector.**

   f. **Use the insertion handle to fully seat the board.**

   g. **Lock the handle by pulling up the locking lever into position until it is fully nested with the handle.**

3.1.6 Powering On a Control Board

Control boards are powered on upon insertion. When power is on, the yellow LEDs are lit. No power-on commands are necessary for the control board.

3.1.7 Configuring a Newly Installed Control Board as the Primary Control Board

Once a failed primary control board has been designated as an alternate and replaced, it is the system administrator's option to reinstate it as the primary control board. To reinstate the original primary control board, see Section 9.2 "Configuring a Control Board Using SSP Version 3.0" on page 9-3 or Section 9.3 "Configuring a Control Board Using SSP Version 3.1 and Subsequent Compatible Versions" on page 9-6.

3.1.8 Verifying a Control Board

All domains must be off before testing a control board.

1. **Log in to the SSP as** `ssp`**.**

   When prompted for the `SUNW_HOSTNAME`, use the name of the domain to be tested.

2. **Prepare the domains for testing by typing:**

```
ssp% power -off -all
ssp% power -on -all
```

3. **From the same SSP window, run POST by typing:**

```
ssp% bringup -A off -l64
```

   Answer **`y`** when prompted to configure the centerplane. The bringup process can take up to 90–180 minutes depending on system configuration. Refer to the `bringup`(1M) or `hpost`(1M) man page for more detail.

3.2 System Board Replacement

3.2.1 Isolating a Failed System Board or Mezzanine Board

Use the following checklist to assist with fault isolation.

- Check for any error messages during `post`.
- On the SSP, check for any error messages in `/var/opt/SUNWssp/adm/messages`.
- On the SSP, if available, use `redx` to examine any arbstop dump files or record stop dump files located in `/var/opt/SUNWssp/adm/domain_name`.
- On specific domains, if system call dump files are available, use `ADB` to examine `/var/crash/domain_name`.

3.2.2 Powering Off a System Board

1. **Use `hostview`(1M) to verify that the system board is not part of a running domain.**

Caution – Do not turn off power to a system board with the system board circuit breaker. It is possible to arbstop the entire platform when the board is powered on again.

2. **Power off a system board by using `hostview`(1M) or by typing:**

```
ssp# power -off -sb x
```

Where *x* = 0-15. Refer to `power`(1M) for more information.

3.2.3 Removing a System Board

1. **Open the access door.**

Caution – If the yellow LEDs are lit, do not remove the component. See Section 3.2.2, "Powering Off a System Board" on page 3-9.

2. **Disconnect all cables from the system board.**
3. **Attach a wrist strap and unlock the handles by lifting the locking levers that reside on each of the handles.**
4. **Use the handles to extract the system board and place it on a flat, sturdy, ESD-protected surface with the components side up.**

3.2.4 Installing a System Board

These procedures are designed to prevent the weight of the system boards from resting on the plastic power connectors. Follow these procedures carefully so that the plastic power connectors are not loosened or damaged.

Caution – Do not attempt to connect a system board to a centerplane that has a damaged plastic power connector. A bad connection can result in fire.

1. **Confirm that the event monitoring daemon is running by typing:**

```
ssp% edd_cmd
```

The returned message should show `State = started-monitoring`. If not, you must restart the event monitoring daemon by typing:

```
ssp% edd_cmd -x start
```

Refer to `edd`(1M) and `edd_cmd`(1M) for additional information.

2. **Attach a wrist strap and install a system board by firmly grasping the board by the handles and positioning it onto the card cage rail.**
3. **Slide the system board in carefully until the guide pins at the centerplane connector begin to engage the system board.**

4. **Gently press on the bottom of the system board face just below the I/O panel so that the rear of the system board is tilted upwards.**

   This action prevents or minimizes force on the power module housings.

Caution – If you feel any abnormal resistance during installation, remove the system board and examine the connector for damage. A bad connection can result in fire.

5. **While keeping the rear of the system board tilted upwards, press firmly on the face of the system board to seat it as far as possible without using the insertion handles.**

   The system board should now be approximately a quarter inch from the fully seated position.

6. **Fully seat the system board using the insertion handles and latch them.**

   If you feel any abnormal resistance, remove the system board and examine the connector carefully for damage.

7. **Lock the insertion handles by sliding the locking levers into position until they are fully nested with the handles.**

3.2.5 Powering On a System Board

1. **Determine the amount of system power available by typing** `power`**.**

   See TABLE 3-1 to confirm that the amount of available power is sufficient for the number of system boards to be installed.

TABLE 3-1 Power Redundancy

Number of System Boards	Required Power Supplies for N+ 2 Power Supply or N+1 AC Input Unit Redundancy	Required 200V, 30 A single phase circuits
1–2	4	2
3–5	5	3
7–8	6	3
9–12	7	4
13–16	8[1]	4

1. If two supplies are failing, no AC module may be removed unless the two failed supplies are under the same AC module control.

2. **Power on a system board by using** `hostview`**(1M) or by typing:**

```
ssp# power -on -sb x
```

Where *x* = 0-15. Refer to `power`(1M) for more information.

3. **If using SSP version 3.0, restore the system board's thermal calibration data.**

See Section 9.1 "Restoring the Thermal Calibration Information Using SSP Version 3.0" on page 9-1.

3.2.6 Configuring a System Board

After a system board is powered on:

- It is necessary to run `autoconfig`(1M) on the SSP when a system board is installed for the first time in a previously unused slot.
- It is necessary to run `autoconfig`(1M) on the SSP when a replacement system board with a different part number is installed.

3.2.7 Verifying a System Board or Mezzanine Board

1. **Log in to the SSP as** `ssp`**.**

When prompted for the `SUNW_HOSTNAME`, use the name of the domain to be tested.

2. **From the same SSP window, run POST by typing:**

```
ssp% bringup -A off -l64
```

Answer **`y`** when prompted to configure the centerplane. The bringup process can take up to 90–180 minutes depending on system configuration. Refer to the `bringup`(1M) or `hpost`(1M) man page for more detail.

3.3 System Board Component Replacement

Mezzanine board or personality plate replacement requires the system board to be removed and then re-installed. See Section 3.2.3, “Removing a System Board” on page 3-10 and Section 3.2.4, “Installing a System Board” on page 3-10 for assistance.

For *unpopulated* system boards, install multiple mezzanine modules in the following sequence and see TABLE 3-2 for instructions to run `autoconfig`(1M):

1. I/O modules

   See Section 4.1.4, “Installing an SBus I/O Module” on page 4-5 or Section 4.2.5, “Installing a PCI I/O Module” on page 4-13.

2. Memory module

   See Section 5.3.2, “Installing a Memory Module” on page 5-6.

3. Processor module

   See Section 5.4.2, “Installing a Processor Module” on page 5-8.

4. SBus cards or PCI Cards

   See Section 4.1.2, “Installing an SBus Card” on page 4-2 or Section 4.2.7, “Installing a PCI Riser Card” on page 4-16 and Section 4.2.3, “Installing a PCI Card” on page 4-10.

5. DIMMs

   See Section 5.2.1, “Configuring Memory on a System Board” on page 5-3, and Section 5.3.2, “Installing a Memory Module” on page 5-6.

TABLE 3-2 When to Run `autoconfig`(1M)

Sun Enterprise 10000 system Component	Run autoconfig
I/O modules	Yes*
Memory module	Yes*
Processor module	Yes*
SBus cards or PCI cards	No
DIMMs	No

*It is necessary to run `autoconfig`(1M) only when a replacement module has a different Sun part number.

CHAPTER 4

System Board I/O Component Replacement Procedures

Note – All commands performed through the Hostview GUI (`hostview`(1M)) can also be performed by other SSP user commands such as the `power`(1M) command or the `fan`(1M) command.

4.1 SBus Component Replacement

4.1.1 Removing an SBus Card

1. **Attach a wrist strap.**
2. **See Section 3.2.3, "Removing a System Board" on page 3-10.**

   After removal, place the system board on a flat, sturdy, ESD-protected surface with the FRU side up.
3. **Remove the four Phillips screws from the system board cover and remove the cover.**
4. **Disengage the SBus card by pulling up on the handle.**

Caution – The connector housing can break if the SBus card is tilted too far.

5. **Lift the SBus card from the socket at an angle while guiding the faceplate out from the back panel opening (**FIGURE 4-1**).**

6. **Place the SBus card in an antistatic bag.**

7. **If the SBus card is not immediately replaced, install a filler panel (part number 340-2305) in the system board faceplate opening.**

Caution – Be sure to install the filler panel in each vacant slot opening. A missing filler panel can impair system cooling and FCC regulatory compliance.

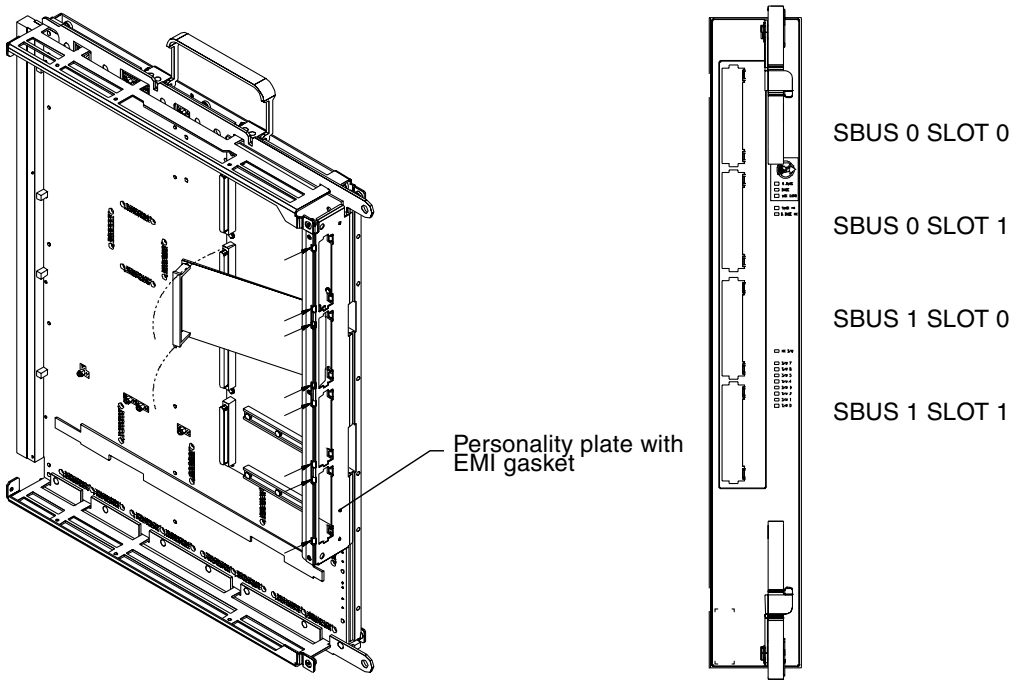


FIGURE 4-1 Replacing System Board SBus Card

4.1.2 Installing an SBus Card

If converting from PCI to SBus, the personality plate must be removed and replaced prior to installing any SBus electrical components.

Note – SBus cards require that the black handles be installed on the cards in order to be installed into the Sun Enterprise 10000 system.

1. **Determine the slot for installing the SBus card.**

   For maximum I/O performance, avoid populating SBus 0 Slot 0 and SBus 0 Slot 1 together and SBus 1 Slot 0 and SBus 1 Slot 1 together.

2. **If a filler panel covers the desired SBus slot, lift the two tabs and detach the filler panel.**

3. **Attach a wrist strap and take the SBus card out of the protective packaging. Inspect the pins in the connector to make sure they are not bent.**

4. **Guide the SBus card faceplate under the springfingers and against the rear face of the personality plate.**

   The I/O connectors of the SBus card should be accessible through the opening in the personality plate.

5. **To align the connector and socket, push the card toward the personality plate against the compliant EMI gasket.**

6. **Hold the SBus card by the edges near the connector and firmly but gently press the card down until the connector is fully seated.**

Caution – Do not rock the card onto the socket; the plastic connector housing can break.

7. **Replace the system board cover and secure with four Phillips screws, tightening to a torque of 0.8 Nm (7.1 inch pounds).**

8. **See Section 3.2.4, "Installing a System Board" on page 3-10 to confirm that the event monitoring daemon is running prior to installing the system board.**

9. **Check for blacklisted components.**

   If SBus cards have been newly added to a system board, confirm that the PCs on those system boards are not blacklisted. PCs are blacklisted at the factory when a system board does not have any SBus cards installed.

   During the bringup process, observe the list of blacklisted components. Alternatively, to retrieve the blacklist file, refer to the `blacklist`(1M) man page.

   Blacklisted PCs will need to be unblacklisted prior to creating a domain that would include those PCs.

   In the following example, a domain will be created using system boards 14 and 15 and the blacklist file is located at `$SSPVAR/etc/starfire1`. Each board in this domain will have an SBus SOC (disk) and HME (network) controller.

a. See if the PCs have been blacklisted by typing:

```
ssp% more $SSPVAR/etc/starfire1/blacklist
pc 2.2 3.2 5.2 6.2 7.2 10.2 11.2 12.2 13.2 14.2 15.2
```

b. Unblacklist the PCs on system boards 14 and 15 by editing the `$SSPVAR/etc/`*starfire1*`/blacklist` **file and remove** `14.2` **and** `15.2` **from the** `pc` **line.**

4.1.3 Removing an SBus I/O Module

1. **See Section 3.2.3, "Removing a System Board" on page 3-10.**

   After removal, place the system board on a flat, sturdy, ESD-protected surface with the FRU side up.

2. **Remove the four Phillips screws from the system board cover and remove the cover.**

3. **Note the locations of each SBus card and remove all SBus cards as described in Section 4.1.1, "Removing an SBus Card" on page 4-1.**

4. **Loosen and remove the five Phillips screws from the I/O module.**

5. **Unscrew the six 3/32-inch hex-head screws located on the compression connectors.**

6. **Remove the SBus I/O module (**FIGURE 4-2**).**

   After removal, place the SBus I/O module on a flat, ESD-protected surface or into an antistatic bag.

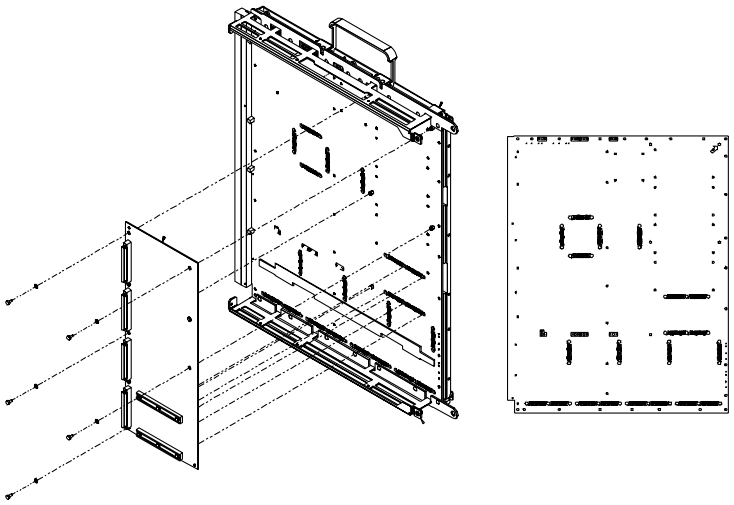


FIGURE 4-2 Replacing the SBus I/O Module

4.1.4 Installing an SBus I/O Module

If converting from PCI to SBus, the personality plate must be removed and replaced prior to installing any SBus electrical components. See Section 4.3, "Personality Plate Replacement" on page 4-17.

1. **Attach a wrist strap.**
2. **Prior to installing the module, wipe the gold pads of the system board and the exposed contacts of the compression connector with a lint-free, nonabrasive cloth or alcohol wipe.**
3. **Align the SBus I/O module compression connectors to the system board compression connector locations.**
4. **Tighten the six captive connector screws clockwise with a 3/32-inch hex driver.**
   a. **Tighten the captive connector screws in the sequence shown in** FIGURE 4-3 **until they touch the metal plate.**
   b. **Tighten each captive connector screw in the sequence shown in** FIGURE 4-3 **an additional 1/2 turn.**
   c. **Tighten the captive connector screws to a final torque of 0.68 Nm (6.0 inch pounds) in the pattern shown in** FIGURE 4-3**.**

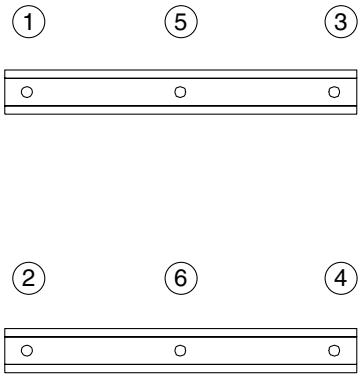


FIGURE 4-3 Tightening Pattern for the SBus I/O Module

5. **Install discrete attachment hardware through the board and into the threaded standoff of the system board.**

   Later versions of the system board include discrete hardware with a captive washer. If a separate washer is used, see FIGURE 4-4 for proper orientation of cone washer.

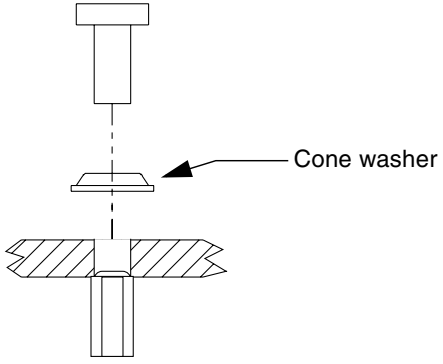


FIGURE 4-4 Cone Washer and Standoff

6. **Tighten discrete attachment hardware to a torque setting of 0.7–0.8 Nm (6.0–7.0 inch pounds).**
7. **Install SBus cards, if necessary. See Section 4.1.2, "Installing an SBus Card" on page 4-2.**
8. **Replace the system board cover and secure with Phillips screws tightening to a torque of 0.8 Nm (7.1 inch pounds).**

9. **See Section 3.2.4, "Installing a System Board" on page 3-10 to confirm that the event monitoring daemon is running prior to installing the system board.**

10. **Run** `autoconfig`(1M) **if you:**
    - Replace an SBus I/O module with an SBus I/O module that has a different Sun part number.
    - Replace a PCI I/O module with an SBus I/O module.
    - Install an SBus I/O module in a previously unused slot.

4.2 PCI Component Replacement

Before you can install PCI components onto a system board, that board must belong to a domain that has Solaris 2.6 operating environment or subsequent compatible versions installed. The SSP must be running version 3.1 or subsequent compatible versions. For information about installing Solaris operating environment, refer to documentation that shipped with the Solaris CD, which contains procedures for installing Solaris 2.6 operating environment on a new domain or upgrading a domain to Solaris 2.6 operating environment.

The board on which you wish to install the PCI components must also be physically removed from the system. If the system is up, and the domain to which the board belongs is running, you must remove the board logically before you do so physically. The *Dynamic Reconfiguration User's Guide* tells how to do so with the DR Detach feature.

