SPARC T8-2 Server Service Manual

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Contents

Using This Documentation

- **Overview** – Describes how to troubleshoot and maintain the server
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – This guide is intended for trained technicians and authorized service personnel who have been instructed on the hazards within the equipment and are qualified to remove and replace hardware

Product Documentation Library

Documentation and resources for this product and related products are available at `http://www.oracle.com/goto/t8-2/docs`.

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Identifying Components

These topics identify key components of the server, including major boards and internal system cables, as well as front and rear panel features.

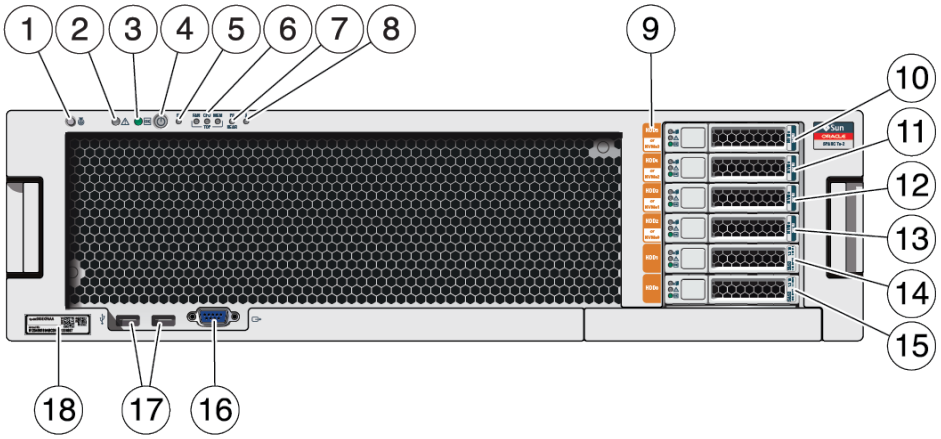
For system overview information, see "Understanding the Server" in *SPARC T8-2 Server Installation Guide*.

Related Information

Front Panel Components (Service)

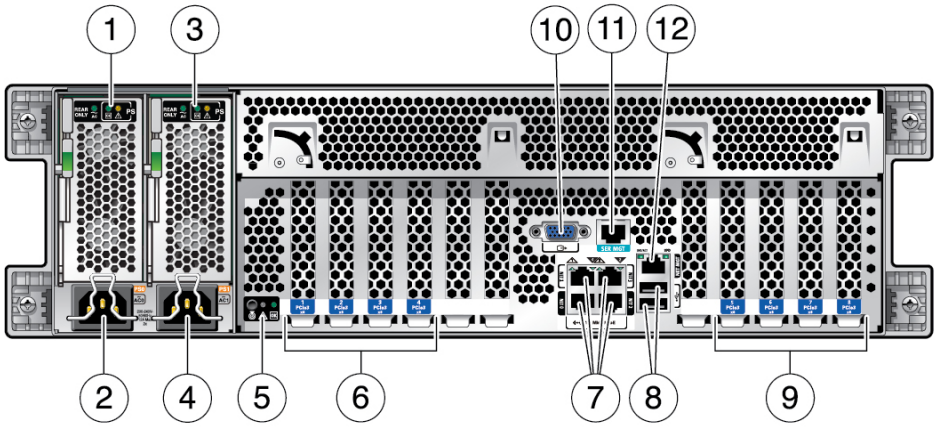
The following figure shows the layout of the server front panel, including the power and server locate buttons and the various status and fault LEDs.

Note - The front panel also provides access to internal drives, the removable media drive (if equipped), and the two front USB ports.



No.	Description	Links
1	Locate indicator and button (white)	“Front Panel Controls and LEDs” on page 34
2	Service Action Required LED (amber)	“Front Panel Controls and LEDs” on page 34
3	Power/OK LED (green)	“Front Panel Controls and LEDs” on page 34
4	Power button	“Front Panel Controls and LEDs” on page 34
5	SP OK indicator (green)	“Front Panel Controls and LEDs” on page 34 “Servicing the SPM” on page 129
6	Three Service Action Required LEDs (amber) for fan module (FAN), processor (CPU), and memory (MEM)	“Servicing Fan Modules” on page 75 “Servicing the Motherboard” on page 147 “Servicing Memory Risers and DIMMs” on p
7	PS Service Action Required LED (amber)	“Servicing Power Supplies” on page 83
8	Overtemp LED (amber)	“Front Panel Controls and LEDs” on page 34
9	Drive labels	
10 11 12 13	HDD 5 or NVMe 3 HDD 4 or NVMe 2 HDD 3 or NVMe 1 HDD 2 or NVMe 0	“Servicing Drives” on page 63
14 15	HDD 1 HDD 0	“Servicing Drives” on page 63
16	DB-15 video connector	“VGA Port” in *SPARC T8-2 Server Installatio*
17	Two USB 2.0 connectors	“USB Ports” in *SPARC T8-2 Server Installati*
18	Serial number	

Rear Panel Components (Service)



No.	Description	Links
1	Power supply 0 status indicator LEDs	“Servicing Power Supplies” on page 83
2	Power supply 0 AC inlet	
3	Power supply 1 status indicator LEDs	“Servicing Power Supplies” on page 83
4	Power supply 1 AC inlet	
5	Server status LEDs	“Rear Panel Controls and LEDs” on page 36
6	PCIe card slots 1 to 4 (left to right)	“Servicing PCIe Cards” on page 119
7	NET 10/100/1000 ports (4): NET 0 to NET 3	
8	USB 3.0 connectors (2)	
9	PCIe card slots 5 to 8 (left to right)	“Servicing PCIe Cards” on page 119
10	DB-15 video connector	
11	SER MGT/RJ-45 serial port	
12	NET MGT port	

Internal System Cables

The following table identifies the internal system cables used in the server.

