SPARC M5-32 and SPARC M6-32 Servers

Service Manual

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Contents

Using This Documentation

This document describes how to troubleshoot and maintain the SPARC M5-32 and SPARC M6-32 servers from Oracle. This document is written for technicians, system administrators, and authorized service providers who have advanced experience working with similar products.

Product Notes

For late-breaking information and known issues about this product, refer to the product notes at:

`http://www.oracle.com/goto/M5-32/docs`

`http://www.oracle.com/goto/M6-32/docs`

Related Documentation

Documentation	Links
SPARC M5-32 and SPARC M6-32 servers	http://www.oracle.com/goto/M5-32/docs http://www.oracle.com/goto/M6-32/docs
Oracle Integrated Lights Out Manager (ILOM)	http://www.oracle.com/goto/ILOM/docs
Oracle Solaris 11 OS	http://www.oracle.com/goto/Solaris11/docs
Oracle VM Server for SPARC	http://www.oracle.com/goto/VM-SPARC/docs
Oracle VTS	http://www.oracle.com/goto/VTS/docs
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Identifying Components

Use this chapter to locate components in the Oracle SPARC M5-32 and SPARC M6-32 servers.

Note – Components in these servers can be replaced only by authorized service personnel.

Note – Working conditions vary from site to site. Arrange with the customer's facilities department to schedule time to work on the server and prevent unexpected complications.

Description	Links
View front components.	"Identifying Front Components" on page 2
View rear components.	"Identifying Rear Components" on page 9
View side components.	"Side Panels" on page 16
View internal components.	"Identifying Internal Components" on page 17
Understand scalability.	"Scalability, DCUs, and PDomains" on page 21
Understand the cooling system in the server.	"Understanding Cooling Zones" on page 24
Understand how service tasks are organized in the service manual.	"Component Service Task Reference" on page 30

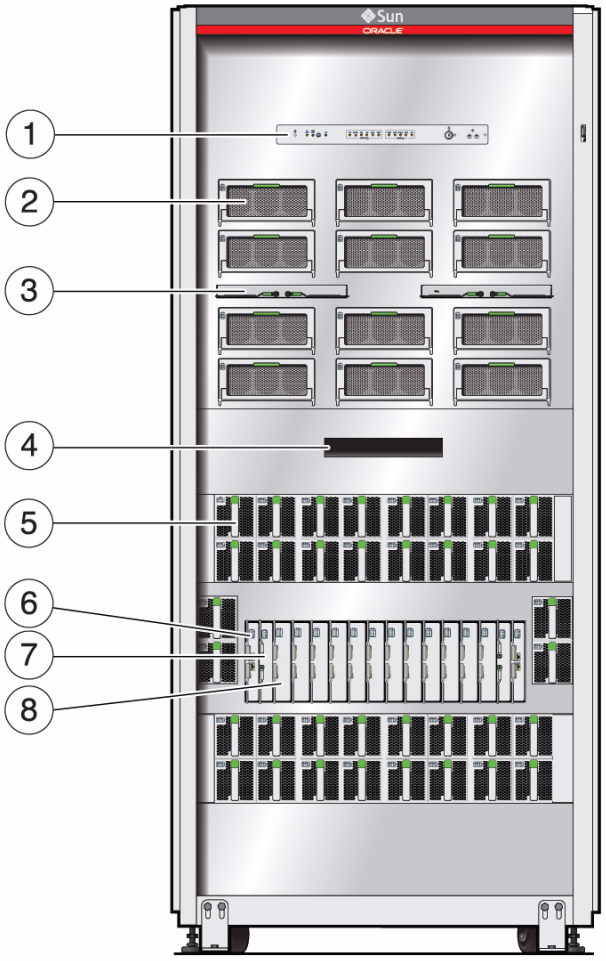
Related Information

- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481
- *Server Installation*
- *Server Administration*

Identifying Front Components

Related Information

Front Component Locations



No.	Description	Links
1	Front LED panel	“Servicing the Front LED Panel” on page 287
2	Power supply (12)	“Servicing Power Supplies” on page 101
3	Power system distribution board (PSDB) (2)	“Servicing PSDBs” on page 109
*	Power system cage	“Servicing the Power System Cage” on page 323
4	Front filler panel	“Servicing the Front Filler Panel” on page 291
†	Fan cages (2)	“Servicing Fan Cages” on page 295

No.	Description	Links
5	Fan module (36)	“Servicing Fan Modules” on page 115
‡	Scalability card cage	“Servicing the Scalability Card Cage” on page 313
6	Service processor (2)	“Servicing Service Processors” on page 141
7	Clock board (2)	“Servicing Clock Boards” on page 131
8	Scalability switch modules (12)	“Servicing SSBs” on page 123
	Front door (not shown)	“Servicing Cabinet Doors” on page 77
	Rear door (not shown)	“Servicing Cabinet Doors” on page 77

* For a view of the power system cage, see “Power System Cage Component Locations” on page 5.

† For views of the fan cages, see “Fan Cage Component Locations” on page 7.

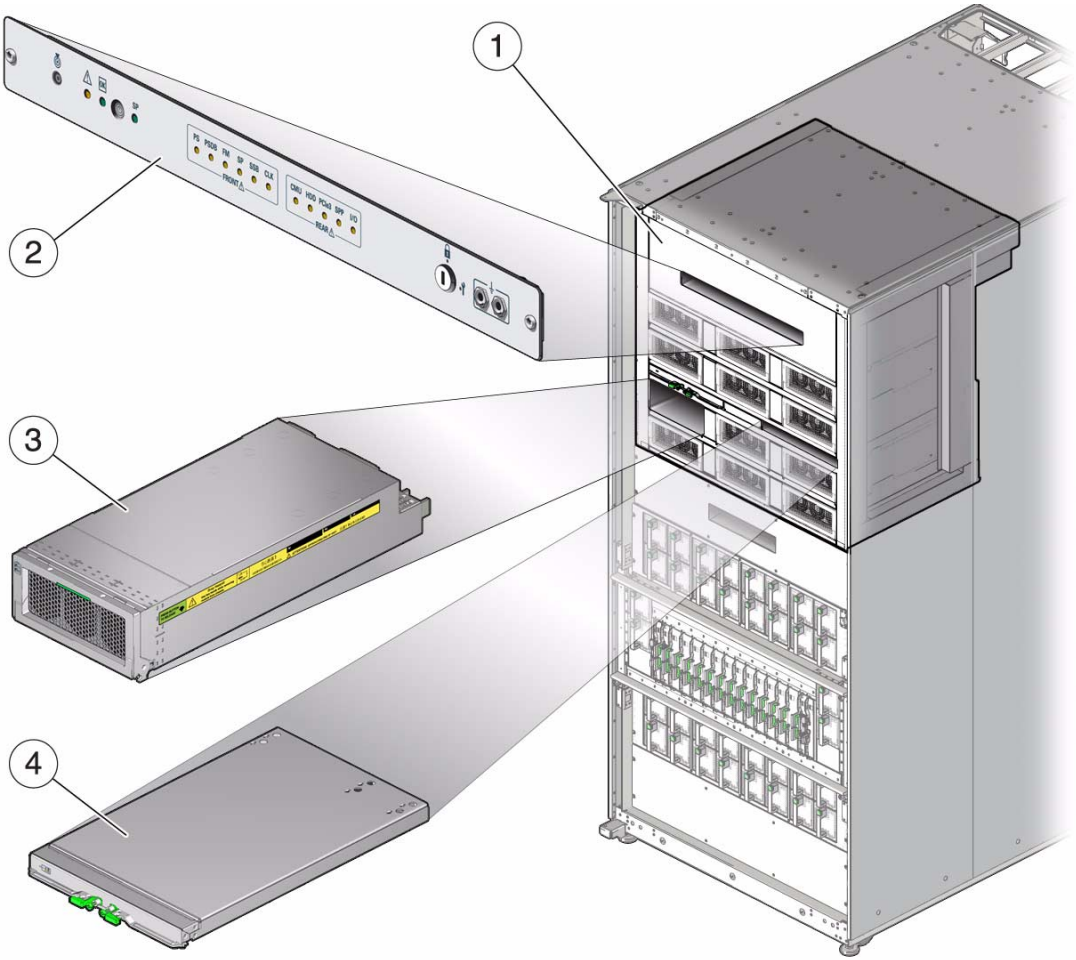
‡ For a view of the scalability card cages, see “Scalability Card Cage Component Locations” on page 8.

Related Information

- “Power System Cage Component Locations” on page 5
- “Fan Cage Component Locations” on page 7
- “Scalability Card Cage Component Locations” on page 8

Power System Cage Component Locations

Note – The server will not boot unless all 12 power supplies are present.



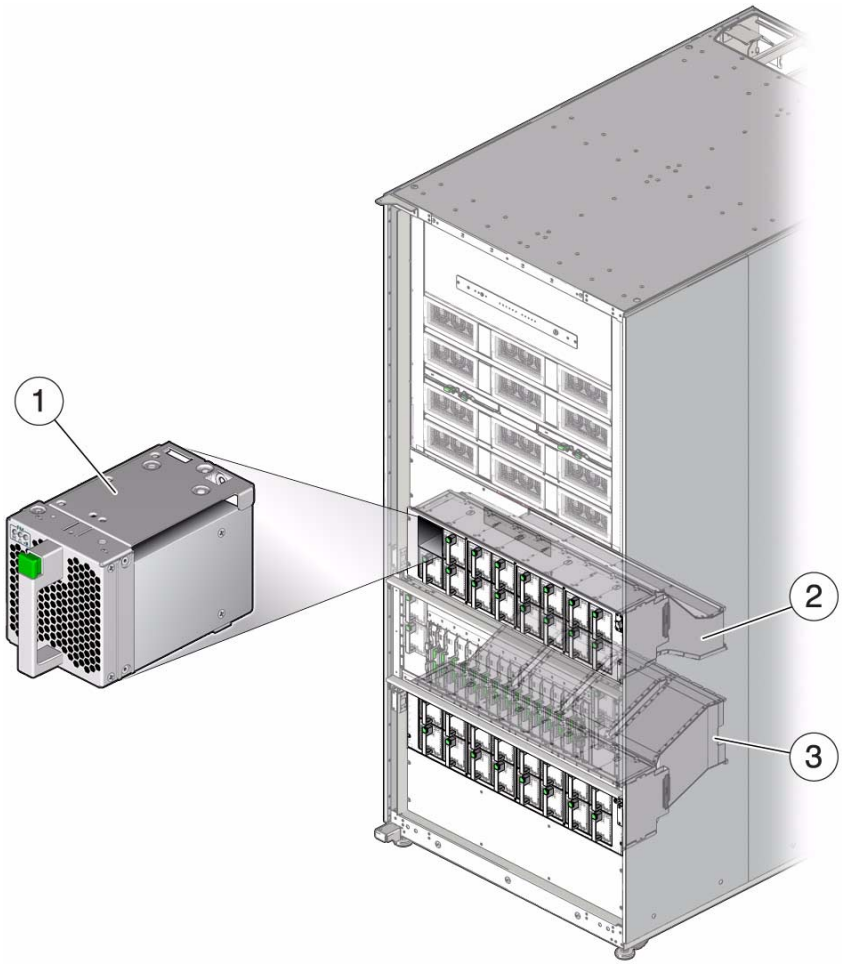
No.	Description	Links
1	Power system cage	"Servicing the Power System Cage" on page 323
2	Front LED panel	"Servicing the Front LED Panel" on page 287
		"Front and Rear LED Panel LEDs and Controls" on page 55

No.	Description	Links
3	Power supply (12)	"Servicing Power Supplies" on page 101 "Understanding Cooling Zones" on page 24
4	PSDB (2)	"Servicing PSDBs" on page 109

Related Information

- "Fan Cage Component Locations" on page 7
- "Scalability Card Cage Component Locations" on page 8

Fan Cage Component Locations



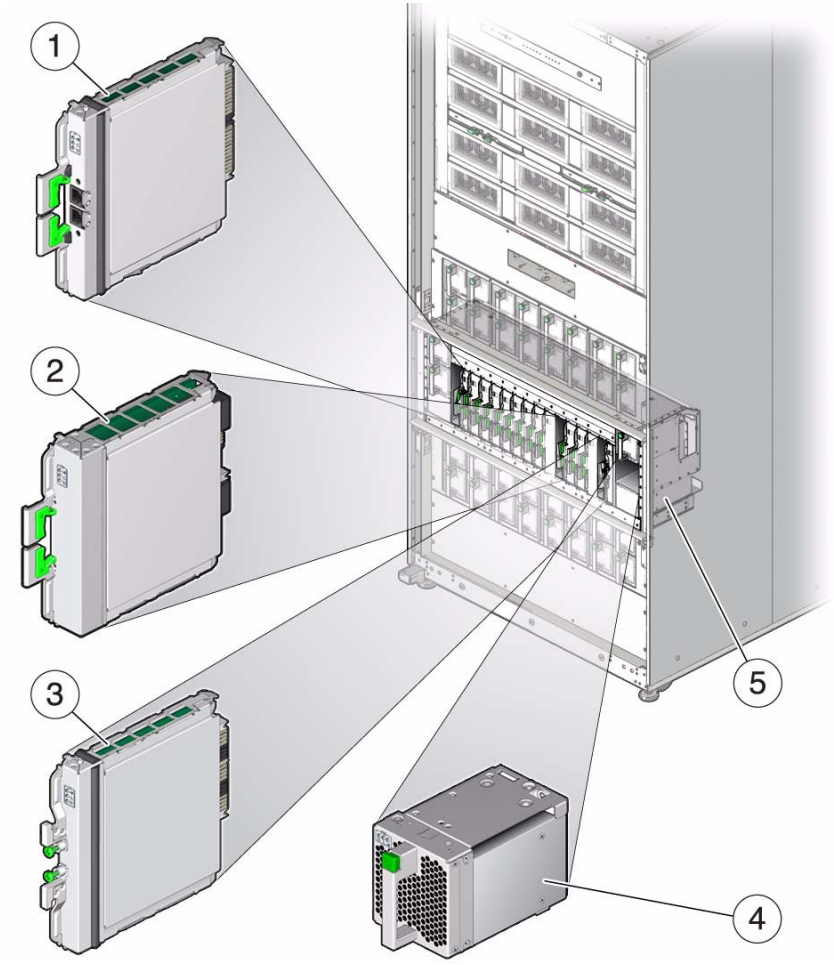
No.	Description	Links
1	Fan module (32)	"Servicing Fan Modules" on page 115
		"Understanding Cooling Zones" on page 24
2	Upper fan cage	"Servicing Fan Cages" on page 295
3	Lower fan cage	"Servicing Fan Cages" on page 295

Related Information

- "Power System Cage Component Locations" on page 5

■ "Scalability Card Cage Component Locations" on page 8

Scalability Card Cage Component Locations



No.	Description	Links
1	Service processor (2)	"Servicing Service Processors" on page 141
2	Scalability switch board (12)	"Servicing SSBs" on page 123
		"Scalability, DCUs, and PDomains" on page 21
		"Scalability Hardware" on page 22

No.	Description	Links
3	Clock board (2)	“Servicing Clock Boards” on page 131
4	Fan module (4)	“Servicing Fan Modules” on page 115
		“Understanding Cooling Zones” on page 24
5	Scalability card cage	“Servicing the Scalability Card Cage” on page 313

Related Information

- “Power System Cage Component Locations” on page 5
- “Fan Cage Component Locations” on page 7

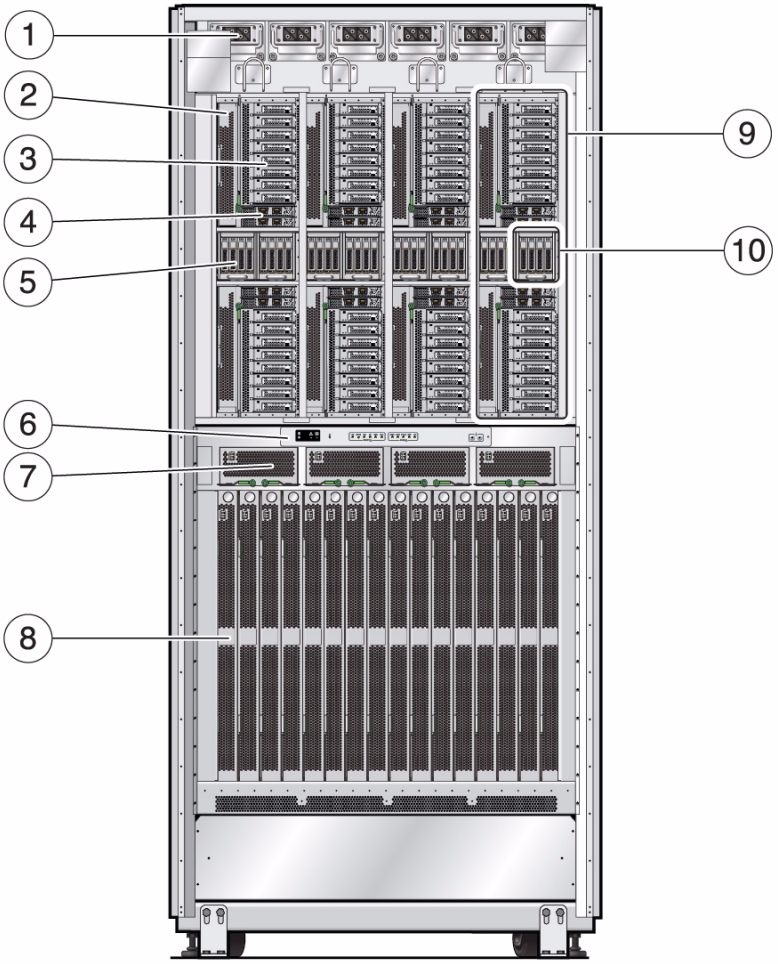
Identifying Rear Components

- “Rear Component Locations” on page 10
- “IOU Component Locations” on page 12
- “CMU Cage Component Locations” on page 14

Related Information

- “Identifying Front Components” on page 2
- “Identifying Internal Components” on page 17
- “Identifying Rear Components” on page 9

Rear Component Locations



No.	Description	Links
1	AC input filters (6)	"Servicing AC Input Filters" on page 343
2	I/O controller boards (8)	"Servicing I/O Switch Boards" on page 153
3	PCIe I/O carrier slots (64)	"Servicing I/O Cards" on page 163
4	EMS slots (16)	"Servicing EMSs" on page 193
5	HDDs and/or SDDs (32)	"Servicing HDDs, SSDs, and Drive Filler Panels" on page 209
6	Rear LED panel	"Servicing the Rear LED Panel" on page 353

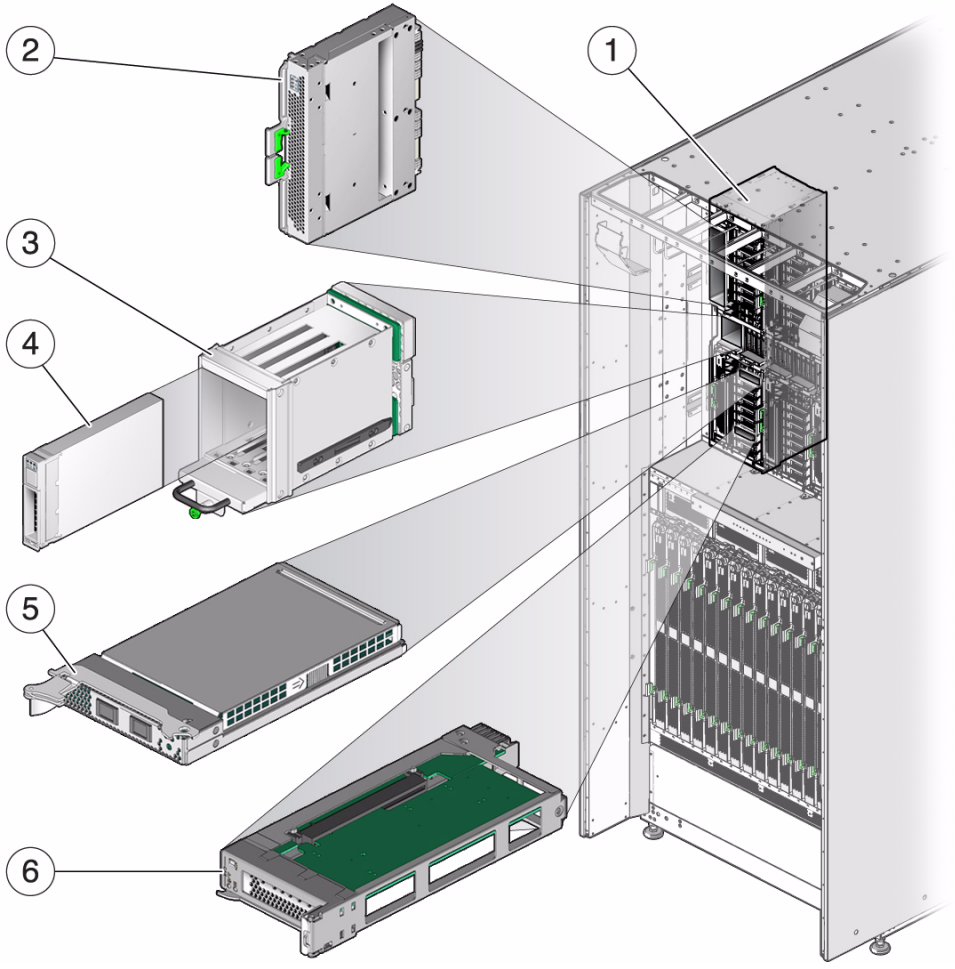
No.	Description	Links
7	SP proxies (4)	“Servicing SPPs” on page 233
8	CMU (16)	“Servicing CMUs” on page 247
9	I/O cages (4)	“Servicing IOUs” on page 357
10	Hard drive cages (4)	“Servicing Hard Drive Cages” on page 371

Related Information

- “Servicing DIMMs” on page 271
- “Servicing AC Power Cords” on page 335
- “Servicing IOUs” on page 357
- “IOU Component Locations” on page 12
- “CMU Cage Component Locations” on page 14

IOU Component Locations

Four IOU card cages are located at the rear of the server. Each cage has the following types of components.



No.	Description	Links
1	IOU (4)	"Servicing IOUs" on page 357
2	I/O switch board (8)	"Servicing I/O Switch Boards" on page 153
3	HDD cage (8)	"Servicing Hard Drive Cages" on page 371

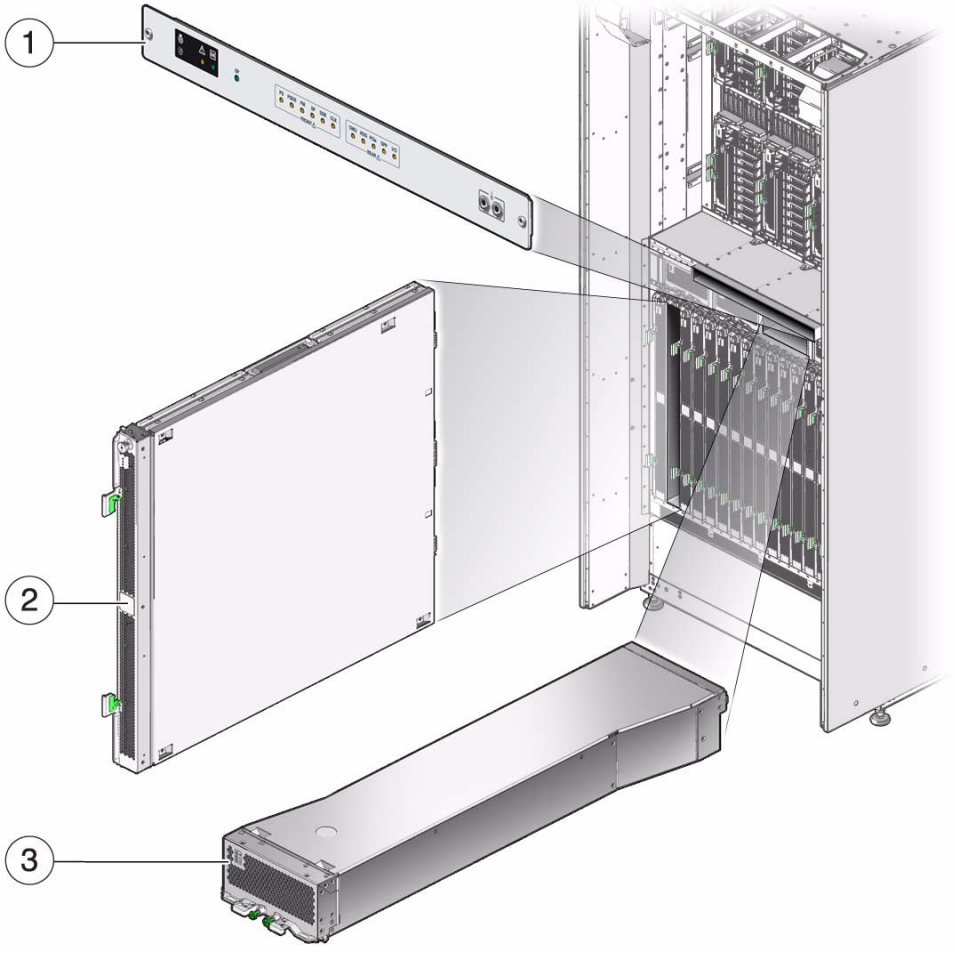
No.	Description	Links
4	HDD or SSD (32)	"Servicing HDDs, SSDs, and Drive Filler Panels" on page 209
5	EMS (16)	"Servicing EMSs" on page 193
6	PCIe hot-plug carrier (64)	"Servicing I/O Cards" on page 163

Related Information

- "Rear Component Locations" on page 10
- "CMU Cage Component Locations" on page 14

CMU Cage Component Locations

The CMU cage contains the following types of components. The cage itself is not removable.



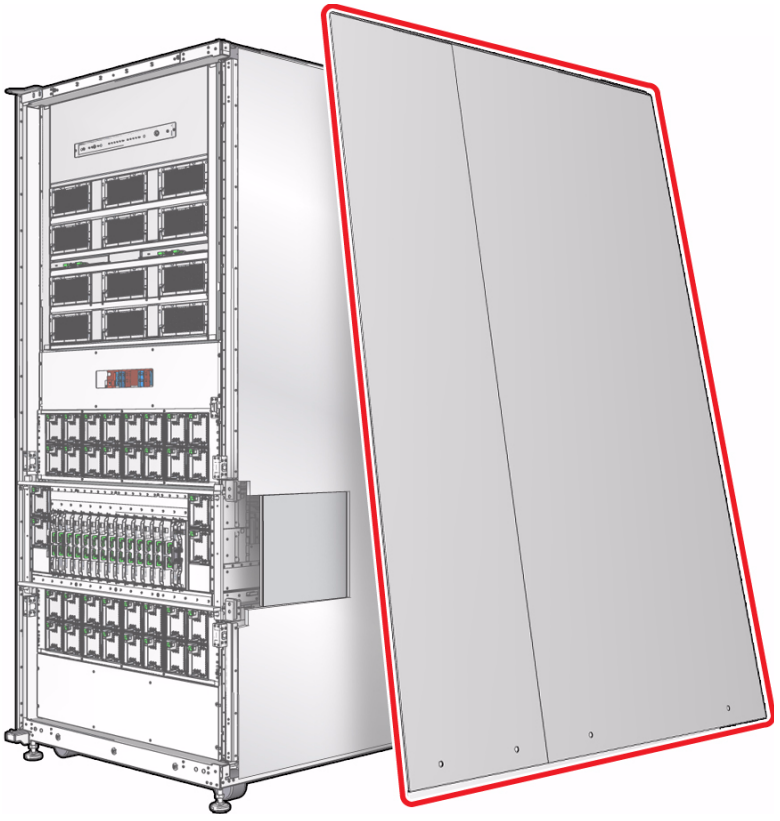
No.	Description	Links
1	Rear LED board	"Servicing the Rear LED Panel" on page 353
2	CMU (16)	"Servicing CMUs" on page 247
3	SPP (4)	"Servicing SPPs" on page 233

Related Information

- “Front and Rear LED Panel LEDs and Controls” on page 55
- “Servicing DIMMs” on page 271
- “Rear Component Locations” on page 10
- “IOU Component Locations” on page 12

Side Panels

The side panels are shown below. There are two panels (one wide and one narrow) to a side. Note that you do not have to remove the side panels to access any of the server's internal components.



Related Information

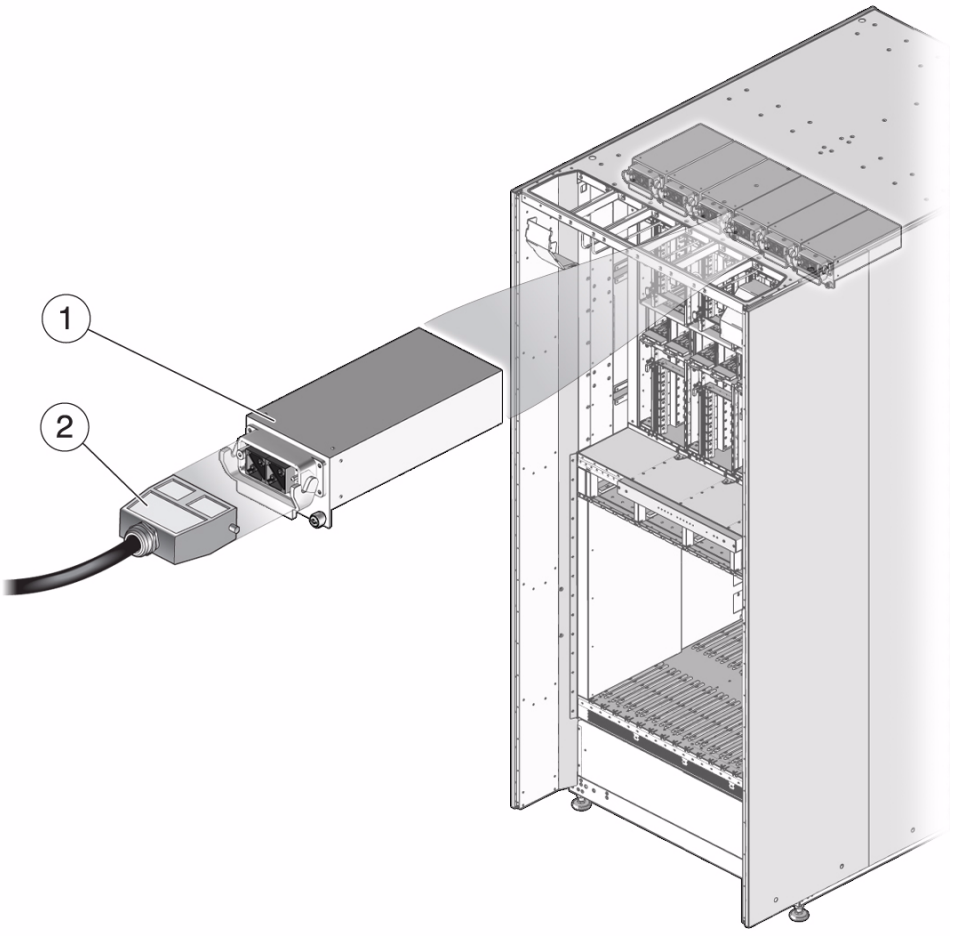
- "Identifying Front Components" on page 2
- "Identifying Internal Components" on page 17
- "Identifying Rear Components" on page 9

Identifying Internal Components

Related Information

- "Identifying Front Components" on page 2
- "Identifying Rear Components" on page 9
- "Side Panels" on page 16

AC Input Filter and AC Power Cord

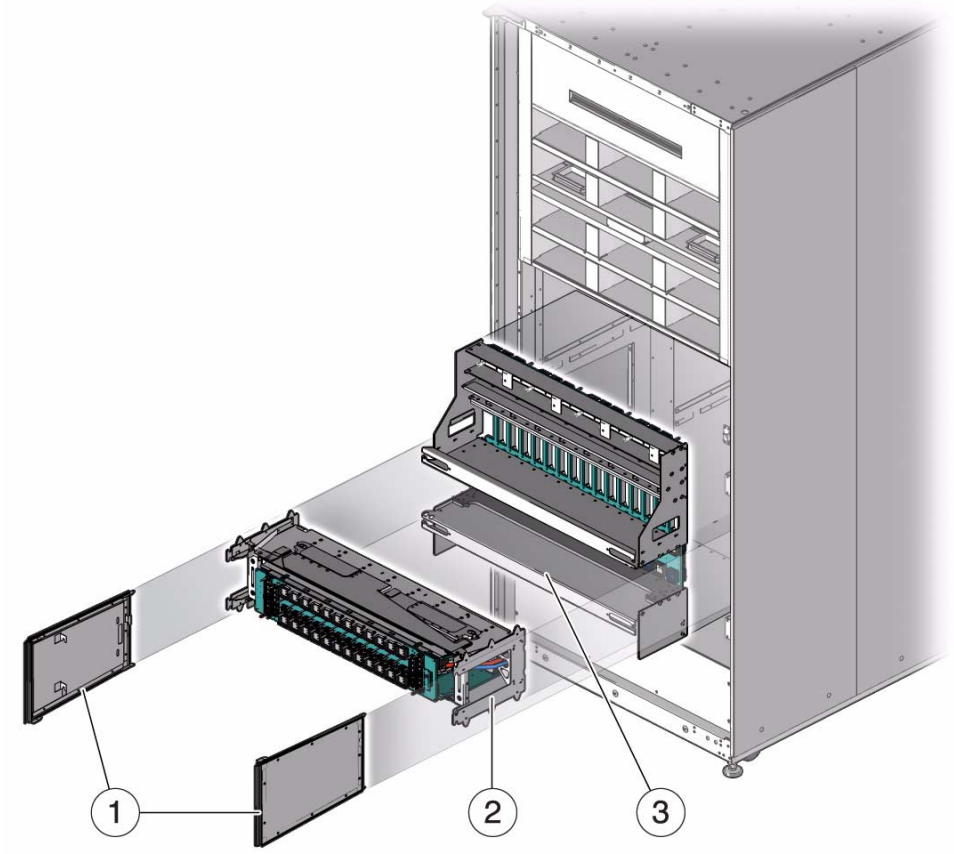


No.	Description	Links
1	AC input filter (6)	"Servicing AC Input Filters" on page 343
2	AC power cord (6)	"Servicing AC Power Cords" on page 335

Related Information

- "RFI Panel, Scalability Assembly, and Midplane Locations" on page 19
- "Internal Cable Factory Names" on page 20
- "Servicing the Power System Cage" on page 323

RFI Panel, Scalability Assembly, and Midplane Locations



No.	Description	Links
1	RFI panels (2)	"Servicing the Scalability Assembly" on page 375
2	Scalability assembly	"Servicing the Scalability Assembly" on page 375
3	Midplane	"Servicing the Midplane" on page 451

Related Information

- "AC Input Filter and AC Power Cord" on page 18
- "Internal Cable Factory Names" on page 20

Internal Cable Factory Names

This list of factory names might help you identify internal cables when ordering replacements.

Factory Name (description in database)	Service Procedures
CABLED LOWER BUS BARS	"Servicing a Cabled Lower Bus Bar Assembly" on page 305
CABLE ASSY, SCALE FANS	"Servicing the Scalability Fans Cable" on page 319
FRU,CLIPS,SCREWS,BUS BAR	"Servicing Bus Bars" on page 329
PWR-CBL 3-PH AC60A DOMESTIC 208VAC	"Servicing AC Power Cords" on page 335
PWR-CBL 3PH AC32A EU 415VAC	"Servicing AC Power Cords" on page 335
CABLE ASSY, I/O POWER	"Servicing an I/O Power Cable Assembly" on page 365
CABLE ASSY,FAN POWER	"Servicing the Fan Power Cable" on page 385
CABLE ASSY, PWR_SHLF-SCALE FANS	"Servicing the Power System Cage to Scalability Assembly Cable" on page 395
CABLE ASSY, SCMP-PSDB, LINK	"Servicing the PSDB to Scalability Midplane Cable" on page 403
CABLE ASSY, FR SYS LINK	"Servicing the Internal Link to Front LED Panel Cable" on page 411
CABLE ASSY, REAR SYS	"Servicing the Rear LED Panel Cable" on page 417
CABLE ASSY, SCALE,CHAS,DC-NEG	"Servicing Midplane Power Cables" on page 423
CABLE ASSY, SCALE,CHAS,DC-POS	"Servicing Midplane Power Cables" on page 423
CABLE ASSY, I/O	"Servicing the I/O Data Cable Assembly" on page 433

Related Information

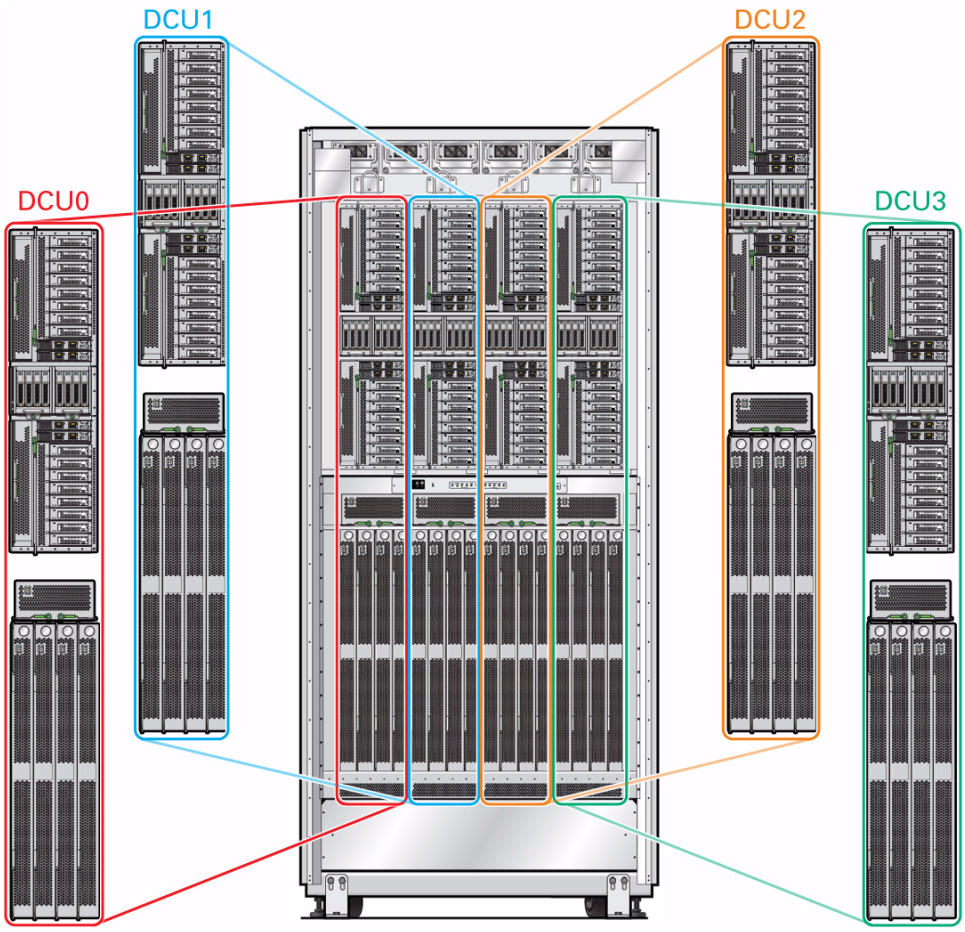
- "AC Input Filter and AC Power Cord" on page 18
- "RFI Panel, Scalability Assembly, and Midplane Locations" on page 19

Understanding Scalability

Scalability, DCUs, and PDomains

A DCU is a physical slice of the server. Each of the four DCUs contains CMUs, I/O components, and hard drives. An SPP in each DCU manages these components.

Scalability is the ability to increase (or scale up) processing power in a server by combining DCUs into logical groups called PDomains. A PDomain can be made more powerful by adding more DCUs.



Related Information

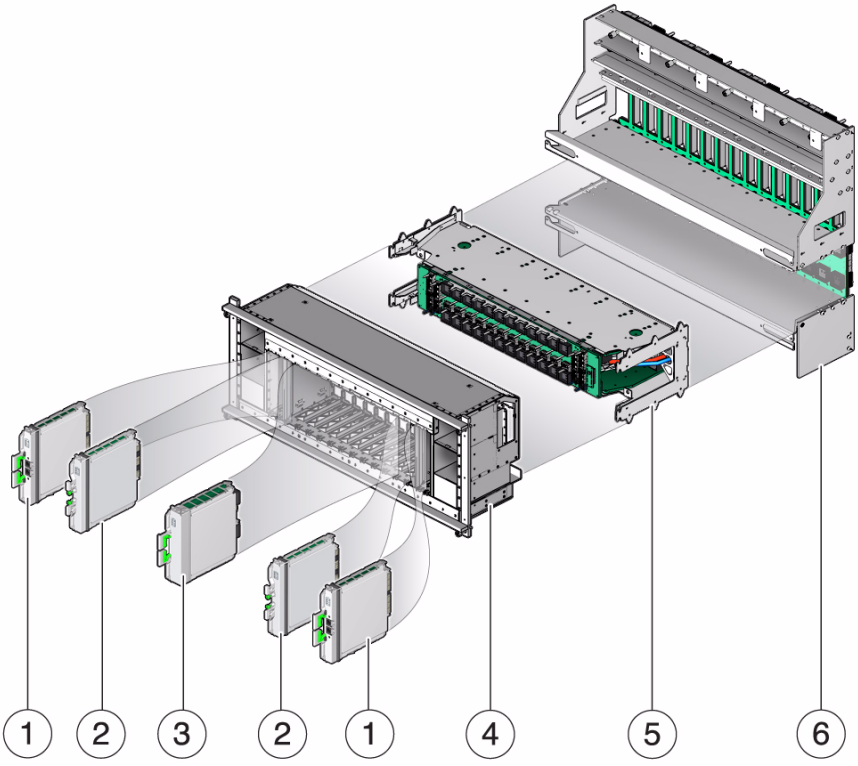
- *Server Administration*, architectural overview
- "Scalability Hardware" on page 22
- "Scalability Card Cage Component Locations" on page 8

Scalability Hardware

In a DCU, the CMUs and I/O components communicate directly with each other through the midplane.

The midplane isolates DCUs from other DCUs in the server. DCUs do not connect with each other directly, but scalability hardware permits DCUs to connect indirectly.

The following figure shows the scalability hardware. Data signals from a DCU cross the midplane and scalability cage to the scalability card cage, where SSBs switch the data signals back through the scalability assembly and the midplane to other DCUs.



	Component	Links
1	Service processor (2)	"Servicing Service Processors" on page 141
2	Clock board (2)	"Servicing Clock Boards" on page 131
3	Scalability switch board (12)	"Servicing SSBs" on page 123
4	Scalability card cage	"Servicing the Scalability Card Cage" on page 313

	Component	Links
5	Scalability assembly	“Servicing the Scalability Assembly” on page 375
6	Midplane	“Servicing the Midplane” on page 451

Note – If the scalability feature is not enabled, the SSB LEDs turn off. This is normal behavior for SSB LEDs on the scalability card cage.

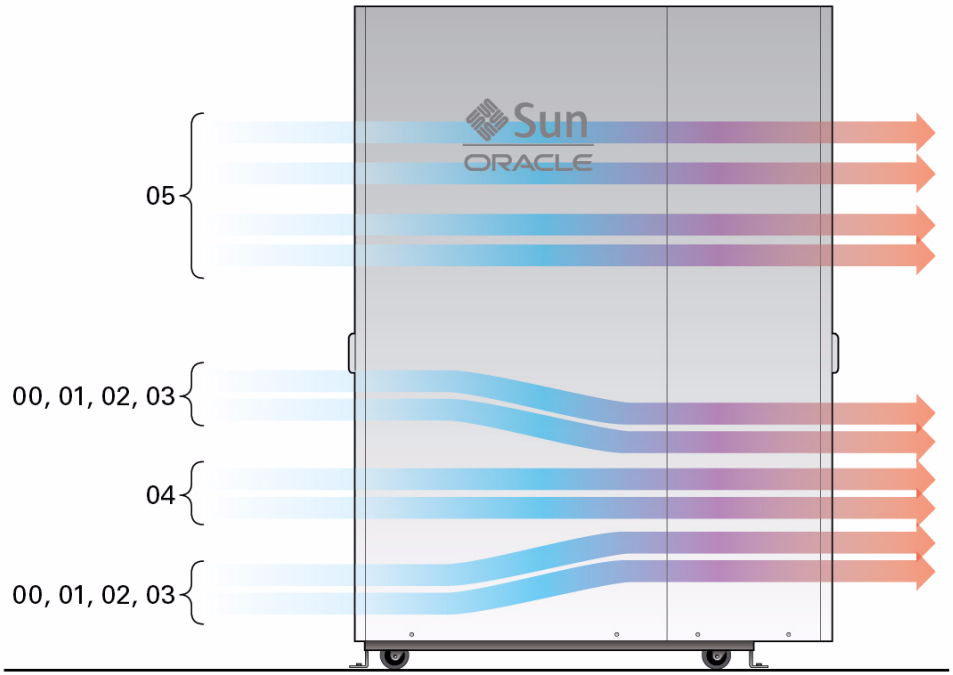
Related Information

- “Scalability, DCUs, and PDomains” on page 21
- “Servicing SSBs” on page 123
- “Servicing the Scalability Card Cage” on page 313
- “Servicing the Scalability Assembly” on page 375
- “Servicing the Midplane” on page 451

Understanding Cooling Zones

Cooling Zones Overview

Air flow through the server is divided into six cooling zones, 00 through 05.



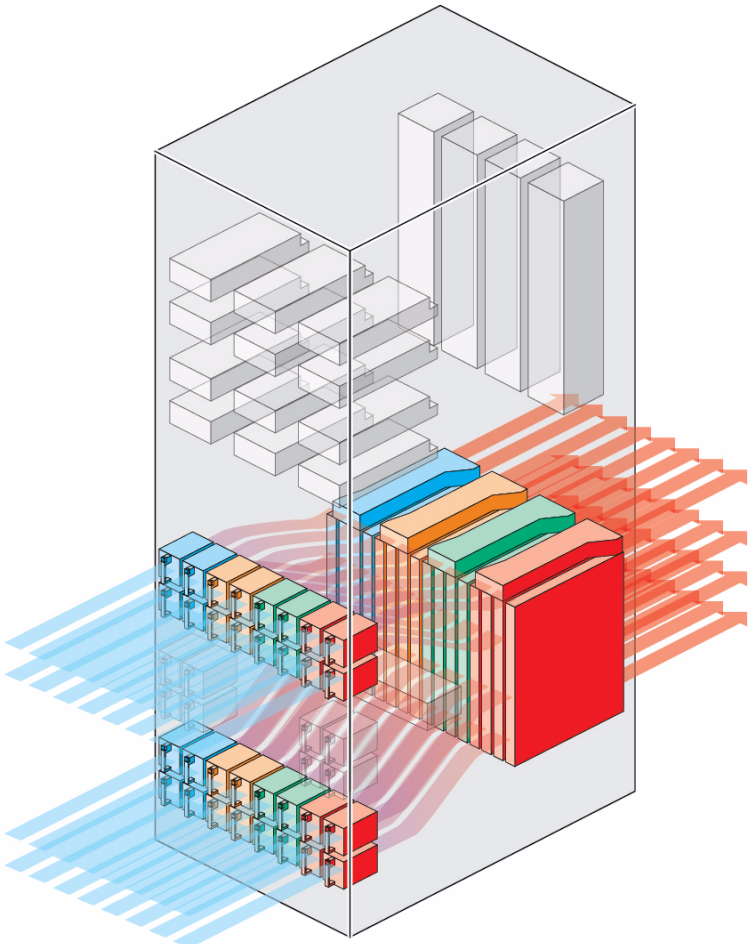
Related Information

- "Cooling Zones 00 Through 03" on page 25
- "Cooling Zone 04" on page 26
- "Cooling Zone 05" on page 28

Cooling Zones 00 Through 03

`CoolingZone00`, `CoolingZone01`, `CoolingZone02`, and `CoolingZone03` cool the SPP and CMU slots. These zones are numbered from left to right, as viewed from the rear of the server.

Cooling for these four zones is supplied by the two fan cages, as shown below. Each fan module contains two fans. If a fan fails in a fan module, replace the entire fan module.



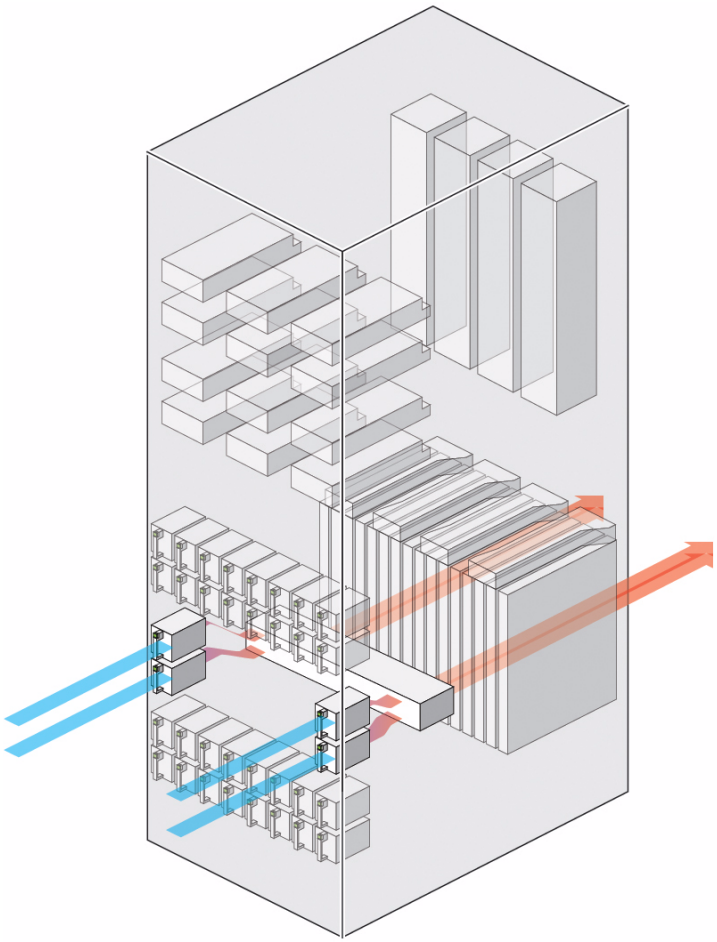
Related Information

- "Servicing Fan Modules" on page 115
- "Cooling Zones Overview" on page 24

Cooling Zone 04

`CoolingZone04` cools the scalability card cage. This zone includes fan modules in slots marked `FM16`, `FM17`, `FM18`, and `FM19`. These fan modules are separate from the fan cages, which are discussed in "Cooling Zones 00 Through 03" on page 25.

Each fan module contains two fans. If a fan fails in a fan module, replace the entire fan module.

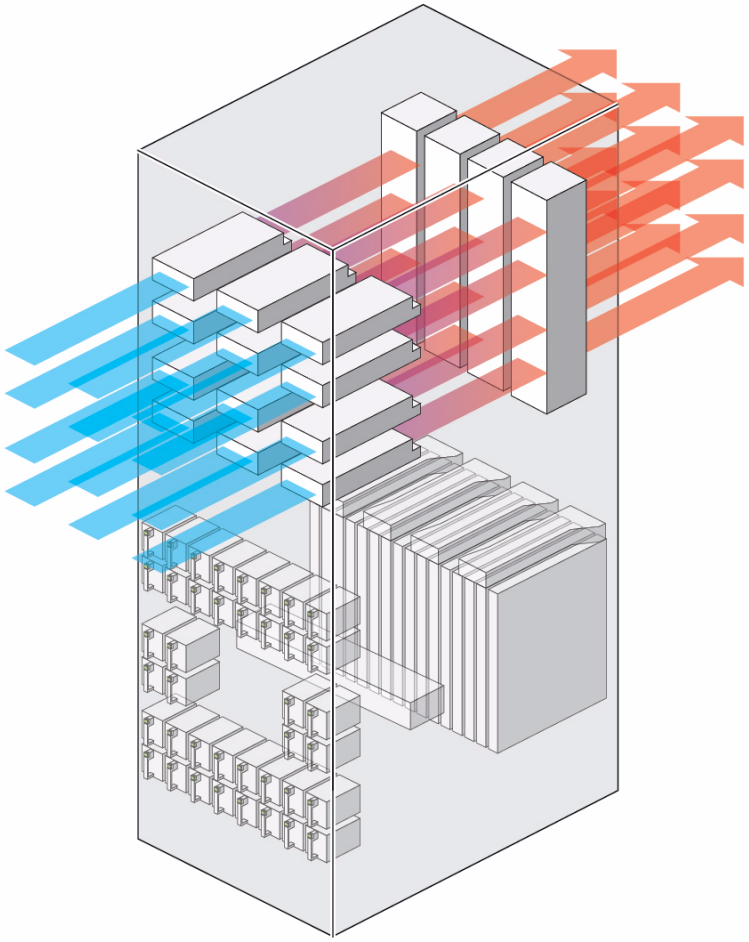


Related Information

- “Servicing Fan Modules” on page 115
- “Cooling Zones Overview” on page 24
- “Cooling Zones 00 Through 03” on page 25
- “Cooling Zone 05” on page 28

Cooling Zone 05

`CoolingZone05` cools the power system cage and four IOUs.



The power supplies in the power system cage provide the cooling air. Each power supply contains three fans. If a fan fails in a power supply, replace the entire power supply.

Related Information

- “Servicing Power Supplies” on page 101
- “Cooling Zones Overview” on page 24
- “Cooling Zones 00 Through 03” on page 25

- “Cooling Zone 04” on page 26

Cooling Zone Assignments and DCUs

Cooling zones 00 through 03 provide cooling air to SPPs and CMUs. The first four cooling zones therefore correspond to the four DCUs. Each cooling zone has eight fan modules. The following table shows which fan modules are assigned to DCUs and CMUs.

Cooling Zone	`CoolingZone00`		`CoolingZone01`		`CoolingZone02`		`CoolingZone03`	
DCU #	00		01		02		03	
CMU numbers	0, 1, 2, 3		4, 5, 6, 7		8, 9, 10, 11		12, 13, 14, 15	
Upper fan cage, top row	FM 35	FM 34	FM 33	FM 32	FM 31	FM 30	FM 29	FM 28
Upper fan cage, bottom row	FM 27	FM 26	FM 25	FM 24	FM 23	FM 22	FM 21	FM 20
Lower fan cage, top row	FM 15	FM 14	FM 13	FM 12	FM 11	FM 10	FM 9	FM 8
Lower fan cage, bottom row	FM 7	FM 6	FM 5	FM 4	FM 3	FM 2	FM 1	FM 0

Cooling zone 04 includes FM 16, FM 17, FM 18, and FM 19. They are part of the scalability card cage. See “Cooling Zone 04” on page 26.

The IOUs for the DCUs are in a separate cooling zone. The server’s power supplies provide the cooling power for the IOUs. See “Cooling Zone 05” on page 28.

Related Information

- “Cooling Zones Overview” on page 24
- “Servicing Fan Modules” on page 115
- “Servicing Power Supplies” on page 101
- “Cooling Zones 00 Through 03” on page 25
- “Cooling Zone 04” on page 26
- “Cooling Zone 05” on page 28

Component Service Task Reference

Use the following FRU names in the software commands shown in the service procedures.

Numbers in brackets indicate the first and last locations for multiple components of the same type. For example, the server has two clock boards, `/SYS/CLOCK0` and `/SYS/CLOCK1`, as indicated by the [0:1} in this table.

Description	FRU Name	Service Procedures
Battery (SP)	`/SYS/SP[0:1]/BAT`	"Servicing Service Processors" on page 141
Battery (SPP)	`/SYS/SPP[0:3]/BAT`	"Servicing SPPs" on page 233
Clock board	`/SYS/CLOCK[0:1]`	"Servicing Clock Boards" on page 131
CMU	`/SYS/CMU[0:15]`	"Servicing CMUs" on page 247
DIMM	`/System/Memory/DIMMs/DIMM_`*x*	"Servicing DIMMs" on page 271
EMS	`/SYS/IOU[0:3]/EMS[1:4]`	"Servicing EMSs" on page 193
Fan module	`/SYS/FM[0:35]`	"Servicing Fan Modules" on page 115
IOU	`/SYS/IOU[0:3]`	"Servicing IOUs" on page 357
I/O switch board	`/SYS/IOU[0:3]/IOB[0:1]`	"Servicing I/O Switch Boards" on page 153
I/O card	`/SYS/IOU[0:3]/PCIE[1:16]`	"Servicing I/O Cards" on page 163
PCIe carrier	`/SYS/IOU[0:3]/PCIE[1:16]`	"Servicing I/O Cards" on page 163
Operator panel	`/SYS/FOPNL0`	"Servicing the Front LED Panel" on page 287
Operator panel	`/SYS/ROPNL0`	"Servicing the Rear LED Panel" on page 353
Power supply	`/SYS/PSU[0:11]`	"Servicing Power Supplies" on page 101
PSDB	`/SYS/PSDB[0:1]`	"Servicing PSDBs" on page 109
Service processor	`/SYS/SP[0:1]`	"Servicing Service Processors" on page 141
SSB	`/SYS/SSB[0:11]`	"Servicing SSBs" on page 123
SPP	`/SYS/SPP[0:3]`	"Servicing SPPs" on page 233

Related Information

- "Identifying Front Components" on page 2
- "Identifying Rear Components" on page 9
- "Identifying Internal Components" on page 17

Detecting and Managing Faults

These topics explain how to use various diagnostic tools to monitor server status and troubleshoot faults in the server.

Related Information

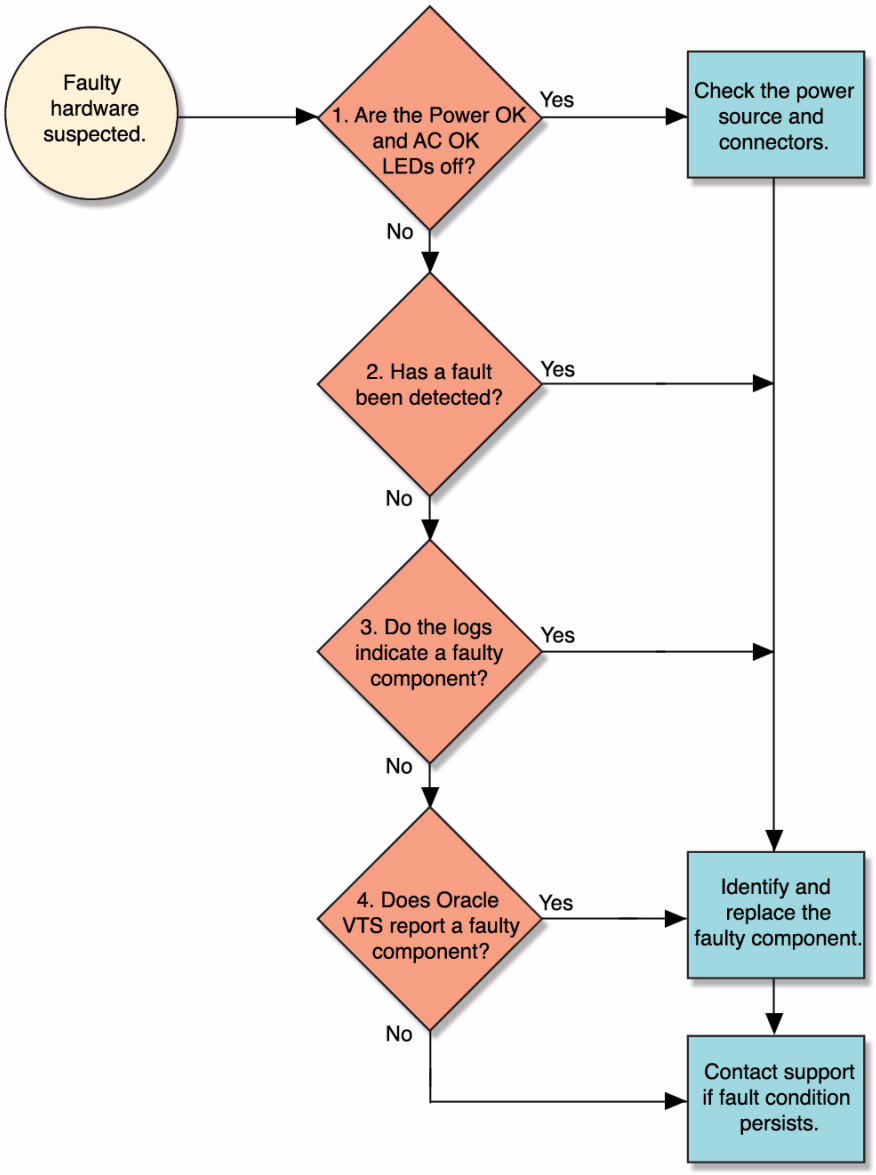
- "Identifying Components" on page 1
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Diagnostic Overview

When a problem arises, use these topics to find the source of the problem and to select a course of action.

Diagnostics Process

This flowchart illustrates the general process of diagnostics for this server. Depending on the fault, you might need to perform all of the steps or just some of them. You also might have to run diagnostic software that needs to be installed or enabled.



This table provides descriptions of the troubleshooting actions that you should take to identify a faulty component, along with links to topics with additional information on each diagnostic action.

Note – The diagnostic tools you use, and the order in which you use them, depend on the nature of the problem you are troubleshooting.

Diagnostic Action	Possible Outcome	Links
Check Power OK and AC Present LEDs on the server.	If these LEDs are not on, check the power source and power connections to the server.	• "Interpreting LEDs" on page 54
Check the log files for fault information.	If system messages indicate a faulty component, replace it. You can obtain information from various tools such as Predictive Self-Healing (PSH), Oracle ILOM, or Oracle Solaris OS.	• "Interpreting Log Files and System Messages" on page 44
Type the `fmadm faulty` command to check for faults.	If the fault is detected by PSH, refer to the PSH Knowledge Article web site for additional information.	• "Check for Faults" on page 40
Run Oracle VTS software.	To run Oracle VTS, the server must be running the Oracle Solaris OS. • If Oracle VTS reports a faulty component, replace it. • If Oracle VTS does not report a faulty component, run POST.	• `http://www.oracle.com/goto/VTS/docs`
Contact technical support.	The majority of hardware faults are detected by the server's diagnostics. In rare cases a problem might require additional troubleshooting. If you are unable to determine the cause of the problem, contact your service representative for support.	

Related Information

- "Diagnostic Overview" on page 31
- "Diagnostic Tools" on page 34
- "Log In to Oracle ILOM (Service)" on page 38

Diagnostic Tools

The availability of the diagnostic tools depends on the state of the server. These topics describe which tools are available, when they are available, and how to access them.

These tools are available to perform diagnostics:

- **Status LEDs** – Indicate the condition or state of the chassis and components. See "Interpreting LEDs" on page 54.
- **Log files and command interface** – Provide the standard Oracle Solaris OS log files and investigative commands that can be accessed and displayed on the device of your choice.
- **Predictive Self-Healing (PSH)** – PSH continuously monitors the health of the CPU, memory and other components, and works with Oracle ILOM and Oracle Solaris to take a faulty component offline if needed. PSH enables systems to accurately predict component failures and mitigate many serious problems before they occur.
- **Oracle ILOM** – The Oracle ILOM firmware runs on the service processor. In addition to providing the interface between the hardware and OS, Oracle ILOM also tracks and reports the health of key server components. Oracle ILOM works closely with PSH to keep the system running, even when there is a faulty component.
- **Oracle VTS** – This application exercises the system, provides hardware validation, and discloses possible faulty components with recommendations for repair. Refer to the Oracle VTS documentation for more information at:

  `http://www.oracle.com/goto/VTS/docs`

Related Information

- "Tool Availability" on page 36
- "Oracle ILOM Service-Related Tools" on page 37

Device Management Tools

Commands in Oracle ILOM and Oracle Solaris can manage devices in the server. Some commands such as `format` and `hotplug` are limited to specific device types.

Category	Command	Description
Oracle Solaris		
	`cfgadm`(1M)	Use `cfgadm` to locate and manage I/O cards and hard drives.
	`format`(1M)	Use `format` to locate **hard drives**. The `format` command does not support I/O cards.
	`hotplug`(1M)	Use `hotplug` to list **I/O card slots** and identify card types. The `hotplug` command currently does not support hard drives.
Oracle ILOM		
	`show`	Use `show` to locate and manage server components such as fan modules and power supplies. See "Oracle ILOM Service-Related Tools" on page 37.

Related Information

- "Diagnostics Process" on page 32
- "Diagnostic Tools" on page 34
- "Tool Availability" on page 36
- "Oracle ILOM Service-Related Tools" on page 37
- "Log In to Oracle ILOM (Service)" on page 38

Tool Availability

This table describes what tools are available at the different states in which the server operates.

Tool	Stand-by Power	OpenBoot Prompt	Oracle Solaris Prompt
Status LEDs	Yes	Yes	Yes
Oracle ILOM commands and logs	Yes	Yes*	Yes
PSH commands	Yes	No	Yes
OpenBoot commands	No	Yes	Yes
Oracle Solaris commands and logs	No	No	Yes
Oracle VTS	No	No	Yes (if installed)
Third-party software	No	No	Yes (if installed)

* Provided the system console is configured to be accessible through the SER MGT and NET MGT ports.

Related Information

- "Diagnostic Tools" on page 34
- "Oracle ILOM Service-Related Tools" on page 37

Oracle ILOM Service-Related Tools

These Oracle ILOM shell commands are used most frequently when performing service-related tasks.

Oracle ILOM Command	Description
`help [`*command*`]`	Displays a list of all available commands with syntax and descriptions. Specifying a command name as an option displays help for that command.

`set /HOST`*x* `send_break_action=break`
or
`set /Servers/PDomains/PDomain_`*x*`/HOST send_break_action=break`
	Takes the host server from the OS to either `kmdb` or OpenBoot prompt (equivalent to a Stop-A), depending on the mode in which the Oracle Solaris OS was booted.

`start /HOST`*x*`/console`
or
`start /Servers/PDomains/PDomain_`*x*`/HOST/console`
	Connects to the host.

`show /HOST`*x*`/console/history`
or
`start /Servers/PDomains/PDomain_`*x*`/\ HOST/console/history`
	Displays the contents of the host's console buffer.

`set /HOST`*x*`/bootmode` *property=value* or `set /Servers/PDomains/PDomain_`*x*`/HOST/\ bootmode`	Controls the method of booting for the host server's firmware. The value of *property* can be `state`, `config`, or `script`.
`stop /System`	Powers off the host server.
`start /System`	Powers on the host server.
`reset /System`	Generates a hardware reset on the host server.
`stop /Servers/PDomains/PDomain_`*x*`/HOST`	Powers off PDomain *x*.
`start /Servers/PDomains/PDomain_`*x*`/HOST`	Powers on PDomain *x*.
`reset /Servers/PDomains/PDomain_`*x*`/HOST`	Generates a hardware reset on PDomain *x*.
`reset /SP`	Reboots the main and spare service processors and the four SPPs.

Related Information

- "Diagnostic Tools" on page 34
- "Tool Availability" on page 36

▼ Log In to Oracle ILOM (Service)

- **At the terminal prompt, type:**

```
ssh root@xxx.xxx.xxx.xxx
Password: password
Waiting for daemons to initialize...
Daemons ready
Oracle (R) Integrated Lights Out Manager
Version 3.2.0.0
Copyright (c) 2012, Oracle and/or its affiliates, Inc. All rights
reserved.
->
```

Related Information

- "Diagnostics Process" on page 32
- "Diagnostic Tools" on page 34
- "Device Management Tools" on page 35
- "Tool Availability" on page 36
- "Oracle ILOM Service-Related Tools" on page 37

Managing Faults

These topics describe PSH.

- "PSH Overview" on page 38
- "Check for Faults" on page 40
- "Clear a Fault" on page 43

PSH Overview

PSH enables the server to diagnose problems and mitigate many problems before they negatively affect operations. PSH uses the Fault Manager daemon, `fmd`(1M), which starts at boot time and runs in the background, to monitor all of the faults that are generated by the components in the server.

On the service processor, PSH works with Oracle ILOM to manage all of the components on the server. On the host, PSH works with POST and the Oracle Solaris OS to manage the components assigned to the host.

If a component generates a fault, the `fmd`(1M) daemon correlates the fault with data from previous faults and other relevant information to diagnose the problem. After diagnosis, the daemon assigns a UUID to the error. This value distinguishes this error across any set of systems.

When possible, the Fault Manager daemon initiates steps to self-heal the failed component and take the component offline. The daemon also logs the fault to the `syslogd` daemon and provides a fault notification with a MSGID. You can use the message ID to get additional information about the problem from the knowledge article database.

A PSH console message provides this information about each detected fault:

- Type
- Severity
- Description
- Automated response
- Impact
- Suggested action for system administrator

If PSH detects a faulty component, use the `fmadm faulty` command to display information about the fault. See "Check for Faults" on page 40.

Related Information

- "Check for Faults" on page 40
- "Clear a Fault" on page 43

▼ Check for Faults

The `fmadm faulty` command displays the list of faults detected by PSH. You can run this command from either the host or through the `fmadm` shell.

1. **Access the Oracle ILOM.**

   See "Log In to Oracle ILOM (Service)" on page 38.

2. **Check for PSH-diagnosed faults.**

   This example shows how to check for faults through the Oracle ILOM fault management shell.

```
-> start /SP/faultmgmt/shell
Are you sure you want to start /SP/faultmgmt/shell (y/n)? y

faultmgmtsp> fmadm faulty
------------------- ------------------------------------ ------------- -------
Time                UUID                                 msgid       Severity
------------------- ------------------------------------ ------------- -------
2013-03-26/14:10:10 ba87bf23-7a71-c381-838f-eaa765a7581c SPSUN4V-8001-6Q MAJOR

Problem Status   : solved
Diag Engine      : fdd 1.0
System
  Manufacturer   : Oracle Corporation
  Name           : M5-32
  Part_Number    : 7045605
  Serial_Number  : AK00060096

----------------------------------------
Suspect 1 of 2
  Fault class  : fault.cpu.generic-sparc.c2c-failover
  Certainty    : 50%
  Affects      : /SYS/CMU3/CMP1/SLINK3/LANE0
  Status       : faulted but still in service
  FRU
     Status            : faulty
     Location          : /SYS/CMU3
     Manufacturer      : Celestica Holdings PTE LTD
     Name              : CPU-MEM-YS2 BRD
     Part_Number       : 07042349
     Revision          : 03
     Serial_Number     : 465769T+1227VY00WW
     Chassis
        Manufacturer   : Oracle Corporation
        Name           : M5-32
        Part_Number    : 7045605
        Serial_Number  : AK00060096

Suspect 2 of 2
  Fault class  : fault.asic.switch.c2c-failover
  Certainty    : 50%
  Affects      : /SYS/SSB2/SA/SLINK12/LANE0
  Status       : faulted but still in service
  FRU
     Status            : faulty
```

```
      Location           : /SYS/SSB2
      Manufacturer       : Celestica Holdings PTE LTD
      Name               : M4-32 Scalability Switch Board
      Part_Number        : 07041912
      Revision           : 06
      Serial_Number      : 465769T+1224WL00E0
      Chassis
         Manufacturer    : Oracle Corporation
         Name            : M5-32
         Part_Number     : 7045605
         Serial_Number   : AK00060096

Description : During poweron testing, a lane failover has occurred on an
              interconnect between a CPU chip and a switch chip

Response    : The hardware has automatically reconfigured the link to
              isolate the failing lane.

Impact      : The system's capacity to correct transmission errors between
              CPU chips has been reduced.

Action      : Use 'fmadm faulty' to provide a more detailed view of this
              event. Please refer to the associated reference document at
              http://support.oracle.com/msg/SPSUN4V-8001-6Q for the latest
              service procedures and policies regarding this diagnosis.
faultmgmtsp>
```

In this example, a fault is displayed that includes these details:

- Date and time of the fault (`2012-08-27/19:46:26`).
- UUID (`4e16c8d-5cdb-c6ca-c949-e24d3637ef27`), which is unique to each fault.
- Message identifier (`PCIEX-8000-8R`), which can be used to obtain additional fault information from Knowledge Base articles.

3. **Use the message ID to obtain more information about this type of fault:**

   a. **Obtain the message ID from console output.**

   b. **Go to the** `http://support.oracle.com`**, and search on the message ID.**

4. **Follow the suggested actions to repair the fault.**

5. **If necessary, clear the fault manually.**

   See "Clear a Fault" on page 43.

Related Information

- "PSH Overview" on page 38
- "Clear a Fault" on page 43

▼ Clear a Fault

When PSH detects faults, the faults are logged and displayed on the console. In most cases, after the fault is repaired, the corrected state is detected by the server and the fault condition is repaired automatically. However, this repair should be verified. In cases where the fault condition is not automatically cleared, the fault must be cleared manually.

1. **After replacing a faulty FRU, power on the server.**

   See "Returning the Server to Operation" on page 481.

2. **At the host prompt, determine whether the replaced FRU still shows a faulty state.**

   See "Check for Faults" on page 40.

   - If no fault is reported, you do not need to do anything else. Do not perform the subsequent steps.
   - If a fault is reported, continue to Step 3.

3. **Clear the fault from all persistent fault records.**

   In some cases, even though the fault is cleared, some persistent fault information remains and results in erroneous fault messages at boot time. To ensure that these messages are not displayed, type this PSH command:

```
faultmgmtsp> fmadm acquit UUID
```

4. **If required, reset the server.**

   In some cases, the output of the `fmadm faulty` command might include this message for the faulty component:

   `faulted and taken out of service`

   If this message appears in the output, you must reset the server after you manually repair the fault.

```
faultmgmtsp> exit
-> reset /System
Are you sure you want to reset /System? y
Resetting /System ...
```

Related Information

- "PSH Overview" on page 38
- "Check for Faults" on page 40

Interpreting Log Files and System Messages

With the OS running on the server, you have the full complement of Oracle Solaris OS files and commands available for collecting information and for troubleshooting.

If PSH does not indicate the source of a fault, check the message buffer and log files for notifications for faults. Drive faults are usually captured by the Oracle Solaris message files.

These topics explain how to view the log files and system messages.

- "Check the Message Buffer" on page 44
- "View Log Files (Oracle Solaris)" on page 45
- "View Log Files (Oracle ILOM)" on page 45

▼ Check the Message Buffer

The `dmesg` command checks the system buffer for recent diagnostic messages and displays them.

1. **Log in as superuser.**
2. **Type:**

```
# dmesg
```

Related Information

- "View Log Files (Oracle Solaris)" on page 45
- "View Log Files (Oracle ILOM)" on page 45

▼ View Log Files (Oracle Solaris)

The error logging daemon, `syslogd`, automatically records various system warnings, errors, and faults in message files. These messages can alert you to system problems such as a device that is about to fail.

The `/var/adm` directory contains several message files. The most recent messages are in the `/var/adm/messages` file. After a period of time (usually every week), a new `messages` file is automatically created. The original contents of the `messages` file are rotated to a file named `messages.1`. Over a period of time, the messages are further rotated to `messages.2` and `messages.3`, and then deleted.

1. **Log in as superuser.**
2. **Type:**

```
# more /var/adm/messages
```

3. **To view all logged messages, type:**

```
# more /var/adm/messages*
```

Related Information

- "Check the Message Buffer" on page 44
- "View Log Files (Oracle Solaris)" on page 45

▼ View Log Files (Oracle ILOM)

1. **You can locate a faulty component using the `Open_Problems` log.**
   a. **View the log:**

```
-> show /System/Open_problems

Open Problems (9)
Date/Time                 Subsystems              Component
------------------------  ------------------      ------------
Wed Aug 21 14:59:57 2013   Other Removable Devices  SSB4 (Scalability Switch
       A device necessary to support a configuration has failed.(Probabilit
       UUID:xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx, Part Number:07041912, Serial Num
       Reference Document:http://support.oracle.com/msg/SPT-8000-1Q)
...
```

In this case, **SSB4** is identified as faulty.

b. View details for the faulty component that was shown in the log file:

```
-> show /SYS/SSB4

 /SYS/SSB4
    Targets:
        12V_STBY
        ...

    Properties:
        type = Scalability Switch Board
        ipmi_name = /SSB4
        requested_config_state = Enabled
        current_config_state = Enabled
        disable_reason = None
        ...
        fault_state = Faulted
        clear_fault_action = (none)
        prepare_to_remove_status = Not Ready
        prepare_to_remove_action = (none)
        return_to_service_action = (none)
        power_state = Off
        ...
```

2. You can identify a faulty component using the `show faulty` **command.**

```
-> show faulty
Target                    | Property              | Value
--------------------------+-----------------------+---------
/SP/faultmgmt/0           | fru                   | /SYS/SSB0
/SP/faultmgmt/0/faults/0  | class                 | fault.chassis.device.fail
/SP/faultmgmt/0/faults/0  | sunw-msg-id           | SPT-8000-1Q
/SP/faultmgmt/0/faults/0  | component             | /SYS/SSB0
/SP/faultmgmt/0/faults/0  | uuid                  | XXXXXXXX-XXXX-XXXX-XXX...
/SP/faultmgmt/0/faults/0  | timestamp             | 2013-08-21/16:32:45
/SP/faultmgmt/0/faults/0  | detector              | /SYS/SSB0/SA
/SP/faultmgmt/0/faults/0  | fru_part_number       | XXXXXXXX
/SP/faultmgmt/0/faults/0  | fru_rev_level         | XX
/SP/faultmgmt/0/faults/0  | fru_serial_number     | XXXXXXX+XXXXXXXXXX
/SP/faultmgmt/0/faults/0  | fru_manufacturer      | Celestica Holdings PTE LTD
/SP/faultmgmt/0/faults/0  | fru_name              | M4-32 Scalability Switch
/SP/faultmgmt/0/faults/0  | system_manufacturer   | Oracle Corporation
/SP/faultmgmt/0/faults/0  | system_name           | SPARC M5-32
/SP/faultmgmt/0/faults/0  | system_part_number    | XXXXXXXX
/SP/faultmgmt/0/faults/0  | system_serial_number  | AK000XXXXX
/SP/faultmgmt/0/faults/0  | chassis_manufacturer  | Oracle Corporation
/SP/faultmgmt/0/faults/0  | chassis_name          | SPARC M5-32
/SP/faultmgmt/0/faults/0  | chassis_part_number   | XXXXXXXX
```

```
/SP/faultmgmt/0/faults/0 | chassis_serial_number| AK000XXXXX
/SP/faultmgmt/0/faults/0 | system_component_manu| Oracle Corporation
/SP/faultmgmt/0/faults/0 | system_component_name| SPARC M5-32
/SP/faultmgmt/0/faults/0 | system_component_part| 7045605
/SP/faultmgmt/0/faults/0 | system_component_seri| AK000XXXXX
/SP/faultmgmt/0/faults/0 | diagnosis_engine     | fdd 1.0
...
```

3. **View the event log.**

```
-> show /SP/logs/event/list
```

4. **View the audit log.**

```
-> show /SP/logs/audit/list
```

Related Information

- "Check the Message Buffer" on page 44
- "View Log Files (Oracle Solaris)" on page 45

Configuring POST

These topics explain how to configure POST as a diagnostic tool.

POST Overview

POST is a group of PROM-based tests that run when the server is powered on or when it is reset. POST checks the basic integrity of the critical hardware components in the server.

You can also set other Oracle ILOM properties to control various other aspects of POST operations. For example, you can specify the events that cause POST to run, the level of testing POST performs, and the amount of diagnostic information POST displays. These properties are described in "Oracle ILOM Properties That Affect POST Behavior" on page 49.

If POST detects a faulty component, the component is disabled automatically. If the system is able to run without the disabled component, the system boots when POST completes its tests. For example, if POST detects a faulty processor core, the core is disabled, POST completes its test sequence, and the system boots using the remaining cores.

Related Information

- "Oracle ILOM Properties That Affect POST Behavior" on page 49
- "Configure POST" on page 52
- "Run POST With Maximum Testing" on page 53

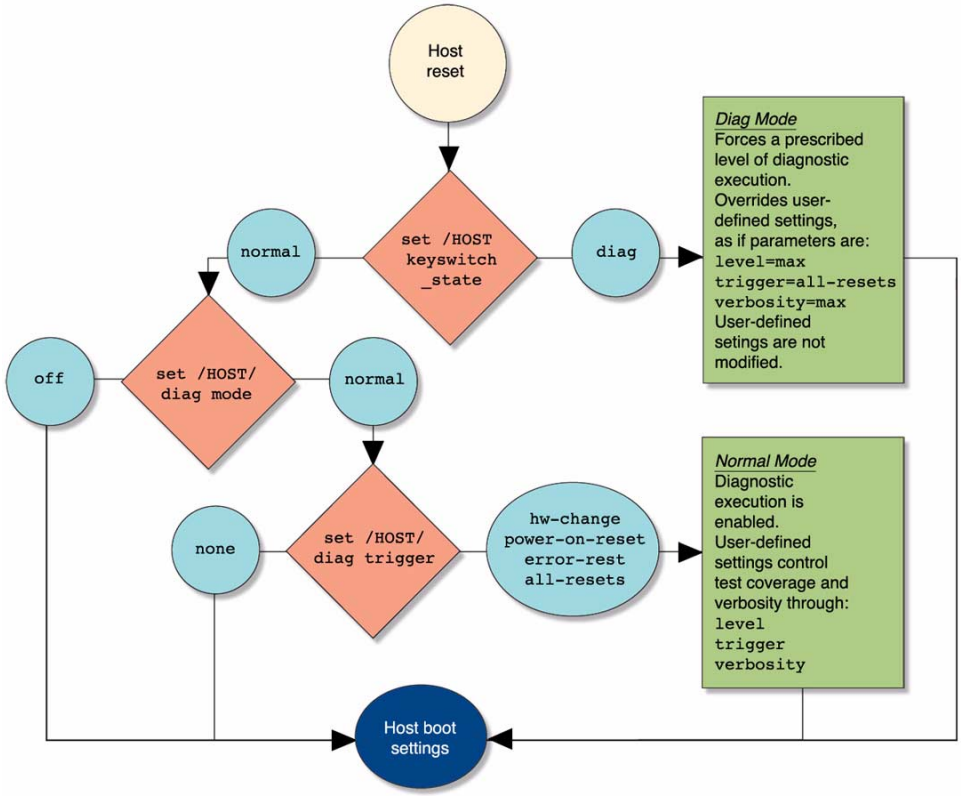
Oracle ILOM Properties That Affect POST Behavior

Note – The value of `keyswitch_state` must be `normal` when individual POST parameters are changed.

Properties	Values	Description
`/HOST keyswitch_state`	`normal`	The server can power on and run POST (based on the other parameter settings). This parameter overrides all other commands.
	`diag`	The server runs POST based on predetermined settings.
	`standby`	The server cannot power on.
	`locked`	The server can power on and run POST, but no flash updates can be made.
`/HOST/diag mode`	`off`	POST does not run.
	`normal`	POST runs according to `diag level` value.
`/HOST/diag level`	`max`	If `diag mode=normal`, runs all the minimum tests plus extensive processor and memory tests.
	`min`	If `diag mode=normal`, runs minimum set of tests.
`/HOST/diag trigger`	`hw-change`	(default) — Runs POST following a FRU replacement or an AC power cycle.
	`all-resets`	Runs POST on all resets.
	`error-reset`	Runs POST on all error resets.
	`power-on-reset`	Runs POST on every power on.
	`none`	Does not run POST on reset.
`/HOST/diag hw_change_level`	`max`	Runs the maximum set of tests.
	`min`	Runs the minimum set of tests.
`/HOST/diag hw_change_verbosity`	`min`	(default) — Displays the minimum level of output.
	`max`	Displays information for each step.
	`normal`	Displays a moderate amount of information, including component names and test results.
	`debug`	Displays extensive debugging information.

Properties	Values	Description
	none	Disables the output.
/HOST/diag power_on_level	max	(default) — Runs the maximum set of tests.
	min	Runs the minimum set of tests.
/HOST/diag power_on_verbosity	min	(default) — Displays the minimum level of output.
	max	Displays information for each step.
	normal	Displays a moderate amount of information, including component names and test results.
	debug	Displays extensive debugging information.
	none	Disables the output.
/HOST/diag error_reset_level	max	(default) — Runs the maximum set of tests.
	min	Runs a minimum set of tests.
/HOST/diag error_reset_verbosity	min	(default) — Displays the minimum level of output.
	max	Displays information for each step.
	normal	Displays a moderate amount of information, including component names and test results.
	debug	Displays extensive debugging information.
	none	Disables the output.
/HOST/diag verbosity	normal	Displays all test and informational messages in POST output.
	min	Displays functional tests with a banner and pinwheel in POST output.
	max	Displays all test, informational, and some debugging messages in POST output.
	debug	Displays extensive debugging information.
	none	Does not display POST output.

The following flowchart illustrates the same set of Oracle ILOM `set` command variables as listed in the table above.



Related Information

- "POST Overview" on page 48
- "Configure POST" on page 52
- "Run POST With Maximum Testing" on page 53

▼ Configure POST

1. **Log in to Oracle ILOM.**

   See "Log In to Oracle ILOM (Service)" on page 38.

2. **Set the virtual keyswitch to the value that corresponds to the POST configuration you want to run.**

   This example sets the virtual keyswitch to `normal`, which configures POST to run according to other parameter values.

   In the following examples, *x*=0-3.

```
-> set /Servers/PDomains/PDomain_x/HOST keyswitch_state=normal
Set 'keyswitch_state' to 'Normal'
```

   For possible values for the `keyswitch_state` parameter, see "Oracle ILOM Properties That Affect POST Behavior" on page 49.

3. **If the virtual keyswitch is set to `normal`, and you want to define the `mode`, `level`, `verbosity`, or `trigger`, set the respective parameters.**

   Syntax:

   `set /Servers/PDomains/PDomain_`*x*`/HOST/diag` *property=value*

   See "Oracle ILOM Properties That Affect POST Behavior" on page 49 for a list of parameters and values.

   Examples:

```
-> set /Servers/PDomains/PDomain_x/HOST/diag mode=normal
-> set /Servers/PDomains/PDomain_x/HOST/diag verbosity=max
```

4. **View the current values for settings.**

   Example:

```
-> show /Servers/PDomains/PDomain_x/HOST/diag

/Servers/PDomains/PDomain_x/HOST/diag
    Targets:

    Properties:
        level = min
        mode = normal
        trigger = power-on-reset error-reset
        verbosity = normal

    Commands:
```

```
          cd
          set
          show
->
```

Related Information

- "POST Overview" on page 48
- "Oracle ILOM Properties That Affect POST Behavior" on page 49
- "Run POST With Maximum Testing" on page 53

▼ Run POST With Maximum Testing

This procedure describes how to configure the server to run the maximum level of POST.

1. **Log in to the Oracle ILOM.**

   See "Log In to Oracle ILOM (Service)" on page 38.

2. **Set the virtual keyswitch to `diag` so that POST runs in service mode.**

   Alternatively, you can use the `/SYS` or `/System` target.

```
-> set /Servers/PDomains/PDomain_x/HOST keyswitch_state=diag
Set 'keyswitch_state' to 'Diag'
```

3. **Run POST.**

   Alternatively, you can use the `/System` target.

```
-> start /SYS
Are you sure you want to start /SYS (y/n)? y
Starting /SYS
```

Related Information

- "POST Overview" on page 48
- "Oracle ILOM Properties That Affect POST Behavior" on page 49
- "Configure POST" on page 52

Interpreting LEDs

Use these steps to determine if an LED indicates that a component has failed in the server.

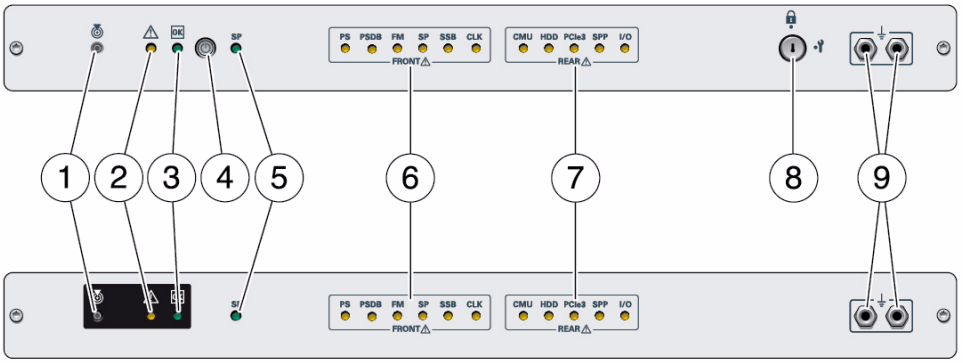
Step	Check the LEDs	Links
1.	On front and rear LED panels.	• "Front and Rear LED Panel LEDs and Controls" on page 55
2.	On individual components.	• "PSDB LEDs" on page 110 • "Power Supply LEDs" on page 103 • "Fan Module LEDs" on page 117 • "SSB LEDs" on page 125 • "Clock Board LEDs" on page 133 • "Service Processor General Status LEDs" on page 142 • "I/O Switch Board LEDs" on page 155 • "PCIe Hot-Plug Carrier LEDs" on page 176 • "EMS General Status LEDs" on page 202 • "EMS Network Port LEDs" on page 203 • "HDD LEDs" on page 213 • "SSD LEDs" on page 214 • "SPP LEDs" on page 235 • "CMU LEDs" on page 252

Related Information

- "Diagnostic Overview" on page 31
- "Configuring POST" on page 48
- "Managing Faults" on page 38
- "Interpreting Log Files and System Messages" on page 44

Front and Rear LED Panel LEDs and Controls

The server has two LED panels containing system status indicators, one located at the front of the server and one at the rear.



No.	LED	Description
1	Locate LED button (white)	You can light the Locate LED button to identify the server. When on, the LED blinks rapidly. You can light the LED button in two ways: • Press the Locator LED button. • Type the following Oracle ILOM command: `set /System locator_indicator=on` **Note -** When you light the locator LED button, any previously blinking LEDs on the panel will blink at the same fast rate as the locator LED. When you switch off the Locator LED, any previously blinking LEDs will return to their previous blink rate. **All lights on test:** Press the Locate button three times within five seconds to test the functionality of the front and rear panel LEDs as well as other server LEDs under Oracle ILOM control. The LEDs will light for 15 seconds and then return to normal operation. **Note -** Component LEDs that are not under Oracle ILOM control will not light up during this test.
2	Fault LED (amber)	Indicates that a service action is required. • Use the Oracle ILOM `show faulty` command to display details about any faults that cause this indicator to light. • Under some fault conditions, individual component fault LEDs light in addition to the Fault LED.

No.	LED	Description
3	System OK LED (green)	Indicates the following conditions: • Off – System is not running in its normal state. System power might be off. The SPs might still be running. • Steady on – System is powered on and is running in its normal operating state. No service actions are required. • Short blink every three seconds – System is running in standby mode and can be quickly returned to full function. • Slow blink – A normal but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running or that the system is booting.
4	Power On/Standby button	The recessed Power On/Standby button toggles the system on or off. • When the server is shut down, press briefly to power on and return the server to its previously configured operating configuration. • When the server is powered on, press briefly to shut the server down gracefully. • When the server is powered on, press and hold for at least 5 seconds to perform an emergency shut down. **Caution - Electrical Hazard.** After using the Power On/Standby button, you must switch off the circuit breakers on your facility power grid in order to power off the server completely. The server will remain on standby power until you switch the facility circuit breakers off.
5	SP LED	Indicates the following conditions: • Off – The server is not receiving power. For example, the power cords are not connected or the facility power grid circuit breakers are switched off. • Steady on, green – One or both of the SPs have initialized and can be accessed through the Oracle ILOM CLI or web interface. • Blink, green – SPs are initializing the Oracle ILOM firmware.
6	Front Component LEDs (amber)	A front component requires service.
7	Rear Component LEDs (amber)	A rear component requires service. **Note -** The system Fault LED and the service processor Fault LED light while the service processor boots. This is normal behavior. The green OK LEDs light when the service processor has finished booting. **Note -** The HDD Fault LEDs on the front and rear LED panels indicate a fault of an HDD cage backplane. They do not indicate that an HDD or SSD has failed.
8	System key switch	**Normal operation mode:** • You can power on the server by pressing the Power On/Standby button. • You can power off the server by pressing the Power On/Standby button. **Service mode:** • When the key switch is in the Service position, hosts will not be automatically booted when AC Power is applied.

No.	LED	Description
9	ESD grounding jacks	The server has four 4-mm ESD grounding jacks (two on each panel) where you can attach antistatic wrist straps prior to installing or servicing the server.

Related Information

- *Server Administration*, Locate the Server

Preparing for Service

Note – Server components can be replaced only by authorized service personnel.

Note – Working conditions vary from site to site. Arrange with the customer's facilities department to schedule time to work on the server and prevent unexpected complications.

Caution – Do not remove FRUs from the chassis to reduce the weight of the server during transportation or installation.

The following topics are in this chapter.

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Service Sequence

The service manual is organized so the most accessible components appear first. The less accessible components appear after the procedures that help you to access those components.

Use the following table as a guide to locate service procedures.

1. Start with Step 1 in the left column and where necessary, use the links in the right column.
2. Follow the subsequent steps and links until you reach the component you need to replace.

   For example, if you are installing an I/O card, you can skip Step 7 (opening the front door) because the I/O section is at the rear of the server. You can also skip Step 9, because powering off AC is not a part of installing an I/O card. Similarly you should skip Steps 10, 11, and 12.

Step	Description	Link
1.	Review safety and handling information.	"Safety Information" on page 62
2.	Gather the tools for service.	"Tools for Service" on page 66
3.	Consider the filler panel options.	"Filler Panels" on page 67
4.	Find the server serial number.	"Find the Server Serial Number" on page 68
5.	Find the component to be serviced.	"Locate the Component" on page 69
6.	If necessary, stop activity in all components.	"Power Off a PDomain" on page 72
	Take proper ESD precautions.	"Prevent ESD Damage" on page 64
7.	You can now service these components.	"Remove the Door" on page 77 "Remove Side Panels" on page 86
	Open the front door.	
8.	You can now service these hot-serviceable components at the front of the server.	"Remove a Power Supply" on page 104 "Remove a PSDB" on page 111 "Remove a Fan Module" on page 118 "Remove an SSB" on page 126 "Remove a Clock Board" on page 135 "Remove a Service Processor" on page 146

Step	Description	Link
	Open the back door.	
9.	You can now service these hot-serviceable components at the rear of the server.	"Remove an I/O Card From the Server" on page 180 "Remove an I/O Card From a Carrier" on page 182 "Remove an EMS" on page 205 "Remove an HDD" on page 222 "Remove a Drive Filler Panel" on page 231 "Remove a CMU" on page 257
	Shut down the OS and power down the server.	"Prepare to Power Off the Server" on page 73 "Power Off the Server" on page 73
	You can now service these cold-serviceable components at the front of the server.	"Remove the Front LED Panel" on page 288 "Remove the Front Filler Panel" on page 291 "Remove the Upper Fan Cage" on page 296 "Remove the Scalability Card Cage" on page 314 "Remove the Lower Fan Cage" on page 301 "Remove the Power System Cage to Scalability Assembly Cable" on page 395 "Remove the Power System Cage" on page 323
10.	You can now service these cold-serviceable components at the rear of the server.	"Remove an AC Input Filter" on page 345 "Remove an AC Power Cord" on page 337 "Remove the Rear LED Panel" on page 354
	Go to the back of the server.	
11.	You can now service these cold-serviceable components at the rear of the server.	"Remove an SPP" on page 237 "Remove an I/O Switch Board" on page 156 "Remove a DIMM" on page 283 "Remove an IOU" on page 357 "Remove a Hard Drive Cage" on page 372
	Remove the scalability assembly.	"Remove the Scalability Assembly" on page 375
12.	You can now service these cold-service components at the front of the server.	"Remove a Cabled Lower Bus Bar Assembly" on page 305 "Remove the Power System Cage to Scalability Assembly Cable" on page 395 "Remove the PSDB to Scalability Midplane Cable" on page 403 "Remove the Scalability Fans Cable" on page 319 "Remove an I/O Data Cable Assembly" on page 433
13.	Remove the midplane.	"Remove the Midplane" on page 459

Related Information

- "Safety Information" on page 62

Safety Information

This topic contains the following sections.