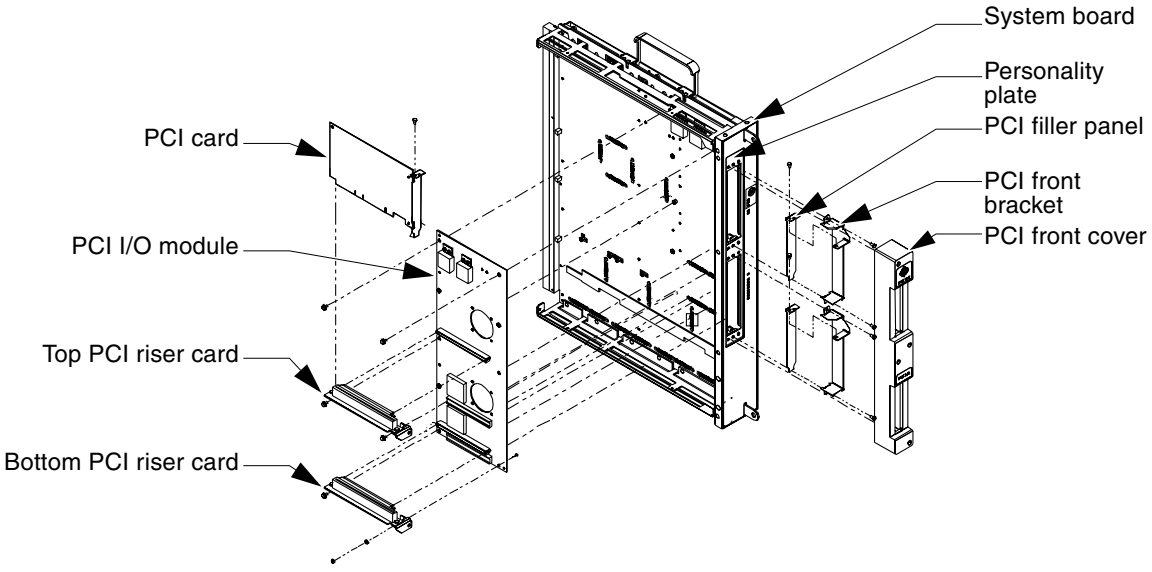


FIGURE 4-5 PCI Components

4.2.1 Accessing PCI Components

1. **Attach a wrist strap.**
2. **See Section 3.2.3, "Removing a System Board" on page 3-10.**

   After removal, place the system board on a flat, sturdy, ESD-protected surface with the FRU side up.
3. **Remove the four Phillips screws from the system board cover and remove the cover.**
4. **Loosen the four captive screws on the PCI front cover and remove from the system board front cover (**FIGURE 4-6**).**

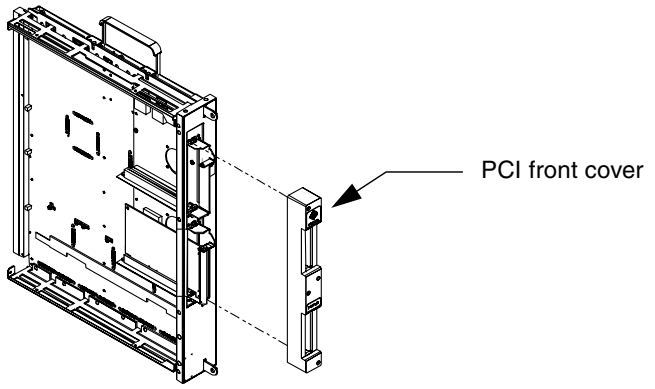


FIGURE 4-6 PCI Front Cover Removal

4.2.2 Removing a PCI Card

1. **Attach a wrist strap.**
2. **Remove the PCI retention screw from the top flange of the PCI card.**
3. **Disengage the card from the riser card and remove it from the system board assembly (**FIGURE 4-7**).**

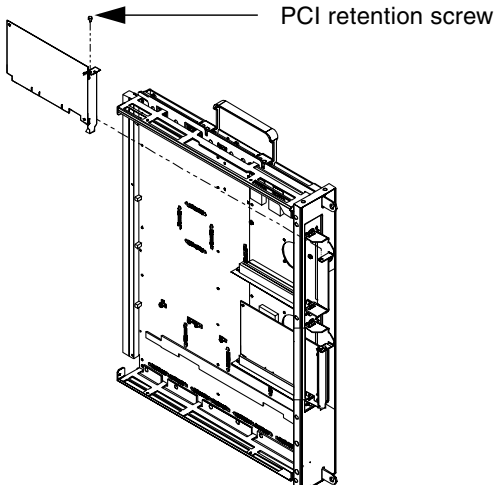


FIGURE 4-7 PCI Card Removal

4. **Place the PCI card in an antistatic bag.**

5. **If the PCI card is not immediately replaced, install a filler panel (part number 240-2391-01) onto the PCI front bracket using the PCI retention screw (**FIGURE 4-8**).**

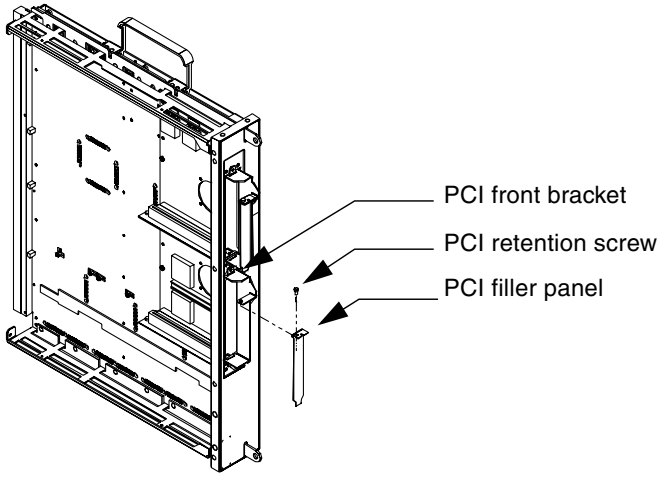


FIGURE 4-8 Installing a PCI Filler Panel

4.2.3 Installing a PCI Card

If converting from SBus to PCI, the personality plate and I/O module must be removed and replaced prior to installing any PCI electrical components. See Section 4.3, "Personality Plate Replacement" on page 4-17 and Section 4.1.3, "Removing an SBus I/O Module" on page 4-4

1. **Determine the slot for installing the PCI card (**FIGURE 4-9**).**

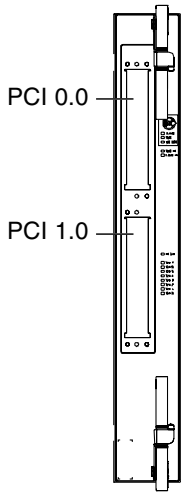


FIGURE 4-9 PCI Slot Numbering

2. **If a filler panel covers the PCI slot, remove the PCI retention screw on the top flange to remove the filler panel (**FIGURE 4-8**).**

   Retain the screw to attach the PCI card.

3. **Attach a wrist strap and take the PCI card out of the protective packaging. Inspect the connector to make sure it is not damaged.**

4. **Confirm that the installed riser card is the correct voltage for the PCI card to be installed.**

   PCI cards and risers cards are available in multiple voltages. Inspect the keyed connector on the PCI card to confirm that it will properly mate with the riser connector. If not, obtain and install the correct riser card (Section 4.2.6, “Removing a PCI Riser Card” on page 4-15 and Section 4.2.7, “Installing a PCI Riser Card” on page 4-16).

5. **Guide the PCI card from behind the system board faceplate, through the opening, and place the PCI card edge into the mating connector (**FIGURE 4-10**).**

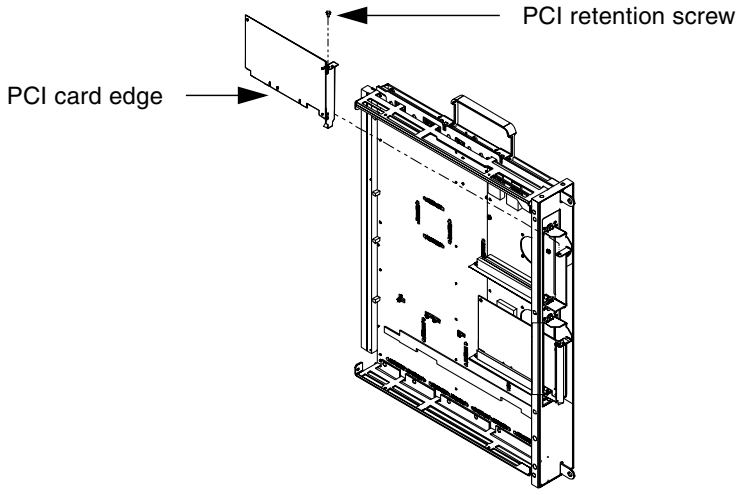


FIGURE 4-10 Inserting a PCI Card

6. **Confirm alignment of the PCI card, then firmly push the card into the connector until fully seated.**
7. **Install the PCI retention screw into the mating flange and tighten to a torque of 0.8 Nm (7.1 inch pounds).**

4.2.4 Removing a PCI I/O Module

1. **Note the location of each PCI card.**
2. **Attach a wrist strap and remove all PCI cards.**
   SeeSection 4.2.2, “Removing a PCI Card” on page 4-9.
3. **Remove the five Phillips screws from the I/O module.**
4. **Loosen the six captive 3/32-inch hex screws located on the compression connectors.**
5. **Remove the I/O module (**FIGURE 4-11**).**
   After removal, place it on a flat, sturdy ESD-protected surface.

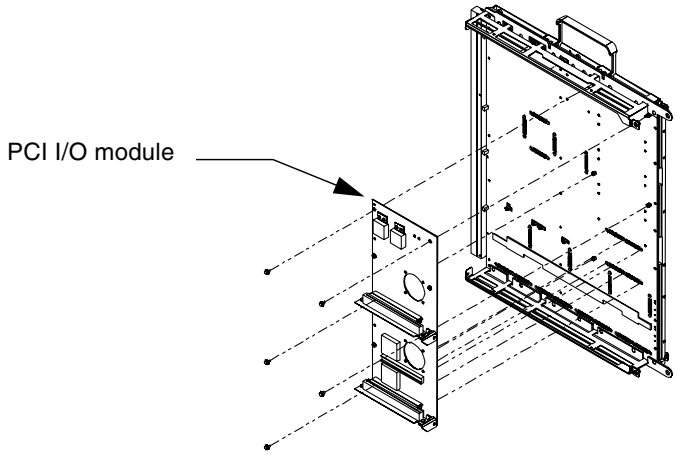


FIGURE 4-11 Replacing the PCI I/O Module

4.2.5 Installing a PCI I/O Module

If converting from SBus to PCI, the personality plate must be removed and replaced prior to installing any PCI electrical components. See Section 4.3, "Personality Plate Replacement" on page 4-17.

1. **Attach a wrist strap.**
2. **Prior to installing the module, wipe the gold pads of the system board and the exposed contacts of the compression connector with a lint-free, nonabrasive cloth or alcohol wipe.**
3. **Align the PCI I/O module compression connectors to the system board compression connector locations.**
4. **Align the standoffs on the system board with the I/O module.**
5. **Tighten the six captive connector screws clockwise with a 3/32-inch hex driver.**
   a. **Tighten the captive connector screws in the sequence shown in** FIGURE 4-12 **until they touch the metal plate.**
   b. **Tighten each captive connector screw in the sequence shown in** FIGURE 4-12 **an additional 1/2 turn.**
   c. **Tighten the captive connector screws to a final torque of 0.68 Nm (6.0 inch pounds) in the pattern shown in** FIGURE 4-12**.**

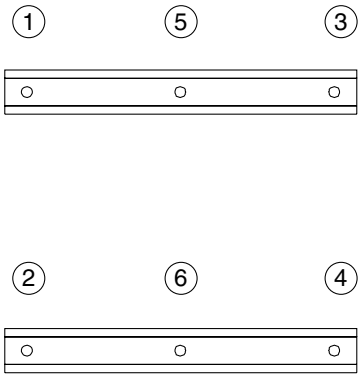


FIGURE 4-12 Tightening Pattern for the PCI I/O Module

6. **Install discrete attachment hardware through the board and into the threaded standoff of the system board.**

   See FIGURE 4-13 for proper orientation of separate cone washer.

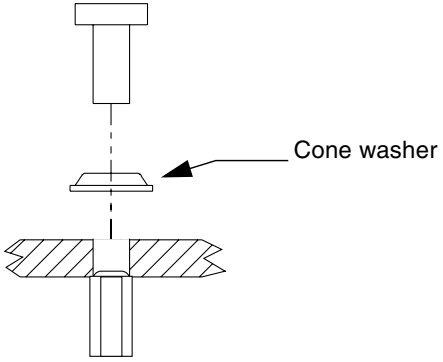


FIGURE 4-13 Cone Washer and Standoff

7. **Tighten discrete attachment hardware to a torque setting of 0.7–0.8 Nm (6.0–7.0 inch pounds).**

8. **Install PCI cards, if necessary. SeeSection 4.2.3, “Installing a PCI Card” on page 4-10.**

4.2.6 Removing a PCI Riser Card

The PCI I/O module must be removed to remove or install a riser card. See Section 4.2.4 “Removing a PCI I/O Module” on page 2-11.

1. **Attach a wrist strap.**
2. **Remove any PCI cards according to Section 4.2.2, “Removing a PCI Card” on page 4-9.**

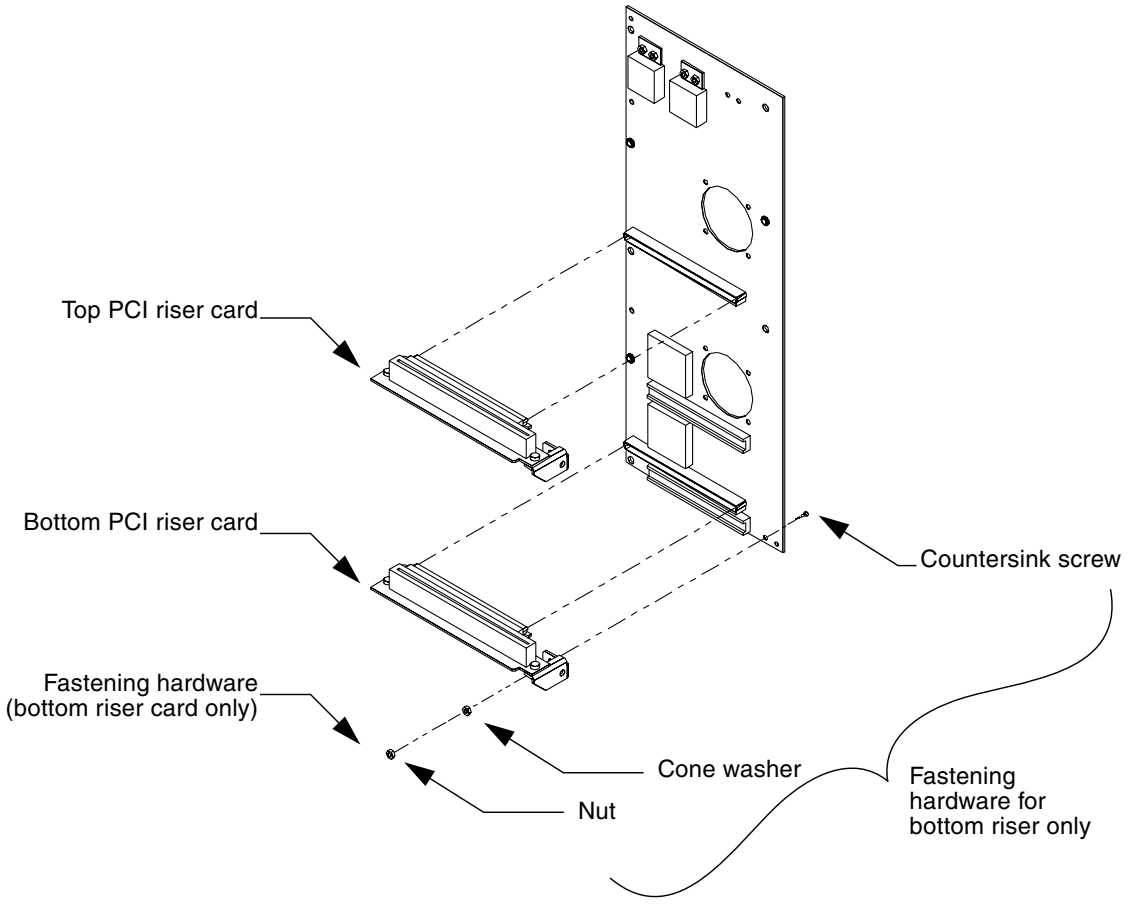


FIGURE 4-14 Removing a PCI Riser Card

3. **To remove the bottom PCI riser card, remove the fastening hardware shown in** FIGURE 4-14**.**

4. **Pull the riser card straight out from the PCI I/O module mating connector.**

5. **Place the riser card in an antistatic bag.**

4.2.7 Installing a PCI Riser Card

If converting from SBus to PCI, the personality plate and I/O module must be removed and replaced prior to installing any PCI electrical components. See Section 4.3, "Personality Plate Replacement" on page 4-17 and Section 4.1.3, "Removing an SBus I/O Module" on page 4-4.

1. **Confirm that the riser card is the correct voltage for the PCI card to be installed.**

   PCI cards and risers cards are available in multiple voltages. Inspect the keyed connector on the PCI card to confirm that it will properly mate with the riser connector. If not, obtain the correct riser card.

2. **Attach a wrist strap and insert the riser card into the mating connector on the PCI I/O module.**

   Press firmly to seat completely into the connector.

3. **If installing the bottom riser, use the fastening hardware as shown in** FIGURE 4-14**, torque to a setting of 0.6 Nm (5.3 inch pounds).**

4. **Install any PCI cards according to Section 4.2.3, "Installing a PCI Card" on page 4-10.**

4.2.8 Completing a PCI Component Replacement Procedure

1. **Install the PCI front cover onto the front of the system board tightening to a torque setting of 0.8 Nm (7.1 inch pounds).**

2. **Replace the system board cover and secure with screws tightening to a torque setting of 0.8 Nm (7.1 inch pounds).**

3. **See Section 3.2.4, "Installing a System Board" on page 3-10 to confirm that the event monitoring daemon is running prior to installing the system board.**

4. **Run** `autoconfig`(1M) **if you:**
   - Replace a PCI I/O module with a PCI I/O module that has a different Sun part number.
   - Replace an SBus I/O module with a PCI I/O module.
   - Install a PCI I/O module in a previously unused slot.

4.3 Personality Plate Replacement

Personality plates are located behind the system board faceplate. Therefore, all of the following components must be removed for access to the personality plate:

- PCI front covers (if used)
- PCI front brackets (if used)
- PCI risers (if used)
- I/O modules
- I/O cards

4.3.1 Removing a Personality Plate

1. **Attach a wrist strap.**
2. **See Section 3.2.3, "Removing a System Board" on page 3-10.**

   After removal, place the system board on a flat, sturdy, ESD-protected surface with the FRU side up.
3. **Remove the four Phillips screws from the system board cover and remove the cover.**
4. **Remove the PCI front cover, if necessary, as shown in** FIGURE 4-15**.**

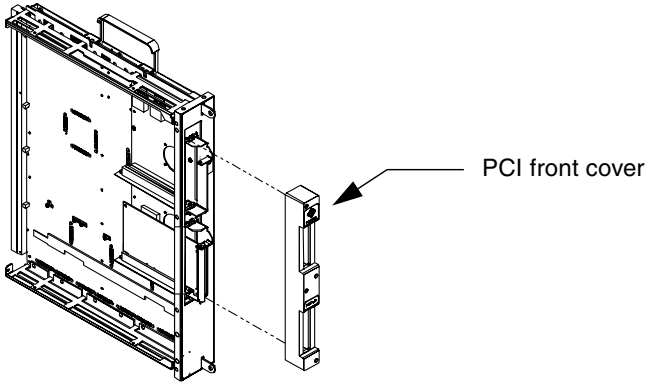


FIGURE 4-15 PCI Front Cover Removal

5. **Remove the I/O cards, if necessary. See Section 4.1.1, "Removing an SBus Card" on page 4-1 or Section 4.2.2, "Removing a PCI Card" on page 4-9.**

6. **Remove the I/O module, if necessary. See Section 4.1.3, "Removing an SBus I/O Module" on page 4-4 or Section 4.2.4, "Removing a PCI I/O Module" on page 4-12.**

7. **Remove the PCI front brackets, if necessary, by removing the four screws shown in** FIGURE 4-16**.**

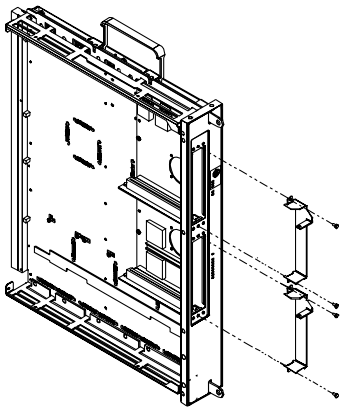


FIGURE 4-16 PCI Front Bracket Removal

8. **Compress the personality plate to the backside of the system board faceplate to relieve the stress on the screws. Sustain this force while removing the three screws securing the personality plate (**FIGURE 4-17**).**

Caution – The compliant EMI gasket puts force on the three attachment screws. This force needs to be relieved while removing each screw to prevent the threads from becoming damaged and rendering the personality plate useless.

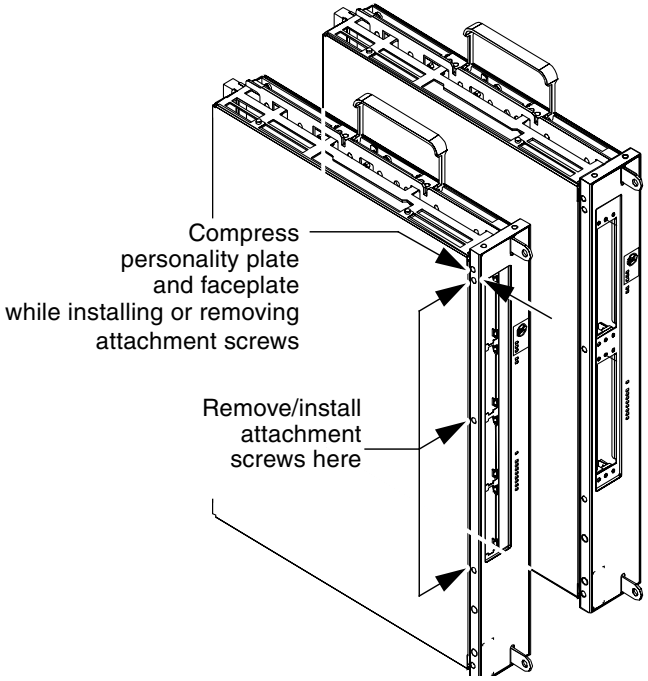


FIGURE 4-17 Installing a Personality Plate

9. Lift the personality plate out as noted in top view (FIGURE 4-18**).**

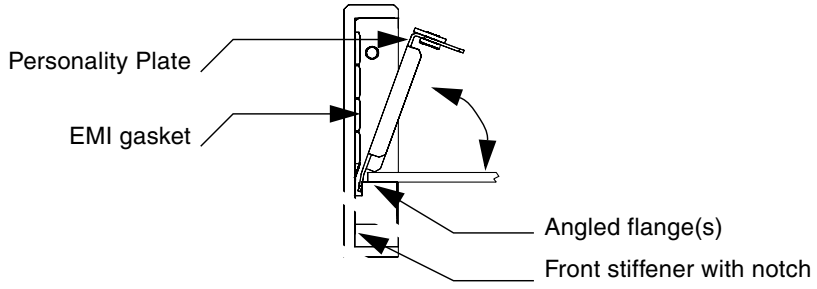


FIGURE 4-18 Installing a Personality Plate—Top View

4.3.2 Installing a Personality Plate

Personality plates are located behind the system board faceplate. All PCI front covers, front brackets, and risers (if used), I/O modules, and I/O cards must be removed for access to the personality plate.