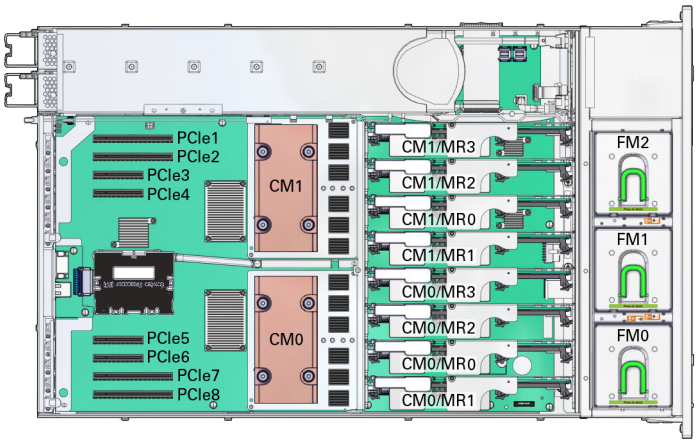
Cable	Description
Top cover interlock cable	This cable connects the safety interlock switch on the top cover to the power distribution board. When the top cover is removed, this connection is broken, which causes the server to power down.
Power supply backplane signal cable (1 ribbon cable)	This cable carries signals between the power supply backplane and the power distribution board.
Motherboard signal cable (1 ribbon cable)	This cable carries signals between the power distribution board and the motherboard.
Drive data cables (2 bundled)	These cables carry data and control signals between the motherboard and the drive backplane.
Mini SAS cables (2 bundled)	These cables connect the drive backplane HDD/SSD to either an on-motherboard SAS controller or to a PCI-E low-profile form factor HBA option.

Related Information

- "Internal Component Locations" on page 17
- "Power Distribution and Fan Module Component Locations" on page 22

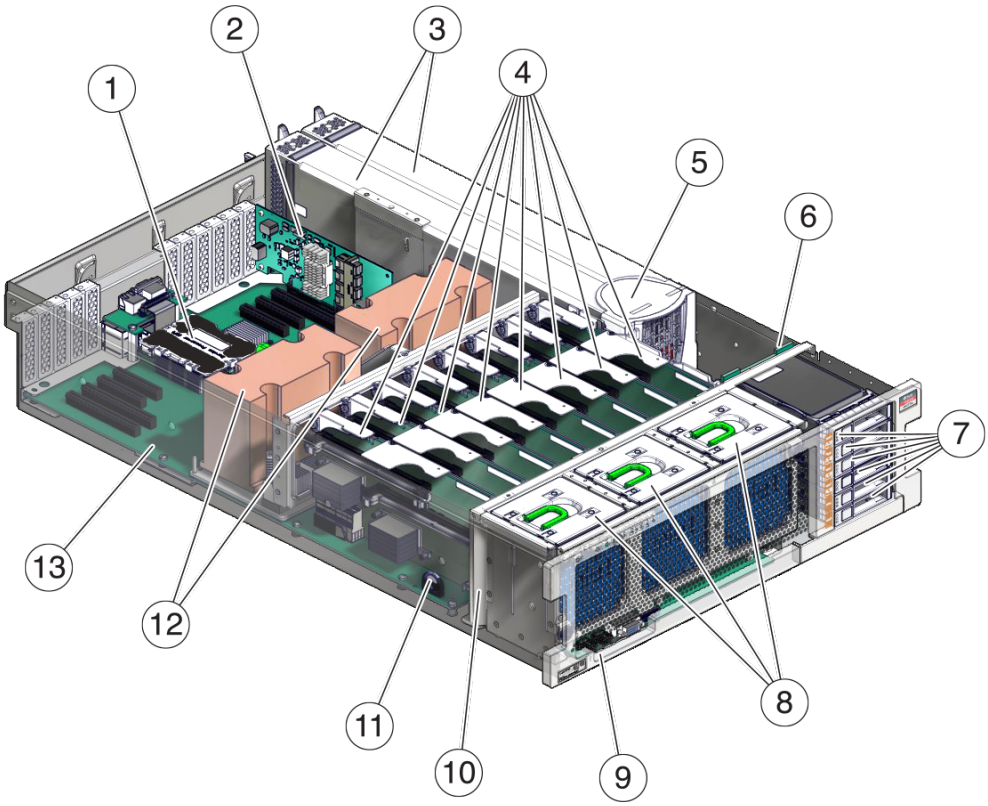
Server Top View

The following figure shows a top view of the server with the top cover removed.



Internal Component Locations

The following figures identify the replaceable component locations with the top cover removed.



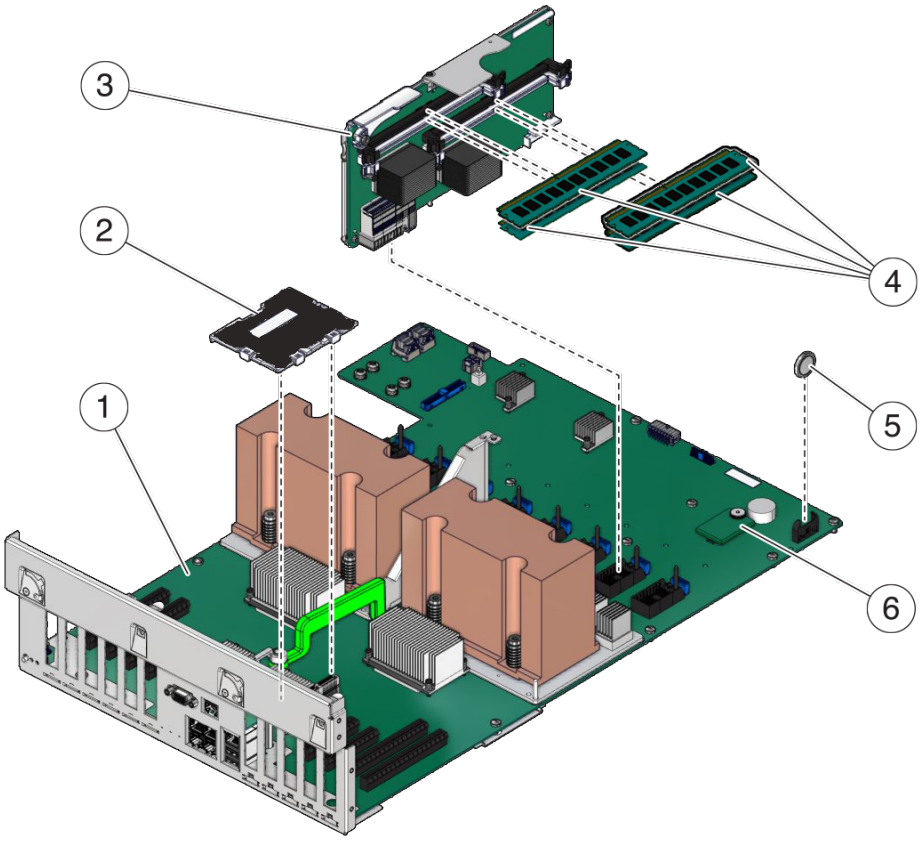
No.	Component	Oracle ILOM Target	Links
1	SP board module	`/SYS/MB/SPM`	"Servicing the SPM" on page 129