Safety Symbols

Note the meanings of the following symbols that might appear in this document:

Caution – There is a risk of personal injury or equipment damage. To avoid personal injury and equipment damage, follow the instructions.

Caution – Hot surface. Avoid contact. Surfaces are hot and might cause personal injury if touched.

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

Related Information

- "Safety Precautions" on page 63

- "ESD Measures" on page 64
- "Prevent ESD Damage" on page 64
- "Antistatic Wrist Strap Use" on page 65
- "Antistatic Mat" on page 65

Safety Precautions

Observe the following safety precautions when setting up equipment:

- Follow all cautions and instructions marked on the equipment and described in the documentation shipped with your system.
- Follow all cautions and instructions marked on the equipment and described in the *SPARC M5-32 and SPARC M6-32 Servers Safety and Compliance Guide*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Disconnect all power supplies before servicing any of the components that are inside the chassis.
- Follow the ESD safety practices as described in this section.

Related Information

- "Safety Symbols" on page 62
- "ESD Measures" on page 64
- "Prevent ESD Damage" on page 64
- "Antistatic Wrist Strap Use" on page 65
- "Antistatic Mat" on page 65

ESD Measures

Caution – Circuit boards and drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy the components located on these boards. Do not touch the components along their connector edges.

Wear an antistatic wrist strap and use an antistatic mat when handling components such as drive assemblies, circuit boards, or PCIe cards.

Related Information

- "Safety Symbols" on page 62
- "Safety Precautions" on page 63
- "Prevent ESD Damage" on page 64
- "Antistatic Wrist Strap Use" on page 65
- "Antistatic Mat" on page 65

▼ Prevent ESD Damage

Many components housed within the chassis can be damaged by electrostatic discharge. To protect these components from damage, perform these steps before opening the chassis for service. See Safety Information.

1. **Prepare an antistatic surface to set parts on during the removal, installation, or replacement process.**

   Place ESD-sensitive components such as printed circuit boards on an antistatic mat.

2. **Attach an antistatic wrist strap.**

   When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis.

Related Information

- "Safety Symbols" on page 62
- "Safety Precautions" on page 63
- "ESD Measures" on page 64
- "Antistatic Wrist Strap Use" on page 65
- "Antistatic Mat" on page 65

Antistatic Wrist Strap Use

Use a disposable antistatic wrist strap if you do not have a permanent wrist strap. Disposable and permanent wrist straps differ in how they are used.

Disposable wrist strap — attach the strap to your wrist and then attach the adhesive end to a metal area on the chassis. Disposable antistatic wrist straps are included with optional and replacement components. A disposable wrist strap should be discarded after the first use because the adhesive loses its effectiveness.

Permanent wrist strap — attach the strap to your wrist and then plug the metal end into one of the grounding jacks on the front LED panel or rear LED panel.

Related Information

- "Safety Symbols" on page 62
- "Safety Precautions" on page 63
- "ESD Measures" on page 64
- "Prevent ESD Damage" on page 64
- "Antistatic Mat" on page 65

Antistatic Mat

When servicing ESD-sensitive components such as motherboards, memory, and other PCBs, place them on an antistatic mat.

Related Information

- "Safety Symbols" on page 62
- "Safety Precautions" on page 63
- "ESD Measures" on page 64
- "Prevent ESD Damage" on page 64
- "Antistatic Wrist Strap Use" on page 65

Tools for Service

- Antistatic wrist strap
- Antistatic mat
- T10, T15, T20, T30 Torx screwdrivers

  (Some Torx screws will also accept a flat-bladed screwdriver.)
- 6 mm Allen wrench
- A mechanical lifting device might be loaned to you with replacement components that weigh over 40 lb (18 kg).

Related Information

- "Service Sequence" on page 60
- "Safety Information" on page 62
- "Tools for Service" on page 66
- "Torque Reference" on page 66

Torque Reference

The factory uses the following torque values. Use the following values as a general guide for using a manual screwdriver.

An adjustable torque screwdriver might be included with a replacement component that requires critical torque values.

Component	Torque Value	Examples
Small screws (M4 - M10)	7 in-lb (0.79 Nm)	Connections for some breakable parts such as printed circuits, nylon bushings
Small screws (M4 - M10)	10 in-lb (1.1 Nm)	Connections for breakable parts that require increased torque.
Small screws (M4 - M10)	15 in-lb (1.7 Nm)	Metal to metal connections
Large screws and bolts	15 in-lb (1.7 Nm)	Connections for breakable parts such as Nylon bushings
Large screws and bolts	40 in-lb (4.5 Nm)	Metal to metal connections

Related Information

- "Service Sequence" on page 60
- "Safety Information" on page 62
- "Locate the Component" on page 69

Filler Panels

Depending on the server's configuration, the server might include the following filler panels:

- Front filler panel (chassis filler panel)
- Hard drive or SSD filler panel
- PCIe card carriers (these function like fillers when a card is not installed)
- CMU filler panel

To maintain the proper air flow, all filler panels must remain in the server until replaced by a functioning component.

Related Information

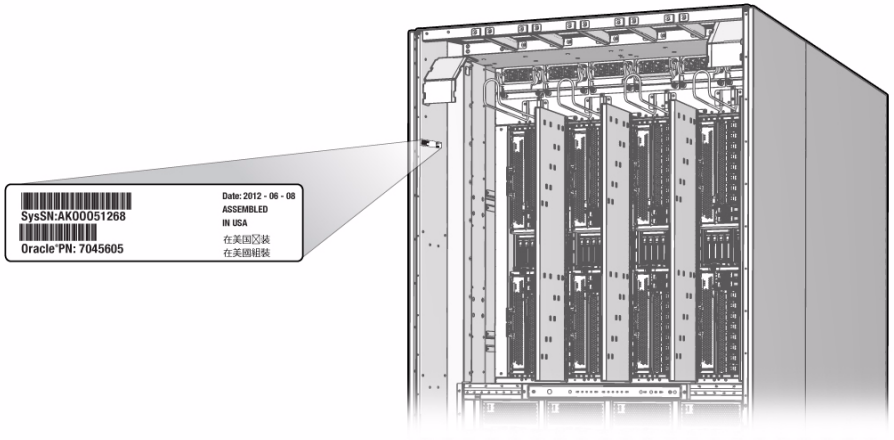
- "Service Sequence" on page 60
- "Locate the Component" on page 69

▼ Find the Server Serial Number

- **Find the server serial number in one of three ways:**
  - You can display the system serial number using the Oracle ILOM `show` command:

```
-> show /System serial_number
```

  - You can see the system serial number label inside the rear of the cabinet.



  - You can use an RFID reader device to read the system serial number in an RFID tag on the front of the cabinet.

Related Information

"Service Sequence" on page 60

"Safety Information" on page 62

"Locate the Component" on page 69

▼ Locate the Component

1. **Use an Oracle ILOM command to display faulty components in a server or group of servers:**

```
-> show /System/Open_Problems
```

or

```
-> show faulty
```

2. **Prepare the component for removal.**

Note – The following lists are intended to show you how the procedures vary according to the type of component. For specific preparations, see the service procedures for specific components elsewhere in this document.

- Use the Oracle ILOM `set` command for the following components:

Component	Target Name	*x* Values	*y* Values
CMU	`/SYS/CMU`*x*	0-15	
Fan module	`/SYS/FM`*x*	0-35	
I/O switch board	`/SYS/IOU`*x*`/IOB`*y*	0-3	0-1
SSB	`/SYS/SSB`*x*	0-11	

a. Light the Ready to Remove LED:

```
-> set /SYS/target_name prepare_to_remove_action=true
```

b. Verify that the Ready to Remove LED is lit:

```
-> show /SYS/target_name prepare_to_remove_status
    prepare_to_remove_status = Ready
```

- Use the Oracle ILOM `stop` command for the following components:

  The command stops the component and lights the Ready to Remove LED.

Component	ILOM Target Name	*x* Values
Service processor	`/SYS/SP`*x*	0-1
SPP	`/SYS/SPP`*x*	0-3

- Use the links in the following table for these components:

Component	Alternate command	Link
HDD	Use `cfgadm` command.	See "Locate an HDD" on page 216.
I/O card	Use `hotplug` command.	See "Locate an I/O Card in the Server" on page 177.
PCIe low profile carrier	Use `hotplug` command.	See "Locate an I/O Card in the Server" on page 177.
SSD	Use `cfgadm` command.	See "Locate an SSD" on page 219.

- These components do not have a Ready to Remove LED:
  - EMS
  - I/O card carrier (PCIe low profile carrier)
  - Power supply
  - PSDB

3. **Physically locate the specific server and component:**

   At the server — Fault LEDs might be lighted on the front LED panel and rear LED panel.

   On the component — See the component replacement procedure in this document for a description of the LEDs that might help you locate that component.

   Ready to Remove LED — If the component has a blue Ready to Remove LED, the LED should be lighted before you remove the component. See Step 2.

Related Information

"Service Sequence" on page 60

"Understanding Cooling Zones" on page 24

"Find the Server Serial Number" on page 68

"Power Off a PDomain" on page 72

▼ Power Off a PDomain

1. **Log in to Oracle ILOM.**
2. **At the Oracle ILOM prompt, connect to a specific PDomain so you can view the console output.**

   This example connects to PDomain_2.

```
-> start /Servers/PDomains/PDomain_2/HOST/console
Are you sure you want to start
/Servers/PDomains/PDomain_2/HOST/console (y/n) ? y
Connecting /Servers/PDomains/PDomain_2/HOST/console
->
```

3. **You can choose to power off a specific PDomain either gracefully or immediately:**
   - To **gracefully** shut down the OS then power off a specific PDomain (PDomain_2 in this example), type:

```
-> stop /Servers/PDomains/PDomain_2/HOST
Are you sure you want to stop /Servers/PDomains/PDomain_2/HOST
(y/n) ? y
Stopping /Servers/PDomains/PDomain_2/HOST

->
```

   - To **immediately** turn off power to a specific PDomain, leaving the server in standby, type:

```
-> stop -f /Servers/PDomains/PDomain_2/HOST
Stopping /System

->
```

Related Information

- "Prepare to Power Off the Server" on page 73
- "Service Sequence" on page 60

Removing Power From the Server

▼ Prepare to Power Off the Server

Note – Some components can be removed while the server is powered up. To determine if the AC power must be turned off, see the replacement procedure for the specific component.

- **If you determine that AC power must be removed from the system, notify users in advance that the server will be turned off.**

Related Information

- "Service Sequence" on page 60
- "Safety Information" on page 62

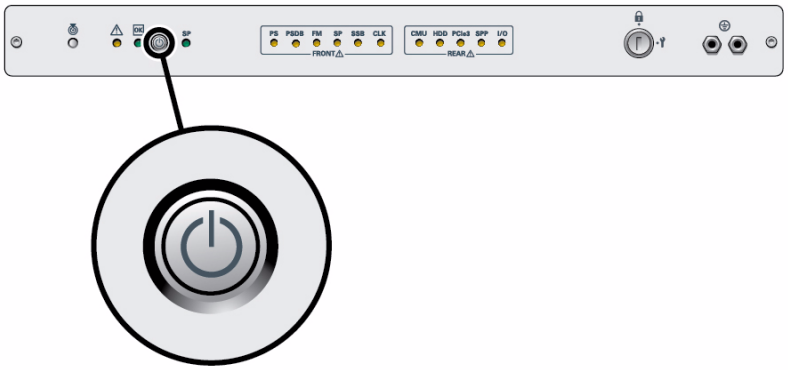
▼ Power Off the Server

1. **Use one of four methods to turn off the server:**
   - **For a graceful shutdown** (data will be saved), use one of two methods:
     - Log into Oracle ILOM and issue this command:

       This command requires the Oracle ILOM Reset and Host Control (r) user role.

```
-> stop /System
```

     - Alternatively, momentarily press the On/Standby button on the front LED panel.



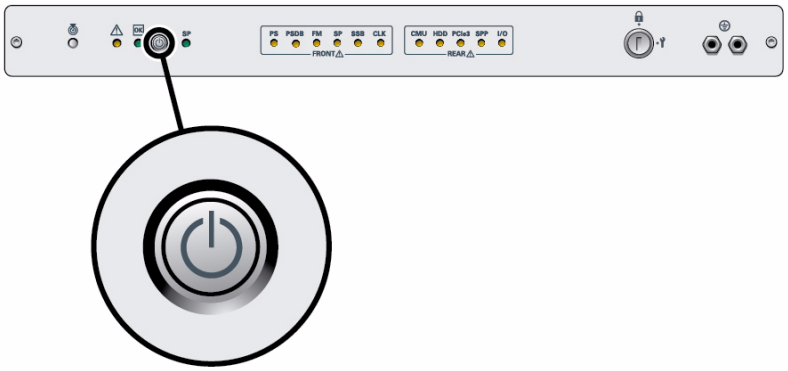
The OK LED blinks slowly to show that the server and its domains are shutting down.

- **For an emergency shutdown** (data will not be saved), use one of two methods:
  - Log into Oracle ILOM and issue this command:

    This command requires the Oracle ILOM Reset and Host Control (r) user role.

```
-> stop -force /System
```

  - At the front LED panel, press and hold the On/Standby button for five seconds or more.



2. **Turn off all facility AC power grid circuit breakers for the server.**

   There should be six facility circuit breakers, one for each AC power cord attached to the server.

3. **For maximum safety, disconnect all AC power cords from the server.**

   See "Remove an AC Power Cord" on page 337.

Related Information

- "Service Sequence" on page 60
- "Safety Information" on page 62

Servicing Cabinet Doors

Cabinet doors are hot-swappable components.

Caution – A front or rear door weighs 40.3 lbs (18.3 kg). Two people are required to remove or install it.

- "Remove the Door" on page 77
- "Install the Door" on page 81

Related Information

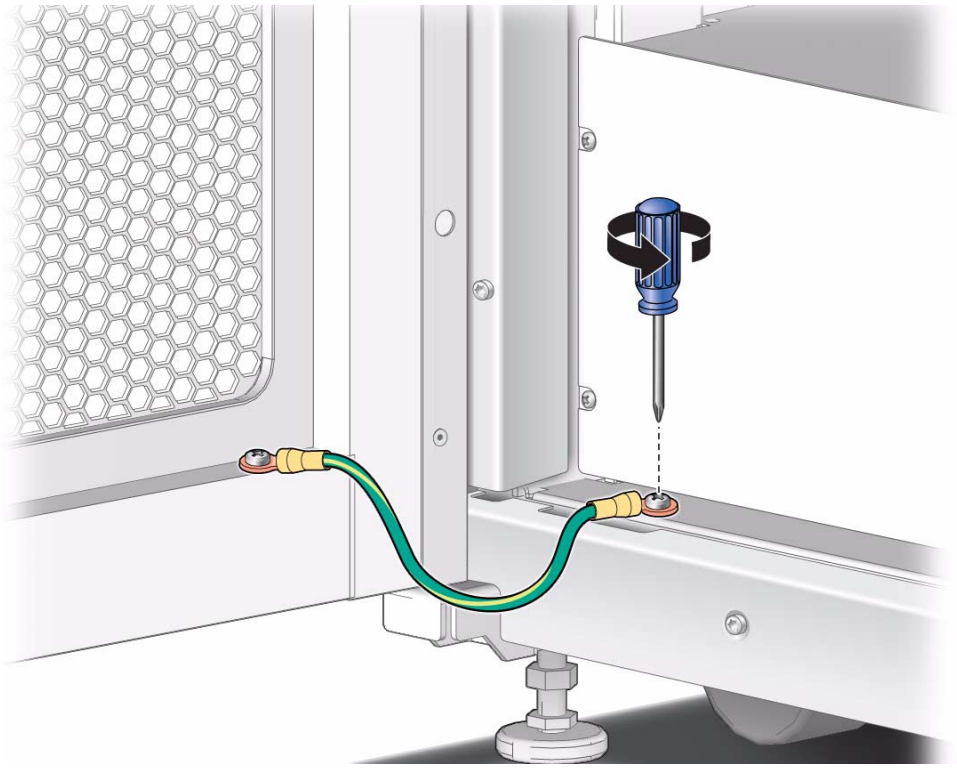
- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

▼ Remove the Door

Remove the front door to access the front trim and kick plate. You can follow these same steps to remove the rear door.

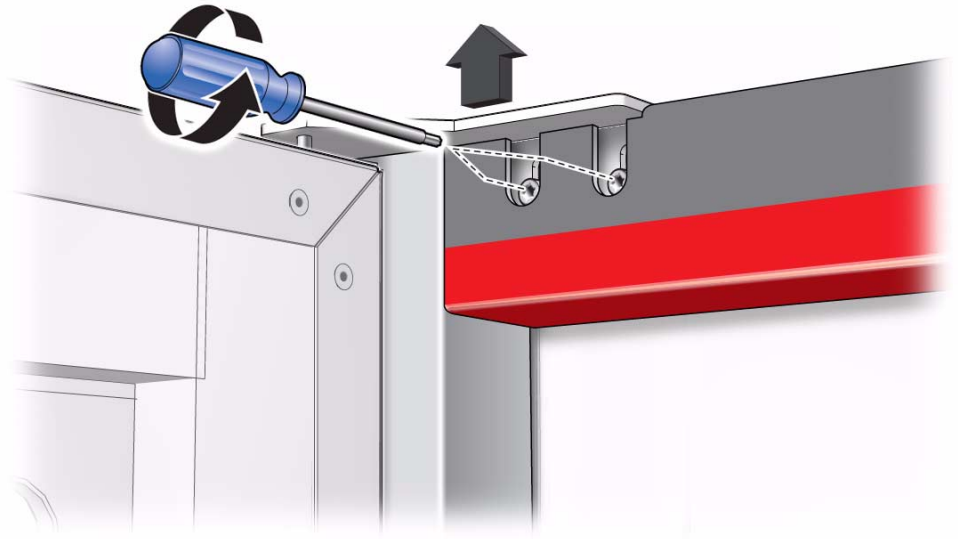
1. **Open the front door and use a T20 screwdriver to remove the M4 screw securing the ground cable connected to the server frame.**

   Save the M4 screw in a safe location.



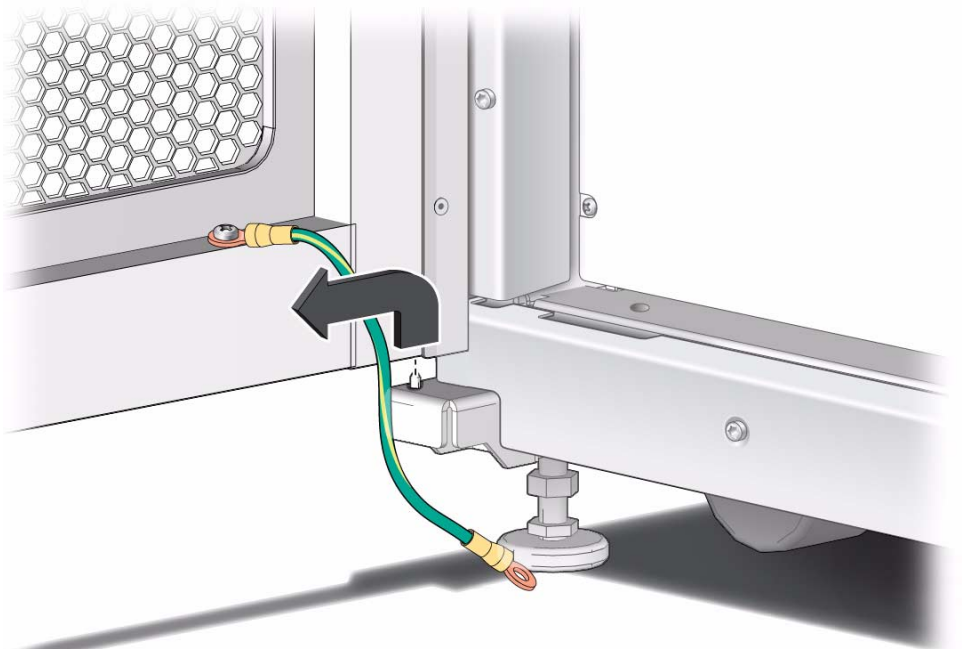
2. **Use a Torx T20 screwdriver to loosen the two M4 screws securing the upper hinge bracket to the server.**

   Loosen, but do not remove these screws. Leave the upper hinge bracket loosely attached to the server.



3. **Hold the door to keep it from falling, and then lift the upper hinge bracket to release the door.**

4. **Lift the door off the lower hinge pin and set the door aside.**



Note – If you removed the door to complete another task, return to that task. Otherwise, continue to the next step.

Related Information

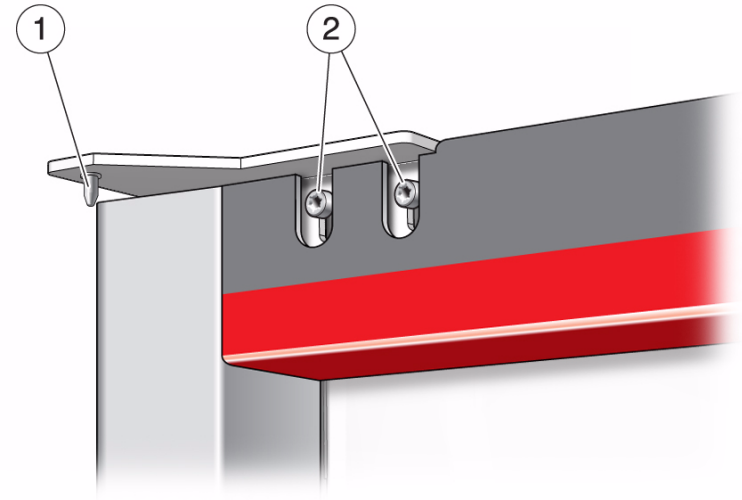
- "Install the Door" on page 81
- "Service Sequence" on page 60

▼ Install the Door

You can follow these same steps to install either door.

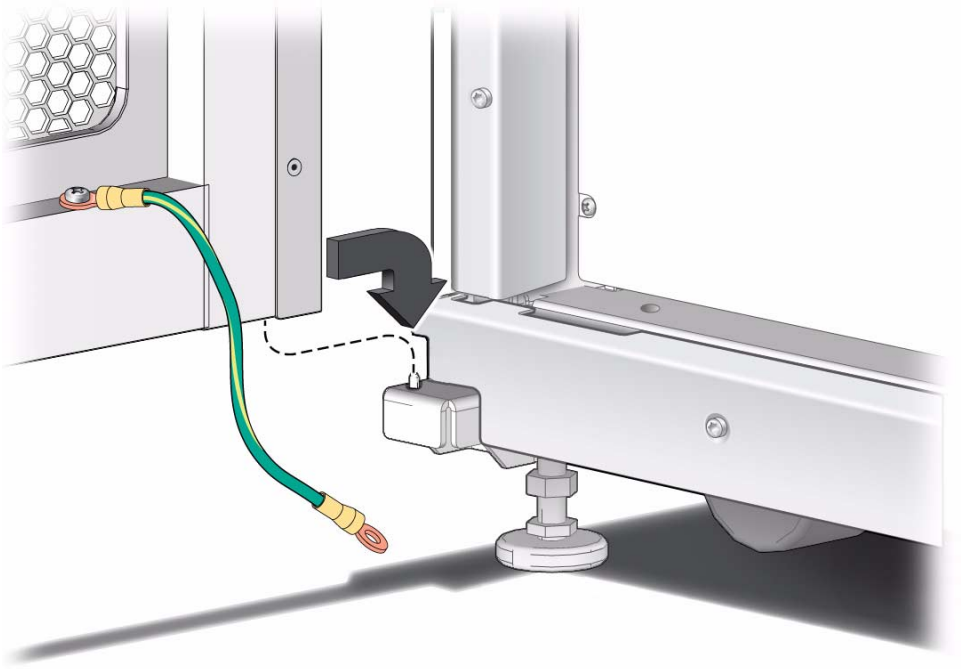
1. **Confirm that the upper hinge bracket is loosely attached to the server.**

   This bracket should have been loosened when you removed the door. If the hinge bracket is secured tightly to the server, use a T20 screwdriver to loosen the two M4 screws.



1	Upper hinge pin
2	M4 screws securing the upper hinge bracket

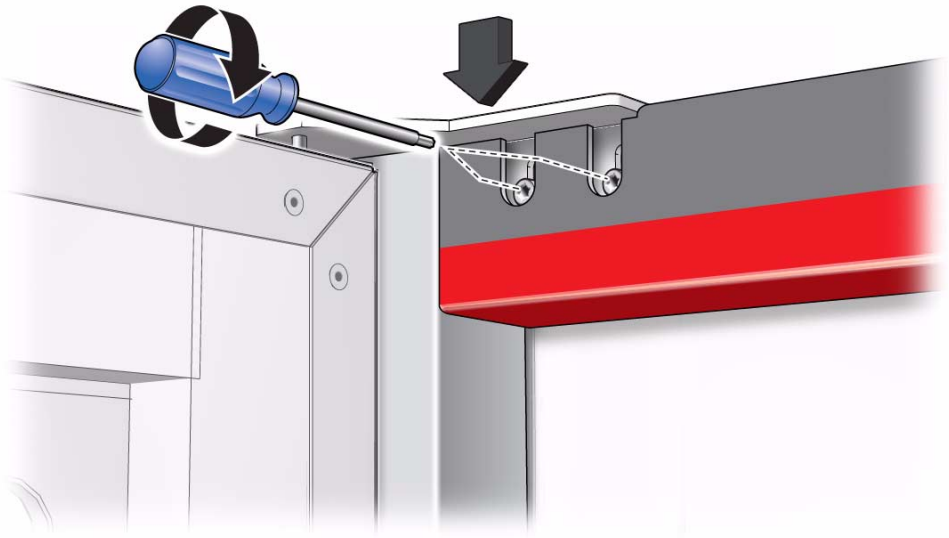
2. **Place the door on the lower hinge pin.**



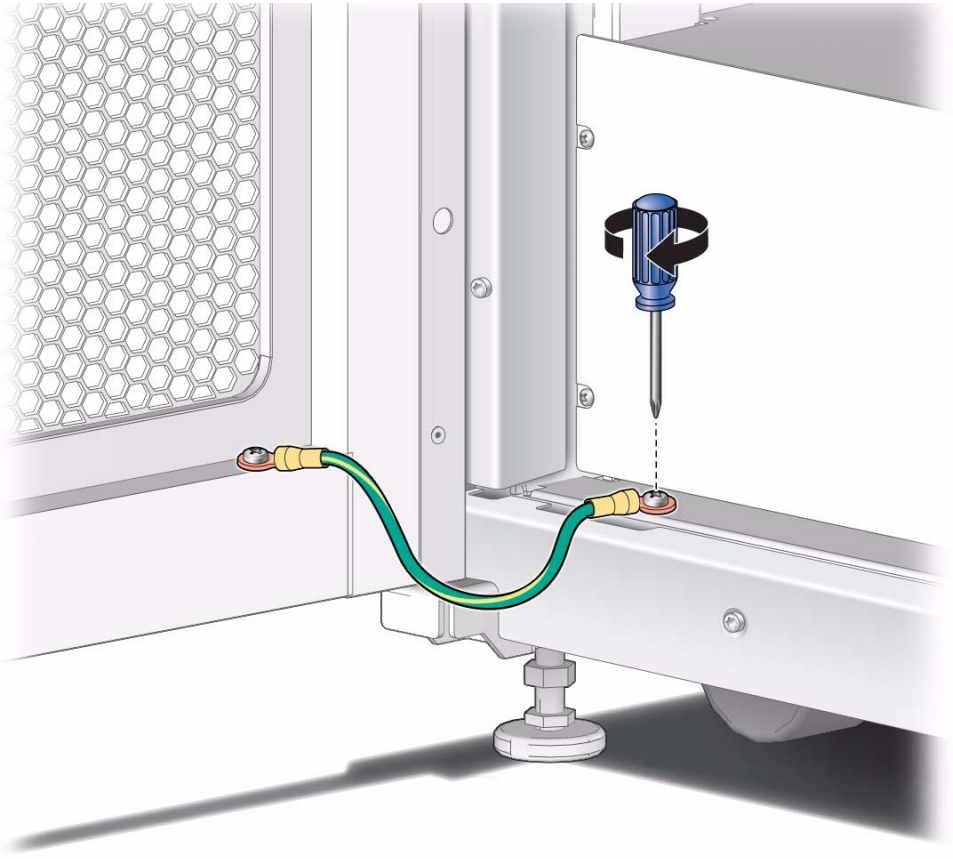
3. **Lift the upper hinge bracket, and then lower the upper hinge pin into the hole in the top of the door.**

4. **Use a T20 screwdriver to tighten the two M4 screws securing the upper hinge bracket to the server.**

   After securing the two screws, verify that the door can swing freely.



5. **Use a T20 Torx screwdriver to secure the ground cable to the server frame using an M4 screw.**



6. **Close the door.**

Related Information

- "Install the Door" on page 81
- "Service Sequence" on page 60

Servicing Side Panels

Side panels are cold-service components. See "Side Panels" on page 16 for the location of side panels.

Note – There are no serviceable components behind the side panels. None of the procedures in this service document require the removal of the side panels.

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

▼ Remove Side Panels

Each side panel is in two pieces.

Note – There are no serviceable components behind the side panels.

1. **Prepare the server as needed:**
   - If there is sufficient space around the server to remove the side panels, go to Step 2.
   - If the server is located between other servers and there is no room to remove the side panels, power down the server so you can move it to a place where the sides are accessible:

     a. **Turn off all AC power to the server.**

        See "Removing Power From the Server" on page 73.

     b. **Disconnect the server's AC cords.**

        See "Remove an AC Power Cord" on page 337.

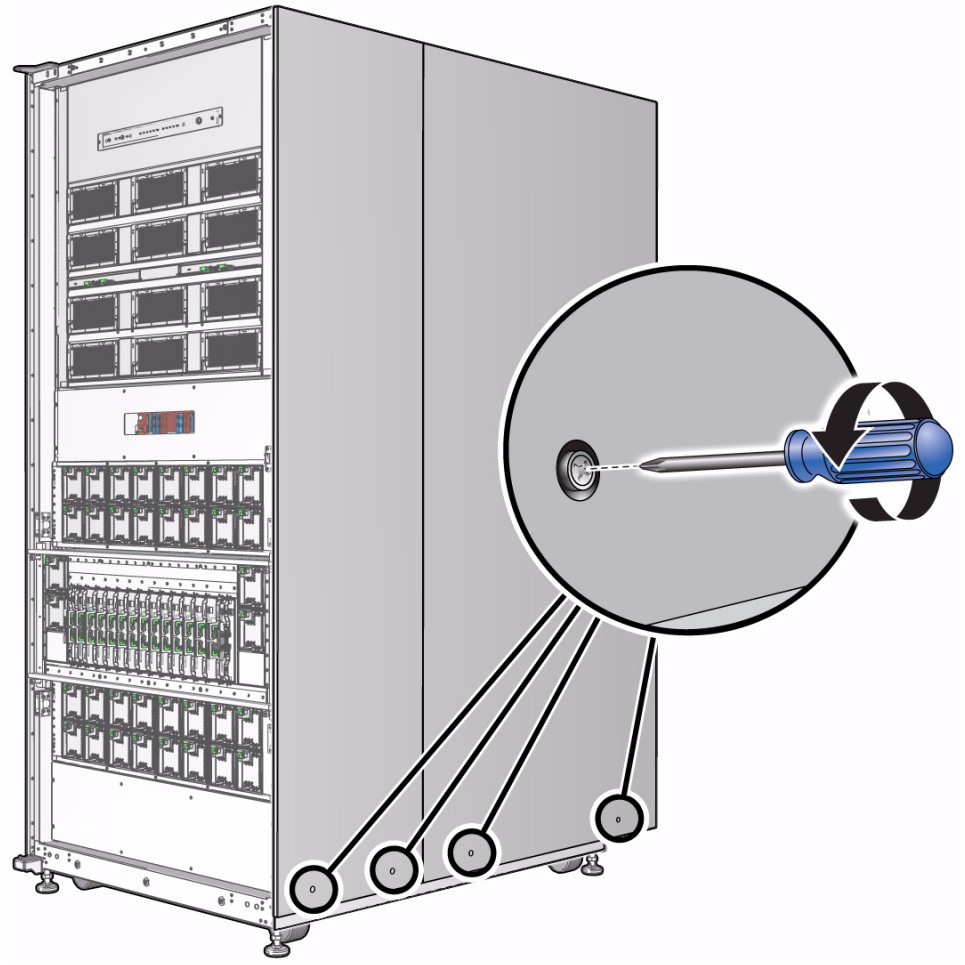
     c. **Label and disconnect the server's I/O cables and any other connections such as ground cables.**

     d. **Raise the leveling feet or remove any mounting brackets.**

     e. **Move the server to a location where you can access the side panels.**

2. **Loosen captive T20 Torx screws on the side panels.**

Caution – A rear side panel weighs 47 lbs (21 kg). Two people are required to move it. A front side panel weighs 27 lbs (12 kg).



3. **Pull the side panels away from the bottom of the server, then left the panels off.**

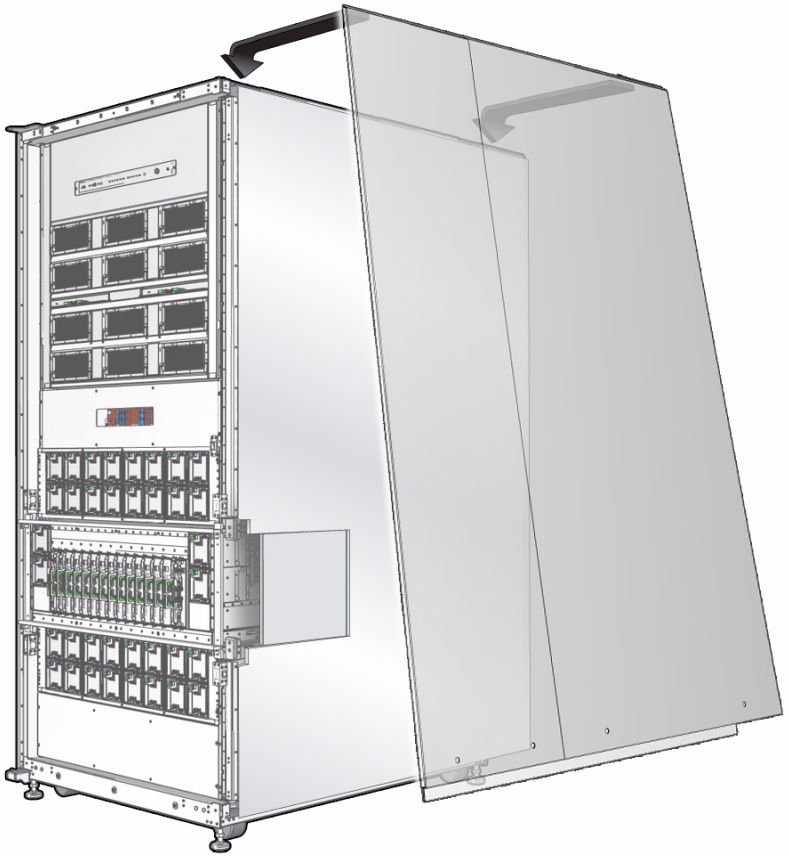
Related Information

- "Install Side Panels" on page 88
- "Side Panels" on page 16

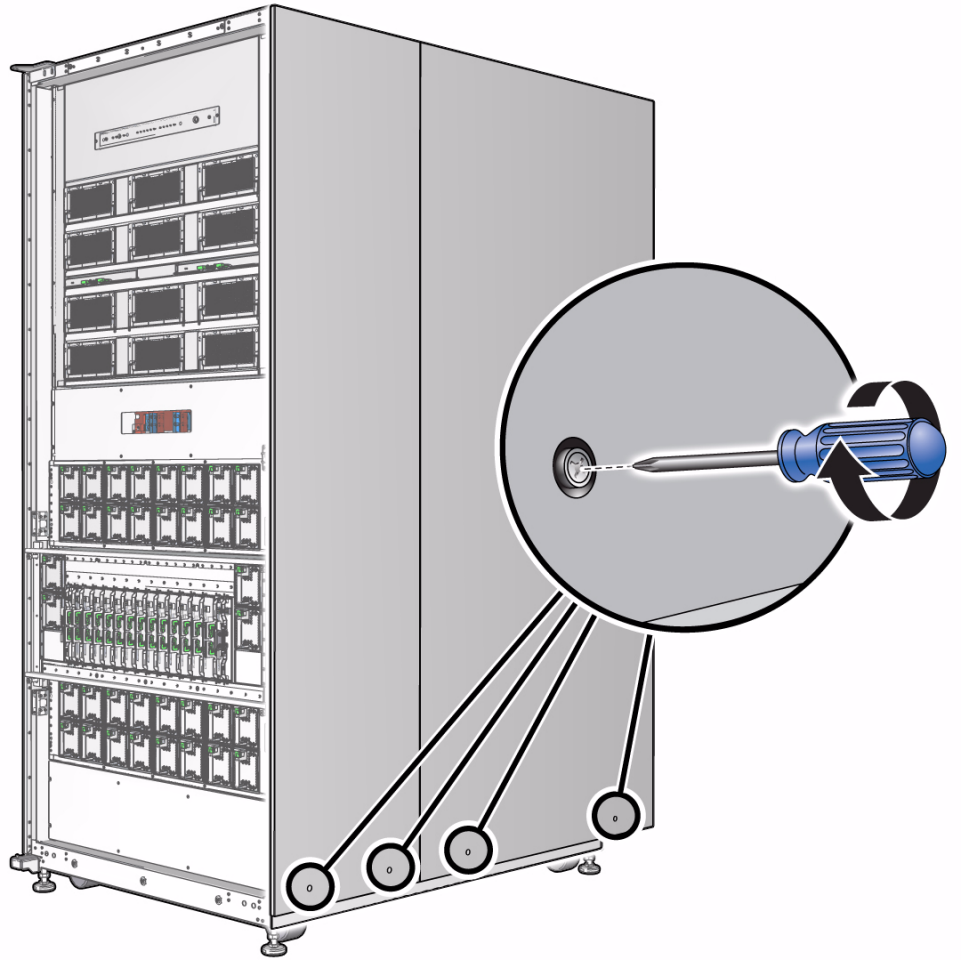
▼ Install Side Panels

1. Hook the top edges of the side panels over the side of the server.

Caution – A rear side panel weighs 47 lbs (21 kg). Two people are required to move it. A front side panel weighs 27 lbs (12 kg).



2. **Tighten the captive T20 Torx screws to secure the side panels.**
   Tighten the screws to 15 in-lb.



3. **If you moved the server to access the side panels:**
   a. **Move the server back to its original location.**
   b. **Lower the leveling feet or install the mounting brackets.**
      Refer to the Installation Guide.
   c. **Connect any grounding cables and I/O cables.**
   d. **Connect AC power to the server.**
      See "Reconnect AC Power to the Server" on page 483.

e. **Restart the server.**

   See "Restart the Server" on page 484.

4. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "Remove Side Panels" on page 86
- "Side Panels" on page 16

Servicing Trim Panels and the Kick Plate

Trim panels and the kick plate are cold-service components.

Trim Panel Service Preparation

Some procedures for the server require you to remove different groupings of the trim panel and the kick plate. For example, the procedure to replace the power system cage requires removing standoffs that are next to the cage, but you can leave lower standoffs in place because they are in less danger of breakage.

▼ Remove the Trim Panels

To prepare for a task such as replacing a power system cage or a fan cage, remove trim panels and standoffs to avoid breakage and cosmetic damage.

1. **Determine your first step.**

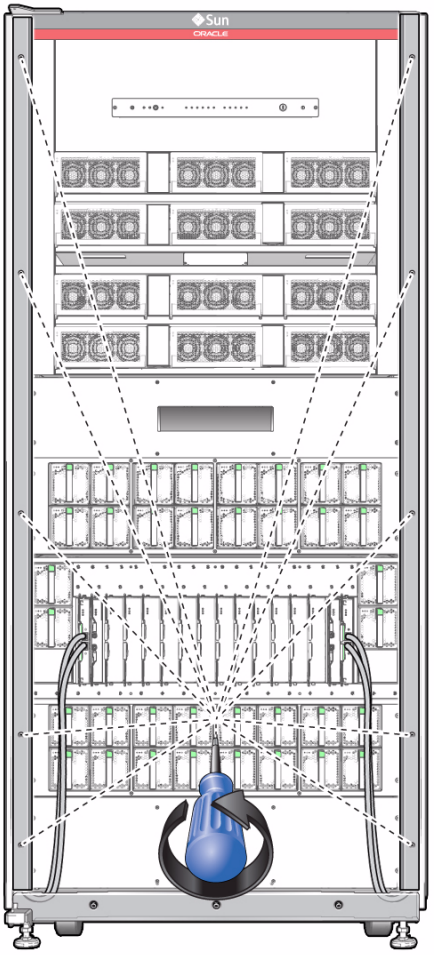
   See "Trim Panel Service Preparation" on page 91 for relevant tasks.

2. **Remove the front door to access the trim panels.**

   See "Remove the Door" on page 77.

3. **Remove the side trim panels.**

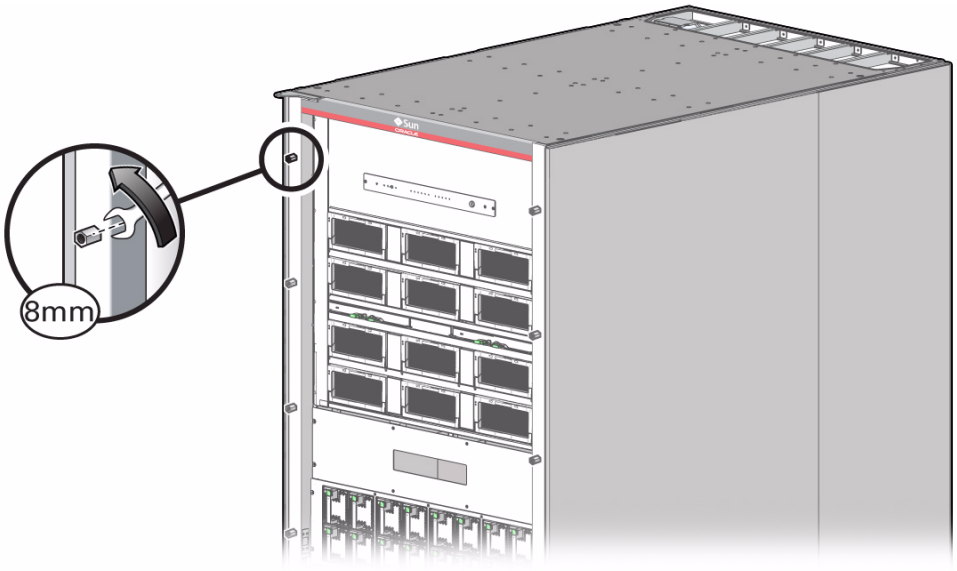
   Loosen five captive T20 Torx screws on each side trim panel.



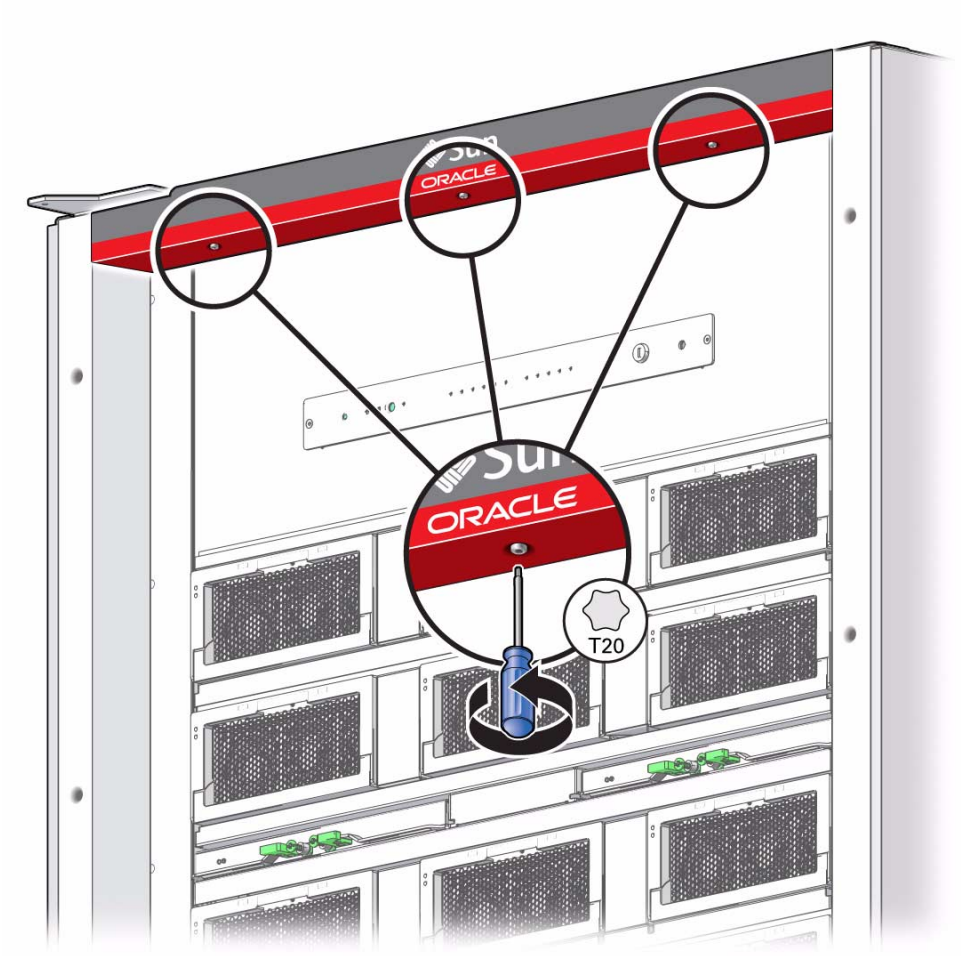
4. **Remove standoffs to protect them from damage.**

   Use an 8-mm wrench.

   - If you are removing and installing the power system cage, remove the standoffs nearest the cage. There are three on each side of this cage.
   - If you are removing and installing a fan cage, remove the standoffs at the sides of the cage.



5. **If you are removing the power system cage, remove the top trim panel.**
   There are three T20 Torx captive screws.



Related Information

- "Install Trim Panels" on page 95
- "Remove the Kick Plate" on page 98
- "Install the Kick Plate" on page 99

▼ Install Trim Panels

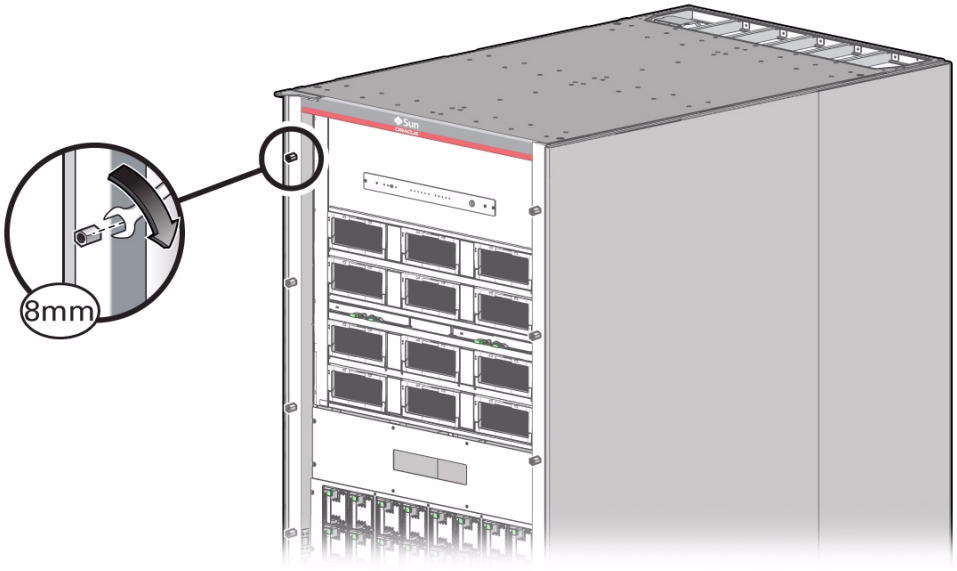
These steps are needed to complete another task such as replacing a fan cage.

1. **Determine your first step.**

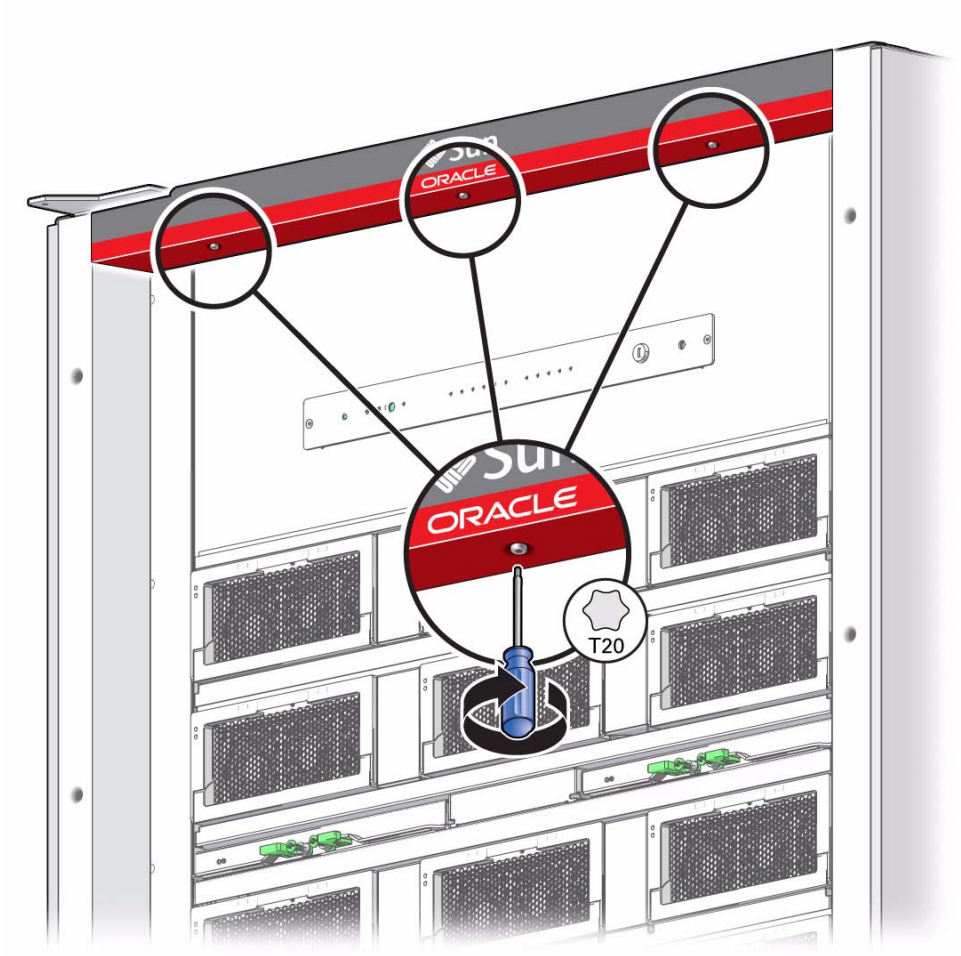
   See "Trim Panel Service Preparation" on page 91 for relevant tasks.

2. **Install any standoffs that you might have removed previously.**

   Tighten the 8-mm standoffs to approximately 15 in-lb.

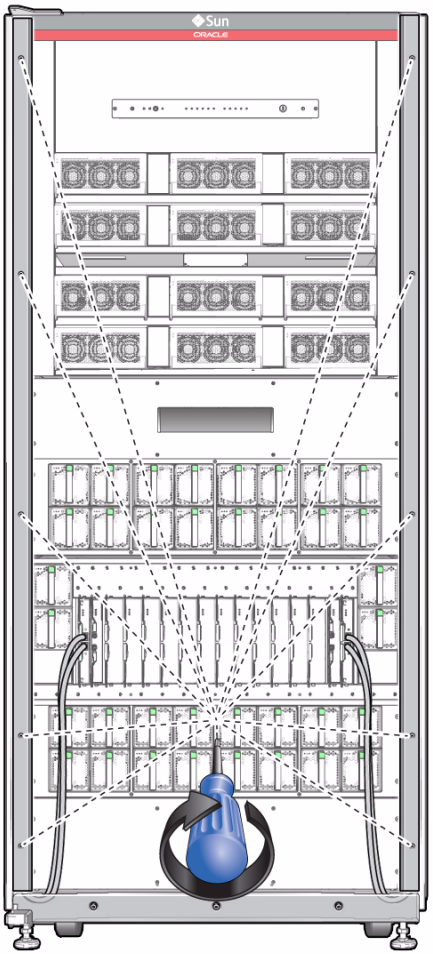


3. **Install the top trim panel, if you removed it in an earlier step.**
   Tighten the captive T20 Torx screws to 15 in-lb.



4. **Install the side trim panels.**

   Tighten the captive T20 Torx screws to 15 in-lb.



5. **Install the front door.**

   See "Install the Door" on page 81.

Related Information

- "Remove the Trim Panels" on page 91
- "Install the Kick Plate" on page 99
- "Install the Door" on page 81

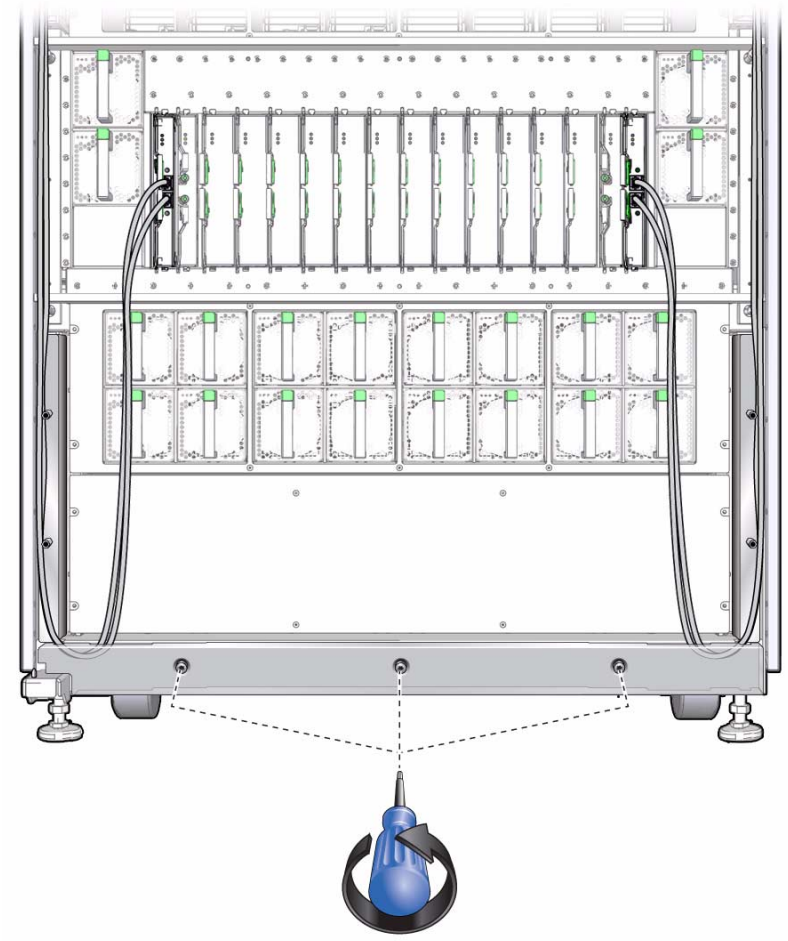
▼ Remove the Kick Plate

Remove the kick plate to service the service processor cables or optional mounting brackets. Refer to *Server Installation* for instructions on routing service processor cables and installing mounting brackets.

1. **Determine your first step.**

   See "Trim Panel Service Preparation" on page 91 for relevant tasks.

2. **Loosen three captive T20 Torx screws to remove the kick plate.**

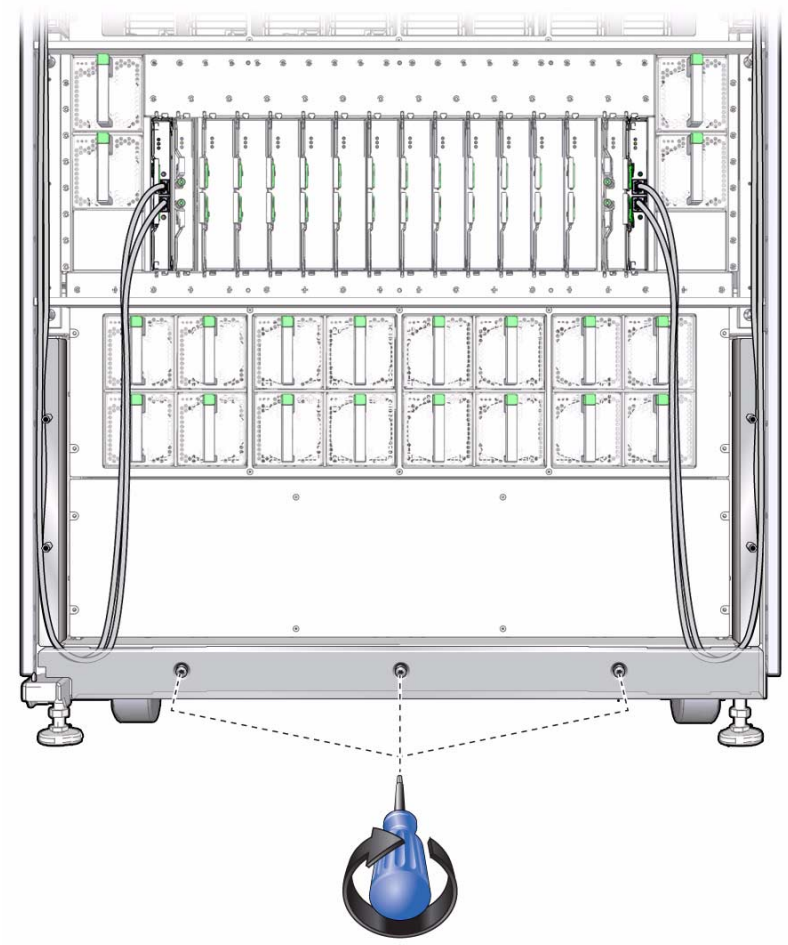


Related Information

- "Remove the Trim Panels" on page 91
- "Remove the Door" on page 77
- "Remove the Kick Plate" on page 98
- *Server Installation*, securing the SP cables

▼ Install the Kick Plate

1. **Determine your first step.**
   See "Trim Panel Service Preparation" on page 91 for relevant tasks.
2. **Tighten three captive T20 Torx screws to install the kick plate.**
   Tighten the screws to 15 in-lb.



Related Information

- "Remove the Kick Plate" on page 98
- "Install Trim Panels" on page 95
- "Install the Door" on page 81
- *Server Installation*, securing the SP cables

Servicing Power Supplies

Power supplies are hot-swappable components. See "Power System Cage Component Locations" on page 5 for the location of power supplies.

Note – The server will not boot unless all 12 power supplies are present.

Caution – Do not remove more than one power supply at a time from a running server, to avoid system shutdown.

Caution – A power supply weighs approximately 20 lbs (9 kg). Handle with caution.

Description	Links
Understanding power supplies	"Power Supply Configuration" on page 102
Replacing power supplies	"Power Supply Configuration" on page 102
	"Remove a Power Supply" on page 104
	"Install a Power Supply" on page 107

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Power Supply Configuration

Note – The server will not boot unless all 12 power supplies are installed.

Although the server requires that 12 power supplies be installed, it can operate with a minimum of six functioning power supplies.

If there are only five functioning power supplies, the server will cease operations:

- If the DCUs are on, they will shut down.
- If the DCUs are off, they cannot be turned on.

If you encounter this situation, turn on both facility power grids to ensure that 11 power supplies are functioning before you replace a faulty power supply.

The following table shows which power supplies, AC power cords, and AC input filters receive AC power from the two facility power grids.

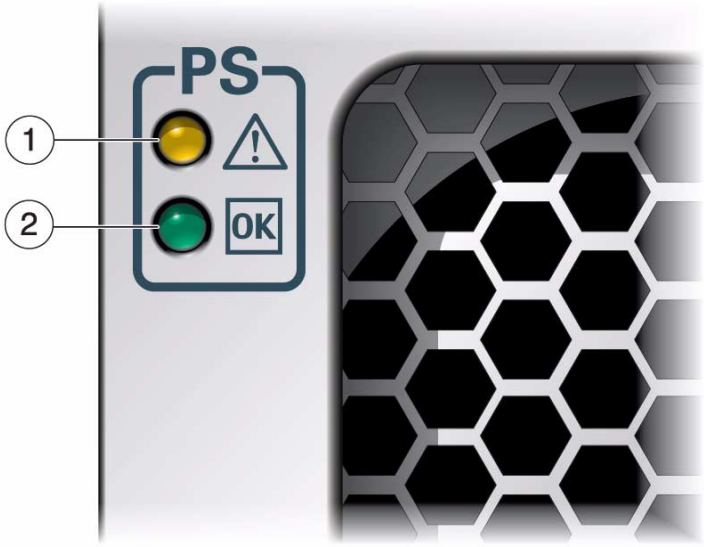
AC Power Cord and AC Input Filter	Power Supplies	Power Grid
AC0	PS5, PS11	Power grid 1
AC1	PS4, PS10	Power grid 1
AC2	PS3, PS9	Power grid 1
AC3	PS2, PS8	Power grid 0
AC4	PS1, PS7	Power grid 0
AC5	PS0, PS6	Power grid 0

See the Installation Guide for detailed information about power grids.

Related Information

- Installation Guide
- “Cooling Zone 05” on page 28
- “Power Supply LEDs” on page 103
- “Remove a Power Supply” on page 104
- “Install a Power Supply” on page 107
- “Servicing AC Power Cords” on page 335
- “Servicing AC Input Filters” on page 343

Power Supply LEDs



No.	LED	Icon	Description
1	Service Required (amber)	⚠	Indicates that service is required.
2	Power OK (green)	OK	Indicates these conditions: • **Off –** Power supply is not running in its normal state. • **Brief blink –** Power supply is running, but a Predicted Fault condition such as a slow fan speed or overtemperature has been detected. • **Steady on –** Power supply is powered on and running normally.

Related Information

- "Front and Rear LED Panel LEDs and Controls" on page 55
- "Power Supply Configuration" on page 102
- "Remove a Power Supply" on page 104
- "Install a Power Supply" on page 107

▼ Remove a Power Supply

Note – The server will not boot unless all 12 power supplies are present.

Caution – To prevent system overheating, do not leave a slot empty.

1. **Use one of these Oracle ILOM commands to display faulty components:**

```
-> show faulty
```

or

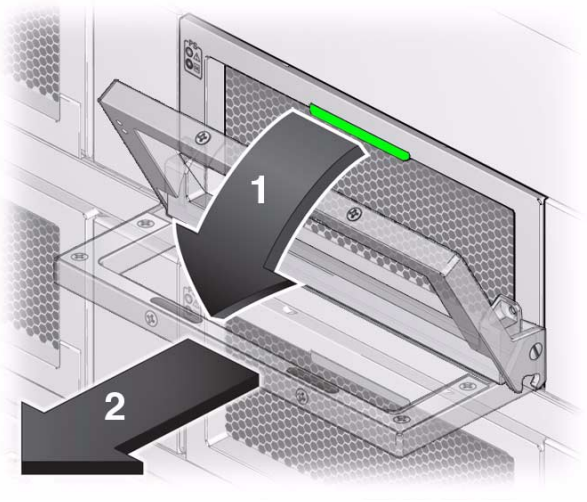
```
-> show /System/Open_Problems
```

See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. **Locate the faulty power supply by its amber Fault LED.**
   Power supplies are located on the front of the server.
3. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
4. **Unpack and prepare the replacement power supply.**
   a. **If there is a protective cover on the connectors, remove the cover.**
   b. **Inspect the connectors for possible damage.**

5. **Remove the faulty power supply from the server:**

   a. **Push the green release button up into the handle.**



   b. **Pull the handle down into the horizontal position.**

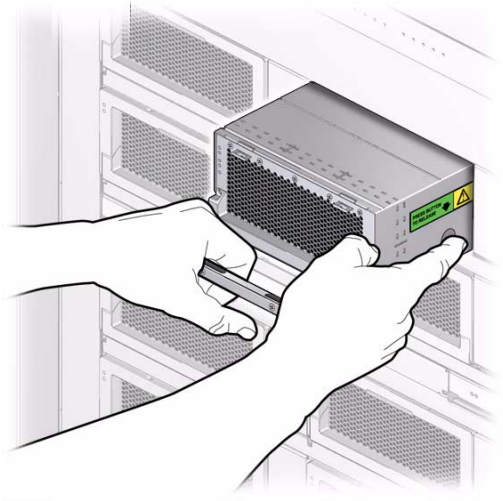
   c. **Pull the power supply part way out of the slot.**

      A safety lock on the side will stop the power supply.

Note – A label on the side of the power supply indicates how near the end of the power supply is to the front of the opening.

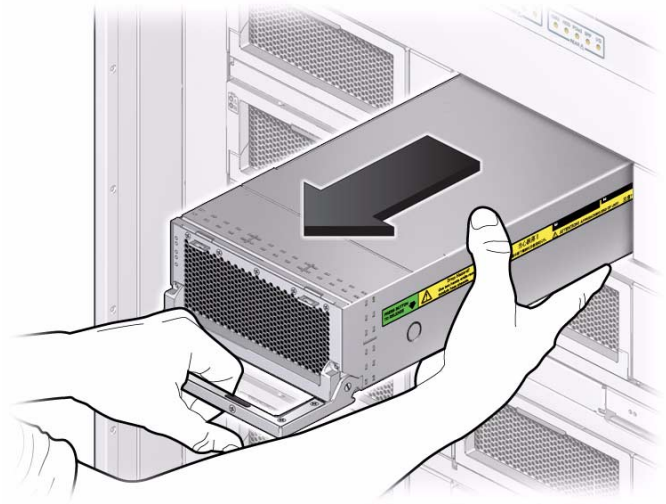
---

d. Press the green release button on the right side of the power supply to unlock it.



Caution – Do not allow the back of the power supply to drop. The connectors at the rear of the power supply will be damaged.

e. Support the bottom of the power supply as you pull it completely out of the slot.



f. Inspect the connectors inside the empty slot for possible damage.

g. **Place the power supply on an antistatic mat.**

Caution – Do not stack power supplies more than two units high. The EMI shields (the beryllium copper edge fingers) are easily bent or broken when another power supply or other heavy weight is placed on them. Offset the stacked power supplies so that the EMI shields do not lock together.

6. **Install the replacement power supply.**

Caution – Do not leave the slot empty. The server can shut down if it detects more than one empty slot.

See "Install a Power Supply" on page 107.

Related Information

- "Power Supply Configuration" on page 102
- "Power Supply LEDs" on page 103
- "Install a Power Supply" on page 107

▼ Install a Power Supply

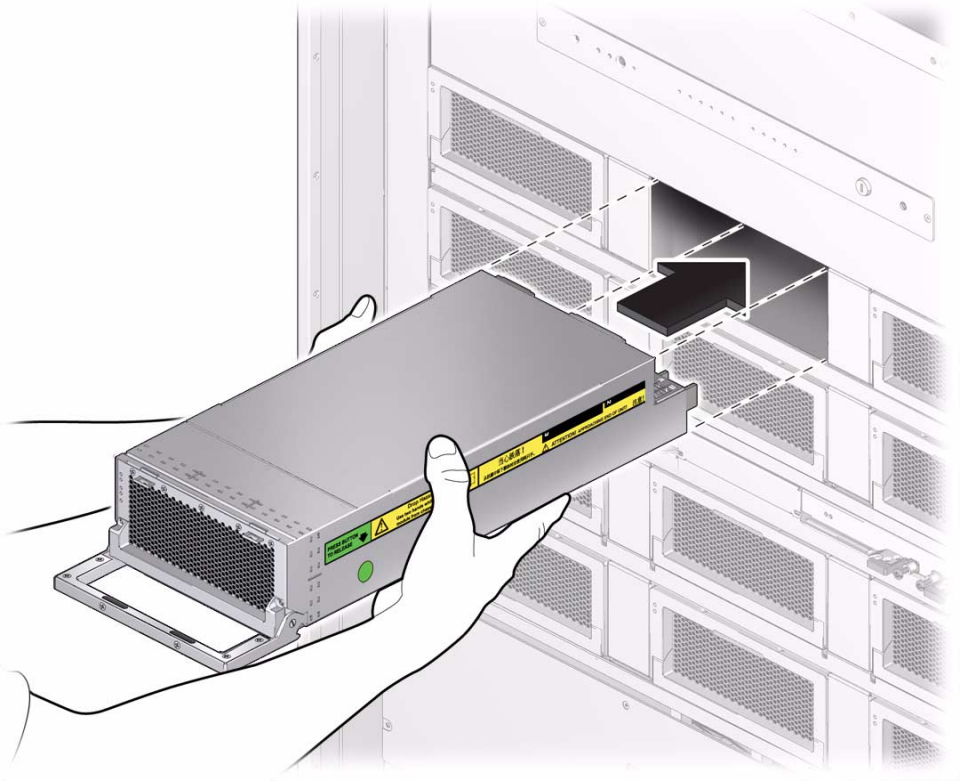
Note – The server will not boot unless all 12 power supplies are present.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **If you have not already done so, inspect and prepare the replacement power supply.**
   a. **Remove any protective caps from the connectors on the power supply.**
   b. **Inspect the connectors for damage.**
   c. **Inspect the connectors at the rear of the empty slot.**

3. **Insert the power supply:**

   a. **Pull the power supply handle into the horizontal position.**

   b. **Push the power supply into the slot until the rear of the handle touches the cabinet and starts to close.**



   c. **Raise the handle into the locked position until the green release button clicks into place.**

      The power supply should restart automatically.

4. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "Power Supply Configuration" on page 102
- "Power Supply LEDs" on page 103
- "Remove a Power Supply" on page 104

Servicing PSDBs

PSDBs are cold-service components. See "Power System Cage Component Locations" on page 5 for the locations of PSDBs.

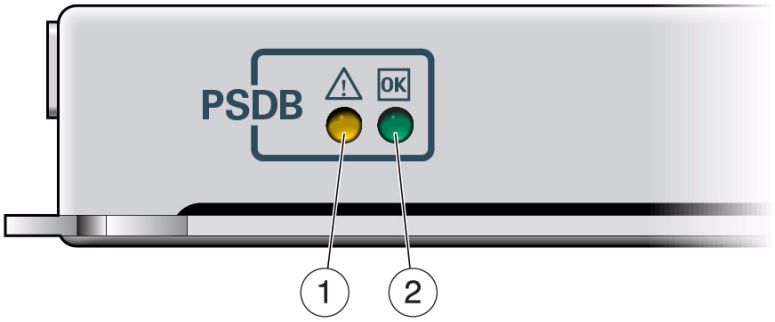
See "Power System Cage Component Locations" on page 5 for the location of PSDBs.

- "PSDB LEDs" on page 110
- "Remove a PSDB" on page 111
- "Install a PSDB" on page 112

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

PSDB LEDs



No.	LED	Icon	Description
1	Service Required (amber)	⚠	Indicates that service is required. The `show faulty` command provides details about any faults that cause this indicator to light.
2	Power OK (green)	OK	Indicates these conditions: • **Off –** PSDB is not running in its normal state. • **Steady on –** PSDB is powered on and running normally.

Related Information

- "Power System Cage Component Locations" on page 5
- "Remove a PSDB" on page 111
- "Install a PSDB" on page 112

▼ Remove a PSDB

1. **Use one of these Oracle ILOM commands to display faulty components:**

```
-> show faulty
```

or

```
-> show /System/Open_Problems
```

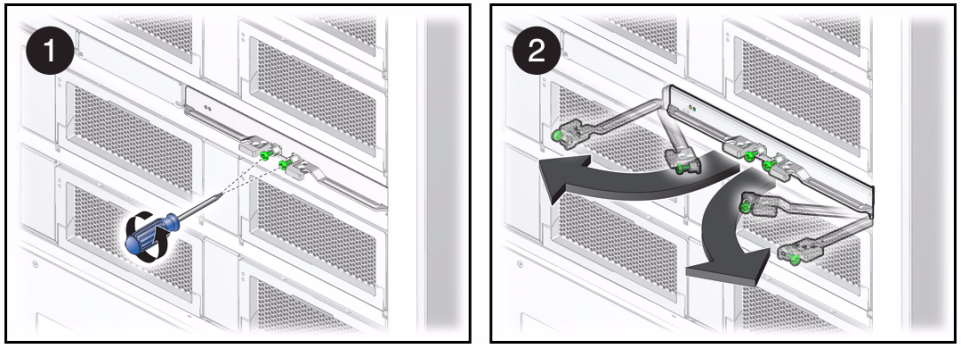
See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. **Physically locate the faulty PSDB.**
3. **Power down the server.**

See "Removing Power From the Server" on page 73.

4. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
5. **Remove the PSDB:**

   a. **Use a T20 Torx screwdriver to loosen the captive screws (1) on the extraction levers.**



   b. **Open the extraction levers fully.**

   c. **Pull the PSDB out of the slot.**

   A PSDB weighs 7 lbs (3.2 kg).

6. **Install the replacement PSDB.**

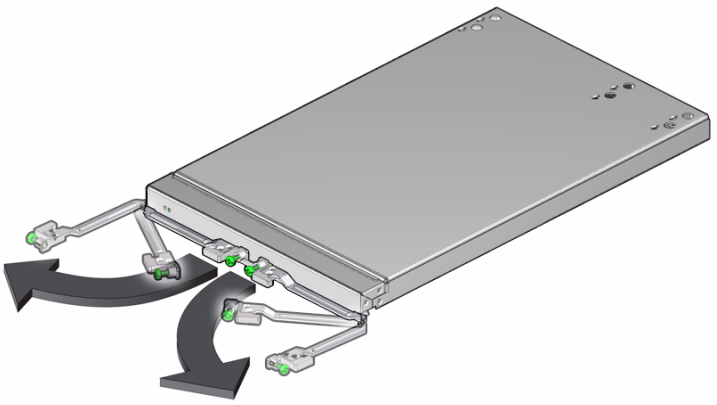
See "Install a PSDB" on page 112.

Related Information

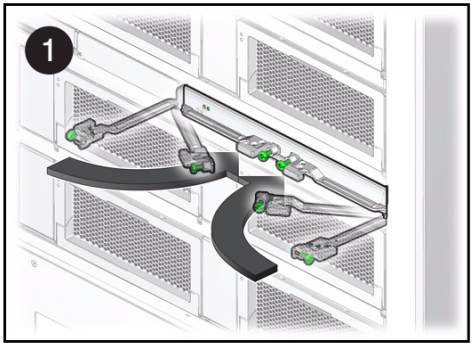
- "PSDB LEDs" on page 110
- "Install a PSDB" on page 112

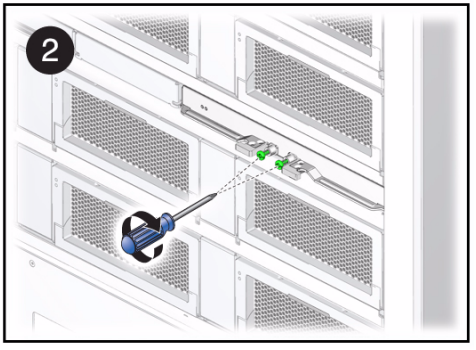
▼ Install a PSDB

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install the PSDB:**
   a. **Use a T20 Torx screwdriver to loosen the captive screws (1) on the extraction levers.**
   b. **Open the extraction levers fully.**



   c. **Insert the replacement module until the extraction levers start to close.**





d. Close the extraction levers to lock the PSDB in the slot.

e. Tighten the locking screws.

Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

3. **Reconnect the server to AC power.**

   See "Install an AC Power Cord" on page 340.

4. **Restart the server.**

   See "Restart the Server" on page 484.

5. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "PSDB LEDs" on page 110
- "Remove a PSDB" on page 111

Servicing Fan Modules

Fan modules are hot-swappable components. See "Fan Cage Component Locations" on page 7 and "Scalability Card Cage Component Locations" on page 8 for the locations of fan modules.

Caution – Do not remove more than one fan module at a time. The system might shut down.

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Fan Module Configuration

Fan modules are used in fan cages and the scalability card cage.

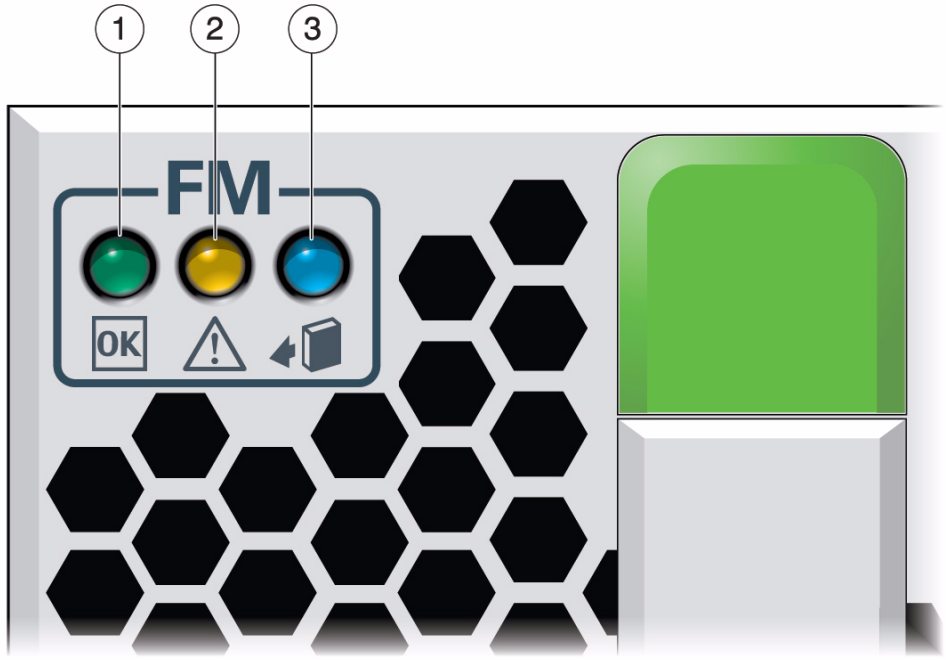
If a fan fails in a fan module, replace the entire fan module. See "Remove a Fan Module" on page 118.

Note – If a fan module fails in the scalability card cage, upgrade the server to system firmware 9.1.1.b or greater. This issue applies to fan module slots `FM16`, `FM17`, `FM18`, or `FM19`. See "Cooling Zone 04" on page 26 for their physical locations.

Related Information

- "Understanding Cooling Zones" on page 24
- "Fan Cage Component Locations" on page 7
- "Scalability Card Cage Component Locations" on page 8

Fan Module LEDs



No.	LED	Icon	Description
1	Power OK (green)	OK	Indicates these conditions: • **Off –** fan module is not running in its normal state. • **Steady on –** fan module is powered on and running normally.
2	Service Required (amber)	⚠	Indicates that service is required.
3	Ready to Remove (blue)		Indicates that a fan module can be removed during a hot-service operation.

Related Information

- "Fan Module Configuration" on page 116
- "Remove a Fan Module" on page 118
- "Install a Fan Module" on page 121

▼ Remove a Fan Module

Caution – To avoid system overheating, do not leave a slot empty.

Caution – Do not remove more than one fan module at a time. The system might shut down.

1. **Use one of these Oracle ILOM commands to display faulty components:**

```
-> show faulty
```

or

```
-> show /System/Open_Problems
```

See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. **If the failed fan module is located in the scalability card cage, check the server's firmware version.**

Note – Under some conditions, replacing a fan module in the scalability card cage can generate a fault that prevents operation of the fan. The affected fan module slots are FM16, FM17, FM18, and FM19. For the locations of these slots, see "Cooling Zone 04" on page 26.

   a. **Determine the firmware version:**

```
-> show -d properties /System/Firmware
  /System/Firmware
    Properties:
        system_fw_version = Sun System Firmware version number
->
```

   b. **If the firmware version is earlier than 9.1.1.b, update the firmware.**

      Refer to *Server Administration*, update the firmware.

3. **Halt the fan module:**

a. **Issue the `stop` command:**

```
-> stop /SYS/FMx
```

b. **Verify that the fan module is stopped.**

```
-> show /SYS/FMx
```

Note – The server might run the remaining fans at a higher speed to compensate for the stopped fan module. This is normal behavior.

---

4. **Light the blue Ready to Remove LED on the fan module.**

a. **Light the LED:**

```
-> set /SYS/FMx prepare_to_remove_action=true
```

b. **Verify that the LED is lit:**

```
-> show /SYS/FMx prepare_to_remove_status
    prepare_to_remove_status = Ready
```

Note – If you change your mind and decide not to remove this component, execute the `return_to_service_action` command from the above path.

---

5. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

6. **Unpack the replacement fan module.**

Note – A fan module weighs 1.6 lbs (0.7 kg).

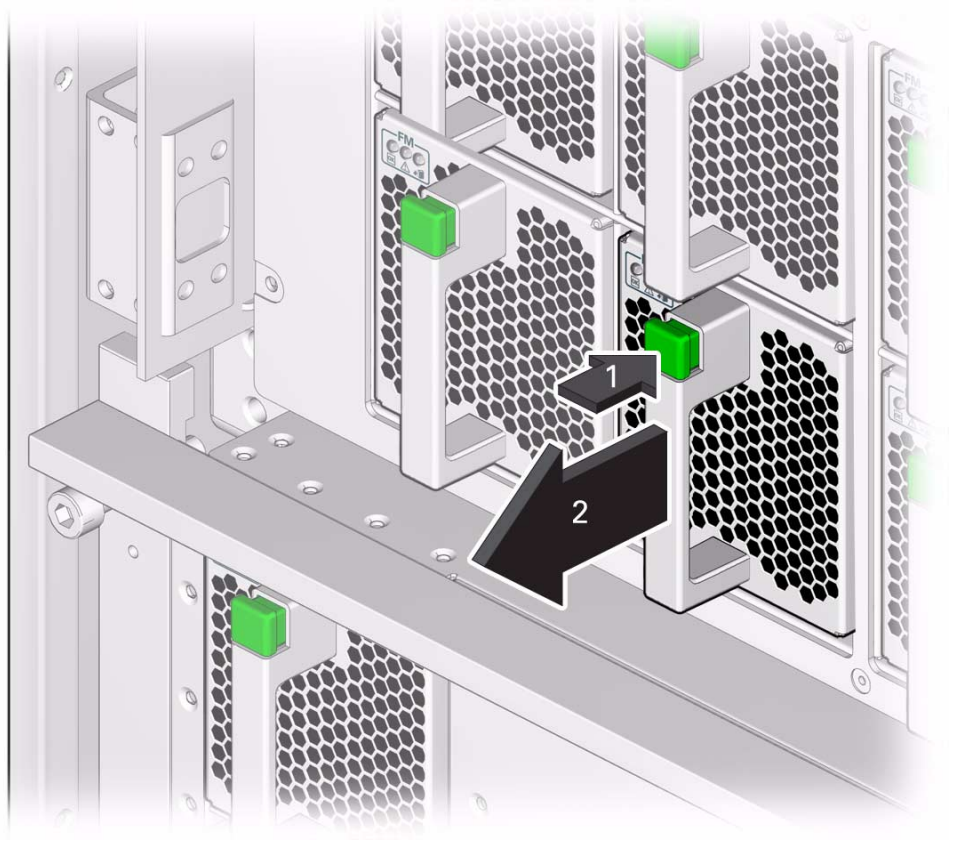
---

7. **Locate the lit blue Ready to Remove LED.**

The fan module is on the front of the server.

- FM0 to FM15 are in the lower fan tray. See "Fan Cage Component Locations" on page 7.
- FM16 to FM19 are in the scalability card cage. See "Scalability Card Cage Component Locations" on page 8.
- FM20 to FM35 are in the upper fan tray. "Fan Cage Component Locations" on page 7.

8. **Press the green release button on the fan module, and pull the fan module out of the slot.**



9. **Install the replacement fan module.**

   See "Install a Fan Module" on page 121.

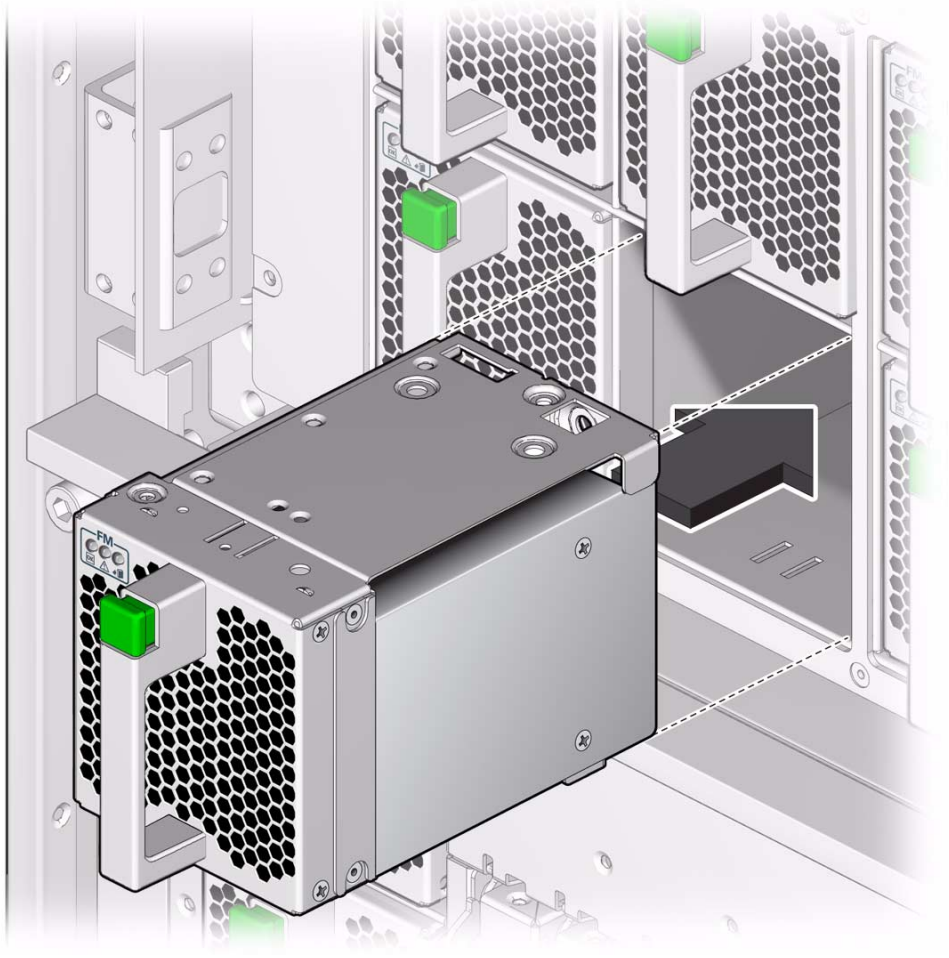
Caution – Do not remove more than one fan module at a time. The system might shut down.

Related Information

- "Fan Module Configuration" on page 116
- "Fan Module LEDs" on page 117
- "Install a Fan Module" on page 121

▼ Install a Fan Module

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Insert the replacement fan module until it locks into place.**



The power LED should immediately light and the fan should start.

3. **Return the replaced component to Oracle.**

See "Return a Component to Oracle" on page 488.

Related Information

- “Fan Module Configuration” on page 116
- “Fan Module LEDs” on page 117
- “Remove a Fan Module” on page 118

Servicing SSBs

SSBs are hot-pluggable components, but a system reboot will be required to complete the replacement. See "Scalability Card Cage Component Locations" on page 8 for the locations of SSBs.

Description	Links
Understand SSBs	"SSB Configuration" on page 124
Replace an SSB	"SSB LEDs" on page 125
	"Remove an SSB" on page 126
	"Install an SSB" on page 129

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

SSB Configuration

SSBs are part of the scalability feature that allows a PDomain to control more than one DCU. See "Scalability Hardware" on page 22 for an overview.

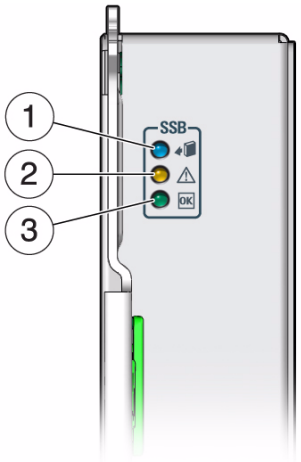
Scalability boards (SSBs) are configured to work together as a single unit. If an SSB fails, the server attempts to remove the faulty SSB from the configuration in order for the scalability feature to continue functioning. If the reconfiguration succeeds, the server continues working.

Note – If the server contains expandable PDomains and an SSB is replaced, the PDomains must be stopped to allow the scalability unit to be reconfigured with the new SSB. If there are no expandable PDomains, the stoppage is not necessary. See "Remove an SSB" on page 126 to determine if a PDomain is expandable.

Related Information

- "SSB LEDs" on page 125
- "Remove an SSB" on page 126
- "Install an SSB" on page 129

SSB LEDs



No.	LED	Icon	Description
1	Ready to Remove (blue)		Indicates that an SSB can be removed during a hot-service operation.
2	Service Required (amber)		Indicates that service is required.
3	Power OK (green)	OK	Indicates these conditions: • **Off –** SSB is not running in its normal state. If all SSB OK LEDs are off, the scalability feature is disabled. • **Steady on –** SSB is powered on and running normally. If all SSB OK LEDs are on, the scalability feature is enabled.

Related Information

- "SSB Configuration" on page 124
- "Remove an SSB" on page 126
- "Install an SSB" on page 129

▼ Remove an SSB

1. **Use one of these Oracle ILOM commands to display faulty components:**

```
-> show faulty
```

or

```
-> show /System/Open_Problems
```

See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. **Determine whether the SSB can be stopped without stopping PDomains:**

```
> show /SYS/SSBx current_config_state
  /SYS/SSBx
    Properties:
    current_config_state = State
```

- If *state* = `Disabled`, go to Step 6. You can remove the SSB without halting the PDomains.
- If *state* = `Enabled`, go to Step 3. PDomains might have to be halted.

3. **Determine what types of PDomains are in the server:**

   a. **For each PDomain, determine whether it is an *expandable* PDomain:**

```
-> show /Servers/PDomains/PDomain_x/HOST/ expandable
/Servers/PDomains/PDomain_x/HOST
Properties:
expandable = State
->
```

   The `expandable` property has two possible states, `true` and `false`.

   b. **Repeat Step a for the remaining PDomains in the server.**

4. **Based on the results that you found:**
   - If expandable *state* = `false` for all PDomains, go to Step 6. No PDomains are expandable. You do not need to stop the PDomains.
   - If expandable *state* = `true` for any one or more PDomains), go to Step 5. Some PDomains are expandable. You must stop the PDomains that are expandable.

5. **For any PDomain that you identified as expandable in** Step 3**:**

   a. **Stop the expandable PDomain.**

```
-> stop /Servers/PDomains/PDomain_x/HOST
Are you sure you want to stop
/Servers/PDomains/PDomain_x/HOST/ (y/n) ? y
Stopping /Servers/PDomains/PDomain_x/HOST
->
```

   b. **Repeat for any remaining expandable PDomains.**

6. **Light the blue Ready to Remove LED on the SSB.**

   a. **Light the LED:**

```
-> set /SYS/SSBx prepare_to_remove_action=true
```

   b. **Verify that the LED is lit:**

```
-> show /SYS/SSBx prepare_to_remove_status
    prepare_to_remove_status = Ready
```

Note – If you change your mind and decide not to remove this component, execute the `return_to_service_action` command from the above path.

---

7. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

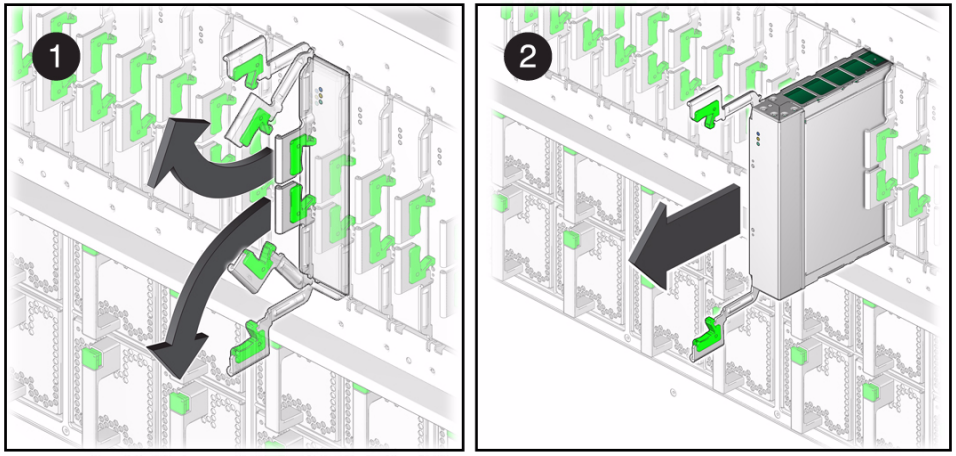
8. **Locate the lit blue Ready to Remove LED.**

   The SSB is at the front of the server.

9. **Remove the SSB:**

   a. **Squeeze the locks on the extraction levers and open the extraction levers to the horizontal position.**

   See detail 1 in the following illustration.



b. Pull the SSB out of the slot.

Caution – The connectors on the rear of the SSB are easily damaged.

10. **Install the new SSB.**

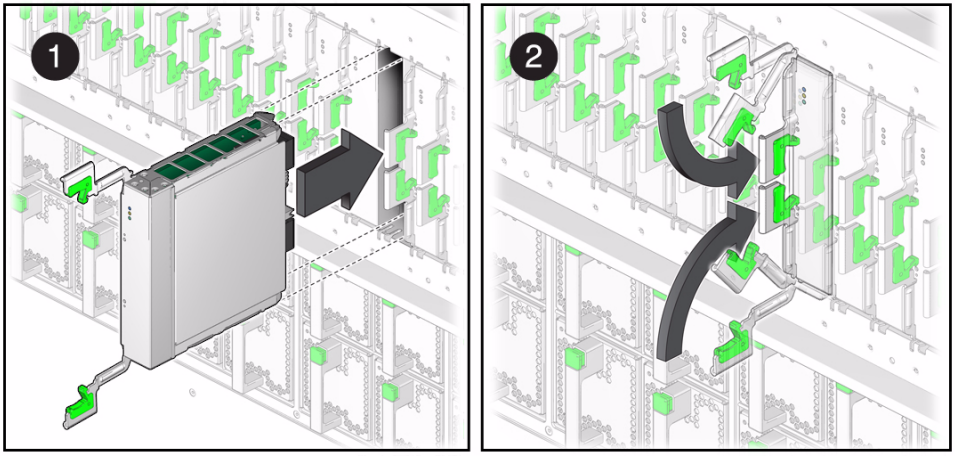
    See "Install an SSB" on page 129.

Related Information

- "SSB Configuration" on page 124
- "SSB LEDs" on page 125
- "Install an SSB" on page 129

▼ Install an SSB

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Squeeze the locks on the extraction levers and open the extraction levers to the horizontal position.**



3. **Insert the SSB and push it into the slot until the extraction levers start to close.**
4. **Close the extraction levers until they lock into place.**
5. **Determine your next step:**
   - If none of the PDomains is expandable, go to Step 8. There is no need to restart any PDomain.
   - If there is a mix of nonexpandable (bounded) and expandable PDomains, go to Step 7.

Note – To determine if a PDomain is expandable, see Step 3 in "Remove an SSB" on page 126.