1. **Confirm that the type of personality plate you are installing is correct for your application (**FIGURE 4-19**).**

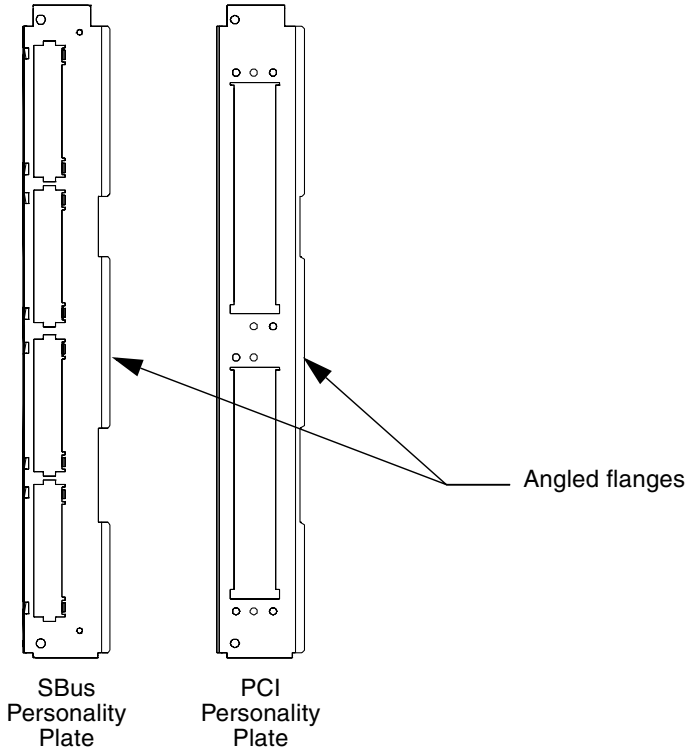


FIGURE 4-19 Personality Plate Identification

2. **Attach a wrist strap.**

3. **Install the personality plate by aligning the angled flange to the notch of the front stiffener.**

4. **Swing the personality plate into place against the EMI gasket as shown in** FIGURE 4-20**.**

   Do not place the personality plate between the EMI gasket and faceplate.

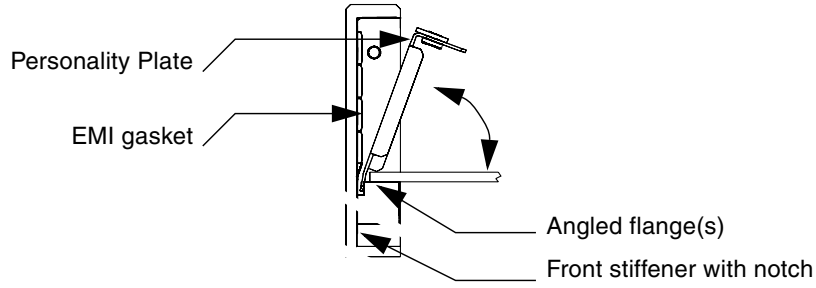


FIGURE 4-20 Installing a Personality Plate—Top View

5. **Compress the personality plate against the EMI gasket to align the screw holes. Sustain this force to relieve stress on the screw threads while installing the three attachment screws as noted in** FIGURE 4-21**.**

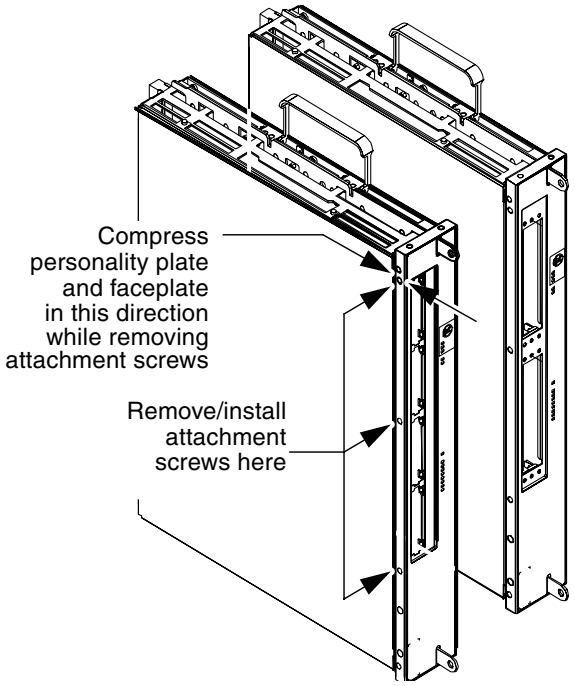


FIGURE 4-21 Installing a Personality Plate

6. **If using PCI components, install the PCI front bracket.**
7. **Replace the I/O module, if necessary. See Section 4.1.4, "Installing an SBus I/O Module" on page 4-5 or Section 4.2.5, "Installing a PCI I/O Module" on page 4-13.**
8. **Install the I/O cards, if necessary. See Section 4.1.2, "Installing an SBus Card" on page 4-2 or Section 4.2.3, "Installing a PCI Card" on page 4-10.**
9. **If using PCI components, install the PCI front cover.**
10. **Replace the system board cover and secure with screws tightening to a torque of 0.8 Nm (7.1 inch pounds).**
11. **See Section 3.2.4, "Installing a System Board" on page 3-10 to confirm that the event monitoring daemon is running prior to installing the system board.**

CHAPTER 5

System Board Memory and CPU Module Replacement Procedures

Note – All commands performed through the Hostview GUI (`hostview`(1M)) can also be performed by other SSP user commands such as the `power`(1M) command or the `fan`(1M) command.

5.1 Memory Component Replacement

5.1.1 Isolating a Failed DIMM

Note – An occasional correctable memory error that the Solaris operating environment calls "Persistent" or "Intermittent" on a DIMM is normal. A DIMM only needs to be replaced if the number of these type of correctable errors experienced on the same DIMM is three or more in a 24 hour period and the SSP Recordstop corresponding to the Solaris operating environment error message indicates the DIMM is the source of the errors, not another component. Systems that experience uncorrectable errors or correctable errors called "Sticky" require immediate service, but once again the SSP Arbstop, Recordstop, or POST log needs to be examined to ensure the DIMM is the source of the errors, not another component.

Use the following checklist to assist with fault isolation.

- In the suspect domain, check `/var/adm/messages` for DIMM error messages.
- Check the domain's console window for error messages
- Review the POST messages either by running POST or, if available, access the POST log files in `/var/opt/SUNWssp/adm/domain_name/post`. Use TABLE 5-1 and TABLE 5-2 to determine the failed component.

TABLE 5-1 DIMM and MM Conversion

DIMM to Bits	MM to Banks
DIMM 0: lo half bits [17:0]	MM0 = Bank 0
DIMM 1: lo half bits [35:18]	MM1 = Bank 1
DIMM 2: lo half bits [53:36]	MM2 = Bank 2
DIMM 3: lo half bits [71:54]	MM3 = Bank 3
DIMM 4: hi half bits [17:0]	
DIMM 5: hi half bits [35:18]	
DIMM 6: hi half bits [53:36]	
DIMM 7: hi half bits [71:54]	

TABLE 5-2 Bank Conversion

		Bank 0			Bank 1			Bank 2			Bank 3		
	DIMM	BITS	MM	P#	BITS	MM	P#	BITS	MM	P#	BITS	MM	P#
Low Half	0	0-17	0_0	1	0-17	1_0	17	0-17	2_0	3	0-17	3_0	19
	1	18-35	0_1	5	18-35	1_1	21	18-35	2_1	7	18-35	3_1	23
	2	36-53	0_2	9	36-53	1_2	25	36-53	2_2	11	36-53	3_2	27
	3	54-71	0_3	13	54-71	1_3	29	54-71	2_3	15	54-71	3_3	29
High Half	4	0-17	0_4	2	0-17	1_4	18	0-17	2_4	4	0-17	3_4	20
	5	18-35	0_5	6	18-35	1_5	22	18-35	2_5	8	18-35	3_5	24
	6	36-53	0_6	10	36-53	1_6	26	36-53	2_6	12	36-53	3_6	28
	7	54-71	0_7	14	54-71	1_7	30	54-71	2_7	16	54-71	3_7	32

5.2 Removing a System Board DIMM

1. **Attach a wrist strap.**
2. **See Section 3.2.3, "Removing a System Board" on page 3-10 to remove the system board and place it on a flat, sturdy, ESD-protected surface with the FRU side up.**
3. **Remove the four Phillips screws from the system board cover and remove the cover.**
4. **Unlatch the sides of the DIMM connector and lift the DIMM out of its holder.**

5.2.1 Configuring Memory on a System Board

Follow these DIMM configuration guidelines:

- All sockets within a bank must be fully populated.
- DIMM sizes should be equal. However, if mixed sizes are used, the larger DIMMs will be limited to the smallest DIMM size used.
- For increased performance on partially populated memory boards, do not use banks 0 and 2 together or banks 1 and 3 together.
- On the silkscreen, in the replacement guide, and in the diagnostics, MM*x* indicates bank number.

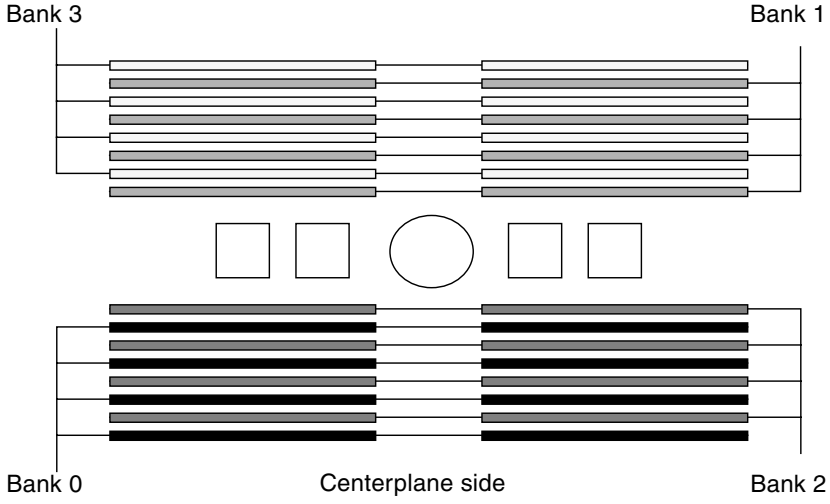


FIGURE 5-1 Memory Bank Locations

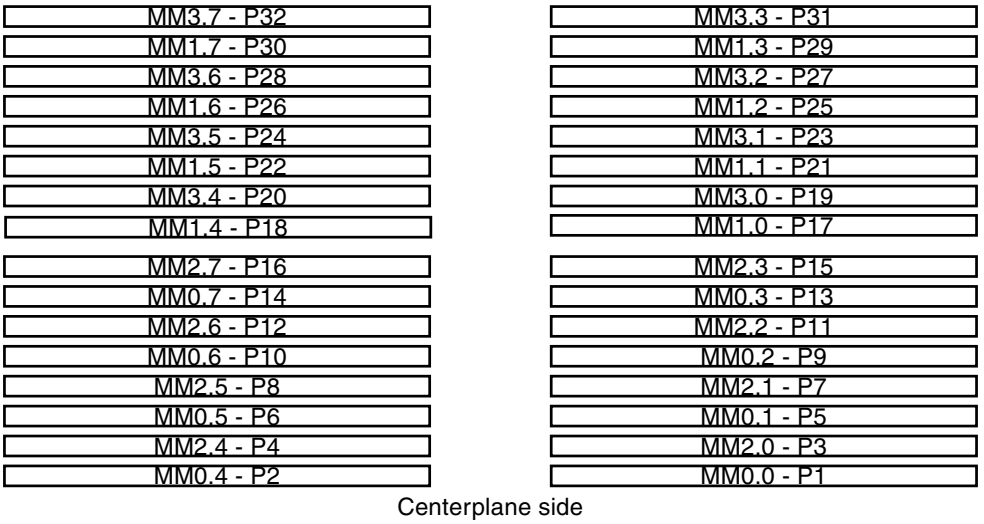


FIGURE 5-2 Memory DIMM Locations

5.3 Installing a System Board DIMM

1. **Attach a wrist strap.**
2. **Verify key orientation of the DIMM with respect to the connector.**
3. **Install the DIMM into the connector by applying firm pressure and pushing the DIMM straight into connector until it clicks into place.**
4. **Replace the system board cover and secure with Phillips screws tightening to a torque of 0.8 Nm (7.1 inch pounds).**
5. **See Section 3.2.4, "Installing a System Board" on page 3-10 to confirm that the event monitoring daemon is running prior to installing the system board.**

5.3.1 Removing a Memory Module

1. **Attach a wrist strap.**
2. **See Section 3.2.3, "Removing a System Board" on page 3-10 to remove the system board and place it on a flat, sturdy, ESD-protected surface with the FRU side up.**

3. **Remove the four Phillips screws from the system board cover and remove the cover.**
4. **Remove the eight Phillips screws from the memory module.**
5. **Loosen the ten captive 3/32-inch hex screws located on the compression connector.**
6. **To remove the memory module, lift straight out and place on a flat, ESD-protected surface (**FIGURE 5-3**).**

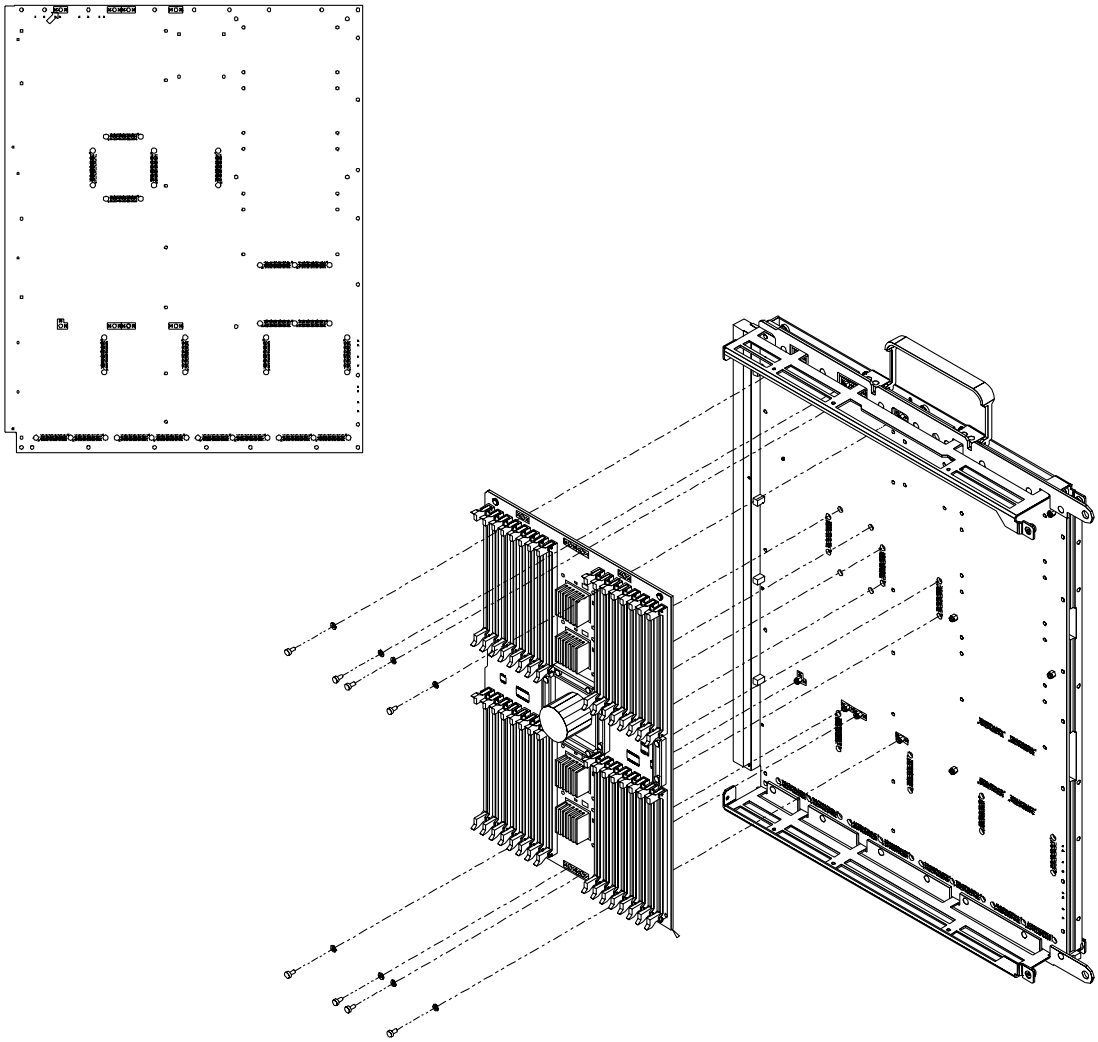


FIGURE 5-3 Replacing the System Board Memory Module

5.3.2 Installing a Memory Module

1. **Prior to installing the module, wipe the gold pads of the system board and the exposed contacts of the compression connector with a lint-free, nonabrasive cloth.**
2. **Align the memory module compression connectors to the system board compression connectors.**
3. **Tighten the ten captive connector screws clockwise with a 3/32-inch hex driver.**
   a. **Tighten the captive connector screws in the sequence shown in** FIGURE 5-4 **until they touch the metal plate.**
   b. **Tighten each captive connector screw in the sequence shown in** FIGURE 5-4 **an additional 1/2 turn.**
   c. **Tighten the captive connector screws to a final torque of 0.68 Nm (6.0 inch pounds) in the pattern shown in** FIGURE 5-4**.**

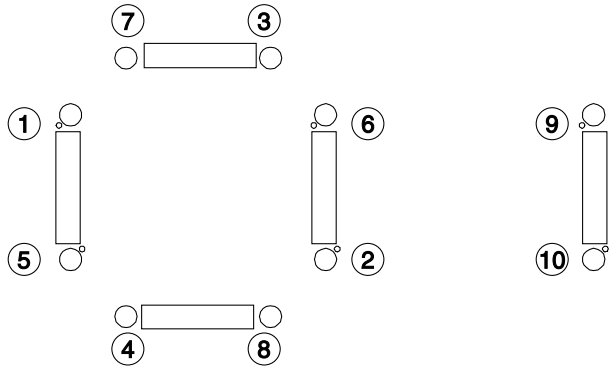


FIGURE 5-4 Tightening Pattern for the Memory Module

4. **Install discrete attachment hardware through the cone washer and into the board and standoff (**FIGURE 5-5**).**

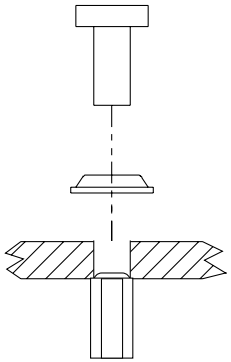


FIGURE 5-5 Cone Washer and Standoff

5. **Tighten discrete attachment hardware to a torque setting of 0.8 Nm (7.1 inch pounds).**
6. **Install memory DIMMs, if necessary. See Section 5.3, "Installing a System Board DIMM" on page 5-4.**
7. **Replace the system board cover and secure with Phillips screws tightening to a torque of 0.8 Nm (7.1 inch pounds).**
8. **See Section 3.2.4, "Installing a System Board" on page 3-10 to confirm that the event monitoring daemon is running prior to installing the system board.**
9. **Run** `autoconfig`(1M) **if you:**
   - Replace a memory module with a memory module that has a different Sun part number.
   - Install a memory module in a previously unused slot.