2	PCIe card (in slot 1)	`/SYS/MB/PCIE1`
		`/SYS/MB/PCIE2`
		`/SYS/MB/PCIE3`
		`/SYS/MB/PCIE4`
			"Servicing PCIe Cards" on page 119

No.	Component	Oracle ILOM Target	Links
		/SYS/MB/PCIE5	
		/SYS/MB/PCIE6	
		/SYS/MB/PCIE7	
		/SYS/MB/PCIE8	
3	Power supplies	/SYS/PS0 (outer)	"Servicing Power Supplies" on page 83
		/SYS/PS1 (inner)	
4	Memory risers	/SYS/MB/CM0/CMP/MR0	"Servicing Memory Risers and DIMMs" on page 89
		/SYS/MB/CM0/CMP/MR1	
		/SYS/MB/CM0/CMP/MR2	
		/SYS/MB/CM0/CMP/MR3	
		/SYS/MB/CM1/CMP/MR0	
		/SYS/MB/CM1/CMP/MR1	
		/SYS/MB/CM1/CMP/MR2	
		/SYS/MB/CM1/CMP/MR3	
5	PS backplane and cover	/SYS/PDB	"Servicing the PS Backplane" on page 165
6	Drive backplane	/SYS/DBP	"Servicing the Drive Backplane" on page 159
7	Drives	/SYS/DBP/HDD0 (bottom)	"Servicing Drives" on page 63
		/SYS/DBP/HDD1	
		/SYS/DBP/HDD2	
		/SYS/DBP/HDD3	
		/SYS/DBP/HDD4	
		/SYS/DBP/HDD5 (top)	
8	Fan modules	As viewed from front of server:	"Servicing Fan Modules" on page 75
		/SYS/FANBD/F0 (left front)	
		/SYS/FANBD/F1 (center)	
		/SYS/FANBD/F2 (right)	
9	Fan board	/SYS/FANBD	"Servicing the Fan Board" on page 137
10	Air baffle		

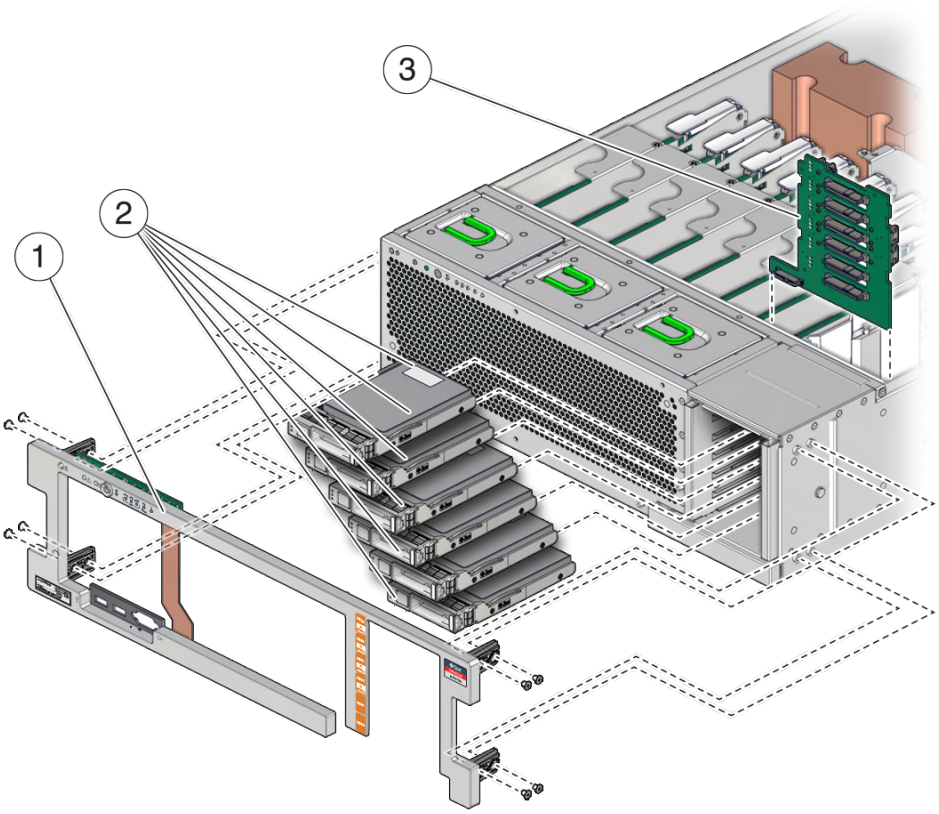
No.	Component	Oracle ILOM Target	Links
11	Battery	/SYS/MB/BAT	"Servicing the Battery" on page 111
12	Processor modules and heat sinks (these are only replaceable by replacing the motherboard)	/SYS/MB/CM0 /SYS/MB/CM1	"Servicing the Motherboard" on page 147
13	Motherboard	/SYS/MB	"Servicing the Motherboard" on page 147

Motherboard Component Locations



No.	Component	Oracle ILOM Target	LInks
1	Motherboard	/SYS/MB	"Servicing the Motherboard" on page 147
2	SP module	/SYS/MB/SPM	"Servicing the SPM" on page 129
2	Memory riser	/SYS/MB/CM*n*/CMP/MR*n*	"Servicing Memory Risers and DIMMs" on page 89
4	DIMMs	/SYS/MB/CM*n*/CMP/MR*n*/BOB*n*/CH*n*/DIMM	"Servicing Memory Risers and DIMMs" on page 89
5	Battery	/SYS/MB/BAT	"Servicing the Battery" on page 111
6	eUSB	/SYS/MB/EUSB	"Servicing the eUSB Drive" on page 115