   - If all PDomains are expandable, go to Step 6.
6. **If all PDomains are expandable, restart the server and then go to Step 8.**

   Skip Step 7.

```
-> start /System
```

7. **If there are both nonexpandable (bounded) and expandable PDomains, start only the expandable PDomains:**

   These are the PDomains that you identified as expandable in Step 5.

   a. **Start an expandable PDomain.**

```
-> start /Servers/PDomains/PDomain_x/HOST
```

   b. **Repeat for any remaining expandable PDomains.**

8. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "SSB Configuration" on page 124
- "SSB LEDs" on page 125
- "Remove an SSB" on page 126

Servicing Clock Boards

Clock boards are hot-pluggable components. See "Scalability Card Cage Component Locations" on page 8 for the location of clock boards.

Caution – Do not remove both clock boards at the same time while the server is running. The server will shut down.

Description	Links
Understand clock board types.	"Clock Board Configuration" on page 131
	"Display the Clock Board Type" on page 134
Replace a clock board.	"Clock Board LEDs" on page 133
	"Remove a Clock Board" on page 135
	"Install a Clock Board" on page 138

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Clock Board Configuration

The server has redundant clock boards. The active clock board provides the working clock signals. If the active clock board fails, the standby clock board can be made the active clock board.

The factory default configuration makes `CLOCK0` the active clock board and `CLOCK1` the standby clock board.

The server supports two types of clock boards:

- **Dual-synthesizer Clock Board**. If one clock synthesizer fails on the active clock board, the remaining clock synthesizer will function until the failed clock board is replaced, or the standby clock board is made the active clock board. This type of clock board is standard in the SPARC M6-32 server.
- **Single-synthesizer Clock Board**. If an active clock board with a single clock synthesizer fails, the standby clock board must manually be made the new active clock board. This type of clock board was standard in the original SPARC M5-32 server.

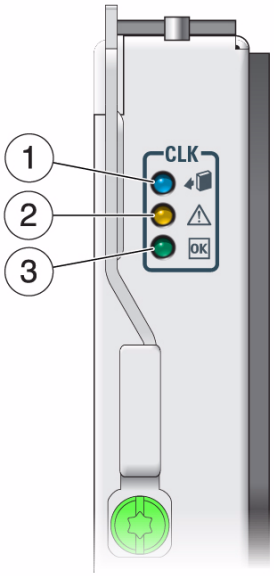
Note – The server supports the mixing of dual- and single-synthesizer clock boards. For maximum system redundancy, the dual-synthesizer clock board should be the active clock board.

Note – The SPARC M5-32 server requires new firmware to use the dual-synthesizer clock board. Refer to the latest *Server Product Notes*, upgrading the SPARC M5-32 server.

Related Information

- "Clock Board LEDs" on page 133
- "Display the Clock Board Type" on page 134
- "Remove a Clock Board" on page 135
- "Install a Clock Board" on page 138
- "Servicing the Scalability Card Cage" on page 313

Clock Board LEDs



No.	LED	Icon	Description
1	Ready to Remove (blue)		Indicates that the clock board can be removed during a hot-service operation.
2	Service Required (amber)		Indicates that service is required.
3	Power OK (green)	OK	Indicates these conditions: • **Off –** Clock board is not running in its normal state. • **Steady on –** Clock board is powered on and running normally.

Related Information

- "Clock Board Configuration" on page 131
- "Display the Clock Board Type" on page 134
- "Remove a Clock Board" on page 135
- "Install a Clock Board" on page 138
- "Servicing the Scalability Card Cage" on page 313

▼ Display the Clock Board Type

- **Use the `show` command to display information about a clock board.**

  The display for a single-synthesizer clock board shows a single unnumbered synthesizer, `CORE_SYNTH`.

```
-> show /SYS/CLOCKx
 /SYS/CLOCKx
    Targets:
        CORE_SYNTH
...
    Properties
        type = Clock Board
        ipmi_name = /CLKx
...
        fru_rev_level = 02
...
```

  The display for a dual-synthesizer clock board shows two synthesizers, `CORE_SYNTH0` and `CORE_SYNTH1`.

```
-> show /SYS/CLOCKx
 /SYS/CLOCKx
    Targets:
        CORE_SYNTH0
        CORE_SYNTH1
...
    Properties
        type = Clock Board
        ipmi_name = /CLKx
...
        fru_rev_level = 03
...
```

Related Information

- "Clock Board Configuration" on page 131
- "Clock Board LEDs" on page 133
- "Remove a Clock Board" on page 135
- "Install a Clock Board" on page 138

▼ Remove a Clock Board

1. **Use one of these Oracle ILOM commands to display faulted components:**

```
-> show faulty
```

or

```
-> show /System/Open_Problems
```

See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. **Verify the state of the clock board:**

```
-> show /SYS/CLOCKx fault_state

 /SYS/CLOCKx
   Properties
       fault_state = Faulted
```

3. **Test the faulted clock board to determine whether it is the active clock board:**

```
-> stop /SYS/CLOCKx
```

- If the clock board stops, it is the standby clock board. Continue at Step 5.
- If the clock board does not stop, it is the active clock board. Continue at Step 4.

4. **If the faulted board is the active clock board, change its state to standby:**

   a. **Prepare the clock board for the change:**

```
-> set /SYS/CLOCKx requested_config_state=Disabled
```

   b. **Stop the hosts:**

```
-> stop /System
```

c. Restart the hosts:

```
-> start /System
```

When the server restarts, the redundant clock board is the active clock board. The faulted clock board is now the standby clock board and can be stopped.

d. Stop the faulted clock board:

```
-> stop /SYS/CLOCKx
```

5. Prepare the standby clock board for removal:

a. Light the blue Ready to Remove LED on the board.

```
-> set /SYS/CLOCKx prepare_to_remove_action=true
```

b. Verify that the LED is lit:

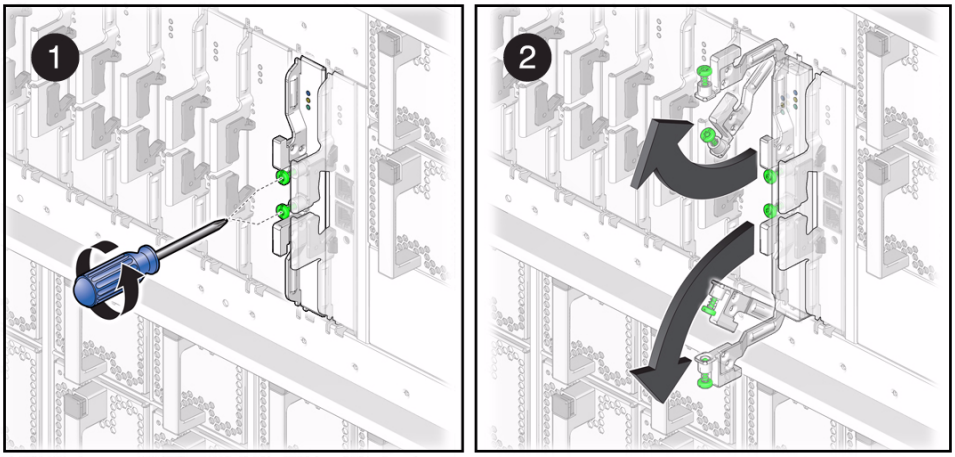
```
-> show /SYS/CLOCKx prepare_to_remove_status
    prepare_to_remove_status = Ready
```

6. At the front of the server, locate the clock board with the blue Ready to Remove LED.

7. Use an antistatic wrist strap to protect the equipment from ESD damage.

8. **Remove the clock board:**

   a. **Use a T20 Torx screwdriver to loosen the captive screws on the extraction levers (panel 1).**



   b. **Open the extraction levers to the horizontal position (panel 2).**

   c. **Pull the clock board out of the slot.**

9. **Install the replacement clock board.**

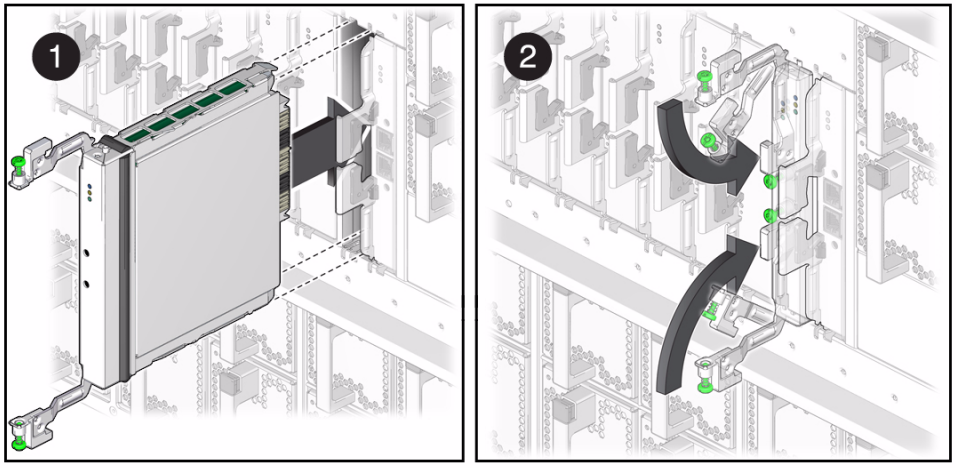
   See "Install a Clock Board" on page 138.

Related Information

- "Install a Clock Board" on page 138
- "Display the Clock Board Type" on page 134
- "Clock Board LEDs" on page 133
- "Clock Board Configuration" on page 131
- "Servicing the Scalability Card Cage" on page 313

▼ Install a Clock Board

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Use a T20 Torx screwdriver to loosen the captive screws on the extraction levers.**
3. **Open the extraction levers to the horizontal position (panel 1).**



4. **Insert the replacement clock board and push it into the slot until the extraction levers touch the cabinet and start to close (panel 2).**
5. **Close the extraction levers and tighten the captive screws.**

   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

Note – The clock board will not be detected and configured until the server is power cycled.

---

6. **Determine your next step:**
   - If the PDomains are not stopped, go to Step 9 to configure the clock board.
   - If the PDomains are stopped, go to Step 7 to restart them.
7. **If the PDomains are stopped, enter:**

```
-> start /System
```

8. **Display the state of the clock board:**

```
-> show /SYS/CLOCKx requested_config_state
```

   - If the state is `requested_config_state=Enabled`, go to Step 9.
   - If the state is `requested_config_state=Disabled`, enable it:

```
-> set /SYS/CLOCKx requested_config_state=Enabled
```

9. **Configure the clock board.**

```
-> start /SYS/CLOCKx
```

10. **Return the replaced component to Oracle.**

    See "Return a Component to Oracle" on page 488.

Related Information

- "Remove a Clock Board" on page 135
- "Display the Clock Board Type" on page 134
- "Clock Board LEDs" on page 133
- "Clock Board Configuration" on page 131
- "Servicing the Scalability Card Cage" on page 313

Servicing Service Processors

Service processors are hot-pluggable components. See "Scalability Card Cage Component Locations" on page 8 for the location of service processors.

Caution – Do not remove both service processors at the same time while the server is running. The server will shut down.

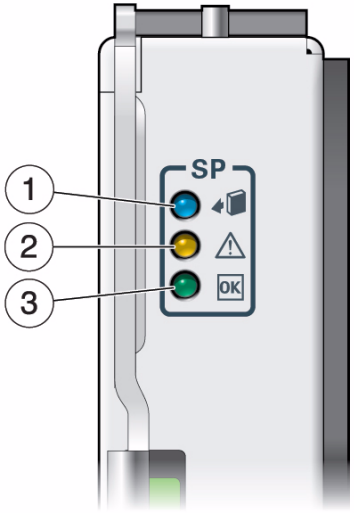
Description	Links
Replace a service processor.	"Service Processor LEDs" on page 142
	"Remove a Service Processor" on page 146
	"Install a Service Processor" on page 151
Replace the battery in a service processor.	"Check a Service Processor Battery" on page 145
	"Service Processor LEDs" on page 142
	"Remove a Service Processor" on page 146
	"Replace a Service Processor Battery" on page 148
	"Install a Service Processor" on page 151

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Service Processor LEDs

Service Processor General Status LEDs



No.	LED	Icon	Description
1	Ready to Remove (blue)		Indicates that service processor can be removed during a hot-service operation.
2	Service Required (amber)		Indicates that service is required. Check the `/SP/logs/event/list` to determine which service processor failed and which service processor became active.
3	Power OK (green)	OK	Indicates these conditions: • **Off –** Service processor is not running. • **Steady on –** Service processor is powered on and running under ILOM.

Note – On the server's rear LED panel, two amber Fault LEDs light while the service processor is booting. The system Fault LED and the service processor Fault LED are normally on during boot. The fault LEDs should turn off and the OK LEDs turn on after the service processor boots without errors.

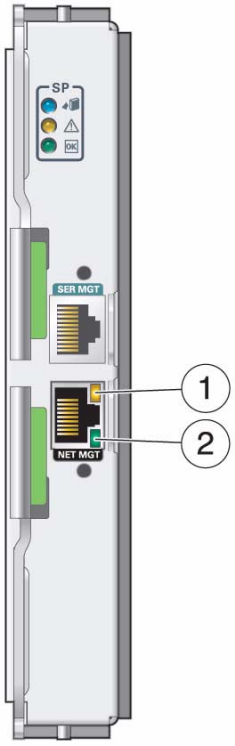
Note – On the server's front and rear LED panels, the green `SP` LEDs remain on until the server is powered off. If the front and rear LED panels light both the green SP and amber `SP Fault` LEDs, check the LEDs located on the service processor boards for the true status of the service processors.

Related Information

- "Service Processor Network Management Port LEDs" on page 144
- "Remove a Service Processor" on page 146
- "Replace a Service Processor Battery" on page 148
- "Install a Service Processor" on page 151

Service Processor Network Management Port LEDs

The NET MGT port on the service processor operates at 1 Gb/sec, 100BASE-T, and 10BASE-T speeds.



The NET MGT port has two LEDs. The upper LED indicates the port's speed, as shown in the following table. The lower LED blinks green when active, and stays solid green when the port link is up but idle.

Network Speed	Speed Indicator (LED 1)	Activity (LED 2)
1 Gb/sec	Amber	Green
100BASE-T	Green	Green
10BASE-T	Off	Green

Related Information

- "Service Processor General Status LEDs" on page 142

- “Remove a Service Processor” on page 146
- “Install a Service Processor” on page 151
- “Replace a Service Processor Battery” on page 148

▼ Check a Service Processor Battery

Each service processor has a battery.

1. Check the status of the service processor battery:

```
-> show /SYS/SPx/BAT
 /SYS/SPx/BAT
    Targets:

    Properties:
        type = Battery
        fault_state = OK
        clear_fault_action = (none)
...
```

2. Check the voltage of the battery:

```
-> show /SYS/SPx/V_VBAT

 /SYS/SPx/V_VBAT
...
    Properties:
        type = Voltage
        class = Threshold Sensor
        value = 3.271 Volts
        upper_nonrecov_threshold = N/A
...
        lower_noncritical_threshold = 2.704 Volts
...
```

Related Information

- “Service Processor LEDs” on page 142
- “Remove a Service Processor” on page 146
- “Replace a Service Processor Battery” on page 148
- “Replace an SPP Battery” on page 240

▼ Remove a Service Processor

1. **Use one of these Oracle ILOM commands to display faulty components:**

```
-> show faulty
```

or

```
-> show /System/Open_Problems
```

See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. **Identify which service processor must be replaced:**
   - **Active service processor failed:** If the active service processor fails, it becomes the standby service processor (while the former standby service processor becomes active). Replace the standby service processor. Go to Step 5.
   - **Standby service processor failed:** Go to Step 5 to replace the standby service processor.
   - **Both service processors failed:** Go to Step 4 to stop all the hosts first.
   - **If you are uncertain:** Go to Step 3 to check the `/SP/logs/event/list`.
3. **Check the `/SP/logs/event/list` to determine which service processor failed and which service processor became active:**

```
-> show /SP/logs/event/list
```

4. **If both service processors failed, stop the hosts:**

   Use this command only if both service processors have failed. If one service processor failed, go instead to Step 5.

```
-> stop /System
Are you sure you want to stop /System (y/n) ? y
```

5. **Stop the standby service processor (`SP`*x*):**

a. **Issue the `stop` command:**

```
-> stop /SYS/SPx
```

In approximately two minutes, this step halts the service processor, turns off the service processor OK LED, and lights the Ready to Remove LED.

b. **Verify that the service processor is stopped.**

```
-> show /SYS/SPx
```

6. **Locate the lit blue Ready to Remove LED.**

   The service processor is at the front of the server.

7. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

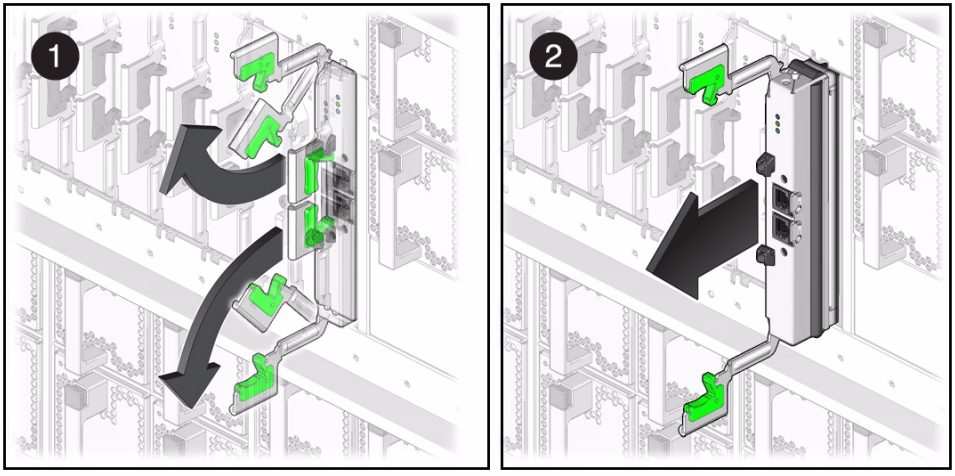
8. **Label and disconnect the cables attached to the serial and network ports.**

   Serial management is the upper port.

   Network management is the lower port.

9. **Remove the faulty service processor:**

   a. **Squeeze the locks on the extraction levers.**



   b. **Swing the extraction levers into the horizontal position.**

   c. **Pull the service processor out of the slot.**

10. **Determine your next step:**

    - To replace the battery, see "Replace a Service Processor Battery" on page 148.

- To install a service processor, see "Install a Service Processor" on page 151.

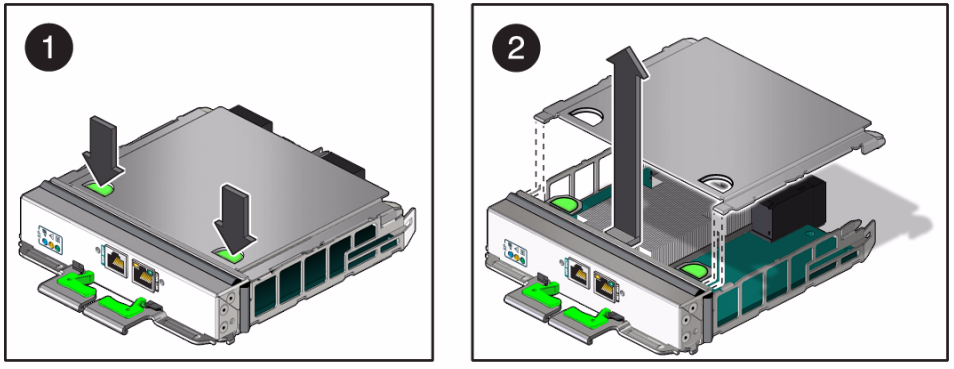
Related Information

- "Replace a Service Processor Battery" on page 148
- "Install a Service Processor" on page 151
- "Service Processor LEDs" on page 142

▼ Replace a Service Processor Battery

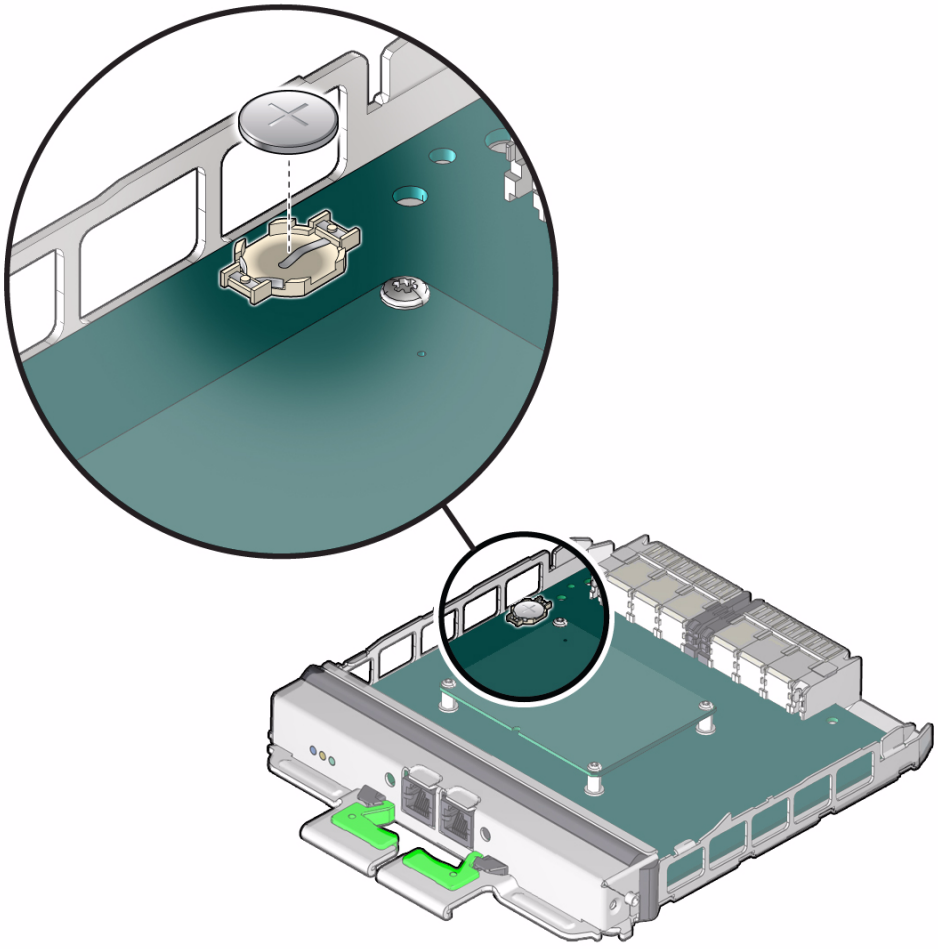
Each service processor has a battery.

1. **Check the state of the battery.**
   See "Check a Service Processor Battery" on page 145.
2. **If the battery is faulty, remove the service processor.**
   See "Remove a Service Processor" on page 146.
3. **Remove the cover from the service processor.**
   a. **Press the green latches on the cover to unlock it (panel 1).**



   b. **Slide the cover backward and lift it off (panel 2).**

4. **Use a small flat screwdriver or similar tool to carefully pry the battery out of the battery holder.**

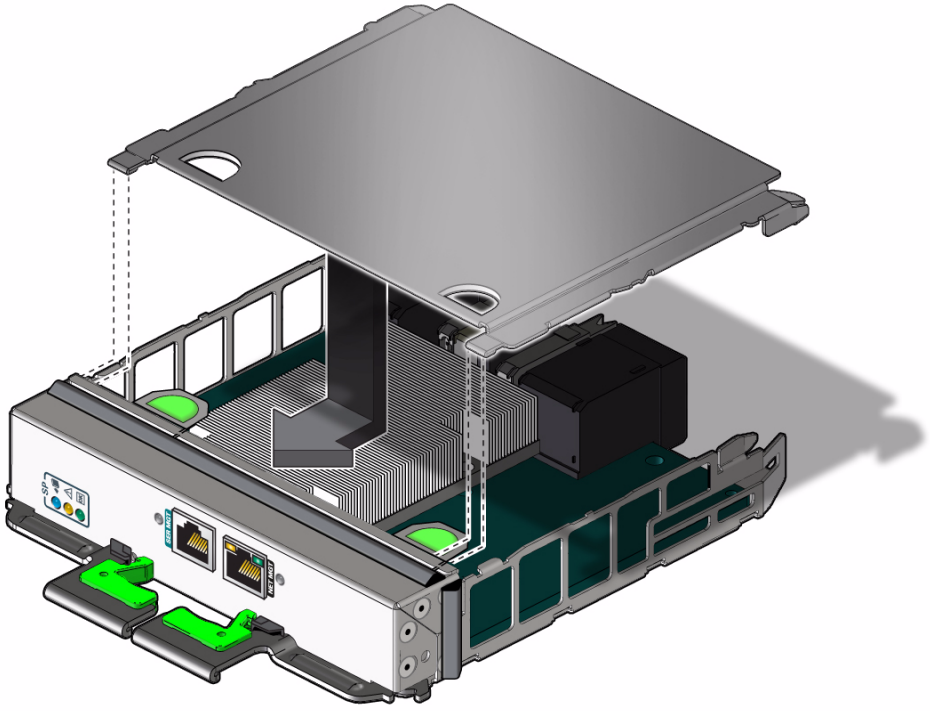


5. **To insert the new battery, press it straight down into the battery holder.**

   The positive side of the battery faces up.

6. **Install the cover.**

   Place the cover on the case, then slide the cover toward you until the green latches lock the cover in place.

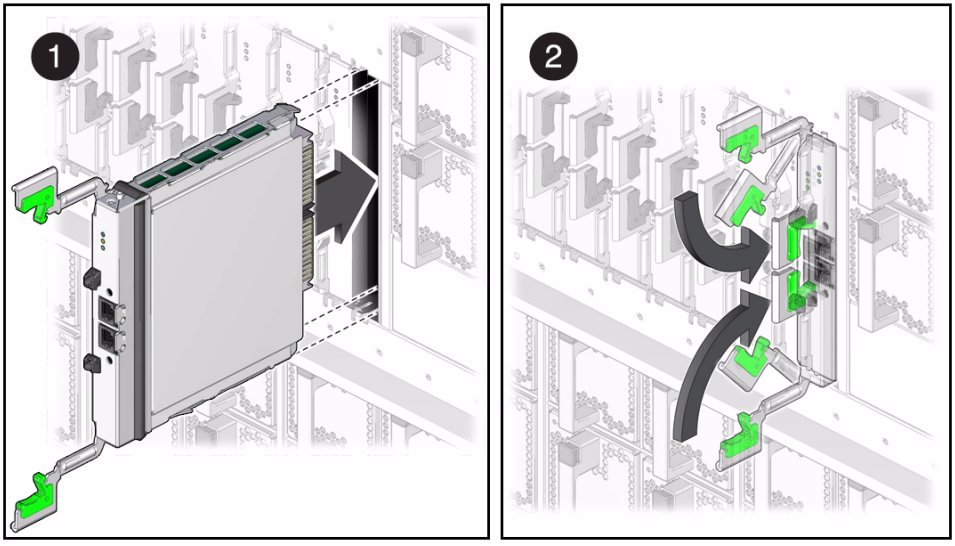


Related Information

- “Remove a Service Processor” on page 146
- “Install a Service Processor” on page 151
- “Service Processor LEDs” on page 142

▼ Install a Service Processor

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Insert the service processor and push it into the slot until the extraction levers start to close.**



3. **Close the extraction levers fully until they lock into place.**
4. **Install the serial management and network management cables to the card.**

   Serial management is the upper port.

   Network management is the lower port.

Note – Refer to the Installation Guide for instructions on managing and routing cables.

---

5. **Use Oracle ILOM to restart the service processor:**

```
-> start /SYS/SPx
```

6. **If you stopped all the hosts previously, you can restart them now:**

   Do this only if you stopped all the hosts in Step 4 in "Remove a Service Processor" on page 146.

```
-> start /System
```

7. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "Remove a Service Processor" on page 146
- "Replace a Service Processor Battery" on page 148
- "Service Processor LEDs" on page 142

Servicing I/O Switch Boards

I/O switch boards are hot-pluggable components. See “IOU Component Locations” on page 12 for the location of I/O switch boards.

Note – The I/O switch board weighs 5.3 lbs (2.4 kg).

Description	Links
Understand I/O switch boards	“I/O Switch Board Configuration” on page 154
Replace an I/O switch board	“I/O Switch Board LEDs” on page 155
	“Remove an I/O Switch Board” on page 156
	“Install an I/O Switch Board” on page 158

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

I/O Switch Board Configuration

There are two I/O switch boards in each I/O cage. To identify a specific I/O switch board, you need to identify its IOU number (the cage number) as well as the I/O switch board number, as shown below.

- "I/O Switch Board FRU Name" on page 154
- "Determining Which PDomain Has the I/O Switch Board" on page 154

I/O Switch Board FRU Name

The FRU name for an I/O switch board is `/SYS/IOU`*x*`/IOB`*y*, where:

- *x* = the IOU number (0 to 3).
- *y* = the I/O switch board number (0 or 1)

Related Information

- "Determining Which PDomain Has the I/O Switch Board" on page 154
- "I/O Switch Board LEDs" on page 155
- "Remove an I/O Switch Board" on page 156
- "Install an I/O Switch Board" on page 158

Determining Which PDomain Has the I/O Switch Board

The I/O switch board is located in an IOU (`IOU`*x*), which is part of a DCU (`DCU_`*x*). If you know the FRU name of the I/O switch board (/SYS/IOU*x*/IOB*y*), the DCU number is equal to the IOU number, where *x* can be 0 to 3.

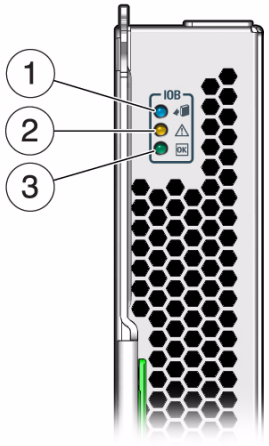
In a fully configured server, there are always four DCUs. However, the number of PDomains in a server can vary, depending on how the server is configured. A server can be configured with only one PDomain, or as many as four PDomains.

Before removing an I/O switch board you might need to halt a specific PDomain (`PDomain_`*n*), where *n* might be 0, 1, 2, or 3.

Related Information

- "I/O Switch Board FRU Name" on page 154
- "I/O Switch Board LEDs" on page 155
- "Remove an I/O Switch Board" on page 156
- "Install an I/O Switch Board" on page 158

I/O Switch Board LEDs



No.	LED	Icon	Description
1	Ready to Remove (blue)		Indicates that the I/O switch board can be removed during a hot-service operation.
2	Service Required (amber)		Indicates that service is required. The `show faulty` command provides details about any faults that cause this indicator to light.
3	Power OK (green)	OK	Indicates these conditions: • **Off –** I/O switch board is not running in its normal state. • **Steady on –** I/O switch board is powered on and running normally.

Related Information

- "I/O Switch Board Configuration" on page 154
- "Remove an I/O Switch Board" on page 156

■ "Install an I/O Switch Board" on page 158

▼ Remove an I/O Switch Board

1. Use one of these Oracle ILOM commands to display faulty components:

```
-> show faulty
```

or

```
-> show /System/Open_Problems
```

See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. Stop the PDomain that has the I/O switch board:

a. Determine which DCU (`DCU_x`) has the I/O switch board.

```
-> show /System/DCUs
    /System/DCUs/DCU_x
```

b. Determine which PDomain contains DCU_*x*.

```
-> show /System/DCUs/DCU_x host_assigned
    /System/DCUs/DCU_x
    Properties:
        host_assigned = HOSTy
```

The *y* in `HOSTy` indicates that the PDomain is `PDomain_y`.

c. Stop the specified PDomain (`PDomain_y`):

```
-> stop /Servers/PDomains/PDomain_y/HOST
```

3. Light the blue Ready to Remove LED on the IOB.

a. Light the LED:

```
-> set /SYS/IOUx/IOBy prepare_to_remove_action=true
```

b. Verify that the LED is lit:

```
-> show /SYS/IOUx/IOBy prepare_to_remove_status
    prepare_to_remove_status = Ready
```

Note – If you change your mind and decide not to remove this component, execute the `return_to_service_action` command from the above path.

---

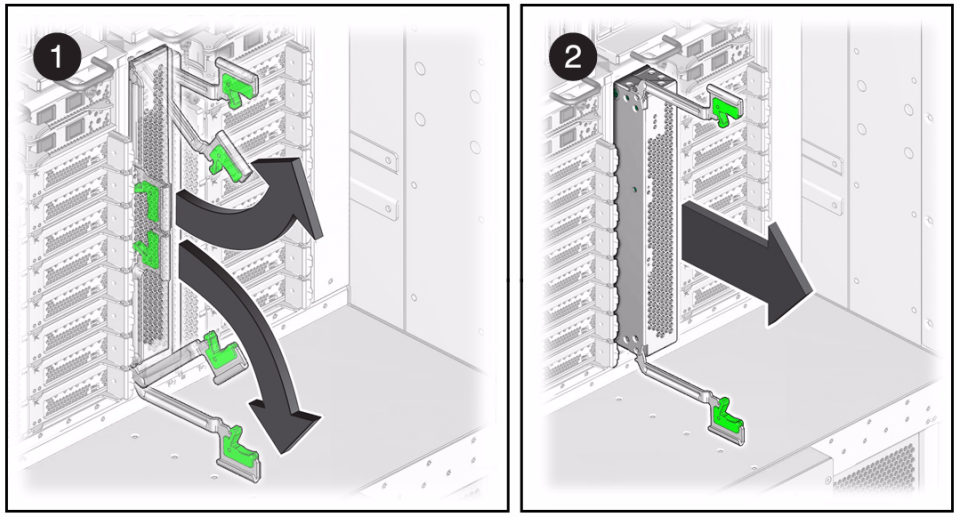
4. **Locate the lit blue Ready to Remove LED.**

   The I/O switch board is in an IOU at the rear of the server.

5. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

6. **Remove the I/O switch board:**

   a. Squeeze the locks on the extraction lever handles.



   b. Swing the extraction levers into the horizontal position.

   c. Pull the I/O switch board out of the slot.

7. **Install the replacement I/O switch board.**

   See "Install an I/O Switch Board" on page 158.

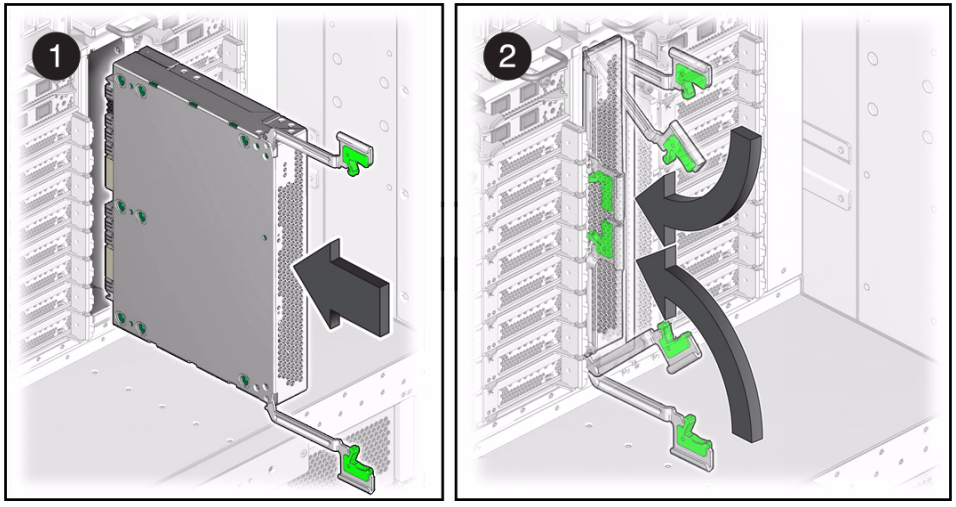
Related Information

- "I/O Switch Board Configuration" on page 154
- "I/O Switch Board LEDs" on page 155

- "Install an I/O Switch Board" on page 158

▼ Install an I/O Switch Board

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Open the extraction levers on the replacement I/O switch board to the horizontal position.**



3. **Insert the I/O switch board and push it into the slot until the extraction levers start to close.**
4. **Close the extraction levers fully to lock the I/O switch board.**
5. **Restart the PDomain:**

   See "Restart a PDomain" on page 487.

6. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "I/O Switch Board Configuration" on page 154
- "I/O Switch Board LEDs" on page 155
- "Remove an I/O Switch Board" on page 156

Servicing Cable Management Assemblies

Cable management assemblies are hot-swappable components.

Caution – These components must be serviced only by a trained service technician.

- "Remove a Cable Management Assembly" on page 159
- "Install a Cable Management Assembly" on page 161

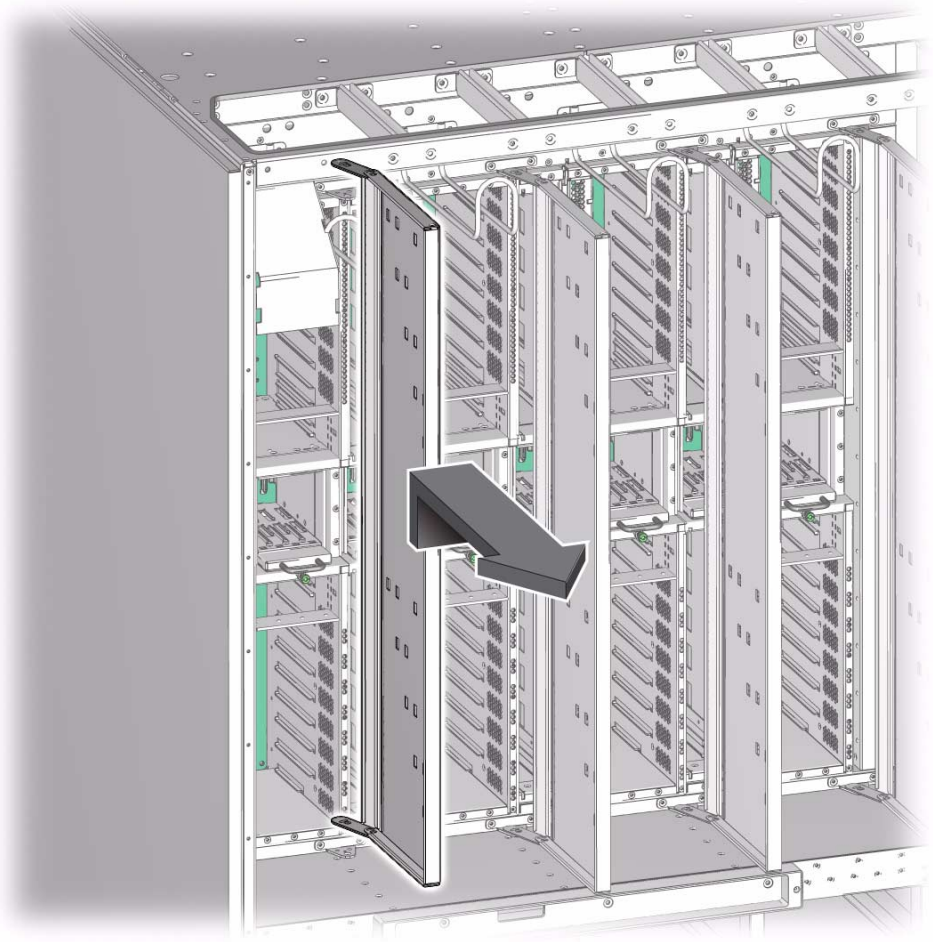
Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

▼ Remove a Cable Management Assembly

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Remove all cable ties and bindings that hold I/O cables to the faulty cable management assembly and move the cables aside.**
3. **Remove the T20 Torx screw from the lower hinge.**

4. **Lift the cable management assembly free from the upper and lower hinge posts.**



5. **Install the replacement cable management assembly.**

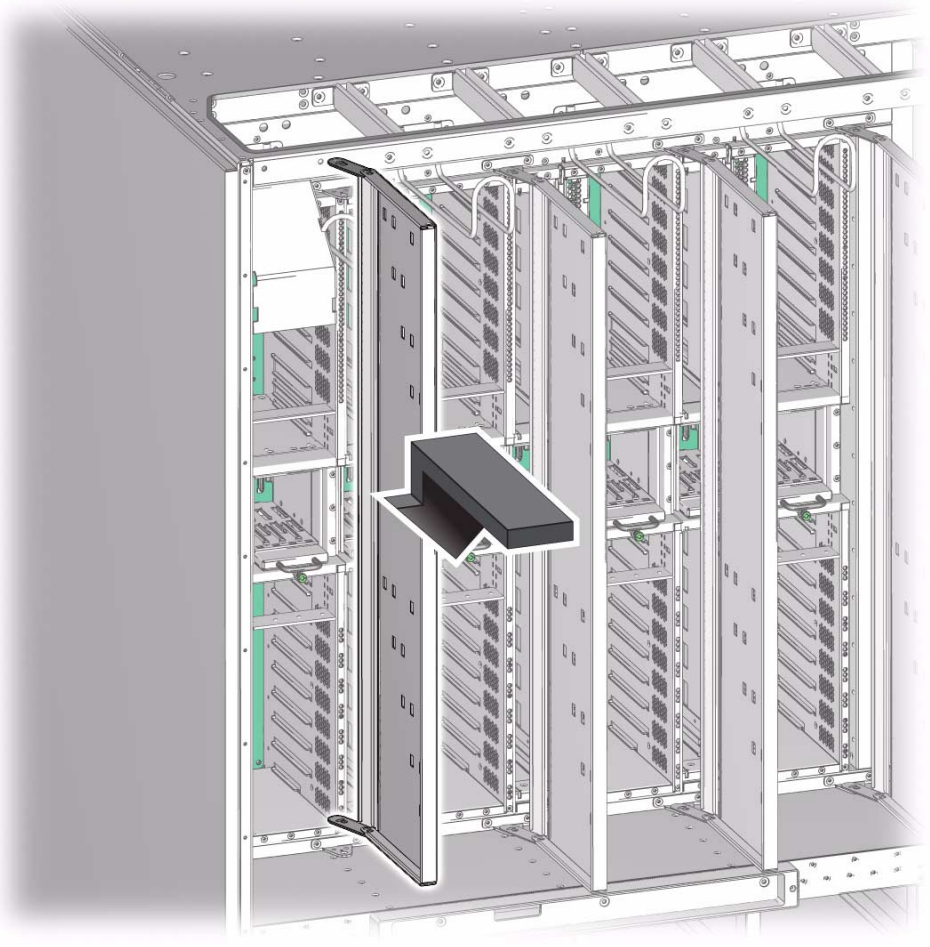
   See "Install a Cable Management Assembly" on page 161.

Related Information

- "Install a Cable Management Assembly" on page 161
- *Server Installation,* connecting the rear power cords and data cables

▼ Install a Cable Management Assembly

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Place the upper hinge of the cable management assembly over the upper hinge post.**



3. **Place the lower hinge on the lower hinge post.**
4. **Install the T20 Torx hinge screw and tighten securely.**
5. **Verify that the cable management assembly is able to pivot freely.**

6. **Attach the I/O cables to the cable management assembly.**

   Leave some slack in the cables so that the louver can move freely.

   Fabric hook and loop fasteners are preferred over tie wraps.

Caution – If you must use tie wraps, do not overtighten them. The I/O cables might be damaged.

Note – Refer to the Installation Guide for instructions on managing and routing the I/O card cables.

Related Information

- "Remove a Cable Management Assembly" on page 159
- *Server Installation*, connecting the rear power cords and data cables

Servicing I/O Cards

I/O cards are hot-pluggable components. See "IOU Component Locations" on page 12 for the location of PCIe hot-plug carriers.

All I/O cards in the server are mounted in PCIe hot-plug carriers.

Description	Links
Understand I/O card slots.	"Understanding I/O Card Slot Configuration" on page 164
Replace an I/O card.	"PCIe Hot-Plug Carrier LEDs" on page 176
	"Locate a Faulty I/O Card" on page 178
	"Prepare an I/O Card For Removal" on page 179
	"Remove an I/O Card From the Server" on page 180
	"Remove an I/O Card From a Carrier" on page 182
	"Install an I/O Card in a Carrier" on page 183
	"Install an I/O Card in the Server" on page 184
	"Verify an I/O Card" on page 189
Add an I/O card.	"Remove a Filler Panel From the Server" on page 185
	"Remove a Filler Panel From a Carrier" on page 186
	"Install an I/O Card in a Carrier" on page 183
	"Install an I/O Card in the Server" on page 184
	"PCIe Hot-Plug Carrier LEDs" on page 176
	"Verify an I/O Card" on page 189
Remove an I/O card.	"PCIe Hot-Plug Carrier LEDs" on page 176
	"Locate an I/O Card in the Server" on page 177
	"Prepare an I/O Card For Removal" on page 179
	"Remove an I/O Card From the Server" on page 180

Description	Links
	"Remove an I/O Card From a Carrier" on page 182
	"Install a Filler Panel in a Carrier" on page 187
	"Install a Filler Panel in the Server" on page 188

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Understanding I/O Card Slot Configuration

The server supports low-profile I/O cards mounted in PCIe hot-plug carriers. The server supports the PCIe 8-lane format.

I/O card slots connect to root complexes in CMPs that are mounted on CMUs. The I/O paths include I/O switch boards in I/O card cages. For more information on root complexes and redundant paths, refer to *Server Administration*, understanding PCIe device root complexes.

- "Ensuring I/O Card Performance" on page 165
- "IOU Locations" on page 167
- "Identifying I/O Card Slots in an IOU" on page 168

Related Information

- "Understanding I/O Card Slot Device Paths and FRU Paths" on page 169
- "Sun Flash Accelerator F40 and F80 PCIe Cards" on page 175
- "Locate an I/O Card in the Server" on page 177
- "Remove an I/O Card From the Server" on page 180
- "Remove an I/O Card From a Carrier" on page 182
- "Remove a Filler Panel From a Carrier" on page 186

Ensuring I/O Card Performance

PCIe I/O card slots are divided into three levels of performance. These levels are first tier, second tier, and third tier, as defined below.

- **First tier** slots have dedicated resources and provide the best performance. Install high-bandwidth cards in the first tier slots shown below.
- **Second tier** slots share resources with other server components, so the throughput performance of these slots can be affected. Use second tier slots after the first tier slots are filled.
- **Third tier** slots share resources with the EMS modules and their subordinate components. Use these slots after first and second tier slots are filled.

The table notes in *italic font* two slots where I/O card slot performance differs between fully-populated and half-populated DCUs. Footnotes mark additional slots where performance can be affected when a PDomain restarts. See the following notes for more information.

I/O Card Slot	Fully-Populated DCU	Half-Populated DCU*
16	First tier	First tier†
15	Second tier	Second tier
14	Third tier	Third tier
13	First tier	First tier†
12	First tier	First tier
11	Third tier	Third tier†
10	*First tier*	*Second tier†*
9	First tier	First tier
8	First tier	First tier
7	*First tier*	*Second tier†*
6	Third tier	Third tier†
5	First tier	First tier
4	First tier	First tier†
3	Third tier	Third tier
2	Second tier	Second tier
1	First tier	First tier†

* Results are based on the default factory configuration for a half-populated DCU.

† Removing or adding a PCIe card can change the I/O card slot performance. See the following note.

Note – PCIe I/O card slot performance can change if the I/O paths are reconfigured when the PDomain is reset, as can occur when an I/O card is removed or added. The Oracle ILOM property `/HOSTx/ioreconfigure` controls this reconfiguration behavior. To change the setting for `ioreconfigure`, refer to *Server Administration*, manage I/O path reconfiguration settings.

Note – Half-populated DCU: The DCU configuration described here is the factory default, which has CMUs in the first and fourth CMU slots, and EMSs in IOU slot numbers `EMS1` and `EMS3`. Other half-populated configurations are possible but can have limitations. See "CMU Configuration" on page 250.

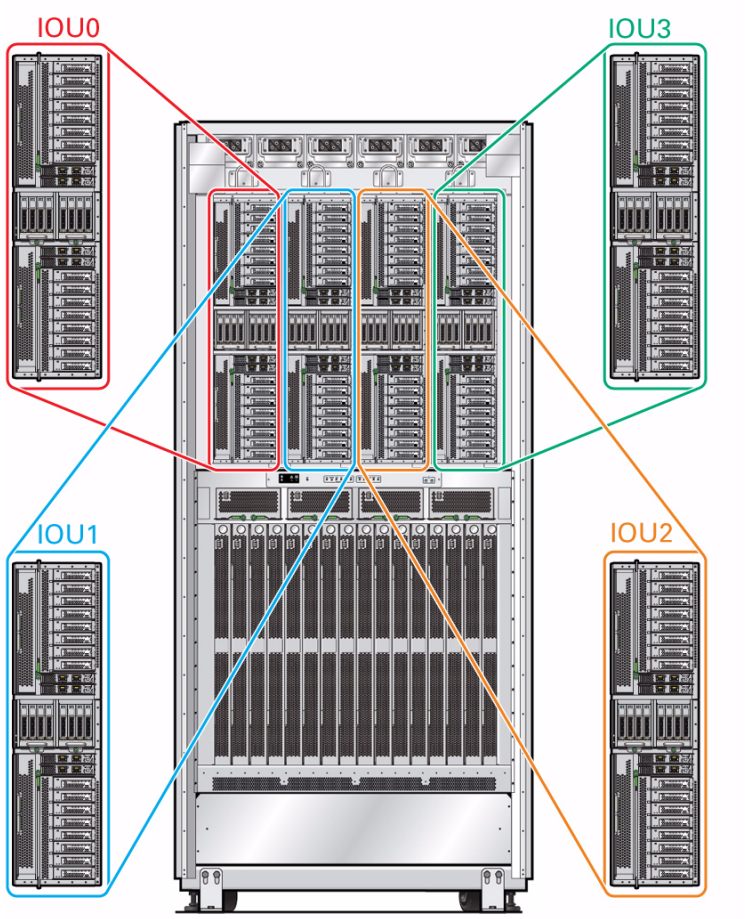
For more information about hard disk and SSD device paths and root complexes, refer to *Server Administration*, understanding hard drive device paths.

Related Information

- "IOU Locations" on page 167
- "Identifying I/O Card Slots in an IOU" on page 168
- "Locate an I/O Card in the Server" on page 177
- "Remove an I/O Card From the Server" on page 180

IOU Locations

The server has four IOUs, numbered 0 to 3.



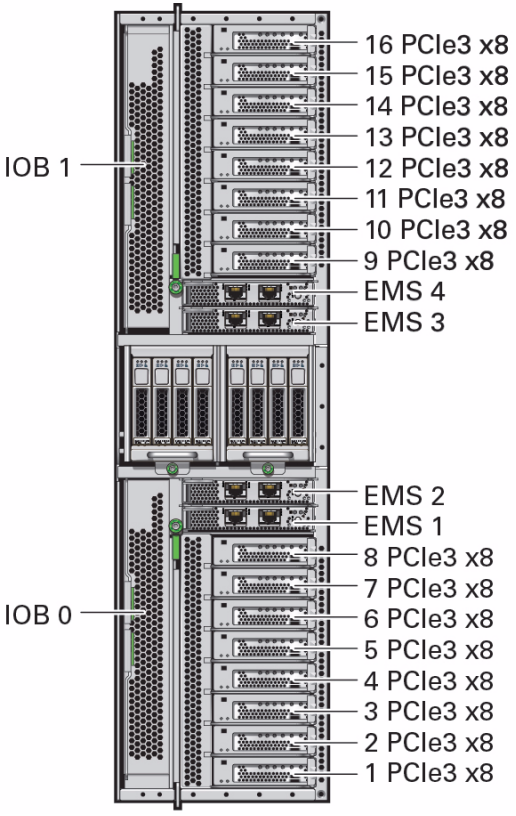
Related Information

- “IOU Component Locations” on page 12
- “Ensuring I/O Card Performance” on page 165
- “Identifying I/O Card Slots in an IOU” on page 168

Identifying I/O Card Slots in an IOU

Each IOU has 16 I/O card slots. The slot numbers repeat from 1 to 16 in each IOU, so to identify the physical location of a card you must specify the IOU number as well as the card slot number.

This illustration shows the locations of the card slots (also known as PCIe carrier slots) in an IOU. Note that the physical numbering for I/O card slots starts at 1 (not 0) and ends at 16 (not 15).



Related Information

- "Ensuring I/O Card Performance" on page 165
- "IOU Locations" on page 167
- "IOU Component Locations" on page 12
- "Remove an I/O Card From the Server" on page 180

Understanding I/O Card Slot Device Paths and FRU Paths

Every slot location has three unique methods of identification:

- A physical location consists of the **IOU number** (0-3) and the **PCIe slot**.
- The **device path** is how the Oracle Solaris `hotplug` command identifies a slot location.
- The **FRU path** is how the Oracle ILOM `show` command identifies a slot location.

The following two tables show how the three forms of slot identification relate to each other.

- "I/O Card Slot Device Paths and FRU Paths in Fully-populated DCUs" on page 169
- "I/O Card Slot Device Paths and FRU Paths in Half-Populated DCUs" on page 172

Related Information

- "Understanding I/O Card Slot Configuration" on page 164
- "Sun Flash Accelerator F40 and F80 PCIe Cards" on page 175
- "PCIe Hot-Plug Carrier LEDs" on page 176
- "Remove an I/O Card From the Server" on page 180

I/O Card Slot Device Paths and FRU Paths in Fully-populated DCUs

This table shows I/O card slots for fully-populated DCUs (four CMUs each). The slots are grouped by IOU number.

These device paths differ from those used in half-populated DCUs. See "I/O Card Slot Device Paths and FRU Paths in Half-Populated DCUs" on page 172.

IOU No.	PCIe Slot Label	Device Path	FRU Path
IOU 0	1 PCIe3 x8	/pci@5c0/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE1
IOU 0	2 PCIe3 x8	/pci@340/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE2
IOU 0	3 PCIe3 x8	/pci@300/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE3
IOU 0	4 PCIe3 x8	/pci@580/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE4
IOU 0	5 PCIe3 x8	/pci@380/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE5
IOU 0	6 PCIe3 x8	/pci@500/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE6
IOU 0	7 PCIe3 x8	/pci@540/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE7
IOU 0	8 PCIe3 x8	/pci@3c0/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE8
IOU 0	9 PCIe3 x8	/pci@6c0/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE9
IOU 0	10 PCIe3 x8	/pci@440/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE10
IOU 0	11 PCIe3 x8	/pci@400/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE11
IOU 0	12 PCIe3 x8	/pci@680/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE12
IOU 0	13 PCIe3 x8	/pci@480/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE13
IOU 0	14 PCIe3 x8	/pci@600/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE14
IOU 0	15 PCIe3 x8	/pci@640/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE15
IOU 0	16 PCIe3 x8	/pci@4c0/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE16
IOU 1	1 PCIe3 x8	/pci@9c0/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE1
IOU 1	2 PCIe3 x8	/pci@740/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE2
IOU 1	3 PCIe3 x8	/pci@700/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE3
IOU 1	4 PCIe3 x8	/pci@980/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE4
IOU 1	5 PCIe3 x8	/pci@780/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE5
IOU 1	6 PCIe3 x8	/pci@900/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE6
IOU 1	7 PCIe3 x8	/pci@940/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE7
IOU 1	8 PCIe3 x8	/pci@7c0/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE8
IOU 1	9 PCIe3 x8	/pci@ac0/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE9
IOU 1	10 PCIe3 x8	/pci@840/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE10
IOU 1	11 PCIe3 x8	/pci@800/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE11
IOU 1	12 PCIe3 x8	/pci@a80/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE12
IOU 1	13 PCIe3 x8	/pci@880/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE13

IOU No.	PCIe Slot Label	Device Path	FRU Path
IOU 1	14 PCIe3 x8	/pci@a00/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE14
IOU 1	15 PCIe3 x8	/pci@a40/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE15
IOU 1	16 PCIe3 x8	/pci@8c0/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE16
IOU 2	1 PCIe3 x8	/pci@dc0/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE1
IOU 2	2 PCIe3 x8	/pci@b40/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE2
IOU 2	3 PCIe3 x8	/pci@b00/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE3
IOU 2	4 PCIe3 x8	/pci@d80/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE4
IOU 2	5 PCIe3 x8	/pci@b80/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE5
IOU 2	6 PCIe3 x8	/pci@d00/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE6
IOU 2	7 PCIe3 x8	/pci@d40/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE7
IOU 2	8 PCIe3 x8	/pci@bc0/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE8
IOU 2	9 PCIe3 x8	/pci@ec0/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE9
IOU 2	10 PCIe3 x8	/pci@c40/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE10
IOU 2	11 PCIe3 x8	/pci@c00/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE11
IOU 2	12 PCIe3 x8	/pci@e80/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE12
IOU 2	13 PCIe3 x8	/pci@c80/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE13
IOU 2	14 PCIe3 x8	/pci@e00/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE14
IOU 2	15 PCIe3 x8	/pci@e40/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE15
IOU 2	16 PCIe3 x8	/pci@cc0/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE16
IOU 3	1 PCIe3 x8	/pci@11c0/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE1
IOU 3	2 PCIe3 x8	/pci@f40/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE2
IOU 3	3 PCIe3 x8	/pci@f00/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE3
IOU 3	4 PCIe3 x8	/pci@1180/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE4
IOU 3	5 PCIe3 x8	/pci@f80/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE5
IOU 3	6 PCIe3 x8	/pci@1100/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE6
IOU 3	7 PCIe3 x8	/pci@1140/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE7
IOU 3	8 PCIe3 x8	/pci@fc0/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE8
IOU 3	9 PCIe3 x8	/pci@12c0/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE9
IOU 3	10 PCIe3 x8	/pci@1040/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE10

IOU No.	PCIe Slot Label	Device Path	FRU Path
IOU 3	11 PCIe3 x8	/pci@1000/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE11
IOU 3	12 PCIe3 x8	/pci@1280/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE12
IOU 3	13 PCIe3 x8	/pci@1080/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE13
IOU 3	14 PCIe3 x8	/pci@1200/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE14
IOU 3	15 PCIe3 x8	/pci@1240/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE15
IOU 3	16 PCIe3 x8	/pci@10c0/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE16

Related Information

- "I/O Card Slot Device Paths and FRU Paths in Half-Populated DCUs" on page 172
- "Ensuring I/O Card Performance" on page 165
- "Remove an I/O Card From the Server" on page 180

I/O Card Slot Device Paths and FRU Paths in Half-Populated DCUs

This table shows I/O card slots for half-populated DCUs (two CMUs each). The slots are grouped by IOU number.

These device paths differ from those used in fully-populated DCUs. See "I/O Card Slot Device Paths and FRU Paths in Fully-populated DCUs" on page 169.

IOU No.	PCIe Slot Label	Device Path	FRU Path
IOU 0	1 PCIe3 x8	/pci@340/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE1
IOU 0	2 PCIe3 x8	/pci@340/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE2
IOU 0	3 PCIe3 x8	/pci@300/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE3
IOU 0	4 PCIe3 x8	/pci@300/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE4
IOU 0	5 PCIe3 x8	/pci@380/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE5
IOU 0	6 PCIe3 x8	/pci@380/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE6
IOU 0	7 PCIe3 x8	/pci@3c0/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE7
IOU 0	8 PCIe3 x8	/pci@3c0/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE8
IOU 0	9 PCIe3 x8	/pci@6c0/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE9
IOU 0	10 PCIe3 x8	/pci@6c0/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE10

IOU No.	PCIe Slot Label	Device Path	FRU Path
IOU 0	11 PCIe3 x8	/pci@680/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE11
IOU 0	12 PCIe3 x8	/pci@680/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE12
IOU 0	13 PCIe3 x8	/pci@600/pci@1/pci@0/pci@8	/SYS/IOU0/PCIE13
IOU 0	14 PCIe3 x8	/pci@600/pci@1/pci@0/pci@2	/SYS/IOU0/PCIE14
IOU 0	15 PCIe3 x8	/pci@640/pci@1/pci@0/pci@6	/SYS/IOU0/PCIE15
IOU 0	16 PCIe3 x8	/pci@640/pci@1/pci@0/pci@4	/SYS/IOU0/PCIE16
IOU 1	1 PCIe3 x8	/pci@740/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE1
IOU 1	2 PCIe3 x8	/pci@740/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE2
IOU 1	3 PCIe3 x8	/pci@700/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE3
IOU 1	4 PCIe3 x8	/pci@700/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE4
IOU 1	5 PCIe3 x8	/pci@780/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE5
IOU 1	6 PCIe3 x8	/pci@780/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE6
IOU 1	7 PCIe3 x8	/pci@7c0/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE7
IOU 1	8 PCIe3 x8	/pci@7c0/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE8
IOU 1	9 PCIe3 x8	/pci@ac0/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE9
IOU 1	10 PCIe3 x8	/pci@ac0/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE10
IOU 1	11 PCIe3 x8	/pci@a80/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE11
IOU 1	12 PCIe3 x8	/pci@a80/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE12
IOU 1	13 PCIe3 x8	/pci@a00/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE13
IOU 1	14 PCIe3 x8	/pci@a00/pci@1/pci@0/pci@2	/SYS/IOU1/PCIE14
IOU 1	15 PCIe3 x8	/pci@a40/pci@1/pci@0/pci@6	/SYS/IOU1/PCIE15
IOU 1	16 PCIe3 x8	/pci@a40/pci@1/pci@0/pci@4	/SYS/IOU1/PCIE16
IOU 2	1 PCIe3 x8	/pci@b40/pci@1/pci@0/pci@8	/SYS/IOU1/PCIE1
IOU 2	2 PCIe3 x8	/pci@b40/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE2
IOU 2	3 PCIe3 x8	/pci@b00/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE3
IOU 2	4 PCIe3 x8	/pci@b00/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE4
IOU 2	5 PCIe3 x8	/pci@b80/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE5
IOU 2	6 PCIe3 x8	/pci@b80/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE6
IOU 2	7 PCIe3 x8	/pci@bc0/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE7

IOU No.	PCIe Slot Label	Device Path	FRU Path
IOU 2	8 PCIe3 x8	/pci@bc0/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE8
IOU 2	9 PCIe3 x8	/pci@ec0/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE9
IOU 2	10 PCIe3 x8	/pci@ec0/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE10
IOU 2	11 PCIe3 x8	/pci@e80/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE11
IOU 2	12 PCIe3 x8	/pci@e80/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE12
IOU 2	13 PCIe3 x8	/pci@e00/pci@1/pci@0/pci@8	/SYS/IOU2/PCIE13
IOU 2	14 PCIe3 x8	/pci@e00/pci@1/pci@0/pci@2	/SYS/IOU2/PCIE14
IOU 2	15 PCIe3 x8	/pci@e40/pci@1/pci@0/pci@6	/SYS/IOU2/PCIE15
IOU 2	16 PCIe3 x8	/pci@e40/pci@1/pci@0/pci@4	/SYS/IOU2/PCIE16
IOU 3	1 PCIe3 x8	/pci@f40/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE1
IOU 3	2 PCIe3 x8	/pci@f40/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE2
IOU 3	3 PCIe3 x8	/pci@f00/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE3
IOU 3	4 PCIe3 x8	/pci@f00/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE4
IOU 3	5 PCIe3 x8	/pci@f80/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE5
IOU 3	6 PCIe3 x8	/pci@f80/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE6
IOU 3	7 PCIe3 x8	/pci@fc0/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE7
IOU 3	8 PCIe3 x8	/pci@fc0/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE8
IOU 3	9 PCIe3 x8	/pci@12c0/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE9
IOU 3	10 PCIe3 x8	/pci@12c0/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE10
IOU 3	11 PCIe3 x8	/pci@1280/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE11
IOU 3	12 PCIe3 x8	/pci@1280/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE12
IOU 3	13 PCIe3 x8	/pci@1200/pci@1/pci@0/pci@8	/SYS/IOU3/PCIE13
IOU 3	14 PCIe3 x8	/pci@1200/pci@1/pci@0/pci@2	/SYS/IOU3/PCIE14
IOU 3	15 PCIe3 x8	/pci@1240/pci@1/pci@0/pci@6	/SYS/IOU3/PCIE15
IOU 3	16 PCIe3 x8	/pci@1240/pci@1/pci@0/pci@4	/SYS/IOU3/PCIE16

Related Information

- "I/O Card Slot Device Paths and FRU Paths in Fully-populated DCUs" on page 169
- "Ensuring I/O Card Performance" on page 165
- "Remove an I/O Card From the Server" on page 180

Sun Flash Accelerator F40 and F80 PCIe Cards

Sun Flash Accelerator F40 and F80 PCIe cards are SSDs in PCIe card format. These cards are hot-pluggable in any IOU slot except slot 8.

Caution – Do not install Sun Flash Accelerator F40 or F80 cards in IOU slots labeled `8 PCIe3 x8`. These slots have less airflow than the other PCIe slots and may not adequately cool these particular cards under all recommended operating conditions. If these cards are detected in these slots, the server and these cards will operate, but the server will generate a fault. You should install these cards in any PCIe slot in any IOU except PCIe slot 8.

If this card is installed in slot 8, you will see this console error message:

```
Hypervisor version: @(#)Hypervisor 1.12.1-nightly_ 2013/01/08 18:40
...
2013-01-10 23:22:12   SP> NOTICE:  Start Host    in progress: Step number
2013-01-10 23:22:14   SP> NOTICE:  /SYS/IOU0/PCIE8/CAR/CARD is not supported
in this slot
2013-01-10 23:22:14   SP> NOTICE:  Power off host due to
/SYS/IOU0/PCIE8/CAR/CARD
```

If you try to power up the PDomain with the card in slot 8, the entire DCU will be excluded from the PDomain with this console error message:

```
Serial console started.     To stop, type #.
2013-01-10 13:24:09    SP> NOTICE:  Check for usable CPUs in /SYS/DCU0
2013-01-10 13:24:10    SP> NOTICE:  Apply configuration rules to /SYS/DCU0
2013-01-10 13:24:11    SP> NOTICE:   Exclude    all of /SYS/DCU0.  Reason:
Illegal Add-in card configuration
```

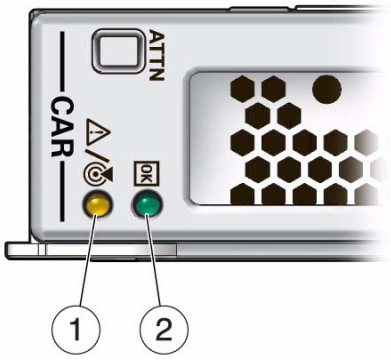
Note – To recover from this error, see "Relocate a Sun Flash Accelerator F40 PCIe Card" on page 190.

The card can produce a maximum of 25 Watts. When you install the card, you might hear an increase in fan noise as the fans in the PDomain automatically run at a higher speed to provide sufficient cooling.

Related Information

- "Locate an I/O Card in the Server" on page 177
- "Remove an I/O Card From the Server" on page 180
- "Install an I/O Card in the Server" on page 184

PCIe Hot-Plug Carrier LEDs



No.	LED	Icon	Description
1	Service Required (amber)	⚠	Indicates that service is required. The `show faulty` command provides details about any faults that cause this indicator to light.
2	Power OK (green)	OK	Indicates these conditions: • **Off –** PCIe hot-plug carrier is not running in its normal state. • **Steady on –** PCIe hot-plug carrier is powered on and running normally. • **Fast blink –** System is accessing the I/O card in the PCIe hot-plug carrier. • **Slow blink –** The ATTN button has been pushed, and the system is configuring or unconfiguring the I/O card and PCIe hot-plug carrier.

Related Information

- "Understanding I/O Card Slot Configuration" on page 164
- "Understanding I/O Card Slot Device Paths and FRU Paths" on page 169

▼ Locate an I/O Card in the Server

1. **Use the Oracle Solaris `hotplug` command to list all 64 I/O card slots:**

```
# hotplug list -l
```

   The `hotplug` command identifies slots by their device paths.

2. **In the list, locate the slot that you need to find.**

   The keyword `(EMPTY)` identifies a slot that contains a blank filler panel.

3. **Use this command to determine the type of card that is currently in a slot:**

```
# hotplug get -o card_type path
```

4. Determine your next step.
   - If the I/O card is assigned to an I/O domain, see "Prepare an I/O Card For Removal" on page 179.
   - If the I/O card is not assigned to an I/O domain, see "Remove an I/O Card From the Server" on page 180.

Related Information

- "PCIe Hot-Plug Carrier LEDs" on page 176
- "Locate a Faulty I/O Card" on page 178
- "Prepare an I/O Card For Removal" on page 179
- "Remove an I/O Card From the Server" on page 180

▼ Locate a Faulty I/O Card

1. **Use one of these Oracle ILOM commands to display faulty components:**

```
-> show faulty
```

or

```
-> show /System/Open_Problems
```

See "View Log Files (Oracle ILOM)" on page 45 for examples.

The `show` command identifies slots by their FRU paths.

2. **Use the output to locate the faulty I/O card (`/SYS/IOU`*x*`/PCIE`*y*`):**

where:

- *x* can be 0 through 3.

  See "IOU Locations" on page 167 for IOU locations.

- *y* can be 1 through 16.

  The 16 PCIe slots are labeled with slot numbers. Numbering is from bottom to top.

  See "Identifying I/O Card Slots in an IOU" on page 168.

3. **Look for these amber status LEDs to find the server that has a faulty I/O card:**
   - Fault LEDs are lit on the server's front and rear LED panels.
   - PCIe Fault LEDs are lit on the server's front and rear LED panels.
   - Fault LED is lit on the PCIe hot-plug carrier's front panel.
4. **Remove the PCIe hot-plug carrier containing the card.**

   See "Remove an I/O Card From the Server" on page 180.

Related Information

- "PCIe Hot-Plug Carrier LEDs" on page 176
- "Front and Rear LED Panel LEDs and Controls" on page 55
- "Locate an I/O Card in the Server" on page 177
- "Prepare an I/O Card For Removal" on page 179
- "Remove an I/O Card From the Server" on page 180

▼ Prepare an I/O Card For Removal

If the PCIe I/O card is assigned to an LDom I/O domain, use these steps to avoid a configuration that is unsupported by the Direct I/O or SR-IOV feature.

If the PCIe I/O card is not assigned to an LDom I/O domain, go to "Remove an I/O Card From the Server" on page 180.

1. **Remove the I/O card from the I/O domain.**

   a. **Stop the I/O domain if it is running.**

```
# ldm stop I/O_domain_name
```

   b. **Remove the I/O card from the I/O domain**

```
# ldm rm-io pcie_slot_name I/O_domain_name
```

   For more information about making PCIe hardware changes, refer to Oracle VM for SPARC reference manual.

2. **Add the I/O card to the Root Domain through a delayed reconfiguration.**

```
# ldm start-reconf root_domain
# ldm add-io root_domain
```

3. **Shut down the root domain with one of these methods.**
   - If the root domain is a non-primary root domain, use this LDom command:

```
# ldm stop root_domain
```

   - If the root domain is the control domain (primary domain), shut down the root domain using Solaris commands.

4. **Physically remove the I/O card from the server.**

   See "Remove an I/O Card From the Server" on page 180.

Related Information

- Oracle VM for SPARC 3.1 Reference Manual
- Oracle VM for SPARC 3.1 Administration Guide
- "Locate an I/O Card in the Server" on page 177

- "Locate a Faulty I/O Card" on page 178
- "Remove an I/O Card From the Server" on page 180

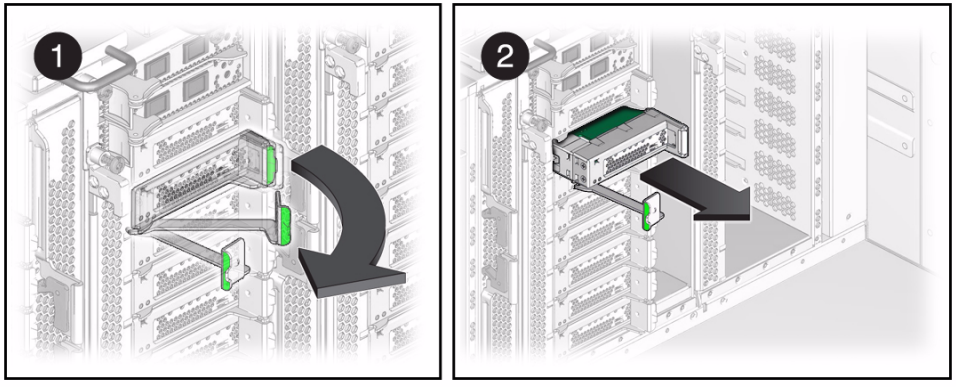
▼ Remove an I/O Card From the Server

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Press the ATTN button on the carrier that contains the I/O card that you wish to remove.**

   The LEDs on the carrier blink for approximately 10 seconds as the PDomain disables the I/O card. When the LEDs on both the carrier and the card turn off, the carrier and card are ready to remove.
3. **Label and remove any I/O cables from the I/O card.**
4. **Remove the carrier from the slot:**

   a. **Pull the carrier's extraction lever.**

      The lever is held in place by friction.



   b. **Swing the extraction lever out 90 degrees until the far end of the lever begins to push the carrier out of the slot.**

   c. **Remove the carrier from the slot.**

   d. **Place the carrier on a static-safe workspace.**
5. **Remove the I/O card from the carrier.**

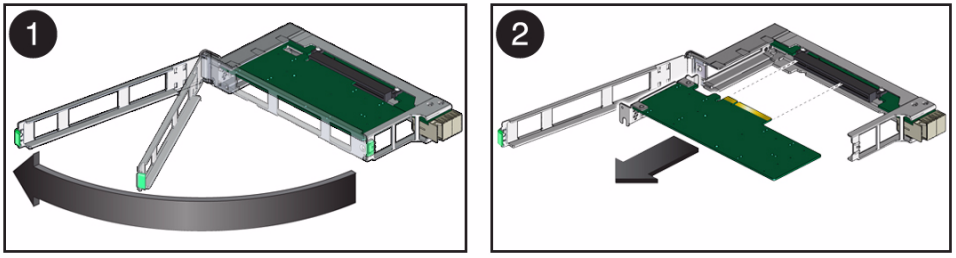
   See "Remove an I/O Card From a Carrier" on page 182.

Related Information

- "Prepare an I/O Card For Removal" on page 179
- "Install an I/O Card in a Carrier" on page 183
- "Install a Filler Panel in a Carrier" on page 187

▼ Remove an I/O Card From a Carrier

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Lift the green tab to unlock and open the top of the PCIe hot-plug carrier.**
   The following view shows the rear of the carrier.



3. **Pull the I/O card out of the carrier.**
4. **Install a replacement I/O card or filler panel.**
   - See "Install an I/O Card in a Carrier" on page 183.
   - See "Install a Filler Panel in a Carrier" on page 187.

Related Information

- "Remove an I/O Card From the Server" on page 180
- "Install an I/O Card in the Server" on page 184

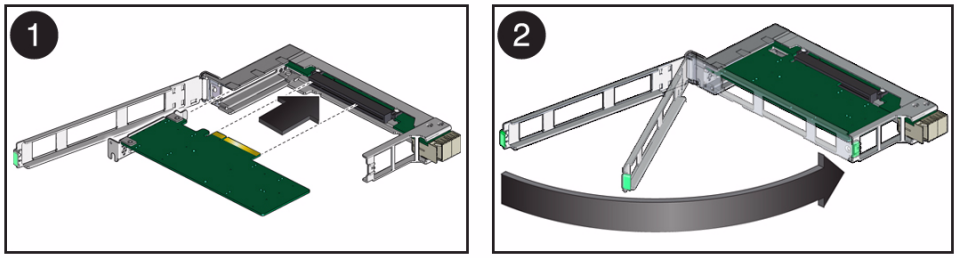
▼ Install an I/O Card in a Carrier

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Seat the I/O card or filler panel in the PCIe hot-plug carrier.**

   The following view shows the rear of the carrier.

   The card or filler panel is correctly seated when the notch at the top of the card bracket fits around a guide post on the carrier.

Note – If the I/O card includes a mounting screw, do not use the mounting screw. The carrier does not accept mounting screws.



3. **Close the top of the carrier.**

   The green latch should click into place.

   If the top is difficult to close, verify that the notch of the card bracket or filler panel fits around the guide post.

4. **Install the carrier in the server.**

   See "Install an I/O Card in the Server" on page 184.

Related Information

- "Locate an I/O Card in the Server" on page 177
- "Remove an I/O Card From the Server" on page 180
- "Remove an I/O Card From a Carrier" on page 182
- "Install an I/O Card in the Server" on page 184

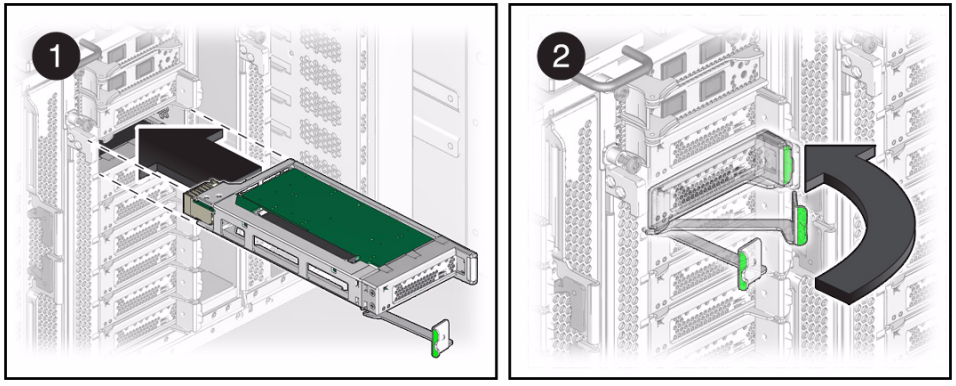
▼ Install an I/O Card in the Server

Note – Before you install Sun Flash Accelerator F40 and F80 PCIe cards, see "Sun Flash Accelerator F40 and F80 PCIe Cards" on page 175.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install the carrier and I/O card in the IOU slot.**
   a. **Push evenly on both sides of the carrier so that the carrier slides straight into the slot (panel 1).**

      If the carrier slides correctly into the slot, you should feel a slight resistance as the carrier starts to seat in the connector.

Caution – Do not push the extraction lever while you insert the carrier into the slot. The carrier can enter at an angle and damage the connectors.



   b. **Lock the carrier's extraction lever (panel 2).**

      The LEDs on the carrier and the card should remain off at this point.

3. **Attach I/O cables to the card.**

Note – Refer to the Server Installation for instructions on managing and routing the I/O card cables.

4. **Press the ATTN button on the carrier to reconfigure the I/O card into the PDomain.**

   The carrier's LEDs should blink for a few seconds until the PDomain enables the I/O card. The card's LEDs will show activity when the card is enabled.

Related Information

- "Remove an I/O Card From the Server" on page 180
- "Install an I/O Card in a Carrier" on page 183
- "Remove an I/O Card From a Carrier" on page 182

▼ Remove a Filler Panel From the Server

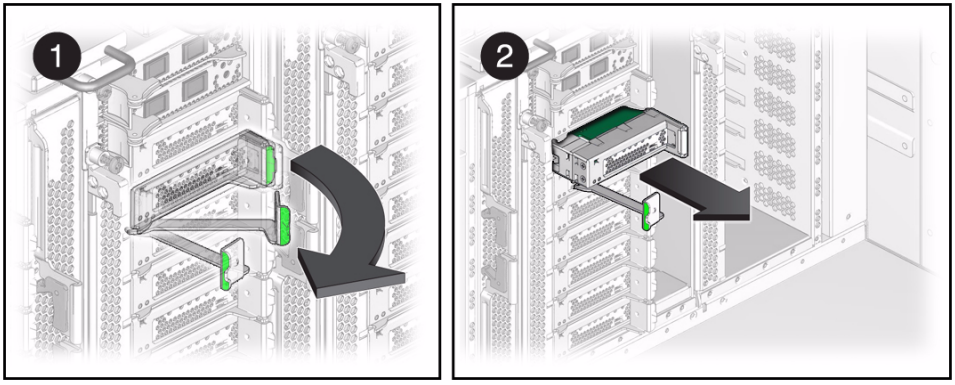
If a carrier contains a blank filler panel, the LEDs on the carrier are off.

If the carrier LEDs are lit or blinking, the carrier contains an I/O card. See "Remove an I/O Card From the Server" on page 180.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Remove the carrier from the slot:**

   a. **Pull the carrier's extraction lever.**

      The lever is held in place by friction.



   b. **Swing the extraction lever out 90 degrees until the far end of the lever begins to push the carrier out of the slot.**

   c. **Remove the carrier from the slot.**

d. Place the carrier on a static-safe workspace.

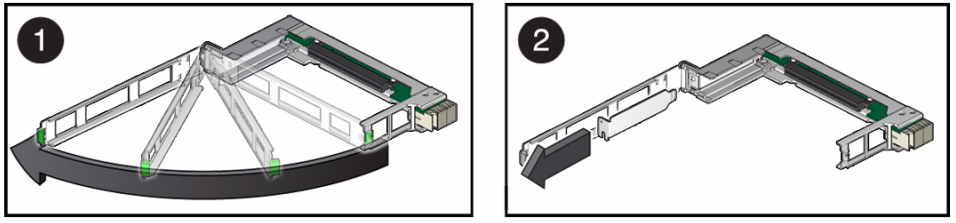
3. **Remove the filler panel from the carrier.**
   See "Remove a Filler Panel From a Carrier" on page 186

Related Information

- "Install an I/O Card in a Carrier" on page 183
- "Install an I/O Card in the Server" on page 184

▼ Remove a Filler Panel From a Carrier

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Lift the green tab to unlock and open the top of the PCIe hot-plug carrier.**
   The following view shows the rear of the carrier.



3. **Pull the filler panel out of the carrier.**
4. **You can now install an I/O card in the carrier.**
   See "Install an I/O Card in a Carrier" on page 183.

Related Information

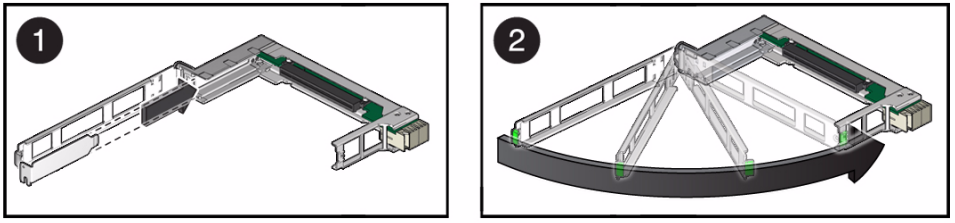
- "Remove an I/O Card From the Server" on page 180
- "Install an I/O Card in the Server" on page 184

▼ Install a Filler Panel in a Carrier

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Seat filler panel in the PCIe hot-plug carrier.**

   The following view shows the rear of the carrier.

   The card or filler panel is correctly seated when the notch at the top of the card bracket fits around a guide post on the carrier.



3. **Close the top of the carrier.**

   The green latch should click into place.

   If the top is difficult to close, verify that the notch of the card bracket or filler panel fits around the guide post.

4. **Install the carrier in the server.**

   See "Install an I/O Card in the Server" on page 184.

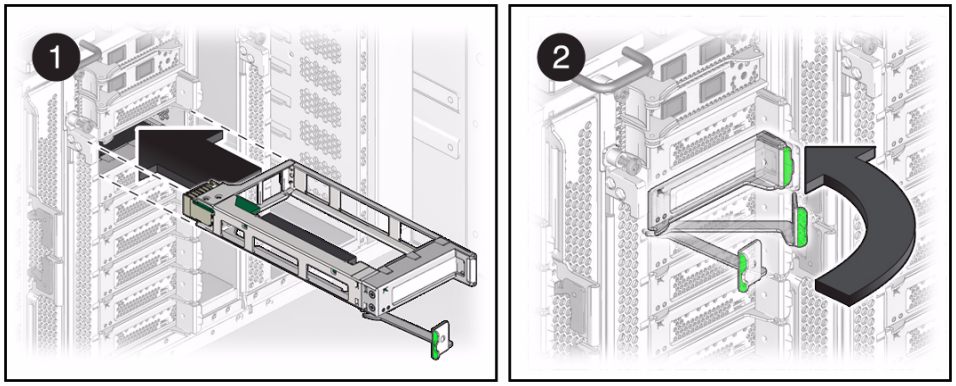
Related Information

- "Locate an I/O Card in the Server" on page 177
- "Locate a Faulty I/O Card" on page 178
- "Install an I/O Card in a Carrier" on page 183
- "Install an I/O Card in the Server" on page 184

▼ Install a Filler Panel in the Server

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Insert the carrier with the filler panel in the IOU slot and lock the carrier's extraction lever.**

   The LEDs on the carrier remain off when the carrier contains a filler panel.



Related Information

- "Remove an I/O Card From the Server" on page 180
- "Install an I/O Card in a Carrier" on page 183
- "Remove an I/O Card From a Carrier" on page 182

▼ Verify an I/O Card

1. **In the server, do the following:**

   a. **Verify that the green Power LED is lit on the I/O card.**

   b. **Verify that the Fault LED is not lit on the card.**

   c. **Verify that the server Fault and PCIe LEDs on the front and rear LED panels are not lit.**

   d. **Perform one of the following tasks based on your verification results:**

      - If any of the Fault LEDs are lit, see "Detecting and Managing Faults" on page 31.
      - If none of the Fault LEDs are lit, go to Step 2.

2. **At a terminal, use the `cfgadm -al` command to ensure that the card is connected.**

   Example:

```
# cfgadm -al
Ap_id                  Type         Receptacle      Occupant     Condition
...
IOU1-PCIE1             ib/hp        connected       configured   ok
IOU1-PCIE2             ib/hp        connected       configured   ok
IOU1-PCIE2             ib/hp        connected       configured   ok
...
```

   In the attachment points column, the PCIe devices in IOU1 are shown to be connected.

Related Information

- "Install an I/O Card in the Server" on page 184
- "Locate a Faulty I/O Card" on page 178
- "Ensuring I/O Card Performance" on page 165

▼ Relocate a Sun Flash Accelerator F40 PCIe Card

Slot 8 in an IOU does not provide sufficient cooling for a Sun Flash Accelerator F40 PCIe Card. If the server detects this card in drive carrier slot 8 in any IOU, the server will turn off the PDomain in which the card is located. The PDomain will not turn on while the card is in drive carrier slot 8.

See "Sun Flash Accelerator F40 and F80 PCIe Cards" on page 175 for additional details and error messages.

1. **If a PDomain powers down unexpectedly or is unable to power on after a Sun Flash Accelerator F40 PCIe Card has been installed, use one of the following commands to determine the problem.**
   - Use `show /System/Open_Problems`:

     The message below gives the IOU number, PCIe slot number, and a diagnosis (highlighted below).

```
-> show /System/Open_Problems
...
Tue Apr  2 08:08:33 2013  System       IOU0/PCIE8/CAR/CARD (PCIE Module)
        A FRU has been inserted into a location where it is not supported.
        (Probability:100,
        UUID:e435fb08-364c-c0a8-a00e-abc4ba787d28, Part Number:N/A, Serial
        Number:N/A, Reference
        Document:http://support.oracle.com/msg/SPT-8000-PX)
...
```

   - Use `show faulty`:

     The message below gives the IOU number, PCIe slot number, and a diagnosis (highlighted below).

```
-> show faulty
Target                    | Property       | Value
--------------------------+----------------+---------------------------
...
/SP/faultmgmt/3           | fru            | /SYS/IOU0/PCIE8/CAR/CARD
/SP/faultmgmt/3/faults/0  | class          | fault.component.misconfigured
/SP/faultmgmt/3/faults/0  | sunw-msg-id    | SPT-8000-PX
/SP/faultmgmt/3/faults/0  | component      | /SYS/IOU0/PCIE8/CAR/CARD
```

```
/SP/faultmgmt/3/faults/0   | uuid            | e435fb08-364c-c0a8-a00e-...
/SP/faultmgmt/3/faults/0   | timestamp       | 2013-04-02/08:08:33
...
```

2. **Display the fault state of the card.**

Caution – Do not remove the card from the slot. **You must repair the fault before removing the card**.

```
-> show /SYS/IOU0/PCIE8/CAR/CARD

/SYS/IOU0/PCIE8/CAR/CARD
   Targets:
       PCIE_LINK

   Properties:
       type = PCIE Module
       fault_state = Faulted
       clear_fault_action = (none)
...
```

3. **With the card still in drive carrier slot 8, clear the fault state:**

   When prompted, enter y to continue the command.

```
-> set /SYS/IOU0/PCIE8/CAR/CARD clear_fault_action=true
Are you sure you want to clear /SYS/IOU0/PCIE8/CAR/CARD (y/n)? y
Set 'clear_fault_action' to 'true'
```

4. **Verify the fault state is now clear:**

```
->  show  /SYS/IOU0/PCIE8/CAR/CARD

/SYS/IOU0/PCIE8/CAR/CARD
   Targets:
       PCIE_LINK

   Properties:
       type = PCIE Module
       fault_state = OK
       clear_fault_action = (none)
...
```

5. **Remove the card and the drive carrier from the drive carrier slot.**

   If you do not remove the card from slot 8, the fault will be detected the next time the host is started.

   See "Remove an I/O Card From the Server" on page 180.

6. **Install the card and the drive carrier in any drive carrier slot except slot 8.**

   See "Install an I/O Card in the Server" on page 184.

Related Information

- "Verify an I/O Card" on page 189
- "Ensuring I/O Card Performance" on page 165
- "Identifying I/O Card Slots in an IOU" on page 168

Servicing EMSs

EMSs are hot-pluggable components. See "IOU Component Locations" on page 12 for the location of EMSs.

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Understanding EMS Configurations

Hard drives used in the server are SAS-format hard drives and SATA-format SSDs. The EMS has a SAS-format drive controller which supports both SAS-format and SATA-format.

EMS and Hard Drive Cage Compatibility

Caution – Replacing an EMS or hard drive cage with an incompatible version can halt a DCU. The DCU will be unusable until a compatible component is installed.

Incompatible EMS Error Message

If you see this error message, an IOU contains incompatible EMSs and hard drive cages:

```
SP> NOTICE:     Exclude all of /SYS/DCUx.  Reason: Mixing M5 and
M6 HDDBP/BaseIO cards in the same DCU
```

`HDDBP` refers to the hard drive cage. `BaseIO card` refers to the EMS.

First- and Second-Generation EMSs and Hard Drive Cages

First-generation EMSs and hard drive cages are incompatible with their second-generation counterparts.

You can mix first-generation and second-generation EMSs and hard drive cages in the same server if you follow these rules:

- Both hard drive cages in an IOU must be of the same generation. Do not mix first-generation and second-generation hard drive cages in the same IOU. See "Determine Hard Drive Cage and EMS Part Numbers" on page 204.
- Do not mix different generations of EMSs and hard drive cages in the same IOU. Use first-generation EMSs only with first-generation hard drive cages, and use second-generation EMSs only with second-generation hard drive cages.
- First-generation servers require upgraded firmware to use second-generation components. Refer to the latest *Server Product Notes*, upgrading the SPARC M5-32 server.

Note – If a first-generation EMS or a first-generation hard drive cage fails and a first-generation replacement is no longer available, replace the two hard drive cages in the IOU, along with all four EMSs with second-generation parts to ensure compatibility. Any remaining first-generation IOUs in the same server do not need to be upgraded if their components are working properly.

Note – If the server contains a mix of IOUs with first-generation and second-generation parts, you will see a difference between LED behavior on the hard disk drives and SSDs in the IOUs. If an IOU has first-generation hard drive cages, the LEDs on the drives *stay lit* when the host is stopped. If an IOU has second-generation hard drive cages, the LEDs on the drives *turn off* when the host is stopped. In addition, the LEDs on the drives are brighter in an IOU with second-generation hard drive cages.

Related Information

- "Determine Hard Drive Cage and EMS Part Numbers" on page 204
- "Remove an EMS" on page 205
- "Servicing Hard Drive Cages" on page 371

Redundant EMS Control of SAS-Format Drives

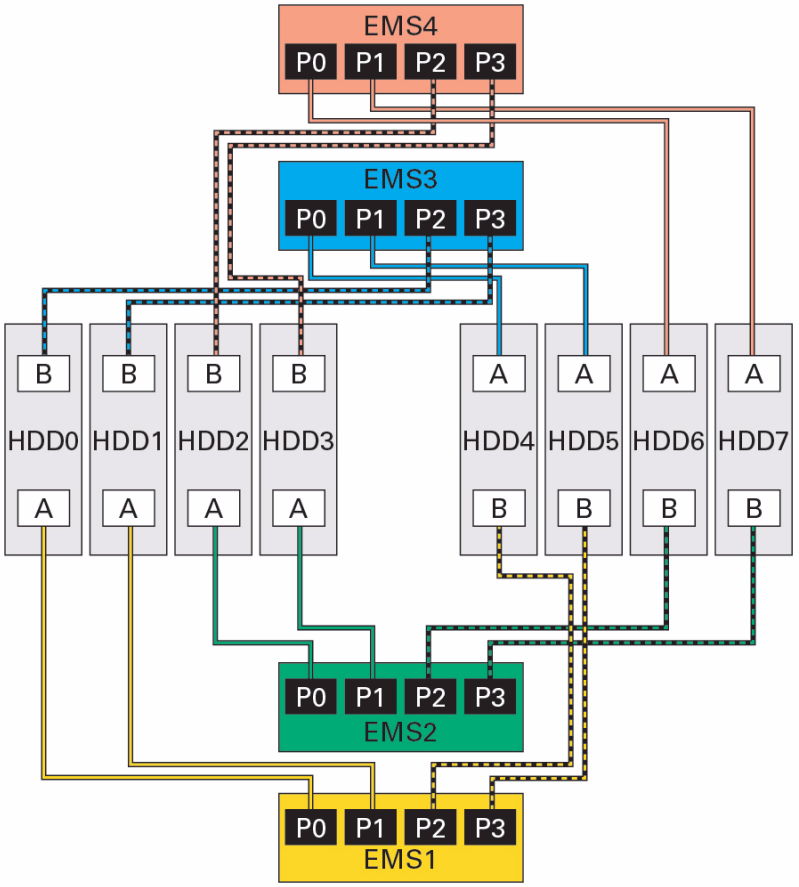
The SAS-format drive controller in an EMS provides access to four SAS-format hard drives. Each SAS-format hard drive has two ports, allowing for redundant access by two EMSs.

Note – A SATA-format SSD has a single port, and does not have redundant access. For SATA-format SSD information, see "Nonredundant EMS Control of SATA-Format Drives" on page 197.

For redundancy, each SAS-format drive can be accessed by two EMSs. For additional redundancy, each EMS is located in different halves of the same IOU so that disk access is maintained even if one of the two IOBs (I/O switch boards) fails in an IOU.

For details on EMS paths and redundancy, see *Server Administration*, EMS SAS-format paths to internal drives.

EMSs provide redundant access to SAS-format hard drives that have dual ports.