5.4 Processor Component Replacement

5.4.1 Removing a Processor Module

1. **Attach a wrist strap.**
2. **See Section 3.2.3, "Removing a System Board" on page 3-10 to remove the system board and place it on a flat, sturdy, ESD-protected surface with the FRU side up.**

3. **Remove the four Phillips screws from the system board cover and remove the cover.**

4. **Loosen the five captive 3/32-inch hex screws located on the compression connector.**

5. **To remove the processor module, lift up and away from obstructions and place on a flat, ESD-protected surface (**FIGURE 5-6**).**

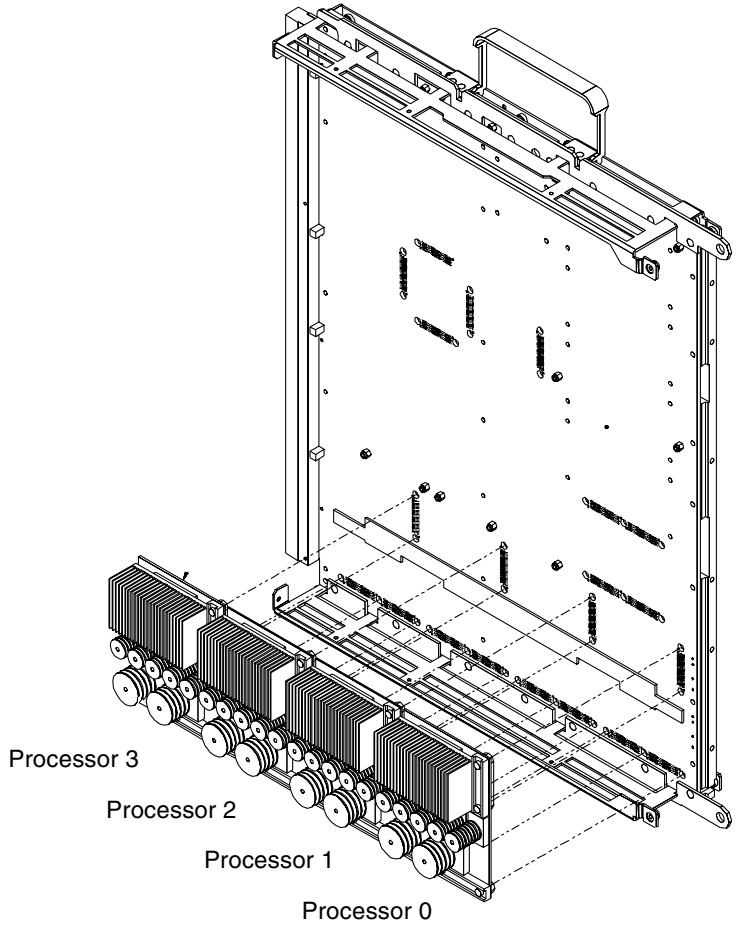


FIGURE 5-6 Replacing System Board Processor Module

5.4.2 Installing a Processor Module

1. **If no processor modules exist on this board, install them in the following order:**

1. Processor 0
2. Processor 2
3. Processor 1
4. Processor 3

For increased processor performance, avoid populating processors 0 and 1 together and processors 2 and 3 together.

2. **Verify that the new processor module speed is the same as all other processor modules that are installed or will be installed in the *system*.**

   Mixing processors speeds in a system will cause processors that do not match the system clock speed to fail. Refer to `sys_clock`(1M).

3. **Verify that the new processor module cache size is the same as all other processor modules that are installed or will be installed on the *system board*.**

   Mixing cache sizes on a system board will result in the larger caches sizes being limited to the size of the smallest. If possible, move dissimilar processor modules to another system board.

4. **Attach a wrist strap.**

5. **Remove the thin, blue plastic strip from the processor board thermal pad on the system board, if present.**

   This blue plastic strip covers a white thermal pad that provides thermal relief for the cache on the processor module. When a processor module is installed, it should be removed permanently.

6. **Prior to installing the module, wipe the gold pads of the system board and the exposed contacts of the compression connector with a lint-free, nonabrasive cloth.**

7. **Align the processor module compression connectors to the system board compression connectors.**

8. **Tighten the five captive connector screws clockwise with a 3/32 hex driver.**

   a. **Tighten the captive connector screws in the sequence shown in** FIGURE 5-7 **until they touch the metal plate.**

   b. **Tighten each captive connector screw in the sequence shown in** FIGURE 5-7 **an additional 1/2 turn.**

   c. **Tighten the captive connector screws to a final torque of 0.68 Nm (6.0 inch pounds) in the pattern shown in** FIGURE 5-7**.**

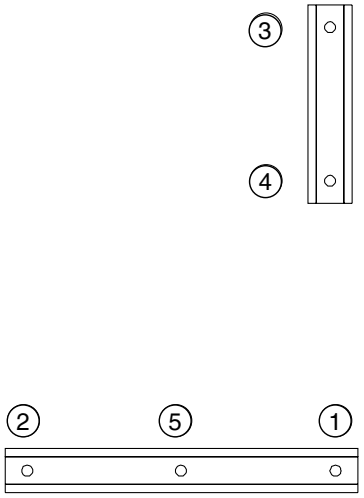


FIGURE 5-7 Tightening Pattern for the Processor Module

9. **Replace the system board cover and secure with Phillips screws tightening to a torque of 0.8 Nm (7.1 inch pounds).**

10. **See Section 3.2.4, "Installing a System Board" on page 3-10 to confirm that the event monitoring daemon is running prior to installing the system board.**

11. **Run** `autoconfig`(1M) **if you:**
    - Replace a processor module with a processor module that has a different Sun part number.
    - Install a processor module in a previously unused location.
    - Install a processor module onto a system board that has been newly installed into a system board slot that was previously unused.

CHAPTER 6

Centerplane Support Board and Fan Centerplane Replacement Procedures

Note – All commands performed through the Hostview GUI (`hostview`(1M)) can also be performed by other SSP user commands such as the `power`(1M) command or the `fan`(1M) command.

6.1 Centerplane Support Board Replacement

6.1.1 Isolating a Failed Centerplane Support Board

Use the following checklist to assist with fault isolation.

- Check for any error messages during POST.
- On the SSP, check for any error messages in `/var/opt/SUNWssp/adm/messages`.
- On the SSP, if available, use `redx` to examine any arbstop dump files or record stop dump files located in `/var/opt/SUNWssp/adm/domain_name`.
- On specific domains, if system call dump files are available, use `ADB` to examine `/var/crash/domain_name`.

6.1.2 Powering Off a Centerplane Support Board

Powering off a centerplane support board also powers off one-half of the centerplane. Therefore, be sure to either blacklist one-half of the centerplane or have all of the domains down.

- **Power off a centerplane support board by using `hostview`(1M) or by typing:**

```
ssp# power -off -csb x
```

Where *x* = 0-1. Refer to `power`(1M) for more information.

6.1.3 Removing a Centerplane Support Board

1. **Open the access door.**

Caution – If the yellow LEDs are lit, do not remove the component. See Section 6.1.2, "Powering Off a Centerplane Support Board" on page 6-2.

2. **Attach a wrist strap and unlock the handle by pulling up on the locking lever that resides on the handle.**
3. **Use the handle to extract the centerplane support board and place on a flat, sturdy, ESD-protected surface.**

6.1.4 Installing a Centerplane Support Board

1. **Confirm that the event monitoring daemon is running by typing:**

```
ssp% edd_cmd -x start
```

Refer to `edd`(1M) and `edd_cmd`(1M) for additional information.

2. **Attach a wrist strap and firmly grasp the centerplane support board by the handle and position it onto the control board carrier.**
3. **With the handle extended, slide the board into the slot until it begins to mate with the centerplane connector.**

4. **Apply firm pressure to the faceplate to engage the board with the centerplane connector.**
5. **Push the insertion handle to fully seat the board.**
6. **Lock the handle by sliding the locking lever into position until it is fully nested with the handle.**

6.1.5 Powering On a Centerplane Support Board

- **Power on the centerplane support board by using `hostview`(1M) or by typing:**

```
ssp# power -on -csb x
```

Where *x* = 0-1. Refer to `power`(1M) for more information.

6.1.6 Verifying a Centerplane Support Board

All domains must be off before testing the centerplane support board.

1. **Log in to the SSP as `ssp`.**

   When prompted for the `SUNW_HOSTNAME`, use the name of the domain to be tested.

2. **Prepare the domains for testing by typing:**

```
ssp% power -off -all
ssp% power -on -all
```

3. **From the same SSP window, run POST by typing:**

```
ssp% bringup -A off -164
```

Answer **`y`** when prompted to configure the centerplane. The bring-up process can take up to 90–180 minutes depending on system configuration. Refer to the `bringup`(1M) or `hpost`(1M) man page for more detail.

6.2 Fan Centerplane Replacement

6.2.1 Removing a Fan Centerplane

Caution – The fan centerplane is NOT considered hot-swappable. This procedure requires turning off the AC power to the system and disconnecting the AC power cords.

1. **Since the system must be powered off, the operating system and all of the domains must be systematically brought down and then halted.**
2. **Power off the system by typing:**

```
ssp# power -off -all
```

3. **Power off the breakers on the AC input modules.**
4. **Open the access doors.**
5. **Attach a wrist strap and remove all of the fan trays from the front and rear of the fan centerplane that is to be replaced.**

   See Section 2.8.3, “Removing a Fan Tray” on page 2-19.
6. **Verify that the control cables are properly identified.**
7. **Disconnect the power cable and four control cables from the fan centerplane.**
8. **Remove and retain the ten fastener subassemblies (screw, washer, and spacer) using a 2.5-hex driver.**
9. **Remove the fan centerplane from the cabinet.**

6.2.2 Installing a Fan Centerplane

1. **Attach a wrist strap.**
2. **From the front, insert the fan centerplane into the cabinet.**

3. **Align the holes and insert the all the fastening hardware.**
   Using a 2.5-hex driver, tighten to a torque of 0.6 Nm (5.3 inch pounds).
4. **Connect the power cable and four control cables to the fan centerplane.**
5. **Install the fan trays.**
   See Section 2.8.4, “Installing a Fan Tray” on page 2-19.
6. **Close the access doors.**
7. **Using the breakers on the AC input module, power on the AC input modules.**
8. **Power on the system by typing:**

```
ssp# power -on -all
```

CHAPTER 7

Centerplane Replacement Procedures

Note – All commands performed through the Hostview GUI (`hostview`(1M)) can also be performed by other SSP user commands such as the `power`(1M) command or the `fan`(1M) command.

7.1 Centerplane Replacement

Caution – The centerplane is NOT considered hot-swappable. This procedure requires turning off the AC power to the system.

7.1.1 Isolating a Failed Centerplane

Use the following checklist to assist with fault isolation:

- Check for any error messages during `post`.
- On the SSP, check for any error messages in `/var/opt/SUNWssp/adm/messages`.
- On the SSP, if available, use `redx` to examine any arbstop dump files or record stop dump files located in `/var/opt/SUNWssp/adm/domain_name`.
- On specific domains, if system call dump files are available, use `ADB` to examine `/var/crash/domain_name`.

7.1.2 Setting Up the System Prior to Replacing the Centerplane

1. **Locate two Phillips screw drivers (No.1 and No.2), one small straight-slot screwdriver, one small flashlight, one digital volt meter (DVM), and one set of centerplane handles with captive attachment hardware.**
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 identified.**
   If needed, install new labels as shown in FIGURE 7-1.

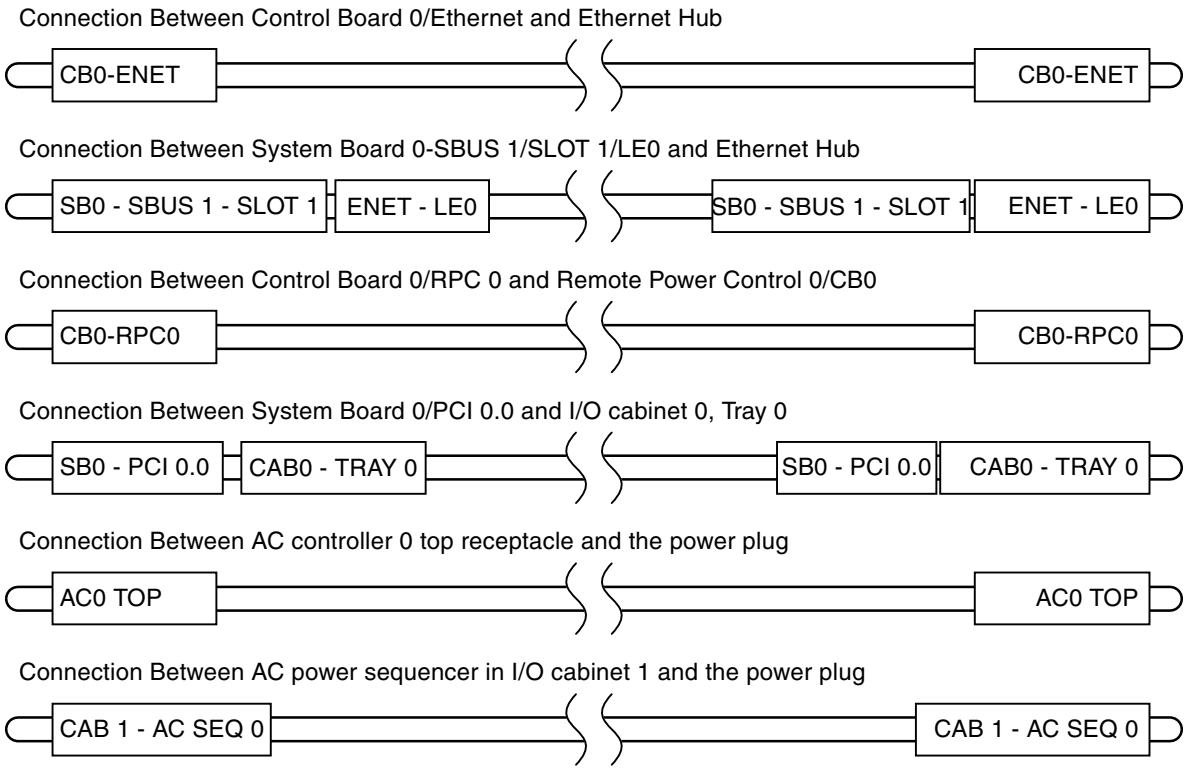


FIGURE 7-1 Cable Labeling

4. **Set up an ESD-protected staging area for several system boards, control boards, centerplane support boards and four fan trays.**

Caution – System boards, centerplane support boards, control boards, SBus cards, and the centerplane are all VERY susceptible to electrostatic discharge. Therefore, all possible precautions should be taken to protect these boards against static damage. Transport board assemblies on an ESD-protected cart whenever possible. Use an ESD wrist strap when handling.

5. **Open and remove all access doors.**
6. **Attach a wrist strap.**
7. **In the table below, note the serial numbers and locations of the system boards and the serial number and revision of the new centerplane.**

TABLE 7-1 Component Serial Numbers

Location	Serial Number	Location	Serial Number
CB0		CB1	
CSB0		CSB1	
SB0		SB15	
SB1		SB14	
SB2		SB13	
SB3		SB12	
SB4		SB11	
SB5		SB10	
SB6		SB9	
SB7		SB8	

New Centerplane:

8. **On the side of the new centerplane without the stiffener, use a DVM to check that VDD_CSB0 (use C29) and VDD_CSB1 (use C118) are not less than 100 ohms.**

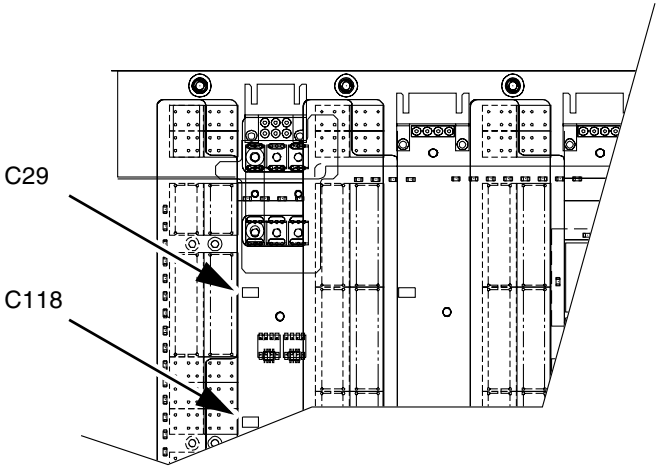


FIGURE 7-2 Centerplane Test Points

9. **Visually inspect guide pins and signal pins for possible damage.**

7.1.3 Powering Off the System

1. **Systematically bring down the operating system and then halt the domains.**
2. **Power off the system by typing:**

```
ssp# power -off -all
```

3. **Power off the breakers on the AC input modules.**

7.1.4 Removing the Centerplane Assembly From the Card Cage

From the back side:

1. **Attach a wrist strap.**
2. **Disconnect the I/O cables from the control board, system board 0, and system board 1.**
3. **Remove the control board, centerplane support board, system board 0, and system board 1.**
4. **Disengage the remaining boards from the centerplane.**

Caution – The carrier plate assemblies from both sides of the centerplane must be removed. If the carrier plate assembly is removed from only the front side, the alignment pin on the remaining carrier plate assembly can damage the new centerplane when it is installed.

5. **Remove the carrier plate assembly that holds the control board and centerplane support board.**

   Remove six Phillips screws, three on the top and three on the bottom of the carrier plate assembly.
6. **Remove the top row of fan trays (FT0-FT3).**
7. **Disconnect the power cables on the top of the centerplane (**FIGURE 7-3**).**
8. **Note the position of the ribbon cables on the left side of the centerplane and then disconnect them.**

   Verify that the ribbon cables are properly identified.

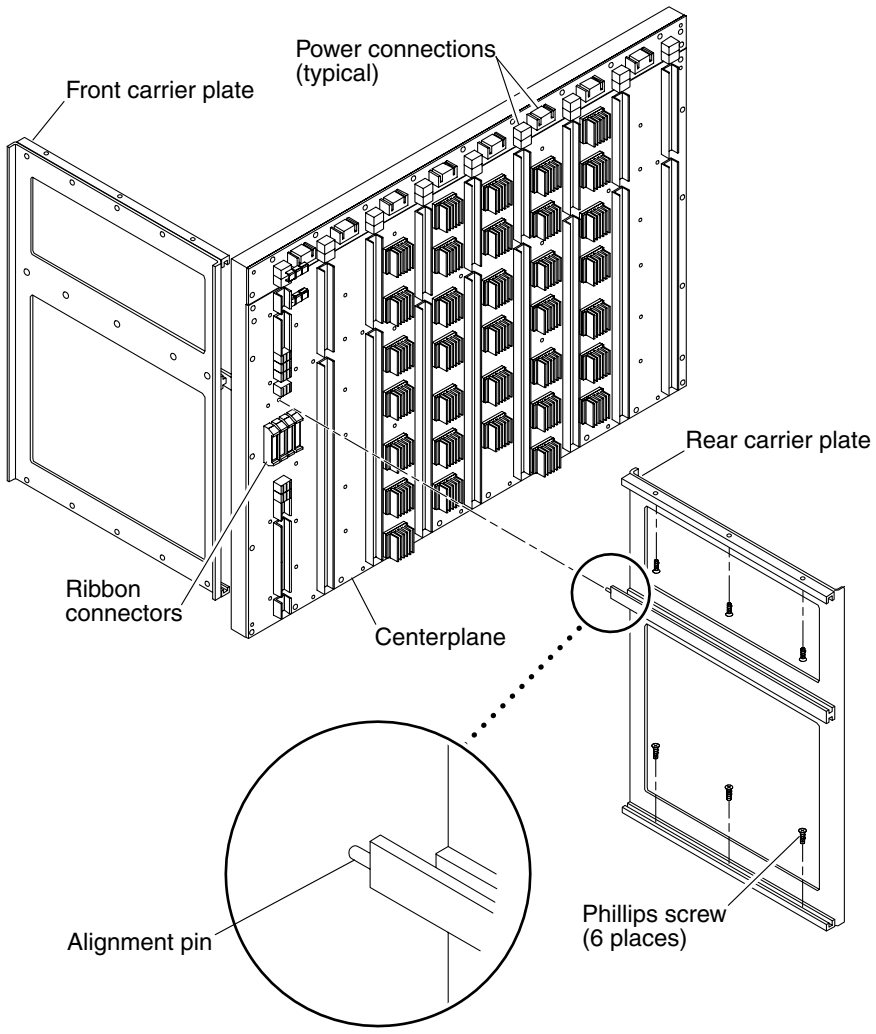


FIGURE 7-3 Carrier Plate Alignment Pin and Centerplane Connectors

From the front side:

1. **Attach a wrist strap.**
2. **Verify that a flat, sturdy, ESD-protected surface is available nearby for the centerplane.**
3. **Disconnect all I/O cables.**
4. **Remove all boards and place them on a flat, sturdy ESD-protected surface.**
5. **Remove the carrier plate assembly that holds the control board and centerplane support board.**

   Remove six Phillips screws, three on the top and three on the bottom of the carrier plate assembly.
6. **Carefully install the centerplane handles onto the stiffener.**

Caution – Centerplane handle installation and removal must be done with care to prevent possible pin damage.