I/O Component Locations

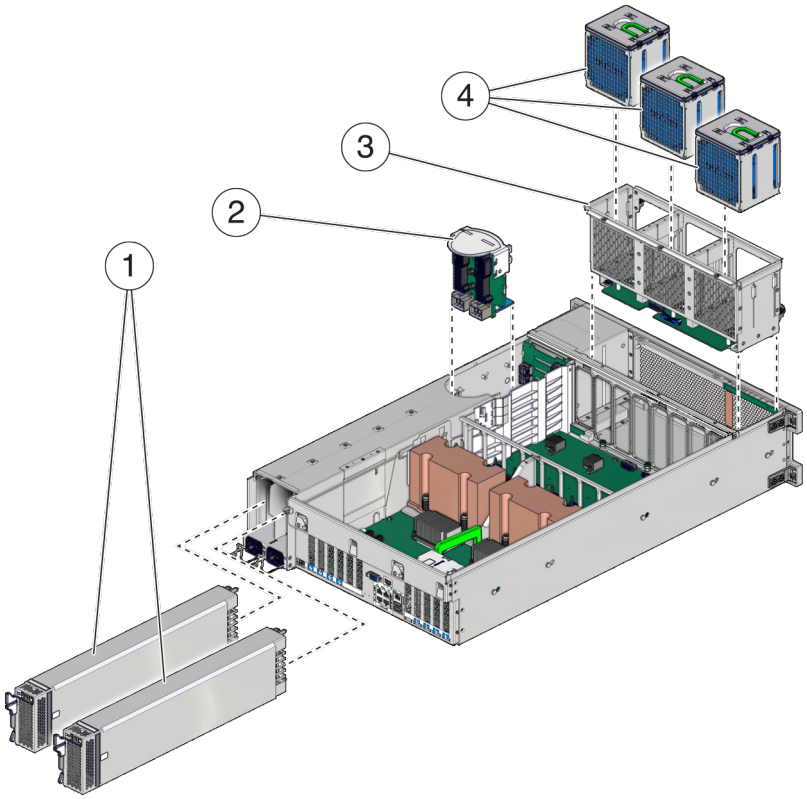


No.	Component	Oracle ILOM Target	LInks
1	Light pipe assembly		"Servicing the Drive Backplane" on page 159

2	Drives	`/SYS/DBP/HDD0` (bottom)
		`/SYS/DBP/HDD1`
		`/SYS/DBP/HDD2`
		`/SYS/DBP/HDD3`
		`/SYS/DBP/HDD4`
			"Servicing Drives" on page 63

No.	Component	Oracle ILOM Target	LInks
		/SYS/DBP/HDD5 (top)	
3	Drive backplane	/SYS/DBP	"Servicing the Drive Backplane" on page 159

Power Distribution and Fan Module Component Locations



No.	Component	Oracle ILOM Target	Links
1	Power supplies	/SYS/PS0 (outer) /SYS/PS1 (inner)	"Servicing Power Supplies" on page 83

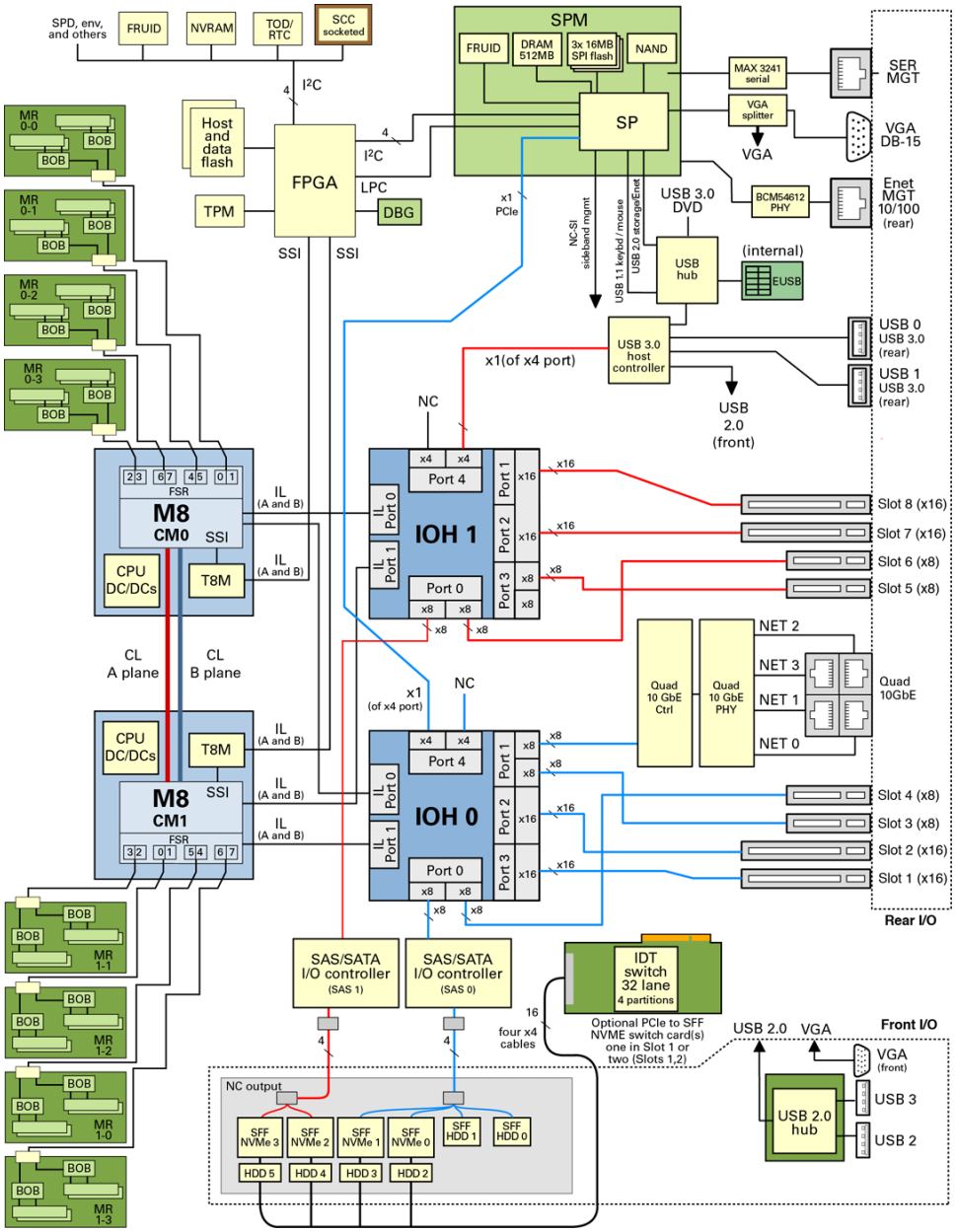
No.	Component	Oracle ILOM Target	Links
2	PS backplane and cover	`/SYS/PDB`	"Servicing the PS Backplane" on page 165
3	Fan board	`/SYS/FANBD`	"Servicing the Fan Board" on page 137

4	Fan modules	`/SYS/FANBD/F0`
		`/SYS/FANBD/F1`
		`/SYS/FANBD/F2`
			"Servicing Fan Modules" on page 75

Server Block Diagram

This block diagram shows the connections between and among components and device slots on the server. Use this block diagram to determine the optimum locations for optional cards or other peripherals, based on your server's configuration and intended use.