Hard Drive Slot	EMS	EMS
HDD 0	EMS 1	EMS 3
HDD 1	EMS 1	EMS 3
HDD 2	EMS 2	EMS 4
HDD 3	EMS 2	EMS 4
HDD 4	EMS 3	EMS 1
HDD 5	EMS 3	EMS 1
HDD 6	EMS 4	EMS 2
HDD 7	EMS 4	EMS 2

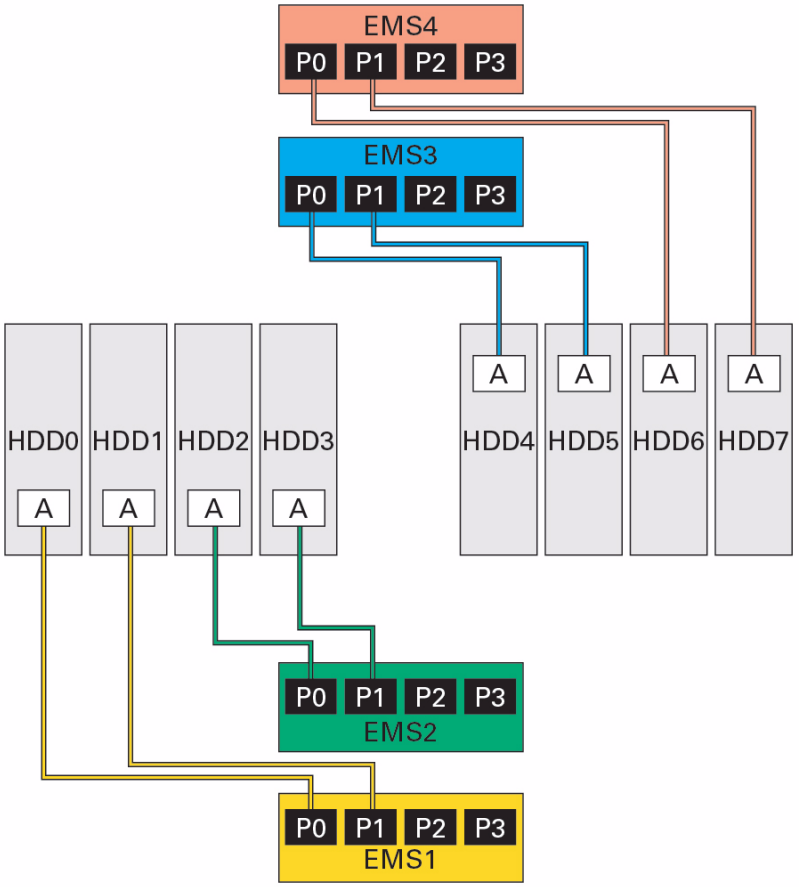
Related Information

- "Nonredundant EMS Control of SATA-Format Drives" on page 197
- "HDD and SSD Hot-Plug Capabilities" on page 211
- "Prepare an HDD for Removal" on page 220
- "Prepare an SSD for Removal" on page 226

Nonredundant EMS Control of SATA-Format Drives

The SAS-format drive controller in an EMS provides access for up to four SATA-format SSDs. SATA-format SSDs do not have redundant access.

EMSs provide nonredundant access to SSDs that have single ports.



Related Information

- "Redundant EMS Control of SAS-Format Drives" on page 195
- "HDD and SSD Hot-Plug Capabilities" on page 211
- "Prepare an HDD for Removal" on page 220
- "Prepare an SSD for Removal" on page 226

Identifying Hard Drive Slot Locations

Every slot location has three unique methods of identification:

- A **physical location** consists of the IOU number (0-3) and the physical slot that is identified by a label.
- The **device path** is how the Oracle Solaris `hotplug` command identifies a slot location.
- The **FRU path** is how the Oracle ILOM `show` command identifies a slot location.

These topics show how the three forms of slot identification relate to each other.

- "EMS Slot Locations in Fully-Populated DCUs" on page 200
- "EMS Slot Locations in Half-Populated DCUs" on page 201

Related Information

- "Rear Component Locations" on page 10
- "IOU Component Locations" on page 12
- "Understanding HDD and SSD Slot Configurations" on page 210
- "Locate an HDD" on page 216
- "Locate an SSD" on page 219

EMS Slot Locations in Fully-Populated DCUs

This table shows hard drive slots for fully populated DCUs (four CMUs each).

IOU No.	EMS Slot	Device Path	FRU Path
IOU 0	EMS 1	/pci@300/pci@1/pci@0/pci@c	/SYS/IOU0/EMS1
IOU 0	EMS 2	/pci@500/pci@1/pci@0/pci@0	/SYS/IOU0/EMS2
IOU 0	EMS 3	/pci@400/pci@1/pci@0/pci@c	/SYS/IOU0/EMS3
IOU 0	EMS 4	/pci@600/pci@1/pci@0/pci@0	/SYS/IOU0/EMS4
IOU 1	EMS 1	/pci@700/pci@1/pci@0/pci@c	/SYS/IOU1/EMS1
IOU 1	EMS 2	/pci@900/pci@1/pci@0/pci@0	/SYS/IOU1/EMS2
IOU 1	EMS 3	/pci@800/pci@1/pci@0/pci@c	/SYS/IOU1/EMS3
IOU 1	EMS 4	/pci@a00/pci@1/pci@0/pci@0	/SYS/IOU1/EMS4
IOU 2	EMS 1	/pci@b00/pci@1/pci@0/pci@c	/SYS/IOU2/EMS1
IOU 2	EMS 2	/pci@d00/pci@1/pci@0/pci@0	/SYS/IOU2/EMS2
IOU 2	EMS 3	/pci@c00/pci@1/pci@0/pci@c	/SYS/IOU2/EMS3
IOU 2	EMS 4	/pci@e00/pci@1/pci@0/pci@0	/SYS/IOU2/EMS4
IOU 3	EMS 1	/pci@f00/pci@1/pci@0/pci@c	/SYS/IOU3/EMS1
IOU 3	EMS 2	/pci@1100/pci@1/pci@0/pci@0	/SYS/IOU3/EMS2
IOU 3	EMS 3	/pci@1000/pci@1/pci@0/pci@c	/SYS/IOU3/EMS3
IOU 3	EMS 4	/pci@1200/pci@1/pci@0/pci@0	/SYS/IOU3/EMS4

Related Information

- "EMS Slot Locations in Half-Populated DCUs" on page 201
- "Understanding HDD and SSD Slot Configurations" on page 210
- "Locate an HDD" on page 216
- "Locate an SSD" on page 219

EMS Slot Locations in Half-Populated DCUs

This table shows hard drive slots for half populated DCUs (two CMUs each).

Note – The device paths differ for the EMS 2 and EMS 3 slots compared to the equivalent device paths in "EMS Slot Locations in Fully-Populated DCUs" on page 200.

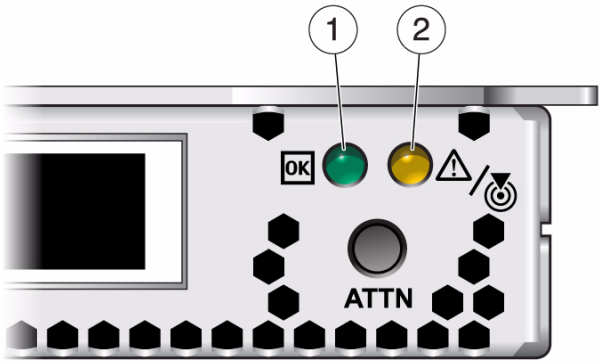
IOU No.	EMS Slot	Device Path	FRU Path
IOU 0	EMS 1	/pci@300/pci@1/pci@0/pci@c	/SYS/IOU0/EMS1
IOU 0	EMS 2	/pci@380/pci@1/pci@0/pci@0	/SYS/IOU0/EMS2
IOU 0	EMS 3	/pci@680/pci@1/pci@0/pci@c	/SYS/IOU0/EMS3
IOU 0	EMS 4	/pci@600/pci@1/pci@0/pci@0	/SYS/IOU0/EMS4
IOU 1	EMS 1	/pci@700/pci@1/pci@0/pci@c	/SYS/IOU1/EMS1
IOU 1	EMS 2	/pci@780/pci@1/pci@0/pci@0	/SYS/IOU1/EMS2
IOU 1	EMS 3	/pci@a80/pci@1/pci@0/pci@c	/SYS/IOU1/EMS3
IOU 1	EMS 4	/pci@a00/pci@1/pci@0/pci@0	/SYS/IOU1/EMS4
IOU 2	EMS 1	/pci@b00/pci@1/pci@0/pci@c	/SYS/IOU2/EMS1
IOU 2	EMS 2	/pci@b80/pci@1/pci@0/pci@0	/SYS/IOU2/EMS2
IOU 2	EMS 3	/pci@e80/pci@1/pci@0/pci@c	/SYS/IOU2/EMS3
IOU 2	EMS 4	/pci@e00/pci@1/pci@0/pci@0	/SYS/IOU2/EMS4
IOU 3	EMS 1	/pci@f00/pci@1/pci@0/pci@c	/SYS/IOU3/EMS1
IOU 3	EMS 2	/pci@f80/pci@1/pci@0/pci@0	/SYS/IOU3/EMS2
IOU 3	EMS 3	/pci@1280/pci@1/pci@0/pci@c	/SYS/IOU3/EMS3
IOU 3	EMS 4	/pci@1200/pci@1/pci@0/pci@0	/SYS/IOU3/EMS4

Related Information

- "EMS Slot Locations in Fully-Populated DCUs" on page 200
- "Understanding HDD and SSD Slot Configurations" on page 210
- "Locate an HDD" on page 216

- “Locate an SSD” on page 219

EMS General Status LEDs



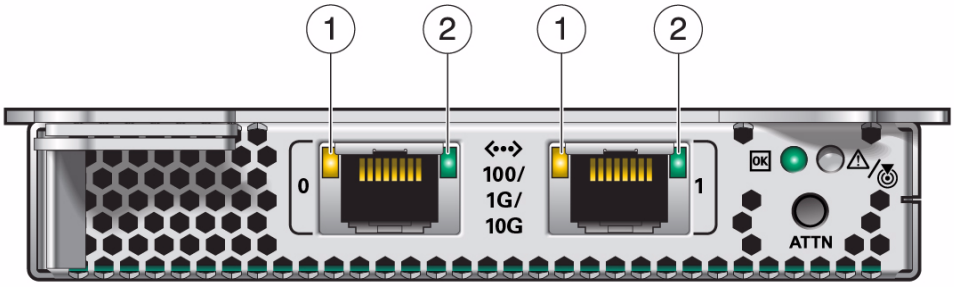
No.	LED	Icon	Description
1	Power OK (green)	OK	Indicates these conditions: • **Off –** EMS is not running in its normal state. • **Steady on –** EMS is powered on and running normally. • **Slow blink –** The ATTN button has been pushed, and the system is configuring or unconfiguring the EMS.
2	Service Required (amber)	⚠	Indicates that service is required. The `show faulty` command provides details about any faults that cause this indicator to light.

Related Information

- “EMS Network Port LEDs” on page 203
- “Understanding EMS Configurations” on page 193
- “Remove an EMS” on page 205
- “Install an EMS” on page 206

EMS Network Port LEDs

The two network ports on the EMS can operate at 10 Gb/sec, 1 Gb/sec, and 100BASE-T speeds.



Each port has two LEDs. The LED on the left side of a port indicates the port's speed. See the following table. The LED on the right side of a port blinks green when active, and stays solid green when the port link is up but idle.

	Port 0		Port 1	
Speed	**Speed (LED 1)**	**Activity (LED 2)**	**Speed (LED 1)**	**Activity (LED 2)**
10 Gb/sec	Amber	Green	Amber	Green
1 Gb/sec	Green*	Green	Green*	Green
100BASE-T	Off	Green	Off	Green

* **SPARC M5-32 server only:** LED 1 green luminance is low at 1 Gb/sec speed.

Related Information

- "EMS General Status LEDs" on page 202
- "Understanding EMS Configurations" on page 193
- "Remove an EMS" on page 205
- "Install an EMS" on page 206

▼ Determine Hard Drive Cage and EMS Part Numbers

1. **Determine a hard drive cage** `fru_part_number`**.**

Note – IOU numbers run from 0 to 3. HDDBP (hard disk drive cage backplane) numbers are 0 and 1.

```
-> show /SYS/IOUx/HDDBPy
 /SYS/IOUx/HDDBPy
...
    Properties:
        fru_part_number = part_number
```

Both hard drive cages in the same IOU must have the same part numbers.

2. **Determine an EMS** `fru_part_number`**.**

Note – IOU numbers run from 0 to 3. EMS numbers run from 1 to 4.

```
-> show /SYS/IOUx/EMSy/CARD
 /SYS/IOUx/EMSy/CARD
...
    Properties:
        fru_part_number = part_number
```

All four EMSs in the same IOU must have the same part numbers.

3. **Compare your FRU part numbers to those listed for SPARC M5-32 or SPARC M6-32 server in the** *Oracle System Handbook***.**

Refer to the `disk backplane` and `I/O` sections for your server in the handbook.

- The handbook notes which part numbers are 1st Gen or 2nd Gen.
- Use only 1st Gen EMSs with 1st Gen disk drive cages.
- Use only 2nd Gen EMSs with 2nd Gen disk drive cages.

Related Information

- "EMS and Hard Drive Cage Compatibility" on page 194
- *Oracle System Handbook*, SPARC M5-32 full components list

- *Oracle System Handbook*, SPARC M6-32 full components list

▼ Remove an EMS

If the EMS is in a SPARC M5-32 or early SPARC M6-32 server, see "EMS and Hard Drive Cage Compatibility" on page 194. Be certain that you have the correct replacement.

1. **Use one of these Oracle ILOM commands to display faulty components:**

```
-> show faulty
```

or

```
-> show /System/Open_Problems
```

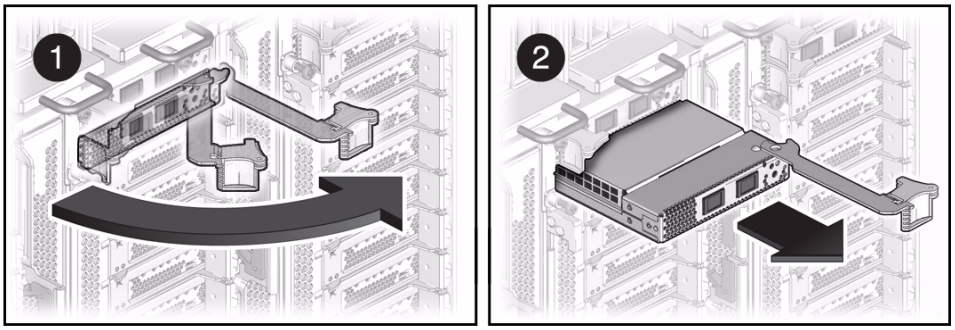
See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. **Identify which EMS has faulted by locating the path** `/SYS/IOUx/EMSy`**.**
3. **At the rear of the server, locate the EMS and press the ATTN button on the EMS panel.**

   The EMS's Power OK LED should go off, indicating that the EMS is ready to be removed.

4. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
5. **Label and remove cables from the EMS.**
6. **Remove the EMS:**

   a. **Press the end of the plastic locking handle and swing the end of the extraction lever out 90 degrees.**



b. Pull the EMS out of the slot.

7. **Install an EMS.**

   See "Install an EMS" on page 206.

Related Information

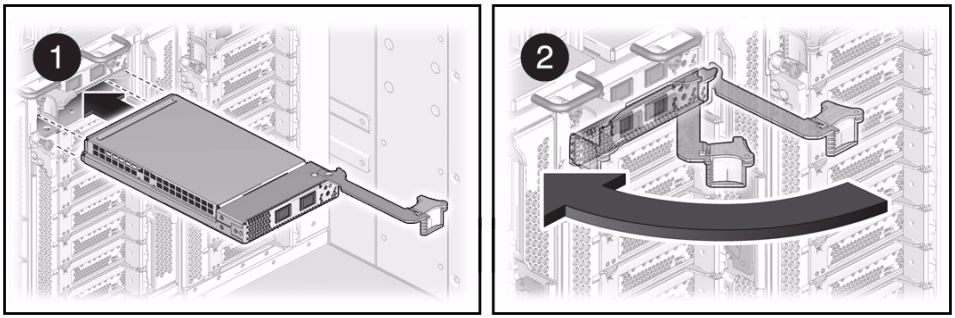
- "Understanding EMS Configurations" on page 193
- "Install an EMS" on page 206
- "EMS General Status LEDs" on page 202
- "EMS Network Port LEDs" on page 203

▼ Install an EMS

If the EMS is in a SPARC M5-32 or early SPARC M6-32 server, see "EMS and Hard Drive Cage Compatibility" on page 194. Be certain that you have the correct replacement.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install the EMS in the slot.**

   a. Swing the end of the extraction lever out 90 degrees.



b. Insert the EMS in the slot and push it until the extraction lever touches the front of the slot and begins to swing shut.

c. Close the extraction lever until the plastic locking handle snaps into place.

d. Attach network cables to the RJ45 network ports.

Note – Refer to *Server Installation*, installing and routing cables.

---

3. Press the ATTN button on the EMS to reconfigure the EMS into the PDomain.

4. To check the EMS network link speeds, do one of the following:

- At the EMS, observe the link speed LEDs on the ports. See "EMS Network Port LEDs" on page 203.
  - Amber = 10 Gb/sec
  - Green = 1 Gb/sec
  - Off = 100BASE-T
- At a terminal:

  a. In the `/etc/path_to_inst` file, find the `ixgbe` instances for the EMS.

  b. Use the data-link administration command to display the link speeds for the `ixgbe` instances that you found:

```
# dladm show-phys
LINK            MEDIA               STATE       SPEED   DUPLEX      DEVICE
net0            Ethernet            up          10000   full        ixgbe0
net2            Ethernet            down        0       unknown     ixgbe2
```

5. Return the replaced component to Oracle.

See "Return a Component to Oracle" on page 488.

Related Information

- “Understanding EMS Configurations” on page 193
- “Remove an EMS” on page 205
- “EMS General Status LEDs” on page 202
- “EMS Network Port LEDs” on page 203

Servicing HDDs, SSDs, and Drive Filler Panels

HDDs and SSDs are hot-pluggable components. See "IOU Component Locations" on page 12 for locations of HDDs and SSDs.

Note – The Sun Flash Accelerator F40 PCIe Card is flash memory in I/O card format, so it is installed and serviced differently from HDDs and SSDs. See "Sun Flash Accelerator F40 and F80 PCIe Cards" on page 175 for more information.

Description	Links
Understand HDD and SSD slots	"Understanding HDD and SSD Slot Configurations" on page 210
Replace an HDD	"HDD LEDs" on page 213
	"Locate a Drive" on page 215
	"Removing an HDD" on page 220
	"Install an HDD" on page 224
Add an HDD	"Understanding HDD and SSD Slot Configurations" on page 210
	"Remove a Drive Filler Panel" on page 231
	"Install an HDD" on page 224
Remove an HDD	"Locate a Drive" on page 215
	"Removing an HDD" on page 220
	"Install a Drive Filler Panel" on page 232
Replace an SSD	"SSD LEDs" on page 214
	"Locate a Drive" on page 215
	"Prepare an SSD for Removal" on page 226
	"Removing an SSD" on page 226
	"Install an SSD" on page 229

Description	Links
Add an SSD	"Understanding HDD and SSD Slot Configurations" on page 210
	"Remove a Drive Filler Panel" on page 231
	"Install an SSD" on page 229
Remove an SSD	"Locate a Drive" on page 215
	"Removing an SSD" on page 226
	"Install a Drive Filler Panel" on page 232

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Servicing Hard Drive Cages" on page 371
- "Returning the Server to Operation" on page 481

Understanding HDD and SSD Slot Configurations

The server supports 2.5 inch SAS-format HDDs and SATA-format SSDs mounted in Oracle drive carriers.

An IOU (I/O unit) holds four EMSs and up to eight drives. SAS-format controllers in the EMSs control the SAS-format HDDs and SATA-format SSDs.

Unused drive slots must contain drive filler panels to avoid overheating the server.

- "Redundant and Nonredundant Drive Controllers" on page 211
- "Identifying Drive Slot Locations" on page 211
- "HDD and SSD Hot-Plug Capabilities" on page 211

Redundant and Nonredundant Drive Controllers

HDDs and SSDs are controlled by EMSs.

A SAS-format HDD has two ports, allowing redundant access by two EMSs. See "Redundant EMS Control of SAS-Format Drives" on page 195 for a table which lists HDD slots and the EMSs that provide redundant access.

A SATA-format SSD has one port, so it can be accessed by only one EMS. See "Nonredundant EMS Control of SATA-Format Drives" on page 197 for details.

Note – The Sun Flash Accelerator F40 PCIe Card is installed in an I/O card slot, not in a hard drive slot. See "Sun Flash Accelerator F40 and F80 PCIe Cards" on page 175.

Identifying Drive Slot Locations

Every slot location has three unique methods of identification:

- A **physical location** consists of the IOU number (0-3) and the physical slot that is identified by a label.
- The **device path** is how the Oracle Solaris `hotplug` command identifies a slot location.
- The **FRU path** is how the Oracle ILOM `show` command identifies a slot location.

See "EMS Slot Locations in Fully-Populated DCUs" on page 200 and "EMS Slot Locations in Half-Populated DCUs" on page 201 for tables show how these three forms of slot identification relate to each other.

HDD and SSD Hot-Plug Capabilities

The drives (HDDs and SSDs) are hot-pluggable, meaning that the drives can be removed and inserted while the server is powered on.

To hot-plug a drive you must take the drive offline before you can safely remove it. Taking a drive offline prevents any applications from accessing it, and removes logical software links to it.

You cannot hot-plug a drive in the following situations:

- If the drive contains the operating system and the operating system is not mirrored on another drive.
- If the drive cannot be logically isolated from the online operations of the server.

If either of these conditions apply to the drive being serviced, you must take the server offline (shut down the operating system) before you replace the drive.

If the drive is owned by a specific logical domain, stop that logical domain.

For information about stopping logical domains, refer to the *Oracle VM Server for SPARC Administration Guide* at:

`http://www.oracle.com/goto/VM-SPARC/docs`

Related Information

- "HDD LEDs" on page 213
- "SSD LEDs" on page 214
- "Locate a Drive" on page 215
- "Removing an HDD" on page 220
- "Removing an SSD" on page 226

HDD LEDs

No.	LED	Icon	Description
1	Ready to Remove (blue)		**Caution - The HDD might not be ready for removal**. Do not remove a SAS-format HDD until both ports are unconfigured. See "Prepare an HDD for Removal" on page 220.
2	Service Required (amber)		Indicates that service is required. The `show faulty` command provides details about any faults that cause this indicator to light.
3	Power OK (green)	OK	Indicates these conditions: • **Off –** HDD is not running in its normal state. • **Steady on –** HDD is powered on in an idle state. • **Fast blink –** System is accessing the HDD.

Note – SPARC M5-32 server only: In a darkened room, the backplane of the hard drive cage exhibits a weak amber glow that is visible either through the light pipe at the front of a drive, or inside an empty drive slot. The glow is normal and can be ignored.

Note – The HDD Fault LEDs on the cabinet's front and rear LED panels indicate the state of the HDD cages, and do not indicate the state of individual HDDs or SSDs. See "Front and Rear LED Panel LEDs and Controls" on page 55.

Related Information

- "SSD LEDs" on page 214
- "Understanding HDD and SSD Slot Configurations" on page 210
- "Locate a Drive" on page 215
- "Prepare an HDD for Removal" on page 220
- "Install an HDD" on page 224

SSD LEDs

No.	LED	Icon	Description
1	Ready to Remove (blue)		Indicates that the SSD can be removed during a hot-service operation.
2	Service Required (amber)		Indicates that service is required. The `show faulty` command provides details about any faults that cause this indicator to light.
3	Power OK (green)	OK	Indicates these conditions: • **Off –** SSD is powered off, or SSD is powered on in an idle state. • **Fast blink –** System is accessing the SSD.

Note – SPARC M5-32 server only: In a darkened room, the backplane of the hard drive cage exhibits a weak amber glow that is visible either through the light pipe at the front of a drive, or inside an empty drive slot. The glow is normal and can be ignored.

Note – The HDD Fault LEDs on the cabinet's front and rear LED panels indicate the state of the HDD cages, and do not indicate the state of individual HDDs or SSDs. See "Front and Rear LED Panel LEDs and Controls" on page 55.

Related Information

- "HDD LEDs" on page 213
- "Understanding HDD and SSD Slot Configurations" on page 210
- "Locate a Drive" on page 215
- "Prepare an SSD for Removal" on page 226
- "Install an SSD" on page 229

Locate a Drive

▼ Locate a Faulty Drive

If a drive is faulty:

- The server's front and rear LED panels should light their System Service Required LEDs.
- The drive to be replaced should light the amber Service Required LED.

1. **Use one of these Oracle ILOM commands to display faulty components:**

```
-> show faulty
```

or

```
-> show /System/Open_Problems
```

See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. **Remove the drive.**

See "Remove an HDD" on page 222.

Related Information

- "Locate an HDD" on page 216
- "Locate an SSD" on page 219

▼ Locate an HDD

- **Search for HDDs with `format` or `cfgadm`:**

  a. Using the `format` command:

  For this example, we have chosen to locate item 5 (highlighted below). This HDD has WWID c0t5000CCA02505CC10d0.

```
# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
       0. c0t5000CCA025048FD0d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca025048fd0
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD0/disk
       1. c0t5000CCA02507BEB0d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca02507beb0
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD1/disk
       2. c0t5000CCA02507A528d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca02507a528
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD2/disk
       3. c0t5000CCA025074E74d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca025074e74
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD3/disk
       4. c0t5000CCA025079508d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca025079508
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD4/disk
       5. c0t5000CCA02505CC10d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca02505cc10
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD5/disk
       6. c0t5000CCA025074994d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca025074994
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD6/disk
       7. c0t5000CCA02505A3DCd0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca02505a3dc
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD7/disk
```

Note that the example lists eight drives. A fully configured server can have up to 32 drives.

b. Using the `cfgadm` command:

For this example, we have chosen the HDD Ap_Id c5. However, an HDD has two ports, so this HDD also has Ap_Id c13. Both Ap_Ids are highlighted below.

```
# cfgadm -al
Ap_Id                          Type         Receptacle   Occupant     Condition
IOU1-EMS1                     pci-pci/hp  connected    configured   ok
IOU1-EMS2                     pci-pci/hp  connected    configured   ok
IOU1-EMS3                     pci-pci/hp  connected    configured   ok
IOU1-EMS4                     pci-pci/hp  connected    configured   ok
IOU1-PCIE1                    ib/hp       connected    configured   ok
IOU1-PCIE2                    ib/hp       connected    configured   ok
IOU1-PCIE3                    ib/hp       connected    configured   ok
IOU1-PCIE4                    ib/hp       connected    configured   ok
IOU1-PCIE5                    ib/hp       connected    configured   ok
IOU1-PCIE6                    ib/hp       connected    configured   ok
IOU1-PCIE7                    ib/hp       connected    configured   ok
IOU1-PCIE8                    ib/hp       connected    configured   ok
IOU1-PCIE9                    ib/hp       connected    configured   ok
IOU1-PCIE10                   ib/hp       connected    configured   ok
IOU1-PCIE11                   ib/hp       connected    configured   ok
IOU1-PCIE12                   ib/hp       connected    configured   ok
IOU1-PCIE13                   ib/hp       connected    configured   ok
IOU1-PCIE14                   ib/hp       connected    configured   ok
IOU1-PCIE15                   ib/hp       connected    configured   ok
IOU1-PCIE16                   ib/hp       connected    configured   ok
c2                            scsi-sas    connected    configured   unknown
c2::w5000cca025048fd1,0       disk-path   connected    configured   unknown
c3                            scsi-sas    connected    configured   unknown
c3::w5000cca02507beb1,0       disk-path   connected    configured   unknown
c4                            scsi-sas    connected    configured   unknown
c4::w5000cca02507950a,0       disk-path   connected    configured   unknown
c5                            scsi-sas    connected    configured   unknown
c5::w5000cca02505cc12,0       disk-path   connected    configured   unknown
c6                            scsi-sas    connected    unconfigured unknown
c7                            scsi-sas    connected    configured   unknown
c7::w5000cca02507a529,0       disk-path   connected    configured   unknown
c8                            scsi-sas    connected    configured   unknown
c8::w5000cca025074e75,0       disk-path   connected    configured   unknown
c9                            scsi-sas    connected    configured   unknown
c9::w5000cca025074996,0       disk-path   connected    configured   unknown
c10                           scsi-sas    connected    configured   unknown
c10::w5000cca02505a3de,0      disk-path   connected    configured   unknown
c11                           scsi-sas    connected    unconfigured unknown
c12                           scsi-sas    connected    configured   unknown
c12::w5000cca025079509,0      disk-path   connected    configured   unknown
c13                           scsi-sas    connected    configured   unknown
c13::w5000cca02505cc11,0      disk-path   connected    configured   unknown
```

```
c14                            scsi-sas    connected    configured   unknown
c14::w5000cca025048fd2,0       disk-path   connected    configured   unknown
c15                            scsi-sas    connected    configured   unknown
c15::w5000cca02507beb2,0       disk-path   connected    configured   unknown
c16                            scsi-sas    connected    unconfigured unknown
c27                            scsi-sas    connected    configured   unknown
c27::w5000cca025074995,0       disk-path   connected    configured   unknown
c28                            scsi-sas    connected    configured   unknown
c28::w5000cca02505a3dd,0       disk-path   connected    configured   unknown
c29                            scsi-sas    connected    configured   unknown
c29::w5000cca02507a52a,0       disk-path   connected    configured   unknown
c30                            scsi-sas    connected    configured   unknown
c30::w5000cca025074e76,0       disk-path   connected    configured   unknown
c31                            scsi-sas    connected    unconfigured unknown
```

Related Information

- "Remove an HDD" on page 222
- "Locate an SSD" on page 219

▼ Locate an SSD

Note – The Sun Flash Accelerator F40 PCIe Card is installed in an I/O card slot, not in an HDD slot. See "Servicing I/O Cards" on page 163.

- **Search for SSDs with `format` or `cfgadm`:**

  a. **Using the `format` command:**

  The format command shows WWIDs.

  The drive is shown as an "SSD" in the device description.

```
# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
       0. c0t5000CCA025048FD0d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca025048fd0
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD0/disk
       1. c0t50015179595D1158d0 <ATA-INTEL SSDSA2BZ30-0362 cyl 35769 alt 2 hd
128 sec 128>
          /scsi_vhci/disk@g50015179595d1158
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD1/disk
       2. c0t5000CCA02507A528d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
...
```

  b. **Search for SSDs with the `cfgadm` command:**

  The cfgadm command displays `Ap_Ids`.

  You should see an `Ap_Id` for the SSD in the display.

```
# cfgadm -al
Ap_Id                          Type         Receptacle   Occupant     Condition
...
c2                            scsi-sas     connected    configured   unknown
c2::w5000cca025048fd1,0       disk-path    connected    configured   unknown
c3                            scsi-sas     connected    configured   unknown
c3::w50015179595d1158,0       disk-path    connected    configured   unknown
c4                            scsi-sas     connected    configured   unknown
c4::w5000cca02507950a,0       disk-path    connected    configured   unknown
...
```

Related Information

- "Prepare an SSD for Removal" on page 226
- "Locate an HDD" on page 216
- "Remove a Drive Filler Panel" on page 231

Removing an HDD

▼ Prepare an HDD for Removal

1. **Unconfigure an HDD:**

   An HDD has two redundant ports. You must unconfigure both ports.

   a. **Unconfigure one of the ports:**

      In this step we arbitrarily choose to start with c5, which is shown in "Locate an HDD" on page 216. The `cfgadm` command requires an Ap_Id, and for c5 the Ap_Id is **c5::w5000cca02505cc12,0**.

```
# cfgadm -c unconfigure c5::w5000cca02505cc12,0
```

Caution – The blue Ready to Remove LED lights on the HDD if this first step is successful. **However, the HDD is not ready for removal at this point.** Do not remove the HDD until both ports are unconfigured.

   b. **If** Step a **fails with the following error, the drive might still be active.**

```
# cfgadm -c unconfigure Ap_Id
cfgadm: Hardware specific failure: failed to unconfigure SCSI device: I/O error
```

      If the error appears, you must quiesce the HDD and unconfigure it fully before attempting to remove the drive. See "HDD and SSD Hot-Plug Capabilities" on page 211.

c. **If** Step a **did not produce an error message, unconfigure the second port:**

In this step we unconfigure c13, which has the Ap_Id **c13::w5000cca02505cc11,0**.

```
# cfgadm -c unconfigure c13::w5000cca02505cc11,0
```

Caution – If one operation fails and another succeeds, the blue Ready to Remove LED might be lit but the HDD is not ready for removal until both ports are unconfigured.

2. **Verify that the HDD is unconfigured using either** `format` **or** `cfgadm`**.**

   - Using the `format` command:

```
# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
       0. c0t5000CCA025048FD0d0 <HITACHI-H106060SDSUN600G-A2B0
cyl 64986 alt 2 hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca025048fd0
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD0/disk
...
```

   The selected drive should have disappeared from the output when compared to the output before the unconfigure operation. For example, if the `format` command listed eight drives before the unconfigure command, you should see seven drives now.

   - Using the `cfgadm` command:

```
# cfgadm -al
Ap_Id                          Type         Receptacle   Occupant     Condition
...
c5                             scsi-sas     connected    configured   unknown
c5::w5000cca02505cc12,0        disk-path    connected    unconfigured unknown
...
c13                            scsi-sas     connected    configured   unknown
c13::w5000cca02505cc11,0       disk-path    connected    unconfigured unknown
...
```

   The output should display paths for both ports. The HDD is ready to remove when both paths show **unconfigured**.

3. **Remove the HDD.**

   See "Remove an HDD" on page 222.

Related Information

- "Identifying Drive Slot Locations" on page 211
- "HDD LEDs" on page 213
- "Prepare an SSD for Removal" on page 226

▼ Remove an HDD

1. **Locate the HDD that has a lit blue Ready to Remove LED.**

   Confirm that the HDD slot label shows the correct slot number (`HDD` *n*). The label is just above the HDD on the server chassis.

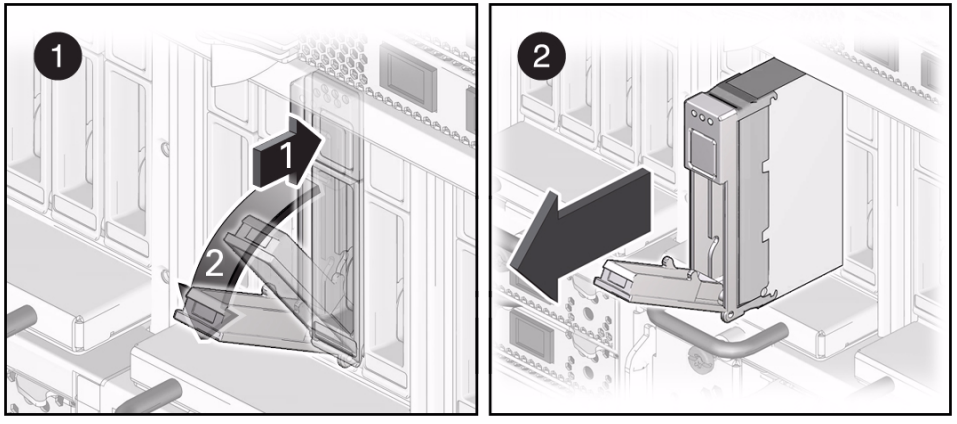
Note – SPARC M5-32 server only: The green LED on the drive remains lit at all times. If the drive has been properly unconfigured it can be removed even though the green LED is lit.

   See "Prepare an HDD for Removal" on page 220 for instructions on unconfiguring the HDD and verifying its status.

2. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
3. **Remove the HDD:**

   a. **Press the release button on the HDD.**

      The extraction lever under the release button swings partially open.



Caution – The latch is not an ejector. Do not force the latch down. Doing so can damage the latch.

---

b. Pull the HDD out of the slot.

Note – Do not leave a slot empty. The server might overheat.

---

4. Install a new HDD or drive filler panel in the empty slot.

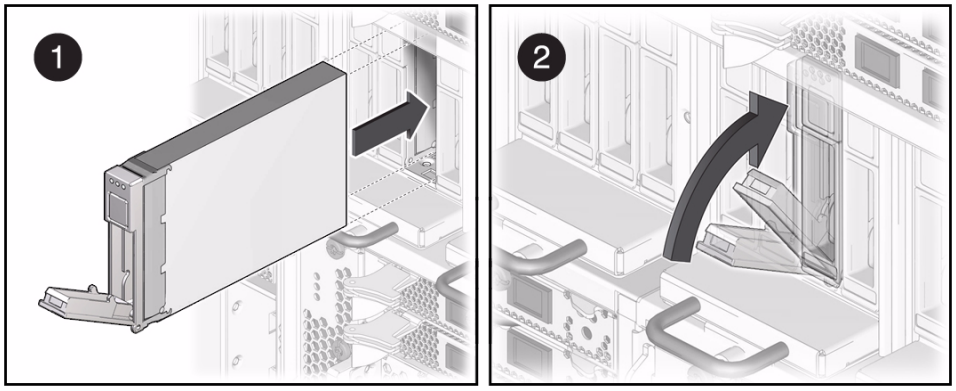
- To install an HDD, see "Install an HDD" on page 224.
- To install a drive filler panel, see "Install a Drive Filler Panel" on page 232.

Related Information

- "Identifying Drive Slot Locations" on page 211
- "HDD and SSD Hot-Plug Capabilities" on page 211
- "Install an HDD" on page 224.
- "Install an SSD" on page 229
- "Install a Drive Filler Panel" on page 232.

▼ Install an HDD

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install the HDD:**
   a. **Insert the HDD in the slot (panel 1).**



   b. **Unlock the extraction lever and push gently on the front of the HDD until the extraction lever begins to close (panel 2).**
   c. **Close the extraction lever until the lever locks.**

      If the front of the HDD does not align with the other drives, it is not completely seated. Repeat Step b.

Note – SPARC M5-32 server only: The green LED on the drive lights almost immediately and never turns off until the DCUs are powered off.

---

3. **Configure the drive:**

   An HDD is accessed by two EMSs, so you must configure both ports on the drive:

   a. **Search for the HDD:**

      An HDD has two ports, so `cfgadm` shows two entries for the new drive (c5 and c13 in the example below). Both entries should be shown as **unconfigured**.

```
# cfgadm -al
Ap_Id                          Type         Receptacle   Occupant     Condition
...
c5                           scsi-sas     connected    configured   unknown
```

```
c5::w5000cca02505cc12,0      disk-path    connected    unconfigured unknown
...
c13                          scsi-sas     connected    configured   unknown
c13::w5000cca02505cc11,0     disk-path    connected    unconfigured unknown
...
```

b. Configure one port on the HDD:

In this example, we have randomly chosen to configure c5 first.

```
# cfgadm -c configure c5::w5000cca02505cc12,0
```

c. Configure the second port on the HDD:

```
# cfgadm -c configure c13::w5000cca02505cc11,0
```

d. Verify that both ports are now configured (highlighted below):

```
# cfgadm -al
Ap_Id                          Type         Receptacle   Occupant     Condition
...
c5                             scsi-sas     connected    configured   unknown
c5::w5000cca02505cc12,0        disk-path    connected    configured   unknown
...
c13                            scsi-sas     connected    configured   unknown
c13::w5000cca02505cc11,0       disk-path    connected    configured   unknown
...
```

Note – The green OK LED operates differently on HDDs and SSDs. For the differences, see "HDD LEDs" on page 213 and "SSD LEDs" on page 214.

4. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "HDD LEDs" on page 213
- "Prepare an HDD for Removal" on page 220
- "Understanding HDD and SSD Slot Configurations" on page 210

Removing an SSD

▼ Prepare an SSD for Removal

1. **Unconfigure an SSD:**

   a. **Unconfigure the SSD:**

      In this step we remove c3, which is shown in "Locate an SSD" on page 219.

      The `cfgadm` command requires an Ap_Id, and for c3 the Ap_Id is c3::w50015179595d1158,0.

```
# cfgadm -c unconfigure c5::w5000cca02505cc12,0
```

      The blue Ready to Remove LED lights on the SSD if this step is successful.

   b. **If** Step a **fails with the following error, the drive might still be active.**

```
# cfgadm -c unconfigure Ap_Id
cfgadm: Hardware specific failure: failed to unconfigure SCSI device: I/O error
```

      You must quiesce the SSD and unconfigure it fully before attempting to remove the SSD. See "HDD and SSD Hot-Plug Capabilities" on page 211.

2. **Verify that the SSD is unconfigured using either** `format` **or** `cfgadm`**.**

   - Using the `format` command:

     The entry for the SSD should have disappeared from the list. c0t5000CCA02507A528d0 was formerly number 2 and is now number 1.

```
# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
       0. c0t5000CCA025048FD0d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
          /scsi_vhci/disk@g5000cca025048fd0
```

```
          /dev/chassis/SPARC_M5-32.AK00056255//SYS/IOU1/HDD0/disk
       1. c0t5000CCA02507A528d0 <HITACHI-H106060SDSUN600G-A2B0 cyl 64986 alt 2
hd 27 sec 668>  solaris
...
```

- Using the cfgadm command:

  c3 appears in the output and is shown as unconfigured.

```
# cfgadm -al
Ap_Id                          Type         Receptacle   Occupant     Condition
...
c2                            scsi-sas     connected    configured   unknown
c2::w5000cca025048fd1,0       disk-path    connected    configured   unknown
c3                            scsi-sas     connected    configured   unknown
c3::w50015179595d1158,0        disk-path    connected    unconfigured unknown
c4                            scsi-sas     connected    configured   unknown
c4::w5000cca02507950a,0       disk-path    connected    configured   unknown
...
```

3. **Remove the SSD.**

   See "Remove an SSD" on page 228.

Related Information

- "SSD LEDs" on page 214
- "Identifying Drive Slot Locations" on page 211
- "HDD and SSD Hot-Plug Capabilities" on page 211

▼ Remove an SSD

1. **Locate the SSD that has a lit blue Ready to Remove LED.**

   Confirm that the label above the slot shows the slot number (`HDD` *n*) that you specified in "Prepare an SSD for Removal" on page 226.

Note – SPARC M5-32 server only: The green LED on the drive remains lit at all times. If the drive has been properly unconfigured it can be removed even though the green LED is lit.

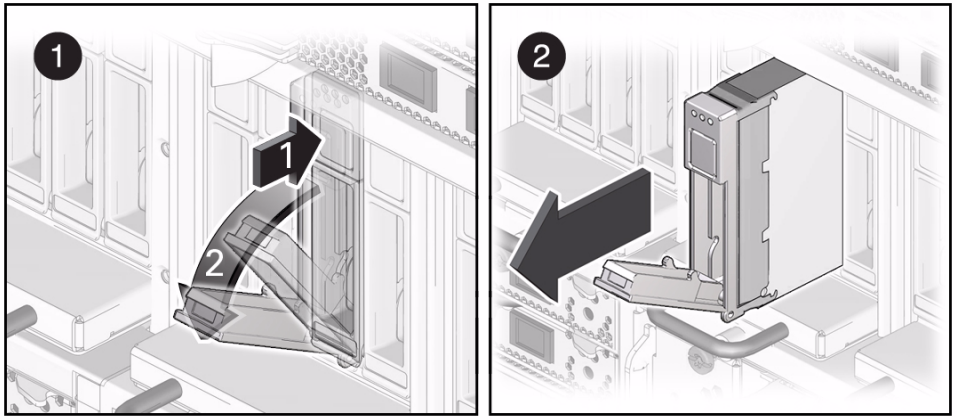
   See "Prepare an SSD for Removal" on page 226 for instructions on unconfiguring the SSD and verifying its status.

2. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

3. **Remove the SSD:**

   a. **Press the release button on the SSD.**

      The extraction lever under the release button swings partially open (panel 1).



Caution – The latch is not an ejector. Do not force the latch down. Doing so can damage the latch.

---

   b. **Pull the SSD out of the slot (panel 2).**

Note – Do not leave a slot empty. The server might overheat.

---

4. **Install a drive or filler panel in the empty slot.**

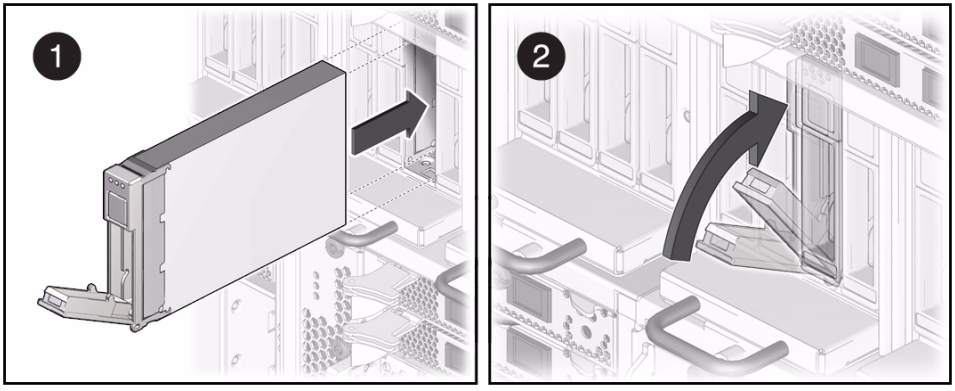
Related Information

- "SSD LEDs" on page 214
- "Install an SSD" on page 229.
- "Prepare an SSD for Removal" on page 226.
- "Install a Drive Filler Panel" on page 232.

▼ Install an SSD

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install the drive:**

   a. **Insert the drive in the slot (panel 1).**



   b. **Unlock the extraction lever and push gently on the front of the drive until the extraction lever begins to close (panel 2).**

   c. **Close the extraction lever until the lever locks.**

      If the front of the drive does not align with the other drives, it is not completely seated. Repeat Step b.

Note – The green OK LED on the SSD blinks, then turns off.

---

3. **Configure an SSD:**

   a. **Search for the SSD:**

      Search for an unconfigured SSD. In this example, Ap_Id `c3` is the unconfigured drive.

```
# cfgadm -al
Ap_Id                          Type         Receptacle   Occupant     Condition
...
c2                             scsi-sas     connected    configured   unknown
c2::w5000cca025048fd1,0        disk-path    connected    configured   unknown
c3                             scsi-sas     connected    configured   unknown
c3::w50015179595d1158,0         disk-path    connected     unconfigured unknown
c4                             scsi-sas     connected    configured   unknown
c4::w5000cca02507950a,0        disk-path    connected    configured   unknown
...
```

   b. **Configure the SSD:**

```
# cfgadm -c configure c3::w50015179595d1158,0
```

   c. **Verify that the SSD is configured:**

```
# cfgadm -al
Ap_Id                          Type         Receptacle   Occupant     Condition
...
c2                             scsi-sas     connected    configured   unknown
c2::w5000cca025048fd1,0        disk-path    connected    configured   unknown
c3                             scsi-sas     connected    configured   unknown
c3::w50015179595d1158,0         disk-path    connected     configured    unknown
c4                             scsi-sas     connected    configured   unknown
c4::w5000cca02507950a,0        disk-path    connected    configured   unknown
...
```

Note – The green OK LED operates differently on HDDs and SSDs. For the differences, see "HDD LEDs" on page 213 and "SSD LEDs" on page 214.

---

4. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "SSD LEDs" on page 214
- "Prepare an SSD for Removal" on page 226

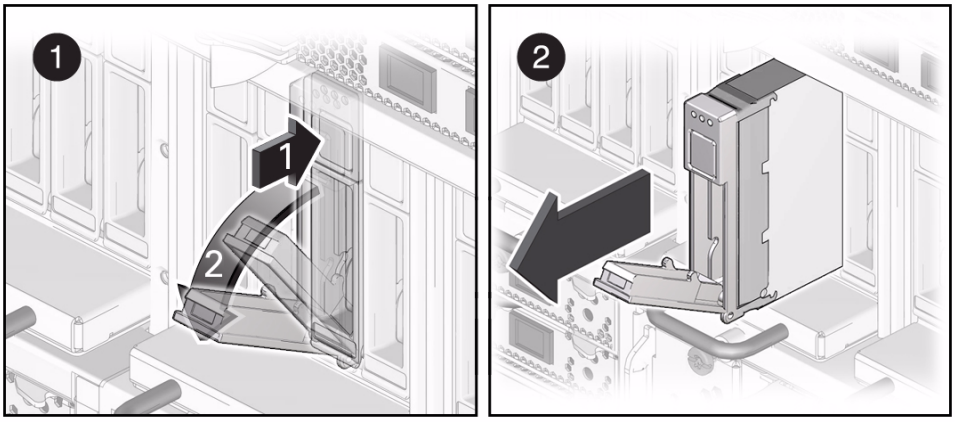
- “Remove an SSD” on page 228

▼ Remove a Drive Filler Panel

The drive filler panel has no active components, so the slot is powered off. The drive filler panel is ready to remove.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Press the release button on the drive filler panel.**

   The extraction lever under the release button swings partially open.



3. **Swing the extraction lever to the horizontal position.**
4. **Pull the drive filler panel out of the slot.**

Note – Do not leave a slot empty. The server might overheat.

---

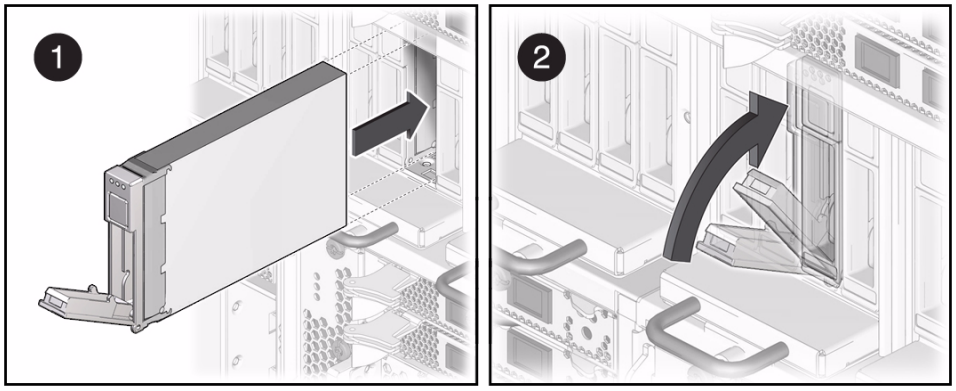
5. **Install a drive or drive filler panel in the empty slot.**

Related Information

- “Install an HDD” on page 224
- “Install an SSD” on page 229
- “Install a Drive Filler Panel” on page 232

▼ Install a Drive Filler Panel

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install the drive filler panel:**
   a. **Insert the drive filler panel in the slot (panel 1).**



   b. **Unlock the extraction lever and push gently on the drive filler panel until the extraction lever begins to close (panel 2).**
   c. **Close the extraction lever until the lever locks.**

      If the front of the drive filler panel does not align with the other drives, it is not completely seated. Repeat Step b.

3. **Close the extraction lever until the lever locks.**

Related Information

- "Removing an HDD" on page 220
- "Removing an SSD" on page 226

Servicing SPPs

SPPs are hot-pluggable components. See “CMU Cage Component Locations” on page 14 for the location of SPPs.

Description	Links
Understand SPP configuration	“SPP Configuration” on page 233
Replace an SPP	“SPP LEDs” on page 235
	“Remove an SPP” on page 237
	“Install an SPP” on page 244
Replace an SPP battery	“Check an SPP Battery” on page 236
	“SPP LEDs” on page 235
	“Remove an SPP” on page 237
	“Replace an SPP Battery” on page 240
	“Install an SPP” on page 244

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

SPP Configuration

In the server, each DCU has its own SPP. An SPP must be present for its DCU to be operational.

If two or more DCUs are combined in one PDomain, one SPP is designated to manage the entire PDomain and is known as the PDomain-SPP. If an SPP must be removed, its DCU cannot be part of a running PDomain.

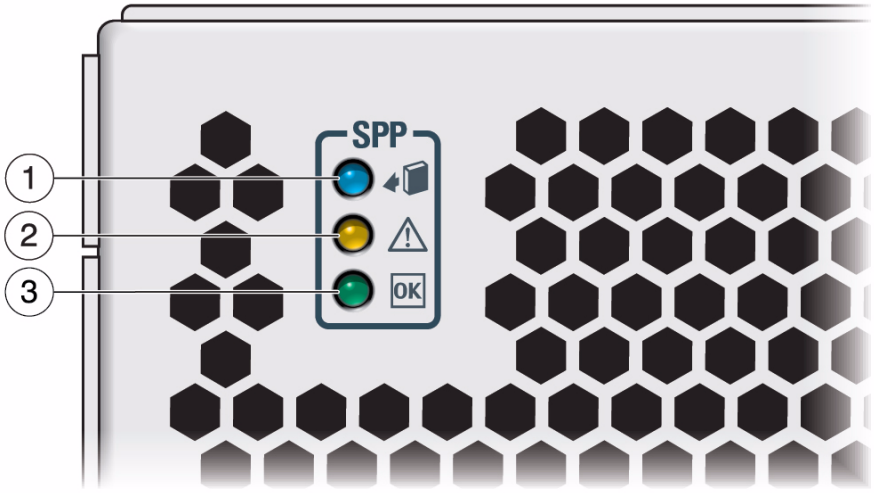
If DCUs are operating independently of each other, the failure of one SPP in a DCU does not affect the other DCUs.

A TPM (Trusted Platform Module) is located on each SPP and provides a secure keystore used in a PDomain. If you replace an SPP in a system running TPM, you might need to save the current TPM keystore for migration to the replacement SPP. See "Remove an SPP" on page 237 and "Install an SPP" on page 244 for instructions.

Related Information

- "SPP LEDs" on page 235
- "Remove an SPP" on page 237
- "Install an SPP" on page 244
- "Replace an SPP Battery" on page 240

SPP LEDs



No.	LED	Icon	Description
1	Ready to Remove (blue)		Indicates that a power supply can be removed during a hot-service operation.
2	Service Required (amber)		Indicates that service is required. The `show faulty` command provides details about any faults that cause this indicator to light.
3	Power OK (green)	OK	Indicates these conditions: • **Off –** SPP is not running in its normal state. • **Steady on –** SPP is powered on and running normally.

Related Information

- "SPP Configuration" on page 233
- "Remove an SPP" on page 237
- "Install an SPP" on page 244
- "Replace an SPP Battery" on page 240

▼ Check an SPP Battery

Each SPP has a battery.

1. Check the status of the SPP battery.

```
-> show /SYS/SPPx/BAT
 /SYS/SPPx/BAT
    Targets:

    Properties:
        type = Battery
        fault_state = OK
        clear_fault_action = (none)
...
```

2. Check the voltage of the SPP battery.

```
-> show /SYS/SPPx/V_VBAT

 /SYS/SPPx/V_VBAT
...
    Properties:
        type = Voltage
        class = Threshold Sensor
        value = 3.271 Volts
        upper_nonrecov_threshold = N/A
...
        lower_noncritical_threshold = 2.704 Volts
...
```

Related Information

- “Remove an SPP” on page 237
- “Replace an SPP Battery” on page 240
- “Install an SPP” on page 244
- “Check a Service Processor Battery” on page 145

▼ Remove an SPP

Caution – Do not turn off an SPP while the associated PDomain is active. Doing so will cause the system to panic.

1. Use one of these Oracle ILOM commands to display faulty components.

```
-> show faulty
```

or

```
-> show /System/Open_Problems
```

See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. Determine if you need to save the TPM keystore from the faulty SPP.

a. In Oracle ILOM, see if TPM is activated.

```
-> show -d properties /Servers/PDomains/PDomain_x/HOST/tpm mode
  /Servers/PDomains/PDomain_x/HOST/tpm
    Properties:
        mode = state
```

- If mode = `off`, go to Step 3.
- If mode = `activated`, continue to Step b.
- If mode = `deactivated`, ask the system administrator if you should save the TPM keystore.

b. At the PDomain host, determine if TPM is in use.

- If you see the migratable root key under the storage root key, TPM is in use. Continue to Step c.

```
$ tpmadm keyinfo
[SYSTEM] 00000000-0000-0000-0000-000000000001 (loaded)
[SYSTEM] 00000000-0000-0000-0000-00000000000b
```

- If you see an error message, TPM is not in use. Go to Step 3.

```
$ tpmadm keyinfo
Connect context: Communication failure (TSS.TSS_E_COMM_FAILURE 0x3011).
Make sure the tcsd service "svc:/application/security/tcsd" is running.
```

c. Verify that TPM is migratable, and the `TPM key blob` is available.

```
$ tpmadm keyinfo 00000000-0000-0000-0000-00000000000b
Key Size: 2048 bits
Key Usage: Storage
Algorithm: RSA
...
Migratable: Yes
...
TPM key blob:
01 01 00 00 00 11 00 00 00 02 00 00 00 00 01 00
03 00 01 00 00 00 0C 00 00 08 00 00 00 00 02 00
00 00 00 00 00 00 00 00 00 01 00 8C ED E1 BA 0D
...
```

d. Export the TPM key blob and the TPM authorization key to the hard drive.

Note – You need the TPM owner's PIN to perform the following step.

```
$ tpmadm migrate export 00000000-0000-0000-0000-0000000000b
Enter TPM Owner PIN:
Enter PIN for the migration key:
Confirm PIN for the migration key:
```

The default file name of the TPM key blob is `tpm-migration.dat`. The default file name of the TPM authorization key is `tpm-migration.key`. Both files are located in `/var/tpm/system/`.

e. Record the migration key PIN that you created in Step d.

You will need the PIN in "Install an SPP" on page 244.

f. Verify that the files were created today.

```
$ ls -la /var/tpm/system/
...
-rw------- 1 root root 563 current_date time tpm-migration.dat
-r-------- 1 root root 1766 current_date time tpm-migration.key
```

3. **In Oracle ILOM, stop the PDomain that contains the SPP.**

   a. **Determine which DCU owns the SPP by referring to the fault report displayed in** Step 1**.**

      In the line that lists the name of the faulted SPP (`/SYS/SPP`*y*), *y* is the DCU number.

   b. **Determine which PDomain owns the DCU.**

```
-> show /System/DCUs/DCU_y host_assigned
    /System/DCUs/DCUy
    Properties:
    host_assigned = HOSTz
```

   c. **Stop the PDomain.**

```
-> stop /Servers/PDomains/PDomain_x/HOST
```

4. **Stop the SPP.**

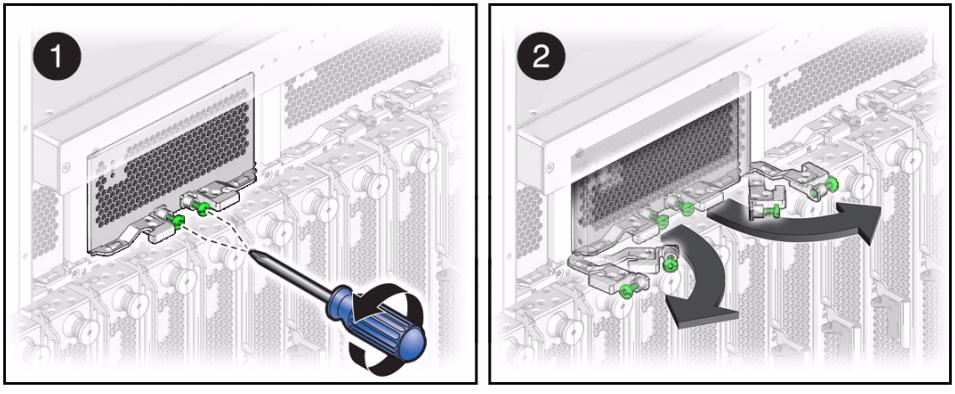
```
-> stop /SYS/SPPy
```

   In approximately two minutes, this step halts the SPP, turns off the service processor OK LED, and lights the Ready to Remove LED.

5. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

6. **Remove the SPP.**

   a. **Use a T25 Torx screwdriver to loosen the captive screws (1) on the extraction levers.**



   b. **Swing the extraction levers 90 degrees out.**

c. **Pull the SPP out of the slot.**

   Place it on a static-safe mat.

7. **Determine your next step.**
   - To replace the battery in the SPP, see "Replace an SPP Battery" on page 240.
   - To install an SPP into the server, see "Install an SPP" on page 244.

Related Information

- "SPP Configuration" on page 233
- "SPP LEDs" on page 235
- "Check an SPP Battery" on page 236
- "Replace an SPP Battery" on page 240
- "Install an SPP" on page 244

▼ Replace an SPP Battery

Each SPP has a battery.

1. **Check the state of the battery.**

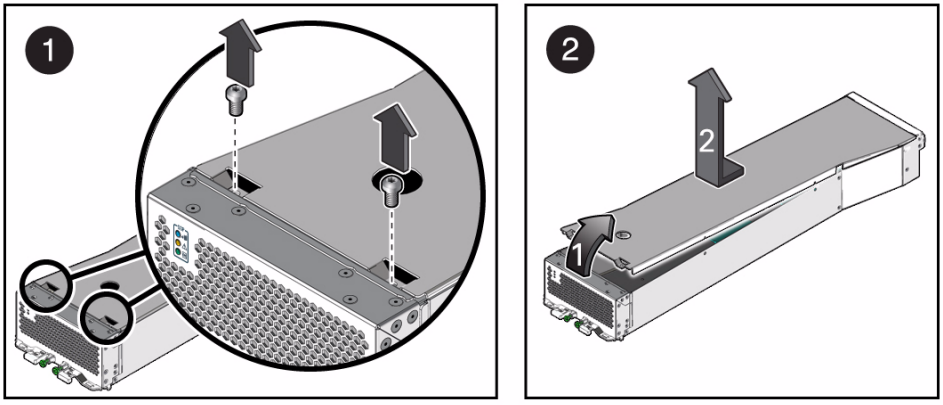
   See "Check an SPP Battery" on page 236.

2. **If the battery is faulty, remove the service processor.**

   See "Remove an SPP" on page 237.

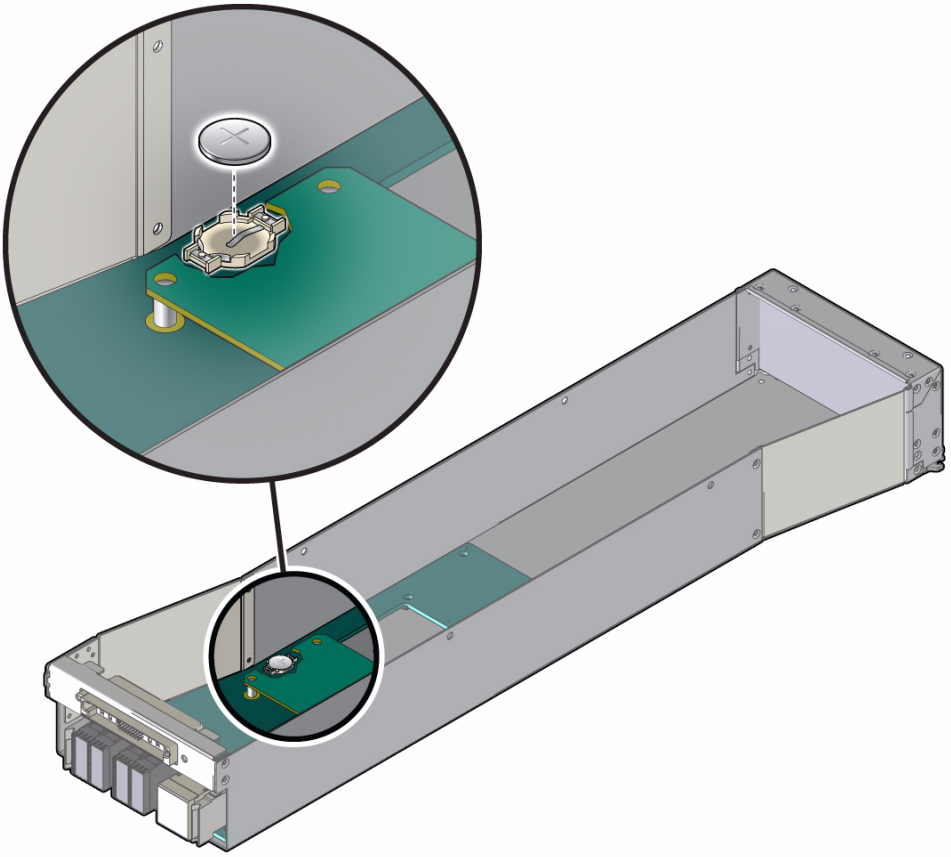
3. **Remove the cover from the service processor.**

   a. **Remove two T20 Torx screws from the front of the cover (panel 1).**



b. Raise the front of the cover, then pull it toward you to lift it off (panel 2).

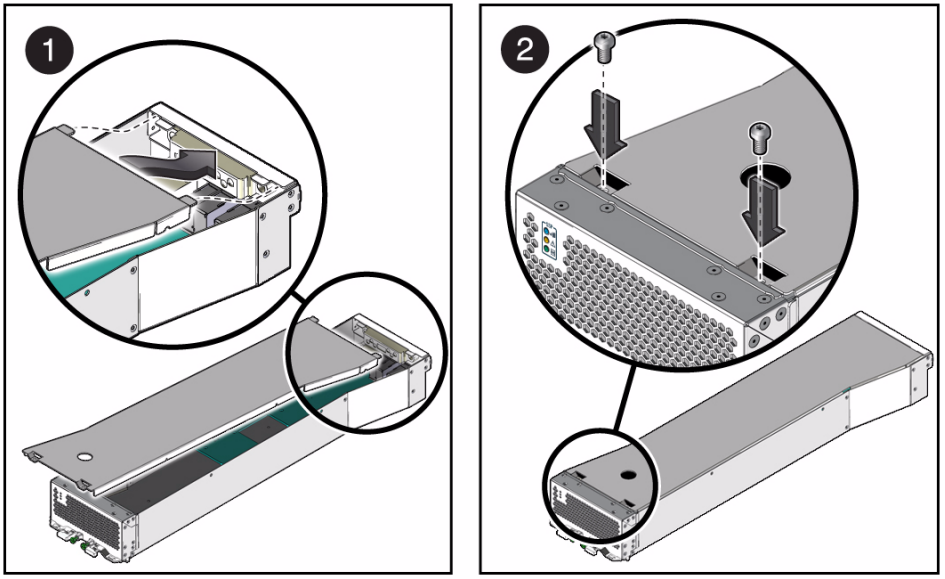
4. **Use a small flat screwdriver or similar tool to carefully pry the battery out of the battery holder.**



5. **To insert the new battery, press it straight down into the battery holder.**
   The positive side of the battery faces up.

6. **Install the cover.**

   a. **Slide the rear edge of the cover into place at the rear of the case (panel 1).**



   b. **Secure the front of the cover with two T20 Torx screws (panel 2).**

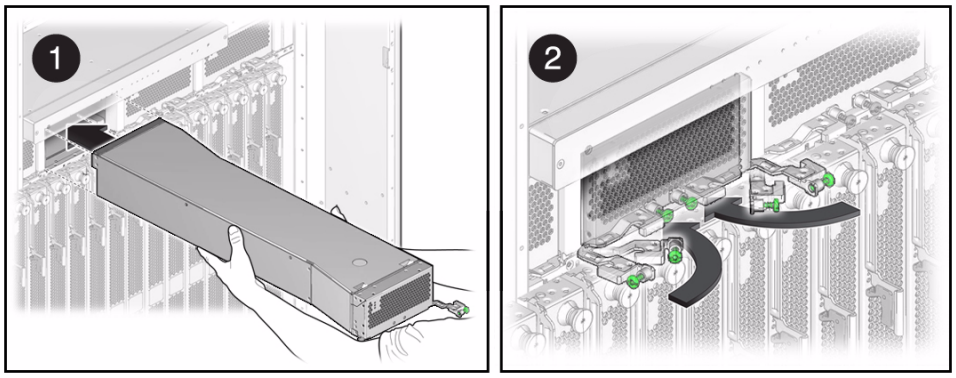
      Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

Related Information

- "Check an SPP Battery" on page 236
- "Remove an SPP" on page 237
- "Install an SPP" on page 244
- "SPP Configuration" on page 233
- "SPP LEDs" on page 235

▼ Install an SPP

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Use a T25 Torx screwdriver to loosen the captive screws on the extraction levers.**



3. **Swing the extraction levers out 90 degrees.**
4. **Insert the SPP in the slot and push it until the extraction levers touch the edge of the slot and start to swing closed.**
5. **Push the SPP and close the extraction levers to seat the module.**
6. **Fasten the locking screws.**

   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.
7. **Start the SPP.**

```
-> start /SYS/SPPx
```

8. **Start the PDomain host.**

```
-> start /Servers/PDomains/PDomain_y/HOST
```

9. **Determine your next step.**
   - If you determined in "Remove an SPP" on page 237 that TPM is in use on the system, continue at Step 10.
   - If TPM is not in use, go to Step 11.

10. **Set up TPM if it is not already running in the PDomain.**

    a. **Enable the TPM `tcsd` daemon.**

```
$ svcadm enable svc:/application/security/tcsd
```

    b. **Initialize TPM.**

Note – To perform the following steps you will need the TPM owner's PIN and the migration key PIN that you created in "Remove an SPP" on page 237.

```
$ tpmadm init
Enter TPM Owner PIN:
Confirm TPM Owner PIN:
```

    c. **Verify that TPM has been initialized and the TPM keystore is available.**

```
$ tpmadm keyinfo
[SYSTEM] 00000000-0000-0000-0000-000000000001 (loaded)
[SYSTEM] 00000000-0000-0000-0000-00000000000b
```

    - If you see the migratable root key under the storage root key, the TPM keystore is available on the PDomain-SPP. Go to Step 11.
    - If you do not see the migratable root key, the replacement SPP is the PDomain-SPP in a single-DCU PDomain. Continue at Step d.

    d. **Copy TPM data and the TPM key to the SPP.**

```
$ tpmadm migrate import
Enter TPM Owner PIN:
Enter PIN for the migration key:
```

    e. **Verify that the information was written to the SPP.**

```
$ tpmadm keyinfo
[SYSTEM] 00000000-0000-0000-0000-000000000001 (loaded)
[SYSTEM] 00000000-0000-0000-0000-00000000000b
$ tpmadm keyinfo 00000000-0000-0000-0000-00000000000b
Key Size: 2048 bits
...
TPM key blob:
01 01 00 00 00 11 00 00   00 02 00 00 00 00 01 00
...
```

11. **Restart the PDomain.**

    See "Restart a PDomain" on page 487.

12. **Return the replaced component to Oracle.**

    See "Reconnect AC Power to the Server" on page 483.

Related Information

- "Remove an SPP" on page 237
- "Replace an SPP Battery" on page 240
- "SPP LEDs" on page 235
- "SPP Configuration" on page 233

Servicing CMUs

CMUs are hot-pluggable components. See “CMU Cage Component Locations” on page 14 for the location of CMUs.

Caution – The CMU is very susceptible to ESD damage. Use an antistatic wrist strap when working with the CMU. Use a grounded antistatic mat, particularly when opening a packaged CMU.

Caution – The CMU is heavy. A fully-loaded CMU weighs 56 lbs (25.5 kg).

Note – Before installing SPARC M6 CMUs into a SPARC M5-32 server, see “CMU Configuration” on page 250.

Description	Links
Understand CMU configuration	“CMU Configuration” on page 250
Understand DIMM configuration	“Memory Configuration” on page 271
Understand CMU LEDs	“CMU LEDs” on page 252
Replace a faulty CMU	“Display General CMU Information” on page 253
	“CMU LEDs” on page 252
	“Remove a CMU” on page 257
	“Move DIMMs to a New CMU” on page 286
	“Install a CMU” on page 260
	“Repack a CMU for Shipping” on page 264

Description	Links
Replace a faulty DIMM	"CMU LEDs" on page 252
	"Locate a Faulty DIMM" on page 281
	"Display General CMU Information" on page 253
	"Remove a CMU" on page 257
	"DIMM Fault Remind Button" on page 282
	"Remove a DIMM" on page 283
	"Install a DIMM" on page 285
	"Install a CMU" on page 260
Increase memory on a CMU	"Memory Configuration" on page 271
	"CMU LEDs" on page 252
	"Remove a CMU" on page 257
	"Install a DIMM" on page 285
	"Install a CMU" on page 260
Reduce memory on a CMU	"Memory Configuration" on page 271
	"CMU LEDs" on page 252
	"Remove a CMU" on page 257
	"Remove a DIMM" on page 283
	"Install a CMU" on page 260
Move DIMMs to a new CMU	"CMU LEDs" on page 252
	"Remove a CMU" on page 257
	"Move DIMMs to a New CMU" on page 286
	"Install a CMU" on page 260
Add CMUs to a DCU	"CMU Configuration" on page 250
	"Memory Configuration" on page 271
	"Remove a CMU Filler Panel" on page 267
	"Install a DIMM" on page 285
	"Install a CMU" on page 260

Description	Links
Upgrade CMUs in a SPARC M5-32 server	"CMU Upgrades in a SPARC M5-32 Server" on page 251
	"Display the CMU Quantity and Type" on page 255
	"CMU LEDs" on page 252
	"Remove a CMU" on page 257 or
	"Remove a CMU Filler Panel" on page 267
	"Move DIMMs to a New CMU" on page 286
	"Install a CMU" on page 260
Remove CMUs from a DCU	"CMU LEDs" on page 252
	"Display General CMU Information" on page 253
	"Remove a CMU" on page 257
	"Install a CMU Filler Panel" on page 268

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

CMU Configuration

You can configure the server with `PDomains` or `Bounded PDomains`.

A Bounded PDomain can have from zero to four CMUs, using any combination of CMU slots in a DCU.

By default, factory configurations use PDomains, where DCUs are either fully-populated (four CMUs), half-populated (two CMUs), or empty (zero CMUs). For half-populated DCUs, the factory installs CMUs in the first and fourth CMU slots in a DCU (for example, `CMU0` and `CMU3` in DCU0).

For more information about PDomains and Bounded PDomains, refer to *Server Administration*, DCU, CMU, and CMP Guidelines.

Other half-populated configurations are supported on PDomains but have these limitations.

CMU Slots for Half-populated Configurations	Example	PCIe Slots	EMS Slots	rKVMS Support
First and fourth (default)	`CMU0`, `CMU3`	All available	All available	Yes, with redundant paths
Second and third	`CMU1`, `CMU2`	All available	All available	Yes, with no redundancy
First and second	`CMU0`, `CMU1`	Some not available	Some not available	Yes, with redundant paths
Third and fourth	`CMU2`, `CMU3`	Some not available	Some not available	Not available

In a PDomain, if a CMU fails in a half-populated DCU, the DCU can lose access to PCIe slots, EMS slots, and SSBs. Refer to *Server Administration*, PCIe and EMS slot information.

Caution – To prevent overheating, fill unused CMU slots with CMU filler boards. This rule does not apply to a DCU that has been temporarily halted for service.

Related Information

- *Server Administration*, DCU, CMU, and CMP guidelines
- "Memory Configuration" on page 271

CMU Upgrades in a SPARC M5-32 Server

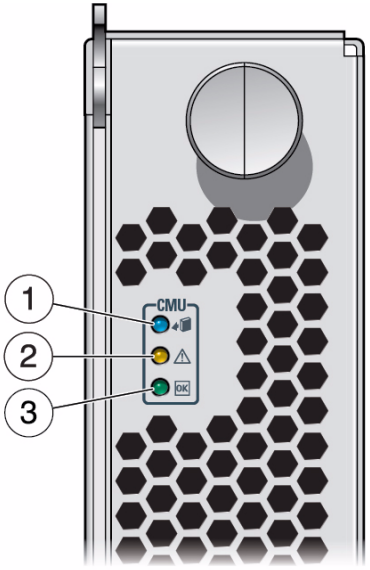
You can mix SPARC M5 CMUs and SPARC M6 CMUs in a server, but all CMUs in a DCU must be the same type. Refer to *Server Administration*, DCU configuration.

Note – To use SPARC M6 CMUs in a SPARC M5-32 server, you must download new firmware. Refer to *Server Product Notes*, upgrading the SPARC M5-32 server.

Related Information

- "Scalability, DCUs, and PDomains" on page 21
- "CMU Configuration" on page 250
- "Memory Configuration" on page 271
- "Display General CMU Information" on page 253
- "Remove a CMU Filler Panel" on page 267
- "Remove a CMU" on page 257
- "Move DIMMs to a New CMU" on page 286
- "Install a CMU" on page 260
- "Repack a CMU for Shipping" on page 264

CMU LEDs



No.	LED	Icon	Description
1	Ready to Remove (blue)		Indicates that a CMU can be removed during a hot-service operation.
2	Service Required (amber)		Indicates that service is required. The `show faulty` command provides details about any faults that cause this indicator to light.
3	Power OK (green)	OK	Indicates these conditions: • **Off –** CMU is not running in its normal state. • **Steady on –** CMU is powered on and running normally.

Related Information

- "CMU Configuration" on page 250
- "Display General CMU Information" on page 253
- "Remove a CMU" on page 257
- "Install a CMU" on page 260
- "Remove a CMU Filler Panel" on page 267

■ "Install a CMU Filler Panel" on page 268

▼ Display General CMU Information

1. You can display all CMUs, DCUs, and PDomains in the server:

```
 -> show /Servers/PDomains/ -level 2 -t power_state
Target                          | Property                    | Value
 -------------------------------+-----------------------------+-------------------
/Servers/PDomains/PDomain_0/    | power_state                 | On
 HOST                           |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System                         |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU0               |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU0/CMU_0         |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU0/CMU_3         |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU1               |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU1/CMU_4         |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU1/CMU_7         |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU2               |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU2/CMU_8         |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU2/CMU_11        |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU3               |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU3/CMU_12        |                             |
/Servers/PDomains/PDomain_0/    | power_state                 | On
 System/DCUs/DCU3/CMU_15        |                             |
```

This example shows one PDomain that contains all four DCUs. Each DCU is half-populated, with two CMUs. The CMU slots that are not listed are empty.

2. **You can determine if a DCU is part of a PDomain:**

```
-> show /System/DCUs/DCU_x host_assigned
    /System/DCUs/DCUx
    Properties:
    host_assigned = HOST#
```

3. **You can list the CMUs in a DCU:**

```
-> show /System/DCUs/DCU_0/
   /System/DCUs/DCU_0/
    Targets:
       CMU_0
       CMU_3
...
```

A DCU can have two or four CMUs. In this example, `DCU_0` has two CMUs. Slots `CMU_1` and `CMU_2` are not listed, indicating they are unused slots.

Related Information

- "Display the CMU Quantity and Type" on page 255
- "CMU Configuration" on page 250
- "Remove a CMU" on page 257
- "Install a CMU" on page 260
- "Remove a CMU Filler Panel" on page 267

▼ Display the CMU Quantity and Type

Note – All CMUs in a DCU must be the same type. The mixing of SPARC M5 CMUs and SPARC M6 CMUs is allowed in a server but not within a DCU. Refer to *Server Administration*, DCU configuration information.

1. **Display the CMU FRU part numbers for your server.**

```
-> show -t  /SYS -d properties type=="CPU Memory Unit" fru_part_number
Target                        | Property                        | Value
------------------------------+---------------------------------+-----------
/SYS/CMU0                     | fru_part_number                 | part_number
/SYS/CMU1                     | fru_part_number                 | part_number
/SYS/CMU2                     | fru_part_number                 | part_number
...
```

2. **Determine the CMU quantity from the** `CMU`*x* **entries in the display.**

3. **Determine the CMU type(s).**

   Compare your FRU part numbers to those listed for SPARC M5-32 or SPARC M6-32 server in the handbook.

   a. **Refer to the** *Oracle System Handbook*.

      The handbook is available through My Oracle Support.

   b. **Go to the** `full components list` **section in the handbook.**

   c. **Find the CMU FRU part numbers in the subsection,** `system board`.

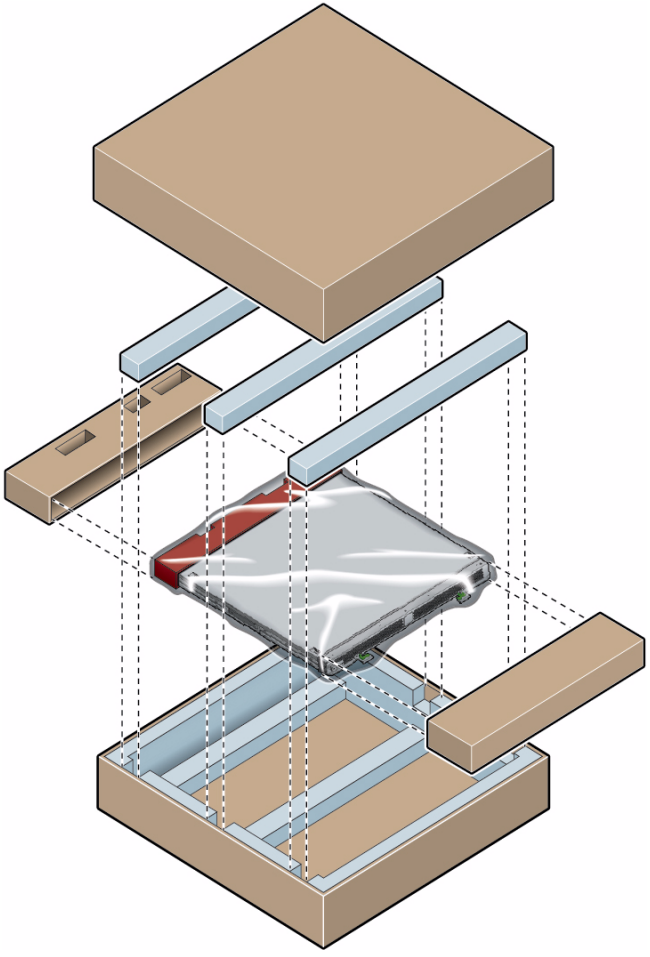
Related Information

- *Oracle System Handbook*, SPARC M5-32 full components list
- *Oracle System Handbook*, SPARC M6-32 full components list
- "Display General CMU Information" on page 253
- "CMU Configuration" on page 250
- "Remove a CMU" on page 257
- "Move DIMMs to a New CMU" on page 286

Unpacking and Inspecting a CMU

When you unpack a new CMU, do not discard the packaging materials. You must use these materials when returning a CMU to the factory. The potential for major damage is greatly increased if you do not properly pack the CMU.

Caution – Open the package on a grounded antistatic mat and use an antistatic wrist strap.



▼ Remove a CMU

Note – If a CMP module is faulty, replace the entire CMU.

1. **Display information about a CMU:**
   - You can display general information for CMUs.
     See "Display General CMU Information" on page 253.
   - You can find a SPARC M5 CMU to upgrade to a SPARC M6 CMU.
     See "Display the CMU Quantity and Type" on page 255.
   - You can find a faulty CMU with one of these commands:

```
-> show faulty
```

   or

```
-> show /System/Open_Problems
```

   See "View Log Files (Oracle ILOM)" on page 45 for examples.

2. **Determine how much memory is in the DCU or system.**
   You will need this information when restarting the PDomain.
   - You can count all of the DIMMs in the server.

```
-> show /System/Memory installed_dimms
   installed_dimms = 320
```

   - Alternatively, you can check the memory in a specific DCU.

```
-> show /System/DCUs/DCU_x cpu_summary memory_summary
   cpu_summary = Eight Oracle SPARC M6
   memory_summary = 8192 GB
```

3. **Stop the PDomain that contains the CMU.**
   a. **Determine which PDomain contains the CMU.**
      See "Display General CMU Information" on page 253.

b. Stop the PDomain.

```
-> stop /Servers/PDomains/PDomain_y/HOST
```

4. Light the blue Ready to Remove LED on the CMU (CMU*x*).

a. Light the LED:

```
-> set /SYS/CMUx prepare_to_remove_action=true
```

b. Verify that the LED is lit:

```
-> show /SYS/CMUx prepare_to_remove_status
    prepare_to_remove_status = Ready
```

c. Go to the server and locate the CMU displaying the lit blue Ready to Remove LED.

Note – If you change your mind and decide not to remove this component, execute the `return_to_service_action` command from the above path.

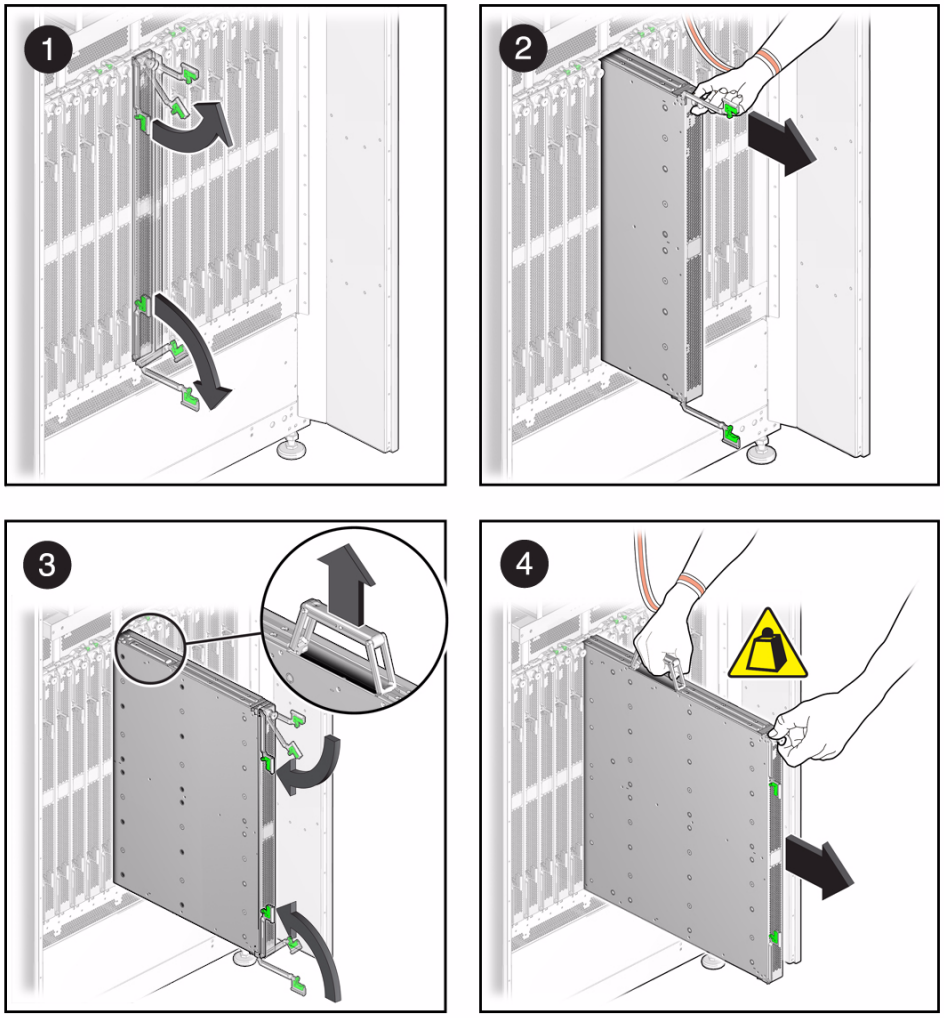
---

5. Use an antistatic wrist strap to protect the equipment from ESD damage.

A 12 ft (3.6 m) antistatic wrist strap is included with the replacement CMU.

6. **Remove the CMU.**

   a. **Squeeze the CMU extraction lever handles to unlock them and rotate the extraction levers to the horizontal position (panel 1).**



   b. **Pull the CMU out of the slot (panel 2) until the carrying handle is exposed.**

Caution – The CMU is heavy. A fully-loaded CMU weighs 56 lbs (25.5 kg).

   c. **Unfold the carrying handle at the top of the CMU (panel 3).**

d. Holding the carrying handle and the extraction knob, pull the CMU out of the slot (panel 4).

e. Place the CMU on a static-safe mat.

7. Determine your next step:

- To replace a DIMM, see "Remove a DIMM" on page 283.
- To upgrade DIMMs, see "Install a DIMM" on page 285
- To install a new CMU, see "Move DIMMs to a New CMU" on page 286.
- To install a CMU filler panel, see "Install a CMU Filler Panel" on page 268.

Related Information

- "CMU Configuration" on page 250
- "CMU LEDs" on page 252
- "Display General CMU Information" on page 253
- "Install a CMU" on page 260
- "Repack a CMU for Shipping" on page 264
- "Remove a CMU Filler Panel" on page 267
- "Install a CMU Filler Panel" on page 268

▼ Install a CMU

Note – The CMU replacement kit includes plastic covers to protect CMU connectors. Do not discard the covers. The covers are to be returned to Oracle.

1. Use an antistatic wrist strap to protect the equipment from ESD damage.

Caution – The CMU is very susceptible to ESD damage. Use an antistatic wrist strap when working with the CMU. Use a grounded antistatic mat, particularly when opening a packaged CMU.

2. Unpack the CMU on a static-safe mat.

A new CMU does not have DIMMs. The DIMMs from the old CMU will be transferred to the new CMU in this procedure.

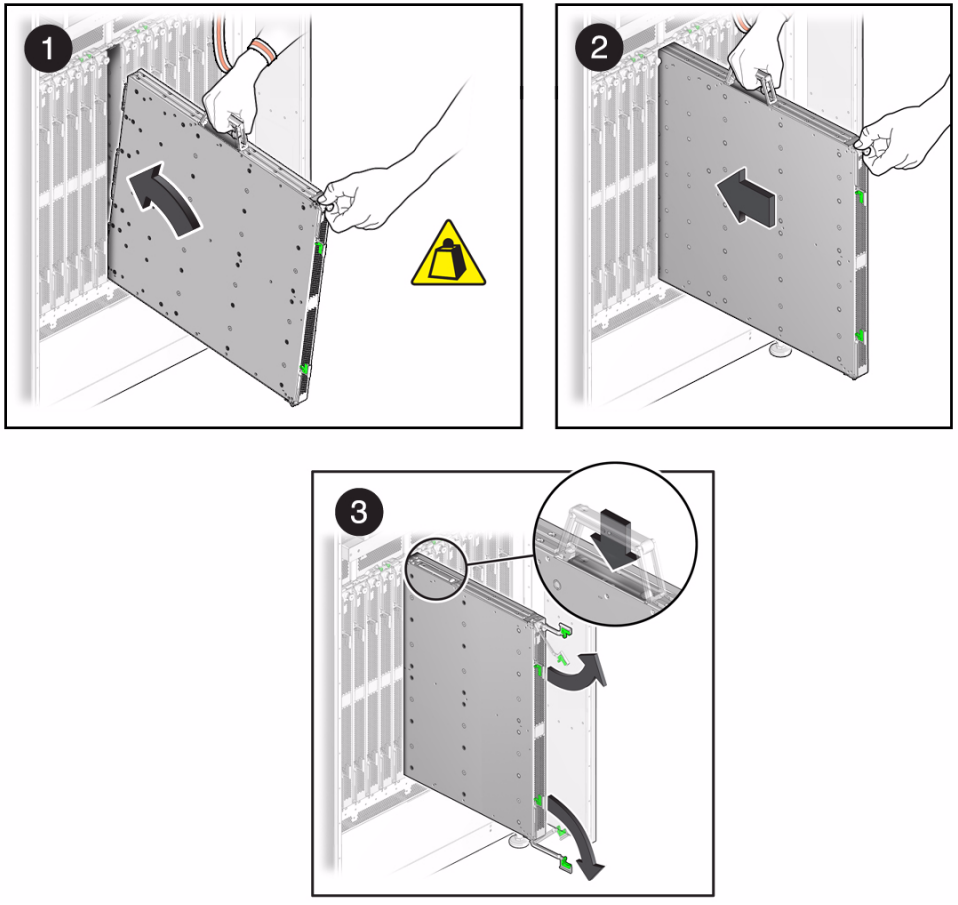
Caution – A CMU is heavy. Without DIMMs, a CMU weighs 44.4 lbs (20.1 kg). A fully-loaded CMU weighs 56 lbs (25.5 kg).

3. **Transfer DIMMs from the old CMU to the new CMU.**

   See "Move DIMMs to a New CMU" on page 286.

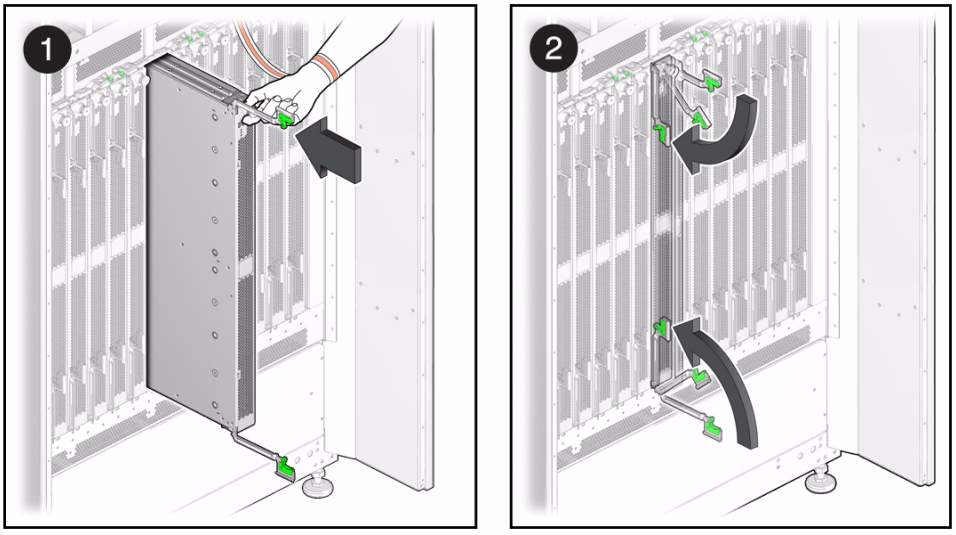
4. **Transfer the plastic covers from the connectors on the new CMU to the connectors on the old CMU.**

5. **Unfold the CMU carrying handle (panel 1) and use the carrying handle and the extraction knob to place the CMU in the slot (panel 2).**



6. **Fold the carrying handle down into the top of the CMU (panel 3).**

7. **Squeeze the levers of the extraction lever handles and rotate the extraction lever levers to the fully horizontal position (panel 1).**



8. **Use the extraction knob to slide the CMU into the slot until CMU nears the end of the slot and the extraction levers start to close (panel 2).**
9. **Close the extraction levers to the vertical (locked) position.**
10. **Verify that the server recognizes the CMU.**
    a. **Wait approximately five to seven minutes for the system to detect the CMU.**

Note – Do not rely on checking the events list. The DIMMs on the CMU **will not appear** in the list unless they were moved to different slot numbers.

---

    b. **After the waiting period, verify that the DIMMs are recognized.**

    Use the DIMM or DCU information that you determined in "Remove a CMU" on page 257.

    - Check the entire server if you know how many DIMMs should be present.

```
-> show /System/Memory installed_dimms
   installed_dimms = 320
```

- Alternatively, check the DCU if you know the total memory in the DCU.

```
-> show /System/DCUs/DCU_x cpu_summary memory_summary
   cpu_summary = Eight Oracle SPARC M6
   memory_summary = 8192 GB
```

11. **Restart the PDomain.**

    See "Restart a PDomain" on page 487.

12. **Return the CMU to Oracle.**

    See "Repack a CMU for Shipping" on page 264.