7. **Fully unscrew the 27 captive Phillips screws from around the perimeter of the stiffener.**
8. **Grasping the handles, gently slide the centerplane assembly straight toward you.**

   After the centerplane is clear of the large guide pins, the centerplane assembly will drop slightly and rest on plastic guides on the bottom of the assembly.
9. **Continue to slide the centerplane assembly straight toward you.**
10. **To remove the centerplane assembly from the card cage, angle the centerplane assembly to enable the left side to exit first.**
11. **Place the centerplane assembly on a flat, sturdy, ESD-protected surface.**
12. **Carefully remove the centerplane handles.**

Caution – Centerplane handle installation and removal must be done with care to prevent possible pin damage.

7.1.5 Installing the Centerplane Assembly Into the Card Cage

From the front side:

1. **Attach a wrist strap.**
2. **Carefully install the centerplane handles onto the stiffener.**

Caution – Exercise caution to prevent the screwdriver from slipping and coming in contact with the centerplane.

3. **Holding the centerplane assembly by the handles, angle the centerplane assembly to enable entry of the right side into the card cage.**
4. **With the plastic guides resting on the bottom rails, gently slide the centerplane assembly toward the center of the cabinet.**
5. **As the centerplane assembly nears the center of the cabinet, tilt the top of the centerplane assembly slightly away from you and firmly push forward, causing the centerplane assembly to rise up on the plastic ramps and engage with the alignment pins.**

   Confirm that no cables are trapped between the centerplane and the cabinet.
6. **Partly install the 27 captive Phillips screws, then fully secure the centerplane to the cabinet.**

   Alternate sides from top to bottom, left to right, as you tighten. Torque to 3.76 Nm (33.3 inch pounds).
7. **Carefully remove the centerplane handles.**

Caution – Failure to remove the centerplane handles may result in system board damage.

8. **Reinstall the carrier plate that holds the control board and centerplane support board.**

   Install the carrier plate in the correct position by carefully inserting the center guide rail alignment pin into the centerplane hole. Install and tighten the six Phillips screws.

9. **Reinstall all systems boards and, if previously installed, the control board and centerplane support board.**

   Use TABLE 7-1 to verify board position. When installing a board, verify that the board top and bottom rail are inserted into the card guides. Push firmly to mate the board connectors with the centerplane connectors.

10. **Reconnect all I/O cables.**

    Use the I/O cable labels to verify cable position.

From the back side:

1. **Attach a wrist strap.**
2. **Reconnect the ribbon cables on the left side of the centerplane and the power cables on the top of the centerplane.**

   Use a flashlight to assist with correct placement of the connectors. Fold the ribbon cables to enable insertion of boards.

3. **Reinstall the carrier plate that holds the control board and centerplane support board.**

   Install the carrier plate in the correct position by carefully inserting the center guide rail alignment pin into the centerplane hole. Install and tighten the six Phillips screws.

4. **Reinstall all system boards, the control board, and centerplane support board.**

   Use TABLE 7-1 on page 2-3 to verify board position. When installing any board, verify that the board top and bottom rail are inserted into the card guides.

5. **Reinstall the top row of fan trays (FT0-FT3).**
6. **Reconnect all I/O cables.**

   Use the I/O cable labels to verify cable position.

7. **Fully engage all remaining system boards.**

7.1.6 Powering on the System

1. **Turn on all AC input breakers.**
2. **Power on the system by typing:**

```
ssp# power -on -all
```

3. **Replace the access doors.**
4. **Place the handles and old centerplane in FRU box for shipping.**
5. **If using SSP version 3.0, restore the system boards thermal calibration data.**

   See Section 9.1, "Restoring the Thermal Calibration Information Using SSP Version 3.0" on page 9-1.
6. **Run diagnostics to verify operation of the system.**

7.1.7 Verifying a Centerplane

All domains must be off before testing the centerplane.

1. **Log in to the SSP as** `ssp`**.**

   When prompted for the `SUNW_HOSTNAME`, use the name of the domain to be tested.
2. **Prepare the domains for testing by typing:**

```
ssp% power -off -all
ssp% power -on -all
```

3. **From the same SSP window, run POST by typing:**

```
ssp% bringup -A off -l64
```

   Answer **`y`** when prompted to configure the centerplane. The bring-up process can take up to 90–180 minutes depending on system configuration. Refer to the `bringup`(1M) or `hpost`(1M) man page for more detail.

CHAPTER 8

Mechanical Component and Cable Replacement Procedures

8.1 Mechanical Component Replacement

8.1.1 Replacing a Styling Panel and End Panel

1. **Using both hands, firmly grasp the panel on each side near the top, lift straight up and then out away from the cabinet.**
2. **To replace, reverse Step 1 while aligning the top two tabs and the lower lip with receptacles on the cabinet frame.**

8.1.2 Replacing an Access Door

8.1.2.1 Removing an Access Door

1. **Open the access door.**
2. **On the upper hinge, grasp the hinge pin and pull down to release the upper part of the door.**
3. **Holding the door in a perpendicular position with respect to the cabinet, angle the top of the access door away from cabinet while lifting the lower hinge pin up and away from the lower hinge.**

8.1.2.2 Replacing an Access Door

4. **To replace, place the lower pin on the lower hinge.**
5. **While pulling down on the upper hinge pin, align the upper pin with the upper hinge. Release the hinge pin to engage.**

8.2 Cable Replacement

For cable identification, see Appendix A. FIGURE 8-1 and FIGURE 8-2 identify the silkscreen numbers on the cabinet that corresponds to the cable connections. See TABLE 8-1.

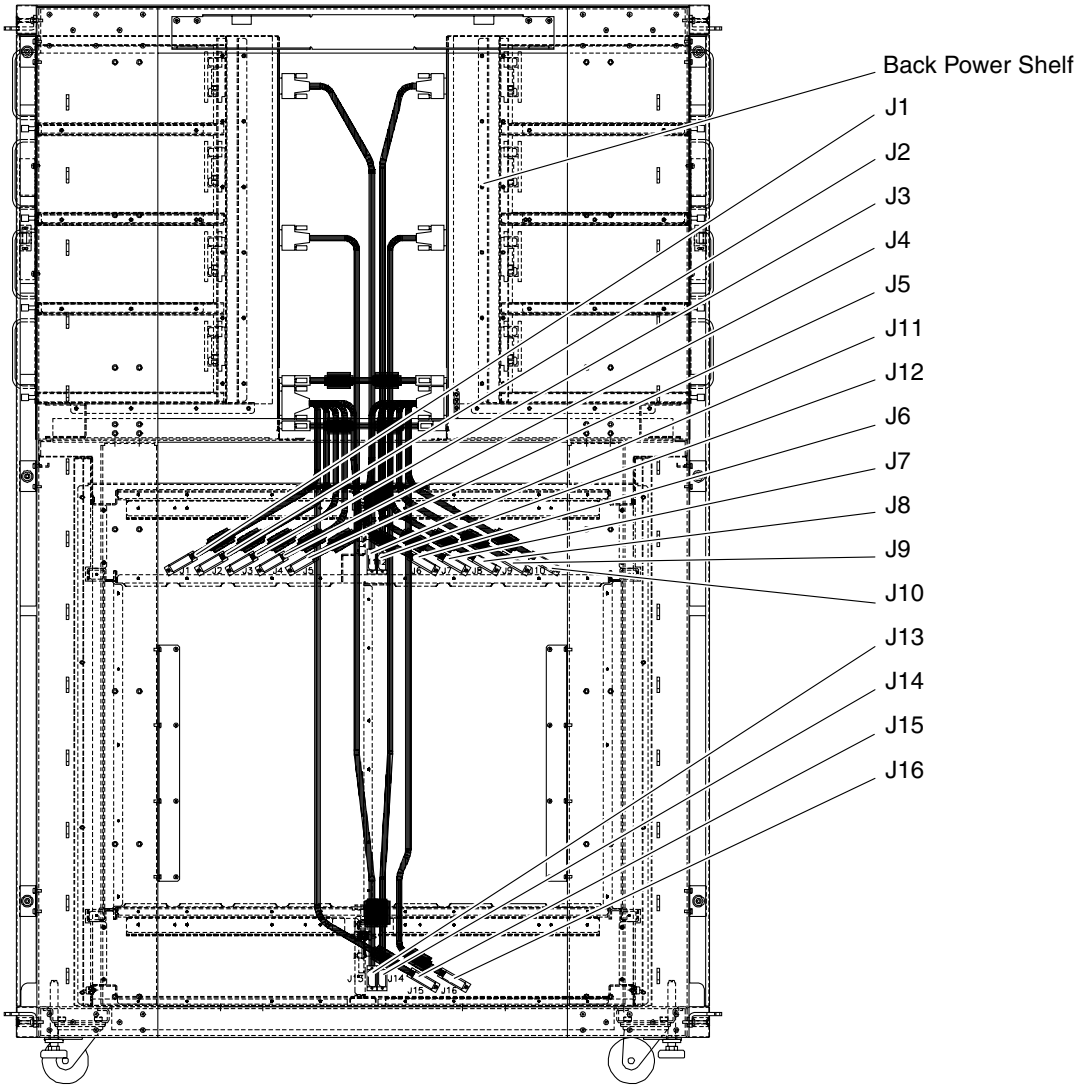


FIGURE 8-1 Internal Cabinet Cable Connections

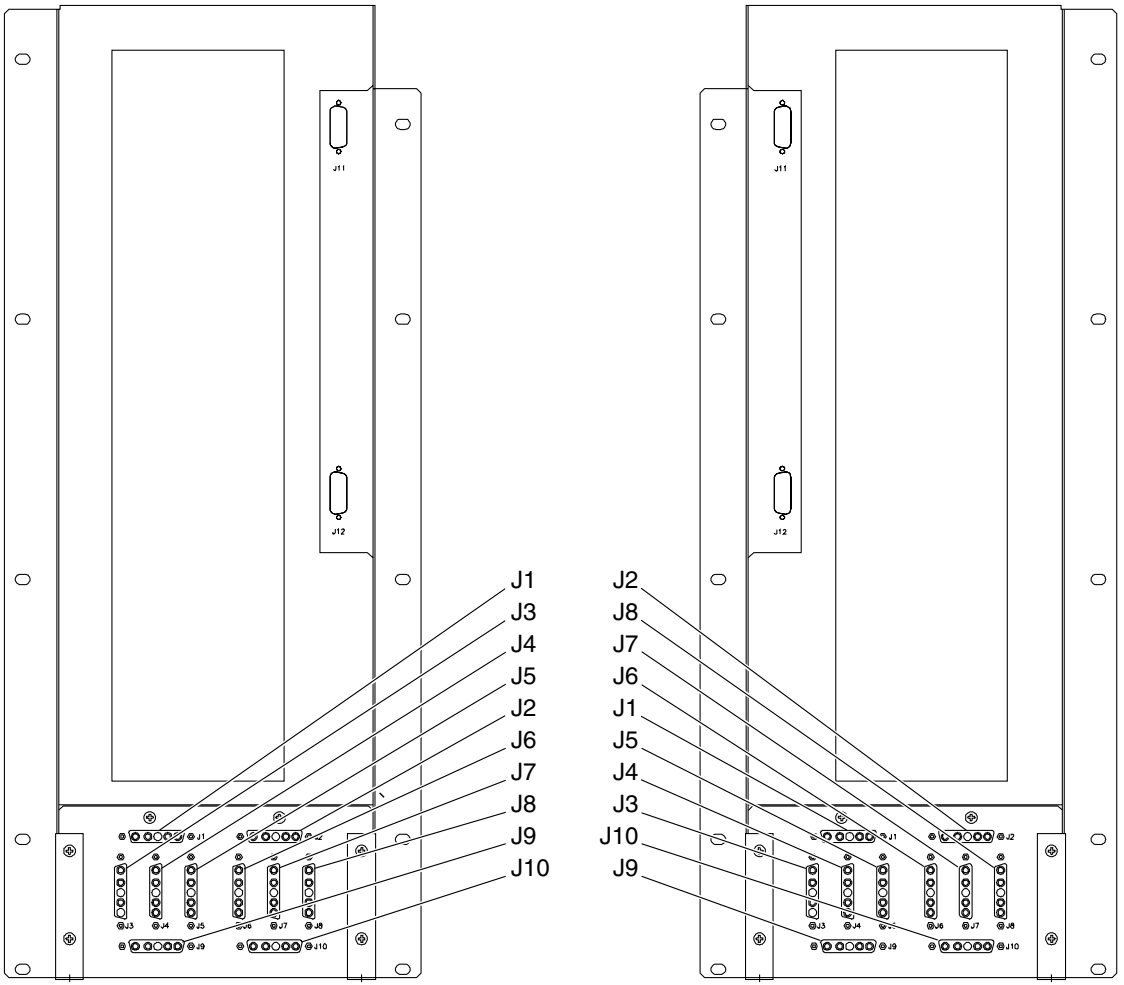


FIGURE 8-2 Power Shelf Cable Connections

TABLE 8-1 System Interconnect Cable Chart

From	To	Function
CC-J10	PS1-J8	Sys-6/Sys-7
CC-J9	PS1-J7	Sys-4/Sys-5
CC-J8	PS1-J6	Sys-2/Sys-3
CC-J7	PS1-J5	Sys-0/Sys-1
CC-J6	PS1-J4	Ctl-0/Fan-0 (top)
CC-J5	PS2-J7	Sys-15/Ctl-1
CC-J4	PS2-J6	Sys-14/Fan-2 (top)
CC-J3	PS2-J5	Sys-12/Sys-13
CC-J2	PS2-J4	Sys-10/Sys-11
CC-J1	PS2-J3	Sys-8/Sys-9
CC-J12	PS1-J11	PS1-top AC Control
CC-J11	PS2-J11	PS2-top AC Control
CC-J16	PS1-J3	Fan-1 (Bottom)
CC-J15	PS2-J8	Fan-3 (Bottom)
CC-J14	PS1-J12	PS1-Bot AC Ctl
CC-J13	PS2-J12	PS2-Bot AC Ctl
PS1-J1	PS2-J2	PS1-PS2 Jumper Rtn
PS1-J2	PS2-J1	PS1-PS2 Jumper Rtn
PS1-J9	PS2-J10	PS1-PS2 Jumper -48V
PS1-J10	PS2-J9	PS1-PS2 Jumper -48V

Legend: (CC)-Cardcage Bulkhead, (PS1)-Power Shelf 1, (PS2)-Power Shelf 2

8.2.1 Replacing Remote Power Control Cables

To hot-swap a remote power control cable, see Section 2.7.2, "Powering Off a Remotely Controlled AC Sequencer" on page 2-12 and Section 2.7.6, "Powering On a Remotely Controlled AC Sequencer" on page 2-18.

8.2.2 Replacing an AC Power Cord

To hot-swap an AC power cord, see Section 2.3.3, "Removing an AC Input Module" on page 2-4.

8.2.3 Replacing an Internal Cabinet Cable

Caution – The internal cabinet cables are NOT considered hot-swappable. These procedures require turning off the AC power to the system.

1. **Systematically bring down the operating systems and then halt the domains.**
2. **Power off the system by typing:**

```
ssp# power -off -all
```

3. **Power off the breakers on the AC input modules.**
4. **Remove the side panel nearest to the power shelves.**
   See Section 8.1.1, "Replacing a Styling Panel and End Panel" on page 8-1.
5. **Disconnect and remove the cable.**
6. **Install the new cable.**
7. **Reinstall the side panel.**
   See Section 8.1.1, "Replacing a Styling Panel and End Panel" on page 8-1.
8. **Power on all AC input breakers.**
9. **Power on the system by typing:**

```
ssp# power -on -all
```

8.2.4 Replacing an Internal Card Cage Cable

Caution – The internal card cage cables are NOT considered hot-swappable. These procedures require turning off the AC power to the system.

1. **Systematically bring down the operating systems and then halt the domains.**
2. **Power off the system by typing:**

```
ssp# power -off -all
```

3. **Power off the breakers on the AC input modules.**
4. **Replacing a Lower Fan Centerplane to Bulkhead Power Cable**
   a. **Remove fan trays ft4–ft6.**
   b. **Disconnect and remove the cable.**
   c. **Install the new cable.**
   d. **Reinstall fan trays.**
   e. **Skip to Step 8.**
5. **Replacing the Fan Centerplane to Bulkhead Power Cable Harness**
   a. **Remove fan trays ft0–ft3 and ft8–ft11.**
   b. **Disconnect and remove the cable.**
   c. **Install the new cable.**
   d. **Reinstall fan trays.**
   e. **Skip to Step 8.**
6. **Replacing a Fan Centerplane to Bulkhead Sense Cable**
   a. **For the upper cables, remove fan trays ft0–ft2, for the lower cables, remove fan trays ft4–ft6.**
   b. **Disconnect and remove the cable.**
   c. **Install the new cable.**
   d. **Reinstall fan trays.**
   e. **Skip to Step 8.**

7. **Replacing a Fan Centerplane to Centerplane Cable**

   a. **Confirm that the cables attached to CB0, SB0, and SB1 are labeled with the SBus location number and remote power control connections.**

   b. **In the table below, record the serial numbers and locations of SB0 and SB1.**

TABLE 8-2 Component Serial Numbers

Location	Serial Number	Location	Serial Number
SB0		SB1	

   c. **Disconnect the cables from CB0, SB0, and SB1.**

   d. **Remove CB0, CSB0, SB0, and SB1.**

   e. **Disconnect and remove the cable.**

   f. **Install the new cable.**

   g. **Reinstall CB0, CSB0, SB0, and SB1.**

   h. **Reconnect all cables to CB0, SB0, and SB1.**

8. **Turn on all AC input breakers.**

9. **Power on the system by typing:**

```
ssp# power -on -all
```

CHAPTER 9

Software Procedures

Note – All commands performed through the Hostview GUI (`hostview`(1M)) can also be performed by other SSP user commands such as the `power`(1M) command or the `fan`(1M) command.

9.1 Restoring the Thermal Calibration Information Using SSP Version 3.0

This procedure is performed automatically by SSP version 3.1 and subsequent compatible versions.

The system boards and centerplane contain ASICs which require thermal calibration data in order for the SSP software to correctly report temperature data. The initial thermal calibration of the system boards and centerplane is done during the manufacturing process using the `thermcal`(1M) command. The resulting thermcal calibration data is then written to EEPROMs resident on the boards. Once done, the `thermcal`(1M) procedure need not be repeated.

The SSP software requires the correct thermal calibration data for each system board and centerplane resident in the system. A data file containing this information is created by the `thermcal_config`(1M) command. In order for this data file to be correct, `thermcal_config`(1M) must be executed during SSP software installation or when system boards or centerplanes are replaced, added, or moved to new slots. Failure to execute this procedure in these cases will prevent the SSP software from correctly monitoring the system's temperature which could result in the system overheating and failure.

1. **Type:**

```
ssp% edd_cmd -x stop
```

This stops the `edd` daemon monitoring scripts.

2. **Type:**

```
ssp% thermcal_config
```

The `thermcal_config`(1M) command requires approximately 10 minutes to complete on a system containing 16 system boards. The `thermcal_config`(1M) command reads thermal data on every system board, as well as the centerplane configured in the system, and creates a file (`thermcaldata.tcl`).

It is important to note any errors that the `thermcal_config`(1M) command encounters when performing this operation. The `$SSPVAR/adm/messages` contains additional messages related to problems the `thermcal_config`(1M) command encounters. Use the following command (in a separate window) to monitor the `messages` file:

```
ssp% tail -f $SSPVAR/adm/messages
```

If the `thermcal_config`(1M) command encounters problems while attempting to read thermal data, you must repeat Step 2 until no errors occur.

Note – If errors of this type persist (especially for the same board), it is likely that the board is not thermally calibrated. In this case, contact your service representative.

---

3. **Type:**

```
ssp% edd_cmd -x start
```

This restarts `edd` event monitoring.

9.2 Configuring a Control Board Using SSP Version 3.0

The following outlines the current procedure for switching from a primary (usually control board 0) to a secondary control board. Use this procedure for the SSP 3.0 release of software.

Caution – Failure to follow these steps can result in crashed domains arbitration stops (arbstops).

Caution – Do not edit the `/var/opt/SUNWssp/.ssp_private/cb_config` file manually. Instead, use the `ssp_config`(1M) command described below.

1. **Shut down all running host domains.**

   Issue the standard Solaris shutdown command for all domains that are running the Solaris operating environment.

2. **From a main SSP window, as user `ssp`, power off all system components except the control boards.**

```
ssp% power -off -all
```

3. **Log in to the main SSP as `root`.**

4. **Obtain the host names and IP addresses for the two control boards.**

5. **As user `root`, execute the `ssp_config`(1M) command.**

   The following is a sample with `snax-cb0` as the current primary control board. After running this command, `snax-cb1` is the primary control board.