Note - For more detail on root complexes related to the PCIe slots, see "I/O Root Complex Connections" on page 121.


SPD, env, and others
FRUID
NVRAM
TOD/ RTC
SCC socketed
SPM
FRUID
DRAM 512MB
3x 16MB SPI flash
NAND
SP
MAX 3241 serial
SER MGT
VGA splitter
VGA
VGA DB-15
Host and data flash
FPGA
TPM
DBG
I²C
LPC
SSI
x1 PCIe
NC-SI sideband mgmt
USB 1.1 keybd / mouse
USB 2.0 storageEnet
USB 3.0 DVD
BCM54612 PHY
Enet MGT 10/100 (rear)
USB hub
(internal)
EUSB
USB 3.0 host controller
USB 0 USB 3.0 (rear)
USB 1 USB 3.0 (rear)
USB 2.0 (front)
x1(of x4 port)
NC
MR 0-0
MR 0-1
MR 0-2
MR 0-3
BOB
M8 CM0
FSR
SSI
CPU DC/DCs
T8M
IL (A and B)
CL A plane
CL B plane
M8 CM1
IOH 1
IOH 0
Port 4
Port 0
Port 1
Port 2
Port 3
IL Port 0
IL Port 1
x16
x8
x4
Slot 8 (x16)
Slot 7 (x16)
Slot 6 (x8)
Slot 5 (x8)
Slot 4 (x8)
Slot 3 (x8)
Slot 2 (x16)
Slot 1 (x16)
Quad 10 GbE Ctrl
Quad 10 GbE PHY
NET 2
NET 3
NET 1
NET 0
Quad 10GbE
Rear I/O
MR 1-1
MR 1-2
MR 1-0
MR 1-3
SAS/SATA I/O controller (SAS 1)
SAS/SATA I/O controller (SAS 0)
IDT switch 32 lane 4 partitions
four x4 cables
Optional PCIe to SFF NVME switch card(s) one in Slot 1 or two (Slots 1,2)
Front I/O
USB 2.0
VGA
VGA (front)
USB 2.0 hub
USB 3
USB 2
NC output
SFF NVMe 3
SFF NVMe 2
SFF NVMe 1
SFF NVMe 0
SFF HDD 1
SFF HDD 0
HDD 5
HDD 4
HDD 3
HDD 2

Related Information

- “Component Service Categories” on page 48
- “Internal Component Locations” on page 17
- “Motherboard Component Locations” on page 19
- “I/O Component Locations” on page 21
- “Power Distribution and Fan Module Component Locations” on page 22

Detecting and Managing Faults

When a SPARC T8 server encounters a fault, the fault is recorded in a common fault database. The fault is then reported by the server in one of several ways, depending on the type and severity of the fault.

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

Step	Description	Links
1.	Check the server for detected faults and for information about components that might require service.	"Checking for Faults" on page 27 "Interpreting LEDs" on page 33
2.	Perform additional troubleshooting if needed.	"Performing Advanced Troubleshooting" on page 37
3.	Manage faults following a service procedure.	"Clear a Fault Manually" on page 43
4.	Contact technical support if the problem persists.	`https://support.oracle.com`

Related Information

- "Identifying Components" on page 13
- "Preparing for Service" on page 45
- "Returning the Server to Operation" on page 171

Checking for Faults

Use these tools to identify components that require service.

Step	Description	Links
1.	Run the `fmadm faulty` command to display information about components that require service.	"Log In to Oracle ILOM (Service)" on page 28 "Identify Faulted Components" on page 29

Step	Description	Links
2.	Run the `show disabled` command to display information about components that have been disabled either intentionally or because of a failure. Plan to service any components that are degraded or might need service soon to minimize system downtime.	"Identify Disabled Components" on page 31
3.	Identify the names of components that require service as reported by diagnostic software.	"Component Names Displayed by Diagnostic Software" on page 32

Related Information

- "Interpreting LEDs" on page 33
- "Performing Advanced Troubleshooting" on page 37
- "Clear a Fault Manually" on page 43

▼ Log In to Oracle ILOM (Service)

● **At the terminal prompt, type:**

```
ssh root@SP-IP-address
Password: password
Oracle (R) Integrated Lights Out Manager
Version 4.0.x
Copyright (c) 2017, Oracle and/or its affiliates, Inc. All rights reserved.
->
```

Related Information

- "Identify Faulted Components" on page 29
- "Identify Disabled Components" on page 31
- "Component Names Displayed by Diagnostic Software" on page 32

Identify Faulted Components

The `fmadm faulty` command displays the list of faults detected by PSH (Predictive Self Healing). You can run this command from the host or through the Oracle ILOM fault management shell.

1. **From the Oracle ILOM prompt, start the fault management shell and type `fmadm faulty`.**

   This example shows how to check for faults through the Oracle ILOM fault management shell. You can also check for faults by typing `show faulty` at the Oracle ILOM prompt.

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

faultmgmtsp> fmadm faulty
------------------- ------------------------------------ -------------- -------
Time                UUID                                 msgid          Severity
------------------- ------------------------------------ -------------- -------
2015-01-16/17:55:26 f4ee56c-9fdd-ca19-efb5-ae39675dfee3  SPT-8000-PX    Major

Problem Status   : open
Diag Engine      : fdd 1.0
System
  Manufacturer   : Oracle Corporation
  Name           : SPARC T8-2
  Part_Number    : 12345678+11+1
  Serial_Number  : 1238BDC0DF

----------------------------------------
Suspect 1 of 1
  Fault class  : fault.component.misconfigured
  Certainty    : 100%
  Affects      : /SYS/MB/CM1/CMP/MR3/BOB1/CH1/DIMM
  Status       : faulted
  FRU
     Status      : faulty
     Location    : /SYS/MB/CM1/CMP/MR3/BOB1/CH1/DIMM
     Manufacturer      : Hynix Semiconductor Inc.
     Name              : 8192MB DDR4 SDRAM DIMM
     Part_Number       : 70xx001,HMA4xxR7MFRxx-TFT8
     Revision          : 01
     Serial_Number     : 465769T+02xxx102WR
     Chassis
        Manufacturer   : Oracle Corporation
        Name           : SPARC T8-2
```

```
        Part_Number    : 12345678+13+2
        Serial_Number  : 1248DC140

Description : A FRU has been inserted into a location where it is not
              supported.

Response    : The service required LED on the chassis may be illuminated.