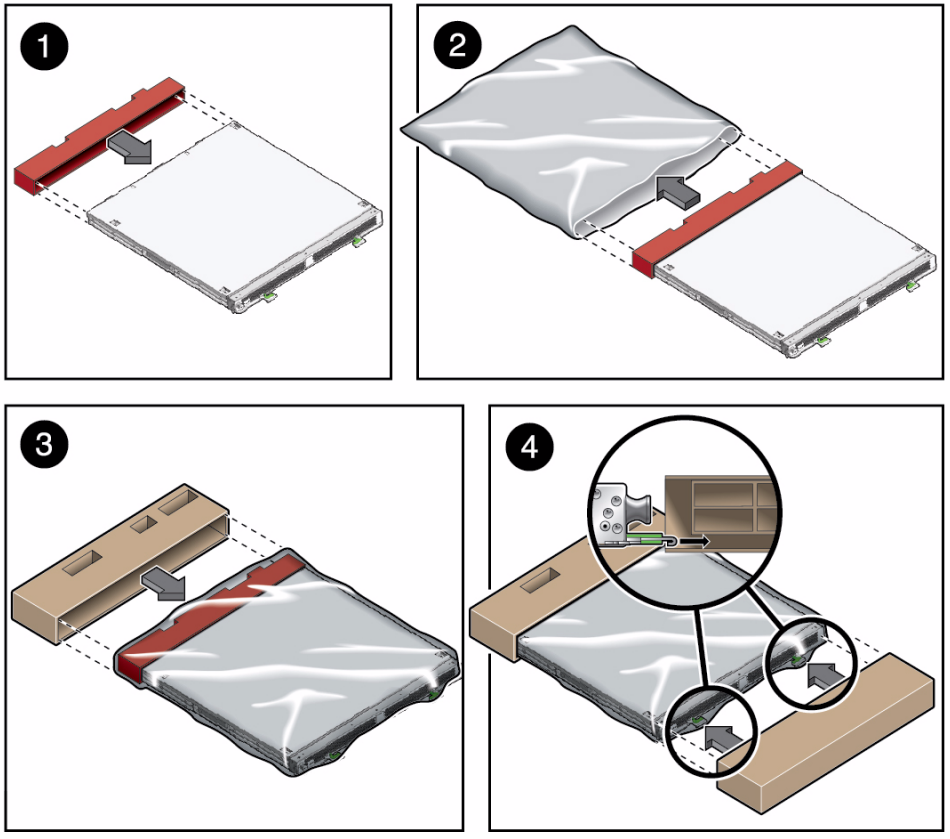
Related Information

- "CMU Configuration" on page 250
- "CMU LEDs" on page 252
- "Display General CMU Information" on page 253
- "Remove a CMU" on page 257
- "Repack a CMU for Shipping" on page 264
- "Remove a CMU Filler Panel" on page 267
- "Install a CMU Filler Panel" on page 268

▼ Repack a CMU for Shipping

1. **Place the end cap on the rear of the CMU (panel 1).**

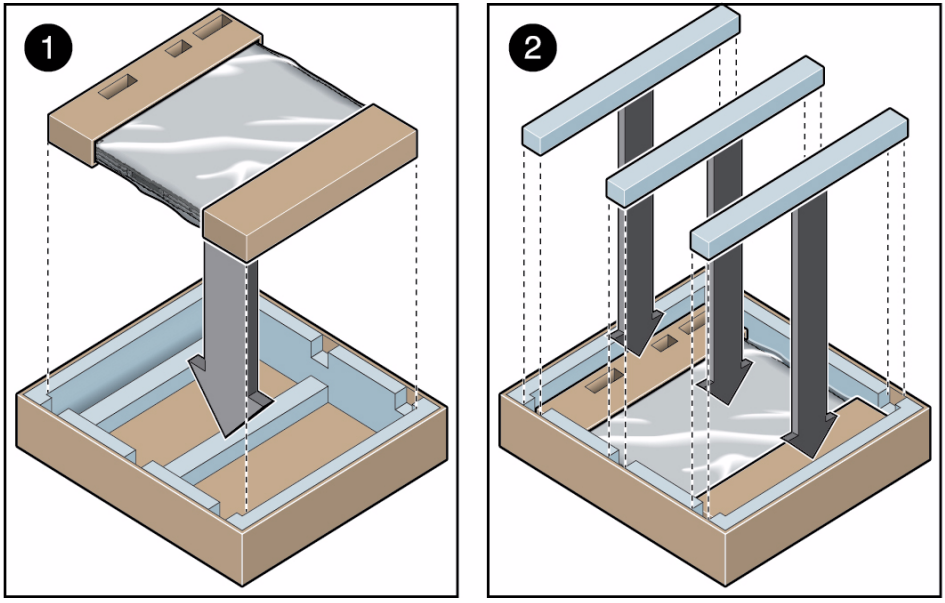
   Note that one end of the cap has holes for guide pins.



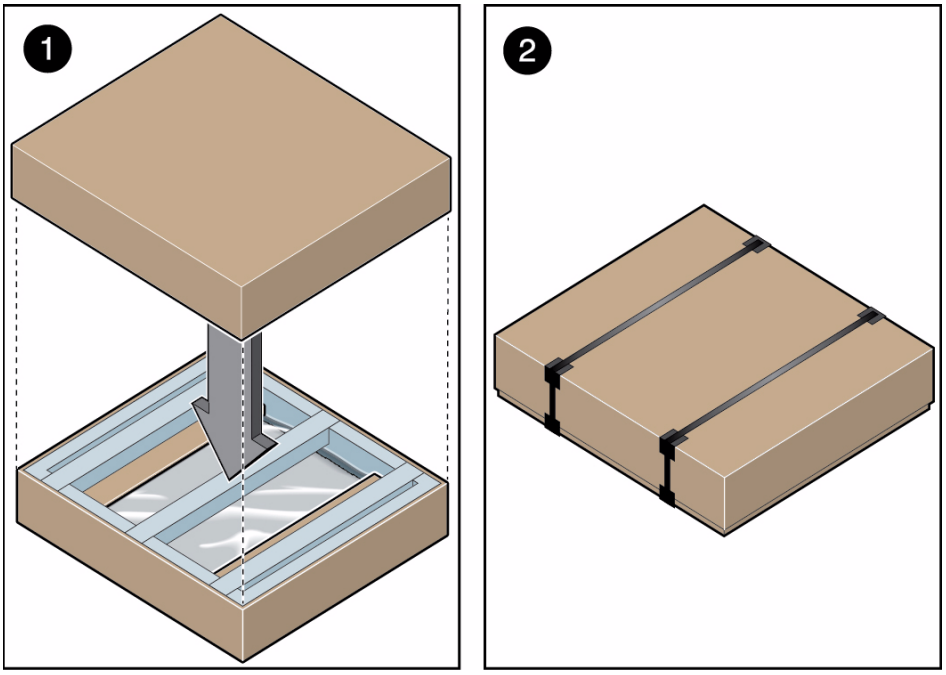
2. **Wrap the CMU in an antistatic bag or antistatic sheet (panel 2).**
3. **Place the corrugated end cover on the rear of the CMU (panel 3).**

   The cover is keyed to install in only one direction.
4. **Place the corrugated front cover on the CMU so that the green extraction levers fit into slots in the cover.**

5. **Place the CMU in the shipping box (panel 1), and install three plastic foam bars on top of the CMU (panel 2).**



6. **Cover the box (panel 1), and seal it with plastic strapping or sealing tape (panel 2).**



7. **Return the CMU to Oracle.**

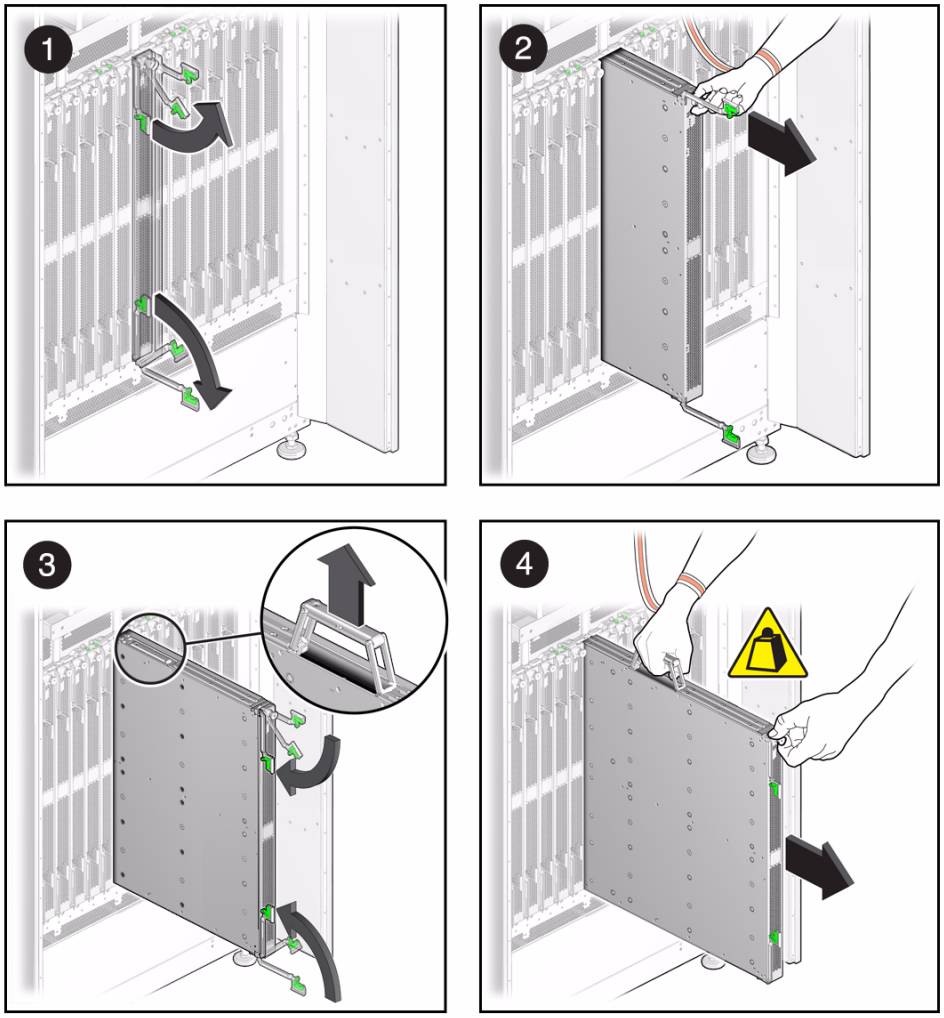
   See "Return a Component to Oracle" on page 488.

Related Information

- "CMU Configuration" on page 250
- "CMU LEDs" on page 252
- "Display General CMU Information" on page 253
- "Remove a CMU" on page 257
- "Install a CMU" on page 260
- "Remove a CMU Filler Panel" on page 267
- "Install a CMU Filler Panel" on page 268

▼ Remove a CMU Filler Panel

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Squeeze the CMU filler panel extraction lever handles to unlock them and rotate the extraction levers to the horizontal position (panel 1).**



3. **Pull the CMU filler panel out of the slot (panel 2) until the carrying handle is exposed.**

4. **Unfold the carrying handle at the top of the CMU (panel 3).**
5. **Holding the carrying handle and the extraction knob, pull the filler panel out of the slot (panel 4).**

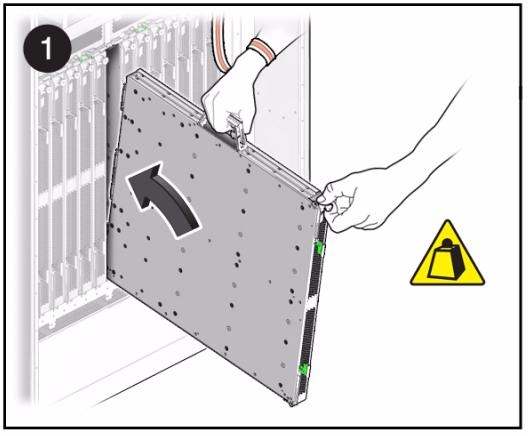
Related Information

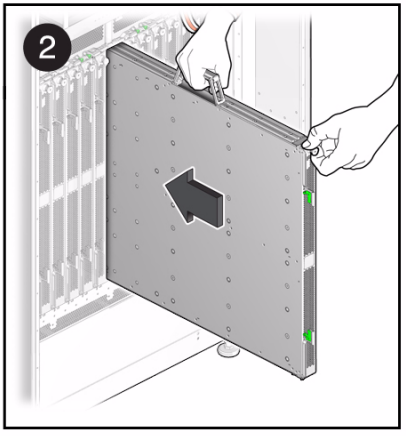
- "CMU Configuration" on page 250
- "CMU LEDs" on page 252
- "Display General CMU Information" on page 253
- "Remove a CMU" on page 257
- "Install a CMU" on page 260
- "Install a CMU Filler Panel" on page 268
- "Repack a CMU for Shipping" on page 264

▼ Install a CMU Filler Panel

Fill an empty CMU slot to avoid overheating the server.

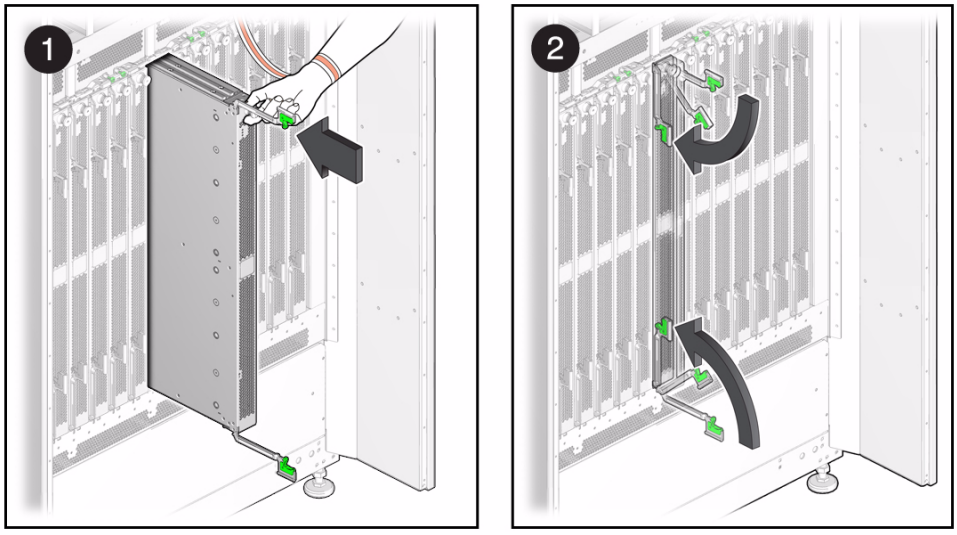
1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Unfold the CMU filler panel carrying handle (panel 1) and use the carrying handle and the extraction knob to place the CMU filler panel in the slot (panel 2).**





3. **Fold the carrying handle down into the top of the CMU filler panel.**

4. **Squeeze the levers of the extraction lever handles and rotate the extraction lever levers to the fully horizontal position (panel 1).**



5. **Use the extraction knob to slide the CMU filler panel into the slot until the filler panel nears the end of the slot and the extraction levers start to close (panel 2).**
6. **Close the extraction levers to the vertical (locked) position.**
7. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "CMU Configuration" on page 250
- "CMU LEDs" on page 252
- "Display General CMU Information" on page 253
- "Remove a CMU" on page 257
- "Install a CMU" on page 260
- "Remove a CMU Filler Panel" on page 267
- "Repack a CMU for Shipping" on page 264

Servicing DIMMs

DIMMs are hot-service components. See "DIMM FRU Names" on page 279 for the location of DIMMs on a CMU.

Related Information

Memory Configuration

The following sections describe memory installation in this server.

Cascaded DIMMs

The term "cascade" refers to the flow of data from the odd-numbered memory buffers to and from the even-numbered memory buffers, as shown in the figure in "DIMM Slot Numbering" on page 274. The odd-numbered memory buffers are on the left side of the figure, along with the DIMM slots that they control.

Related Information

- "Limitations on Mixing DIMMs" on page 273
- "DIMM FRU Names" on page 279
- "Locate a Faulty DIMM" on page 281
- "Remove a DIMM" on page 283
- "Install a DIMM" on page 285
- "Move DIMMs to a New CMU" on page 286

Limitations on Mixing DIMMs

These general rules apply to DIMM installation:

- All DIMMs on a CMU must be the same size and type.
- DIMMs of different capacities can be used in the same server with the limitation that all DIMMs in a CMU must have the same capacity.

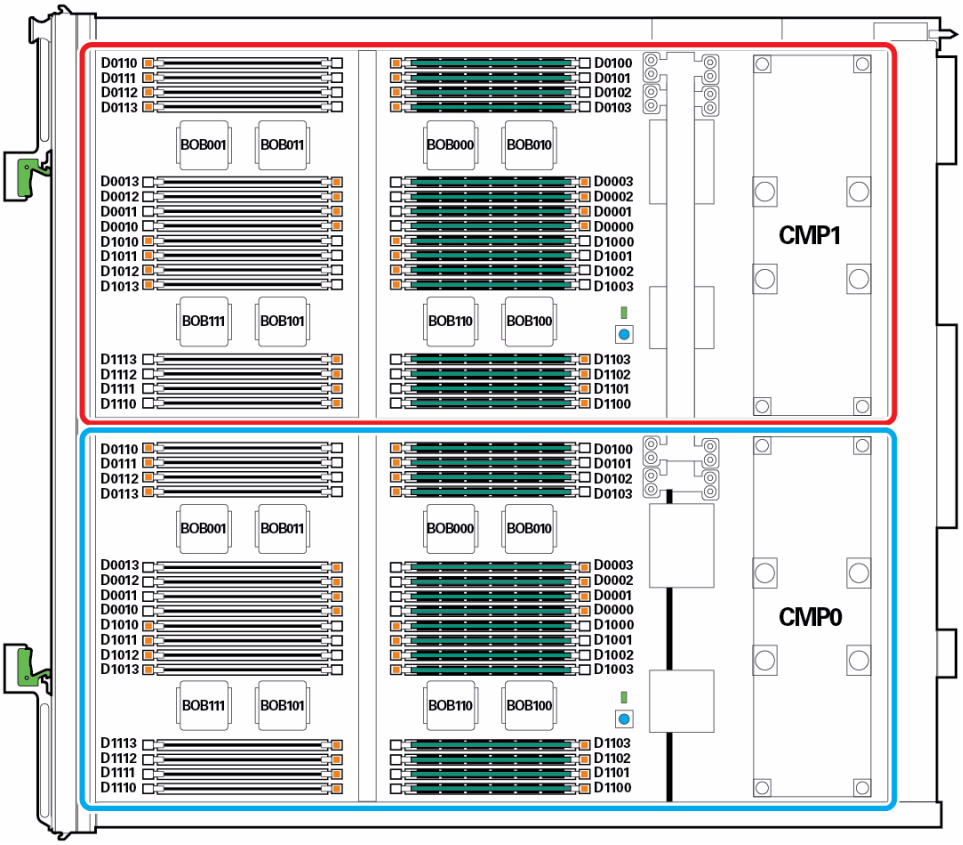
Related Information

- "Cascaded DIMMs" on page 272
- "DIMM Slot Numbering" on page 274
- "DIMM FRU Names" on page 279
- "Locate a Faulty DIMM" on page 281
- "Remove a DIMM" on page 283
- "Install a DIMM" on page 285
- "Move DIMMs to a New CMU" on page 286

DIMM Slot Numbering

A CMU is divided into lower and upper halves, as shown below.

- CMP0 and its DIMM slots are outlined in blue. Note that CMP 0 is in the lower half of the CMU.
- CMP1 and its DIMM slots are outlined in red. CMP 1 is in the upper half of the CMU.



Both sets of DIMM slots use the same numbering system (D0000 to D1113), so to specify the exact location of a DIMM, all of the following information must be provided:

- DIMM slot number (D0000 to D1113)
- CMP module number (CMP0 to CMP1)
- CMU board number (CMU0 to CMU15)

For example, this error message identifies faulty DIMMs on two different CMUs.

```
2012-09-06/17:16:20  ereport.hc.dev_fault@/SYS/CMU5/CMP0/D1111
2012-09-06/17:16:20  ereport.hc.dev_fault@/SYS/CMU8/CMP1/D1113
```

In the first line, DIMM D1111 is located by CMP0 on CMU5.

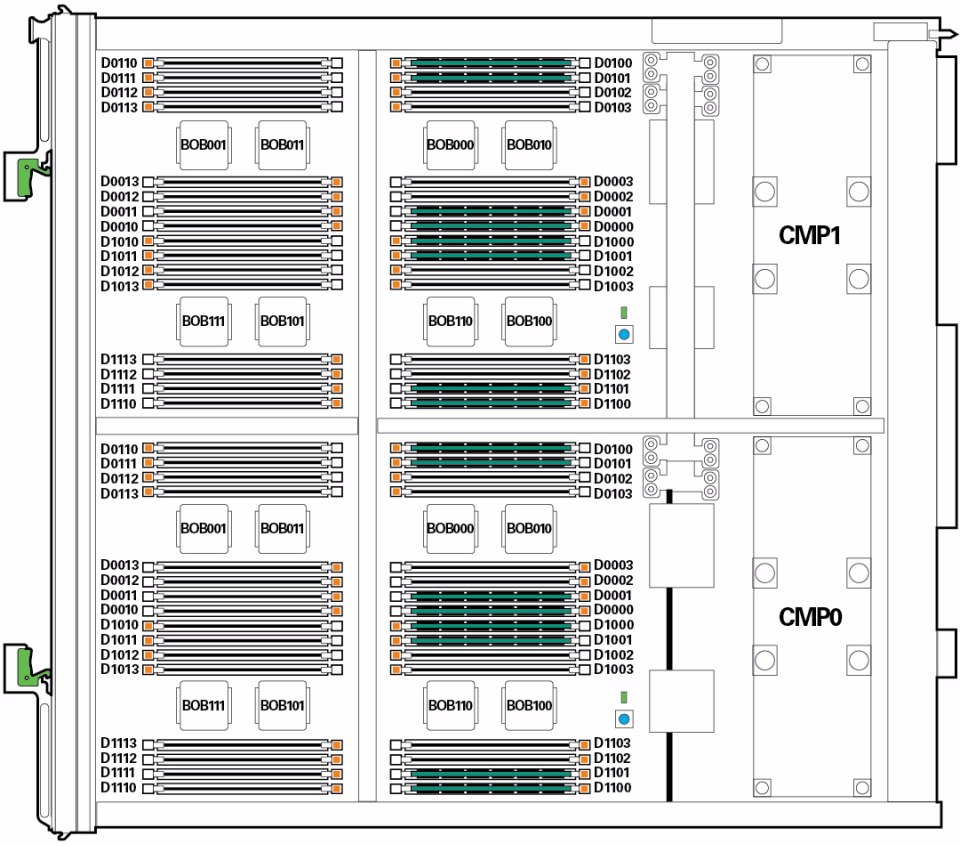
In the second line, DIMM D1113 is located by CMP1 on CMU8.

Related Information

- "Limitations on Mixing DIMMs" on page 273
- "Quarter-Populated Memory" on page 276
- "DIMM FRU Names" on page 279
- "Locate a Faulty DIMM" on page 281
- "Remove a DIMM" on page 283
- "Install a DIMM" on page 285
- "Move DIMMs to a New CMU" on page 286

Quarter-Populated Memory

For a CMU with quarter-populated memory, use the DIMM slots marked in green.

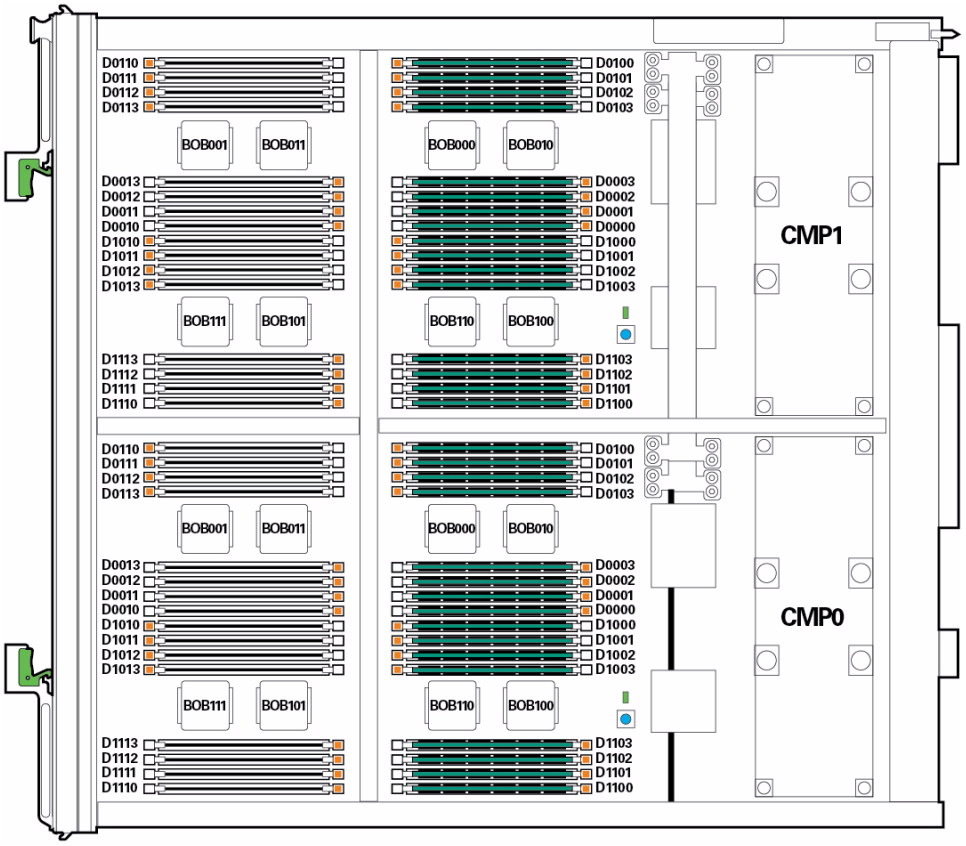


Related Information

- “DIMM Slot Numbering” on page 274
- “Half-Populated Memory” on page 277
- “DIMM FRU Names” on page 279
- “Locate a Faulty DIMM” on page 281
- “Remove a DIMM” on page 283
- “Install a DIMM” on page 285
- “Move DIMMs to a New CMU” on page 286

Half-Populated Memory

For a CMU with half-populated memory, use the DIMM slots marked in green.

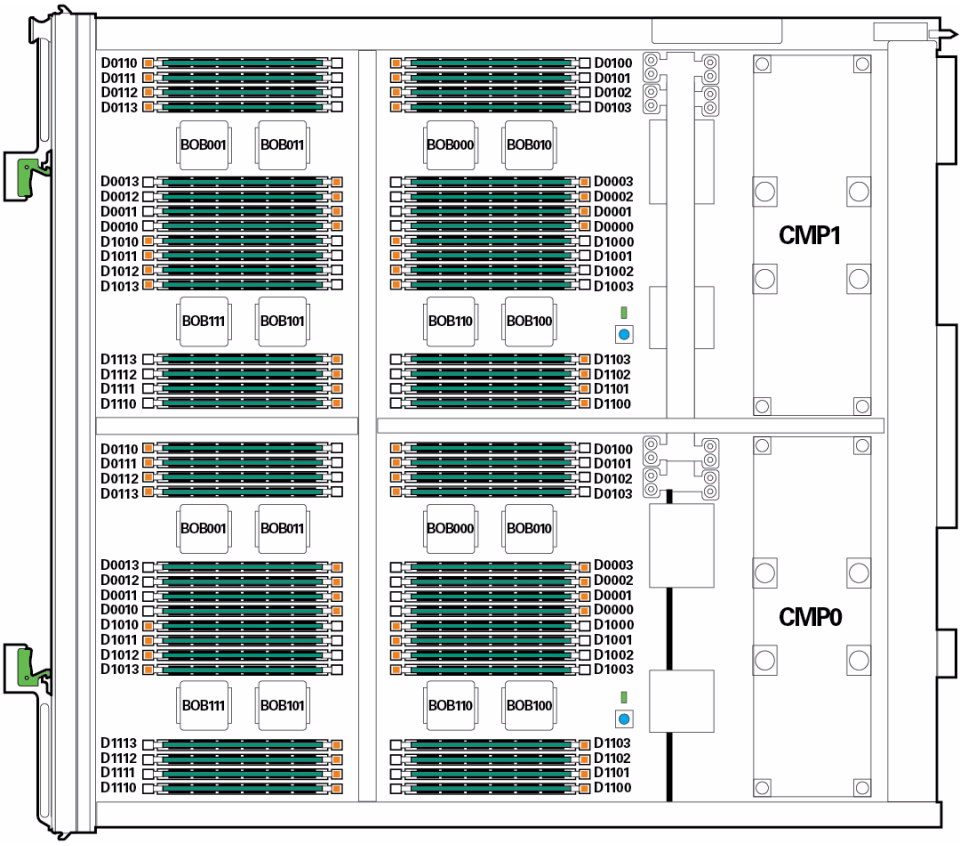


Related Information

- "Quarter-Populated Memory" on page 276
- "Fully-Populated Memory" on page 278
- "DIMM FRU Names" on page 279
- "Locate a Faulty DIMM" on page 281
- "Remove a DIMM" on page 283
- "Install a DIMM" on page 285
- "Move DIMMs to a New CMU" on page 286

Fully-Populated Memory

In a fully-populated CMU, all of the DIMM slots are filled.



Related Information

- "Servicing CMUs" on page 247
- "DIMM FRU Names" on page 279
- "Locate a Faulty DIMM" on page 281
- "Remove a DIMM" on page 283
- "Install a DIMM" on page 285
- "Move DIMMs to a New CMU" on page 286

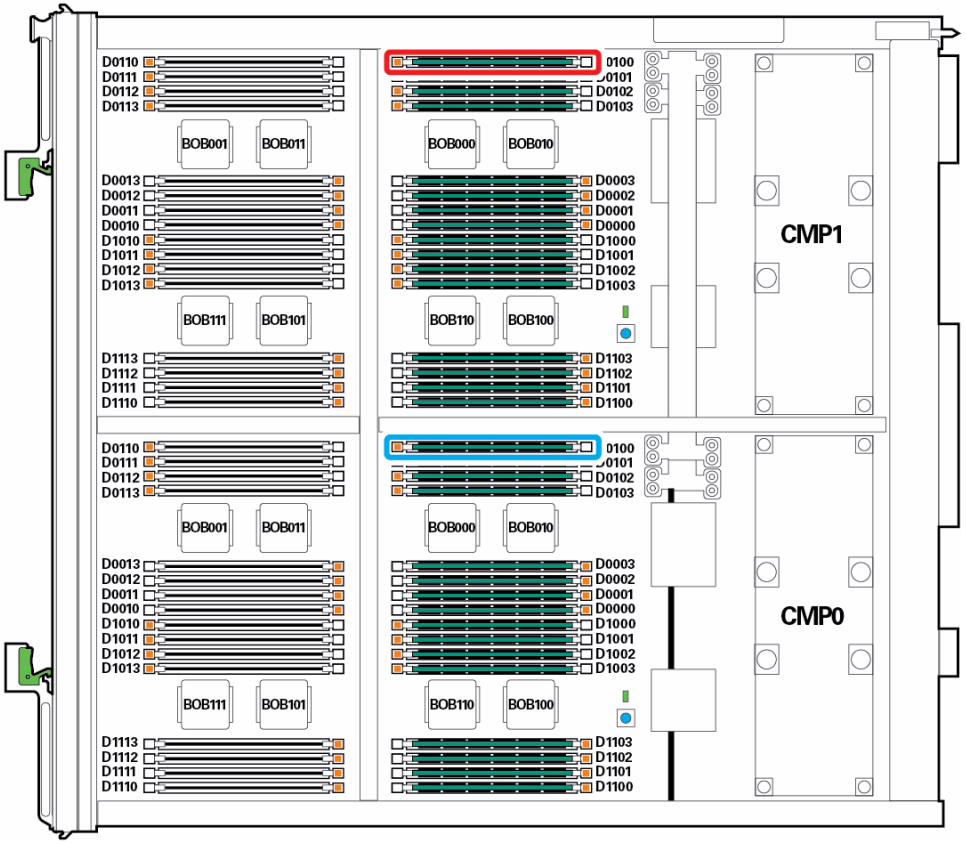
DIMM FRU Names

DIMM FRU names are based on three terms:

- The DIMM slot number (D0000 to D1113)
- The CMP module number (CMP0 to CMP1)
- The CMU number (CMU0 to CMU15)

For example, the DIMM slot number outlined in red below is D0100 and belongs to processor module CMP1. If the CMU is in slot 15, the FRU name for the DIMM slot is:

```
/SYS/CMU15/CMP1/D0100
```



CMP0 also has a DIMM slot D0100 (outlined in blue). The FRU name for this DIMM is almost the same as in the example above:

```
/SYS/CMU15/CMP0/D0100
```

Note that the CMP number differs from the previous example.

Related Information

- "Memory Configuration" on page 271
- "Locate a Faulty DIMM" on page 281
- "DIMM Fault Remind Button" on page 282
- "Remove a DIMM" on page 283
- "Install a DIMM" on page 285
- "Move DIMMs to a New CMU" on page 286

▼ Locate a Faulty DIMM

- **Use Oracle ILOM commands to display faulty components:**

```
-> show faulty
Target                    | Property        | Value
--------------------------+-----------------+----------------------
...
/SP/faultmgmt/1           | fru             | /SYS/CMU4/CMP0/D0000
/SP/faultmgmt/1/faults/0| class           | fault.memory.dimm
/SP/faultmgmt/1/faults/0| sunw-msg-id     | SPSUN4V-8000-CQ
/SP/faultmgmt/1/faults/  | component       | /SYS/CMU4/CMP0/D0000
/SP/faultmgmt/1/faults/  | uuid            | 99209d8f-38ce-e9dc-95fd-c0200...
/SP/faultmgmt/1/faults/  | timestamp       | 2013-04-02/13:12:35
...
```

The highlighted text in the `show faulty` output above shows the CMU number, CMP number, and DIMM number.

See "DIMM FRU Names" on page 279 for an illustration of the slot numbers on the CMU board.

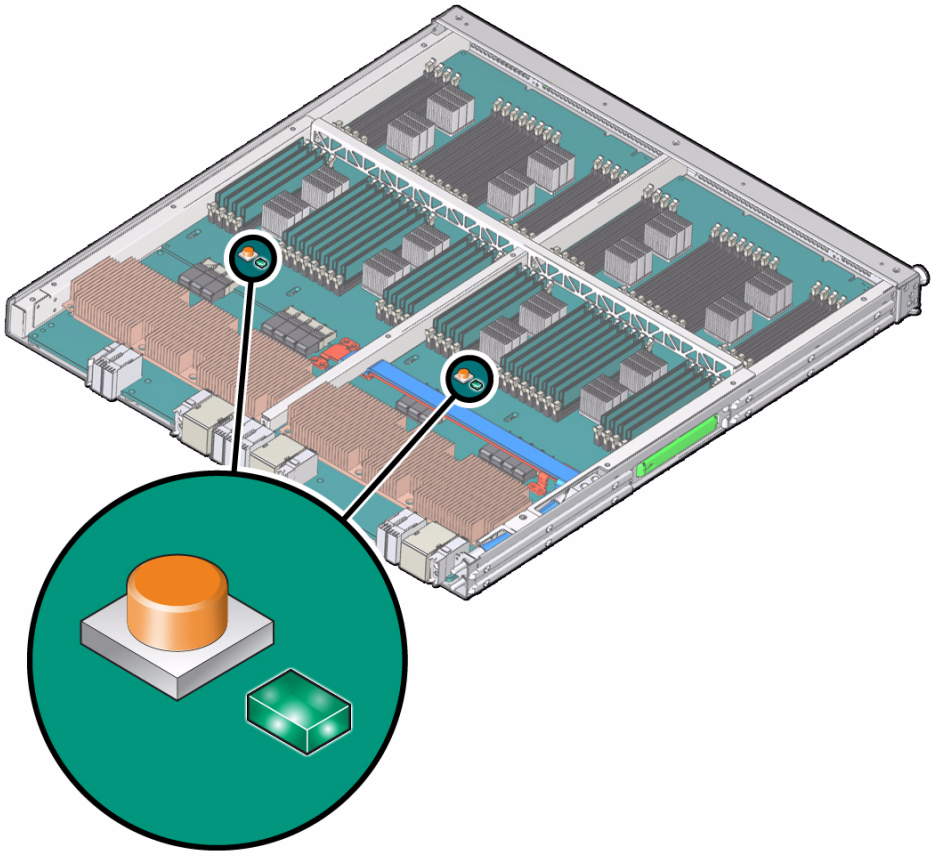
Related Information

- "Memory Configuration" on page 271
- "DIMM FRU Names" on page 279
- "Remove a CMU" on page 257
- "DIMM Fault Remind Button" on page 282
- "Remove a DIMM" on page 283
- "Install a DIMM" on page 285
- "Move DIMMs to a New CMU" on page 286

DIMM Fault Remind Button

After removing the CMU from the server, you have approximately 60 minutes to press a DIMM Fault Remind button to find a faulty DIMM.

There are two Fault Remind Buttons on the CMU. If you press a Fault Remind Button, a green LED should light to tell you that the circuit has power. When you press the correct Fault Remind button, a yellow LED lights to show you the faulty DIMM.



Note – If the green LEDs do not light, the circuits are out of power. In this case, use the `show faulty` error message to locate the faulty DIMM. See "Locate a Faulty DIMM" on page 281.

Related Information

- "Memory Configuration" on page 271
- "DIMM FRU Names" on page 279
- "Locate a Faulty DIMM" on page 281
- "Remove a DIMM" on page 283
- "Install a DIMM" on page 285
- "Move DIMMs to a New CMU" on page 286

▼ Remove a DIMM

1. **Power off the PDomain that has the CMU.**

   See "Power Off a PDomain" on page 72.

2. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

3. **Remove the CMU from the CMU cage.**

   See "Remove a CMU" on page 257 for instructions.

4. **Place the CMU on a static-safe work space.**

5. **Remove the CMU cover.**

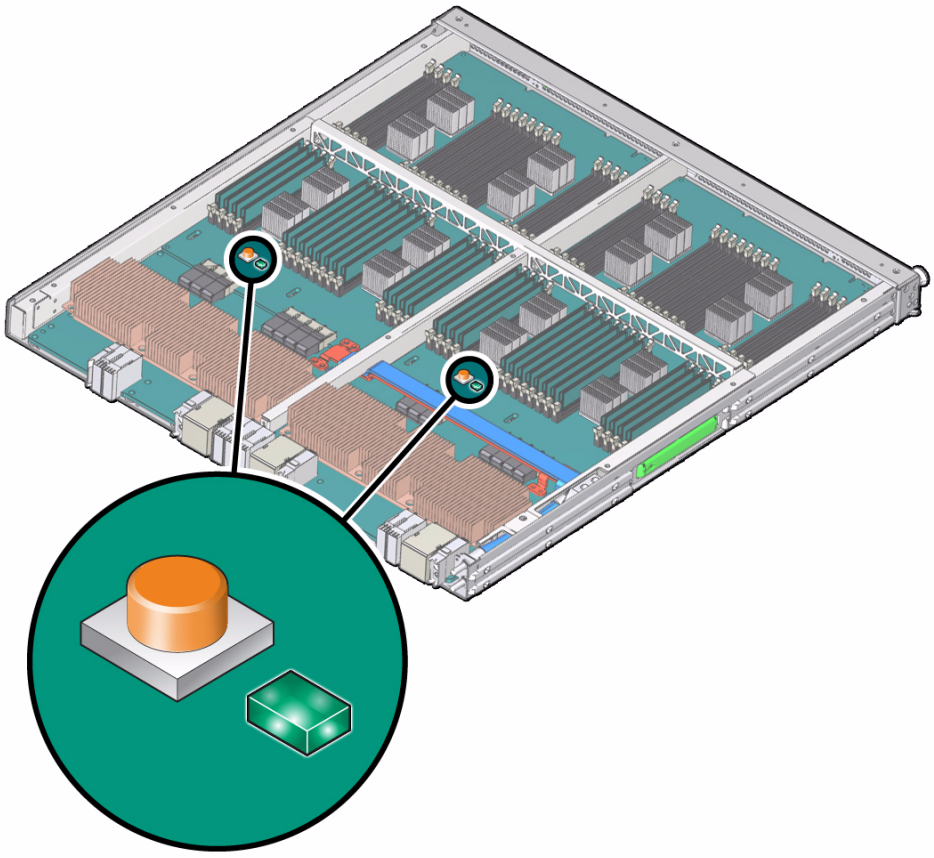
   Loosen captive screws at the four corners of the CMU.

Note – A LED might be lighted next to one of the two fault remind buttons to show you which of the two memory sections has a faulty DIMM. See "DIMM Fault Remind Button" on page 282.

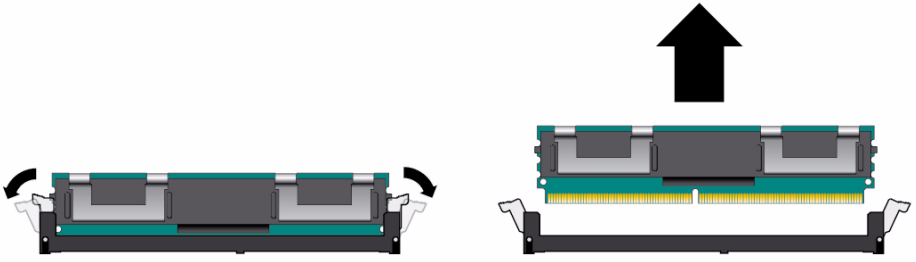
Note – Energy cells on the board power the Fault Remind circuits for approximately **60 minutes** after the CMU is removed from a power source. If the energy cells are depleted, the LEDs will not light. In that case, use the output of the `show faulty` command to determine the location of the faulty DIMM. See "Locate a Faulty DIMM" on page 281.

---

6. **Press the DIMM Fault Remind button that is indicated by a lit LED.**



7. **Eject the DIMM.**



Related Information

- "Memory Configuration" on page 271
- "DIMM FRU Names" on page 279

- "Servicing CMUs" on page 247
- "DIMM Fault Remind Button" on page 282
- "Install a DIMM" on page 285
- "Move DIMMs to a New CMU" on page 286

▼ Install a DIMM

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **If you are replacing a DIMM, go to** Step 5.

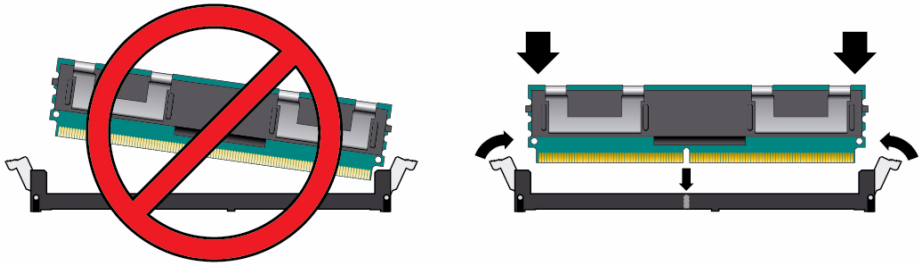
Note – Do not move a suspected faulty DIMM to another DIMM slot for troubleshooting purposes. Complications might arise.

---

3. **If you are installing new DIMMs to expand memory on a CMU, remove the CMU.**

   See "Remove a CMU" on page 257.

4. **Use a T20 Torx driver to remove the CMU cover.**
5. **Install a DIMM in the socket.**



6. **Install the CMU cover.**

   Tighten captive screws at the four corners of the CMU.

7. **Install the CMU in the server.**

   See "Install a CMU" on page 260.

Related Information

- "Memory Configuration" on page 271
- "DIMM FRU Names" on page 279

- "Servicing CMUs" on page 247
- "DIMM Fault Remind Button" on page 282
- "Remove a DIMM" on page 283
- "Install a DIMM" on page 285
- "Move DIMMs to a New CMU" on page 286

▼ Move DIMMs to a New CMU

A replacement CMU has no DIMMs. Use this procedure to move DIMMs from the old CMU to a new CMU.

The same DIMMs can be used in SPARC M5 CMUs or SPARC M6 CMUs.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

   A 12 ft (3.6 m) antistatic wrist strap is included with the replacement CMU.

2. **Use antistatic mats for each CMU.**

   Place the mats side by side for ease of movement during the DIMM transfer.

3. **Use a T20 Torx driver to remove the top covers from both CMUs.**

4. **Note the exact locations of the DIMMs on the old CMU.**
   - See "Quarter-Populated Memory" on page 276.
   - See "Half-Populated Memory" on page 277.

5. **Move the DIMMs to the same locations on the new CMU.**

6. **Install the top covers on both CMUs.**

Related Information

- "Memory Configuration" on page 271
- "DIMM FRU Names" on page 279
- "Servicing CMUs" on page 247
- "DIMM Fault Remind Button" on page 282
- "Remove a DIMM" on page 283
- "Install a DIMM" on page 285

Servicing the Front LED Panel

The front LED panel is a cold-service component. See "Power System Cage Component Locations" on page 5 for the location of the front LED panel.

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Front LED Panel LEDs

The LEDs on the front LED panel show the status of the server and its replaceable components. There are no LEDs to indicate the status of the front LED panel itself.

The LEDs on the front LED panel are described in "Front and Rear LED Panel LEDs and Controls" on page 55.

Related Information

- "Power System Cage Component Locations" on page 5
- "Front and Rear LED Panel LEDs and Controls" on page 55
- "Remove the Front LED Panel" on page 288
- "Install the Front LED Panel" on page 289
- "Servicing the Rear LED Panel" on page 353

▼ Remove the Front LED Panel

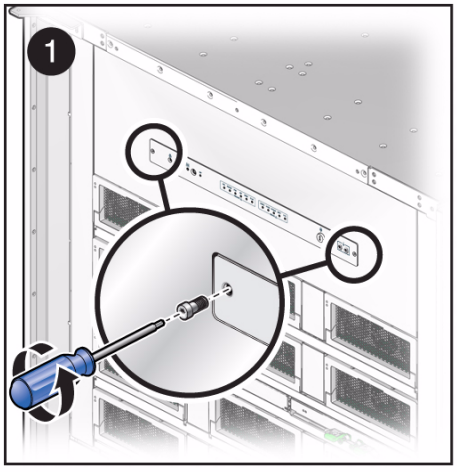
1. **Power off the server and remove off all AC power.**

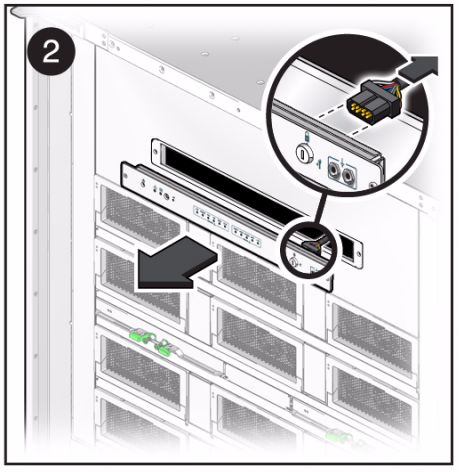
   See "Prepare to Power Off the Server" on page 73.

Caution – Danger of electrocution: AC circuits in the server share AC current. Remove all sources of AC current from the server for safety.

2. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
3. **Use a T10 Torx screwdriver to remove two mounting screws from the ends of the front LED panel.**

   Save the screws to attach the replacement.





4. **Pull the front LED panel out of the slot and disconnect the cable.**

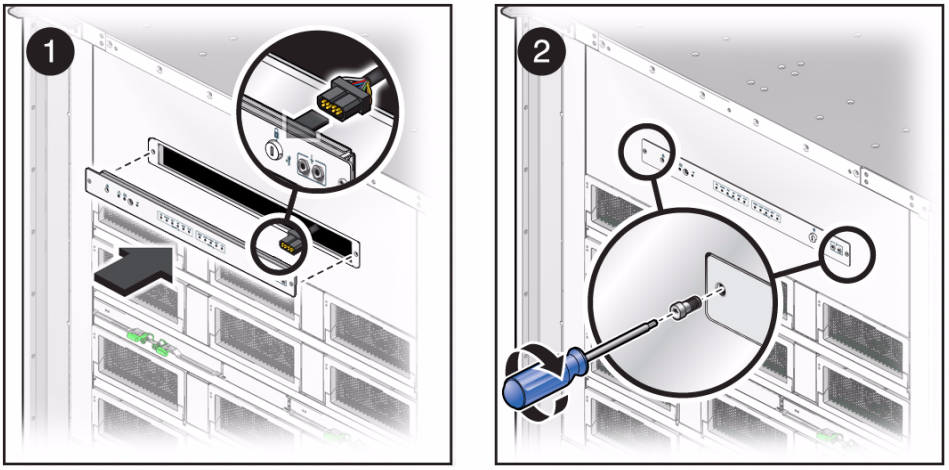
Related Information

- "Preparing for Service" on page 59
- "Install the Front LED Panel" on page 289

▼ Install the Front LED Panel

Caution – This component can be damaged if it is replaced while the server is powered on. Verify that there is no AC power in the system before you begin the installation.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Connect the control cable to the front control panel.**



3. **Push the excess length of control cable through the opening at the rear of the slot while you put the front control panel in the slot.**
4. **Use a T10 Torx screwdriver and two screws to attach the front LED panel to the server.**

   Tighten the screws to 7 in-lb. See "Torque Reference" on page 66.
5. **Reconnect AC power to the server.**

   "Reconnect AC Power to the Server" on page 483

   The fans in the server restart.
6. **Restart the server.**

   See "Restart the Server" on page 484.
7. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "Remove the Front LED Panel" on page 288
- "Returning the Server to Operation" on page 481

Servicing the Front Filler Panel

The Front Filler Panel is a cold-service component. See "Identifying Front Components" on page 2 for the location of the front filler panel.

- "Remove the Front Filler Panel" on page 291
- "Install the Front Filler Panel" on page 293

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

▼ Remove the Front Filler Panel

1. **Halt the server and turn off all AC power.**

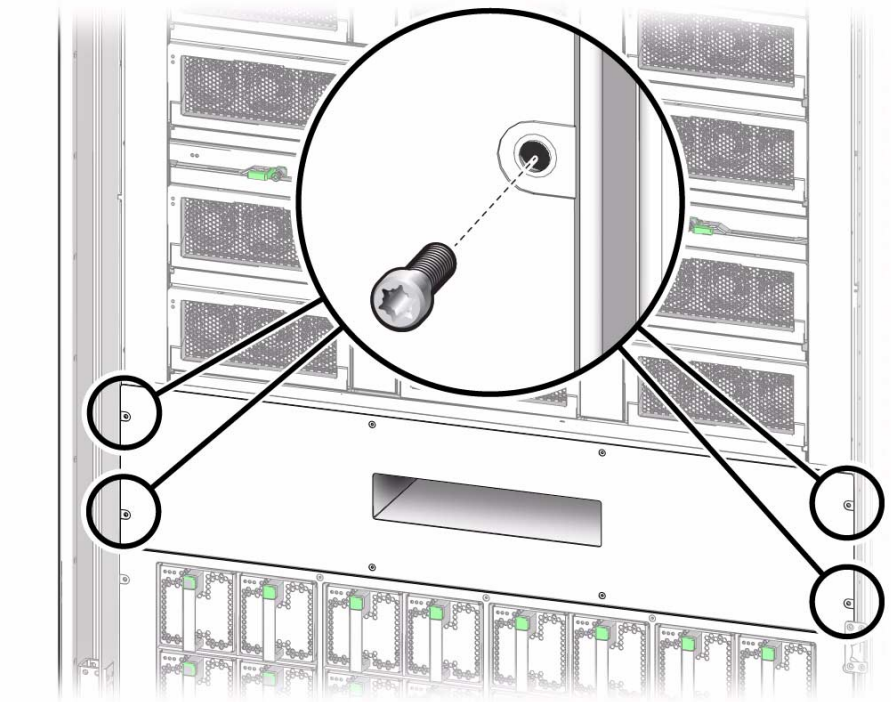
   See "Prepare to Power Off the Server" on page 73.

Caution – Danger of electrocution: AC circuits in the server share current. Remove all sources of AC current from the server.

2. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

3. **Use a T20 Torx screwdriver to remove four mounting screws from the front filler panel.**

   Save the screws to reinstall the front filler panel.



4. **Pull the front filler panel out of the slot.**
5. **Install a front filler panel.**

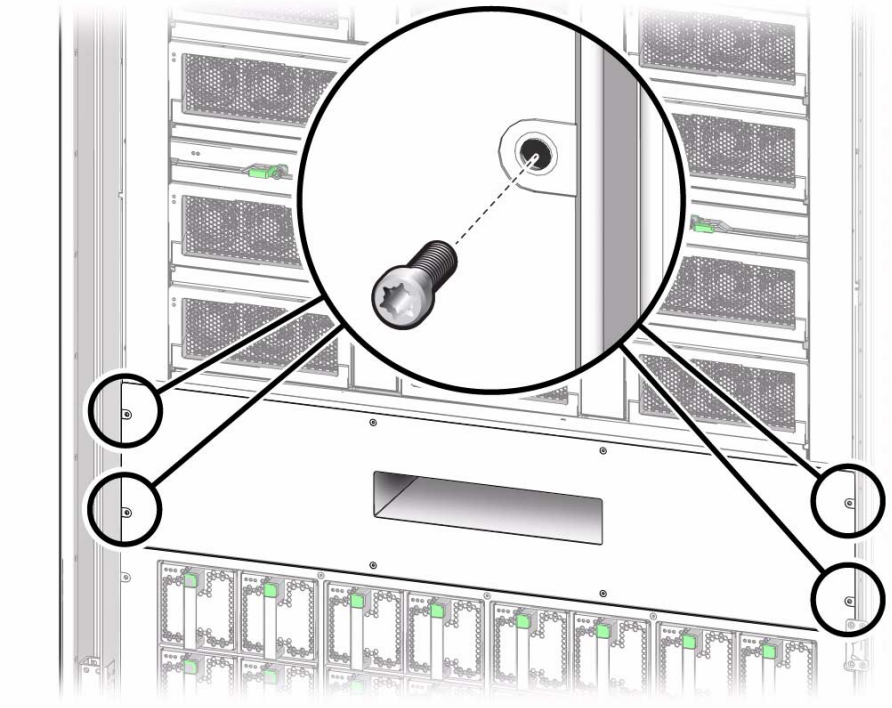
   See "Install the Front Filler Panel" on page 293.

Related Information

- "Preparing for Service" on page 59
- "Install the Front Filler Panel" on page 293

▼ Install the Front Filler Panel

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Put the front filler panel into the slot.**



3. **Use a T20 Torx screwdriver to install four mounting screws in the panel.**
   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.
4. **Connect AC power to the server.**
   "Reconnect AC Power to the Server" on page 483
5. **Restart the server.**
   See "Restart the Server" on page 484
6. **Return the replaced component to Oracle.**
   See "Return a Component to Oracle" on page 488.

Related Information

- "Remove the Front Filler Panel" on page 291
- "Returning the Server to Operation" on page 481

Servicing Fan Cages

The fan cage is a cold-service component. See “Fan Cage Component Locations” on page 7 for the location of the fan cages.

Caution – The lower fan cage weighs 39 lbs (18 kg). The upper fan cage weighs 35 lbs (16 kg). For safety, two people are required to move a fan cage.

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

Fan Cage Configuration

Each fan cage contains 16 fan modules. A fan module contains 2 fans. If a fan fails, replace the entire fan module. Individual fans cannot be replaced separately.

The server is divided into six cooling zones. Four of the cooling zones use the fan cages. See "Understanding Cooling Zones" on page 24.

The scalability card cage contains additional fan modules. See "Scalability Card Cage Component Locations" on page 8.

Power supplies also contain fans. If a fan fails in a power supply, replace the entire power supply. See "Power System Cage Component Locations" on page 5.

Related Information

- "Fan Cage Component Locations" on page 7
- "Servicing Fan Modules" on page 115
- "Servicing Power Supplies" on page 101

▼ Remove the Upper Fan Cage

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Remove the front door.**

   See "Remove the Door" on page 77.
3. **Remove trim panels to protect them from being scratched.**

   See "Remove the Trim Panels" on page 91 to remove the following parts.

   a. **Remove the two side trim panels.**

   b. **Remove trim panel standoffs.**

      Remove the standoffs nearest to the upper fan cage to protect them from breakage.
4. **Remove the front filler panel.**

   See "Remove the Front Filler Panel" on page 291.

5. **Remove the fan modules from the fan cage.**

   See "Remove a Fan Module" on page 118.

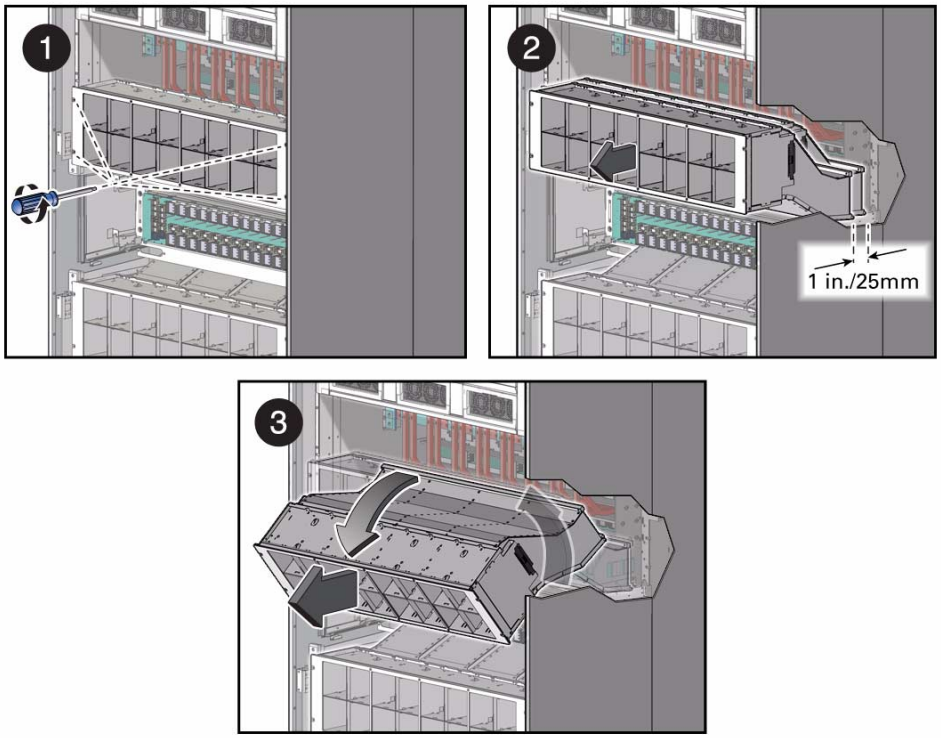
   Place the fan modules on a grounded mat for safety.

   The empty cage weighs 35 lb (16 kg).

6. **Loosen the captive screws at the four corners of the fan cage.**

   See detail 1 below.

Note – The scalability card cage has been omitted from the illustration for clarity. Do not remove the scalability card cage.



7. **Remove the fan cage:**

   a. **Pull the fan cage out approximately 1 in (25 mm) until it is free of the guide pins at the rear of the slot.**

      See detail 2 above.

b. Tilt the fan cage and pull it out of the slot.

Tilt rear of the fan cage up approximately 15 degrees to bypass the top of the scalability card cage.

See detail 3 above.

8. **Install the replacement fan cage.**

See "Install the Upper Fan Cage" on page 298.

Related Information

- "Fan Cage Configuration" on page 296
- "Remove the Lower Fan Cage" on page 301
- "Install the Upper Fan Cage" on page 298
- "Servicing Fan Modules" on page 115

▼ Install the Upper Fan Cage

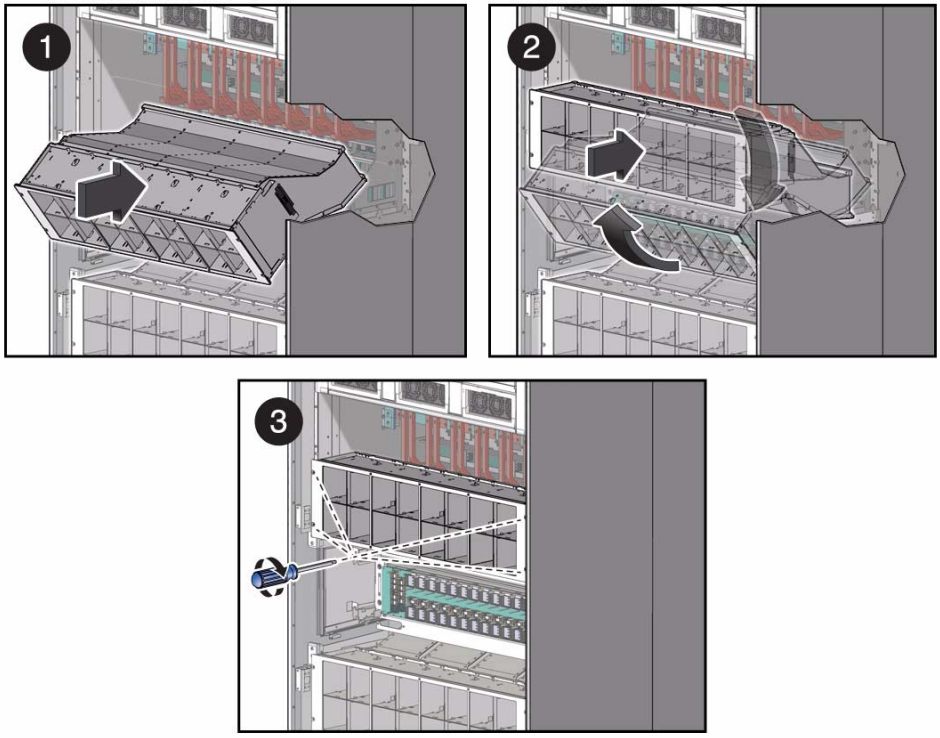
1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Insert the fan cage in the slot:**

a. Tilt the fan cage and begin sliding it into the slot.

Tilt the rear of the fan cage up approximately 15 degrees to bypass the top of the scalability card cage.

See detail 1 below.

Note – The scalability card cage has been omitted from the illustration for clarity. Do not remove the scalability card cage.



b. When the rear of the fan cage is approximately 1.5 in (40 mm) from the midplane, tilt the fan cage down to the horizontal position.

See detail 2 above. The rear of the fan cage goes behind the top of the scalability card cage.

If you cannot lower the rear of the fan cage, it might be hitting the guide pins on the midplane. Pull the fan cage out slightly to bypass the ends of the guide pins.

c. Push the fan cage onto the guide pins until the fan cage is seated in the connectors at the rear of the slot.

3. **Tighten the captive screws at the four corners of the fan cage.**

   See detail 3 above.

   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

4. **Insert the 16 fan modules in the fan cage.**

   See "Install a Fan Module" on page 121.

5. **Install the front filler panel.**

   See "Install the Front Filler Panel" on page 293.

6. **Install the standoffs and trim panels.**

   See “Install Trim Panels” on page 95.

7. **Install the front door.**

   See “Install the Door” on page 81.

8. **Connect AC power and restart the server.**

   “Reconnect AC Power to the Server” on page 483

9. **Return the replaced component to Oracle.**

   See “Return a Component to Oracle” on page 488.

Related Information

- “Fan Cage Configuration” on page 296
- “Remove the Upper Fan Cage” on page 296
- “Remove the Lower Fan Cage” on page 301
- “Servicing Fan Modules” on page 115

▼ Remove the Lower Fan Cage

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Remove the front door.**

   See "Remove the Door" on page 77.
3. **Remove trim panels to protect them from being scratched.**

   See "Remove the Trim Panels" on page 91 to remove the following parts.

   a. **Remove the two side trim panels.**

   b. **Remove trim panel standoffs.**

      Remove the standoffs nearest to the lower fan cage to protect them from breakage.
4. **Remove the fan modules from the lower fan cage.**

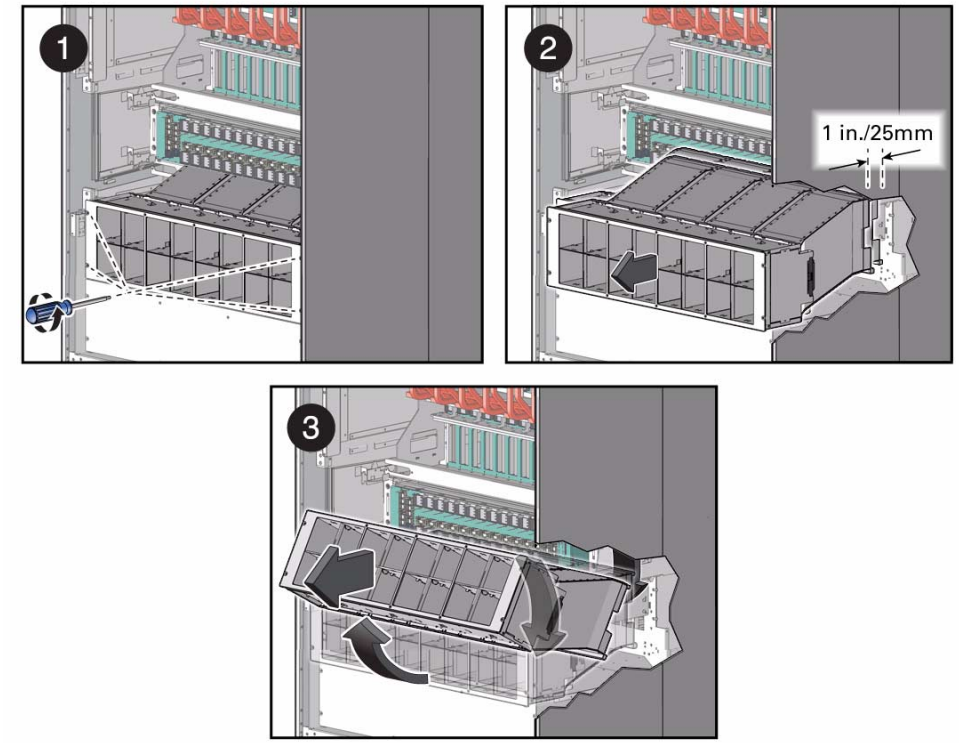
   See "Remove a Fan Module" on page 118.

   Place the fan modules on a grounded mat for safety.

   The empty cage weighs 39 lb (18 kg).
5. **Loosen the captive screws at the four corners of the fan cage.**

   See detail 1 below.

Note – The scalability card cage has been omitted from the illustration for clarity. Do not remove the scalability card cage.



6. **Remove the fan cage:**

   a. **Pull the fan cage out approximately 1 in (25 mm) or until it is free of the guide pins at the rear of the slot.**

      See detail 2 above.

   b. **Tilt the fan cage and pull it out of the slot.**

      Tilt the fan cage down at an angle of approximately 15 degrees so that the rear of the fan cage can bypass the bottom of the scalability card cage.

      See detail 3 above.

7. **To install the fan cage, see** "Install the Lower Fan Cage" on page 303**.**

Related Information

- "Fan Cage Configuration" on page 296
- "Remove the Upper Fan Cage" on page 296
- "Install the Lower Fan Cage" on page 303
- "Servicing Fan Modules" on page 115

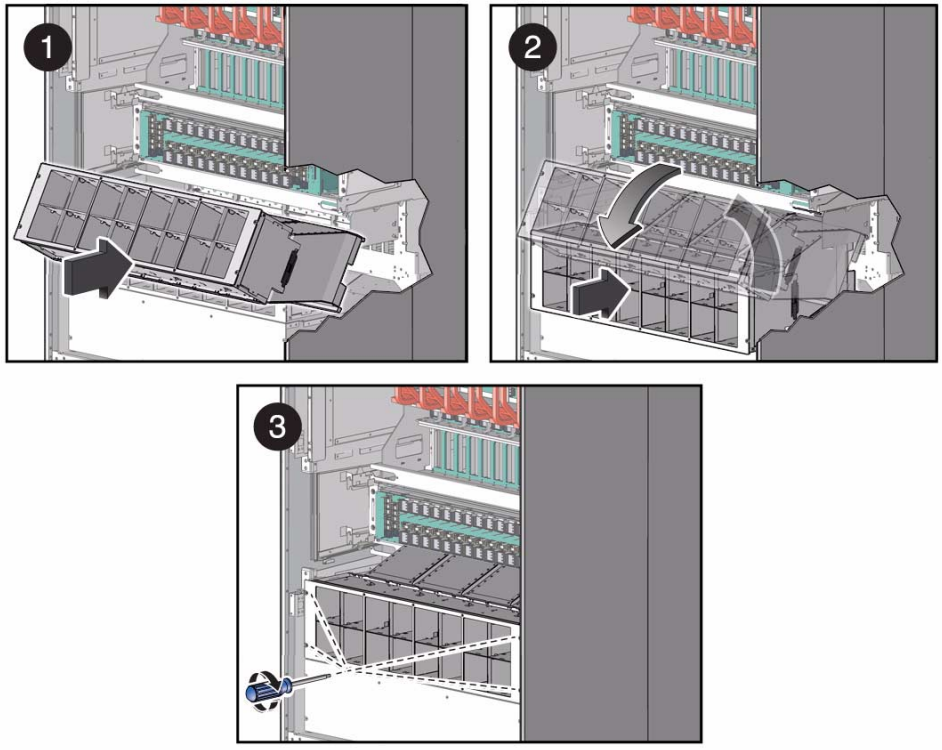
▼ Install the Lower Fan Cage

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Insert the fan cage in the slot:**
   a. **Tilt the fan cage and begin sliding it into the slot.**

      See detail 1 below.

      Tilt the rear of the fan cage down approximately 15 degrees to bypass the bottom of the scalability card cage.

Note – The scalability card cage has been omitted from the illustration for clarity. Do not remove the scalability card cage.



b. When the rear of the fan cage is approximately 1.5 in (40 mm) from the midplane, tilt the fan cage up to the horizontal position.

See detail 2 above.

If you cannot raise the rear of the fan cage, it might be hitting the guide pins on the midplane. Pull the fan cage out slightly to bypass the ends of the guide pins.

c. Push the fan cage onto the guide pins until the fan cage is seated in the connectors at the rear of the slot.

3. **Tighten the captive screws at the four corners of the fan cage.**

   See detail 3 above.

   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

4. **Install the 16 fan modules in the fan cage.**

   See "Install a Fan Module" on page 121.

5. **Install the standoffs and trim panels.**

   See "Install Trim Panels" on page 95.

6. **Install the front door.**

   See "Install the Door" on page 81.

7. **Connect AC power and restart the server.**

   "Reconnect AC Power to the Server" on page 483

8. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "Fan Cage Configuration" on page 296
- "Remove the Lower Fan Cage" on page 301
- "Remove the Upper Fan Cage" on page 296
- "Install the Upper Fan Cage" on page 298
- "Servicing Fan Modules" on page 115

Servicing a Cabled Lower Bus Bar Assembly

Cabled lower bus bar assemblies are cold service only.

The factory description for this cable is "CABLED LOWER BUS BARS".

- "Remove a Cabled Lower Bus Bar Assembly" on page 305
- "Install a Cabled Lower Bus Bar Assembly" on page 309

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

▼ Remove a Cabled Lower Bus Bar Assembly

1. **Halt and power down the server.**

   See "Prepare to Power Off the Server" on page 73.

2. **Remove the front door.**

   See "Remove the Door" on page 77.

3. **Remove trim panels to protect them from being scratched.**

   See "Remove the Trim Panels" on page 91 to remove the following parts.

   a. **Remove the two side trim panels.**

b. Remove trim panel standoffs.

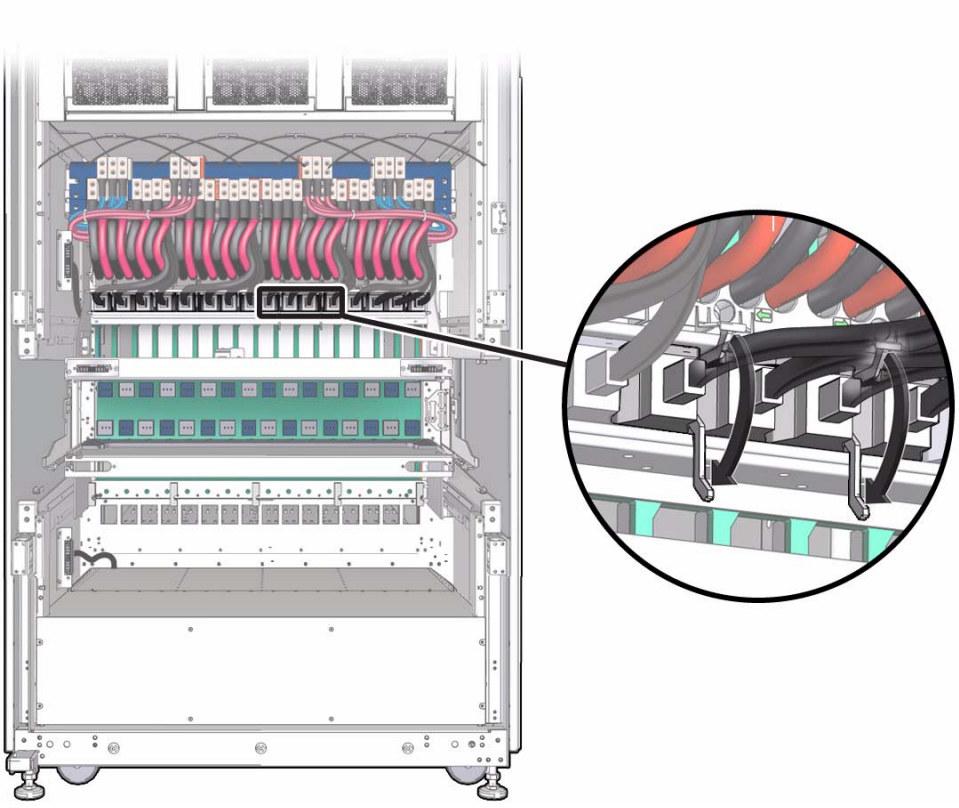
Remove the standoffs on each side to protect them from breakage.

4. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
5. **Remove the front filler panel.**

   See "Remove the Front Filler Panel" on page 291.
6. **Remove the upper fan cage.**

   See "Remove the Upper Fan Cage" on page 296.
7. **Unlock the I/O data cables from the cabled lower bus bar assembly.**

   There are two metal locking levers on the I/O data cable. The metal locking levers push against plastic locking tabs on the cabled lower bus bars assembly.



a. Push up slightly on the plastic locking tab, then pull down a metal lever.

b. Repeat to unlock the second lever.

8. **Remove the T20 Torx screws that hold the upper ends of the red and black power cables to the bus bars.**

   The cabled lower bus bar assembly includes four red cables and four black cables. The upper end of each cable is held in place by two screws.

Note – Take care not to drop the screws. These are not captive screws.

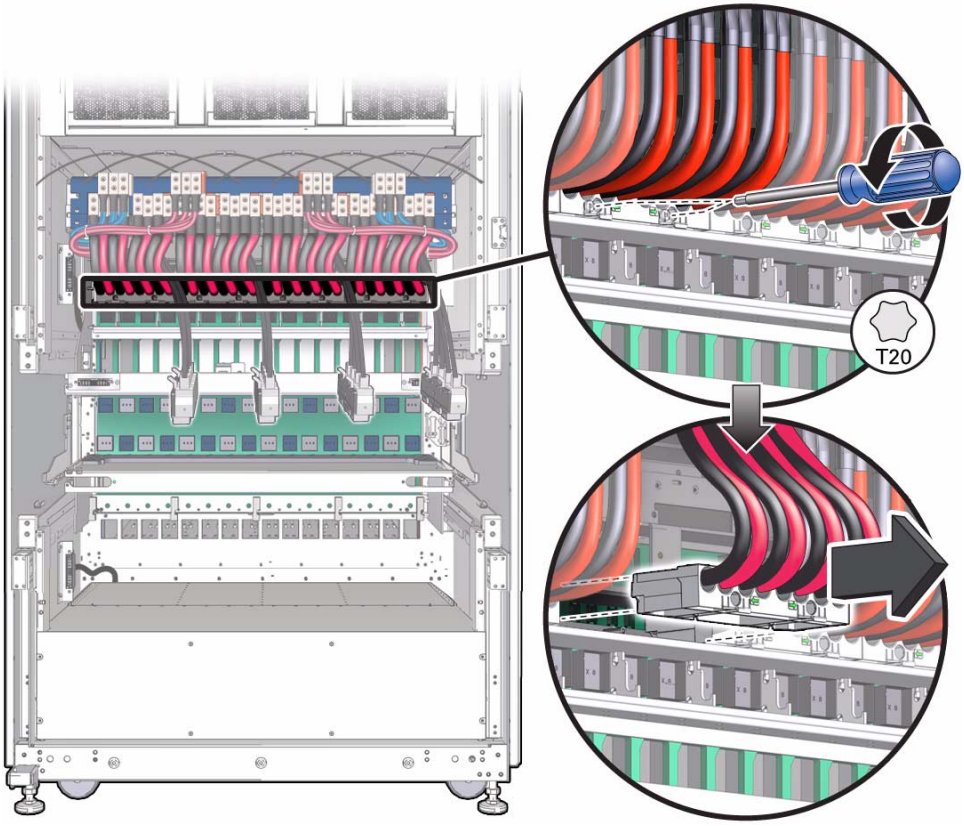
Note – Do not place screws or other loose hardware on the "shelves" of the midplane. Small items can easily fall inside the cabinet.

---

9. **Detach the lower section of the cabled lower bus bars assembly:**

   Loosen two captive T20 Torx screws that hold the plastic housing of the cabled lower bus bars assembly to the midplane, then pull the assembly out of the midplane.

   See the details in the right side of the illustration.



Related Information

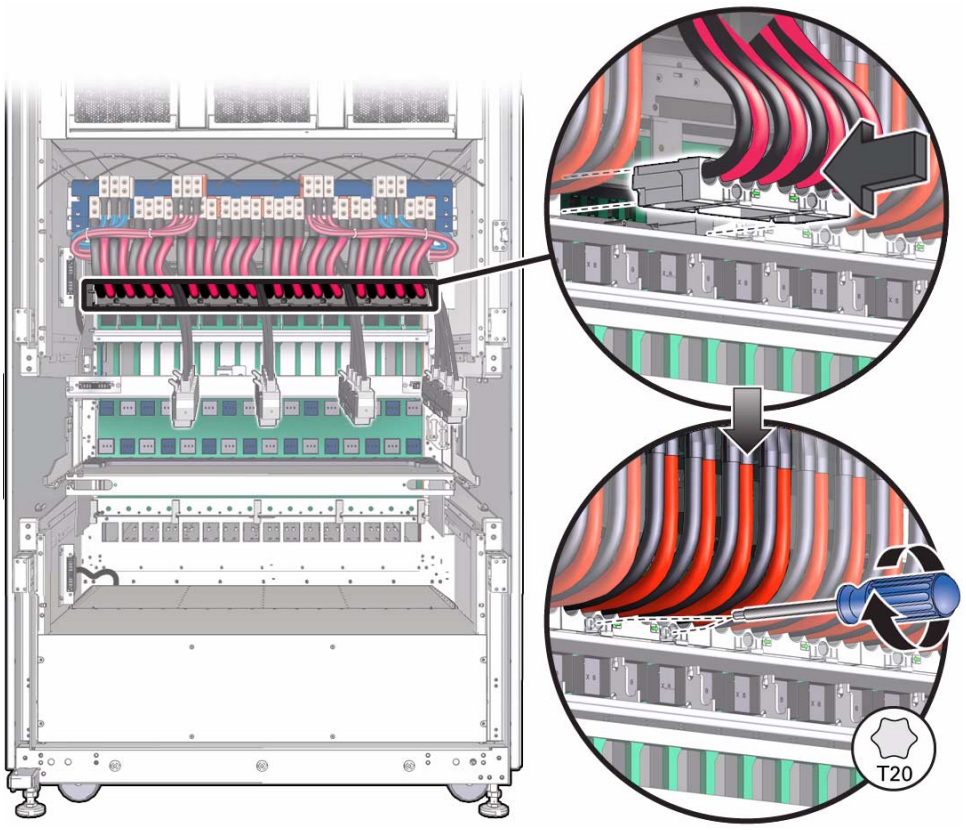
- "Install a Cabled Lower Bus Bar Assembly" on page 309

▼ Install a Cabled Lower Bus Bar Assembly

Note – Do not remove the protective plastic covers from the connectors on the cable until you are ready to plug a cable connector into a socket.

Note – An adjustable torque screwdriver is included with the replacement cable assembly.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install the plastic block of the cabled lower bus bars assembly.**
   a. **Remove the plastic cover from the cable assembly.**
      Do not discard the plastic cover. You will return the cover to Oracle.
   b. **Insert the cable assembly into the socket on the midplane.**



Note – The cable connectors in the plastic block are keyed with flat tops. Align the tops of the cables to make it easier to insert the block in the connector on the midplane.

If the block does not insert easily, twist the individual cable ends so that the flat portions of the cable ends are all aligned and facing up.

c. **Tighten the captive T20 Torx screws to lock the cable assembly in place.**

Use the torque screwdriver that is included with the replacement cable assembly. Set the torque screwdriver to 10 in-lb.

Caution – Tighten the screws alternately, several turns at a time. If the plastic block is not kept parallel to the midplane, stress from the screws can break the block.

3. **Use 16 T20 Torx screws to connect the upper ends of the power cables to the positive and negative bus bars.**

   Tighten the screws to 15 in-lb.

4. **Install the upper fan cage.**

   See "Install the Upper Fan Cage" on page 298.

5. **Install the front filler panel.**

   See "Install the Front Filler Panel" on page 293.

6. **Install the standoffs and trim panels.**

   See "Install Trim Panels" on page 95.

7. **Install the front door.**

   See "Install the Door" on page 81.

8. **Restart the server.**

   See "Returning the Server to Operation" on page 481.

9. **Return the replaced component to Oracle.**

   Place plastic cover(s) on the connectors of the component. Also return any extra covers that were included with the replacement component.

   See "Return a Component to Oracle" on page 488.

Related Information

- "Remove a Cabled Lower Bus Bar Assembly" on page 305
- "Returning the Server to Operation" on page 481

Servicing the Scalability Card Cage

The scalability card cage is a cold-service component. See "Scalability Card Cage Component Locations" on page 8 for the location of the scalability card cage.

Caution – The scalability card cage weighs 49 lbs (22 kg). Two people are required to move it.

- "Remove the Scalability Card Cage" on page 314
- "Install the Scalability Card Cage" on page 316

Related Information

- "Scalability Card Cage Component Locations" on page 8
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

▼ Remove the Scalability Card Cage

1. **Remove the front door.**

   See "Remove the Door" on page 77.

2. **Remove trim panels to protect them from being scratched.**

   See "Remove the Trim Panels" on page 91 to remove the following parts.

   a. **Remove the two side trim panels.**

   b. **Remove trim panel standoffs.**

      Remove the standoffs nearest to the scalability card cage to protect them from breakage.

3. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

4. **Remove these components from the scalability card cage:**

Note – Record the slot number for each component, or stack them in order. You must place them back in their original order later.

---

   a. **Remove the service processors.**

      See "Remove a Service Processor" on page 146.

   b. **Remove the clock boards.**

      See "Remove a Clock Board" on page 135.

   c. **Remove the SSBs.**

      See "Remove an SSB" on page 126.

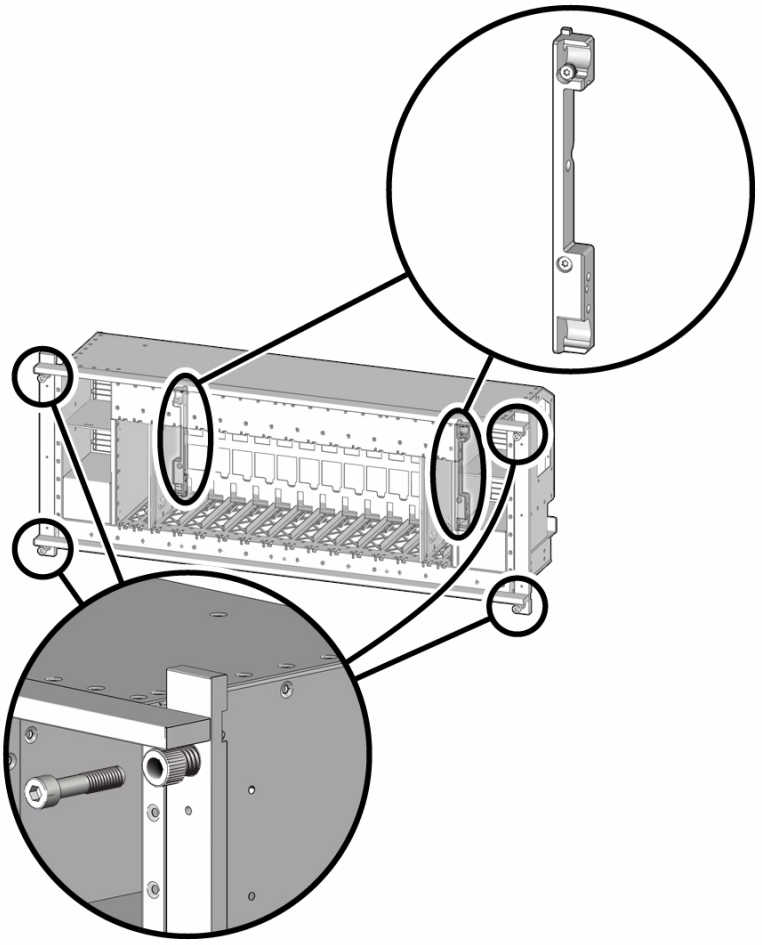
   d. **Remove the four fan modules.**

      See Step 8 in "Remove a Fan Module" on page 118.

5. **Remove the scalability card cage:**

   a. **Inside the cage, use a screwdriver with an extension to undo four captive T20 Torx screws.**

      The screws are inside the cage, near the corners.



   b. **On the outside of the cage, remove four 6 mm Allen head bolts.**

   c. **Pull the scalability card cage out two inches to clear the guide pins.**

   d. **Remove the scalability card cage from the server.**

6. **To install the scalability card cage, see** "Install the Scalability Card Cage" on page 316

Related Information

- "Install the Scalability Card Cage" on page 316
- "Scalability Card Cage Component Locations" on page 8
- "Understanding Scalability" on page 20

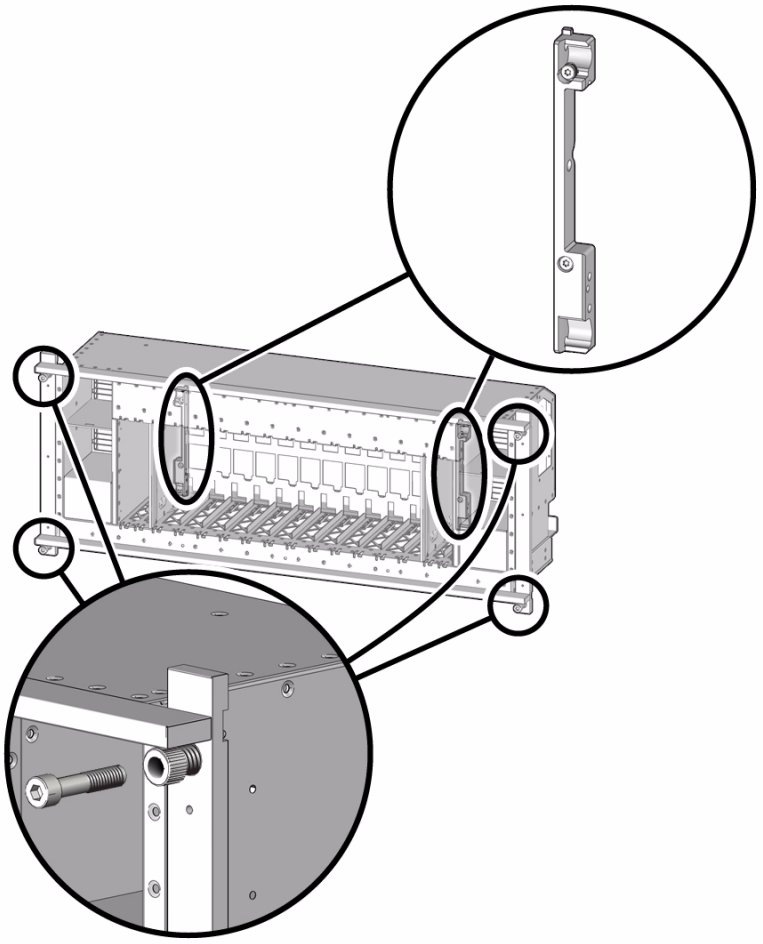
▼ Install the Scalability Card Cage

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Prepare the scalability card cage by loosening the four threaded sleeves.**

   The circular metal sleeves are located at the four outside corners of the cage. See the lower detail in the following figure.

   Screw each sleeve out until the rear edge of the sleeve is flush with the rear of the mounting flange.

   This action ensures that the sleeves will not prevent the cage from seating properly in the next step.



3. **Install the scalability card cage:**

   a. **At the inside corners of the cage, use a screwdriver with an extension to tighten the four captive T20 Torx screws.**

      Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

   b. **On the outside edges of the cage, finger-tighten the four threaded sleeves until each one presses firmly against the cabinet.**

   c. **Insert Allen head bolts and lock washers through the threaded sleeves.**

      Use a 6 mm Allen wrench for the bolts. Screw in the bolts until they press against the fronts of the threaded sleeves.

      Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

4. **Install the following components in the scalability card cage.**

a. **Install service processors SP0 and SP1.**

   See “Install a Service Processor” on page 151.

b. **Install clock boards CLK0 and CLK1.**

   See “Install a Clock Board” on page 138.

c. **Install SSBs SP0 through SP11.**

   See “Install an SSB” on page 129.

d. **Install the four fan modules.**

   See “Install a Fan Module” on page 121.

5. **Install the standoffs and trim panels.**

   See “Install Trim Panels” on page 95.

6. **Install the front door.**

   See “Install the Door” on page 81.

7. **Connect AC power to the server.**

   “Reconnect AC Power to the Server” on page 483

8. **Restart the server.**

   See “Reconnect AC Power to the Server” on page 483

9. **Return the replaced component to Oracle.**

   See “Return a Component to Oracle” on page 488.

Related Information

- “Remove the Scalability Card Cage” on page 314
- “Scalability Card Cage Component Locations” on page 8
- “Understanding Scalability” on page 20

Servicing the Scalability Fans Cable

The scalability fans cable is cold service only.

The factory description for this cable is “CABLE ASSY, SCALE FANS”.

- “Remove the Scalability Fans Cable” on page 319
- “Install the Scalability Fans Cable” on page 321

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

▼ Remove the Scalability Fans Cable

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Unpack and inspect the replacement cable.**

Caution – Use an antistatic mat to protect the cable.

3. **Halt and power down the server.**

   See “Prepare to Power Off the Server” on page 73.

4. **Remove the front door.**

   See “Remove the Door” on page 77.

5. **Remove trim panels to protect them from being scratched.**

   See “Remove the Trim Panels” on page 91 to remove the following parts.

a. **Remove the two side trim panels.**

b. **Remove trim panel standoffs.**

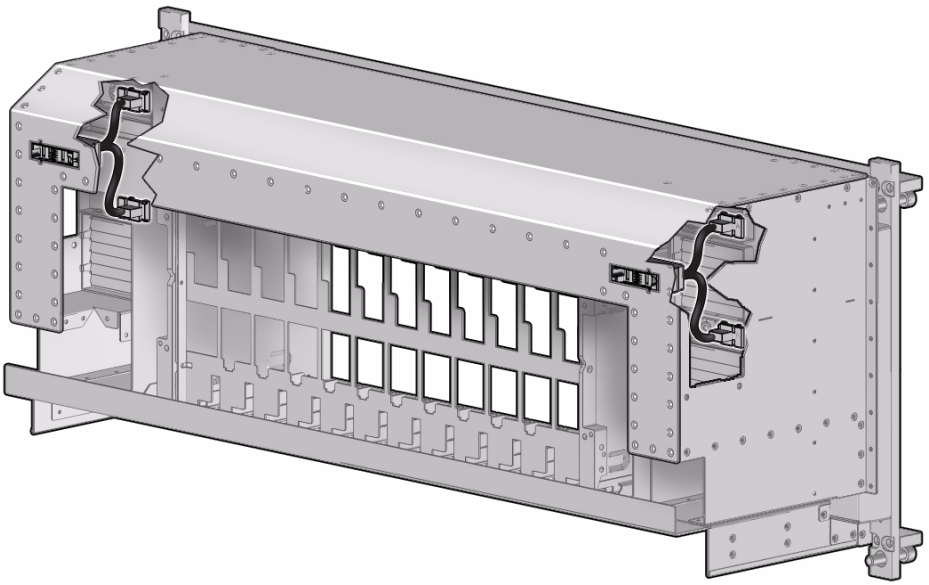
Remove the standoffs nearest to the scalability card cage to protect them from breakage.

6. **Remove the scalability card cage.**

See "Remove the Scalability Card Cage" on page 314.

7. **Undo four T20 Torx screws to remove the access panel from the side of the scalability card cage.**

Note – There are two scalability fan cables, one on the left side of the server and one on the right. The replacement cable can be used for either side.



8. **Reach into the opening to disconnect the cable.**

Disconnect the two small connectors from the interior of the card cage. Disconnect the large connector from the rear of the scalability card cage.

9. **If you are removing both cables, repeat** Step 7 **and** Step 8 **for the second cable.**

Related Information

- "Install the Scalability Fans Cable" on page 321

▼ Install the Scalability Fans Cable

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **If the side access panel has not already been removed, undo four T20 Torx screws to remove the panel.**

Note – There are two scalability fan cables, one on the left side of the server and one on the right. The replacement cable can be used for either side.

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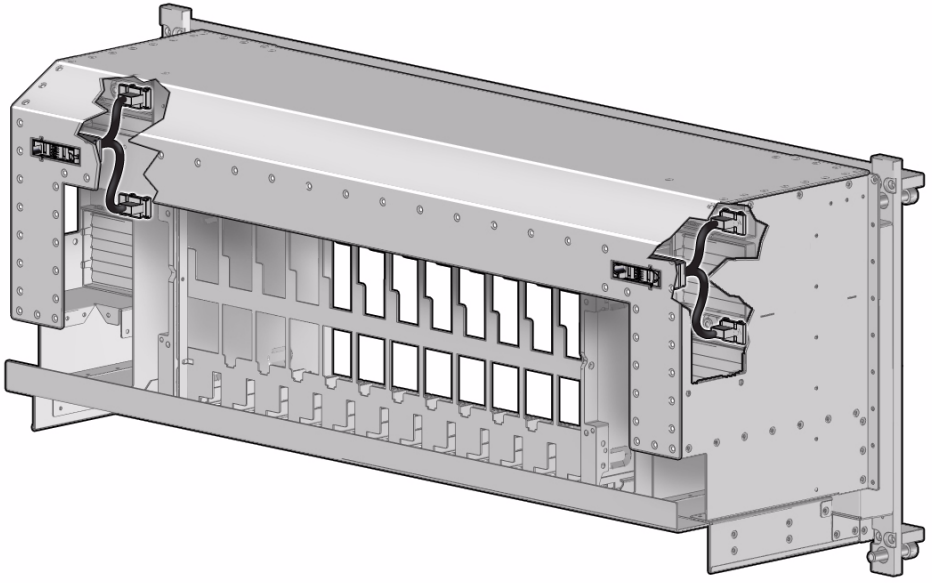
3. **Inside the opening, connect the large cable connector to the rear of the cage, then connect the two small cable connectors to the small sockets inside the card cage.**

   The connectors are not reversible.



4. **Use four T20 Torx screws to attach the access panel.**
5. **If you are replacing both cables, repeat** Step 2 **through** Step 4 **for the second cable.**
6. **Install the scalability card cage.**

   See "Install the Scalability Card Cage" on page 316.

7. **Install the standoffs and trim panels.**

   See "Install Trim Panels" on page 95.

8. **Install the front door.**

   See "Install the Door" on page 81.

9. **Restart the server.**

   See "Returning the Server to Operation" on page 481.

Related Information

- "Remove the Scalability Fans Cable" on page 319
- "Returning the Server to Operation" on page 481

Servicing the Power System Cage

The power system cage is a cold-service component. See "Power System Cage Component Locations" on page 5 for the location of power system cage.

- "Remove the Power System Cage" on page 323
- "Install the Power System Cage" on page 326

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

▼ Remove the Power System Cage

Caution – The empty power system cage weighs 207 lbs (94kg). At least two people and a mechanical lifting device are required for this procedure.

Note – A lifting device is included with the replacement power system cage.

1. **Halt the server and turn off all AC power.**

   See "Removing Power From the Server" on page 73.

2. **Remove trim panels to protect them from being scratched.**

   See "Remove the Trim Panels" on page 91 to remove the following parts.

   a. **Remove the two side trim panels.**

b. **Remove the top trim panel.**

c. **Remove trim panel standoffs.**

Remove the upper three standoffs on each side to protect them from breakage.

3. **Remove the front filler panel to access the power system cage.**

See "Remove the Front Filler Panel" on page 291.

4. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

5. **Remove components from the power system cage.**

a. **Remove the PSDBs.**

See "Remove a PSDB" on page 111.

b. **Remove the power supplies.**

See "Remove a Power Supply" on page 104.

Caution – Do not stack power supplies more than two units high. The EMI shields (the beryllium copper edge fingers) are easily bent or broken when another power supply or other heavy weight is placed on them. Offset the stacked power supplies so that the EMI shields do not interlock and break.