CODE EXAMPLE 9-1 The `ssp_config`(1M) Command

```
ssp# /opt/SUNWssp/bin/ssp_config

Beginning setup of this workstation to act as a MAIN or SPARE SSP.

Platform name   = snax
Control Board 0 = snax-cb0 => 129.153.49.181
Control Board 1 = snax-cb1 => 129.153.49.182
Primary Control Board = snax-cb0
Is this correct? (y/n): n

The platform name identifies the entire host machine to
the SSP software. The platform name occupies a different
name space than domain names(hostnames of bootable systems).

Please enter the name of the platform this ssp will service [snax]:
Do you have a control board 0? (y/n): y
Please enter the host name of the control board 0 [snax-cb0]:
I could not automatically determine the IP address of snax-cb0.
Please enter the IP address of snax-cb0: 129.153.49.181
You should make sure that this host/IP address is set up properly
in the /etc/inet/hosts file or in your local name service system.
Do you have a control board 1? (y/n): y
Please enter the host name of the control board 1 [snax-cb0]:
I could not automatically determine the IP address of snax-cb1.
Please enter the IP address of snax-cb1: 129.153.49.182
You should make sure that this host/IP address is set up properly
in the /etc/inet/hosts file or in your local name service system.

Please identify the primary control board.
Is Control Board 0 [snax-cb0] the primary? (y/n) n
Is Control Board 1 [snax-cb1] the primary? (y/n) y

Platform name   = snax
Control Board 0 = snax-cb0 => 129.153.49.181
Control Board 1 = snax-cb1 => 129.153.49.182
Primary Control Board = snax-cb1

Is this correct? (y/n): y

Are you currently configuring the MAIN SSP? (y/n) y

MAIN SSP configuration completed
```

6. **If you have a spare SSP, perform the following.**

   a. **Repeat Step 4 and Step 5 on the spare SSP. Remember to answer** `n` **to the following question during** `ssp_config`**:**

```
Are you currently configuring the MAIN SSP? (y/n) n
```

   b. **From the** `root` **window on the main SSP, reboot the SSP.**

```
ssp# init 6
```

   c. **From the** `root` **window on the spare SSP, reboot the SSP.**

```
ssp# init 6
```

   d. **After the main SSP reboots, log in as user** `ssp` **and invoke** `hostview`**(1M).**

Note – Wait at least a minute after the SSP displays the console login prompt before attempting the `hostview` command. This allows time for the SSP daemons to start.

```
ssp% hostview &
```

   Verify that the `J` and `C` symbols are shown on control board 1. This indicates that the JTAG connection and clock distribution signals are coming from control board 1.

   If `hostview` fails to respond, use `ping` to verify that you can communicate with control board 1 or visually examine the LEDs for correct operation and take appropriate action(s) to correct the problem. For example, verify that the link integrity LED is on, indicating a good Ethernet connection, or try running `snoop` on the SSP to verify the control boards are correctly configured.

7. **Issue the following power command on the main SSP to power on all system components.**

```
ssp% power -on -all
```

8. **Use** `bringup(1M)` **on each domain.**

To revert back to control board 0, repeat the procedure and specify control board 0 as the primary. Remember to perform the appropriate steps shown above for the spare SSP as well.

9.3 Configuring a Control Board Using SSP Version 3.1 and Subsequent Compatible Versions

This procedure details how to switch a primary control board to an alternate control board. This requires updating the `cb_config` file to allow the `ssp_config` script to execute and resetting the control board with `cb_reset`. Since this includes changing clock sources to the system boards, centerplane, and centerplane support boards, all domains must be halted and the system must be idle.

1. **Log in to the SSP console as `root`.**
2. **Change to single-user mode by typing:**

```
ssp# init S
```

3. **Stop all SSP daemons from running by typing:**

```
ssp# /opt/SUNWssp/bin/ssp_terminate
```

4. **Change the control board configuration by typing:**

```
ssp# /opt/SUNWssp/bin/ssp_config cb
```

The following output is a representative session of this command:

```
ssp# /opt/SUNWssp/bin/ssp_config cb
Configuring control boards

Platform name   = allxf1
Control Board 0 = xf1-cb0 =>
Control Board 1 = xf1-cb1 =>
Primary Control Board = xf1-cb0

Is this correct? (y/n): n
Do you have a control board 0? (y/n): y
Please enter the host name of the control board 0 [xf1-cb0]:
Do you have a control board 1? (y/n): y
Please enter the host name of the control board 1 [xf1-cb1]:

Please identify the primary control board.
Is Control Board 0 [xf1-cb0] the primary? (y/n) y

Platform name   = allxf1
Control Board 0 = xf1-cb0 => 129.153.49.148
Control Board 1 = xf1-cb1 => 129.153.49.149
Primary Control Board = xf1-cb0

Is this correct? (y/n):
```

5. **Reboot the SSP.**

6. **Use** `hostview` **to verify that the** `J` **and** `C` **symbols are in the appropriate icon for the new primary control board.**

9.4 Recovering From a Hung Domain

To recover from a hung domain, you must be logged in to the SSP as user `ssp` with two login sessions. Both login sessions must have their environment pointed at the correct domain. Use the `domain_status` and `domain_switch` commands to set up the environment. Use one session as a system console for the domain with the `netcon` command. Use the other session for all SSP commands.

9.4.1 Determining If a Domain Is Hung

1. **Verify that `netcon` responds to a carriage return and that you can `ping` the domain from the SSP.**

   If you cannot perform these functions, you either have a system problem or a hung domain.

   - Confirm a system problem by checking power status and `hostview` warnings.
   - Confirm a hung domain by issuing a `telnet` to the domain.

2. **Use UNIX commands to determine the cause of sluggish behavior.**

   - Use `ps -elf` to look for slow processes.
   - Use `df -lk` to check file system usage and to determine who are current users and what processes they are running.

9.4.1.1 Restoring a Hung Domain

1. **Issue the following SSP commands and save the output to a file:**

```
ssp% check_host -v
ssp% hostinfo -h
```

2. **Attempt to force the domain into OpenBoot™ PROM by typing:**

```
ssp% sigbcmd -p[bootproc] obp
```

Observe `netcon` session activity. If you see the `ok>` prompt, then the `sigbcmd` command was successful.

- If the `sigbcmd` worked, issue the following sequence of commands.

  When finished, save the contents of the window buffer to a file, or cut and paste them to a file. This data is useful in analyzing the cause of the hang condition.

```
ok> ctrace
```

  This will give you trace before going into OpenBoot PROM. Symbols will not be available if the kernel is a nondebug kernel.

```
ok>  .registers
```

  This command gives you a global register dump at the time of entering OpenBoot PROM.

```
ok> .locals
```

  This command gives you a local register dump at the time of entering OpenBoot PROM.

```
ok> sync
```

  `Sync` issues a callback to the kernel to get a core dump. The system should dump core and reboot after issuing this OpenBoot PROM command.

- If the `sigbcmd` command did not work, attempt to force the system to panic with the `hostint` command on the SSP.
- If the `hostint` command does not work, try a `sigbcmd -p[bootproc]` panic.

  This is a more forceful version of the `hostint` command.

3. **When all else fails, issue a `bringup` command to restore the domain to operation.**

9.5 Upgrading the CBE Flash PROM on the Control Board Using SSP Version 3.1 and Subsequent Compatible Versions

This procedure can only be used with SSP version 3.1.

1. **Install the CBE SSP patch.**

   Search the SunSolve database for the latest patch information.

2. **Log in to the SSP as user** `ssp`**.**

   When prompted for the `SUNW_HOSTNAME`, use either the platform name or the name of an existing domain.

3. **Open a** `netcon` **session to the domain in another window.**

4. **Log in to the domain as** `root`**.**

5. **Notify users that the system is going down.**

6. **Halt the system using the appropriate Solaris commands.**

   The basic command for halting the system should be `shutdown`(1M). Refer to the man page for options and other considerations. For example:

```
# cd /
# shutdown -i0 -g0 -y
```

7. **Wait for the system-halted message and the OpenBoot PROM** `>ok` **prompt to be displayed on the** `netcon` **console window.**

8. **Repeat on each domain before proceeding.**

9. **On the SSP, power off all of the system boards by typing:**

```
ssp:domain# power -off -all
```

10. **On the SSP console, log in as** `root` **and type:**

```
ssp# /opt/SUNWssp/bin/ssp_config
Beginning setup of this workstation to act as a MAIN or SPARE SSP.


Platform name    = allxf4
Control Board 0 = xf4-cb0 =>
Control Board 1 = xf4-cb1 =>
Primary Control Board = xf4-cb0


Are you currently configuring the MAIN SSP? (y/n) y


MAIN SSP configuration completed
```

The `flash_boot.ima` file and the `cbe.ima` file are copied into `/tftpboot`.

11. **Type:**

```
ssp# exit
ssp% cb_reset
Resetting host e10000-cb0...
Resetting host e10000-cb1...
```

12. **Wait for daemons to reconnect.**

Monitor `/var/opt/SUNWssp/adm/messages` for the following message before proceeding:

```
Jun 22 11:56:46 xf4-ssp (SUNW_HOSTNAME: allxf4) actionsysclock: Fan Speed being set.
Jun 22 11:57:03 xf4-ssp (SUNW_HOSTNAME: xf4-b2) actionsysclock: System clock being set.
```

13. **Type:**

```
ssp% cb_prom -e
cb_prom: Erase PROM
cb_prom: Erase complete
```

14. **Type:**

```
ssp# cd /tftpboot
ssp% cb_prom -p flash_boot.ima
cb_prom: Program PROM with file flash_boot.ima...
cb_prom: Program complete.
```

15. **Type:**

```
ssp% cb_reset
Resetting host e10000-cb0...
Resetting host e10000-cb1...
```

16. **Check that the** `/var/opt/SUNWssp/adm/messages` **file shows the new PROM version:**

```
Mar 12 14:44:51 e10000-cb0 cbe: cbe: NOTICE: MT! initiated   Prom Version = 3.47
```

17. **Configure the other control board as primary.**

    See Section 9.3, "Configuring a Control Board Using SSP Version 3.1 and Subsequent Compatible Versions" on page 9-6.

18. **Reboot the SSP.**

```
ssp# init 6
```

19. **Log in to the SSP as user** `ssp`**.**

    When prompted for the `SUNW_HOSTNAME`, use either the platform name or the name of an existing domain.

20. **Repeat Step 10 through Step 16.**

21. **Reconfigure the original primary control board as the current primary control board.**

    See Section 9.3, "Configuring a Control Board Using SSP Version 3.1 and Subsequent Compatible Versions" on page 9-6.

9.6 Changing the Clock Multiplier

Use this procedure when changing to different speed processor modules. To upgrade from a 250MHz processor module to a 336MHz processor module, the clock multiplier must change from 3:2 to 2:1. To do this, all domains must be down and the new processors installed onto the system board.

1. **Change the multiplier value by typing:**

```
ssp% sys_clock -p two-to-one -s
```

This updates the `ssp_resource` file.

Caution – Do not run the `sys_clock` command with any of its command-line options on a running system.

2. **Check the multiplier value by typing:**

```
ssp% sys_clock
```

APPENDIX **A**

Illustrated Parts Breakdown

The illustrations and tables in this appendix supplement the removal and replacement procedures described in previous chapters.

Part numbers in this section might differ from those found in your system. Before ordering replacement parts, find the label on the part to be replaced and place your order using that number. Be sure you select the right part number for the entire assembly instead of the individual components.

Note – For information about additional capacity drives and other replacement options, contact your sales representative.

A.1 List of Components

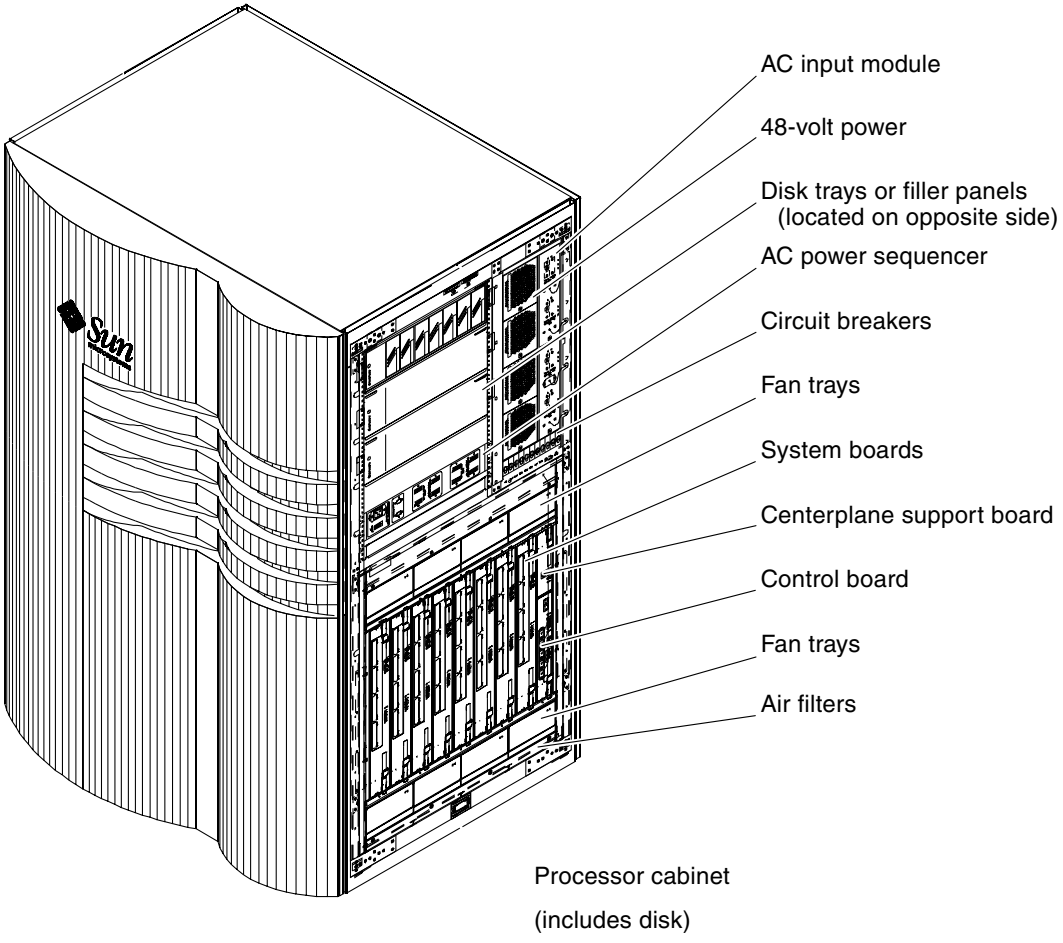


FIGURE A-1 System Components

TABLE A-1 List of Replaceable Components *(1 of 3)*

General Category	Description	Part Number	Page
Cabinet	Access panel - left	Call for PN	page A-7
	Access panel - right	Call for PN	page A-7
	Styling panel	Call for PN	page A-7
	End panel	Call for PN	page A-7
Board Assemblies	Centerplane assembly	F501-4348	page A-8
	System board assembly	F501-4903	page A-8
	Control board assembly	F501-4345	page A-8
	Centerplane support board assembly	F501-4346	page A-8
	Control board filler panel assembly	F540-3064	page A-8
	System board filler panel assembly	F540-3063	page A-8
System Board Components	I/O module assembly for SBus support	F501-4478	page A-9
	SBus filler panel	340-1763-04	page A-9
	Memory module assembly	F501-4776	page A-9
	DIMM module (32 Mbyte)	F501-2653	page A-9
	DIMM module (128 Mbyte)	F501-2654	page A-9
	Processor modules	2530A	page A-9
	PCI I/O module	F501-4830	page A-10
	5.0-volt riser card	F501-4777	page A-10
	3.3-volt riser card	F501-4778	page A-10
	PCI filler panel	240-2391-01	page A-10
Miscellaneous	Customer service accessory kit	565-1398	N/A

TABLE A-1 List of Replaceable Components *(2 of 3)*

General Category	Description	Part Number	Page
SBus Boards	SCSI, fast/wide, diff. (DWIS/S - isp)	1062A	N/A
	SCSI, fast/wide, single (SWIS/S - isp)	1063A	N/A
	SCSI/Ethernet, diff. (DSBE/S - esp)	1052A	N/A
	SCSI/Ethernet, single, (FSBE/S - esp)	1053A	N/A
	SunSwift SBus adapter (fas/hme)	1018A	N/A
	Ultra SCSI RAID controller	6536A	N/A
	SBus Fibre Channel Card (SOCHA)	1057A	N/A
	Quad Ethernet (SQEC)	1058A	N/A
	Sun FastEthernet 2.0, 10/100 (hme)	1059A	N/A
	SunFDDI SAS (5.0)	1025A	N/A
	SunFDDI DAS (5.0)	1026A	N/A
	SunATM 2.0 - 155, fiber	1060A	N/A
	SunATM 2.0 - 155, UTP	1061A	N/A
	SunATM-622 MFiber	1064A	N/A
	SunISDN	1012A	N/A
	Token ring (tr)	1014A	N/A
	Serial (HSI/S)	1019A	N/A
Control Board Components	Mezzanine board	Call for PN	page A-11
	SIMM module	Call for PN	page A-11
System Power Components	Power shelf assembly (left)	F540-3060	page A-12
	Power shelf assembly (right)	F540-3069	page A-12
	AC input module assembly	F540-3441	page A-12
	Power supply, 48 VDC	F300-1368	page A-12
	Circuit breaker assembly, DC distribution	F140-2901	page A-12
Peripheral Power Components	AC sequencer	F300-1290	page A-13
	AC sequencer power cord	F530-2265	page A-13
	Remote power control module assembly with cable	F540-3440	page A-13

TABLE A-1 List of Replaceable Components *(3 of 3)*

General Category	Description	Part Number	Page
Cooling Components	Fan centerplane	F501-4365	page A-14
	Fan tray assembly	F540-3409	page A-14
	Fan tray filler panel	F540-3075	page A-14
	Peripheral filler panel	Call for PN	page A-14
	Air filter, card cage	F370-2845	page A-14
Cables	Remote power control module to control board, 5 feet (1524 mm)	F530-2401	page A-15
	Remote power control module to control board, 10 feet (3048 mm)	F530-2400	page A-15
	Remote power control module to AC sequencer, 20 feet (6096 mm)	F530-2403	page A-15
	Remote power control module to AC sequencer, 20 inches (508 mm)	F530-2402	page A-15
	AC power cord, U.S.A., 20.0 feet (610 cm)	F530-2379	page A-16
	AC power cord, European, 20.0 feet (610 cm)	F530-2380	page A-16
	Cable, internal to cabinet, card cage bulkhead to power shelf, orange, power, 50 inches (1270 mm)	F530-2393	page A-17
	Cable, internal to cabinet, card cage bulkhead to power shelf, orange, power, 24 inches (610 mm)	F530-2392	page A-17
	Cable, internal to cabinet, primary to secondary power shelf, 12 inches (305 mm)	F530-2391	page A-17
	Internal cable, power shelves to bulkhead, power control (sense), 52 inches (1322 mm)	F530-2395	page A-18
	Internal cable, power shelves to bulkhead, power control (sense), 36.02 inches (915 mm)	F530-2394	page A-20
	Cable, internal card cage, power, lower fan centerplane to bulkhead, 10.0 inches (254 mm), quantity 1	F530-2399	page A-18
	Cable, internal card cage, fan centerplane to bulkhead, quantity 1	F530-2396	page A-19
	Cable, internal card cage, fan centerplane to bulkhead, 22.0 inches (559 mm), quantity 4	F530-2398	page A-20
	Cable, internal card cage, fan centerplane to centerplane, 22.0 inches (559 mm), quantity 4	F530-2397	page A-20

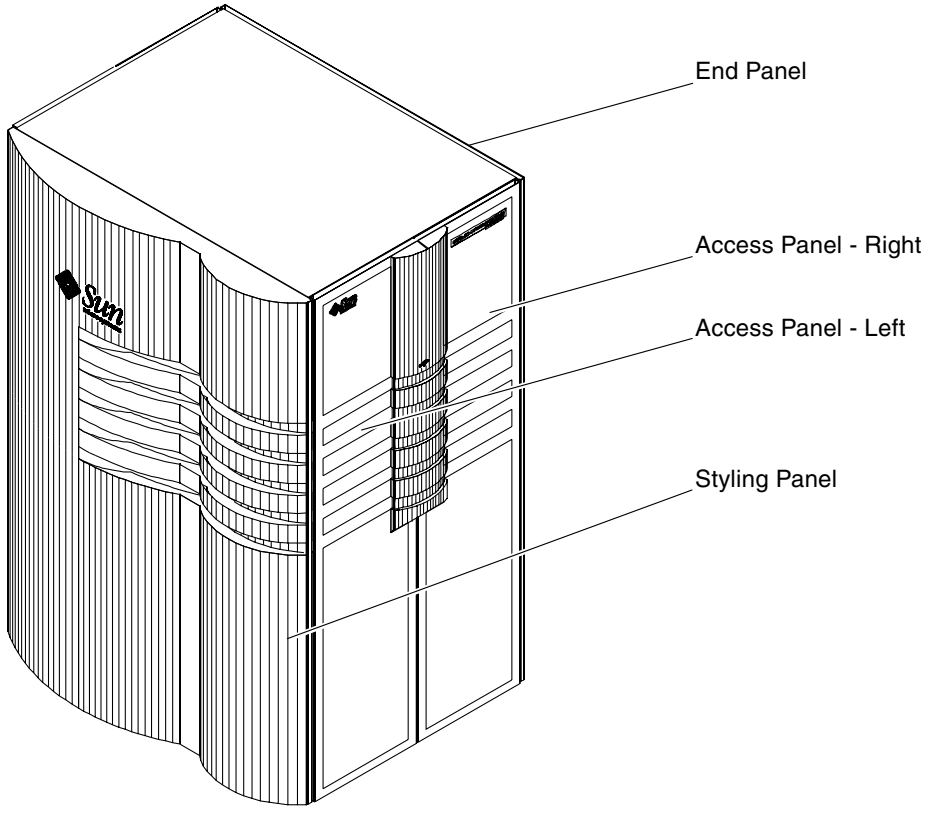
TABLE A-2 Optional Components List

Marketing Number	Part Number	Description
X2720A	595-4619-01[1]	Control board
X2731A	605-1603-01	PCI option
X2730A	595-4620-01	SBus I/O module
X2750A	X2752A	SSP
X2760A	595-4621-01	System board
X3850A	595-4622-01	U.S.A. power cord
X3851A	595-4623-01	European power cord
X3875A	595-4624-01	AC input module
X7025A	595-4625-01	Memory module
X9671A	595-4626-01	Fan tray
X9681A	595-4627-01	Remote power control module
X9685A	595-4628-01	48 VDC power supply