Impact      : The FRU may not be usable in its current location.

Action      : Please refer to the associated reference document at
              http://support.oracle.com/msg/SPT-8000-PX 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 (`2015-01-16/17:55:26`).
- UUID (`f4ee56c-9fdd-ca19-efb5-ae39675dfee3`), which is unique to each fault.
- Message ID (`SPT-8000-PX`), which can be used to obtain additional fault information from Knowledge Base articles.

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

   a. **Obtain the message ID from console output (`SPT-8000-PX` in the example above).**

   b. **Go to `https://support.oracle.com`, and search on the message ID in the Knowledge tab, or type the URL from the Action field into a browser.**

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

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

   See "Clear a Fault Manually" on page 43.

Related Information

- "Log In to Oracle ILOM (Service)" on page 28
- "Identify Disabled Components" on page 31
- "Component Names Displayed by Diagnostic Software" on page 32

▼ Identify Disabled Components

You can run the `show disabled` command from the Oracle ILOM prompt to identify components that have been disabled either intentionally, by a user, or automatically, because of a fault.

1. **At the Oracle ILOM prompt, type:**

```
-> show disabled
Target                              | Property       | Value
-----------------------------------+----------------+--------------------
...
/SYS/MB/CM0/CMP  | disable_reason | Configuration Rules
...
```

2. **For additional information about a disabled component, type the `show -t` command and the Oracle ILOM target.**

   See "Component Names Displayed by Diagnostic Software" on page 32.

   For example:

```
-> show -t /SYS/MB/CM0/CMP/MR3/BOB0/CH1/DIMM
Target                              | Property                | Value
-----------------------------------+------------------------+------------
...
/SYS/MB/CM0/CMP/MR3/BOB0/CH1/DIMM  | type                    | DIMM
/SYS/MB/CM0/CMP/MR3/BOB0/CH1/DIMM  | ipmi name               | P0/M3/B0/C1/D0
/SYS/MB/CM0/CMP/MR3/BOB0/CH1/DIMM  | requested_config_state | Enabled
/SYS/MB/CM0/CMP/MR3/BOB0/CH1/DIMM  | current_config_state    | Enabled
/SYS/MB/CM0/CMP/MR3/BOB0/CH1/DIMM  | disable_reason          | Configuration Rules
/SYS/MB/CM0/CMP/MR3/BOB0/CH1/DIMM  | fru_name                | 8192MB DDR4 SDRAM DIMM
...
```

Related Information

- "Log In to Oracle ILOM (Service)" on page 28
- "Identify Faulted Components" on page 29
- "Component Names Displayed by Diagnostic Software" on page 32

Component Names Displayed by Diagnostic Software

Use the information in this table to identify the name of a component that requires service.

Component	Oracle ILOM Target	Service Procedure
Battery	/SYS/MB/BAT	"Servicing the Battery" on page 111
DIMMs	/SYS/MB/CM*n*/CMP/MR*n*/BOB*n*/CH*n*/DIMM	"Servicing Memory Risers and DIMMs" on page 89
Drive backplane	/SYS/DBP	"Servicing the Drive Backplane" on page 159
Drives	/SYS/DBP/HDD0 (bottom) /SYS/DBP/HDD1 /SYS/DBP/HDD2 /SYS/DBP/HDD3 /SYS/DBP/HDD4 /SYS/DBP/HDD5 (top)	"Servicing Drives" on page 63
Fan board	/SYS/FANBD	"Servicing the Fan Board" on page 137
Fan modules	As viewed from front of server: /SYS/FANBD/F0 (left) /SYS/FANBD/F1 (center) /SYS/FANBD/F2 (right)	"Servicing Fan Modules" on page 75
Memory risers	/SYS/MB/CM0/CMP/MR0 /SYS/MB/CM0/CMP/MR1 /SYS/MB/CM0/CMP/MR2 /SYS/MB/CM0/CMP/MR3 /SYS/MB/CM1/CMP/MR0 /SYS/MB/CM1/CMP/MR1 /SYS/MB/CM1/CMP/MR2 /SYS/MB/CM1/CMP/MR3	"Servicing Memory Risers and DIMMs" on page 89
Motherboard	/SYS/MB	"Servicing the Motherboard" on page 147

Component	Oracle ILOM Target	Service Procedure
PCIe card	/SYS/MB/PCIE1	"Servicing PCIe Cards" on page 119
	/SYS/MB/PCIE2	
	/SYS/MB/PCIE3	
	/SYS/MB/PCIE4	
	/SYS/MB/PCIE5	
	/SYS/MB/PCIE6	
	/SYS/MB/PCIE7	
	/SYS/MB/PCIE8	
Power supplies	/SYS/PS0 (outer)	"Servicing Power Supplies" on page 83
	/SYS/PS1 (inner)	
PS backplane and cover	/SYS/PDB	"Servicing the PS Backplane" on page 165
SP	/SYS/MB/SPM	"Servicing the SPM" on page 129

Related Information

- "Log In to Oracle ILOM (Service)" on page 28
- "Identify Faulted Components" on page 29
- "Identify Disabled Components" on page 31

Interpreting LEDs

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

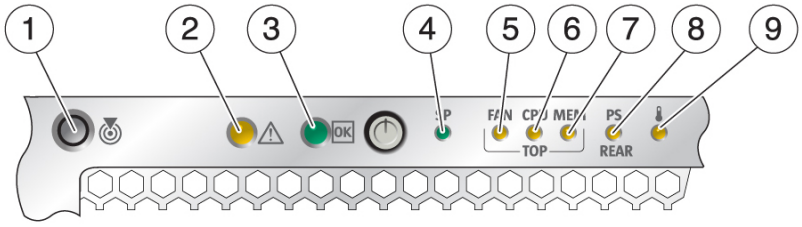
Step	Description	Links
1.	Check the LEDs on the front and rear of the server.	■ "Front Panel Controls and LEDs" on page 34 ■ "Rear Panel Controls and LEDs" on page 36
2.	Check the LEDs on the individual components. Component LEDs might not be lit even though the component is faulty. Rely on software to determine	■ "Servicing Drives" on page 63 ■ "Servicing Fan Modules" on page 75 ■ "Servicing Power Supplies" on page 83 ■ "Servicing Memory Risers and DIMMs" on page 89

Step	Description	Links
	if a component is faulty, see "Identify Faulted Components" on page 29.	■ "Servicing PCIe Cards" on page 119 ■ "Servicing the Motherboard" on page 147