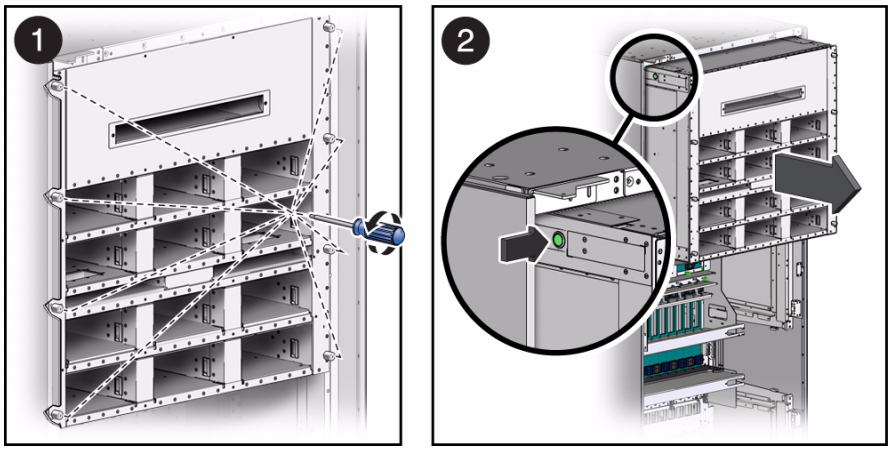
6. **At the rear of the server, disconnect all six AC line filters from the rear of the power system cage.**

See "Disconnect AC Input Filters" on page 348.

Caution – Failure to disconnect all of the AC input filters will result in damage to the power system cage.

7. **Place a lifting device under the power system cage for support.**

8. **Remove eight T20 Torx screws from the front of the power system cage.**



9. **Use the lifting device to carefully pull the power system cage out of the server.**

   The locks on the sides of the power system cage will stop the cage before it is completely out of the cabinet.

10. **Press the lock buttons on the upper sides of the power system cage to unlock them, then remove the power system cage from the server.**

11. **Install the power system cage in the server.**

    See "Install the Power System Cage" on page 326.

Related Information

- "Power System Cage Component Locations" on page 5
- "Safety Precautions" on page 63
- "ESD Measures" on page 64
- "Tools for Service" on page 66

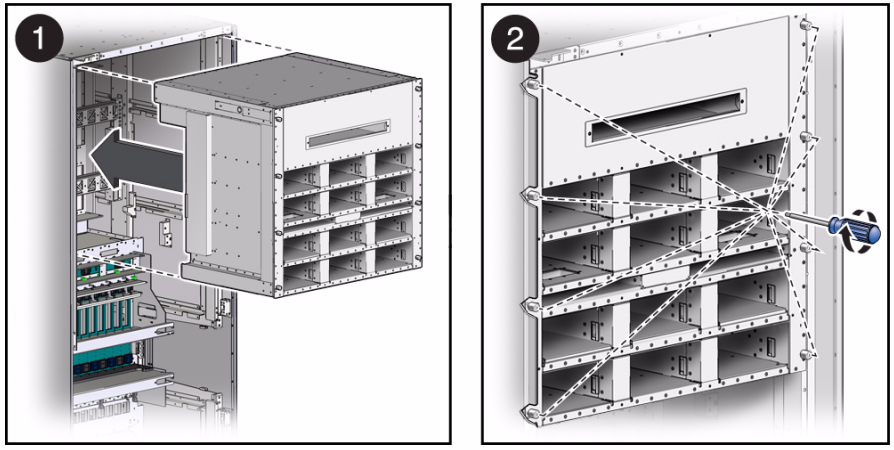
▼ Install the Power System Cage

Caution – The empty power system cage weighs 207 lbs (94 kg). At least two people and a mechanical lifting device are required for this procedure.

Note – A lifting device is included with the replacement power system cage.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Use a lifting device to raise the power system cage.**
3. **Carefully push the power system cage into the server.**

   Shoulder areas on the sides of the power system cage fit into openings at the sides of the cabinet. See detail 1 in the illustration below.



4. **Tighten the T20 Torx screws at the front of the power system cage.**

   Tighten all eight screws to 15 in-lb. See "Torque Reference" on page 66.
5. **Install the power supplies in the power system cage.**

   See "Install a Power Supply" on page 107.
6. **Install the PSDBs in the power system cage.**

   See "Install a PSDB" on page 112.

7. **At the rear of the server, reconnect all six AC line filters.**

   See "Install an AC Input Filter" on page 347.

8. **Install the front filler panel.**

   See "Install the Front Filler Panel" on page 293.

9. **Install the standoffs and trim panels.**

   See "Install Trim Panels" on page 95.

10. **Connect AC power to the server.**

    See "Reconnect AC Power to the Server" on page 483.

11. **Restart the server.**

    See "Restart the Server" on page 484.

12. **Return the replaced component to Oracle.**

    See "Return a Component to Oracle" on page 488.

    Include the mechanical lifting device with the replaced component.

Related Information

- "Power System Cage Component Locations" on page 5
- "Safety Precautions" on page 63
- "ESD Measures" on page 64
- "Tools for Service" on page 66
- "Return a Component to Oracle" on page 488

Servicing Bus Bars

Bus bars are cold-service components.

The factory description for this component is “FRU,CLIPS,SCREWS,BUS BAR”.

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

Bus Bar Configuration

The rear of a power supply connects to six bus bars, three positive and three negative. A replaceable crown clip provides the point of contact at each of the six bus bars. If a power supply fails, all six clips might need to be replaced.

Follow these guidelines when replacing the crown clips.

- Use short screws for a negative bus bar.
- Use long screws and a spacer block for a positive bus bar.
- Use the torque screwdriver that is included in the repair kit. Set the screwdriver to 10 in-lb.

The repair kit includes:

- Adjustable torque screwdriver
- Crown clips (6)
- T20 screws
  - 12 long screws, 1.625 in. (41 mm)
  - 12 short screws, 0.625 in. (16 mm)
- Disposable tie wraps (25 small and 25 large)
- Mechanical lifting device

Related Information

- "Prepare to Replace Crown Clips on a Bus Bar" on page 330
- "Replace Crown Clips" on page 331
- "Return the Server to Operation" on page 333

▼ Prepare to Replace Crown Clips on a Bus Bar

1. **Determine which set of bus bars have to be repaired.**

   There are bus bars behind each power supply. Locate the faulty power supply to determine which bus bars need repairs.

   See "Locate the Component" on page 69.

2. **If you have not prepared for service, do so now.**

   See "Preparing for Service" on page 59.

3. **Remove the front door.**

   See "Remove the Door" on page 77.

4. **Remove trim panels to protect them from being scratched.**

   See "Remove the Trim Panels" on page 91 to remove the following parts.

   a. **Remove the two side trim panels.**

   b. **Remove the top trim panel.**

   c. **Remove trim panel standoffs.**

      Remove the top three standoffs on each side to protect them from breakage.

5. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
6. **Remove the power system cage.**

   See "Remove the Power System Cage" on page 323.

Related Information

- "Preparing for Service" on page 59
- "Bus Bar Configuration" on page 329
- "Returning the Server to Operation" on page 481

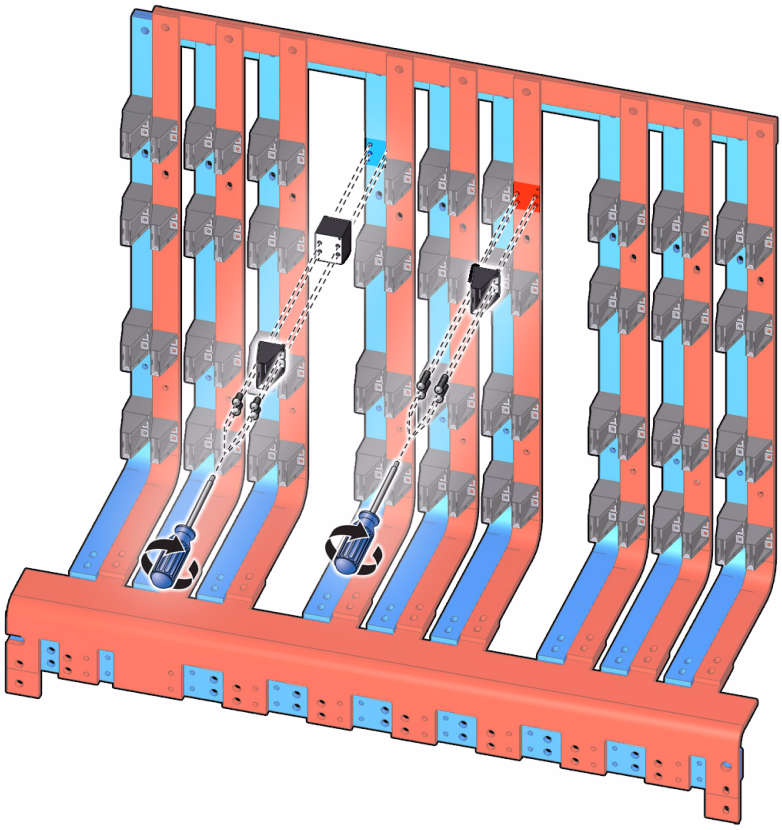
▼ Replace Crown Clips

1. **If you have not prepared to service the bus bars, do so now.**

   See "Prepare to Replace Crown Clips on a Bus Bar" on page 330.
2. **Locate the damaged crown clips.**

   A repair kit contains six replacement crown clips, sufficient for one power supply.
3. **For a crown clip on a blue (negative) bus bar:**

   a. **Remove four short Torx screws.**



b. Install the new crown clip using four 0.625 in/16 mm Torx screws.

Use the torque screwdriver to tighten the screws to 10 in-lb.

4. **For a crown clip on a red (positive) bus bar:**

Note that the positive bus bar requires a spacer block for each crown clip.

a. Remove four T20 Torx screws and the spacer block behind the crown clip.

b. Install the new crown clip using the original spacer block and four long Torx screws.

Use the torque screwdriver to tighten the screws to 10 in-lb.

5. **Repeat** Step 3 **and** Step 4 **for the four remaining crown clips in the set, as needed.**

6. **Install the power system cage.**

See "Install the Power System Cage" on page 326.

7. **Install the standoffs and side trim panels.**

   See "Install Trim Panels" on page 95.

8. **Install the front door.**

   See "Install the Door" on page 81.

9. **Return the server to operation.**

   See "Return the Server to Operation" on page 333.

Related Information

- "Bus Bar Configuration" on page 329
- "Prepare to Replace Crown Clips on a Bus Bar" on page 330
- "Return the Server to Operation" on page 333

▼ Return the Server to Operation

1. **Reconnect power to the server.**

   See "Reconnect AC Power to the Server" on page 483.

2. **Verify that all of the power supplies power up without errors.**

3. **Restart the server.**

   See "Restart the Server" on page 484.

4. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

   Include the mechanical lifting device and the torque screwdriver.

Related Information

- "Bus Bar Configuration" on page 329
- "Prepare to Replace Crown Clips on a Bus Bar" on page 330
- "Replace Crown Clips" on page 331

Servicing AC Power Cords

An AC power cord can be serviced with the server running. See "AC Input Filter and AC Power Cord" on page 18 for the location of AC power cords.

Caution – You can replace an AC power cord while the server is powered on. However, to minimize any potential risk of damage to equipment or personnel, shut down and power off the server before replacing an AC power cord.

Note – Working conditions vary from site to site. Arrange with the customer's facilities department to schedule time to work on the server and prevent unexpected complications.

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481
- *Server Installation*, power cord specifications

AC Power Cord Configuration

The server has six AC power cords. Each power cord provides current to two power supplies. When you disconnect a power cord, two power supplies power off.

Note – All six power cords must be connected to power the server.

The following table shows which power supplies are connected to each AC power cord and AC input filter. This information is also shown on labels on the AC input filters.

AC Power Cord and AC Input Filter	Power Supplies
AC0	PS5, PS11
AC1	PS4, PS10
AC2	PS3, PS9
AC3	PS2, PS8
AC4	PS1, PS7
AC5	PS0, PS6

Note that when you disconnect an AC power cord, the fans in the affected power supplies continue to run because electric current for fans is shared among the remaining power supplies.

Caution – Do not remove power supplies from a running server while you are servicing an AC power cord. The server might overheat and shut down.

The server ships with one of two types of AC power cords. These are the factory designations:

- PWR-CBL 3-PH AC60A DOMESTIC 208VAC
- PWR-CBL 3PH AC32A EU 415VAC

For more detailed information about AC power cords and their connections to power supplies, see the Installation Guide.

Related Information

- "Remove an AC Power Cord" on page 337

■ "Install an AC Power Cord" on page 340

▼ Remove an AC Power Cord

Caution – You can replace an AC input filter while the server is powered on. However, to minimize any potential risk of damage to equipment or personnel, consider turning off AC power to the server instead.

Caution – If you cannot power down the server, replace no more than one input filter at a time while the server is running.

Caution – Do not disconnect the server end of an AC power cord while the power cord is still conducting AC current. Disconnect the IEC 60309 connector from the facility's circuit breaker first.

For cable routing information, refer to the Installation Guide. The guide also includes cable tying information.

1. **Determine which power supplies are connected to the AC power cord that you intend to remove.**

   See "AC Power Cord Configuration" on page 336.

2. **If the power cord is not already labeled, label both ends of the power cord, the facility AC outlet, and the facility AC circuit breakers with the AC input filter number or with a unique facility number.**

   See "AC Power Cord Configuration" on page 336 for a table of suggested names for the power cords.

   By labeling these components, you will be able to connect the power cords to the appropriate outlets after servicing the server.

Note – If you have numbered these components using a numbering sequence unique to your facility, ensure that you can still determine the AC input filter number associated with each component.

3. **Determine how to continue this procedure:**

   You can remove the AC power cord with the server powered on. Alternatively, consider powering off the server instead.

   - If you choose to leave the server running, go to Step 4.
   - If you choose to power off the server:

     a. **Follow the procedure at** "Removing Power From the Server" on page 73**.**

     b. **When AC power is off, continue at** Step 6 **below.**

4. **Power off the external circuit breaker for the AC power cord that you intend to remove.**

5. **Verify that the correct power supplies are off.**

   See "AC Power Cord Configuration" on page 336.

   If the wrong power supplies are off, you have selected the wrong AC power cord.

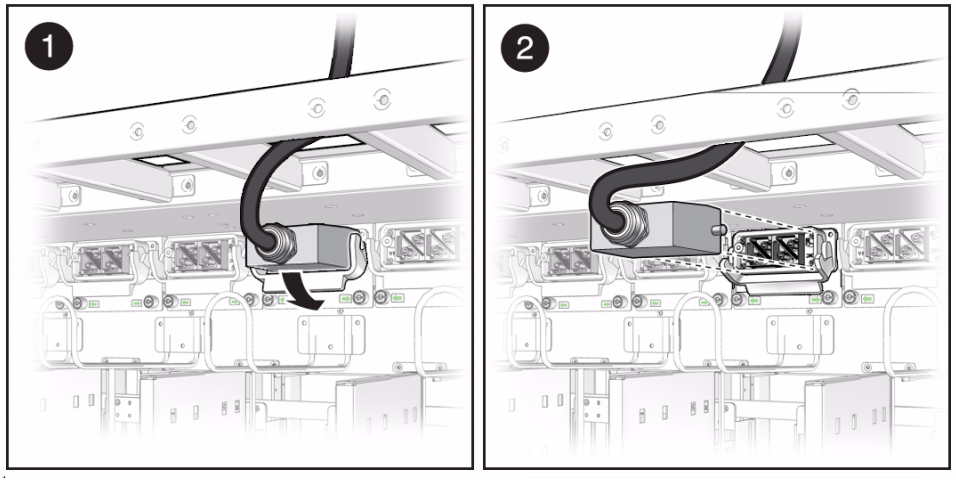
6. **Disconnect the AC power cord from the facility's AC outlet.**

   The illustration shows the IEC 60309 plug.

Note – The color of the connector might be blue or red and the number of pins can vary, depending on the regulations in your locality.

7. **In the server cabinet, disconnect the power cord from the internal AC line filter:**

   a. **Lower the locking lever (panel 1).**



   b. **Pull the plug of the power cord out of the AC line filter (panel 2).**

   To install an AC power cord, see "Install an AC Power Cord" on page 340.

Related Information

- "AC Power Cord Configuration" on page 336
- "Install an AC Power Cord" on page 340

▼ Install an AC Power Cord

Caution – Do not remove any power supplies while power cords are disconnected. The fans in the affected power supplies continue to run because the current for fans is shared among the remaining power supplies.

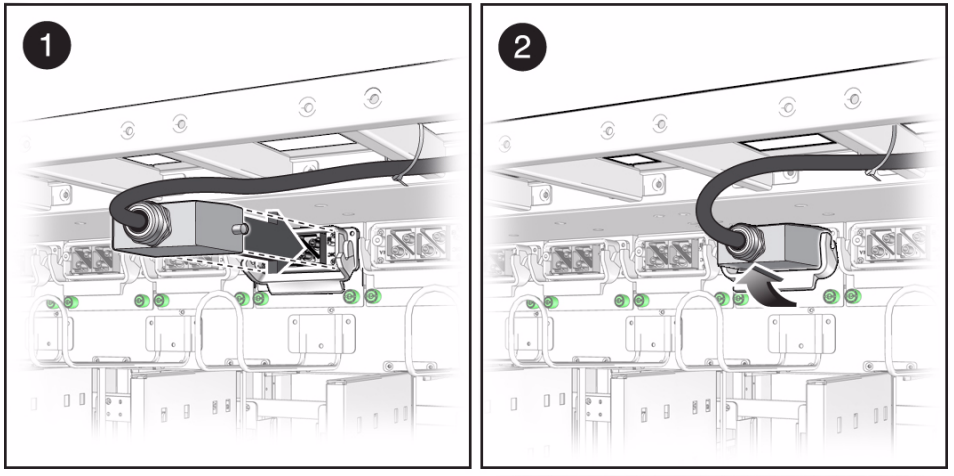
For cable routing information, refer to the Installation Guide. The guide also includes cable tying information.

1. **Determine your first step:**
   - If the server is powered off, go to Step 2.
   - If the server is running, verify that the external AC breaker for the AC power cord is in the Off position.

Caution – Do not disconnect the server end of an AC power cord while the power cord is still conducting AC current. Disconnect the IEC 60309 connector from the facility's circuit breaker first.

2. **Connect the AC power cord to the server:**

   a. **Insert the plug of the power cord into the AC line filter (panel 1).**



   b. **Raise the locking lever to lock the cord into place (panel 2).**

Note – Refer to the Installation Guide for instructions on managing and routing power cords.

3. **Connect the IEC 60309 connector to the socket or AC breaker as shown below.**

Note – The color of the connector might be blue or red, depending on the input voltage. The number of pins can vary, depending on the regulations in your locality.

4. **Turn on the facility's AC circuit breaker for the AC power cord.**

Note – All six power cords must be connected to power the server.

5. **If the server is powered off, power on the server.**

See "Restart the Server" on page 484.

6. **Verify that all of the power supplies are operating correctly.**

   The table in "AC Power Cord Configuration" on page 336 shows how AC power cords relate to power supplies.

7. **Return the replaced component(s) to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "AC Power Cord Configuration" on page 336
- "Remove an AC Power Cord" on page 337

Servicing AC Input Filters

The AC input filter can be serviced with the server running. See "Identifying Rear Components" on page 9 for the location of AC input filters.

Caution – You can replace the AC input filter while the server is powered on. However, to minimize any potential risk of damage to equipment or personnel, shut down and power off the server before replacing the AC input filter.

Note – Working conditions vary from site to site. Arrange with the customer's facilities department to schedule time to work on the server and prevent unexpected complications.

Note – An AC input filter weighs 9 lbs (4.1 kg).

These topics are in this chapter:

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481
- *Server Installation*, facility power requirements

AC Input Filter Configuration

The server has six AC input filters. Each input filter connects to two power supplies. When you disconnect an AC power cord from an AC input filter, two power supplies power off.

Note that when you remove an AC input filter, the fans in the affected power supplies continue to run because electric current for fans is shared among the remaining power supplies.

The following table shows which power supplies are connected to each AC power cord and AC input filter. This information is also shown on labels on the AC input filters.

AC Power Cord and AC Input Filter	Power Supplies
AC0	PS5, PS11
AC1	PS4, PS10
AC2	PS3, PS9
AC3	PS2, PS8
AC4	PS1, PS7
AC5	PS0, PS6

Caution – Do not remove power supplies from a running server while you are servicing an AC power cord. The server might overheat and shut down.

For more detailed information about AC input filters, AC power cords, and their relation to power supplies, see the installation guide.

Related Information

- "Remove an AC Input Filter" on page 345
- "Install an AC Input Filter" on page 347
- "Disconnect AC Input Filters" on page 348
- "Reconnect AC Input Filters" on page 350
- "Servicing AC Power Cords" on page 335
- *Server Installation*, power cord-to-power supply relationship

▼ Remove an AC Input Filter

Caution – You can replace an AC input filter while the server is powered on. However, to minimize any potential risk of damage to equipment or personnel, consider turning off AC power to the server instead.

Caution – If you cannot power down the server, replace no more than one input filter at a time while the server is running.

Caution – Do not disconnect the server end of an AC power cord while the server is running. Disconnect the IEC 60309 connector from the facility's circuit breaker first.

1. **Locate the faulty AC input filter:**
   - If you know which input filter is faulty, go to Step 4.
   - If power supplies indicate a problem with input current:

     a. See "AC Input Filter Configuration" on page 344.

     Use the table to find which combination of AC input filter and AC power cord connects to the affected power supplies.

     The AC power cord is also part of the circuit with the AC input filter and two power supplies, so the AC power cord might be responsible for the problem.

Caution – If more than one AC input filter appears faulty, do not remove more than one at a time while the server is running. The server might shut down if you remove more than one AC input filter or AC power cord.

     b. When you have located the AC input filter, continue at Step 4**.**

2. **Turn off the external circuit breaker for the AC input filter that you intend to remove.**

3. **Verify that the correct power supplies have shut down.**

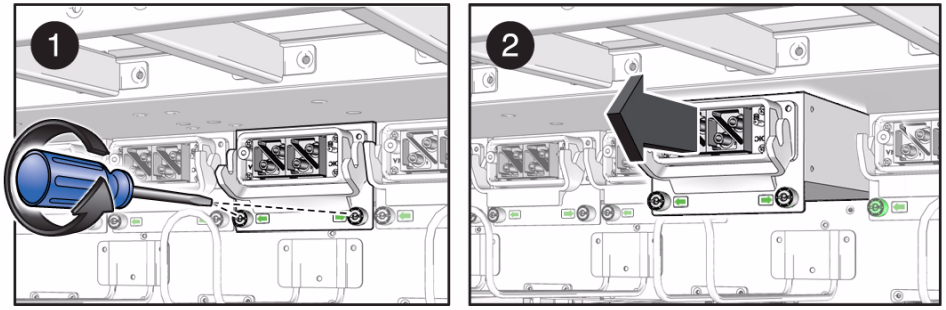
   See "AC Input Filter Configuration" on page 344.

   If the wrong power supplies have shut down, you are working on the wrong AC input filter.

4. **Determine your next step:**
   - If you choose to leave the server running, go to Step 5.
   - If you choose to power off the server:
     a. **Follow the procedure at** "Power Off the Server" on page 73**.**
     b. **When AC power is off, continue at** Step 5 **below.**
5. **Remove the AC power cord that is connected to the AC input filter.**
   Follow the procedure at "Remove an AC Power Cord" on page 337.

Caution – If the server is running, you **must** follow the sequence of steps in "Remove an AC Power Cord" on page 337. Disconnecting the power cord in an incorrect manner poses a shock hazard when AC current is present in the power cord.

6. **Remove the AC input filter:**
   a. **Use a T30 Torx screwdriver to loosen two captive screws (panel 1).**



   b. **Pull the AC input filter out of the slot (panel 2).**
7. **Install the replacement AC input filter.**
   See "Install an AC Input Filter" on page 347.

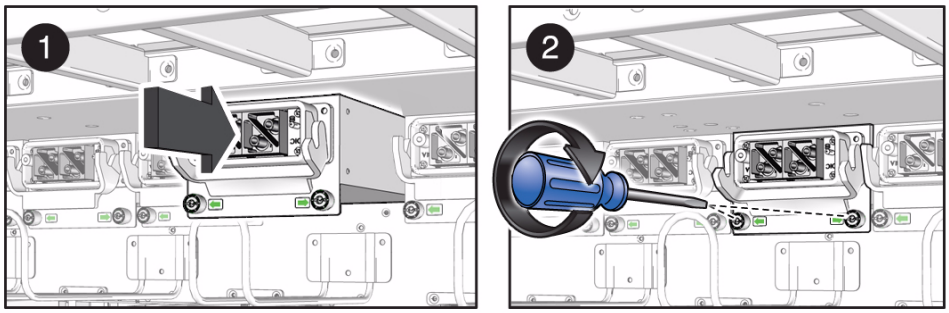
Related Information

- "AC Input Filter Configuration" on page 344
- "Install an AC Input Filter" on page 347
- "Disconnect AC Input Filters" on page 348
- "Reconnect AC Input Filters" on page 350
- "Servicing AC Power Cords" on page 335

▼ Install an AC Input Filter

Caution – Do not remove any power supplies while servicing an AC input filter when the server is running. The fans in the affected power supplies continue to run because the current for fans is shared among the remaining power supplies.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install the replacement AC input filter:**
   a. **Push the AC input filter fully into the slot (panel 1).**



   b. **Use a T30 Torx screwdriver to tighten the two captive screws (panel 2).**
      Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.
3. **Install the AC power cord:**
   Follow the procedure at "Install an AC Power Cord" on page 340.
4. **Return the replaced component to Oracle.**
   See "Return a Component to Oracle" on page 488.

Related Information

- "AC Input Filter Configuration" on page 344
- "Remove an AC Input Filter" on page 345
- "Disconnect AC Input Filters" on page 348
- "Reconnect AC Input Filters" on page 350
- "Servicing AC Power Cords" on page 335

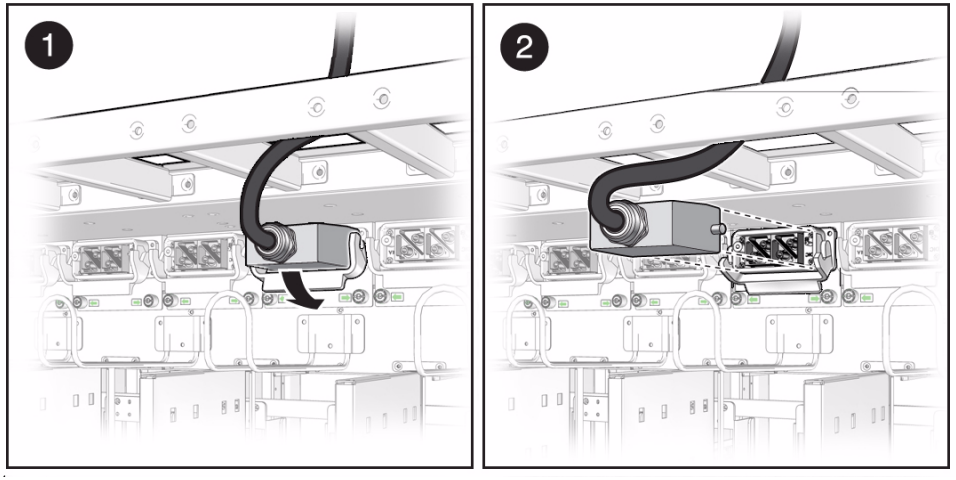
▼ Disconnect AC Input Filters

Note – Use this procedure before you begin replacing the power system cage.

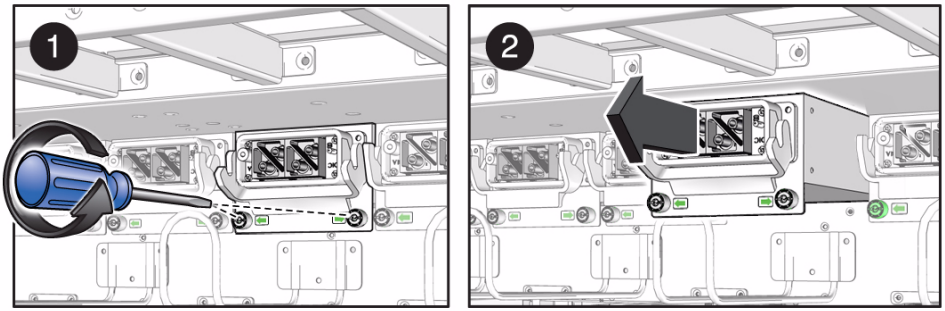
The AC input filters connect to the power system cage, and the cage cannot be pulled out if the filters are still attached.

Caution – Failure to disconnect all of the AC input filters will result in damage to the power system cage.

1. **If you have not already done so, halt the server and turn off all AC power.**
   See "Prepare to Power Off the Server" on page 73.
2. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
3. **Disconnect all AC cables from the server:**
   a. **Push down the locking lever to unlock the AC cable (panel 1).**



   b. **Unplug and remove the AC cable (panel 2).**
4. **Disconnect all AC input filters from the rear of the power system cage:**
   a. **Use a T30 Torx screwdriver to loosen two captive screws from an AC input filter (panel 1).**



b. Pull the AC input filter out of the slot approximately 2 in (50 mm) (panel 2).

c. Repeat these steps until all six AC input filters are disconnected from the rear of the power system cage.

Caution – Failure to disconnect all of the AC input filters will result in damage to the power system cage.

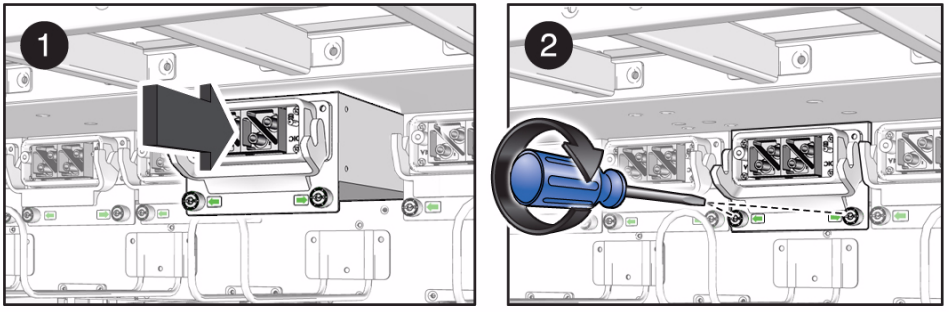
Related Information

- "AC Input Filter Configuration" on page 344
- "Remove an AC Input Filter" on page 345
- "Install an AC Input Filter" on page 347
- "Reconnect AC Input Filters" on page 350
- "Remove the Power System Cage" on page 323.
- "Install the Power System Cage" on page 326.

▼ Reconnect AC Input Filters

Note – Use this procedure when you have finished replacing the power system cage.

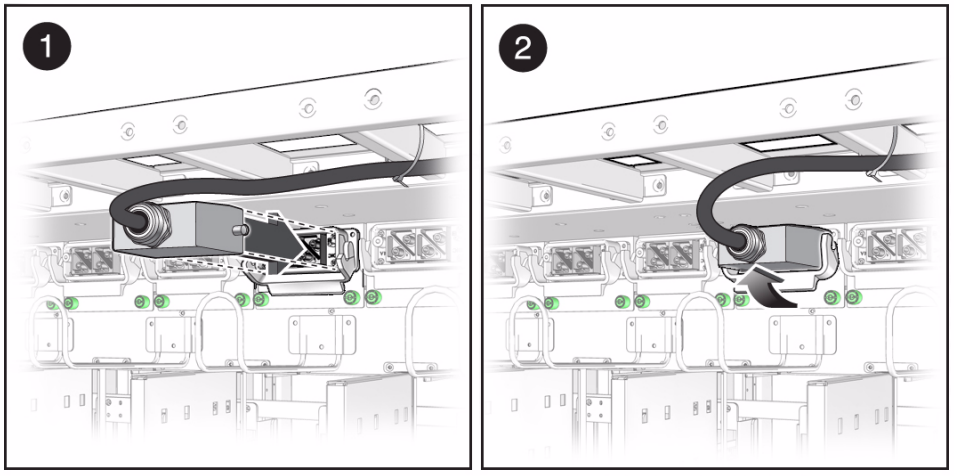
1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install AC input filters:**
   a. **Seat the AC input filter in the slot (panel 1).**



   b. **Use a T30 Torx screwdriver to tighten two captive screws on the AC input filter (panel 2).**
   c. **Repeat these steps until all six AC input filters are installed.**

3. **Connect AC power cords:**

   a. **Seat the AC power cord in the AC input filter (panel 1).**



   b. **Push up the locking lever to lock the AC power cord (panel 2).**

   c. **Repeat these steps until all six AC power cords are connected.**

Related Information

- "AC Input Filter Configuration" on page 344
- "Remove an AC Input Filter" on page 345
- "Install an AC Input Filter" on page 347
- "Disconnect AC Input Filters" on page 348
- "Remove the Power System Cage" on page 323.
- "Install the Power System Cage" on page 326.

Servicing the Rear LED Panel

The rear LED panel is a cold-service component. See "CMU Cage Component Locations" on page 14 for the location of the rear LED panel.

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Rear LED Panel LEDs

The LEDs on the rear LED panel show the status of the server and its replaceable components. There are no LEDs to indicate the status of the rear LED panel itself.

The LEDs on the rear LED panel are described in "Front and Rear LED Panel LEDs and Controls" on page 55.

Note – While the service processor is booting, two Fault LEDs light on the server's rear LED panel. These are the amber system Fault LED and the service processor Fault LED. This is normal behavior. The green OK LEDs light when the service processor finishes booting.

Related Information

- "Remove the Rear LED Panel" on page 354
- "Install the Rear LED Panel" on page 355
- "Front and Rear LED Panel LEDs and Controls" on page 55

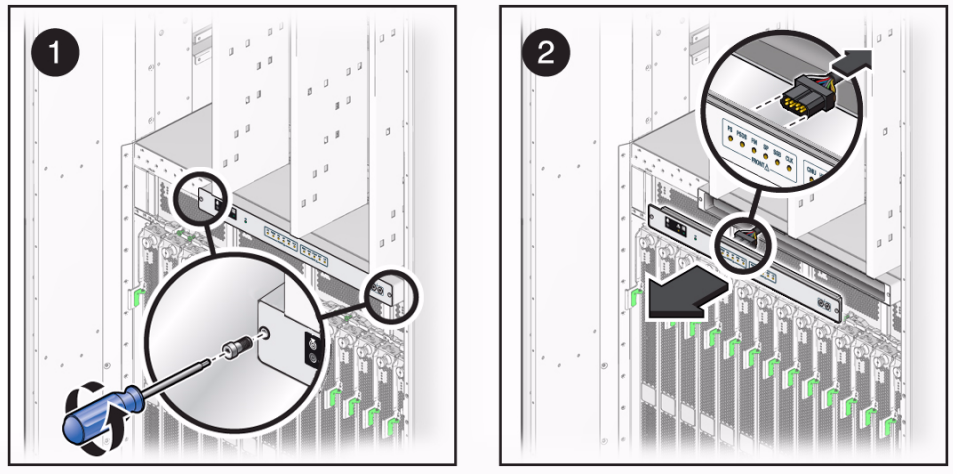
▼ Remove the Rear LED Panel

1. **Power down the server and turn off all AC.**

   See "Prepare to Power Off the Server" on page 73

Caution – Danger of electrocution: AC circuits in the server share current. Remove all sources of AC current from the server.

2. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
3. **Use a Torx T10 screwdriver to remove two mounting screws from the ends of the rear LED panel.**



4. **Pull the rear LED panel out of its slot and disconnect the interface cable.**
5. **Install the new rear LED panel.**

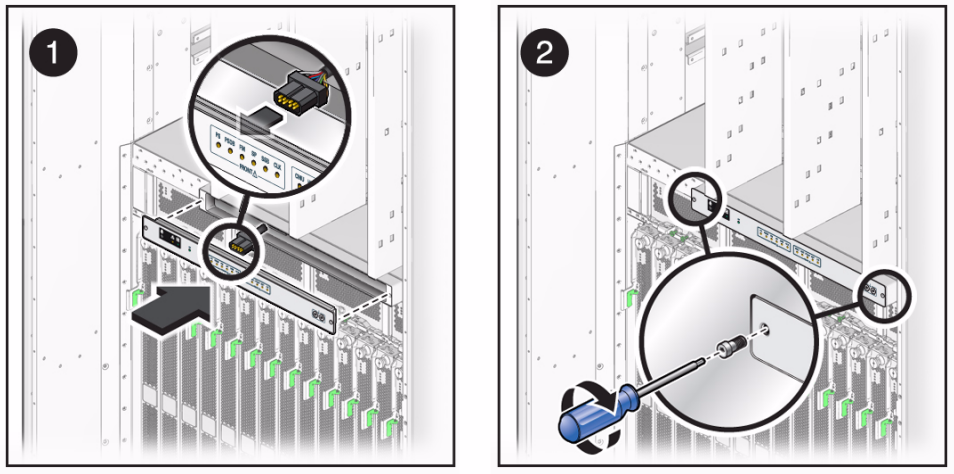
   See "Install the Rear LED Panel" on page 355.

Related Information

- “Rear LED Panel LEDs” on page 353
- “Install the Rear LED Panel” on page 355
- “Front and Rear LED Panel LEDs and Controls” on page 55

▼ Install the Rear LED Panel

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Connect the interface cable to the rear LED panel.**



3. **Push the interface cable into the opening at the rear of the slot while you put the rear LED panel in the slot.**
4. **Use a Torx T10 screwdriver to install the screws at the sides of the rear LED panel.**

   Tighten the screws to 7 in-lb. See “Torque Reference” on page 66.
5. **Connect AC power to the server.**

   “Reconnect AC Power to the Server” on page 483

   The fans in the server will restart.
6. **Restart the server.**

   See “Restart the Server” on page 484

7. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "Rear LED Panel LEDs" on page 353
- "Remove the Rear LED Panel" on page 354
- "Front and Rear LED Panel LEDs and Controls" on page 55

Servicing IOUs

IOUs are cold-service components. See "IOU Component Locations" on page 12 for the location of IOUs.

Caution – These components must be serviced only by a trained service technician.

An empty IOU weighs 27.5 lbs (12.5 kg).

Caution – A fully loaded IOU can weigh more than 80 lbs (36 kg).

- "Remove an IOU" on page 357
- "Install an IOU" on page 362

Related Information

- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

▼ Remove an IOU

Prepare an adequate amount of space to store the contents of the IOU in an orderly manner. After the procedure the components must be reinstalled in their original order.

Prepare labeling materials sufficient for all I/O cables attached to the IOU.

Note – The IOU replacement kit includes plastic covers to protect the IOU connectors. These covers are to be returned to Oracle.

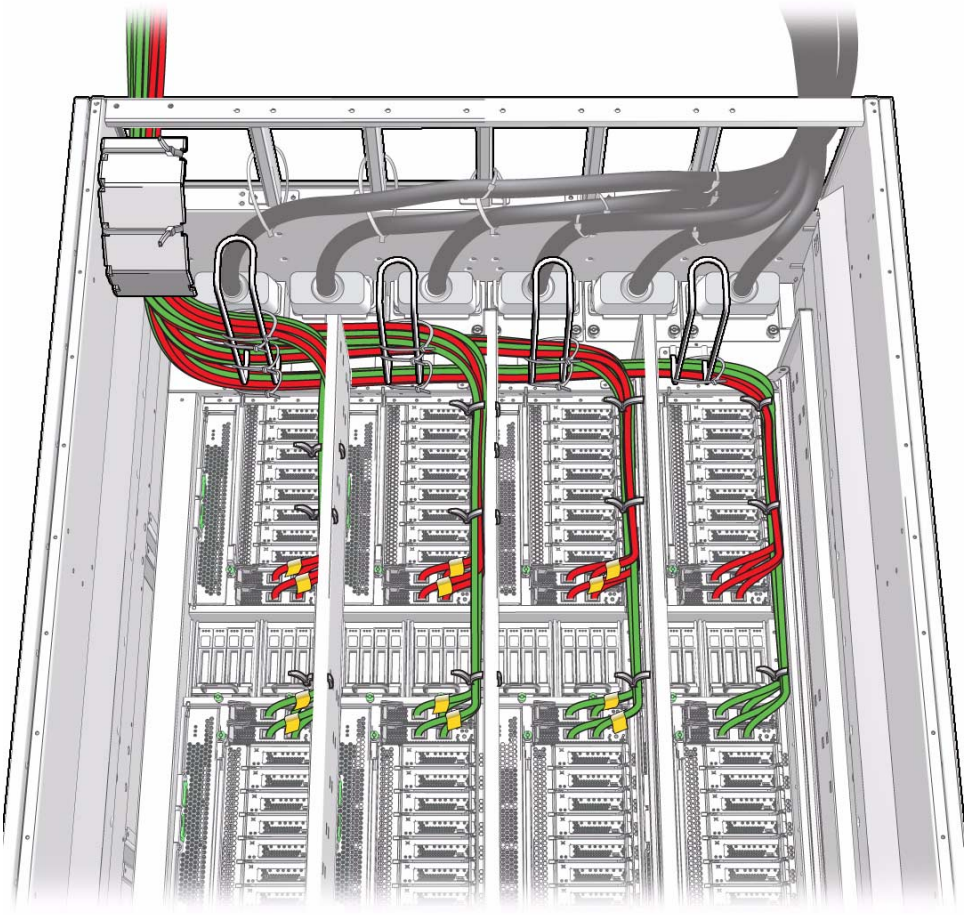
1. **Halt the server and turn off all AC power.**

   See "Prepare to Power Off the Server" on page 73.

Caution – Danger of electrocution: AC circuits in the server share current. Remove all sources of AC current from the server.

2. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
3. **Label and disconnect all I/O cables to the IOU.**

   Label the cables with their IOU numbers and slot numbers to avoid confusion during the installation steps.

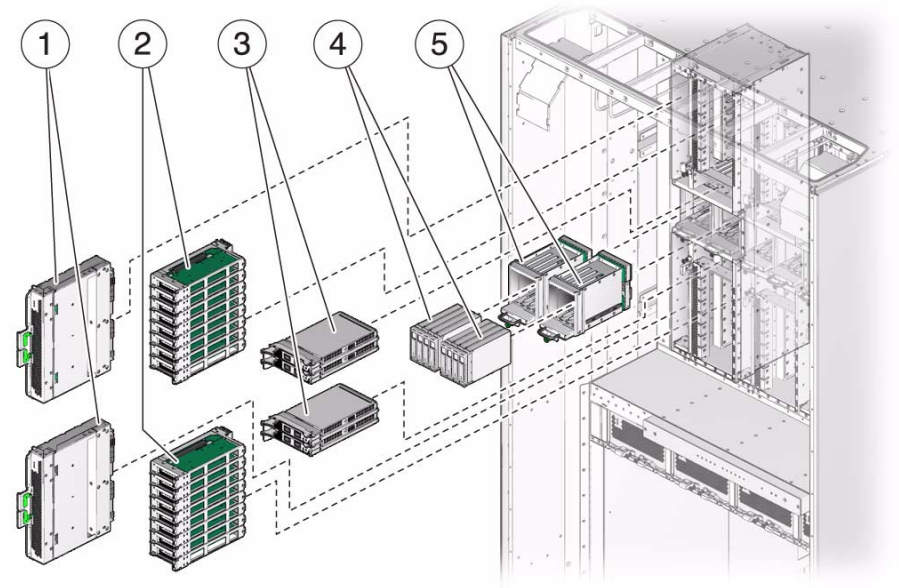


4. **Move or remove any cable management assembly that blocks the removal path of the IOU.**

   See "Remove a Cable Management Assembly" on page 159.

5. **Empty all IOU slots.**

   Set the components aside in orderly groups so you can put them back in their proper slots during the installation steps.



a. **Remove the I/O boards (1).**

b. **Remove the upper set of eight I/O cards and carriers (2).**

   For instructions, see "Remove an I/O Card From the Server" on page 180.

c. **Remove all four EMSs (3).**

   For instructions, see "Remove an EMS" on page 205.

d. **Remove all eight HDDs (4).**

   For instructions, see "Remove an HDD" on page 222.

e. **Remove the lower set of eight I/O cards and carriers (2).**

f. **Remove the two disk cages (5).**

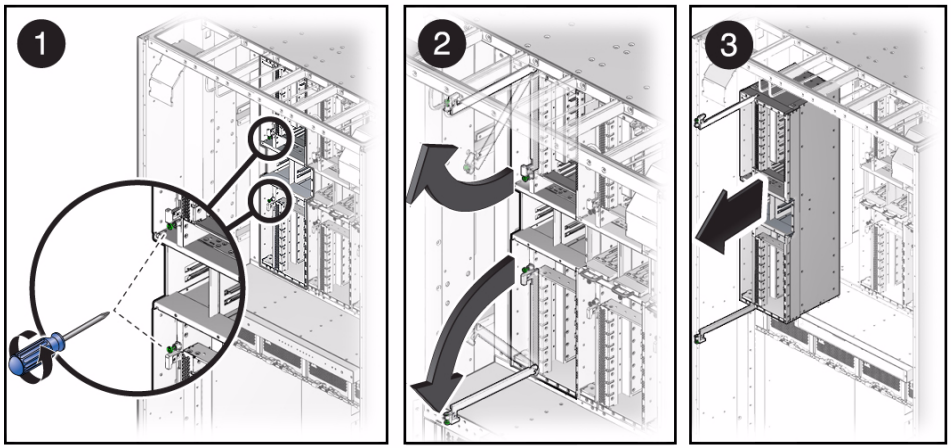
   For instructions, see "Remove a Hard Drive Cage" on page 372

6. **Remove the IOU.**

   a. **Use a T25 Torx screwdriver to loosen the captive screws on the two extraction levers**

   b. **Fully open the extraction levers.**

Caution – The open extraction levers might slip down to eye level and pose a danger. Keep the levers closed and locked whenever possible.



c. **Pull the IOU out of the cabinet.**

Caution – The connectors on the rear of the IOU are easily damaged. Do not rest the IOU on its connectors on a work surface.

d. **Close the IOU extraction levers and secure the captive screws.**

Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

7. **Place the IOU on a static-safe mat.**

Related Information

- "Install an IOU" on page 362
- "IOU Component Locations" on page 12

▼ Install an IOU

Note – The IOU replacement kit includes plastic covers to protect the IOU connectors. These covers are to be returned to Oracle.

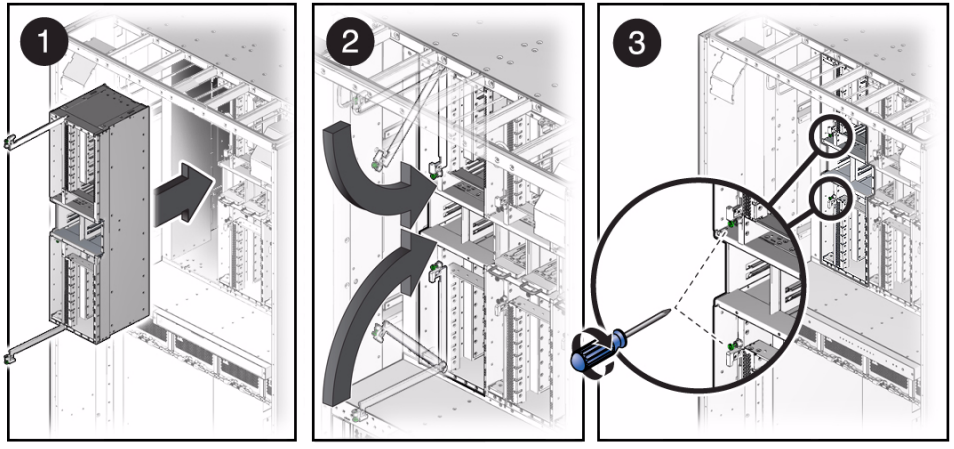
1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Transfer the grey plastic connector covers from the new IOU to the old IOU.**

   Squeeze the edges of a cover to release it from the connector.
3. **Install the new IOU.**

   a. **Loosen the captive screws on the two extraction levers**

   b. **Fully open the extraction levers.**

Caution – The open extraction levers might slip down to eye level and pose a danger. Keep the levers closed and locked whenever possible.



   c. **Slowly slide the IOU into its slot.**

   Keep the IOU as perfectly vertical as possible.

   When the IOU is almost completely into the slot, stop when you feel some resistance.

Caution – There is a danger of bending pins in the connector at the back of the IOU. Do not hold the IOU at an angle when inserting it into the slot.

d. Complete the insertion by closing both extraction levers at the same rate so that they both completely close at the same time.

Note – Because of the large number of connector pins at the rear of the IOU, it is normal to feel a larger than normal resistance as you seat the IOU. If you are not sure that you inserted the IOU at the proper angle (exactly 90° to the midplane), pull the IOU out and inspect the connector sockets and pins for damage. If there is no damage, try inserting the IOU again.

e. Use a T25 Torx screwdriver to tighten the captive screws on the extraction levers.

Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

4. Fill the IOU slots.

Note – Install all components in their original locations.

a. Install the two HDD disk cages.

For instructions, see "Install a Hard Drive Cage" on page 373.

b. Install the lower eight CARs.

For instructions, see "Install an I/O Card in the Server" on page 184.

c. Install the eight HDDs.

For instructions, see "Install an HDD" on page 224.

d. Install the four EMSs.

For instructions, see "Install an EMS" on page 206

e. Install the upper eight CARs.

5. Install any cable management assemblies that you moved during the IOU removal procedure.

See "Install a Cable Management Assembly" on page 161.

6. Install the I/O cables.

Leave some slack in the cables to allow the cables to be moved aside when necessary.

Caution – Tying I/O cables too tightly can damage them.

7. **Connect AC power to the server.**

   "Reconnect AC Power to the Server" on page 483

8. **Restart the server.**

   See "Restart the Server" on page 484

9. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

   Include the plastic connector covers (Step 2) with the component.

Related Information

- "Remove an IOU" on page 357
- "IOU Component Locations" on page 12

Servicing an I/O Power Cable Assembly

The I/O power cable assembly is a cold-service component.

The factory description for this cable is “CABLE ASSY,I/O POWER”.

- “Remove an I/O Power Cable Assembly” on page 365
- “Install an I/O Power Cable Assembly” on page 368

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

▼ Remove an I/O Power Cable Assembly

The replacement kit includes:

- Cable
- Tie wrap kit
- T20 Torx bit
- T30 Torx bit
- Torque wrench, 1/4 inch drive
- Socket extension, 1/4 inch drive

The tools must be returned to Oracle.

1. **Halt the server and turn off all AC power.**

   See “Prepare to Power Off the Server” on page 73.

Caution – Danger of electrocution: AC circuits in the server share current. Remove all sources of AC current from the server.

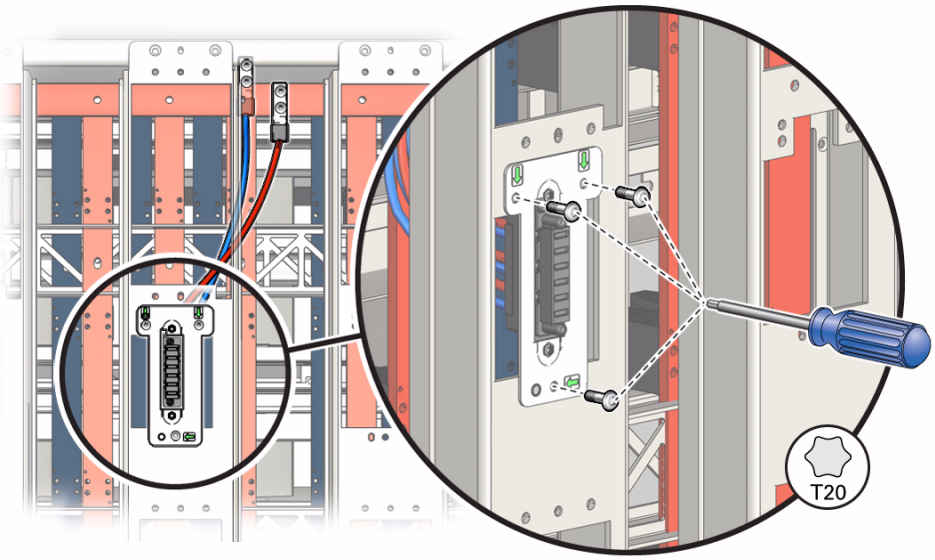
2. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
3. **Remove the IOU that uses the I/O power cable assembly.**

   See “Remove an I/O Power Cable Assembly” on page 365.

4. **Remove the I/O power cable assembly:**

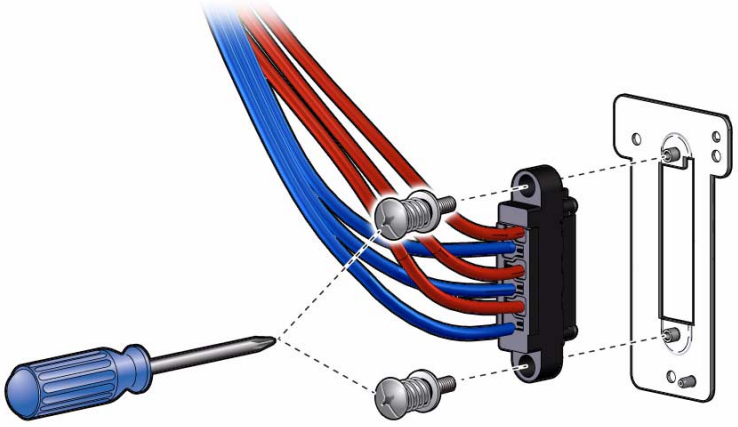
   a. **Disconnect the small bracket and the lower end of the cable from the IOU support column.**

      Remove three T20 Torx screws from the front of the bracket.



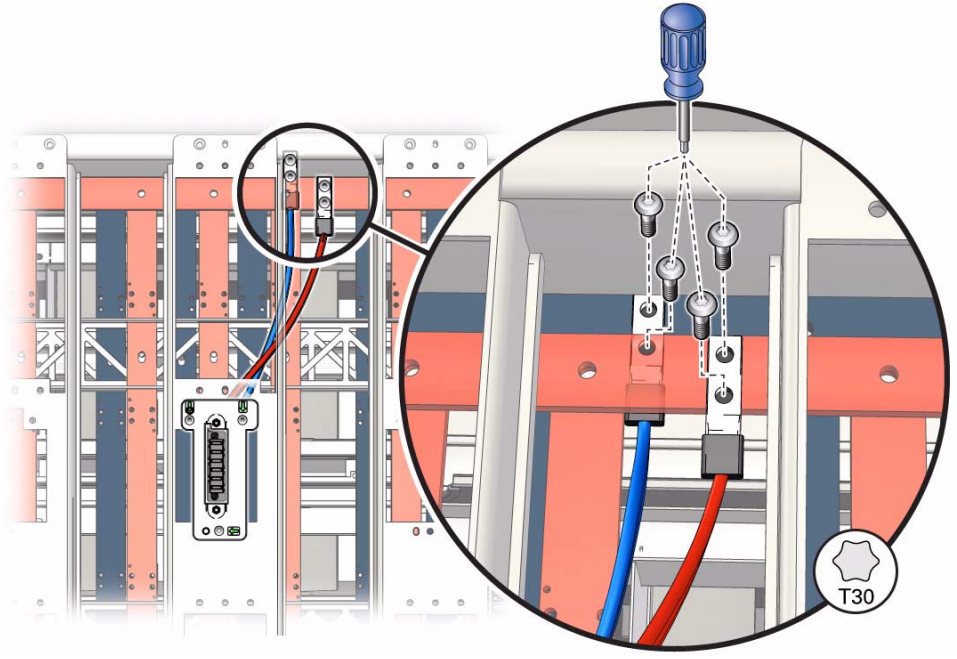
b. Remove the small bracket from the cable.

Remove the two Phillips No. 2 shoulder screws that hold the bracket to the cable connector. Each shoulder screw includes a spring and a washer.



c. Disconnect the upper terminals of the cable from the bus bars.

Remove two T30 screws from each terminal.



5. **Install the replacement cable.**

   See "Install an I/O Power Cable Assembly" on page 368.

Related Information

- "Install an I/O Power Cable Assembly" on page 368

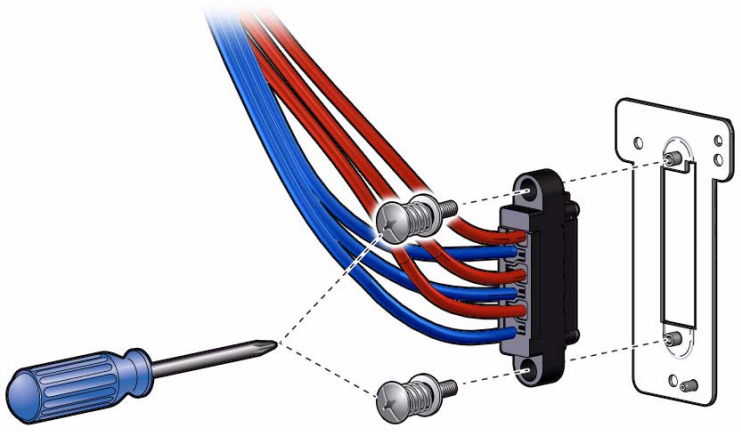
▼ Install an I/O Power Cable Assembly

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install the I/O power cable assembly:**

   a. **Attach the small bracket to the cable connector.**

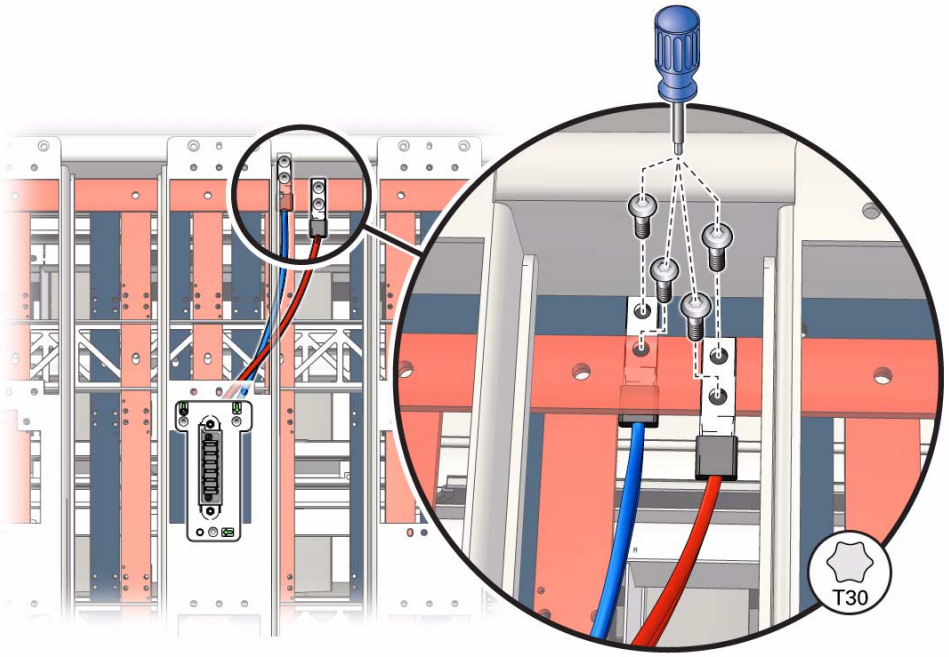
      Install the two Phillips No. 2 shoulder screws. Each shoulder screw includes a spring and a washer.

      Tighten the screws to 7 in-lb. See "Torque Reference" on page 66.

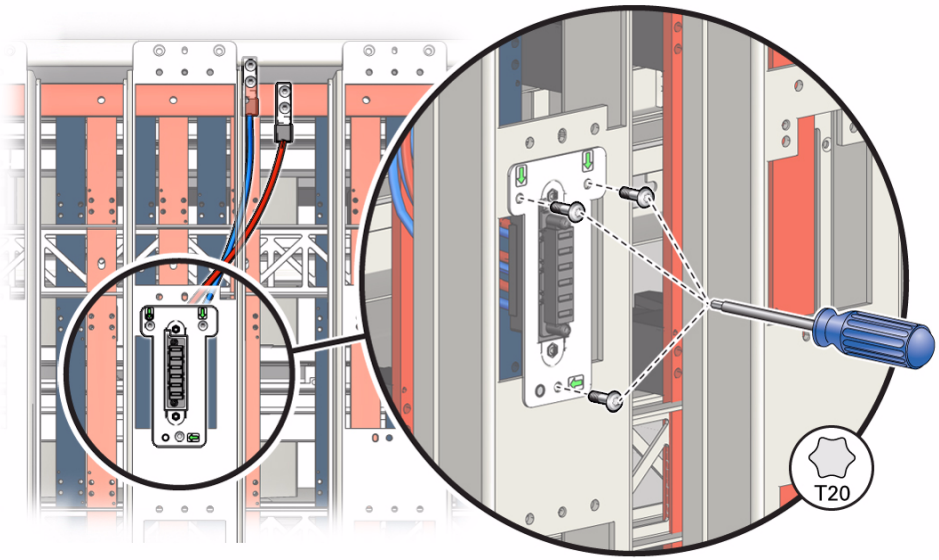


b. Use T30 Torx screws to attach the cable terminals to the bus bars.

Tighten the screws to 40 in-lb. See "Torque Reference" on page 66.



c. **Use three T20 Torx screws to attach the bracket to the IOU support column.**
   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.



3. **Install the IOU that uses the I/O power cable assembly.**
   See "Install an I/O Power Cable Assembly" on page 368.
4. **Connect AC power to the server.**
   "Reconnect AC Power to the Server" on page 483
5. **Restart the server.**
   See "Restart the Server" on page 484
6. **Return the replaced component to Oracle.**
   See "Return a Component to Oracle" on page 488.
   Include the torque screwdriver and accessories.

Related Information

- "Remove an I/O Power Cable Assembly" on page 365

Servicing Hard Drive Cages

The hard drive cage is hot-serviceable when the PDomain is off. See "IOU Component Locations" on page 12 for the location of hard drive cages.

Note – The backplane of the hard drive cage exhibits a weak amber glow that is visible only when a drive carrier is removed from the cage. The glow is normal and can be ignored.

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

Hard Drive Cage Configuration

SPARC M5-32 and early SPARC M6-32 servers: some replacement hard drive cages and EMSs are not compatible. See "EMS and Hard Drive Cage Compatibility" on page 194 before you replace a hard drive cage or an EMS.

Related Information

- "EMS and Hard Drive Cage Compatibility" on page 194
- "Remove a Hard Drive Cage" on page 372

■ "Install a Hard Drive Cage" on page 373

▼ Remove a Hard Drive Cage

Before you start, determine that the replacement is the correct version of hard drive cage. See "EMS and Hard Drive Cage Compatibility" on page 194.

1. **Determine if a DCU is part of a PDomain.**

```
-> show /System/DCUs/DCU_x host_assigned
/System/DCUs/DCUx
Properties:
host_assigned = HOSTy
```

2. **Stop the PDomain that contains the hard drive cage.**

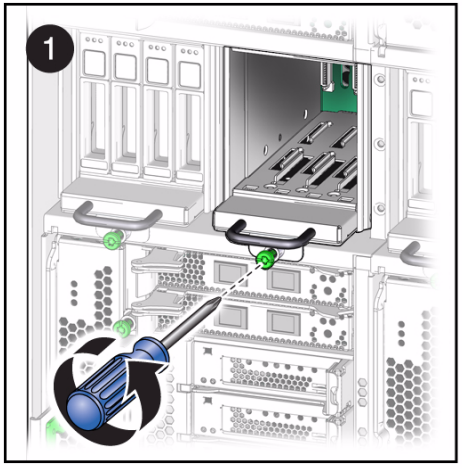
```
-> stop /Servers/PDomains/PDomain_y/HOST
```

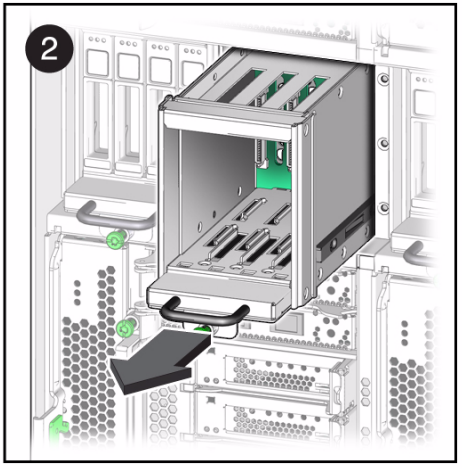
3. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

4. **Remove all drives from the hard drive cage.**

   Note the order of the hard drives. They must be installed in the same order in the replacement cage.

5. **Unlock the captive T25 Torx screw at the bottom of the hard drive cage.**





6. **Pull out the cage.**

7. **Install a hard drive cage.**

   See "Install a Hard Drive Cage" on page 373.

Related Information

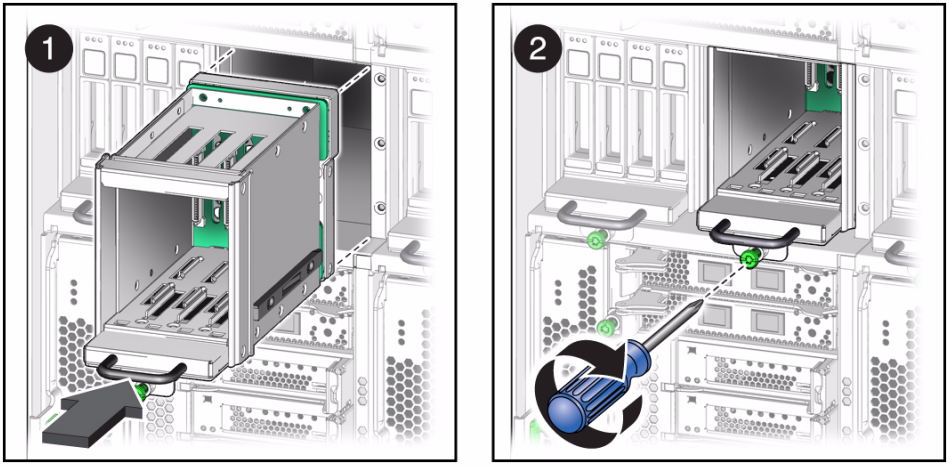
- "Hard Drive Cage Configuration" on page 371
- "EMS and Hard Drive Cage Compatibility" on page 194
- "Install a Hard Drive Cage" on page 373

▼ Install a Hard Drive Cage

If the hard drive cage is in a SPARC M5-32 or early SPARC M6-32 server, see "EMS and Hard Drive Cage Compatibility" on page 194. Be certain that you have the correct replacement.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

2. **Push the cage into the slot so that it seats on the IOU backplane.**



3. **Lock the captive T25 Torx screw.**

   Tighten the screw to 7 in-lb. See "Torque Reference" on page 66.

4. **Install the hard drives (in the same order as before).**

5. **Restart the PDomain.**

```
-> start /Servers/PDomains/PDomain_y/HOST
```

6. **Return the replaced component to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "Hard Drive Cage Configuration" on page 371
- "EMS and Hard Drive Cage Compatibility" on page 194
- "Remove a Hard Drive Cage" on page 372

Servicing the Scalability Assembly

The scalability assembly is a cold-service component. See "Identifying Internal Components" on page 17 for the location of the scalability assembly and EMI panels.

Caution – The scalability assembly weighs 80 lbs (36 kg). Two people are required to move it.

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

▼ Remove the Scalability Assembly

1. **Halt and power down the server.**

   See "Prepare to Power Off the Server" on page 73.

2. **Remove the front door.**

   See "Remove the Door" on page 77.

3. **Remove trim panels to protect them from being scratched.**

   See "Remove the Trim Panels" on page 91 to remove the following parts.

   a. **Remove the two side trim panels.**

b. Remove trim panel standoffs.

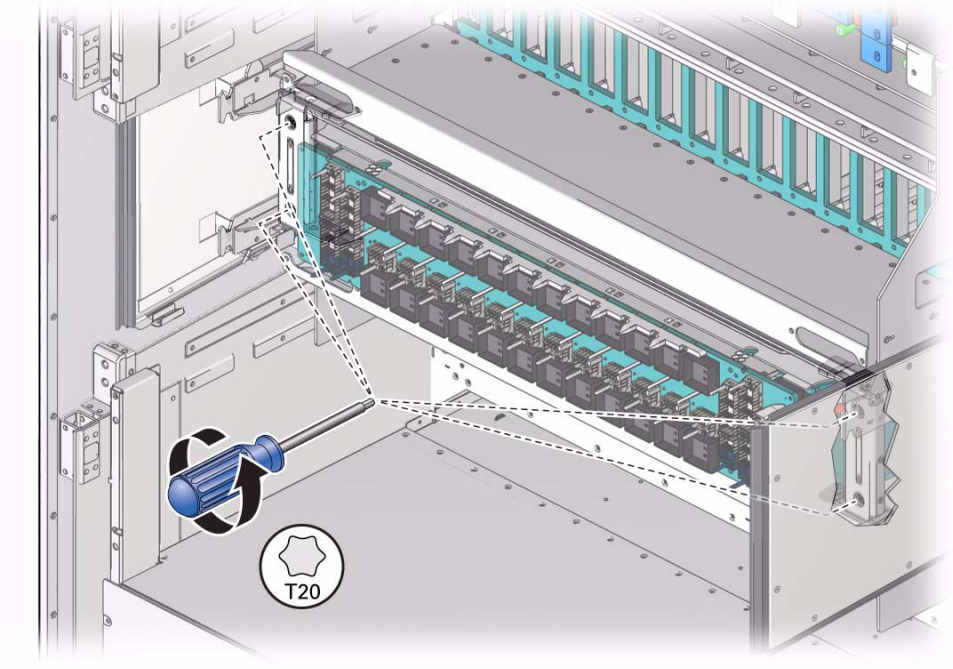
Remove the standoffs nearest to the scalability card cage to protect them from breakage.

4. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
5. **Remove the scalability card cage.**

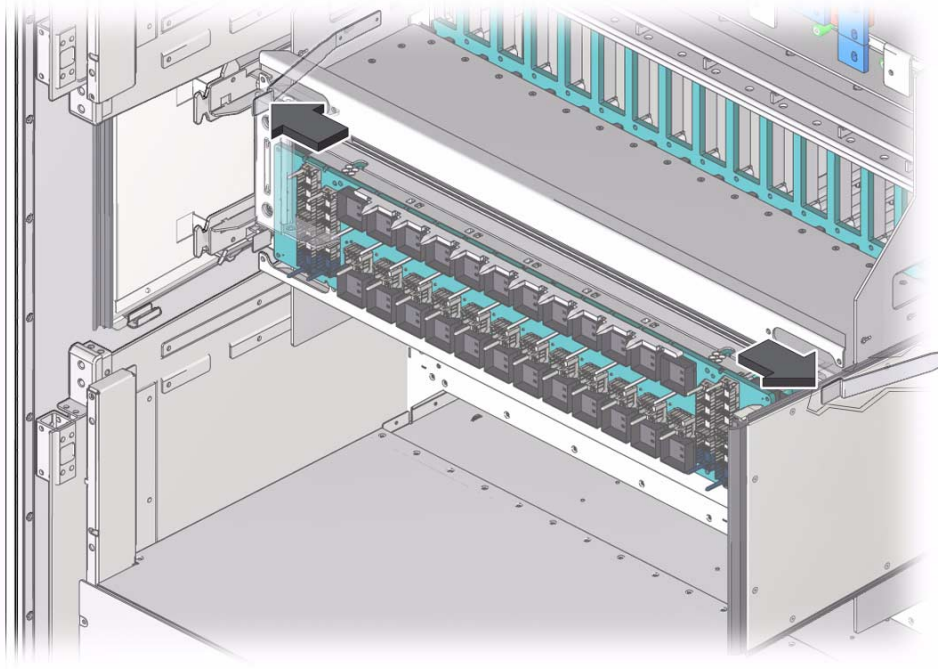
   See "Remove the Scalability Card Cage" on page 314.

6. **Loosen the four captive T20 Torx locking screws on the extraction levers at the sides of the scalability assembly.**

   Use a socket extension if necessary.



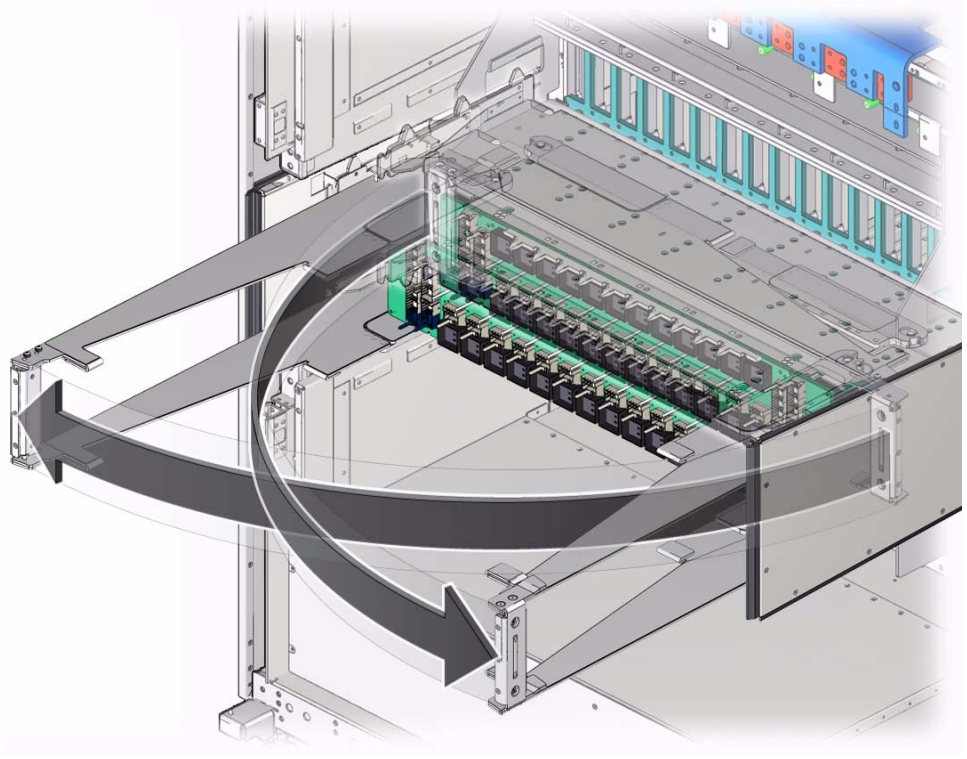
7. **Press the retaining springs to unlock the extraction levers, then swing the extraction levers to the open position.**



8. **Unlock the scalability assembly from the midplane.**

   Pull both handles slowly and simultaneously to unlock the scalability assembly.

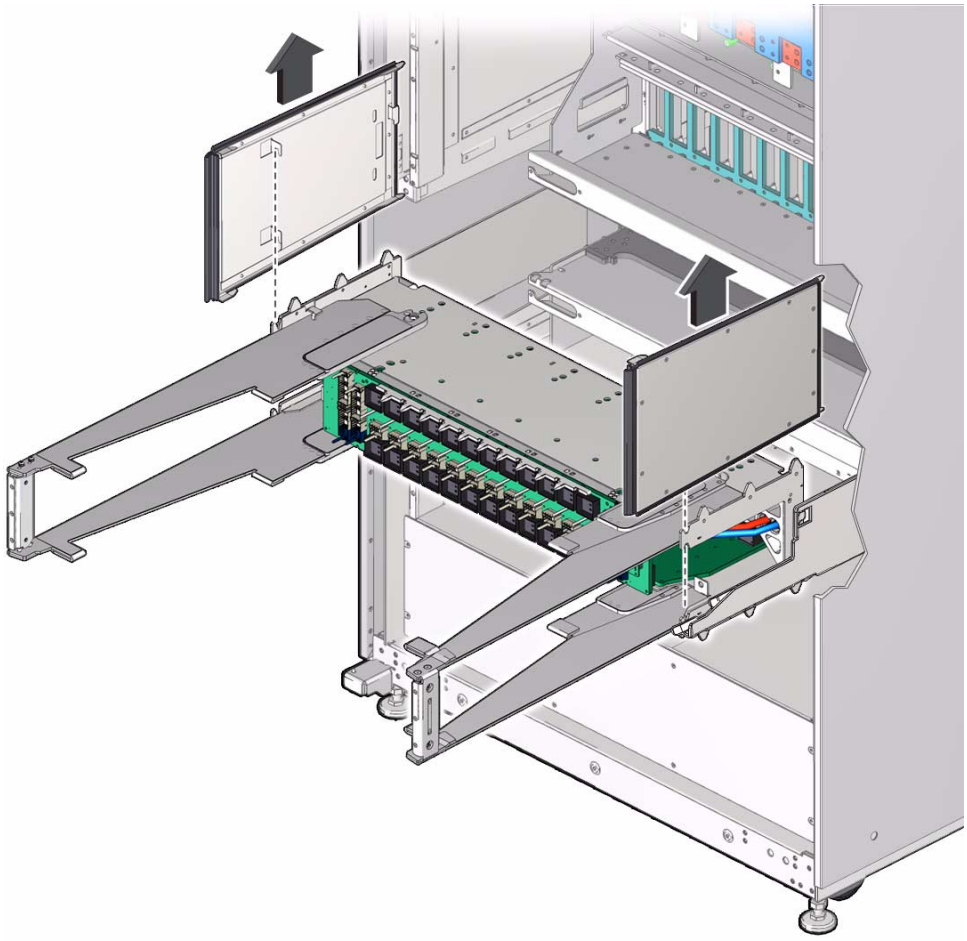
Caution – Pull both handles simultaneously. This action keeps the scalability assembly parallel to the midplane. Pulling just one handle forces the scalability assembly at an angle to the midplane and damages the connectors.



9. **Carefully slide the scalability assembly out of the cabinet.**

Caution – There is very little clearance to the sides. Be very careful near the connector sockets on the sides of the cabinet.

10. **Lift off the EMI panels from the sides of the scalability assembly.**



11. **Fold the handles to the fully closed position and tighten the four captive T20 locking screws on the handles.**

    Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

12. **Lift the scalability assembly off the slides and place it on a static-safe mat.**

13. **Place protective plastic covers on the connectors of the scalability assembly.**

    The covers are packaged separately with the replacement scalability assembly. Additional covers are on the replacement scalability assembly. Do not remove them until you are ready to install the replacement.

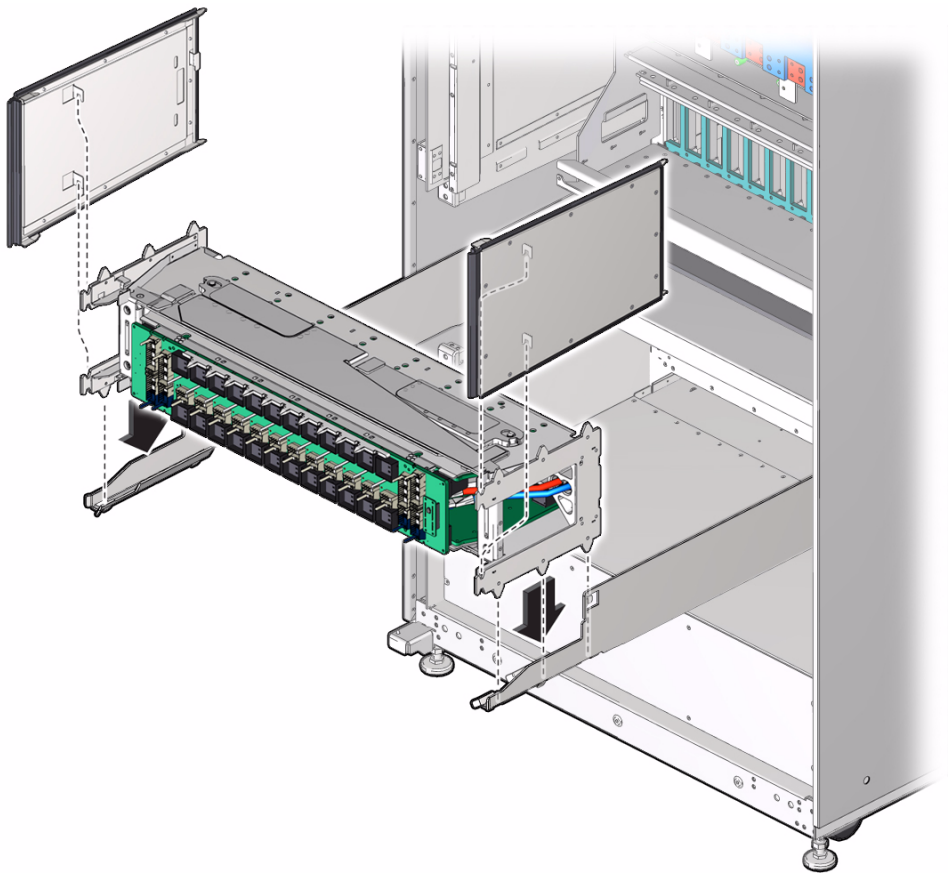
Related Information

- "Install the Scalability Assembly" on page 380
- "Understanding Scalability" on page 20
- "Scalability Card Cage Component Locations" on page 8

▼ Install the Scalability Assembly

Caution – The scalability assembly requires at least two people to move it.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Remove the protective plastic covers from the connectors on the replacement scalability assembly.**
3. **Place the scalability assembly on the slides.**



4. **Install the EMI panels on the sides of the scalability assembly.**

   Note that the tabs on the sides of the panels must face down. The two panels are not interchangeable.

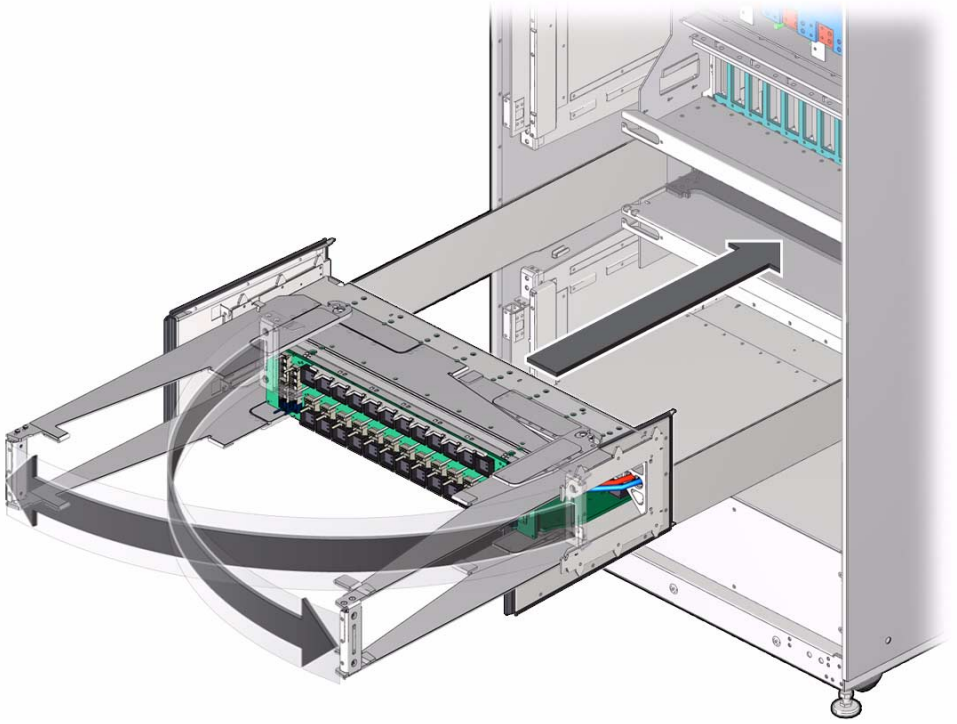
5. **Swing the handles to the fully open position and use the handles to carefully push the scalability assembly into the slot.**

Caution – Push both handles simultaneously. This action keeps the scalability assembly parallel to the midplane. Pushing just one handle forces the scalability assembly at an angle to the midplane and damages the connectors.

When the scalability assembly reaches the end of the slot, the extraction handles start to close as they engage the midplane.

Caution – There is very little clearance to the sides. Be very careful sliding the scalability assembly between the cables on the sides of the cabinet.

Caution – Because of the weight of the scalability assembly, it is easy to accidentally damage the connectors at the rear. Push the scalability assembly slowly until the connectors on the scalability assembly and midplane are engaged.



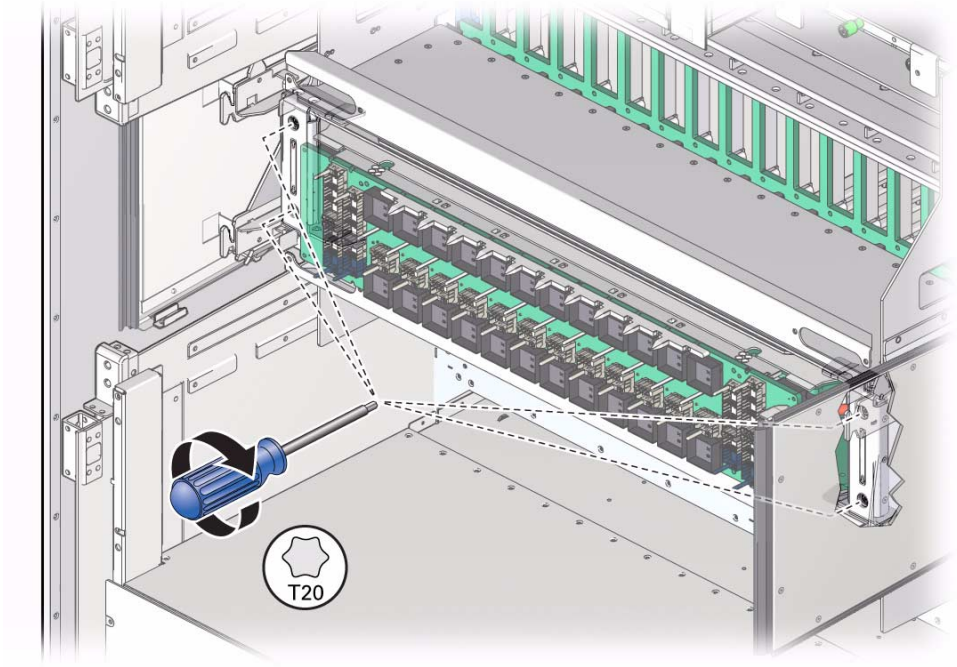
6. **Lock the scalability assembly to the midplane.**

   Push both handles slowly and simultaneously to lock the scalability assembly.

7. **Tighten the T20 Torx locking screws on the extraction levers.**

   Use a socket extension if necessary.

   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.



8. **Reinstall the scalability cage.**

   See “Install the Scalability Card Cage” on page 316.

9. **Install the standoffs and trim panels.**

   See “Install Trim Panels” on page 95.

10. **Install the front door.**

    See “Install the Door” on page 81.

11. **Connect AC power to the server.**

    See “Reconnect AC Power to the Server” on page 483

12. **Restart the server.**

    See “Restart the Server” on page 484

13. **Return the replaced component to Oracle.**

    See “Return a Component to Oracle” on page 488.

    Include all plastic covers with the component.

Related Information

- “Remove the Scalability Assembly” on page 375
- “Understanding Scalability” on page 20

- "Scalability Card Cage Component Locations" on page 8

Servicing the Fan Power Cable

Fan power cables are cold service only. There are two fan power cables in the server.

The factory description for this cable is “CABLE ASSY,FAN POWER”.

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

▼ Remove the Fan Power Cable

1. **Halt and power down the server.**
   See “Removing Power From the Server” on page 73.
2. **Remove the front door.**
   See “Remove the Door” on page 77.
3. **Remove trim panels to protect them from being scratched.**
   See “Remove the Trim Panels” on page 91 to remove the following parts.
   a. **Remove the two side trim panels.**
   b. **Remove trim panel standoffs.**
      Remove the standoffs on each side to protect them from breakage.
4. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

5. **Prepare a space in the server so you can access the cables:**

   a. **Remove the front filler panel.**

      See "Remove the Front Filler Panel" on page 291.

   b. **Remove the upper fan cage.**

      See "Remove the Upper Fan Cage" on page 296.

   c. **Remove the scalability card cage.**

      See "Remove the Scalability Card Cage" on page 314.

   d. **Remove the lower fan cage.**

      See "Remove the Lower Fan Cage" on page 301.

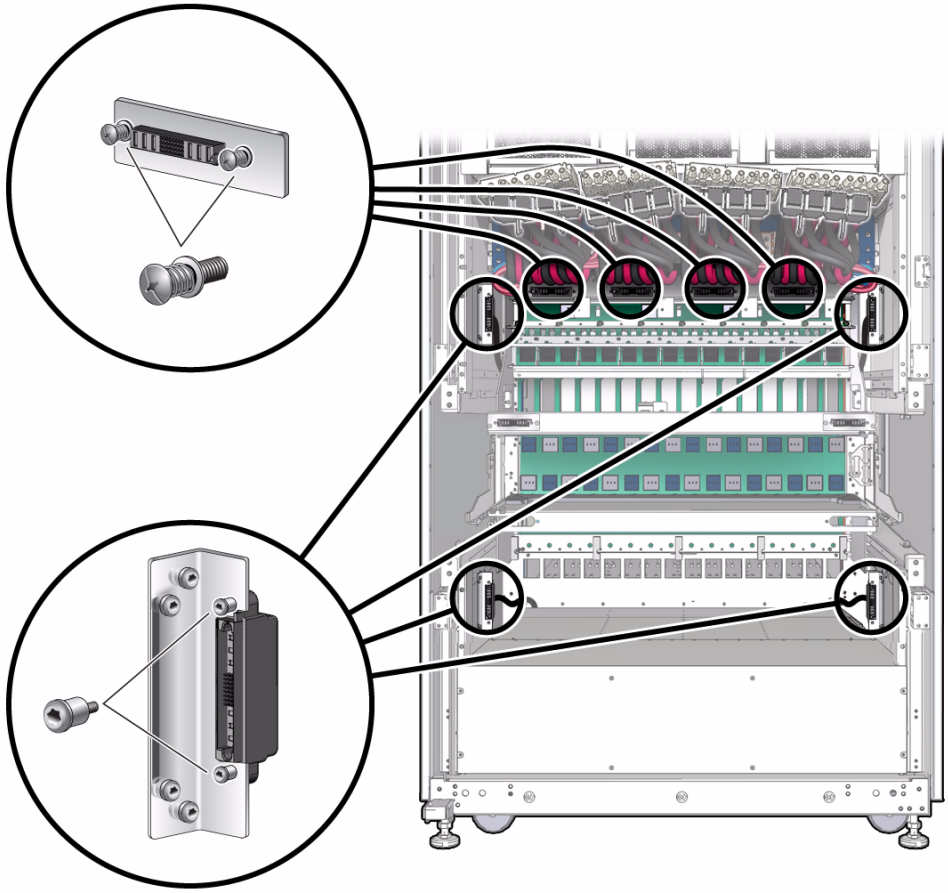
   e. **Remove the scalability assembly.**

      See "Remove the Scalability Assembly" on page 375.

6. **Locate the faulty cable.**

   The same cable can used in two separate places, so identify which side to replace.

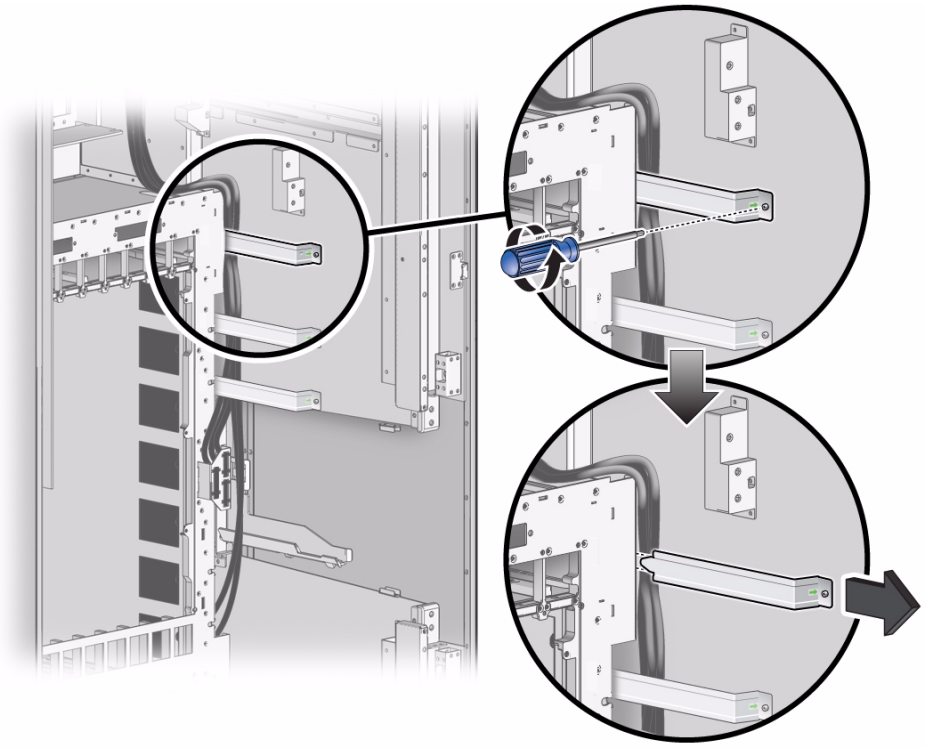
   The cable has four plastic connectors, labeled P1, P2, P3, and P4, and four metal connectors, labeled L1, L2, L3, and L4.



7. **Remove the top cable bracket:**

   The figure below shows cable brackets on the right side of the cabinet. The cable brackets on the left side of the cabinet are removed in the same way.

   a. **Remove the T20 Torx screw from the end of a bracket.**



   b. **Pull the bracket out and set it aside.**

8. **Undo the T20 spring screws holding connectors P1 and P2.**

Note – Take care not to drop the screws. These are not captive screws.

---

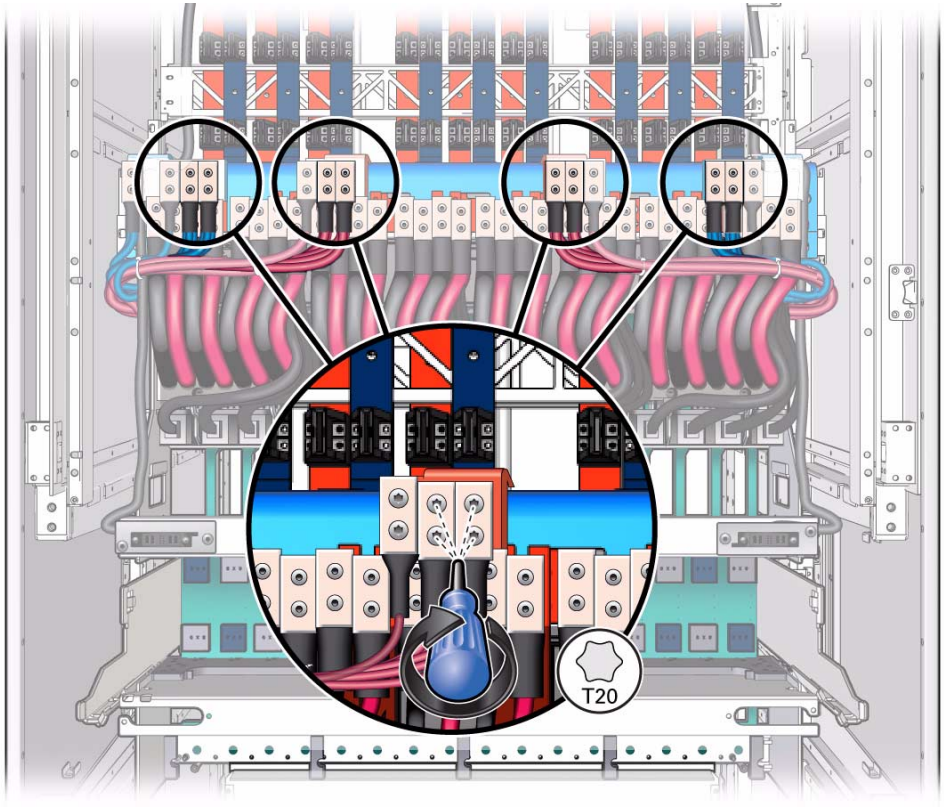
9. **Undo the T20 shoulder screws on connectors P3 and P4.**

Note – Take care not to drop the screws. These are not captive screws.