1. Revisions are current as of 6/11/98

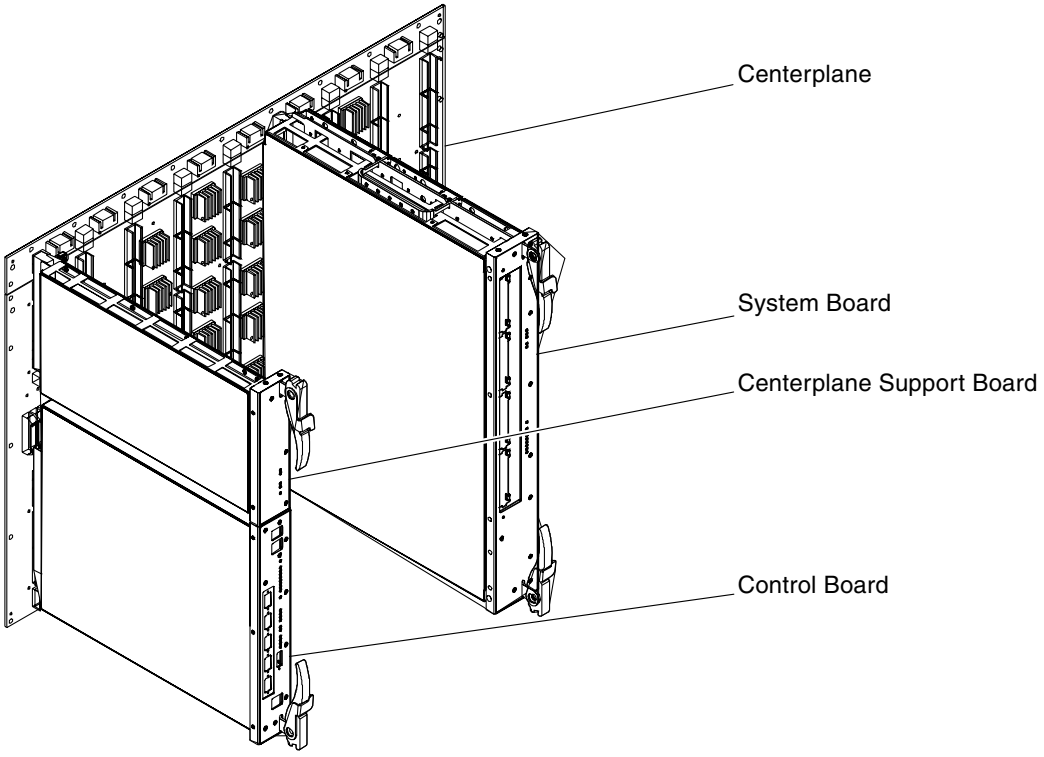
A.2 Illustrated Parts Breakdown

FIGURE A-2 Sun Enterprise 10000 Cabinet



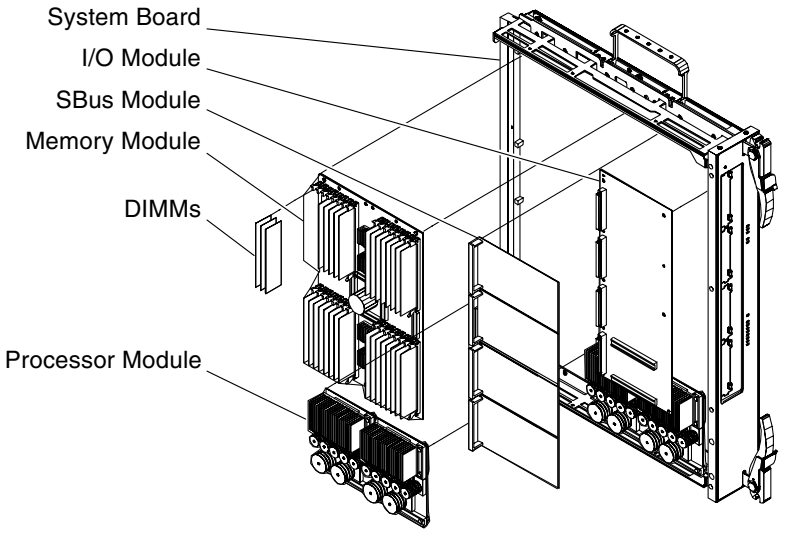
Description	Part Number
Access panel - left	Call for PN
Access panel - right	Call for PN
Styling panel	Call for PN
End panel	Call for PN

FIGURE A-3 Board Assemblies



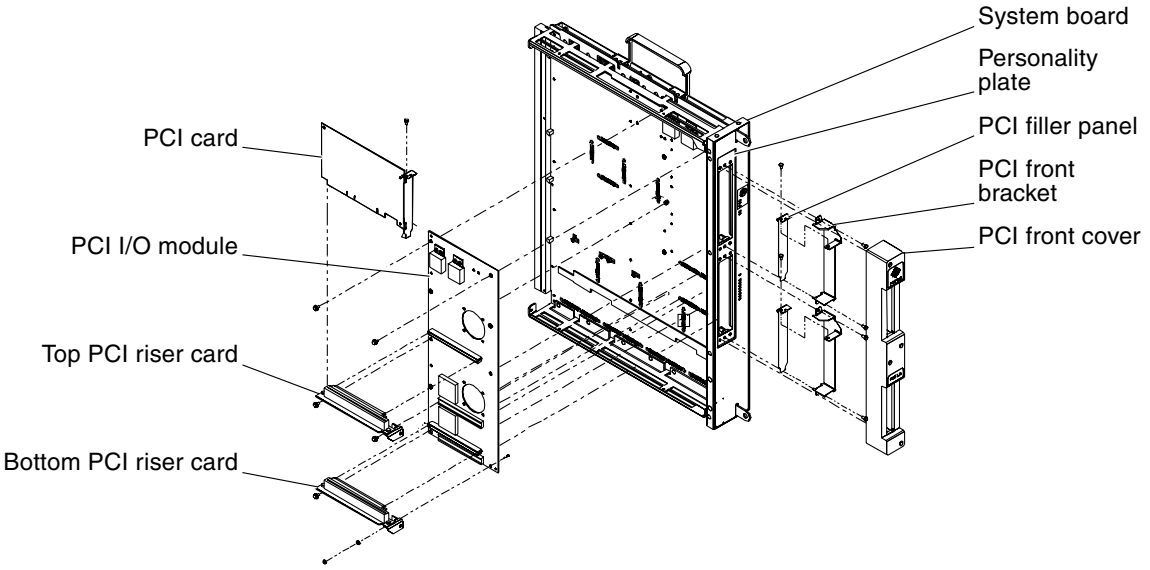
Description	Part Number
Centerplane assembly	F501-4348
System board assembly	F501-4903
Control board assembly	F501-4345
Centerplane support board assembly	F501-4346
Control board filler panel assembly	F540-3064
System board filler panel assembly	F540-3063

FIGURE A-4 System Board and SBus Components



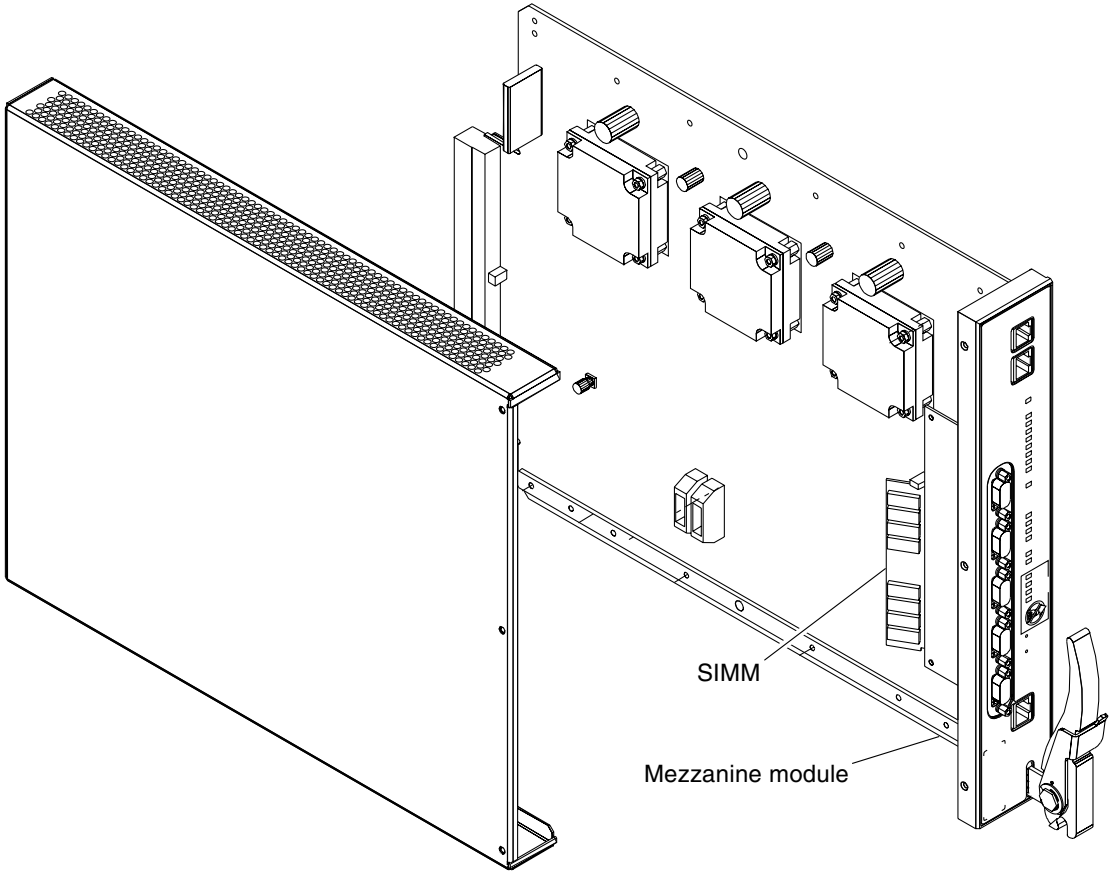
Description	Part Number
I/O module assembly for SBus support	F501-4478
Memory module assembly	F501-4776
DIMM module (32 Mbyte)	F501-2653
DIMM module (128 Mbyte)	F501-2654
Processor modules	2530A
SBus filler panel	340-1763-04

FIGURE A-5 PCI Components



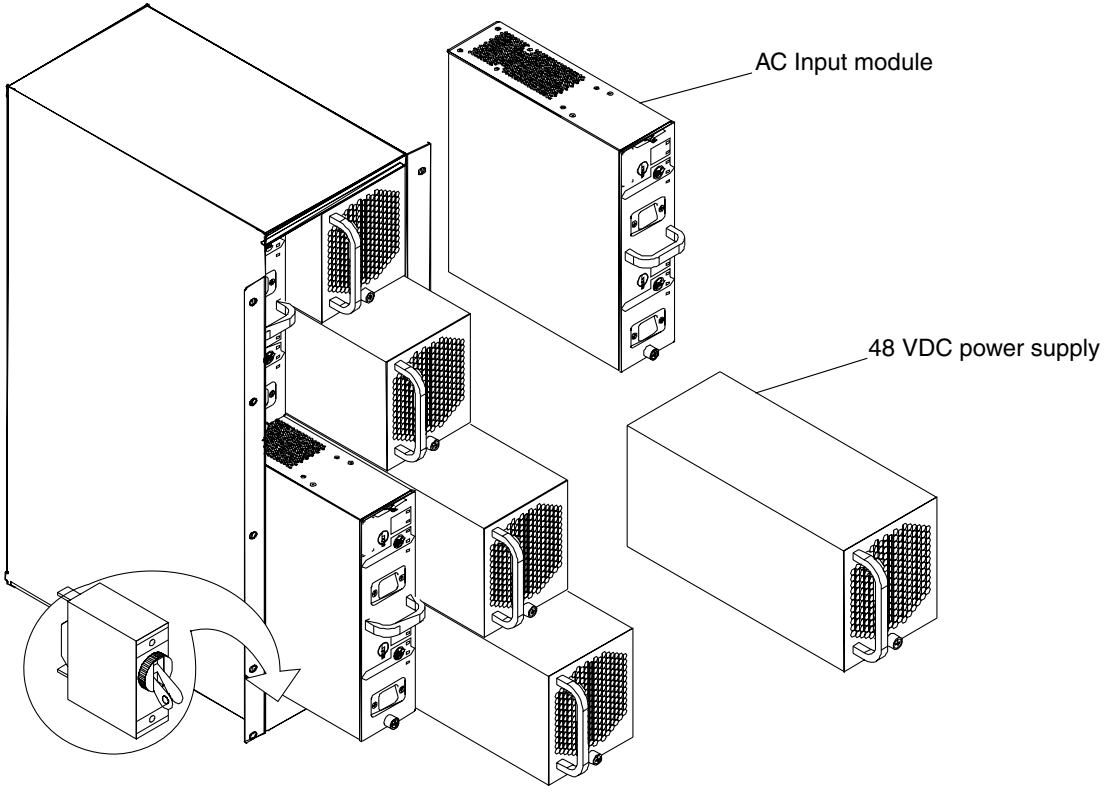
Description	Part Number
PCI I/O module	F501-4830
5.0-volt riser card	F501-4777
3.3-volt riser card	F501-4778
PCI filler panel	240-2391-01

FIGURE A-6 Control Board Components



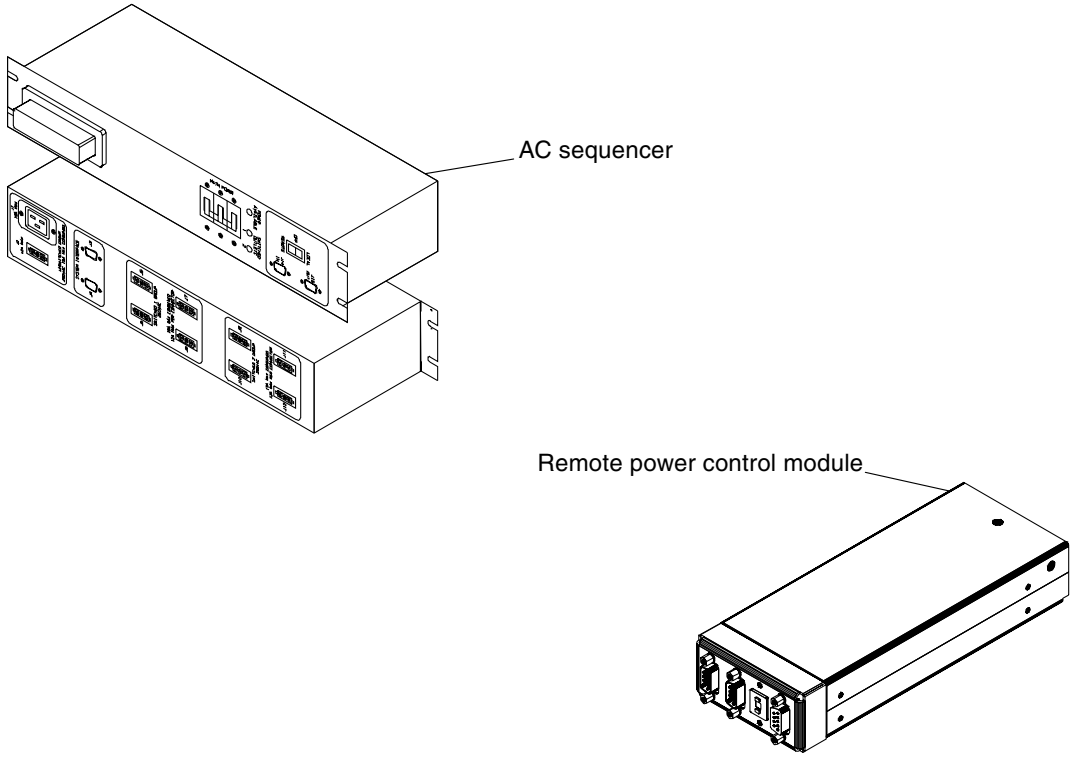
Description	Part Number
Mezzanine board	Call for PN
SIMM module	Call for PN

FIGURE A-7 System Power Components



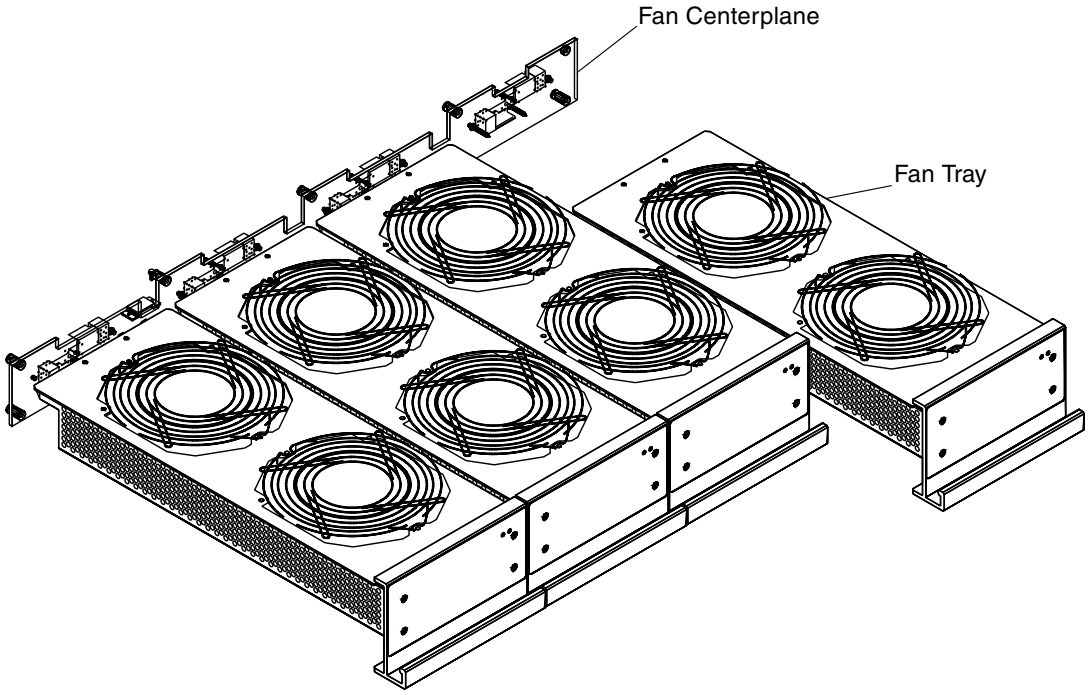
Description	Part Number
Power shelf assembly (left)	F540-3060
Power shelf assembly (right)	F540-3069
AC input module assembly	F540-3441
Power supply, 48 VDC	F300-1368
Circuit breaker assembly, DC distribution	F150-2901

FIGURE A-8 Peripheral Power Components



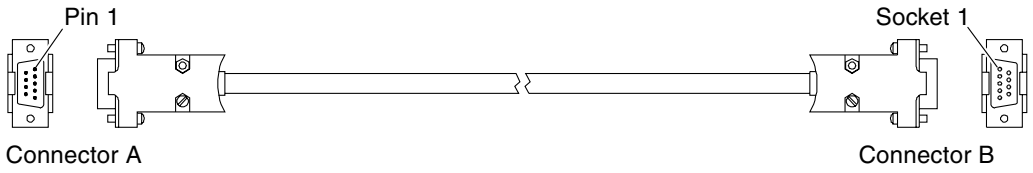
Description	Part Number
AC sequencer	F300-1290
AC sequencer power cord	F530-2265
Peripheral filler panel	Call for PN
Remote power control module assembly with cable	F540-3440