Related Information

- "Checking for Faults" on page 27
- "Performing Advanced Troubleshooting" on page 37
- "Clear a Fault Manually" on page 43

Front Panel Controls and LEDs



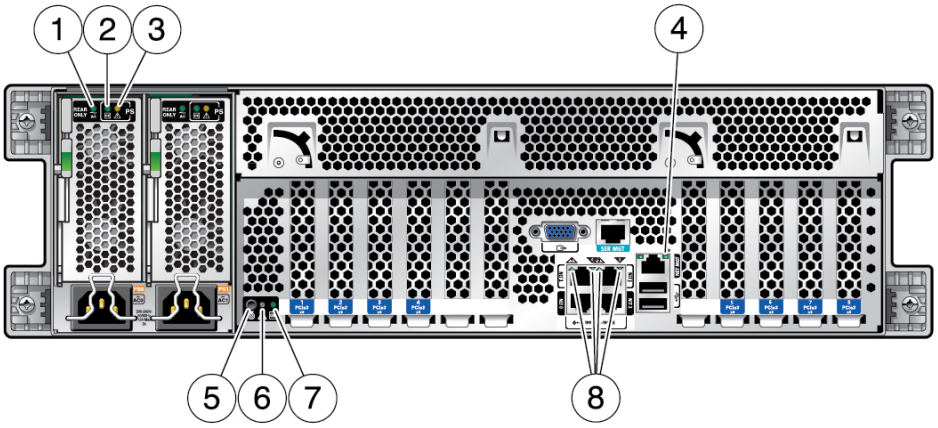
No.	LED	Icon or Label	Description
1	System Server Locate indicator and button (white)		You can turn on the Locate indicator to identify a particular server. When lit, the LED displays as a fast blink. The blinking will time out after 15 minutes. Turn on the Locate indicator by pressing the Locate button, or see "Locate the Server" on page 50.
2	System Fault (Service Action Required) LED (amber)		The `fmadm faulty` command provides details about any faults that cause this indicator to light. See "Identify Faulted Components" on page 29. Under some fault conditions, individual component fault LEDs are lit in addition to the Service Action Required LED.
3	System OK Indicator (green)	OK	Indicates these conditions:

No.	LED	Icon or Label	Description
			■ **Off** – Server is not running in its normal state. Server power might be off. The SP might be running. ■ **Steady on** – Server is powered on and is running in its normal operating state. No service actions are required. ■ **Slow blink** – A normal but transitory activity is taking place. Slow blinking might indicate that server diagnostics are running or that the server is booting. ■ **Standby blink** – Server is running in standby mode and can be quickly returned to full function.
4	SP OK Indicator	SP	Indicates these conditions: ■ **Off** – AC power might not have been connected to the power supplies, or an SPM error has occurred and service is required. ■ **Steady on** – SP is running in its normal operating state. No service actions are required. ■ **Slow Blink** – SP is initializing the Oracle ILOM firmware.
5	Fan Module Fault LED (amber)	FAN	Indicates these conditions: ■ **Off** – Steady state, no service action is required. ■ **Steady on** – A fan module failure event has been acknowledged and a service action is required on at least one of the fan modules.
6	CPU Fault LED (amber)	CPU	Indicates these conditions: ■ **Off** – Steady state, no service action is required. ■ **Steady on** – A fault has been detected on one or more host processors.
7	Memory DIMM Fault LED (amber)	MEM	Indicates these conditions: ■ **Off** – Steady state, no service action is required. ■ **Steady on** – A fault has been detected on one or more DIMMs.
8	Server Power Supply Fault LED (amber)	PS	Indicates these conditions: ■ **Off** – Steady state, no service action is required. ■ **Steady on** – A fault has been detected on one of the two power supplies.
9	Server Overtemp LED (amber)		Indicates these conditions: ■ **Off** – Steady state, no service action is required. ■ **Steady on** – A temperature failure event has been acknowledged. A temperature limit has been exceeded and a service action is required.

Related Information

- "Rear Panel Controls and LEDs" on page 36
- "Checking for Faults" on page 27

Rear Panel Controls and LEDs



No.	LED	Icon or Label	Description
1	PS AC OK LED	AC	Indicates these conditions: ■ **Off** – No AC power applied to this power supply. ■ **Green steady on** – AC power is applied to this power supply and is within specifications. ■ **Amber steady on** – AC power is applied to this power supply and is below 85V.
2	PS DC OK LED (green)	OK	Indicates these conditions: ■ **Off** – 12V DC output from this power supply is disabled or not within specification. ■ **Steady on** – 12V DC output from this power supply is present and within specifications.
3	PS Fault LED (amber)	⚠	Indicates these conditions: ■ **Off** – Steady state, no service action is required. ■ **Steady on** – A fault has been detected on this power supply.
4	NET MGT Port Link and Activity LED (green on left) NET MGT Port Speed LED (green on right)	LINK/ACT SPD	Indicates these conditions: ■ **Off** – No link is established. ■ **Steady On** – A link is established. ■ **Blinking** – A link is established and there is activity on the port. Indicates these conditions:

No.	LED	Icon or Label	Description
			■ **Off** – The link is operating as a 10 Mbps connection. ■ **Steady On** – The link is operating as a 100 Mbps connection.
5	Locate indicator and button (white)		Turn on the Locate indicator by pressing the Locate button, or see "Locate the Server" on page 50. When lit, the LED blinks rapidly.
6	Service Action Required LED (amber)		The `fmadm faulty` command provides details about any faults that cause this indicator to light. See "Identify Faulted Components" on page 29. Under some fault conditions, individual component fault LEDs are lit in addition to the Service Action Required LED.
7	System OK Indicator (green)	OK	Indicates these conditions: ■ **Off** – Server is not running in its normal state. Server power might be off. The SPM might be running. ■ **Steady on** – Server is powered on and is running in its normal operating state. No service actions are required. ■ **Slow blink** – Server is running in standby mode and can be quickly returned to full function. ■ **Fast blink** – A normal but transitory activity is taking place. Fast blinking might indicate that server diagnostics are running or that the server is booting.
8	Host Ethernet Port Link/ Activity LED (green) From left to right, NET 1, NET 0, NET 3, and NET 2.		Indicates these conditions: ■ **Off** – No link is established. ■ **Steady On** – A link is established. ■ **Blinking** – A link is established and there is activity on the port.

Related Information

- "Front Panel Controls and LEDs" on page 34
- "Checking for Faults" on page 27

Performing Advanced Troubleshooting

If you are unable to diagnose faults using the methods provided in "Checking for Faults" on page 27, use any of the following methods to diagnose faults on the server.