---

10. **Undo T20 screws to disconnect the +12v cables (L1 and L3) and the ground cables (L2 and L4) from the bus bars.**

    The following figure shows the connections for the left and right cables.



11. **To install the replacement cable, see** "Install the Fan Power Cable" on page 390**.**

Related Information

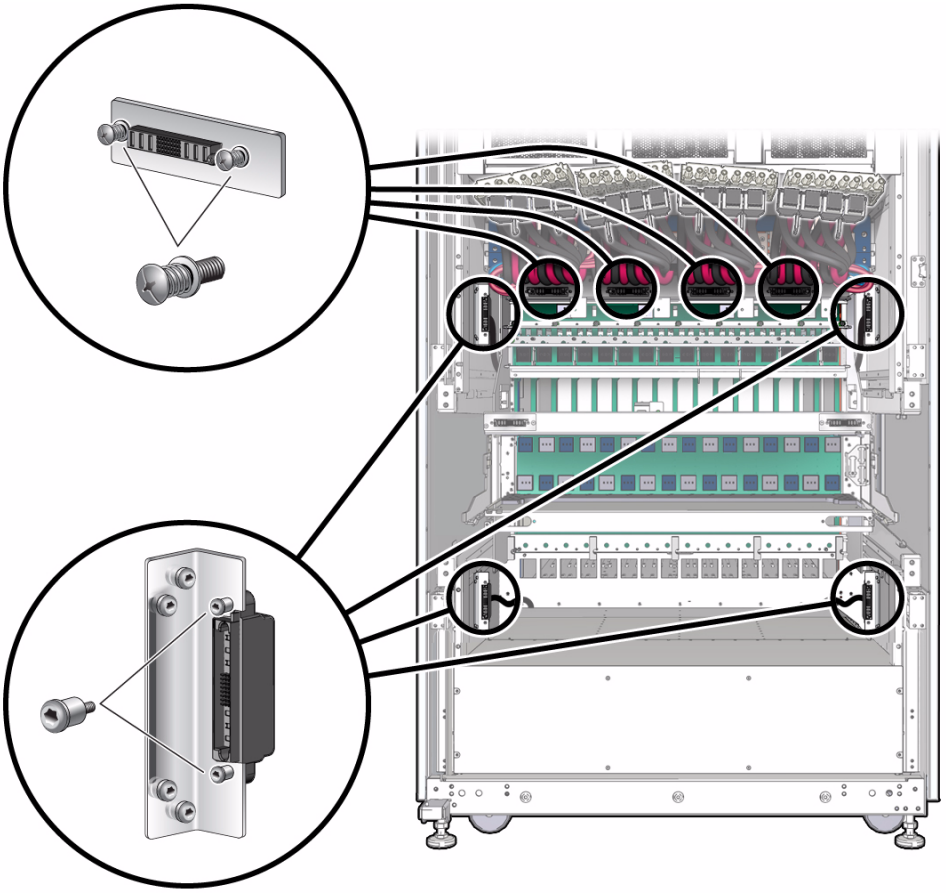
- "Install the Fan Power Cable" on page 390

▼ Install the Fan Power Cable

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Use T20 spring screws to attach connectors P1 and P2 to the midplane.**

   See the upper detail in the following illustration.

   Tighten the screws to 7 in-lb. See "Torque Reference" on page 66.



3. **Use T20 shoulder screws to attach connectors P3 and P4 to brackets on the side of server cabinet.**

   See the lower detail in the above illustration.

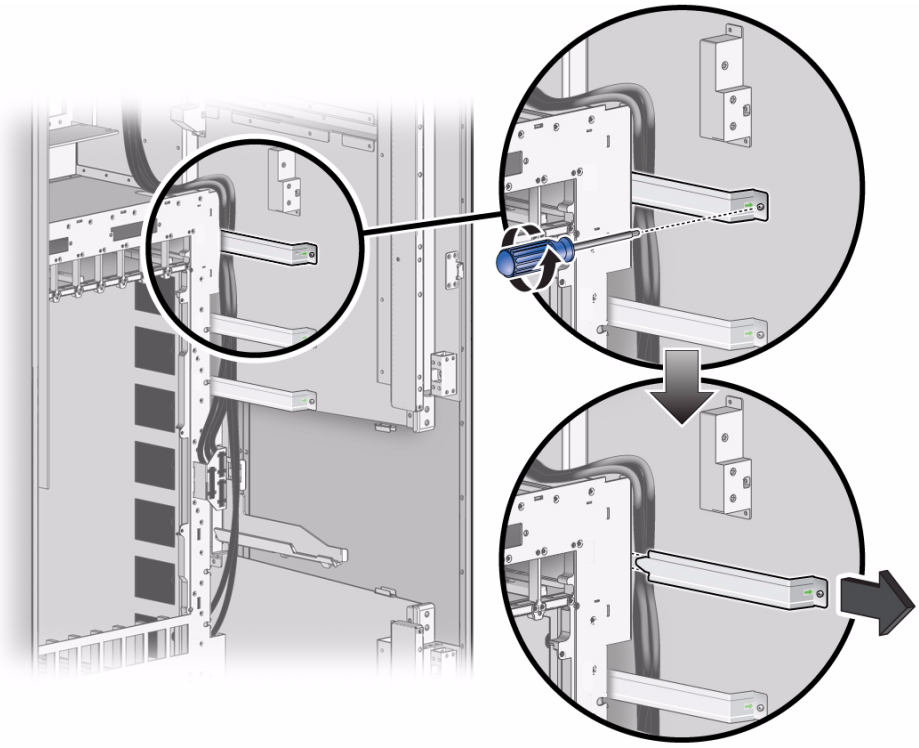
   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

4. **Install the top cable bracket.**

   See the following illustration.

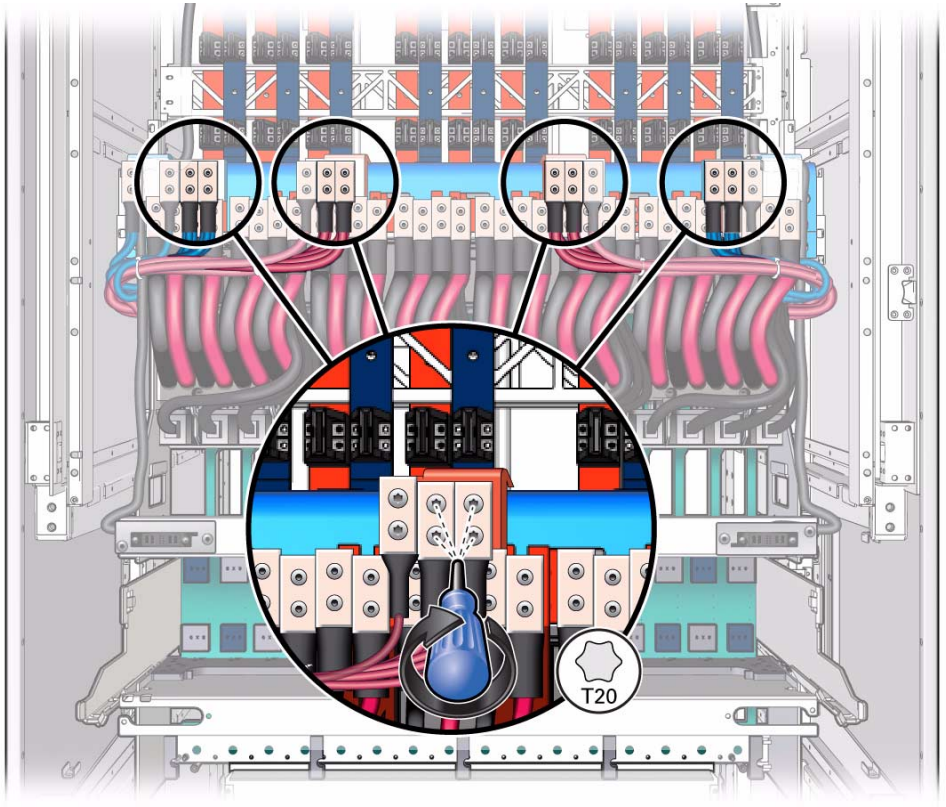
   Tighten the screw to 15 in-lb. See "Torque Reference" on page 66.

   The figure below shows cable brackets on the right side of the cabinet. The cable brackets on the left side of the cabinet are installed in the same way.



5. **Use T20 screws to connect the +12v cables (L1 and L3) and the ground cables (L2 and L4) to the bus bars.**

   The following figure shows the connections for the left and right cables.



6. **Reassemble the server:**

   a. **Install the scalability assembly.**

      See "Install the Scalability Assembly" on page 380.

   b. **Install the lower fan cage.**

      See "Install the Lower Fan Cage" on page 303.

   c. **Install the scalability card cage.**

      See "Install the Scalability Card Cage" on page 316.

   d. **Install the upper fan cage.**

      See "Install the Upper Fan Cage" on page 298.

e. **Install the front filler panel.**

   See "Install the Front Filler Panel" on page 293.

7. **Install the standoffs and trim panels.**

   See "Install Trim Panels" on page 95.

8. **Install the front door.**

   See "Install the Door" on page 81.

9. **Connect AC power to the server.**

   "Reconnect AC Power to the Server" on page 483

10. **Restart the server.**

    See "Restart the Server" on page 484

11. **Return the replaced component to Oracle.**

    See "Return a Component to Oracle" on page 488.

Related Information

- "Remove the Fan Power Cable" on page 385

Servicing the Power System Cage to Scalability Assembly Cable

The power system cage to scalability assembly cables are cold service only. There are two of these cables in the server.

The factory description for this cable is “CABLE ASSY, PWR_SHLF-SCALE FANS”.

- “Remove the Power System Cage to Scalability Assembly Cable” on page 395
- “Install the Power System Cage to Scalability Assembly Cable” on page 399

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

▼ Remove the Power System Cage to Scalability Assembly Cable

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Unpack and inspect the replacement cable.**

Caution – Use an antistatic mat to protect the cable.

Note – For access to the cable, the server must be powered down so that the components shown below can be removed.

3. **Halt and power down the server.**

   See "Prepare to Power Off the Server" on page 73.

4. **Remove the front door.**

   See "Remove the Door" on page 77.

5. **Remove trim panels to protect them from being scratched.**

   See "Remove the Trim Panels" on page 91 to remove the following parts.

   a. **Remove the two side trim panels.**

   b. **Remove trim panel standoffs.**

      Remove the standoffs on each side to protect them from breakage.

6. **Remove the front filler panel.**

   See "Remove the Front Filler Panel" on page 291.

7. **Remove the upper fan cage.**

   See "Remove the Upper Fan Cage" on page 296.

8. **Remove the scalability card cage.**

   See "Remove the Scalability Card Cage" on page 314.

9. **Remove the lower fan cage.**

   See "Remove the Lower Fan Cage" on page 301.

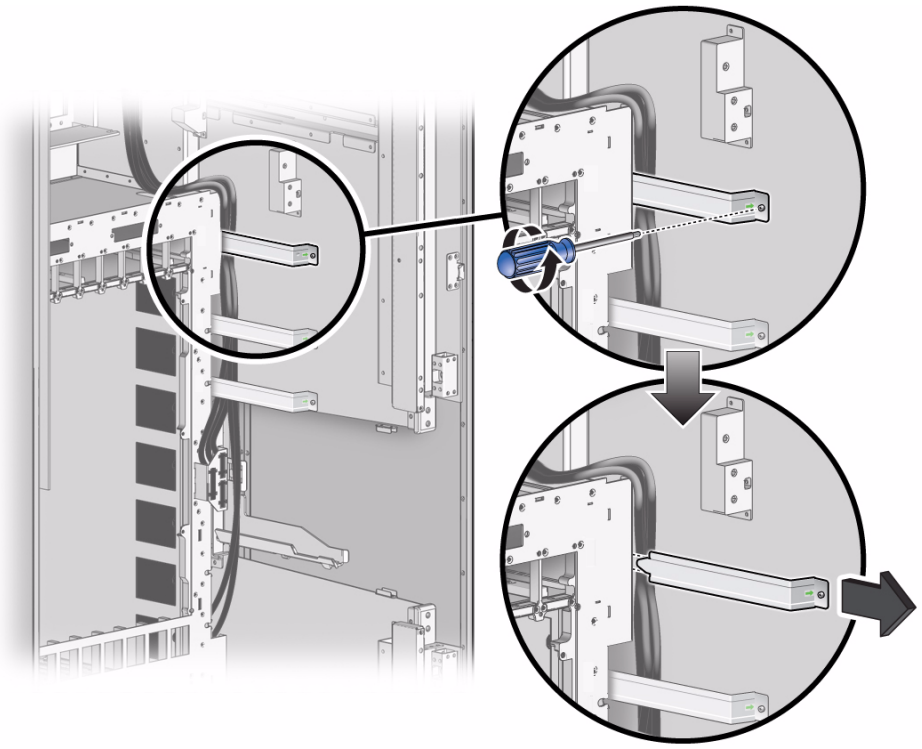
10. **Remove the scalability assembly.**

    See "Remove the Scalability Assembly" on page 375.

11. **Remove the cable brackets that hold cables to the side of the cabinet:**

    The figure below shows cable brackets on the right side of the cabinet. The cable brackets on the left side of the cabinet are removed in the same way.

    a. **Remove the T20 Torx screw from the end of a bracket.**



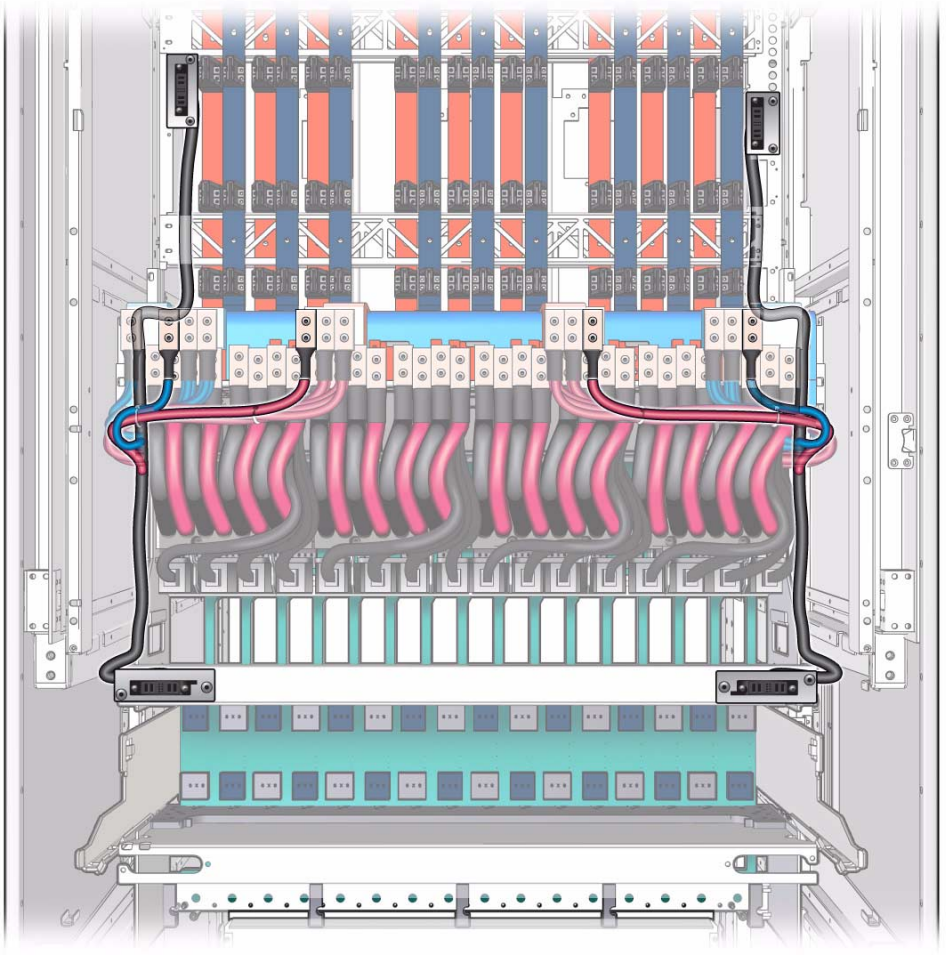
b. Pull the bracket out and set it aside.

c. Repeat these steps for the remaining brackets.

12. Undo two T20 Torx screws to remove the upper end of the cable and metal single-connector bracket from the side of the server.

Note – There are two scalability midplane to PSDB cables, one on the left side of the server and one on the right. The left and right cables are identical.

Note – Take care not to drop the screws. These are not captive screws.



13. **Undo two T20 Torx screws to remove the lower end of the cable.**

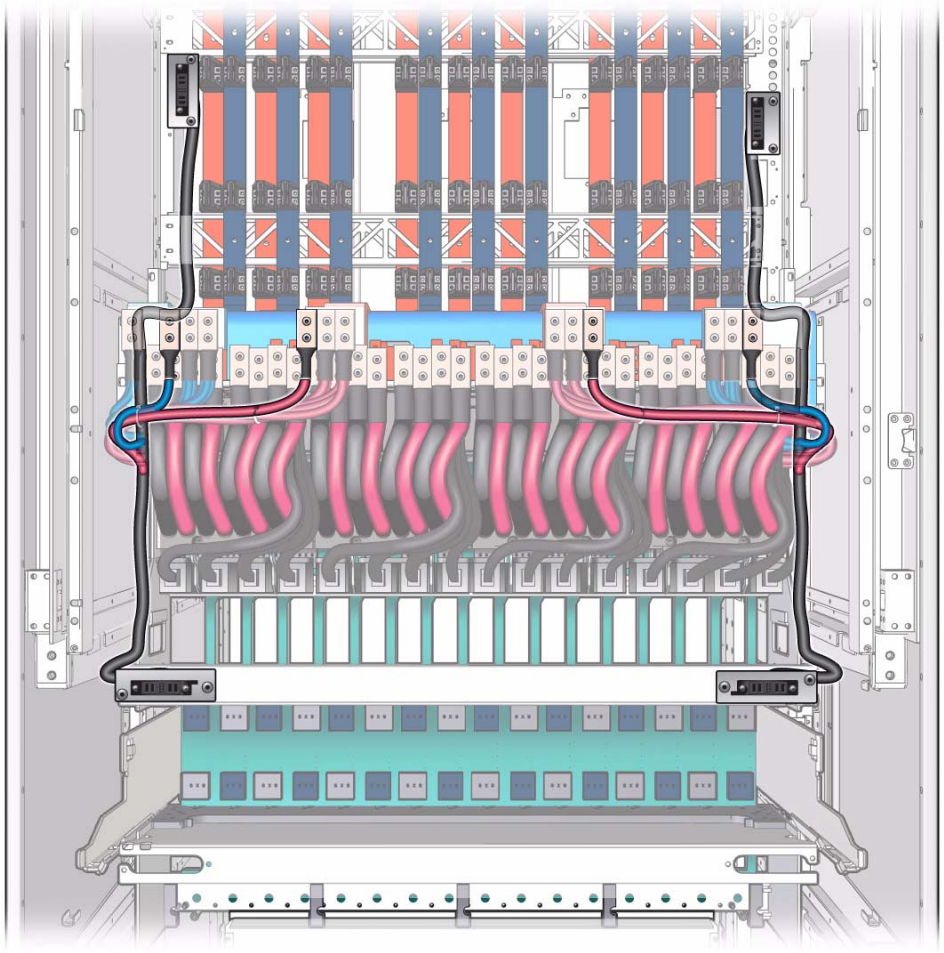
Note – Take care not to drop the screws. These are not captive screws.

Related Information

- "Install the Power System Cage to Scalability Assembly Cable" on page 399

▼ Install the Power System Cage to Scalability Assembly Cable

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Disconnect the faulty cable from the upper bracket and attach the bracket to the replacement cable.**



3. **Disconnect the faulty cable from the lower bracket and attach the bracket to the replacement cable.**

4. **Use two T20 Torx screws to attach the upper bracket to the side of the server.**

   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

5. **Use two T20 Torx screws to attach the lower bracket to the midplane.**

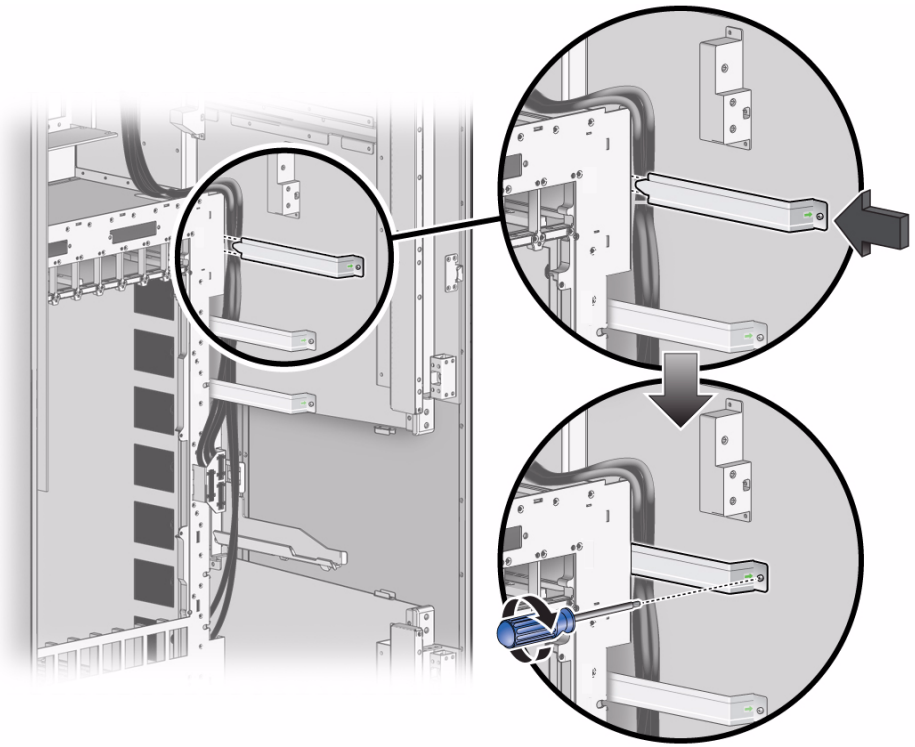
   Tighten the screws to 15 in-lb.

6. **Install three cable brackets to hold the cables to the side of the cabinet.**

   See the following illustration.

   Tighten the screws to 15 in-lb.

   The figure below shows cable brackets on the right side of the cabinet. The cable brackets on the left side of the cabinet are installed in the same way.



7. **Install the scalability assembly.**

   See "Install the Scalability Assembly" on page 380.

8. **Install the lower fan cage.**

   See "Install the Lower Fan Cage" on page 303.

9. **Install the scalability card cage.**

   See "Install the Scalability Card Cage" on page 316.

10. **Install the upper fan cage.**

    See "Install the Upper Fan Cage" on page 298.

11. **Install the front filler panel.**

    See "Install the Front Filler Panel" on page 293.

12. **Install the standoffs and trim panels.**

    See "Install Trim Panels" on page 95.

13. **Install the front door.**

    See "Install the Door" on page 81.

14. **Restart the server.**

    See "Returning the Server to Operation" on page 481.

Related Information

- "Remove the Power System Cage to Scalability Assembly Cable" on page 395

Servicing the PSDB to Scalability Midplane Cable

The PSDB to scalability midplane cable is cold service only.

The factory description for this cable is “CABLE ASSY, SCMP-PSDB, LINK”.

- “Remove the PSDB to Scalability Midplane Cable” on page 403
- “Install the PSDB to Scalability Midplane Cable” on page 407

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

▼ Remove the PSDB to Scalability Midplane Cable

The repair kit includes:

- Mechanical lifting device
- Disposable tie wraps (25 small and 25 large)

1. Unpack and inspect the replacement cable.

Caution – Use an antistatic mat to protect the cable.

2. **Halt and power down the server.**

   See "Prepare to Power Off the Server" on page 73.

3. **Remove the front door.**

   See "Remove the Door" on page 77.

4. **Remove trim panels to protect them from being scratched.**

   See "Remove the Trim Panels" on page 91 to remove the following parts.

   a. **Remove the two side trim panels.**

   b. **Remove trim panel standoffs.**

      Remove the standoffs on each side to protect them from breakage.

5. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

6. **Remove the front filler panel.**

   See "Remove the Front Filler Panel" on page 291.

7. **Remove the upper fan cage.**

   See "Remove the Upper Fan Cage" on page 296.

8. **Remove the scalability card cage.**

   See "Remove the Scalability Card Cage" on page 314.

9. **Remove the scalability assembly.**

   See "Remove the Scalability Assembly" on page 375.

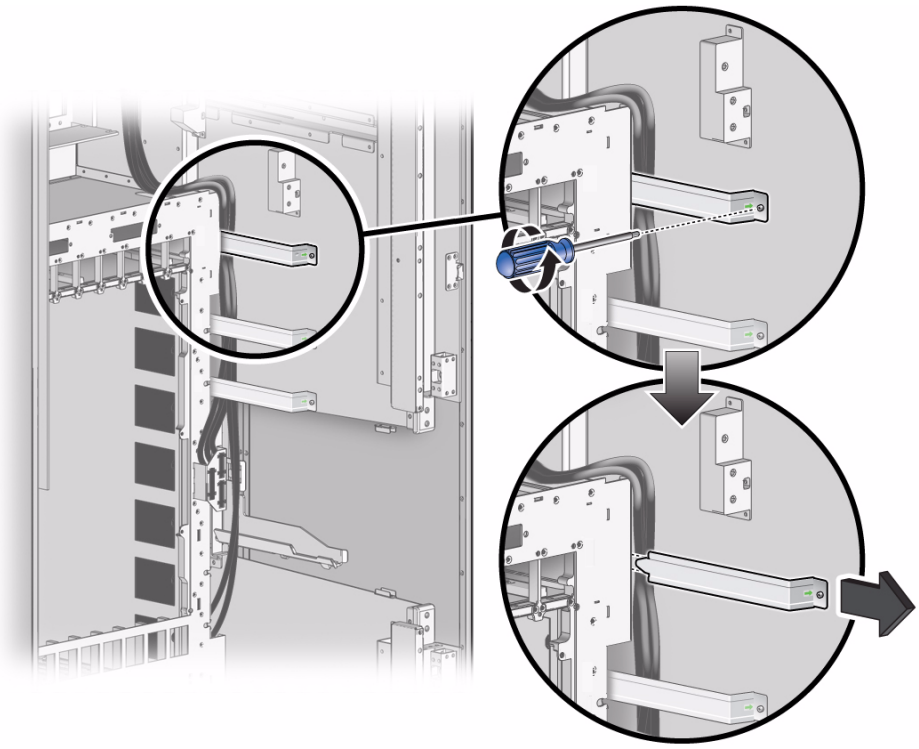
10. **Remove the power system cage.**

    See "Remove the Power System Cage" on page 323.

11. **Remove the cable brackets that hold cables to the side of the cabinet:**

    The figure below shows cable brackets on the right side of the cabinet. The cable brackets on the left side of the cabinet are removed in the same way.

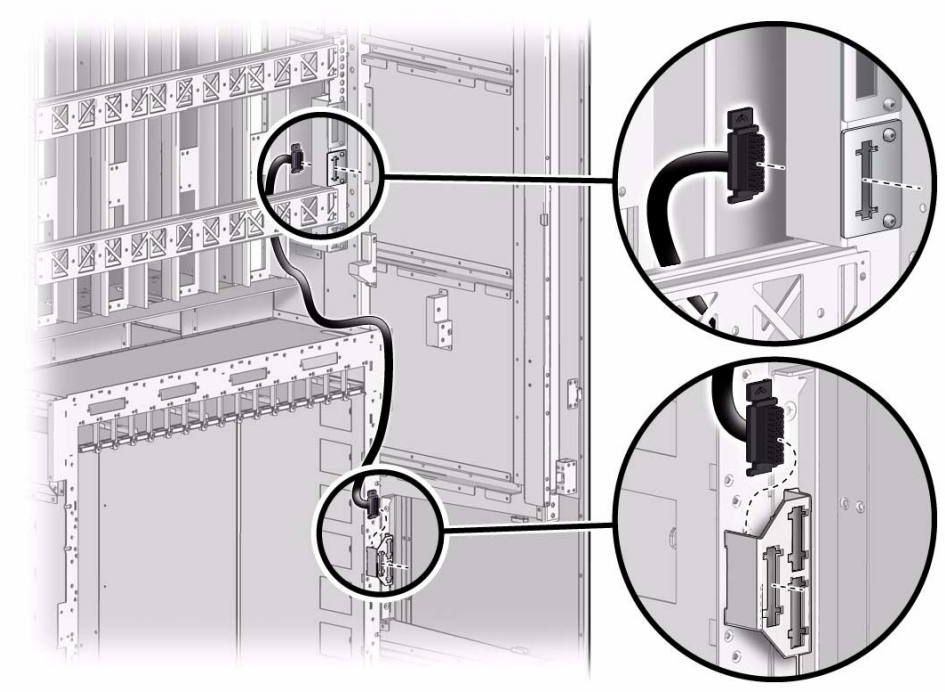
    a. **Remove the T20 Torx screw from the end of a bracket.**



b. **Pull the bracket out and set it aside.**

c. **Repeat these steps for the remaining brackets.**

12. **Undo two T20 Torx screws to remove the upper end of the cable and metal single-connector bracket from the right side of the server.**



Note – Take care not to drop the screws. These are not captive screws.

13. **Undo two T20 Torx screws to remove the lower end of the cable and metal three-connector bracket from the right side of the server.**

Note – Take care not to drop the screws. These are not captive screws.

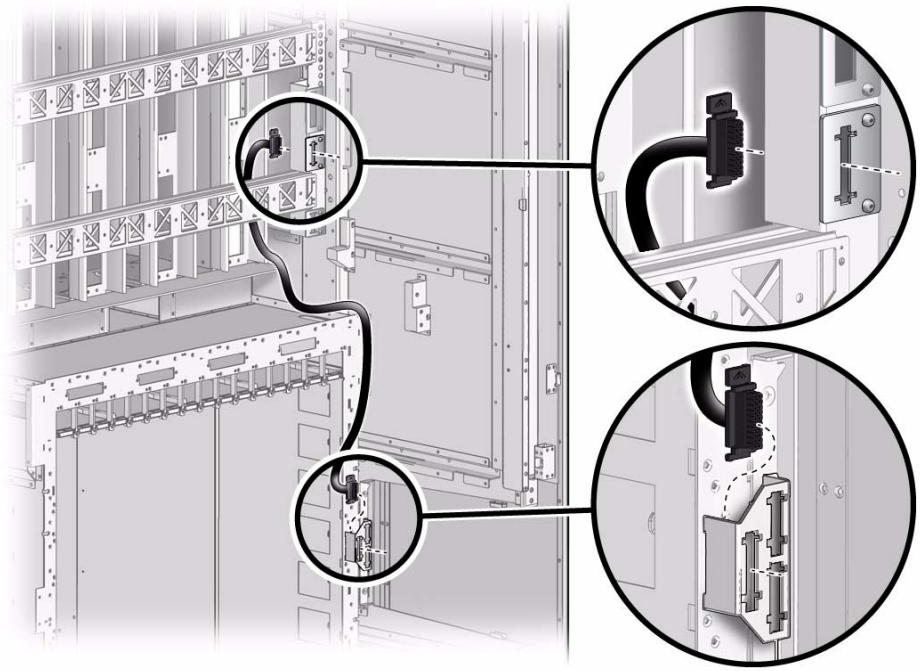
Related Information

- "Install the PSDB to Scalability Midplane Cable" on page 407

▼ Install the PSDB to Scalability Midplane Cable

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Unplug the faulty cable from the upper bracket.**
3. **Plug the replacement cable into the upper bracket.**

   Both ends of the replacement cable are identical, so it doesn't matter which end you use.



4. **Use a cable tie to securely hold the upper end of the faulty cable to the lower end of the replacement cable.**
5. **Pull the faulty cable down to pull the replacement cable into the interior of the server.**
6. **Use two T20 Torx screws to attach the upper bracket and replacement cable to the right side of the server.**

   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

7. **Separate the replacement cable from the failed cable.**

   Open or cut the cable tie and remove the failed cable.

8. **Plug the lower end of the replacement cable into the lower three-connector socket.**

9. **Use two T20 Torx screws to attach the lower bracket to the right side of the server.**

   Tighten the screws to 15 in-lb.

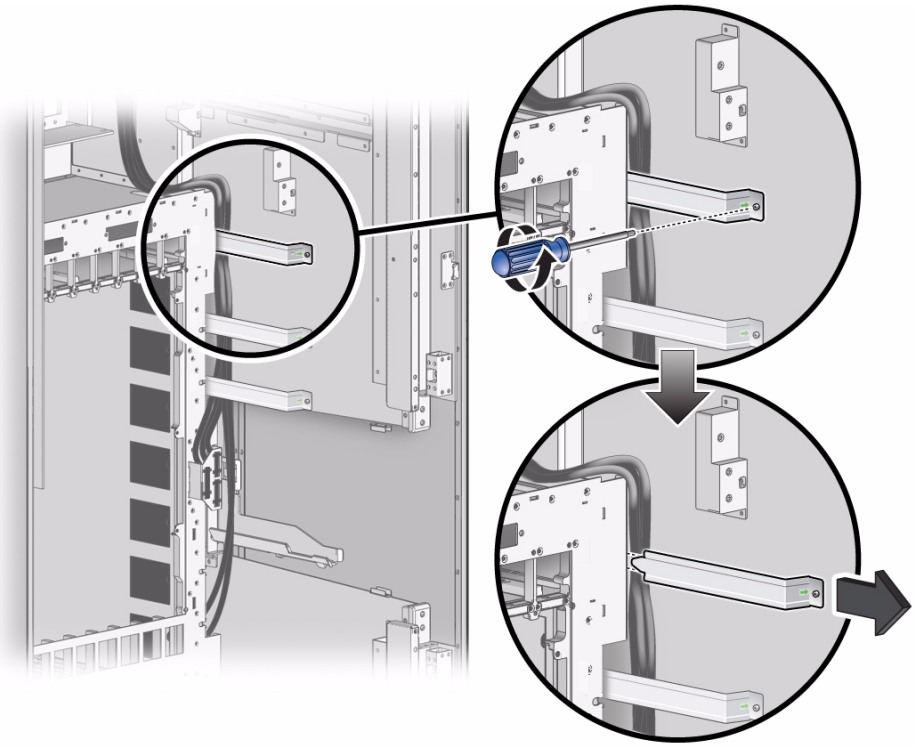
10. **Plug the upper end of the replacement cable to the front LED panel.**

11. **Install three cable brackets to hold the cables to the side of the cabinet.**

    See the following illustration.

    Tighten the screws to 15 in-lb.

    The figure below shows cable brackets on the right side of the cabinet. The cable brackets on the left side of the cabinet are installed in the same way.



12. **Install the scalability assembly.**

    See "Install the Scalability Assembly" on page 380.

13. **Install the scalability card cage.**

    See “Install the Scalability Card Cage” on page 316.

14. **Install the upper fan cage.**

    See “Install the Upper Fan Cage” on page 298.

15. **Install the power system cage.**

    See “Install the Power System Cage” on page 326.

16. **Install the front filler panel.**

    See “Install the Front Filler Panel” on page 293.

17. **Install the standoffs and trim panels.**

    See “Install Trim Panels” on page 95.

18. **Install the front door.**

    See “Install the Door” on page 81.

19. **Restart the server.**

    See “Returning the Server to Operation” on page 481.

20. **Return the replaced component to Oracle.**

    See “Return a Component to Oracle” on page 488.

    Include the mechanical lifting device.

Related Information

- “Remove the PSDB to Scalability Midplane Cable” on page 403

Servicing the Internal Link to Front LED Panel Cable

The internal link to front LED panel cable is cold service only.

The factory description for this cable is “CABLE ASSY, FR SYS LINK”.

- “Remove the Internal Link Cable for the Front LED Panel” on page 411
- “Install the Internal Link Cable for the Front LED Panel” on page 414

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

▼ Remove the Internal Link Cable for the Front LED Panel

1. **Halt and power down the server.**

   See “Prepare to Power Off the Server” on page 73.

2. **Remove the front door.**

   See “Remove the Door” on page 77.

3. **Remove trim panels to protect them from being scratched.**

   See “Remove the Trim Panels” on page 91 to remove the following parts.

   a. **Remove the two side trim panels.**

b. Remove trim panel standoffs.

Remove the standoffs on each side to protect them from breakage.

4. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
5. **Remove the front filler panel.**

   See "Remove the Front Filler Panel" on page 291.
6. **Remove the upper fan cage.**

   See "Remove the Upper Fan Cage" on page 296.
7. **Remove the scalability card cage.**

   See "Remove the Scalability Card Cage" on page 314.
8. **Remove the lower fan cage.**

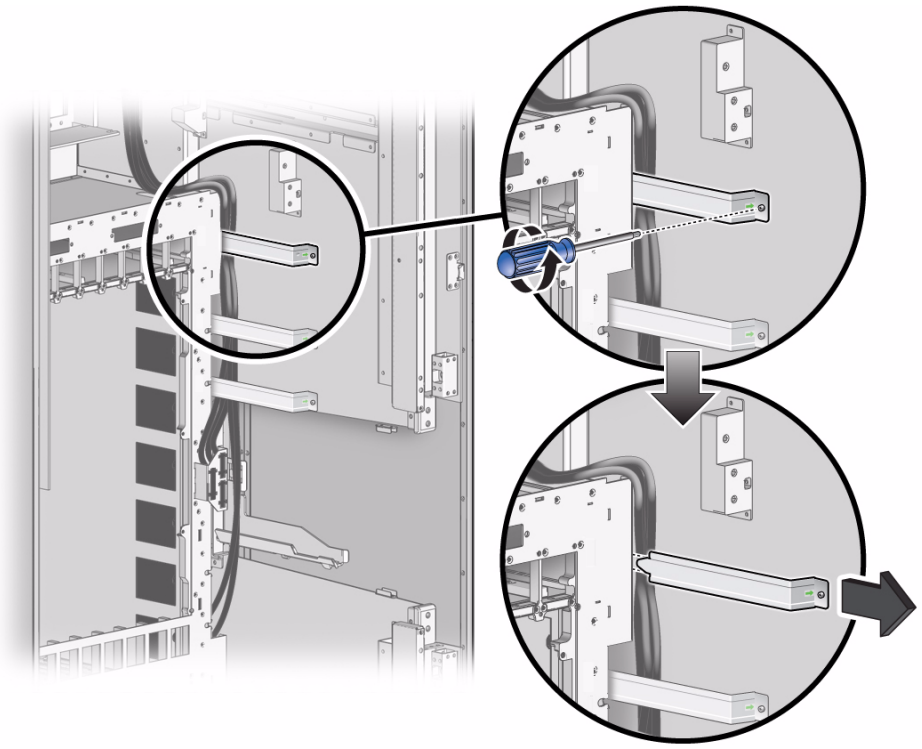
   See "Remove the Lower Fan Cage" on page 301.
9. **Disconnect the lower end of the cable from the bracket.**

   The connector plugs into the bracket without screws. If necessary, disconnect the bracket from the chassis. Two T20 Torx screws hold the bracket to the chassis. This bracket holds three cable connectors.

   The cable is included in a group of cables that are routed up the side of the server. Three long brackets hold the cables in place.
10. **Remove the cable brackets that hold cables to the side of the cabinet:**

    The figure below shows cable brackets on the right side of the cabinet. The cable brackets on the left side of the cabinet are removed in the same way.

    a. Remove the T20 Torx screw from the end of a bracket.



b. Pull the bracket out and set it aside.

c. Repeat these steps for the remaining brackets.

11. **Disconnect the upper end of the cable.**

    The connector plugs into the bracket without screws. If necessary, disconnect the bracket from the chassis. Two T20 Torx screws hold the bracket to the chassis.

12. **If you are removing any other cables in the cable bundle, do so now.**

13. **Install the new cable.**

    See "Install the Internal Link Cable for the Front LED Panel" on page 414.

Related Information

- "Install the Internal Link Cable for the Front LED Panel" on page 414

▼ Install the Internal Link Cable for the Front LED Panel

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Install the upper end of the cable in the bracket.**
3. **Route the cable down the side of the server.**
4. **Install the lower end of the cable in the socket bracket.**

   The connector plugs into the bracket without screws.

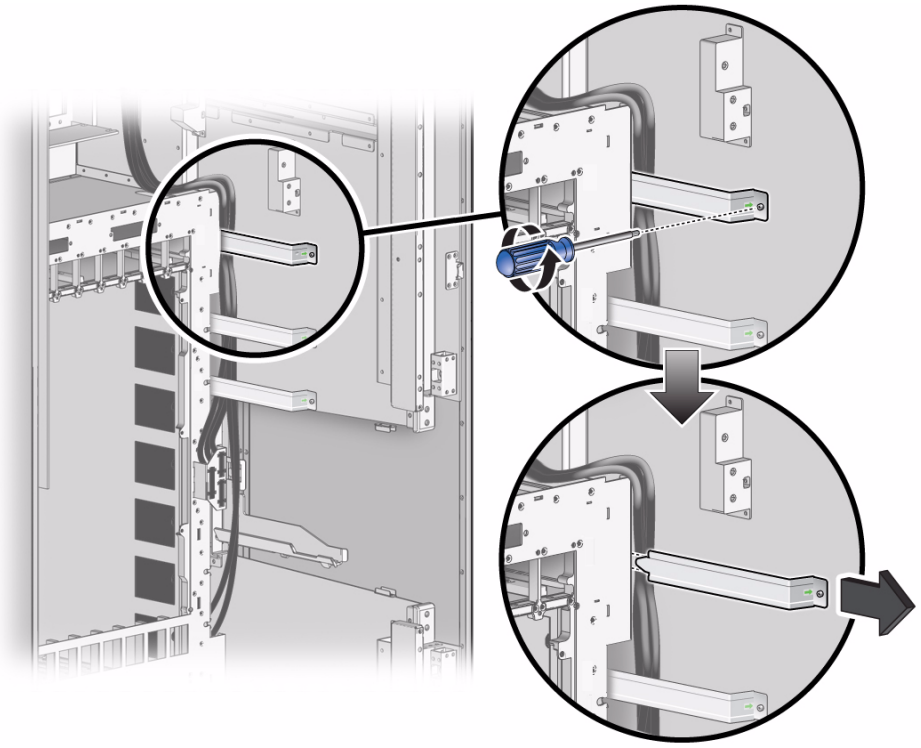
   If necessary, disconnect the bracket from the chassis. Two T20 Torx screws hold the bracket to the chassis. This bracket holds three cable connectors. To install the bracket, tighten the screws to 15 in-lb. See "Torque Reference" on page 66.
5. **If you are installing any other cables in the cable bundle, do so now.**

6. **Install three cable brackets to hold the cables to the side of the cabinet.**

   See the following illustration.

   Tighten the screws to 15 in-lb. See “Torque Reference” on page 66.

   The figure below shows cable brackets on the right side of the cabinet. The cable brackets on the left side of the cabinet are installed in the same way.



7. **Reinstall the lower fan cage assembly.**

   See “Install the Lower Fan Cage” on page 303.

8. **Reinstall the upper fan cage assembly.**

   See “Install the Upper Fan Cage” on page 298.

9. **Reinstall the front filler panel.**

   See “Install the Front Filler Panel” on page 293.

10. **Install the standoffs and trim panels.**

    See “Install Trim Panels” on page 95.

11. **Install the front door.**

    See “Install the Door” on page 81.

12. **Connect AC power to the server.**

    "Reconnect AC Power to the Server" on page 483

13. **Restart the server.**

    See "Restart the Server" on page 484

14. **Return the replaced component to Oracle.**

    See "Return a Component to Oracle" on page 488.

Related Information

- "Remove the Internal Link Cable for the Front LED Panel" on page 411

Servicing the Rear LED Panel Cable

The rear LED panel cable is cold service only.

The factory description for this cable is “CABLE ASSY, REAR SYS”.

- “Remove the Rear LED Panel Cable” on page 417
- “Install the Rear LED Panel Cable” on page 420

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

▼ Remove the Rear LED Panel Cable

1. **Halt and power down the server.**
   See “Prepare to Power Off the Server” on page 73.
2. **Remove the front door.**
   See “Remove the Door” on page 77.
3. **Remove trim panels to protect them from being scratched.**
   See “Remove the Trim Panels” on page 91 to remove the following parts.
   a. **Remove the two side trim panels.**
   b. **Remove trim panel standoffs.**
      Remove the standoffs on each side to protect them from breakage.
4. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

5. **Remove the front filler panel.**

   See “Remove the Front Filler Panel” on page 291.

6. **Remove the upper fan cage.**

   See “Remove the Upper Fan Cage” on page 296.

7. **Remove the scalability card cage.**

   See “Remove the Scalability Card Cage” on page 314.

8. **Remove the lower fan cage.**

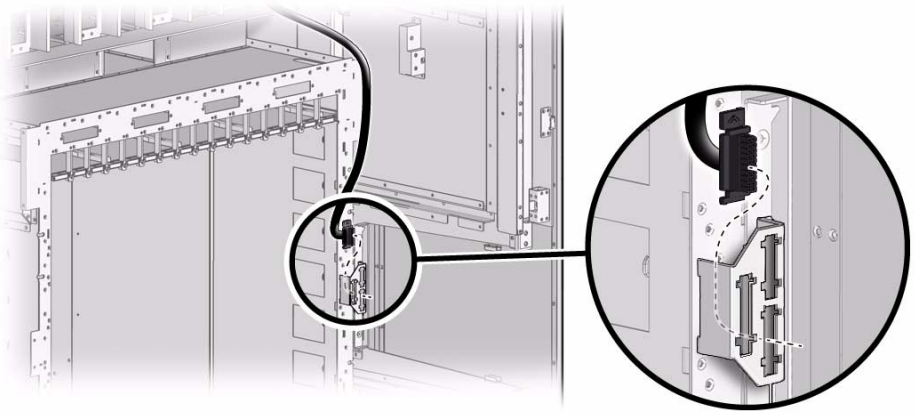
   See “Remove the Lower Fan Cage” on page 301.

9. **Go to the rear of the server and remove the rear LED panel.**

   See “Remove the Rear LED Panel” on page 354.

   Set the rear LED panel on an antistatic mat.

10. **Return to the front of the server and disconnect the lower end of the rear LED panel cable from the bracket.**



The connector plugs into the bracket without screws.

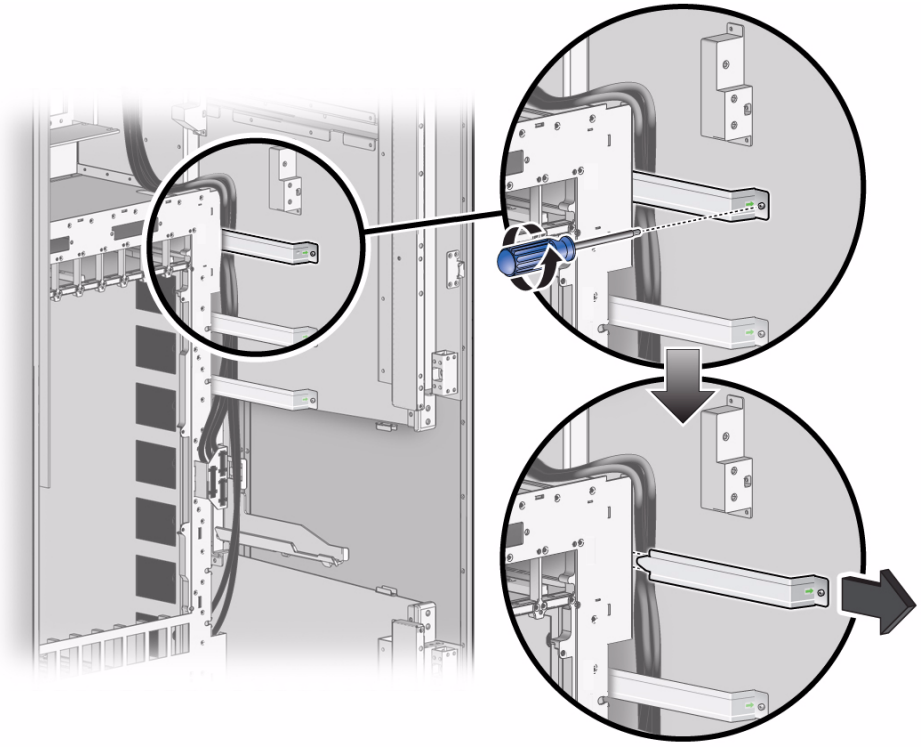
If necessary, disconnect the bracket from the chassis. Two T20 Torx screws hold the bracket to the chassis. This bracket holds three cable connectors. To install the bracket, tighten the screws to 15 in-lb. See “Torque Reference” on page 66.

The cable is included in a group of cables that are routed up the side of the server. Three long brackets hold the cables in place.

11. **Remove the cable brackets that hold cables to the side of the cabinet:**

    The figure below shows cable brackets on the right side of the cabinet. The cable brackets on the left side of the cabinet are removed in the same way.

    a. **Remove the T20 Torx screw from the end of a bracket.**



    b. **Pull the bracket out and set it aside.**

    c. **Repeat these steps for the remaining brackets.**

12. **Install the new cable.**

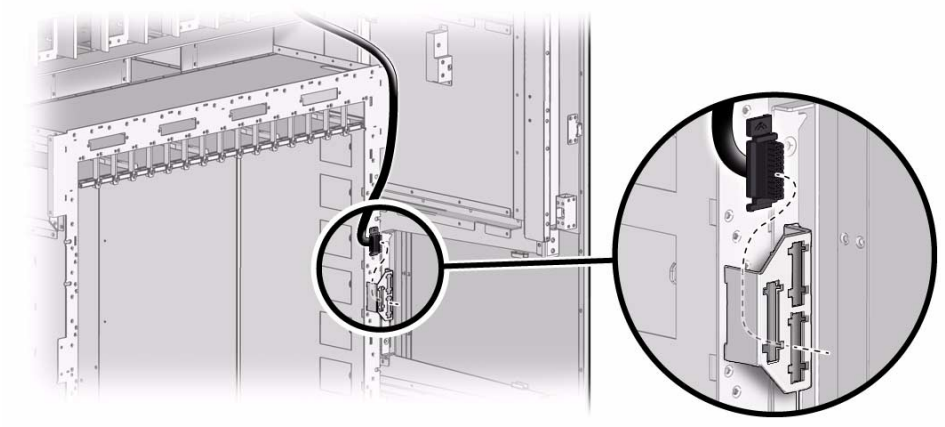
    See "Install the Rear LED Panel Cable" on page 420.

Related Information

- "Install the Rear LED Panel Cable" on page 420

▼ Install the Rear LED Panel Cable

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Connect lower end of the rear LED panel cable to the socket bracket.**



3. **Route the new cable through the opening for the rear LED panel:**
   - Either follow the path of the old cable, or
   - Cable-tie the end of the new cable to the rear of the old cable, then pull the old cable out of the opening for the rear LED panel.
4. **At the rear of the server, install the rear LED panel.**

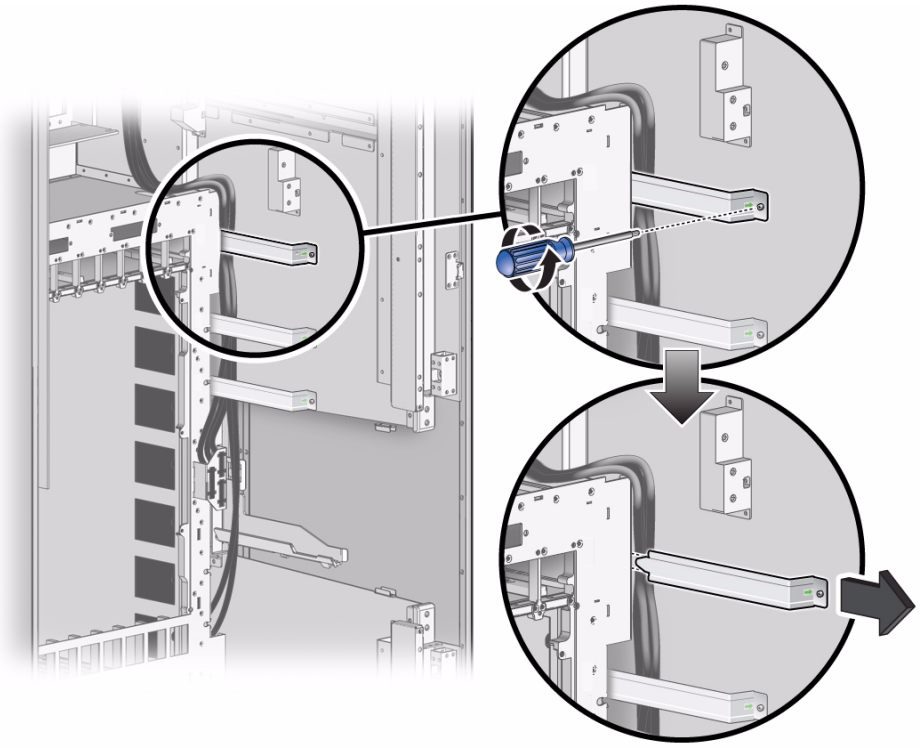
   See "Install the Rear LED Panel" on page 355.
5. **If you are installing any other cables in the cable bundle, do so now.**

6. **Install three cable brackets to hold the cables to the side of the cabinet.**

   See the following illustration.

   Tighten the screws to 15 in-lb. See "Torque Reference" on page 66.

   The figure below shows cable brackets on the right side of the cabinet. The cable brackets on the left side of the cabinet are installed in the same way.



7. **Reinstall the lower fan cage assembly.**

   See "Install the Lower Fan Cage" on page 303.

8. **Reinstall the upper fan cage assembly.**

   See "Install the Upper Fan Cage" on page 298.

9. **Reinstall the front filler panel.**

   See "Install the Front Filler Panel" on page 293.

10. **Install the standoffs and trim panels.**

    See "Install Trim Panels" on page 95.

11. **Install the front door.**

    See "Install the Door" on page 81.

12. **Connect AC power to the server.**

    "Reconnect AC Power to the Server" on page 483

13. **Restart the server.**

    See "Restart the Server" on page 484

14. **Return the replaced component to Oracle.**

    See "Return a Component to Oracle" on page 488.

Related Information

- "Remove the Rear LED Panel Cable" on page 417

Servicing Midplane Power Cables

The midplane power cable is a cold service component.

The factory descriptions for these cables are “CABLE ASSY, SCALE,CHAS,DC-NEG” and “CABLE ASSY, SCALE,CHAS,DC-POS”.

- “Remove a Midplane Power Cable” on page 424
- “Install a Midplane Power Cable” on page 428

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

▼ Prepare to Remove a Midplane Power Cable

1. **Unpack and inspect the replacement cable.**
2. **Halt and power down the server.**
   See “Prepare to Power Off the Server” on page 73.
3. **Remove the front door.**
   See “Remove the Door” on page 77.
4. **Remove trim panels to protect them from being scratched.**
   See “Remove the Trim Panels” on page 91 to remove the following parts.

a. **Remove the two side trim panels.**

b. **Remove trim panel standoffs.**

Remove the standoffs nearest to the upper and lower fan cages to protect them from breakage.

5. **Do the following to gain access to the cables:**

a. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

b. **Remove the front filler panel.**

See "Remove the Front Filler Panel" on page 291.

c. **Remove the upper fan cage.**

See "Remove the Upper Fan Cage" on page 296.

d. **Remove the scalability card cage.**

See "Remove the Scalability Card Cage" on page 314.

e. **Remove the lower fan cage.**

See "Remove the Lower Fan Cage" on page 301.

f. **Remove the scalability assembly.**

See "Remove the Scalability Assembly" on page 375.

Related Information

- "Remove a Midplane Power Cable" on page 424
- "Install a Midplane Power Cable" on page 428

▼ Remove a Midplane Power Cable

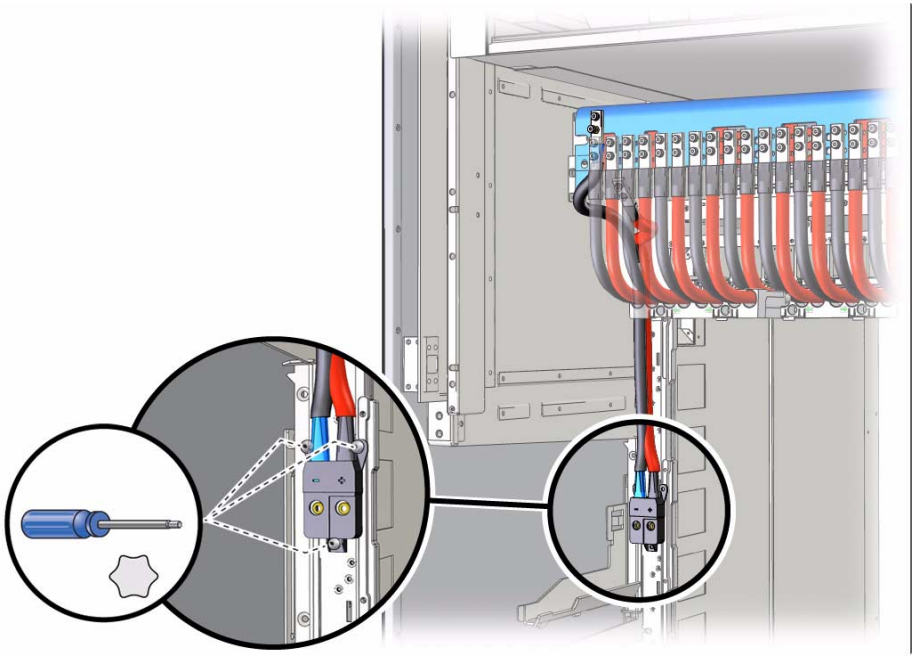
1. **Prepare the front of the server if you have not already done so.**

See "Prepare to Remove a Midplane Power Cable" on page 423.

2. **Disconnect the lower ends of the midplane power cables.**

a. **Undo three T20 Torx screws to remove the plastic housing that contains the lower ends of the two cables.**

Note – Take care not to drop the screws. These are not captive screws.



b. Separate the inner and outer halves of the plastic housing to release the cable ends.

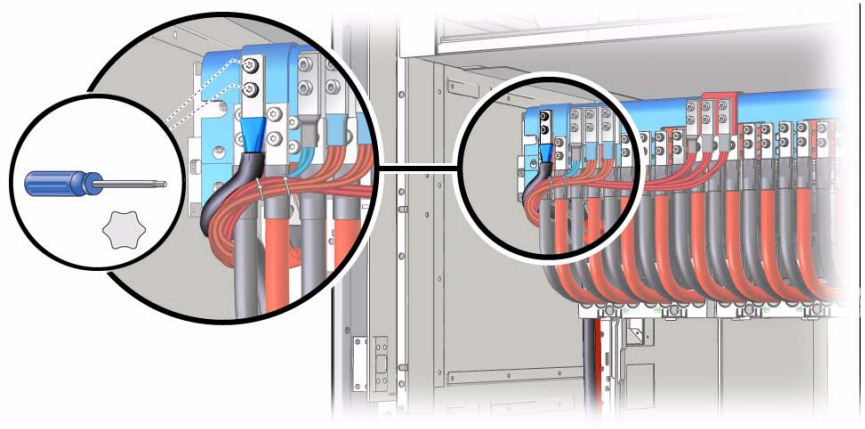
The halves slide apart.

c. Determine your next step.

You can now replace one or both of the cables.

- To replace the negative cable, see Step 3.
- To replace the positive cable, see Step 4.

3. **To remove the negative midplane power cable, loosen two T20 captive Torx screws at the top of the cable.**

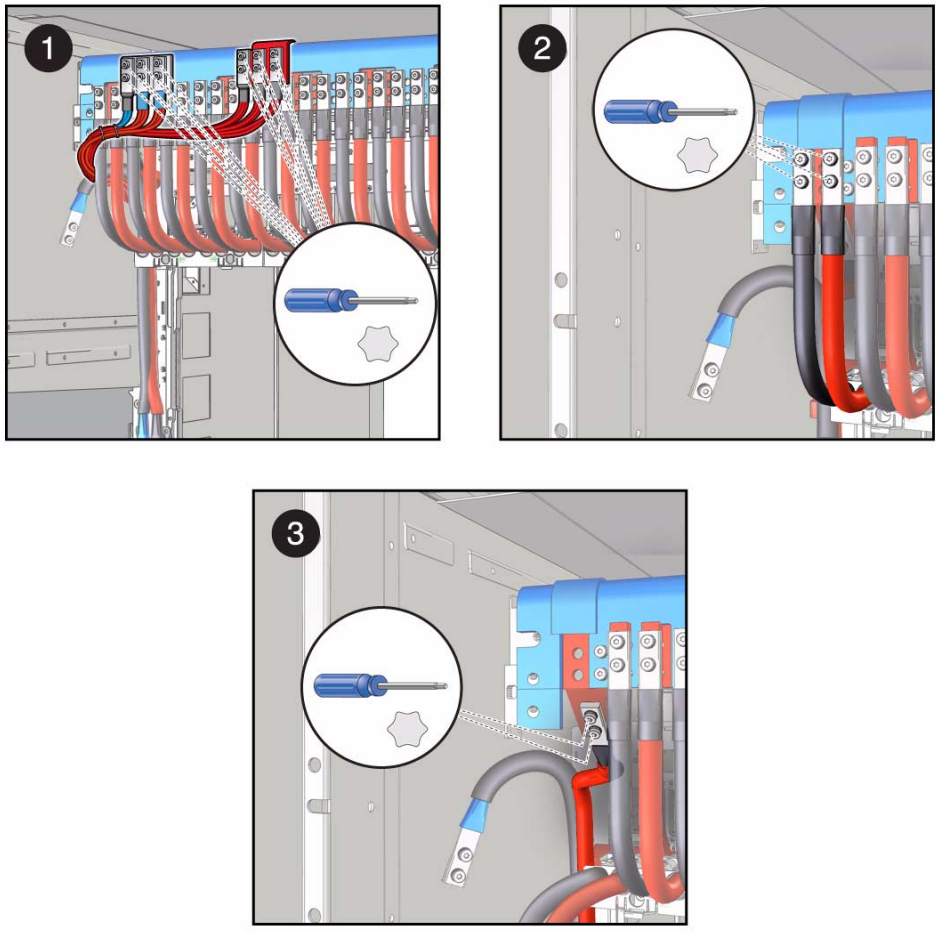


4. **To remove the positive midplane power cable, do the following.**

   The top of the cable is hidden behind several layers of cables.

   a. **Remove T20 Torx screws to disconnect the top connectors of the cable-tied cable assembly (panel 1).**

      If you do not need to replace the negative midplane power cable, ignore the loose single cable shown in the illustration.



b. Undo T20 Torx screws on one negative and one positive bus cables that block access to the positive midplane power cable (panel 2)

c. Loosen two T20 captive Torx screws to remove the positive midplane power cable (panel 3).

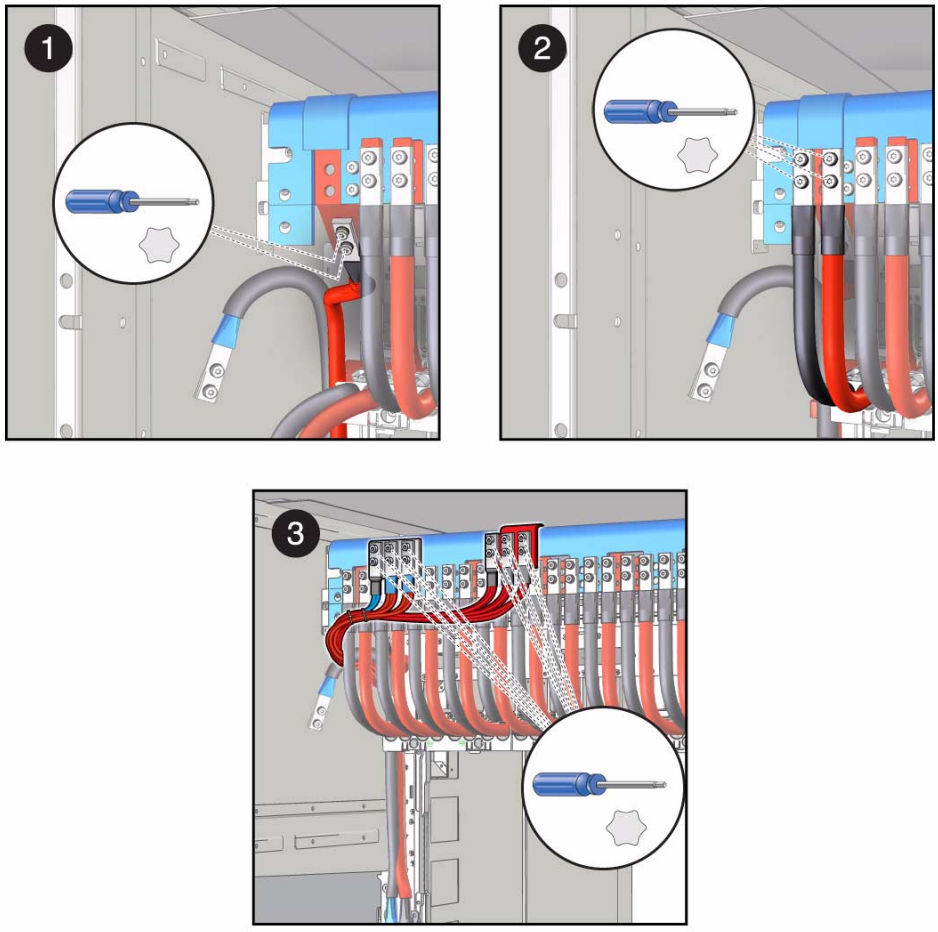
5. To install replacement cables, see "Install a Midplane Power Cable" on page 428**.**

Related Information

- "Install a Midplane Power Cable" on page 428
- "Prepare to Remove a Midplane Power Cable" on page 423

▼ Install a Midplane Power Cable

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Determine your next step.**
   - To install the positive midplane power cable, see Step 3.
   - To install the negative midplane power cable, see Step 4.
3. **Install the positive midplane power cable.**
   a. **Attach the red cable to the angled bus bar (panel 1).**
      Tighten the T20 Torx screws to 15 in-lb. See "Torque Reference" on page 66.



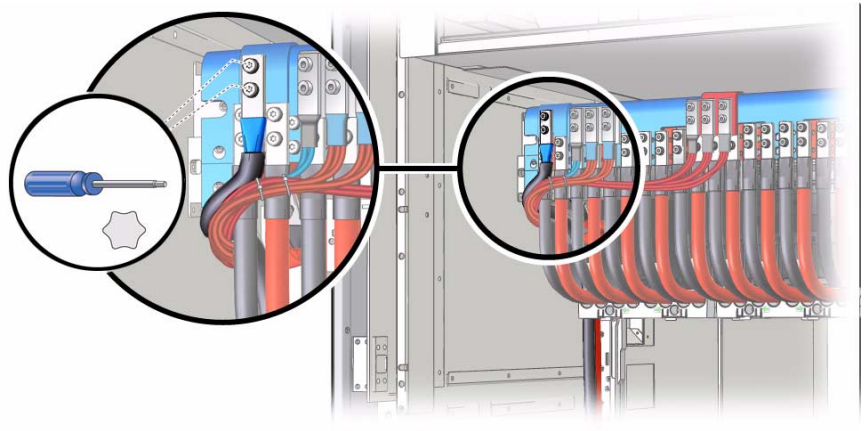
b. Attach the positive and negative bus cables that you disconnected previously (panel 2).

Tighten the T20 Torx screws to 15 in-lb.

c. Attach the cable-tied cable assembly that you disconnected previously (panel 3).

Tighten the T20 Torx screws to 15 in-lb.

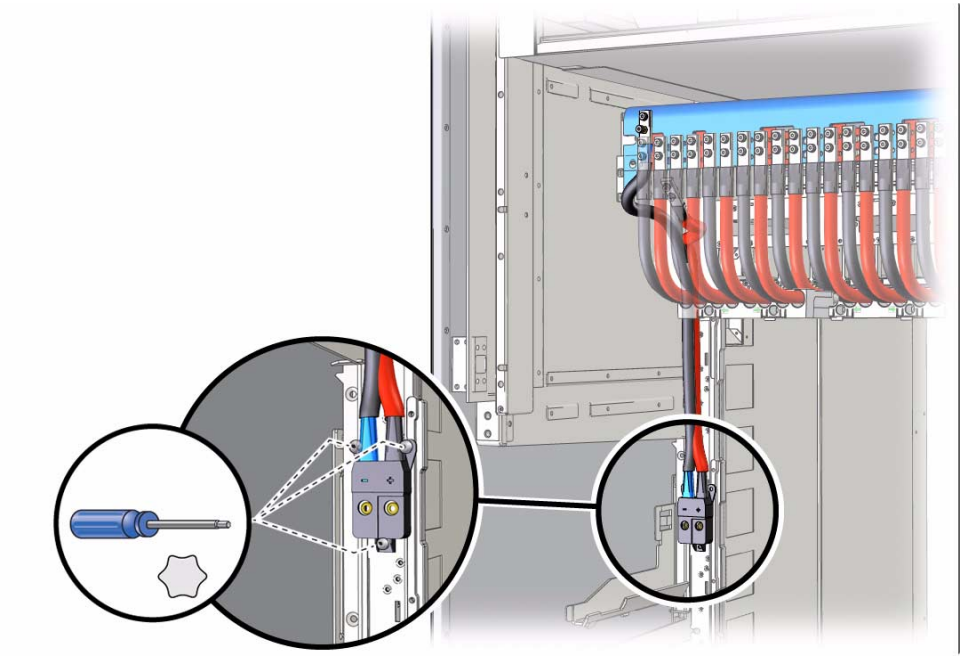
4. **Attach the negative midplane power cable with two T20 captive Torx screws.**



5. **Attach the lower ends of both midplane power cables to the chassis.**

   a. **Place the lower ends of both cables into the outer plastic housing.**

   The black negative cable is on the left, with the red positive cable on the right.



   b. **Slide the inner plastic housing over the cable ends to hold them in place.**

c. **Use three T20 Torx screws to attach the plastic housing to the chassis.**

   Tighten the screws to 7 in-lb.

6. **Determine your next step:**
   - If you are replacing other internal cables or components, do that now.
   - If you do not need further access to the inside of the cabinet, go to Step 7.

7. **Reassemble the server:**

   a. **Install the scalability assembly.**

      See "Install the Scalability Assembly" on page 380.

   b. **Install the lower fan cage.**

      See "Install the Lower Fan Cage" on page 303.

   c. **Install the scalability card cage.**

      See "Install the Scalability Card Cage" on page 316.

   d. **Install the upper fan cage.**

      See "Install the Upper Fan Cage" on page 298.

   e. **Install the front filler panel.**

      See "Install the Front Filler Panel" on page 293.

   f. **Install the standoffs and trim panels.**

      See "Install Trim Panels" on page 95.

   g. **Install the front door.**

      See "Install the Door" on page 81.

   h. **If Oracle has requested the return of the faulty components, see** "Return a Component to Oracle" on page 488**.**

8. **Restart the server.**

   See "Returning the Server to Operation" on page 481.

Related Information

- "Prepare to Remove a Midplane Power Cable" on page 423
- "Remove a Midplane Power Cable" on page 424

Servicing the I/O Data Cable Assembly

The I/O data cables are cold service only. There are four of these cables in the server.

The factory description for this cable is “CABLE ASSY, I/O”.

- “Remove an I/O Data Cable Assembly” on page 433
- “Install an I/O Data Cable Assembly” on page 442

Related Information

- “Identifying Components” on page 1
- “Detecting and Managing Faults” on page 31
- “Preparing for Service” on page 59
- “Component Service Task Reference” on page 30
- “Returning the Server to Operation” on page 481

▼ Remove an I/O Data Cable Assembly

1. **Examine the replacement cable before proceeding.**

   a. **Unpack and inspect the connectors of the replacement cable.**

      Do not discard the plastic covers on the connectors.

Note – If a guide pin is bent or loose, return the cable and order another replacement cable.

Caution – Avoid excessive handling of the cable. Repeated bending of the cable can break wiring to individual connector pins, as can sharp bending of the wires.

b. After the inspection, place the connector covers back on the connectors.

Do not discard the shipping package. You will use it to return the old cable.

2. Prepare the server.

a. Halt and power down the server.

See "Prepare to Power Off the Server" on page 73.

b. Remove the front and rear doors.

See "Remove the Door" on page 77.

c. Remove the front trim panels to protect them from being scratched.

See "Remove the Trim Panels" on page 91 to remove the following parts.

i. Remove the two side trim panels.

ii. Remove trim panel standoffs.

Remove the standoffs on each side to protect them from breakage.

d. Use an antistatic wrist strap to protect the equipment from ESD damage.

e. Prepare an access space in the front of the server:

i. Remove the front filler panel.

See "Remove the Front Filler Panel" on page 291.

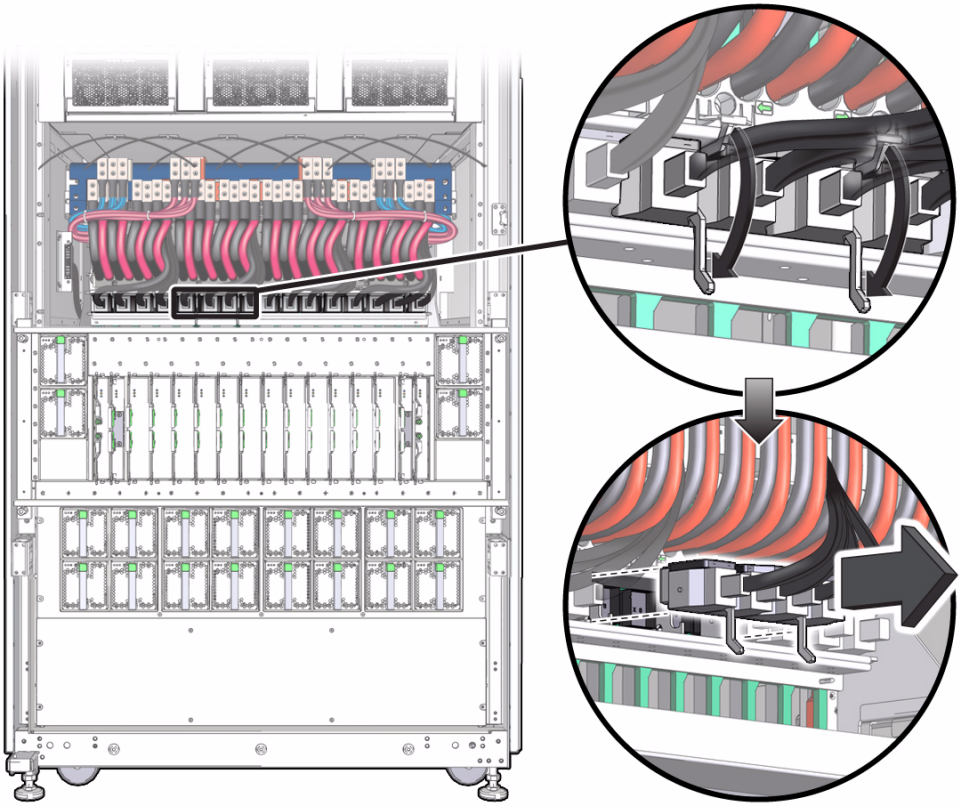
ii. Remove the upper fan cage.

See "Remove the Upper Fan Cage" on page 296.

3. **Disconnect the cable from the midplane.**

   a. **At the front of the server, disconnect the T6/T7/T8/T9 connector assembly:**

      There are two metal locking levers on the assembly. The levers push against plastic locking tabs located above the assembly.



      i. **Push up slightly on the plastic locking tab, then pull down the lever (detail 1).**

      ii. **Unlock the second lever in the same way.**

      iii. **Pull the cable assembly out of the midplane connectors (detail 2).**

      Let the assembly hang free.

      iv. **Note how the T6/T7/T8/T9 connector is oriented.**

      You must orient the connector in the same way when you install the replacement cable assembly. The plastic plate that holds the connectors together faces up as you pull the connectors out of the sockets, and the plate faces the midplane as the cables hang free.

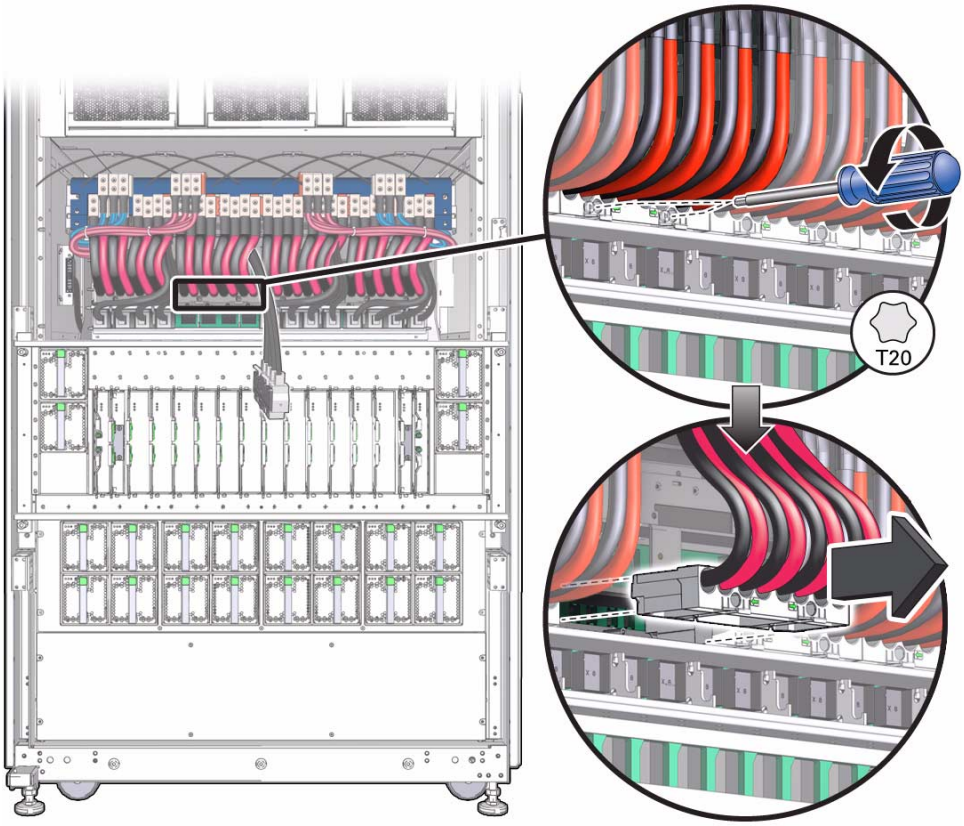
v. **Place covers on the T6/T7/T8/T9 connectors.**

A set of covers is included with the replacement cable assembly.

b. Detach the cabled lower bus bar assembly.

i. **Loosen two captive T20 Torx screws that hold the plastic housing of the assembly to the midplane (detail 1).**

ii. **Pull the assembly out of the socket (detail 2).**

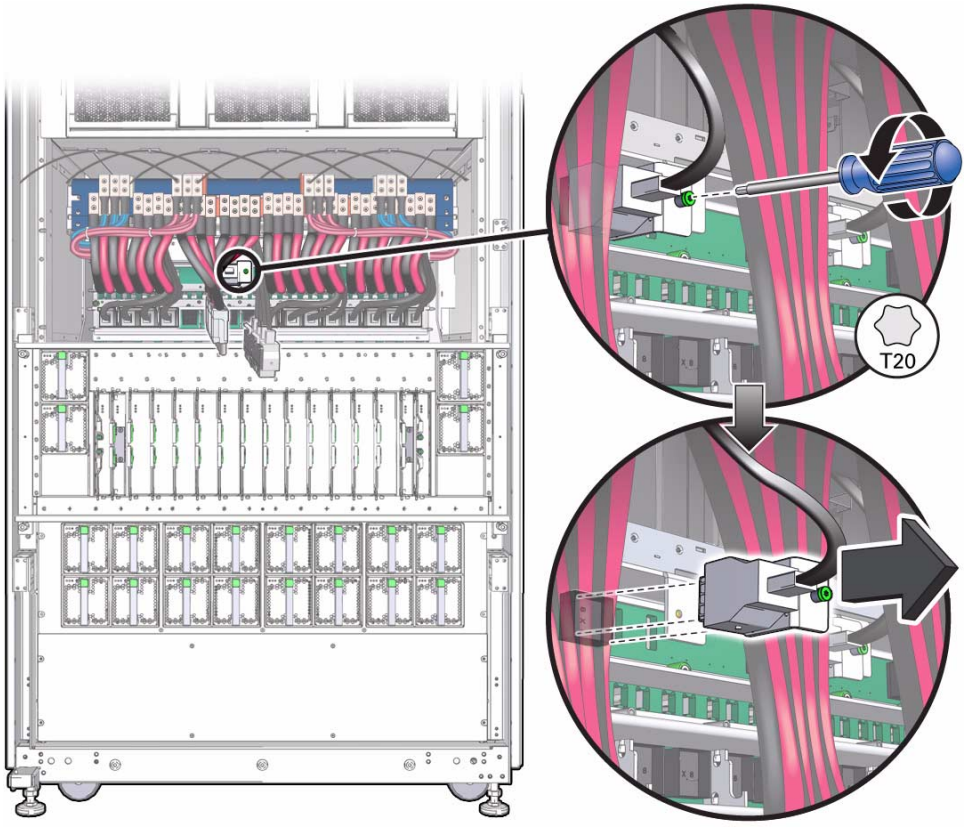


c. **Disconnect connector T5 from the midplane:**

i. **Undo the T20 captive screw on the connector bracket (detail 1).**

ii. **Pull the connector out of the socket (detail 2).**

iii. **Place a cover on the T5 connector.**

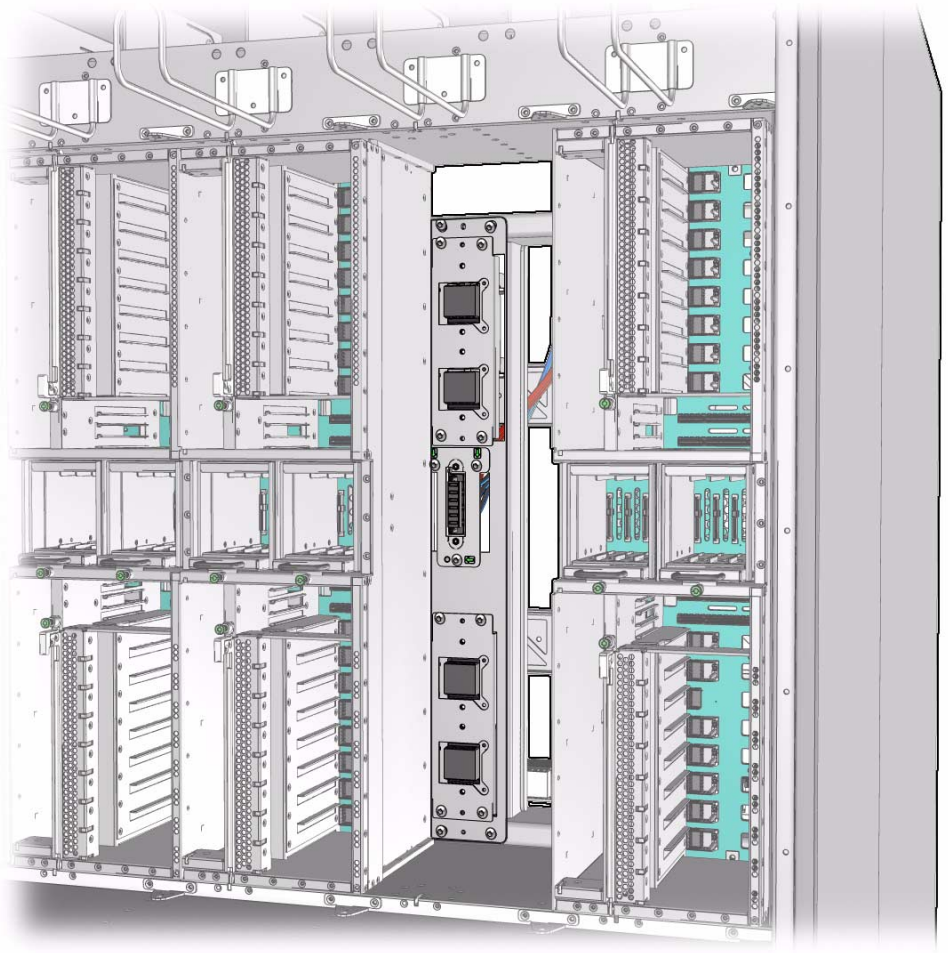


4. **Go to the rear of the server.**

   a. **Remove the I/O Unit that connects to the I/O data cable assembly.**

      See "Remove an IOU" on page 357.

      When you remove the I/O Unit, you see the support bracket for the I/O data cable assembly.

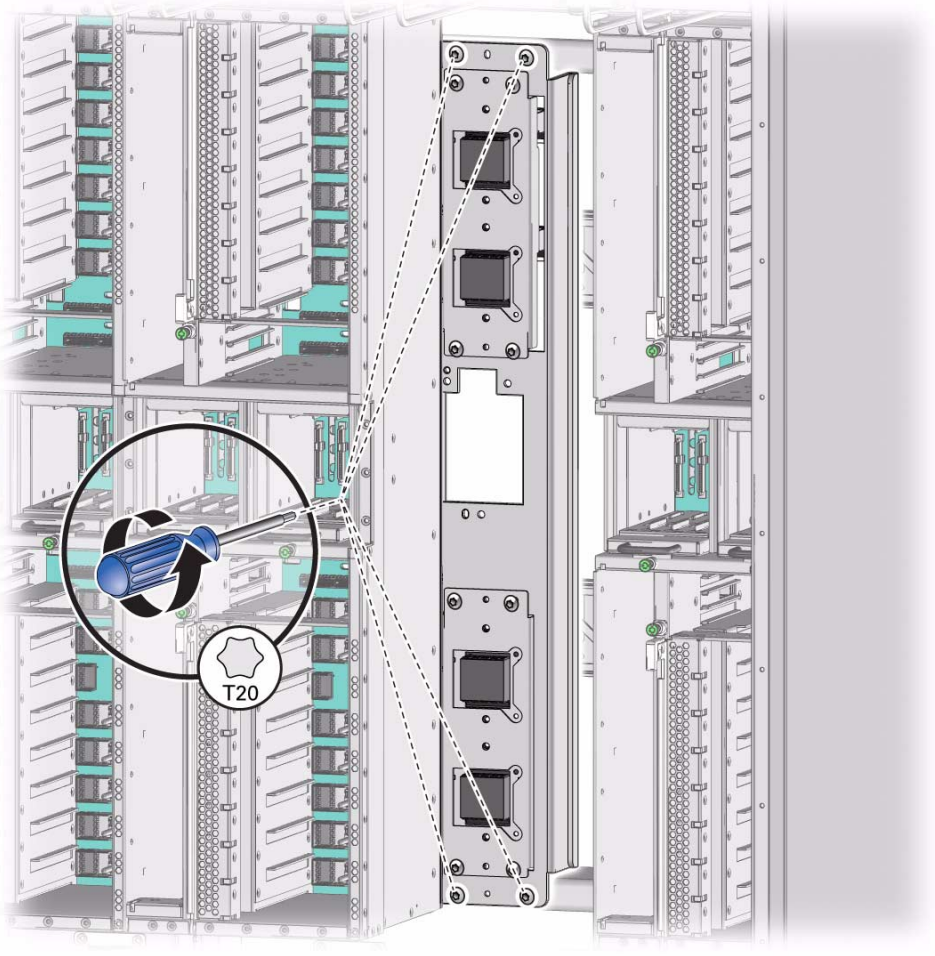


   b. **Place plastic covers on the connectors on the support bracket.**

      Covers are included with the replacement cable.

c. Disconnect the support bracket from the server chassis.

i. Loosen the four captive T20 screws.

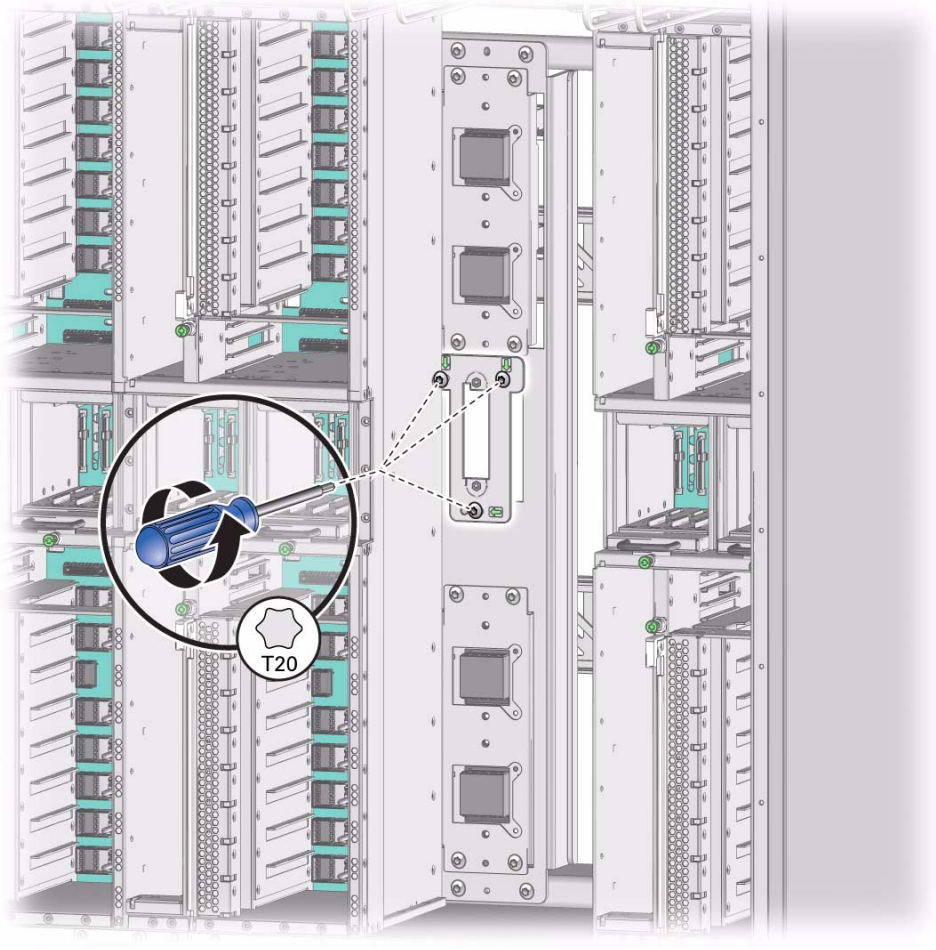


ii. Carefully pull the support bracket partway out of the I/O unit slot.

The cables are still attached, so move slowly and stop as soon as you feel resistance.

d. Disconnect the I/O power cable from the support bracket:

i. Remove three T20 Torx screws that hold the cable to the support bracket.



ii. Carefully pull out the cable far enough so that you can rotate the connector bracket and push it back through the hole in the support bracket.

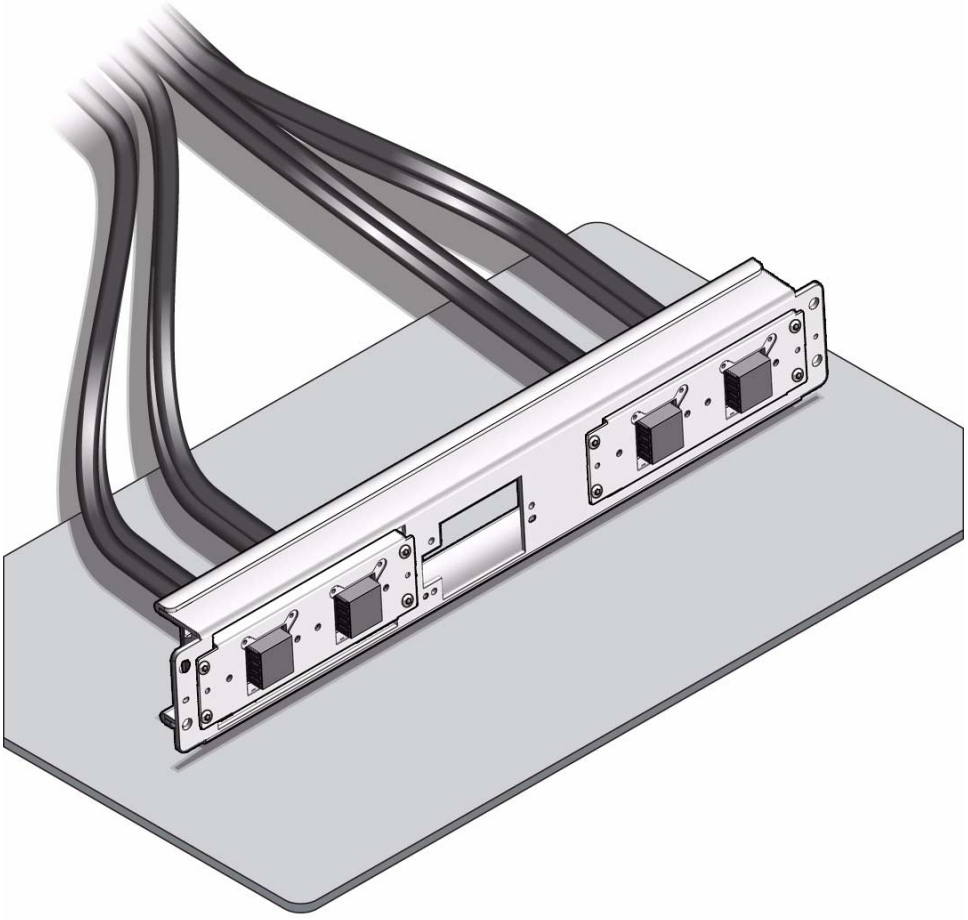
Caution – Avoid sharp bending of the cable.

e. Carefully pull the I/O data cable assembly and the support bracket out of the server.

The cable assembly might undergo failure analysis at the factory, so avoid further damage to the cable assembly.

Follow these rules.

- Avoid sharp bending of the cables.
- Work slowly to avoid dislodging the connector covers.



f. Lay the cable assembly and support bracket on an antistatic mat.

5. Disconnect the cable assembly from the support bracket.

a. Undo four T20 Torx screws on each bracket.

b. **Carefully pull out each cable bracket and the attached cables far enough so that you can turn the cable bracket and push it out of the support bracket.**

Caution – Avoid sharp bending of the cables.

6. **To install the replacement I/O data cable assembly, see** "Install an I/O Data Cable Assembly" on page 442**.**

Related Information

- "Install an I/O Data Cable Assembly" on page 442

▼ Install an I/O Data Cable Assembly

Caution – Do not remove the protective plastic covers from the connectors on the cable until you are ready to plug a cable connector into a socket. Unprotected connectors can be damaged as you push them into the server.

Note – Do not discard the plastic covers. You will use them to return the old cable.

Note – A torque screwdriver is included with the replacement cable.