FIGURE A-9 Cooling Components



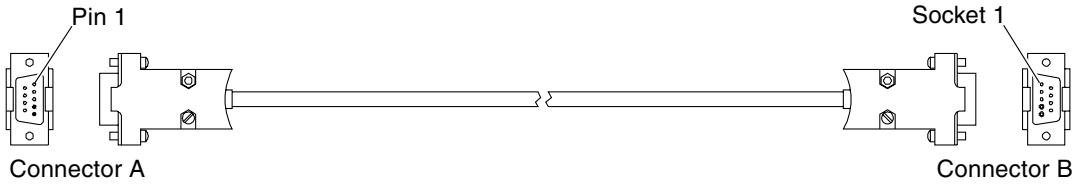
Description	Part Number
Fan centerplane	F501-4365
Fan tray assembly	F540-3409
Fan tray filler panel	F540-3075
Air filter, card cage	F370-2845

FIGURE A-10 Remote Power Control Cable



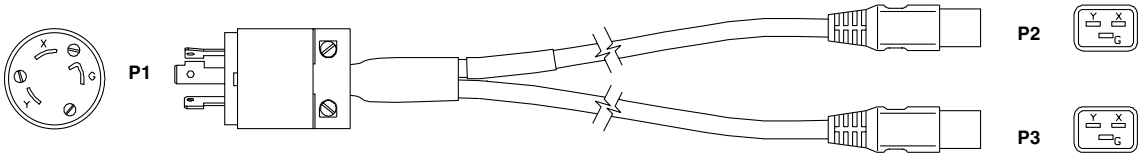
	Description	Part Number
	Remote power control module to control board, 5 feet (1524 mm)	F530-2401
	Remote power control module to control board, 10 feet (3048 mm)	F530-2400

FIGURE A-11 Sequencing Cable



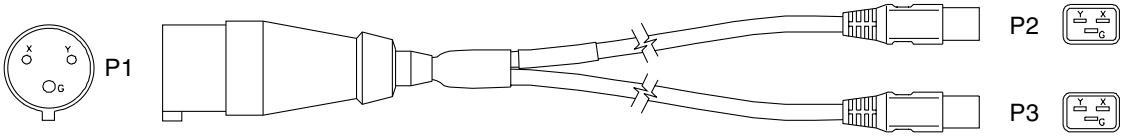
	Description	Part Number
	Remote power control module to AC sequencer, 20 feet (6096 mm)	F530-2403
	Remote power control module to AC sequencer, 20 inches (508 mm)	F530-2402

FIGURE A-12 Domestic Power Cord



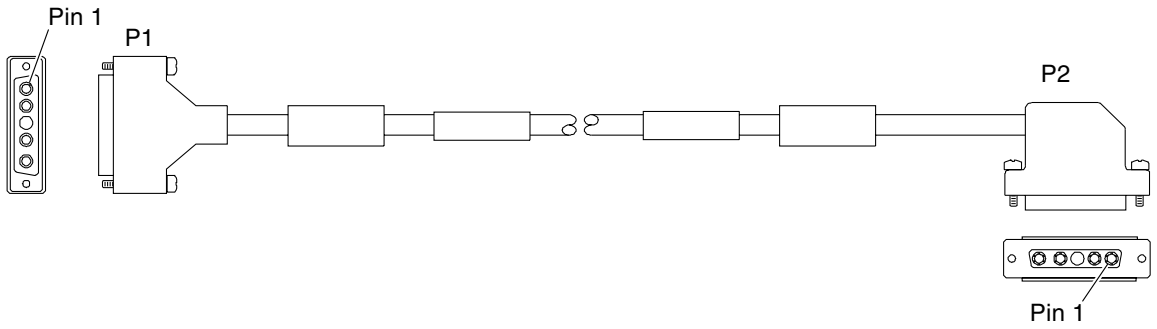
Description	Part Number
AC power cord, U.S.A., 20.0 feet (610 cm)	F530-2379

FIGURE A-13 European Power Cord



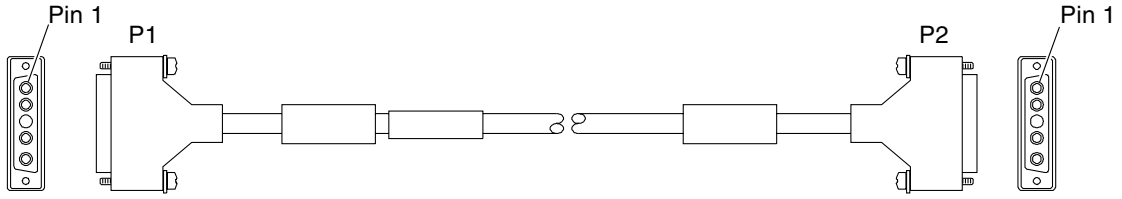
Description	Part Number
AC power cord, European, 20.0 feet (610 cm)	F530-2380

FIGURE A-14 Card Cage Power Cable



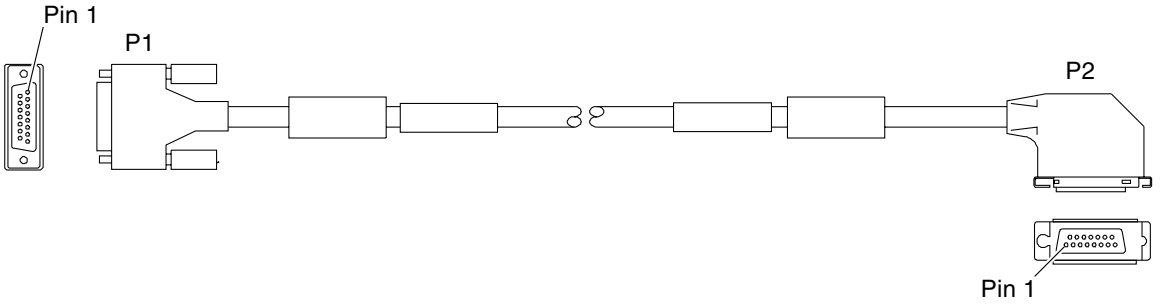
Description	Part Number
Cable, internal to cabinet, card cage bulkhead to power shelf, orange, power, 50 inches (1270 mm)	F530-2393
Cable, internal to cabinet, card cage bulkhead to power shelf, orange, power, 24 inches (610 mm)	F530-2392

FIGURE A-15 Power Cross-over Cable



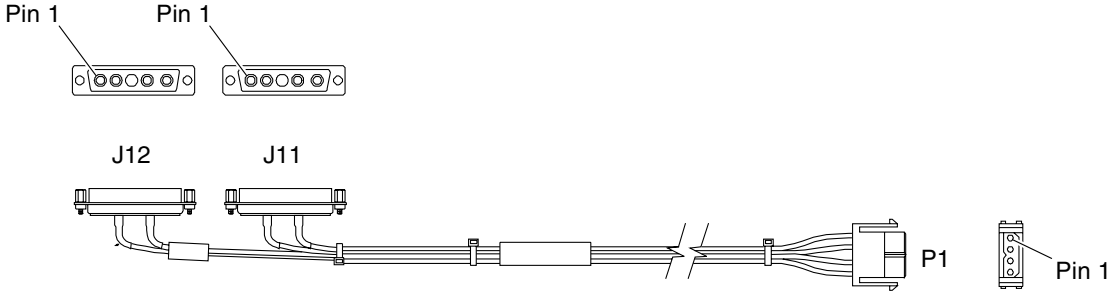
Description	Part Number
Cable, internal to cabinet, primary to secondary power shelf, 12 inches (305 mm)	F530-2391

FIGURE A-16 Card Cage Power Control (Sense) Cable



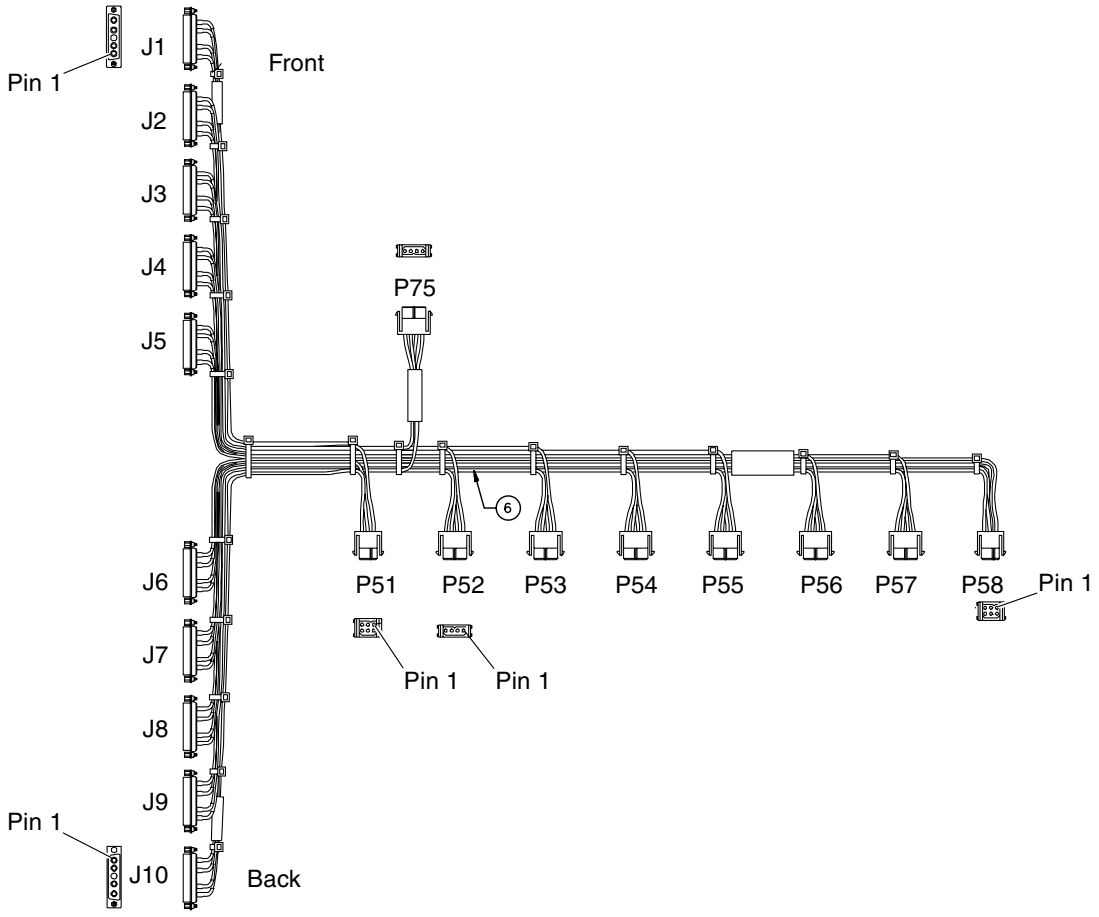
	Description	Part Number
	Internal cable, power shelves to bulkhead, power control (sense), 52 inches (1322 mm)	F530-2395
	Internal cable, power shelves to bulkhead, power control (sense), 36.02 inches (915 mm)	F530-2394

FIGURE A-17 Lower Fan Power Cable



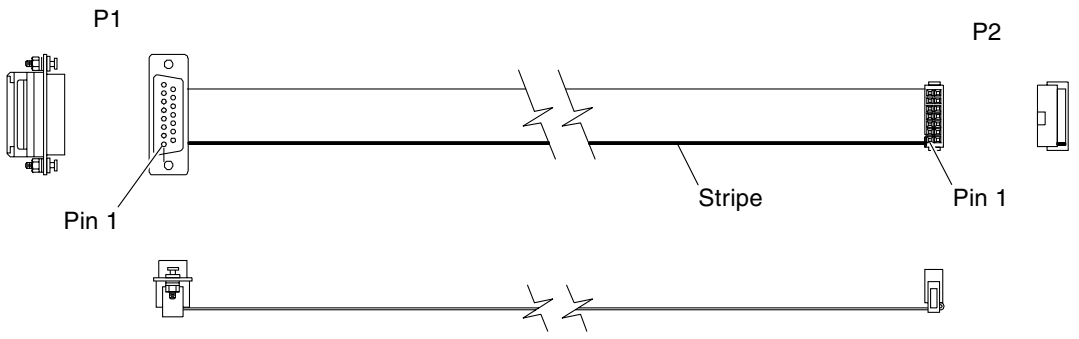
	Description	Part Number
	Cable, internal card cage, power, lower fan centerplane to bulkhead, 10.0 inches (254 mm), quantity 1	F530-2399

FIGURE A-18 Centerplane and Upper Fan Power Cable



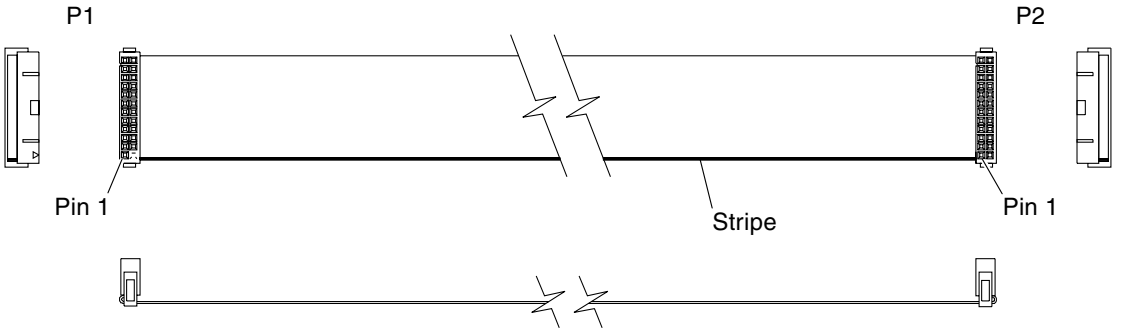
	Description	Part Number
	Cable, internal card cage, fan centerplane to bulkhead, quantity 1	F530-2396

FIGURE A-19 Fan Sense Cable



Description	Part Number
Cable, internal card cage, fan centerplane to bulkhead, 22.0 inches (559 mm), quantity 4	F530-2398

FIGURE A-20 Fan Signal Cable



Description	Part Number
Cable, internal card cage, fan centerplane to centerplane, 22.0 inches (559 mm), quantity 4	F530-2397

Glossary

arbstop	Arbiter stop condition.
ASIC	Application Specific Integrated Circuit
autoconfig	Automatic configuration of the SSP's JTAG scan database.
BBSRAM	Bootbus SRAM
BDA	Board Descriptor Array
Centerplane	A double-sided backplane where eight system boards, one centerplane support board, and one control board connect perpendicular into each side.
Centerplane support board	Board that connects into the centerplane and supplies clocks, JTAG, and control functions for one-half of the centerplane. Normally, two centerplane support boards are used; each connecting into opposite sides of the centerplane.
CIC	Coherency Interface Controller. Handles coherency transactions for the three port controllers on a board. Connects to one of four global address buses. Snoops for one quarter of the address space.
CLM	Centerplane Loopback Mode
Control board	Board that connects into the centerplane and provides the system's JTAG, clock, fan, power, serial interface, and Ethernet interface functions.
Correctable Error	Any error that can be corrected so that processing can continue with no loss of data. This includes automatic correction by hardware, algorithmic correction by software, and correction by hardware with software intervention. Correctable errors are all hardware-initiated.
CSR	Control and Status Register
Degraded mode	Mode in which only half of the centerplane is in use (72 bits of data, two address buses, and one centerplane support board).

Domain A set of one or more system boards that act as a separate system capable of booting and running the Solaris operating environment and independently of any other domains.

DR Dynamic Reconfiguration

Dtags Duplicate tags. Three SRAMs attached to each coherent interface controller provide coherency information that duplicates that maintained in each UltraSPARC processor module. This off-loads coherency snooping from the processor.

ECC Error Correction Code

Externally Initiated Reset (XIR) Refer to XIR

Fatal Error A class of unrecoverable error that necessitates that the system be rebooted; may be hardware- or software-initiated. This type of unrecoverable error results in an arbiter stop condition which requires SSP interaction.

GAARB Global Address Arbiter. Arbitrates for a global address bus. Implemented by a Sun Enterprise 10000 arbiter chip.

GAB Global Address Buses. Four 16:16, 48-bit wide multiplexers that connect together a coherent interface controller from each system board. The multiplexers broadcast one of the inputs to all the outputs. Implemented by 16 XMUX ASICs. Functions like a snoopy bus for coherency purposes, but is really a point-to-point address router.

GDARB Global Data Arbiter. Arbitrates for the global data router's 16x16 crossbar.

GDR Global Data Router. Sixteen 16:1, 144-bit wide multiplexers that connect together the local data routers on each system board. Implemented by 12 XMUX ASICs.

Host name Another term for domain name. Short for the environment variable `SUNW_HOSTNAME` which is used to instruct SSP commands which domain the command is intended for.

I/O module A daughter card containing two SYSIO chips. Each SYSIO controls an SBus, and has sockets for two SBus cards and an embedded SCSI and Ethernet interface.

JBC JTAG Board Controller

JTAG The IEEE 1149.1 serial scan interface, named for the Joint Test Action Group that originally developed it.

LAARB Local Address Arbiter. Arbitrates for the local address router.

LAR Local Address Router. Four bidirectional 3:1 multiplexors that connect the three local address buses to four coherency interface controllers. Implemented inside the four coherency interface controllers on each board.

LBIST Logic Built-in Self-test

LDARB Local Data Arbiter. Arbitrates for the local data router.

LDMUX Local Data MUX. One mode of the XMUX.

LDR Local Data Router. Two unidirectional 144-bit-wide 4:1 multiplexers that connect the four UPA databuses on a system board with the global data router. Implemented by four XMUX ASICs per system board.

MC Memory Controller chip. Accepts memory addresses from the four coherency interface controllers, and data from the data buffer (XDB), and performs reading and writing of 64-byte blocks of data into one to four banks of memory.

Memory bank 512-data bits, plus 64-ECC bits, made up of eight DIMMs.

Memory module A daughter card containing 32 DIMMs.

NPB Non-Processor Board

POST Power-on self-test.

PC Port Controller ASIC. Interfaces UPA modules to the Sun Enterprise 10000 system. The PC controls address flow between the UPA port and the four coherency interface controllers, and controls data flow between the UPA port and the data buffer (XDB).

PCS POST Controller and Sequencer. The SSP-resident component of POST.

Platform The platform name is a logical name given to a Sun Enterprise 10000 system. A platform name does not correspond to any host on the network.

PUP Pack/Unpack. A mode of the XMUX ASIC used on the memory module.

RED_state Trap (REDMODE) A SPARC v9 processor takes a trap at an offset 0xa0 (PA = 0x1ff f000 00a0) when processor reset or trap occurs and TL is at MAX_TL -1 or system software sets PSTATE.RED to 1.

SIR Software Initiated Reset. A software initiated reset is initiated by a SIR instruction within any processor. This pre-processor reset has a trap type 4 at physical address offset 0x80 (PA = 0x1ff f0000 0080).

SMD Shared Memory Domain

SOC Serial Optical Channel. Connects two Fibre Channels to an SBus.

SSP System Service Processor. A networked SPARCstation™ from which the system is booted and diagnosed.

System board A large circuit board containing a memory module, four UltraSPARC processor modules, and two I/O modules.

System clock The interconnect clock. It is centrally distributed to all UPA ports and within the interconnect.

System Controller (SC) The central controller in the interconnect. It orchestrates the cache coherency, data flow, flow control and memory operations.

UDB UltraSPARC Data Buffer. Two chips that connect the UltraSPARC-I processor and its external cache to the 144-bit wide UPA port.

UPA Multiprocessor Ultra Port Architecture. UPA refers to the module interface which plugs into the interconnect. The UPA module may contain a processor, or it may contain an I/O controller, graphics device and so on.

Uncorrectable Error Same as Unrecoverable Error.

Unrecoverable Error An error which cannot be corrected through hardware or software action. Error detected by the hardware indicating that data has been lost. This type of error is fatal and results in an arbiter stop condition.

Watchdog Reset (WDR) A SPARC V9 processor signals itself internally to take a Watchdog Reset (WDR) trap at physical address offset 0x40 (PA = 0x1ff f0000 0040) when a trap occurs and TL is at MAX_TL.

XBAR Data Crossbar. An application of the XMUX on the centerplane.

XDB Data Buffer chip. Buffers cache lines that are in transit between a UPA data port or a memory bank and the local data router.

XARB Arbiter Chip. Has modes to implement three functional units: the local address arbiter, the local data arbiter, and the global address arbiter.

XIR Externally Initiated Reset. An externally initiated reset is sent to the CPU by the XIR pin. It causes a SPARC V9 XIR which has a trap type 0x3 at physical address offset 0x60 (PA = 0x1ff f000 0060).

XMUX Multiplexer chip. Has modes to implement four functional units: the global address router, the local data router, the global data router, and the 144/576-bit wide pack/unpack on the memory module.

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