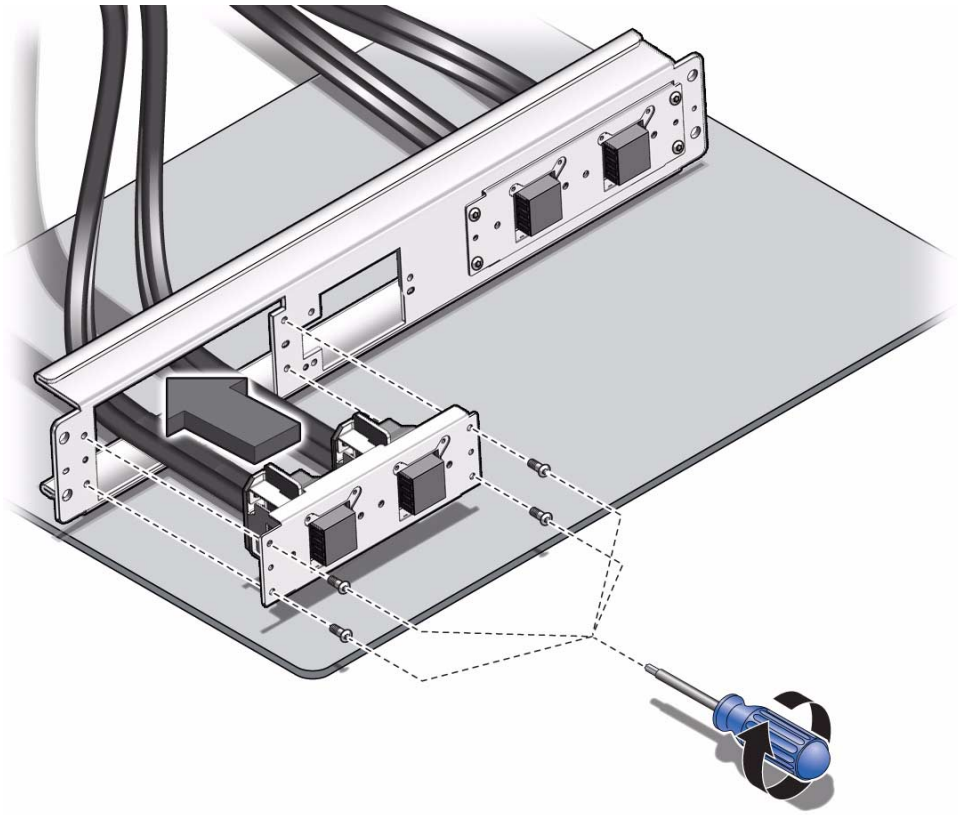
1. **Attach the I/O data cable assembly to the support bracket.**
   a. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
   b. **Remove the replacement I/O data cable assembly from the shipping package and place the assembly on an antistatic mat.**
   c. **Attach the assembly to the support bracket.**

Caution – Avoid excessive handling of the cable. Repeated bending of the cable can break wiring to individual connector pins, as can sharp bending of the wires.

Note – To identify the top of the bracket, look at the opening for the I/O power cable in the center of the bracket. The rectangular opening has two screw holes and a small notch on the top. The bottom of the rectangular opening has only one screw hole.

Use four T20 Torx screws at 15 in-lb for each cable bracket.

- Install cable subassembly T3/T4 at the top of the bracket. A label on the top of the cable bracket identifies this subassembly as TOP.
- Install cable subassembly T1/T2 at the bottom of the bracket. A label on the top of the cable bracket identifies this subassembly as BOTTOM.



2. Install the support bracket and cable assembly in the server.

a. At the rear of the server, carefully push the front half of the cable assembly (connectors T5 and T6/T7/T8/T9) through the opening for the I/O unit.

Follow these rules.

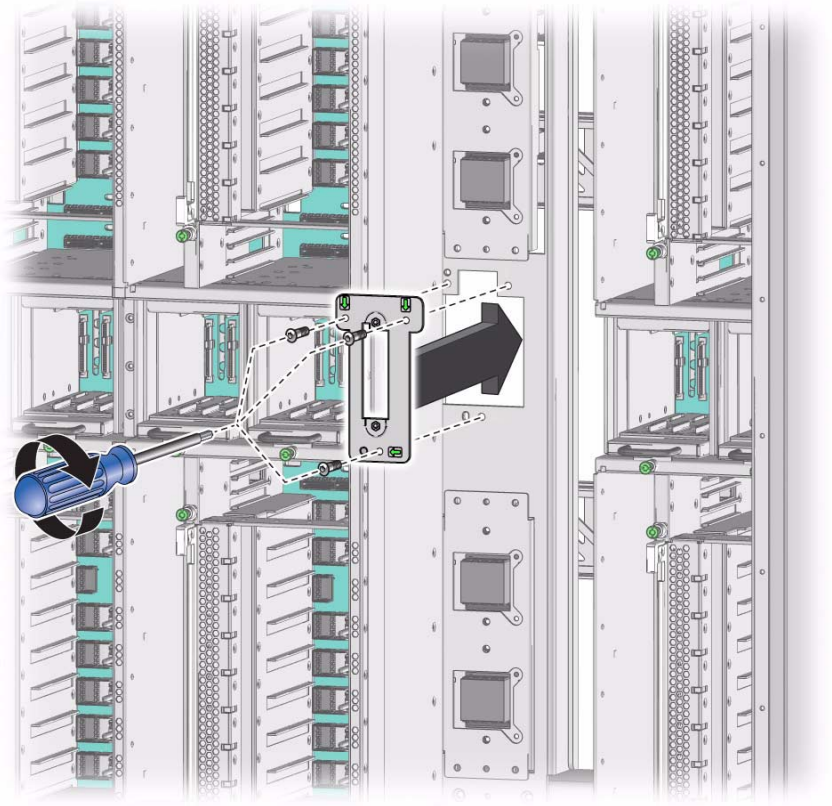
- Avoid sharp bending of the cables.
- Work slowly to avoid dislodging the connector covers.
- Orient the T6/T7/T8/T9 connectors with the plastic plate facing the midplane. This orientation reduces the amount of twisting needed to install the connectors in their sockets and minimizes the danger of breaking the wires in the cable assembly.
- Route the cables under the lower bus bar and let them hang down in front of the midplane for now.

b. Locate the loose I/O power cable.

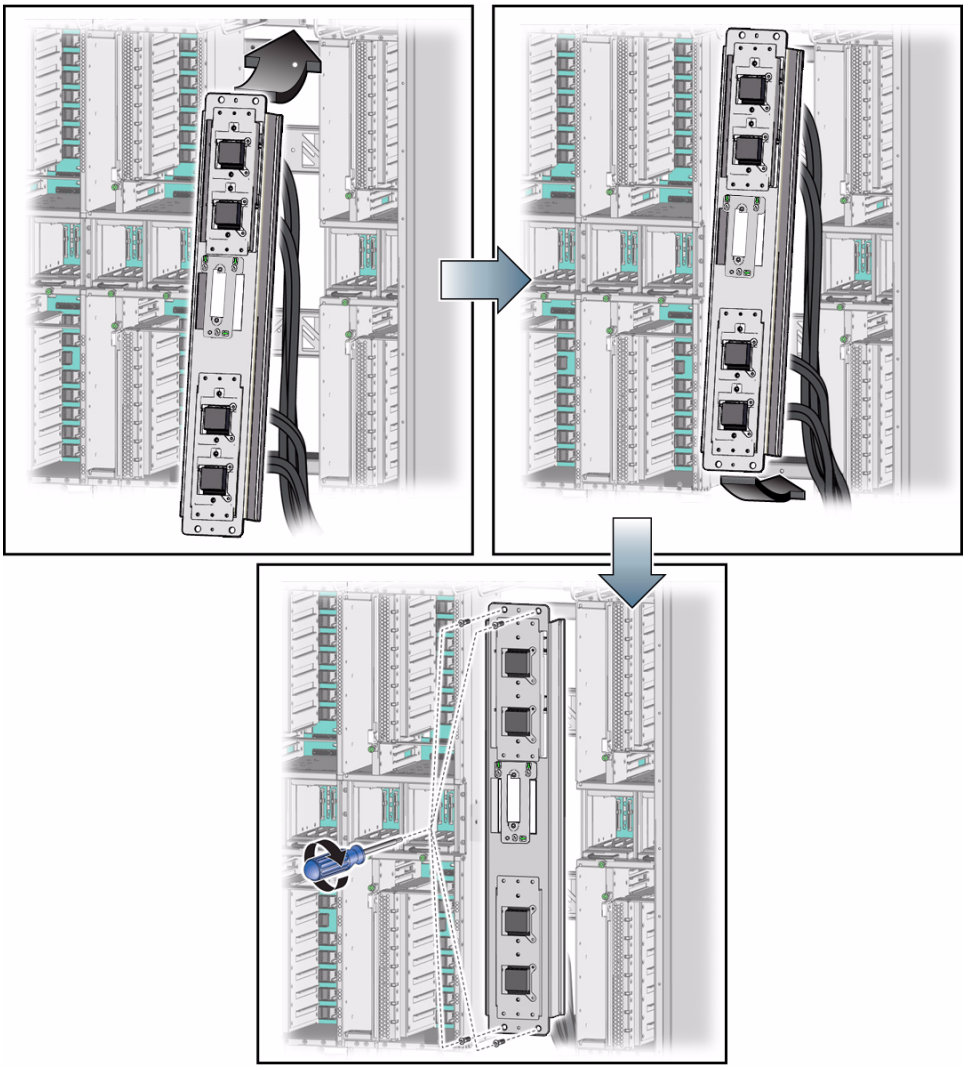
i. Carefully route the I/O power cable connector through the middle hole in the support bracket.

ii. Use three T20 Torx screws to attach the connector to the support bracket.

iii. Tighten the screws to 15 in-lb.



c. **Tilt the support bracket so that the bottom edge is away from the lower guide pin (panel 1).**



d. **Loosely attach the top two captive T20 Torx screws (panel 2).**

e. **Lift the bracket slightly so that the bottom hole fits around the lower guide pin.**

f. **Loosely attach the bottom two captive screws.**

g. **Tighten all four captive screws to 15 in-lb (panel 3).**

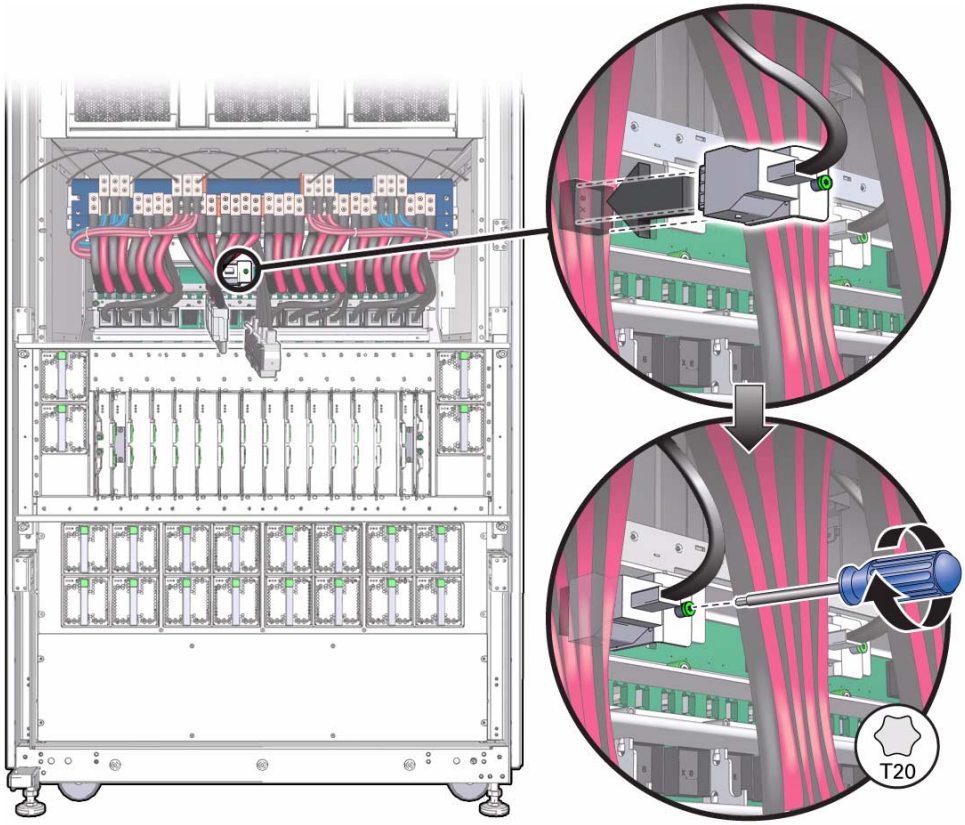
3. **Go the front of the server.**

   a. **Attach connector T5 to the midplane.**

      i. **Remove the plastic cover from the connector.**

         Do not discard the plastic cover.

      ii. **Plug connector T5 into the socket on the midplane (detail 1).**



      iii. **Tighten the captive T20 Torx screw (detail 2).**

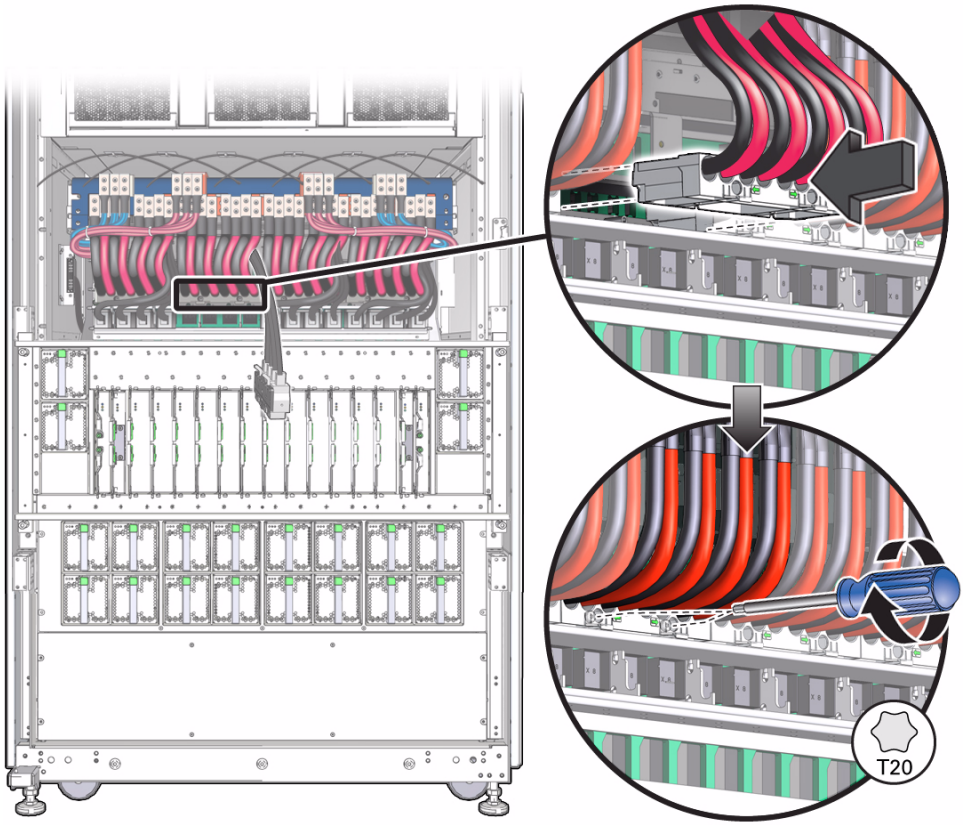
         Tighten the screw to 15 in-lb. See "Torque Reference" on page 66.

   b. **Install the cabled bus bar assembly.**

      i. **Remove the plastic cover from the cable assembly.**

         Do not discard the plastic cover.

ii. **Insert the assembly into the socket on the midplane (detail 1).**



Note – The cable connectors in the plastic block are keyed with flat tops. Align the tops of the cables to make it easier to insert the block in the connector on the midplane. If the block does not insert easily, rotate the individual cable ends so that the flat portions of the cable ends are all aligned and facing up.

---

iii. **Carefully install the two captive T20 Torx screws (detail 2).**

Caution – Tighten the screws alternately, several turns at a time. If the plastic block is not kept parallel to the midplane, stress from the screws can break the block.

---

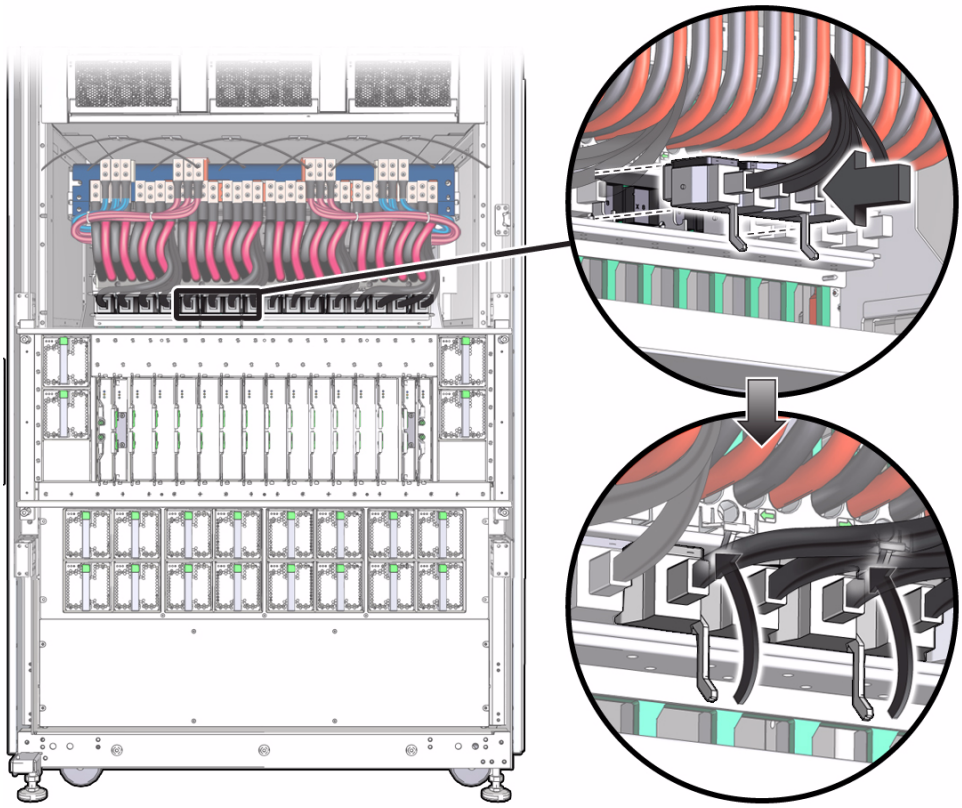
iv. **After you seat the plastic block, tighten the screws to 10 in-lb.**

c. **Install the T6/T7/T8/T9 cable.**

i. **Remove the plastic covers from the connectors.**

Do not discard the plastic covers.

ii. **Insert the assembly into the socket on the midplane.**



iii. **Raise the hinged metal bars on the cable assembly and press them forward until the ends lock into the plastic tabs on the cabled lower bus bar assembly.**

d. **Determine your next step:**

- If you are replacing other internal components, do those now.
- If you do not need further access to the inside of the cabinet, go to Step 4.

4. **Reassemble the server.**

   a. **Install the IOU.**

      See "Install an IOU" on page 362.

   b. **Install the upper fan cage.**

      See "Install the Upper Fan Cage" on page 298.

   c. **Install the front filler panel.**

      See "Install the Front Filler Panel" on page 293.

   d. **Install the standoffs and trim panels.**

      See "Install Trim Panels" on page 95.

   e. **Install the front door.**

      See "Install the Door" on page 81.

   f. **Restart the server.**

      See "Returning the Server to Operation" on page 481.

5. **Pack the old cable assembly.**

   The cable assembly might undergo failure analysis at the factory, so handle the cable assembly carefully.

   Follow these rules.

   - Reuse the package that contained the replacement cable.
   - Place plastic covers on the connectors to prevent damage to the pins.
   - Do not put sharp bends in the cable. Internal connections to wires can break.
   - Do not press on the guide pins. The guide pins can bend and break.
   - Pack the torque screwdriver securely in the package. The torque screwdriver should not be free to move inside the package.
   - Include any remaining connector covers.

6. **Return the old cable assembly to Oracle.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "Remove an I/O Data Cable Assembly" on page 433

Servicing the Midplane

The midplane is a cold-service component. See "RFI Panel, Scalability Assembly, and Midplane Locations" on page 19 for the location of the midplane.

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30
- "Returning the Server to Operation" on page 481

▼ Inspect the Replacement Kit

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Open and inspect the shipping package.**

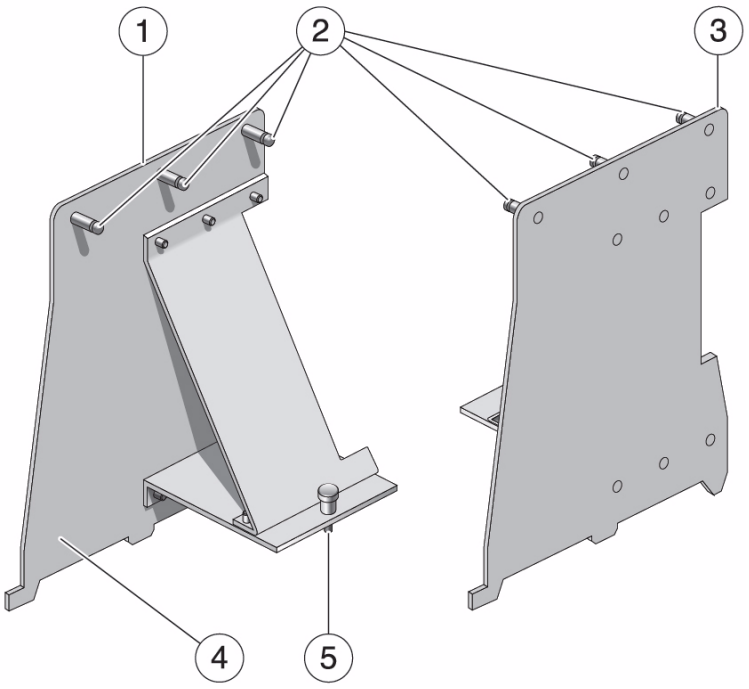
   Do not damage or discard the shipping package. It will be reused to return the old midplane to Oracle.

Caution – Do not remove the protective plastic covers from the connectors on the midplane until you are ready to plug a cable connector into a socket.

The replacement kit contains:

- Midplane, with protective connector covers
- Torque wrench
- Protective plastic covers for cable connectors
- Cable ties
- Two midplane handles

  See below for the features of the handles.



No.	Description
1	Left handle
2	Keyhole pins
3	Right handle
4	Hooked tab

No.	Description
5	Lock pin

Related Information

- "Prepare to Remove the Midplane" on page 453
- "Remove the Midplane" on page 459
- "Install the Midplane" on page 467
- "Reassemble the Server" on page 477
- "Prepare the Old Midplane for Return" on page 478

▼ Prepare to Remove the Midplane

1. **Halt and power down the server.**

   See "Prepare to Power Off the Server" on page 73.

2. **Prepare the front of the server:**

   a. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

   b. **Remove the front door.**

      See "Remove the Door" on page 77.

   c. **Remove the side trim panels.**

      Also remove the three lower trim panel standoffs on each side, to protect the standoffs from breakage. Do not remove the top cap or the kick plate.

      See "Remove the Trim Panels" on page 91.

   d. **Remove the front filler panel.**

      See "Remove the Front Filler Panel" on page 291.

   e. **Remove the upper fan cage.**

      See "Remove the Upper Fan Cage" on page 296.

   f. **Remove the scalability card cage.**

      See "Remove the Scalability Card Cage" on page 314.

   g. **Remove the lower fan cage.**

      See "Remove the Lower Fan Cage" on page 301.

h. **Remove the scalability assembly.**

See "Remove the Scalability Assembly" on page 375.

3. **Prepare the rear of the server:**

   a. **Remove the CMUs from the rear of the server.**

   See "Remove a CMU" on page 257.

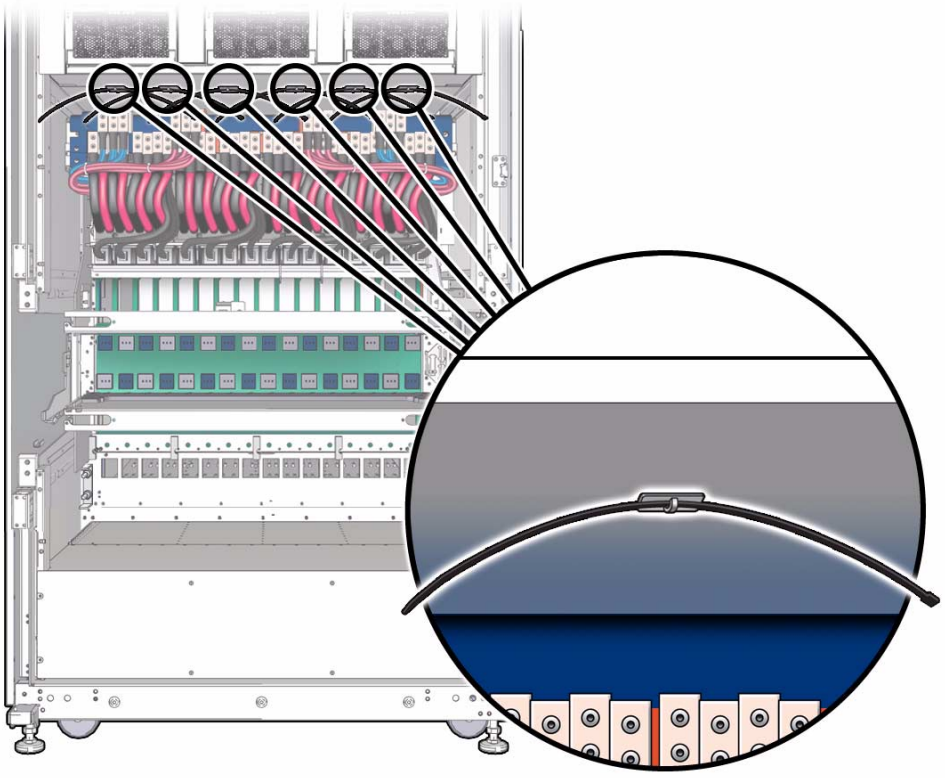
   b. **Remove the SPPs from the rear of the server.**

   See "Remove an SPP" on page 237.

4. **Prepare the inside of the server:**

   a. **At the front of the server, insert cable ties in slots on the bottom of the power system cage.**

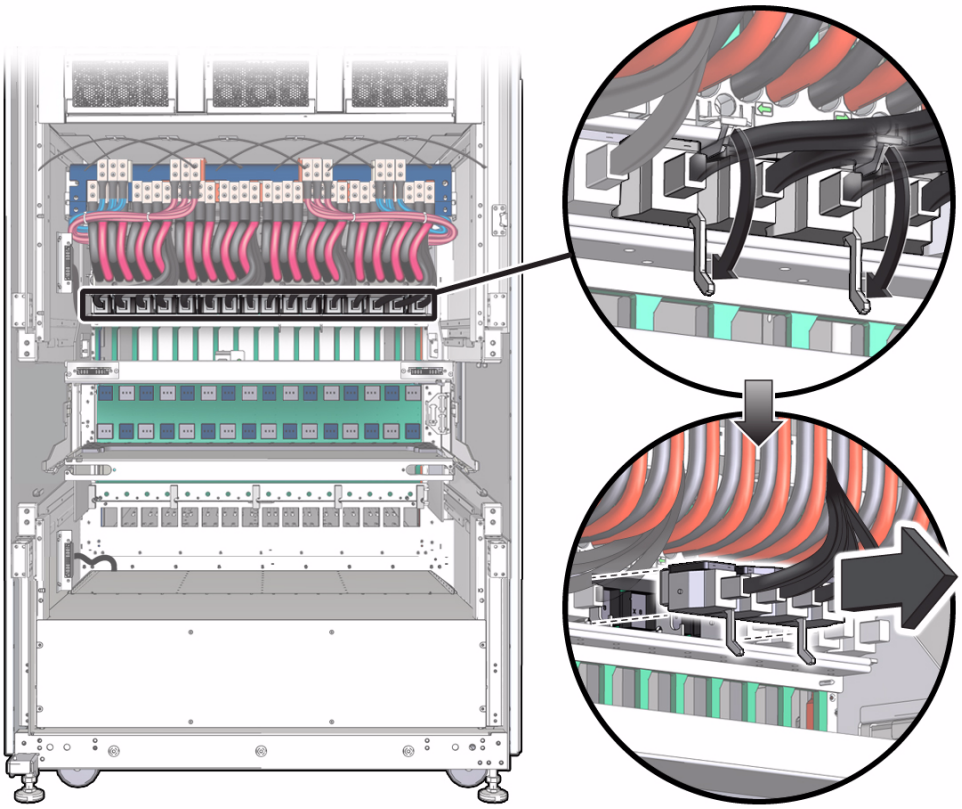
   You will be using the cable ties to raise cable assemblies for access to the midplane.



b. Unlock and detach the CMU data cable assemblies.

There are two metal locking levers on each CMU data cable assembly. The metal locking levers push against plastic locking tabs that are part of the CMU power cable assembly.

i. Push up slightly on the plastic locking tab, and then pull down a metal lever.



ii. Repeat for the second lever.

iii. Pull the CMU data cable assembly out of the midplane and let the assembly hang loose while you remove other assemblies in steps.

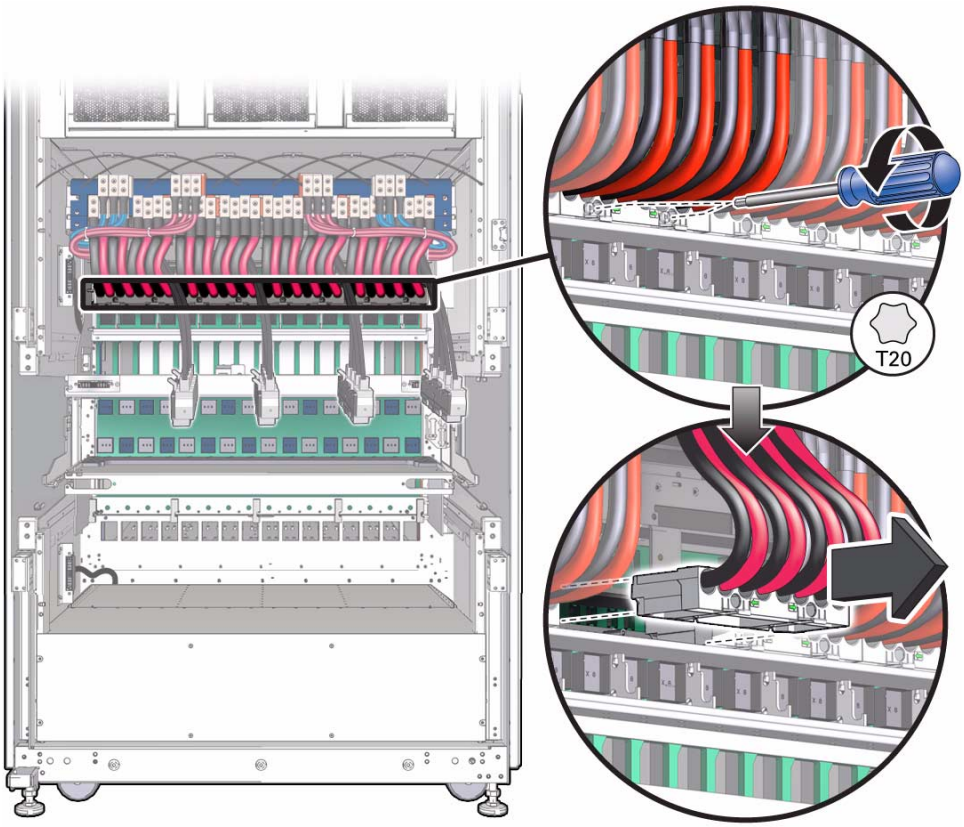
iv. Detach the remaining sets of data cable assemblies.

c. **Unlock and detach the cabled lower bus bar assemblies:**

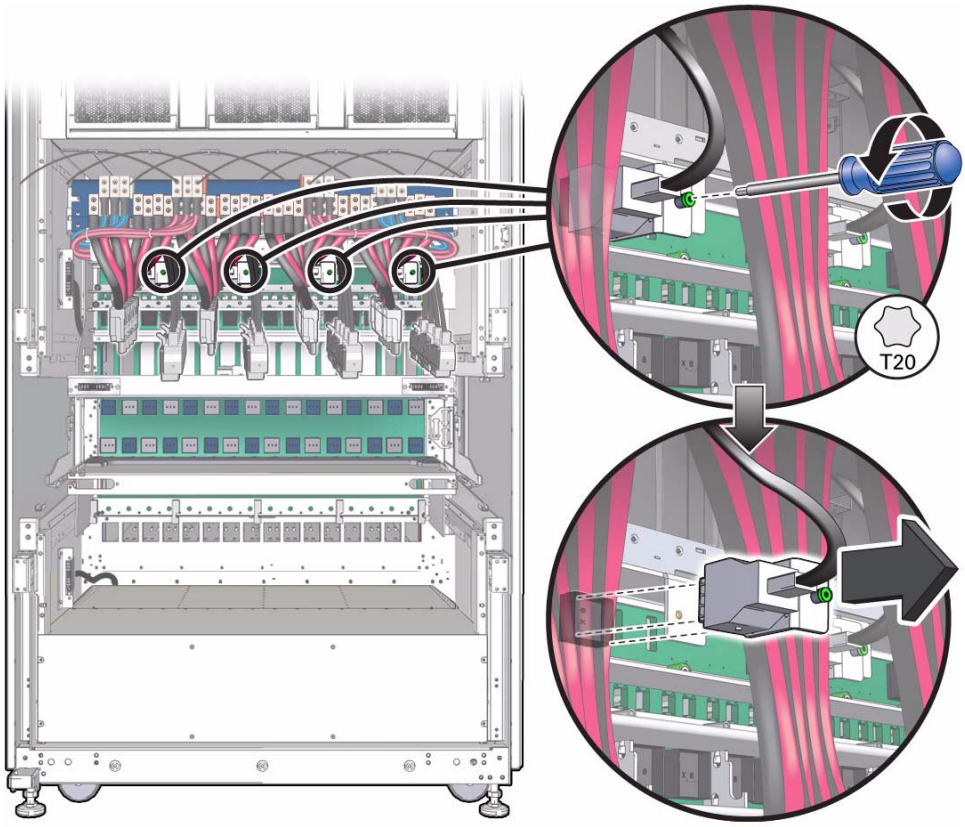
Remove two T20 Torx screws that hold an assembly to the midplane, and then pull the assembly out of the midplane. Detach all four assemblies.

Note – Take care not to drop the screws. These are not captive screws.

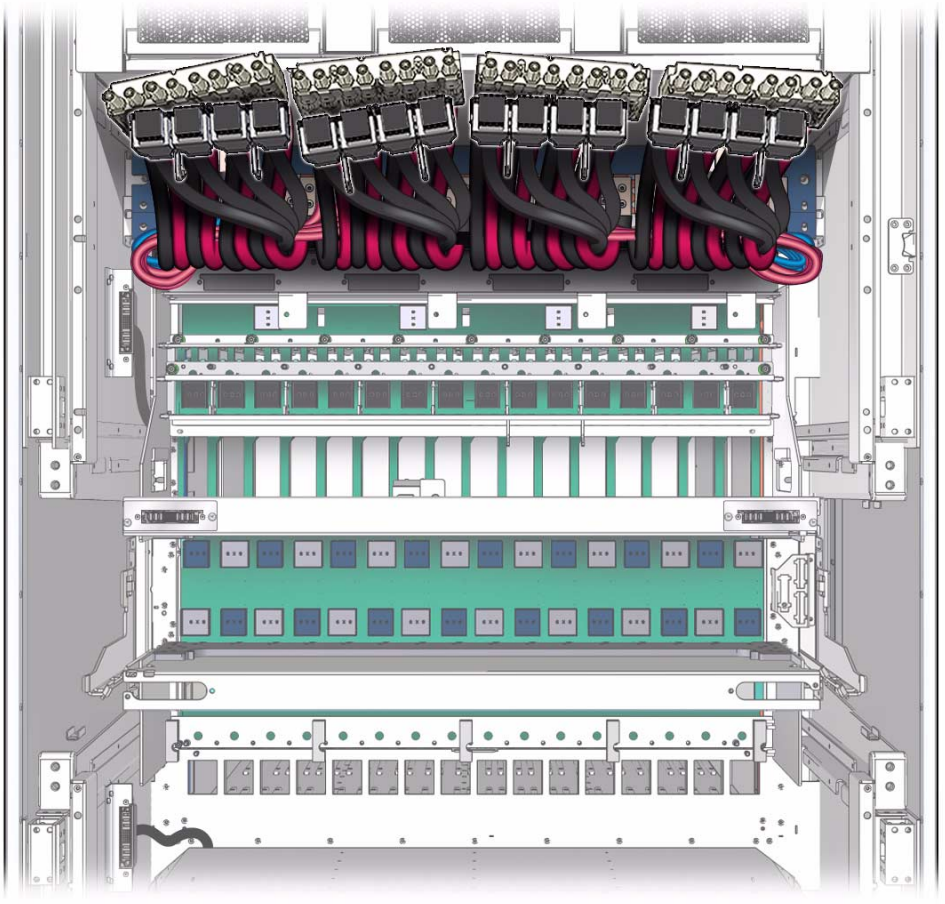
Note – Do not place screws or other loose hardware on the "shelves" of the midplane. Small items can easily fall inside the cabinet.



d. **Use a T20 Torx driver to detach the SPP cables.**


T20

e. **Raise the cable assemblies that you loosened and tie them neatly to the top of the midplane area.**



5. **Remove the old midplane.**

   See "Remove the Midplane" on page 459.

Related Information

- "Inspect the Replacement Kit" on page 451
- "Remove the Midplane" on page 459
- "Install the Midplane" on page 467
- "Reassemble the Server" on page 477
- "Prepare the Old Midplane for Return" on page 478

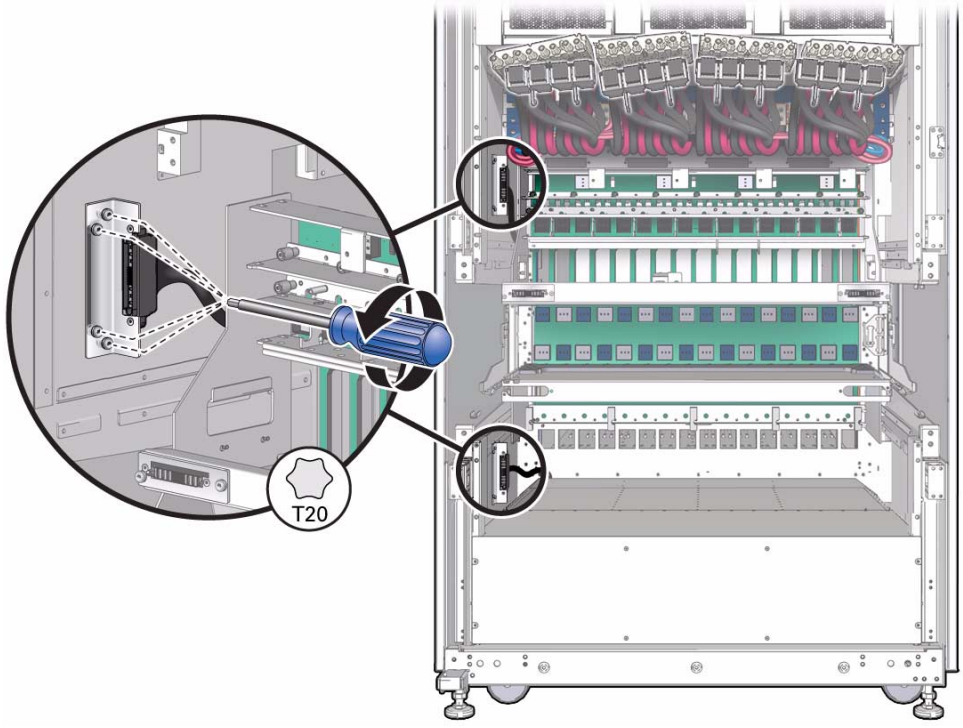
▼ Remove the Midplane

Caution – The midplane weighs 80 pounds and requires two people to carry it.

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Use a T20 Torx screwdriver to detach cables from the sides of the cabinet and the midplane.**

Note – Take care not to drop the screws. They are not captive screws.

a. Detach two scalability cable assembly brackets from the left side of the cabinet.



b. Detach the left scalability card cage cable from the front of the midplane.

c. Tape the upper cables as high as possible to the side of the cabinet.

d. **Place the lower scalability cable assembly bracket on the floor of the cabinet.**

e. **Repeat Step a through Step d for the cables on the right side.**

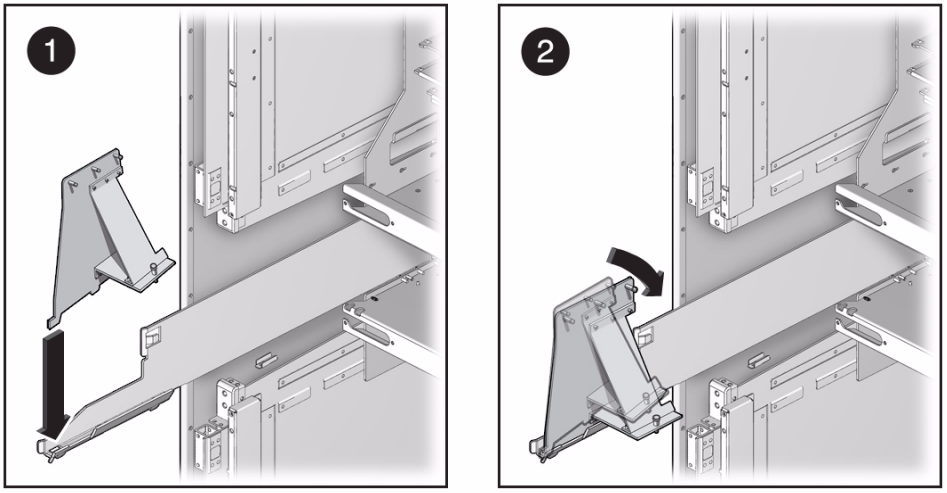
3. **Remove the old midplane.**

   a. **In the shipping carton for the replacement midplane, locate two detachable midplane handles.**

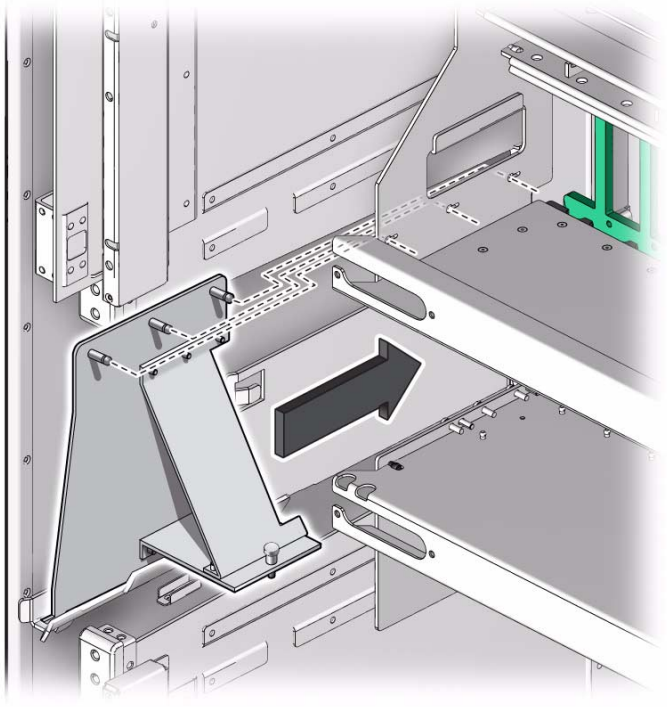
   b. **Attach the handles to the slides:**

      i. **Extend a slide fully.**

      ii. **Insert the hooked tab on the handle into the slide first, and then lower the rear of the handle so the remaining two tabs drop into the slide.**



      iii. **Push the slide back into the chassis until the handle aligns with the side of the midplane.**

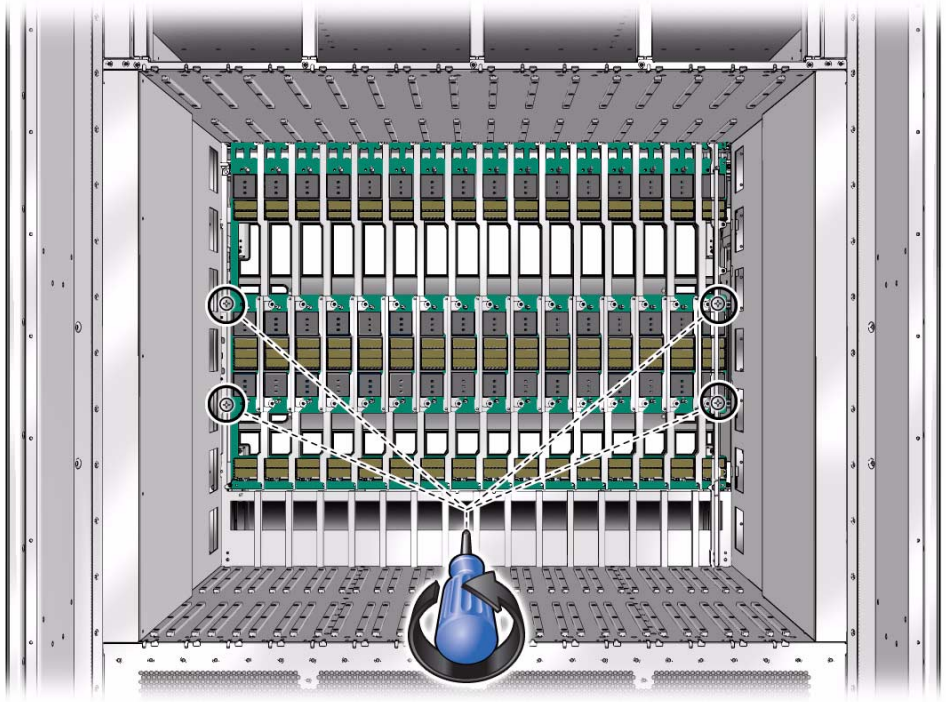


iv. **Insert the keyed pins on the handle into the keyholes on the side of the midplane.**

v. **Raise the spring-loaded lock pin, and then align the pin with the corresponding hole in the base of the midplane.**

vi. **Install the second handle in the same manner.**

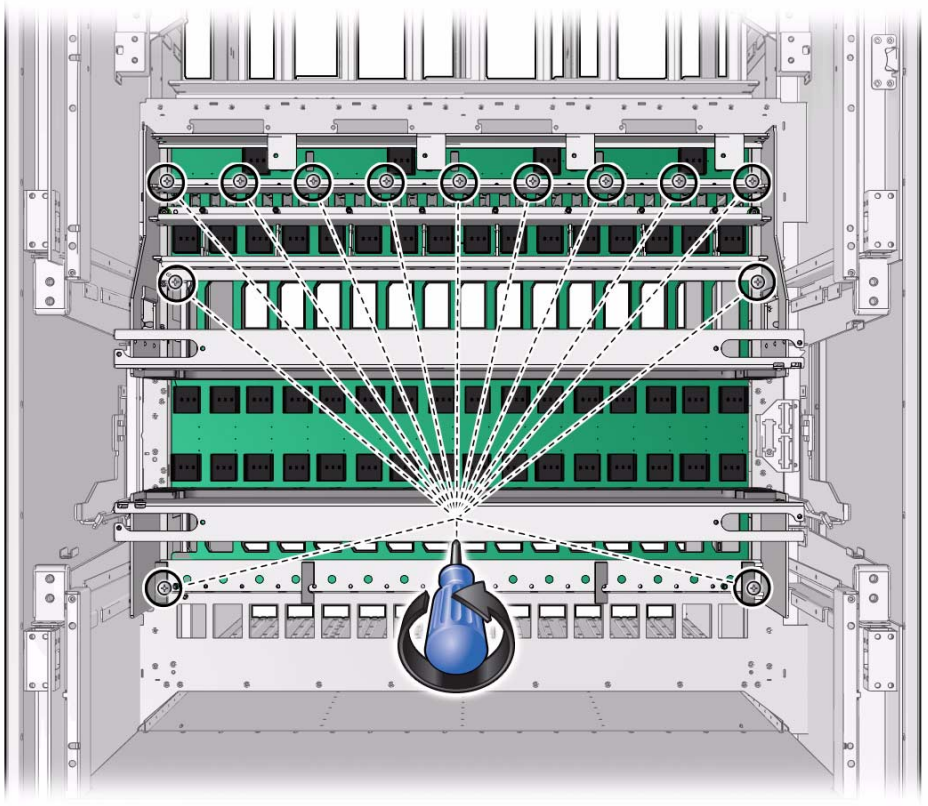
c. **At the rear of the server, remove four screws that are located inside the CMU cage area.**



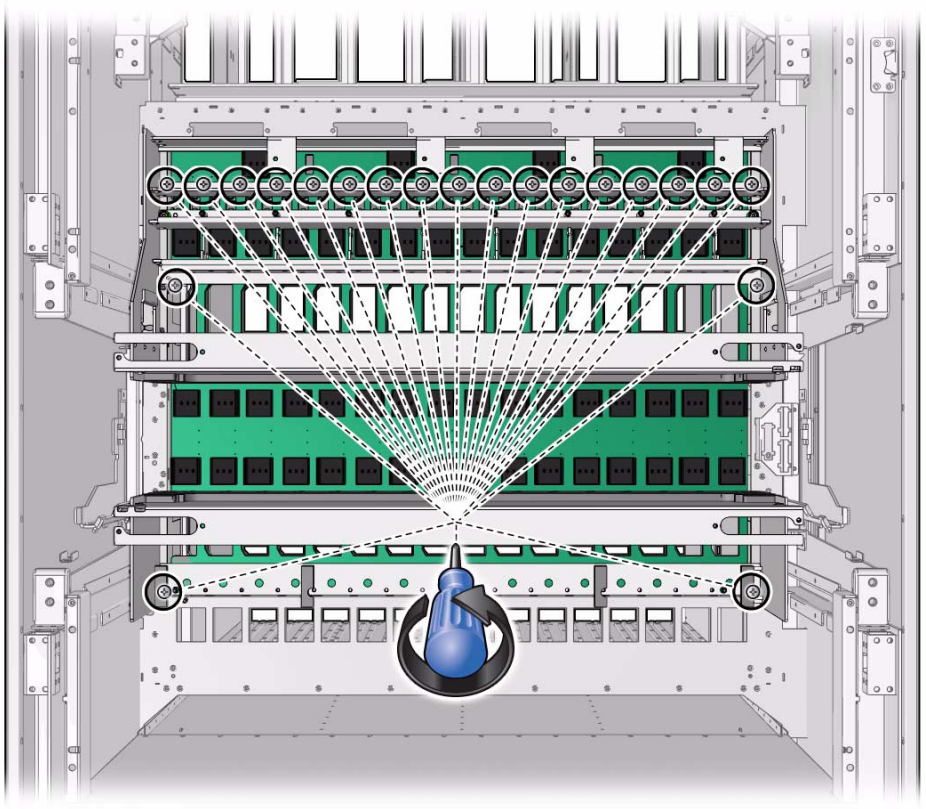
d. Loosen screws on the midplane.

The midplane is one of two types.

- One type of midplane has 13 mounting screws.

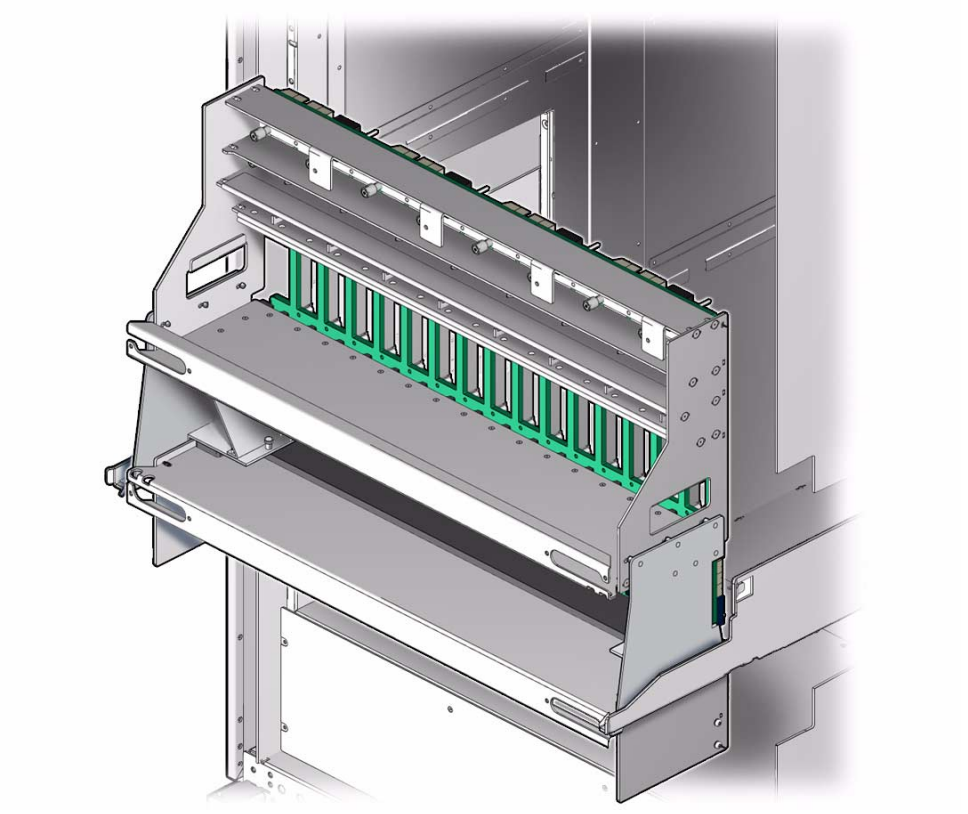


- Another type of midplane has 21 mounting screws.



e. **Holding the handles, pull the midplane out of the cabinet.**

The slides stop when they are fully extended.



f. **Use the handles to lift the midplane off the slides and out of the server.**

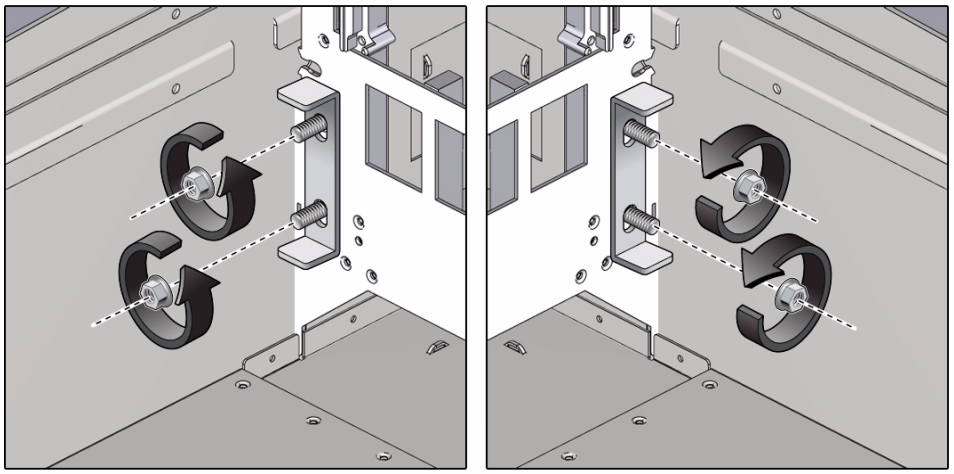
g. **Set the midplane aside on a static-safe surface.**

h. **Remove the handles to use with the replacement midplane.**

i. **If your cabinet has the 21-screw midplane, lower the midplane support brackets.**

Cabinets with the 13-screw midplane do not have support brackets.

Do not remove the 10-mm nuts. Loosen them just enough to let the brackets slip down slightly.



4. **Install the new midplane.**

See "Install the Midplane" on page 467.

Related Information

- "Inspect the Replacement Kit" on page 451
- "Prepare to Remove the Midplane" on page 453
- "Install the Midplane" on page 467
- "Reassemble the Server" on page 477
- "Prepare the Old Midplane for Return" on page 478

▼ Install the Midplane

Caution – The midplane weighs 80 pounds and requires two people to move it.

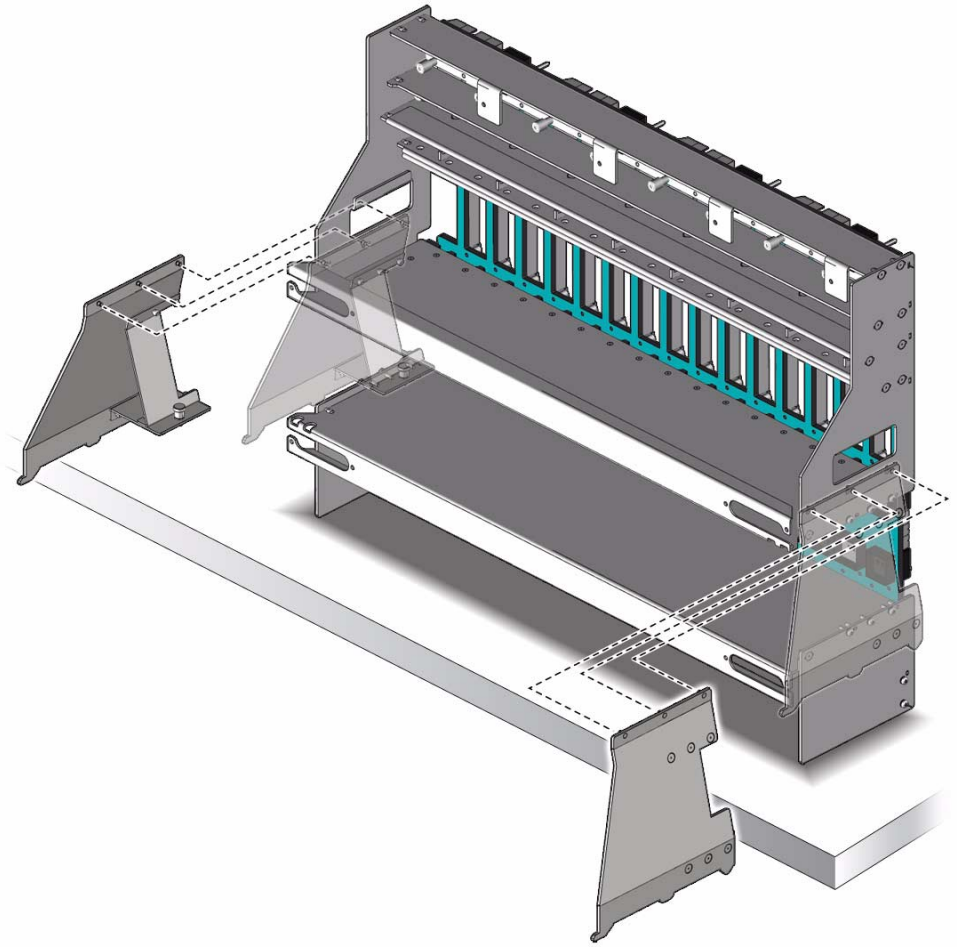
1. **If you haven't already removed the old midplane, see** "Remove the Midplane" on page 459**.**
2. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
3. **Prepare the replacement midplane.**
   a. **Carefully unpack the replacement midplane.**

      You will reuse the packing materials in a later step to send the faulty midplane to an Oracle repair depot.

Caution – Do not remove the protective plastic covers from the connectors on the midplane until you are ready to connect a cable connector to a socket.

   b. **Stand the midplane vertically on a static-safe work space.**
   c. **Attach the handles to the sides of the midplane.**

i. **Insert the keyed pins on the handles into the keyholes on the sides of the midplane.**



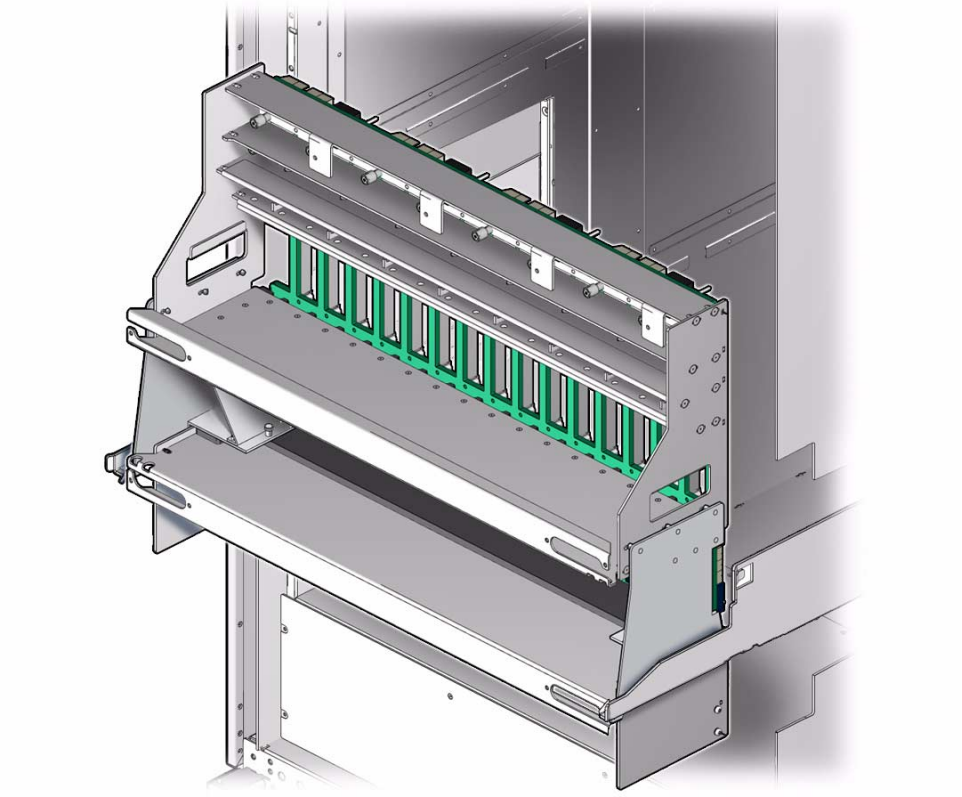
ii. **Raise the spring-loaded lock pin, and then align the pin with the corresponding hole in the base of the midplane.**

iii. **Install the second handle in the same manner.**

d. **Extend the two server slides fully.**

e. **Use the midplane handles to carry the midplane to the slides.**

f. Tilt the top of the midplane slightly away from server to insert the hooked tabs on the handles into the near ends of the slides, and then lower the midplane so the rear tabs on the handles drop into the slides.



g. Remove the plastic covers from the connectors on the midplane.

Do not discard the plastic covers. You will return them to Oracle.

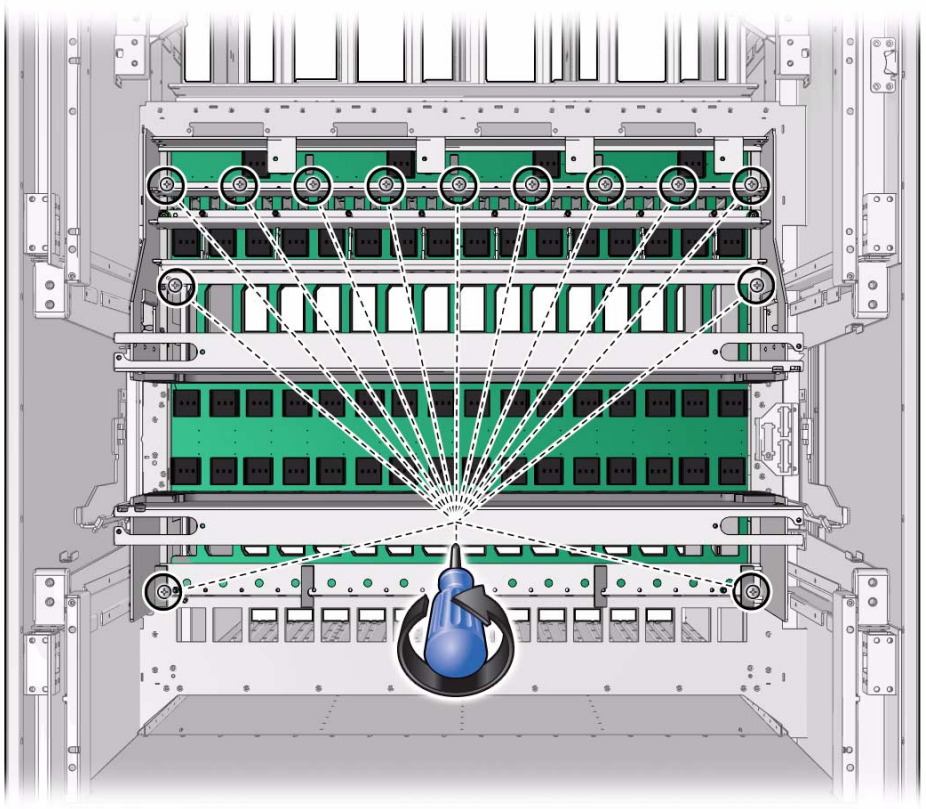
4. Attach the replacement midplane to the server:

a. Push evenly on both handles to slowly slide the midplane into the server.

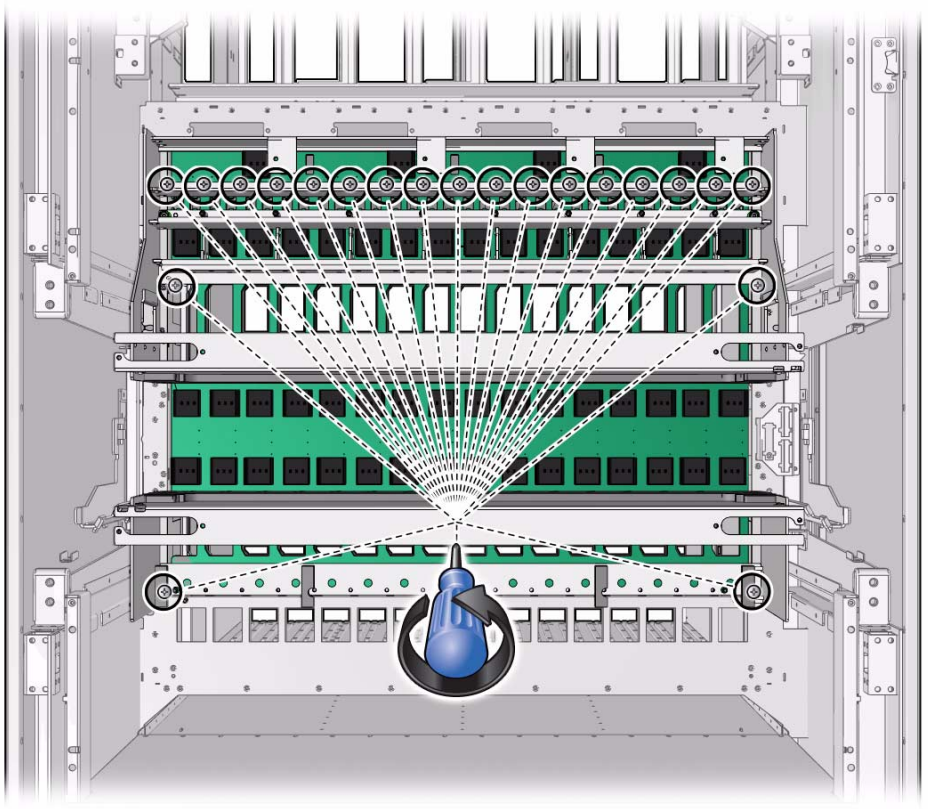
Caution – Because of the weight of the midplane, it is easy to accidentally damage the connectors. Push the midplane slowly until the guide pins and the connectors are engaged.

b. *Loosely* install the captive T20 Torx screws on the front of the midplane.

One type of midplane has 13 front screws.

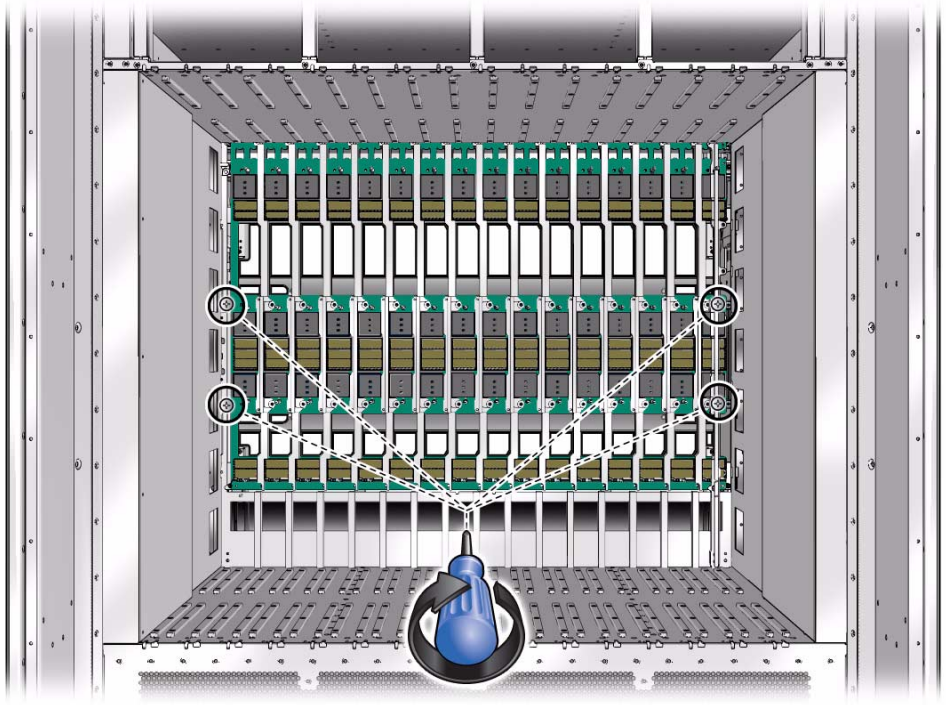


A second type of midplane has 21 front screws.



c. At the rear of the server, install and tighten four T20 Torx screws through the CMU cage to the rear of the midplane.

Use the torque screwdriver that is included with the replacement midplane. Set the torque screwdriver to 15 in-lb.



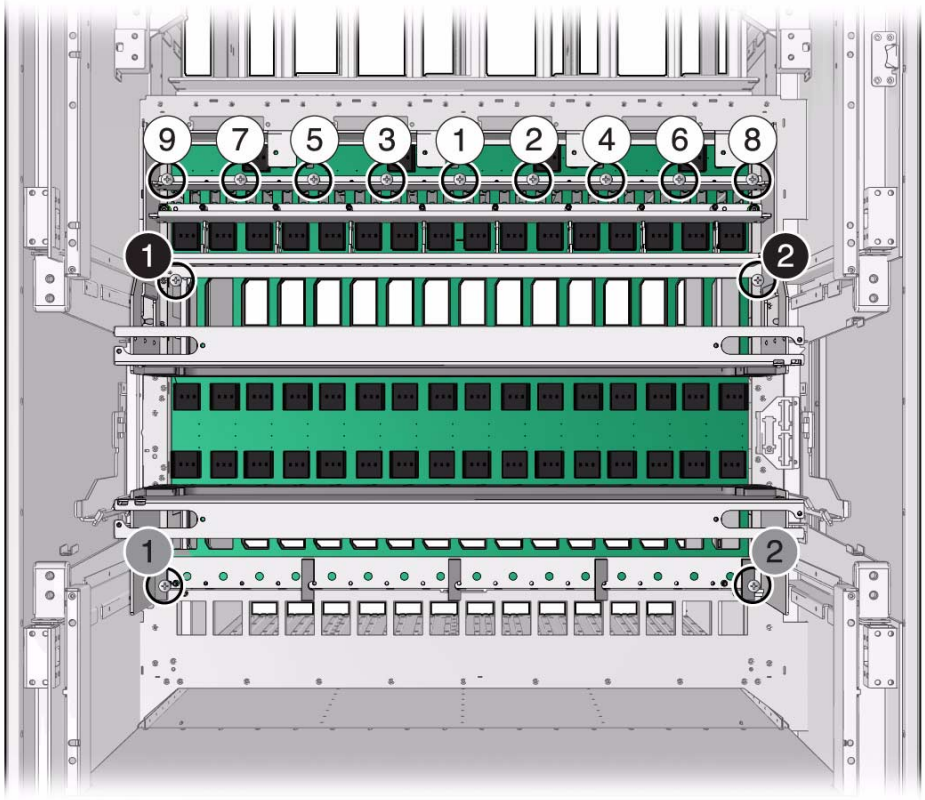
d. Return to the front of the server and tighten the front midplane screws.

i. Follow the numbered sequence shown in the illustration to tighten the top row of screws.

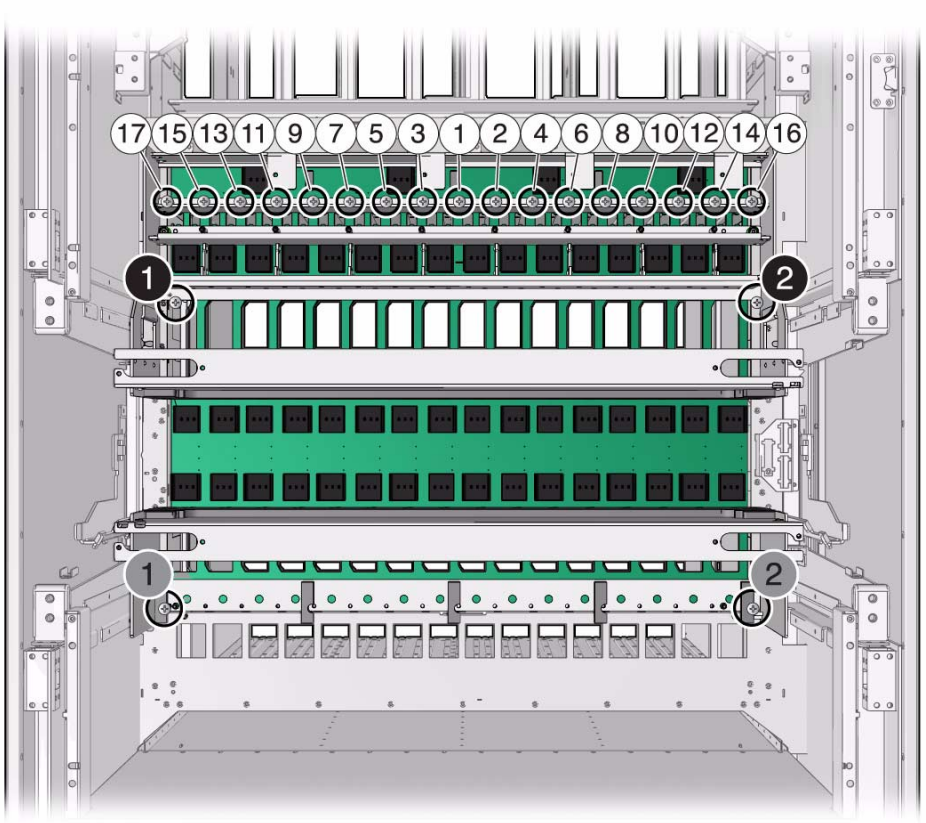
Start in the middle of the top row, and then alternate right and left until all screws are tightened.

Use the torque screwdriver to tighten the screws to 15 in-lb.

The 13-screw midplane has nine screws in the top row.



The 21-screw midplane has 17 screws in the top row.



ii. Tighten the remaining four screws in any order.

Use the torque screwdriver to tighten the screws to 15 in-lb.

e. Adjust two support brackets inside the cabinet.

Note – This step applies only to cabinets with the 21-screw midplane. Cabinets with the 13-screw midplane do not have support brackets.

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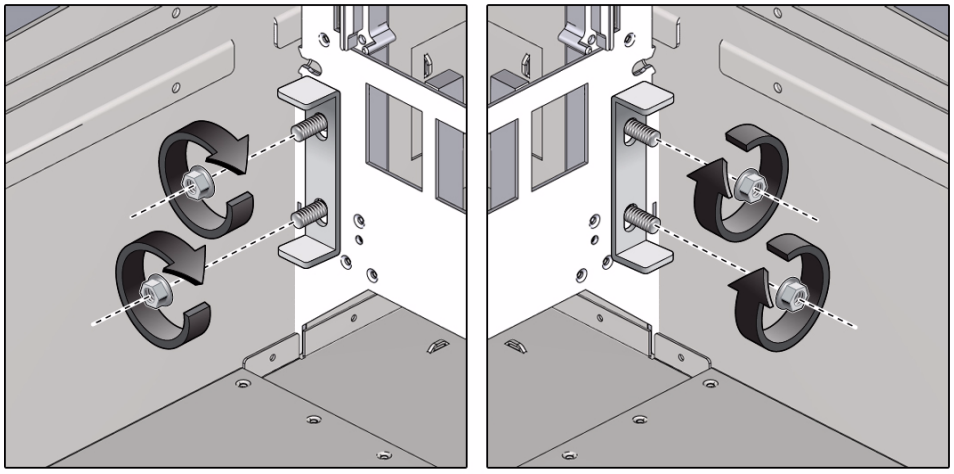
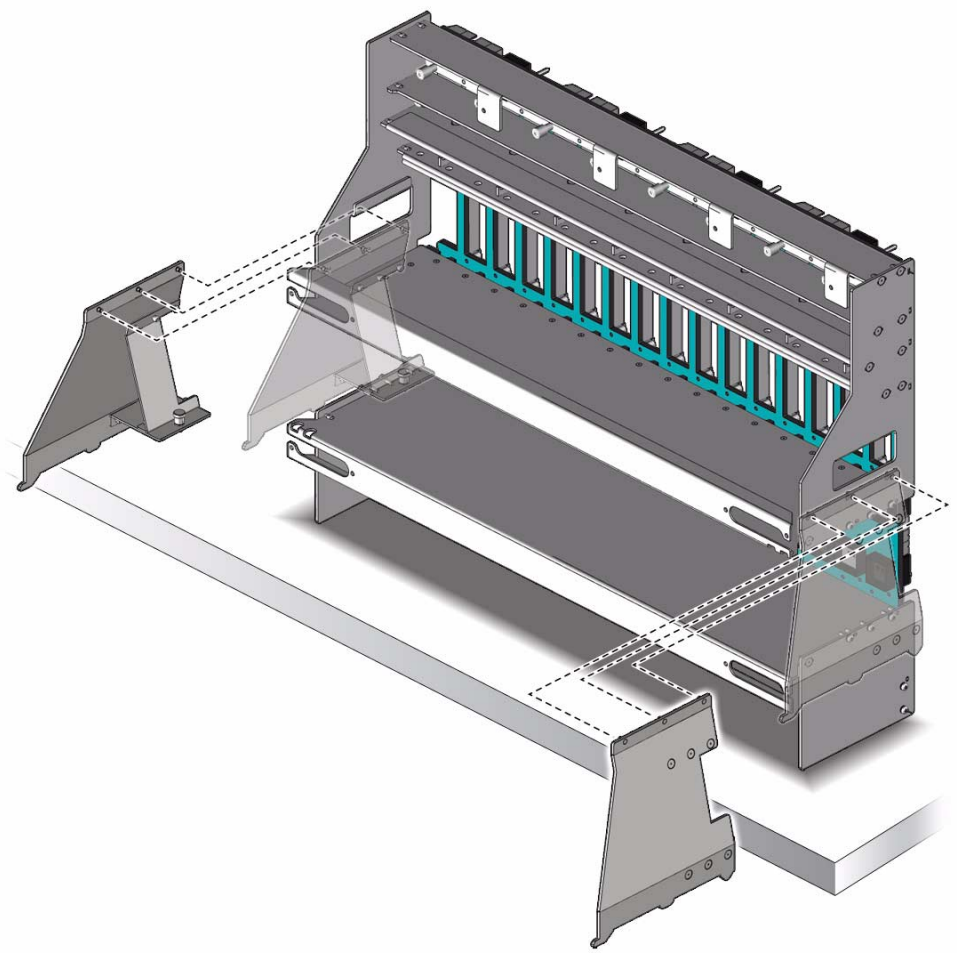
i. Raise the brackets to press against the bottom of the midplane.

ii. Tighten the 10-mm M6 nuts to approximately 15 in-lb (1.7 Nm).



f. Remove the handles from the sides of the midplane.

i. Raise the spring-loaded lock pin on a handle.



ii. Raise the handle slightly to free the keyed pins at the fop from the keyholes on the midplane.

iii. Tilt the handle to remove the hooked tab from the slot in the slide, and then set the handle aside.

iv. Repeat Step i through Step iii to remove the second handle.

g. Reattach cables to the midplane:

i. Install the cabled lower bus bar assemblies.

See "Install a Cabled Lower Bus Bar Assembly" on page 309.

ii. **Install the I/O data cables.**

See "Install an I/O Data Cable Assembly" on page 442.

iii. **Install the left and right scalability card cage cables on the upper shelf of the midplane.**

5. **Reattach the connectors and brackets to the sides of the cabinet.**

Tighten the screws to 15 in-lb.

6. **Reassemble the server.**

See "Reassemble the Server" on page 477.

Related Information

- "Inspect the Replacement Kit" on page 451
- "Prepare to Remove the Midplane" on page 453
- "Remove the Midplane" on page 459
- "Reassemble the Server" on page 477
- "Prepare the Old Midplane for Return" on page 478

▼ Reassemble the Server

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**
2. **Reassemble the rear of the server:**

a. **Install the SPPs.**

See "Install an SPP" on page 244.

b. **Install the CMUs.**

See "Install a CMU" on page 260.

3. **Reassemble the front of the server:**

a. **Install the scalability assembly.**

See "Install the Scalability Assembly" on page 380.

b. **Install the lower fan cage.**

See "Install the Lower Fan Cage" on page 303.

c. **Install the scalability card cage.**

See "Install the Scalability Card Cage" on page 316.

d. **Install the upper fan cage.**

   See "Install the Upper Fan Cage" on page 298.

e. **Install the front filler panel.**

   See "Install the Front Filler Panel" on page 293.

f. **Install the standoffs and side trim panels.**

   See "Install Trim Panels" on page 95.

g. **Install the front door.**

   See "Install the Door" on page 81.

4. **Connect AC power to the server.**

   See "Reconnect AC Power to the Server" on page 483.

5. **Restart the server.**

   See "Restart the Server" on page 484.

6. **Package the old midplane.**

   See "Prepare the Old Midplane for Return" on page 478.

Related Information

- "Inspect the Replacement Kit" on page 451
- "Prepare to Remove the Midplane" on page 453
- "Remove the Midplane" on page 459
- "Install the Midplane" on page 467
- "Prepare the Old Midplane for Return" on page 478

▼ Prepare the Old Midplane for Return

1. **Use an antistatic wrist strap to protect the equipment from ESD damage.**

2. **Collect these items:**

   Use the original packaging to ensure that there are no loose parts to damage the midplane and its connectors during shipment.

   - Midplane, with connector covers
   - Torque wrench
   - Any unused protective plastic covers
   - Two midplane handles

3. **Prepare the package for shipment.**

   See "Return a Component to Oracle" on page 488.

Related Information

- "Inspect the Replacement Kit" on page 451
- "Prepare to Remove the Midplane" on page 453
- "Remove the Midplane" on page 459
- "Install the Midplane" on page 467
- "Reassemble the Server" on page 477

Returning the Server to Operation

After you have removed a component from the SPARC M5-32 or M6-32 server from Oracle and are ready to install a replacement part or an upgrade, use this section to guide you through the sequence for installing components and restarting a domain or the entire server, where applicable.

These topics are in this section:

Related Information

- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Preparing for Service" on page 59
- "Component Service Task Reference" on page 30

Return to Operation Sequence

In the following table, find the point where you stopped removing components, then begin installing the replacement(s) in the order shown by the descriptions below.

For example, if you removed a faulty DIMM, go to the link shown in Step 4 to install the new DIMM then go to Step 5 and the subsequent steps to restore power to the server.

Step	Description	Link
1.	Repair bus bars.	"Prepare to Replace Crown Clips on a Bus Bar" on page 330
2.	Install the midplane.	"Install the Midplane" on page 467
3.	Install the scalability assembly if you serviced these cold-serviceable components at the front of the server.	"Install an I/O Data Cable Assembly" on page 442 "Install the PSDB to Scalability Midplane Cable" on page 407 "Install the Power System Cage to Scalability Assembly Cable" on page 399 "Install the Fan Power Cable" on page 390
4.	Install these cold-serviceable components at the rear of the server.	"Install a Hard Drive Cage" on page 373 "Install an IOU" on page 362 "Install a DIMM" on page 285 "Install a CMU" on page 260 "Install an SPP" on page 244
5.	Install these cold-serviceable components at the rear of the server.	"Install the Rear LED Panel" on page 355 "Install an AC Power Cord" on page 340 "Install an AC Input Filter" on page 347
6.	Install these cold-serviceable components at the front of the server.	"Install the Power System Cage" on page 326 "Install the Scalability Fans Cable" on page 321 "Install the Scalability Card Cage" on page 316 "Install a Cabled Lower Bus Bar Assembly" on page 309 "Install the Lower Fan Cage" on page 303 "Install the Upper Fan Cage" on page 298 "Install the Front Filler Panel" on page 293 "Install the Front LED Panel" on page 289
7.	Power on the server.	"Reconnect AC Power to the Server" on page 483 "Restart the Server" on page 484
8.	Install or close the rear door if you have installed these hot-serviceable components.	"Install an HDD" on page 224 "Install an EMS" on page 206 "Install an I/O Card in a Carrier" on page 183 "Install an I/O Card in the Server" on page 184 "Install an I/O Switch Board" on page 158 "Install the Door" on page 81

Step	Description	Link
9.	Install or close the front door if you have installed these hot-serviceable components.	"Install a Service Processor" on page 151 "Install a Clock Board" on page 138 "Install an SSB" on page 129 "Install a Fan Module" on page 121 "Install a PSDB" on page 112 "Install a Power Supply" on page 107 "Install the Door" on page 81
10.	Install the side panels.	"Install Side Panels" on page 88
11.	Restart a PDomain. Reset the server. Reset service processors.	"Restart a PDomain" on page 487 "Reset the Server" on page 485 "Reset Service Processors" on page 485
12.	Return components to Oracle for repair or recycling.	"Return a Component to Oracle" on page 488

Related Information

- "Preparing for Service" on page 59
- "Identifying Components" on page 1
- "Detecting and Managing Faults" on page 31
- "Component Service Task Reference" on page 30

▼ Reconnect AC Power to the Server

1. **Warn bystanders that you are preparing to restart the server.**
2. **Verify all facility power grid circuit breakers for the server are in the Off position.**

   There should be six circuit breakers.
3. **Connect AC cords to the AC input filters.**

   See "Install an AC Power Cord" on page 340 for instructions.
4. **Connect the other ends of the AC cords to AC outlets.**

Note – All six power cords must be connected to power the server.

5. **Turn on the facility power grid circuit breakers for the AC outlets.**

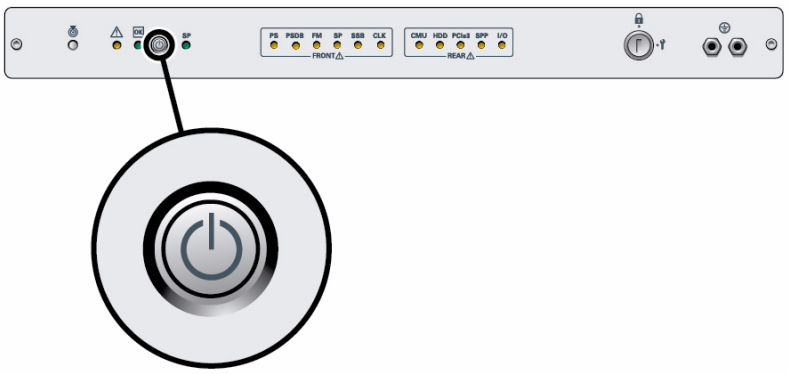
   The fans restart. The server will run POST and, if automatic booting is enabled, the server will boot up.

Related Information

- "Servicing AC Power Cords" on page 335
- "Servicing AC Input Filters" on page 343
- Server Installation, connecting the rear power cords and data cables

▼ Restart the Server

- **Momentarily press the On/Standby button on the front LED panel.**



Related Information

- "Front and Rear LED Panel LEDs and Controls" on page 55
- "Reconnect AC Power to the Server" on page 483
- "Reset the Server" on page 485
- "Reset Service Processors" on page 485
- "Reset a PDomain" on page 486
- "Restart a PDomain" on page 487

▼ Reset the Server

- **To reset the server from the Oracle Solaris prompt, type one of the following commands:**

```
# shutdown -g0 -i6 -y
```

or

```
# reboot
```

Related Information

- "Power Off a PDomain" on page 72
- "Prepare to Power Off the Server" on page 73
- "Restart the Server" on page 484
- "Reset Service Processors" on page 485
- "Reset a PDomain" on page 486
- "Restart a PDomain" on page 487

▼ Reset Service Processors

- **Use this Oracle ILOM command to reset all of the service processors without changing the system configuration:**

```
-> reset /SP
```

Related Information

- "Restart the Server" on page 484
- "Reset the Server" on page 485
- "Reset a PDomain" on page 486
- "Restart a PDomain" on page 487

▼ Reset a PDomain

You must reset each PDomain separately. The following examples show how to perform a graceful and forced reset of the PDomain specified as `PDomain_2`.

- **Use one of the following Oracle ILOM commands to reset the PDomain.**
  - For a graceful reset, enter:

```
-> reset /Servers/PDomains/PDomain_2/HOST
```

  - For an immediate reset, enter:

```
-> reset -force /Servers/PDomains/PDomain_2/HOST
```

Related Information

- "Restart the Server" on page 484
- "Reset the Server" on page 485
- "Reset Service Processors" on page 485
- "Restart a PDomain" on page 487

▼ Restart a PDomain

1. **Log in to Oracle ILOM.**
2. **Connect to a specific PDomain so you can view the console output.**

   This example connects to `PDomain_2`.

```
-> start /Servers/PDomains/PDomain_2/HOST/console
Are you sure you want to start
/Servers/PDomains/PDomain_2/HOST/console (y/n) ? y
Connecting /Servers/PDomains/PDomain_2/HOST/console
->
```

3. **Power on a specific PDomain:**

   This example powers on `PDomain_2`.

```
-> start /Servers/PDomains/PDomain_2/HOST
Are you sure you want to start
/Servers/PDomains/PDomain_2/HOST/ (y/n) ? y
Starting /Servers/PDomains/PDomain_2/HOST
->
```

Related Information

- "Restart the Server" on page 484
- "Reset the Server" on page 485
- "Reset Service Processors" on page 485
- "Reset a PDomain" on page 486

▼ Return a Component to Oracle

1. **Read and follow the repacking and shipping instructions.**
2. **If the replacement included safety covers on the connectors, install the covers on the component that you are returning.**

   This step prevents additional damage during shipping and aids Oracle in determining how the component failed.
3. **Place the component in an antistatic bag and seal the bag with tape.**
4. **In the shipping carton that originally contained the replacement:**

   a. **Place the component so that it is not free to move.**

   b. **Add any required paperwork or other documentation in the carton.**

   c. **Include any tools that were loaned to you by Oracle.**
5. **Close the shipping carton and seal it with the packaging tape supplied by Oracle.**
6. **Apply the shipping label to the shipping carton.**
7. **Notify Oracle or an authorized shipper that the carton is ready for pickup.**

Related Information

- "Prevent ESD Damage" on page 64
- "Find the Server Serial Number" on page 68
- "Safety Information" on page 62

Glossary

A

AC input filter A server power cord AC receptacle.

B

BoB Memory buffer on board. An ASIC on a CMU board that transfers data between a DIMM and a CMP.

Bounded PDomain A type of PDomain which is limited to one DCU. A Bounded PDomain will typically exhibit higher performance as all resources are local to the single DCU. Bounded PDomains are not subject to SSB failure. Bounded PDomains can contain up to eight CMPs.

See also *PDomain*, *CMP*, and *SSB*.

C

CAR Label of the *PCIe hot-plug carrier*.

CFM Cubic feet per minute.

CLK Label for a clock board. The sever contains two dual-redundant clock boards.

CMP Chip multiprocessing. Each CMU contains two CMP processors. The server can contain a maximum of 32 CMPs.

CMU CPU memory unit. Each CMU contains two CMPs and two sets of DIMM slots.

D

DCM Domain configuration management. DCM refers to the reconfiguration of boards in physical domains for Enterprise-class systems.

DCU Domain configurable unit. Each DCU contains two or four CMUs and one IOU. The smallest building block for physical domains.

DHCP Dynamic Host Configuration Protocol. Software that automatically assigns IP addresses to clients on a Transmission Control Protocol/Internet Protocol (TCP/IP) network.

DIMM Dual in-line memory module.

E

EMI Electromagnetic interference.

EMS Express module SAS. Each EMS contains two 10GBASE-T network connections and provides access to four hard drives on the server.

ESD Electrostatic discharge.

F

FMA fault management architecture. Generates fault indictments from the *SP*. FMA provides three system activities: error handling, fault diagnosis, and response.

FRU Field-replaceable unit.

G

GB Gigabyte. 1 gigabyte = 1024 megabytes.

GbE Gigabit Ethernet.

H

HDD Hard disk drive. In Oracle Solaris OS output, HDD can refer to hard disk drives or solid state drives (SSDs).

I

ILOM See *Oracle ILOM*.

IOU I/O unit. The server contains up to four IOUs, one for each DCU. Each IOU supports up to 16 PCIe slots, 8 10GBASE-T ports on 4 EMS modules, and 8 hard drives.

K

KVMS Keyboard video mouse storage.

KW Kilowatt.

L

logical domain A virtual machine comprising a discrete logical grouping of resources that has its own operating system and identity within a single computer system.

L-L Line-to-line. Line-to-line voltage is the voltage between any two phases of an AC generator.

N

NET MGT The network management port on a SP.

O

OpenBoot Firmware that is installed on the server and provides an interface through which you can perform various diagnostic tasks.

Oracle ILOM Oracle Integrated Lights-Out Manager (Oracle ILOM) firmware.

Oracle Solaris OS Oracle Solaris operating system.

Oracle VTS Oracle Validation Test Suite. An application that exercises the system, provides hardware validation, and identifies possible faulty components.

P

PCIe Peripheral Component Interconnect Express.

PCIe hot-plug carrier An enclosure used to install and house PCIe cards in the server.

PDomain Physical domain. Each PDomain is an independently configurable and bootable entity with full hardware domain isolation for fault isolation and security purposes.

The maximum number of PDomains supported is four, which is equal to the number of DCUs. The minimum number of PDomains is one, which can be composed of all available DCUs within the system.

DCUs in a PDomain communicate with other DCUs in the server through the SSBs. If an SSB fails, the PDomain availability will be impacted. Bounded PDomains are limited to one DCU and are not affected by SSB failures.

See also *Bounded PDomain*, *DCU*, and *SSB*.

PDomain-SPP The lead SPP of a physical domain. The PDomain-SPP manages tasks and provides rKVMS service for that physical domain.

POST Power-on self test. A diagnostic that runs when the server boots.

PSDB Power system distribution board.

PSH Predictive self healing. An Oracle Solaris OS technology that continuously monitors the health of the server and works with Oracle ILOM to take a faulty component offline if needed.

R

rKVMS Remote keyboard video mouse and storage.

RMS Root mean square.

S

SAS Serial attached SCSI.

SATA Serial advance technology attachment.

scalability Scalability is the ability to increase (or *scale up*) processing power in a server by combining the server's physical configurable hardware (see *DCU*) into one or more logical groups (see *PDomain*).

SER MGT The serial management port on a SP.

SP Service processor. For redundancy, the server contains two service processors, one being active and one on standby.

SPP Service processor proxy. One SPP is assigned to manage each PDomain. SPPs monitor environmental sensors and manage the CMUs, memory controllers, and DIMMs within the DCU.

See *PDomain-SPP*.

SSB Scalability switch board.

SSD Solid state drive.

SSH Secure shell. A program for logging in and executing commands on a system or service processor.

T

TB Terabyte. 1 terabyte = 1024 gigabytes.

Torx A type of screw head characterized by a 6-point star-shaped pattern.

U

UPS Uninterruptible power supply.

V

VAC Voltage alternating current.

VLAN Virtual local area network.

VTS See *Oracle VTS*.

W

WWN World wide name.

Index

D

E

F

H

I

S

T

U

V