Description	Links
Generate and examine diagnostic information.	"Check the Message Buffer" on page 38
Examine log files for additional information about the server.	"View Log Files (Oracle Solaris)" on page 38

Description	Links
	"View Log Files (Oracle ILOM)" on page 39
Generate and examine low-level diagnostic information generated by POST.	"POST Overview" on page 40 "Configure POST" on page 40 "Oracle ILOM Properties That Affect POST Behavior" on page 42

Related Information

- "Checking for Faults" on page 27
- "Interpreting LEDs" on page 33
- "Clear a Fault Manually" on page 43

Check the Message Buffer

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

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

```
# dmesg
```

Related Information

- "View Log Files (Oracle Solaris)" on page 38
- "View Log Files (Oracle ILOM)" on page 39
- "POST Overview" on page 40

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 38
- "View Log Files (Oracle Solaris)" on page 38
- "POST Overview" on page 40

▼ View Log Files (Oracle ILOM)

1. **View the event log.**

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

2. **View the audit log.**

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

Related Information

- "Check the Message Buffer" on page 38
- "View Log Files (Oracle Solaris)" on page 38

- "POST Overview" on page 40

POST Overview

POST is a group of PROM-based tests that run when the server is powered on or 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. Refer to the section on setting the SPARC host keyswitch state in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 4.0.x* for a list of parameters and values.

If POST detects a faulty component, the component is disabled automatically. If the server is able to run without the disabled component, the server 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 server boots using the remaining cores.

Related Information

- "Configure POST" on page 40
- "Oracle ILOM Properties That Affect POST Behavior" on page 42

▼ Configure POST

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

   See "Log In to Oracle ILOM (Service)" on page 28.

2. **Set `/HOST/diag` to the value that corresponds to the POST configuration you want to run.**

   This example sets the `/HOST/diag` `default_level` to `min`, which configures POST to run according to other parameter values.

```
-> set /HOST/diag default_level=min
Set default_level to min
```

For possible values for the `default_level` parameter, type:

```
-> help /HOST/diag

/HOST/diag : Manage Host Power On Self Test Diagnostics

Targets:

Properties:
default_level : Diag level in the default cause (no error or hw change)
default_level : Possible values = off, min, max
default_level : User role required for set = r

default_verbosity : Diag verbosity in the default cause (no error or hw change)
default_verbosity : Possible values = none, min, normal, max
default_verbosity : User role required for set = r

error_level : Diag level when running after an error reset
error_level : Possible values = off, min, max
error_level : User role required for set = r

error_verbosity : Diag verbosity when running after an error reset
error_verbosity : Possible values = none, min, normal, max
error_verbosity : User role required for set = r

hw_change_level : Diag level when running after a hw change
hw_change_level : Possible values = off, min, max
hw_change_level : User role required for set = r

hw_change_verbosity : Diag verbosity when running after a hw change
hw_change_verbosity : Possible values = none, min, normal, max
hw_change_verbosity : User role required for set = r

->
```

Note - When the verbosity value is set to *none*, the console may not display any POST test status for extended periods of time on certain configurations.

---

3. **(Optional) Set `/HOST/diag` to determine the diagnostic level after an error reset and after a hardware change.**

   To set `error_level`, to `max`, and to set `hw_change_level` to `max`, type:

```
-> set /HOST/diag error_level=max
-> set /HOST/diag hw_change_level=max
```

Refer to the section on setting the SPARC host keyswitch state in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 4.0.x* for a description of parameters and values.

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

   For example:

```
-> show /HOST/diag

/HOST/diag
   Targets:

   Properties:
        default_level = off
        default_verbosity = normal
        error_level = max
        error_verbosity = normal
        hw_change_level = max
        hw_change_verbosity = normal


   Commands:
        cd
        set
        show
->
```

Related Information

- "POST Overview" on page 40
- "Oracle ILOM Properties That Affect POST Behavior" on page 42

Oracle ILOM Properties That Affect POST Behavior

There are a number of Oracle ILOM commands that you can use to perform host diagnostic tests. For details about using these commands, refer to the chapter that describes configuring host server management actions in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 4.0.x*.

Related Information

- "POST Overview" on page 40
- "Configure POST" on page 40

Clear a Fault Manually

When the server detects faults, the faults are logged and displayed on the console. In most cases, after the faulty component is replaced the fault condition is repaired automatically. In cases where the fault condition is not automatically cleared, you must clear the fault manually.

1. **After replacing a faulty component, power on the server and, verify that the fault for that component has cleared.**

   Use the `fmadm faulty` command to confirm that the fault is clear.

2. **Determine your next step.**

   - **If no fault was detected, you do not need to do anything else. Do not perform the subsequent steps.**
   - **If a fault was detected, continue to the next step.**

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:

   ```
   faultmgmtsp> fmadm acquit
     UUID/NAC-name
   ```

   Fault UUID numbers are displayed in `fmadm faulty` output.

4. **Verify the fault is cleared.**

   Run the `show disabled` command to see if any components are still listed as faulty. If there are disabled components, repair the faults manually and continue to the next step to reset the server.

   ```
   faultmgmtsp> show disabled
   ```

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

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

6. **Clear the fault in the Oracle Enterprise Manager Ops Center software, if applicable.**

   Clearing a fault with the `fmadm aquit` command does not clear that fault in the Oracle Enterprise Manager Ops Center software. You must manually clear the fault or incident. For more information, refer to the section on marking an incident repaired in the *Oracle Enterprise Manager Ops Center Feature Reference Guide* at:

   http://www.oracle.com/pls/topic/lookup?ctx=oc122

7. **If you are servicing a component, return to the procedure for that component.**

Related Information

- "Checking for Faults" on page 27
- "Interpreting LEDs" on page 33
- "Performing Advanced Troubleshooting" on page 37

Preparing for Service

These topics explain how to prepare the server for servicing.

Note - Use only SPARC T8 components in SPARC T8 servers.

Step	Description	Links
1.	Review safety and handling information.	"Safety Information" on page 45
2.	Gather the tools needed for service.	"Tools Needed For Service" on page 47
3.	Consider filler options.	"Fillers" on page 47
4.	Review component service categories.	"Component Service Categories" on page 48
5.	Find the server serial number.	"Find the Server Serial Number" on page 49
6.	Identify the server to be serviced.	"Locate the Server" on page 50
7.	For cold-service operations, shut down the OS and remove power from the server.	"Removing Power From the Server" on page 51
8.	Move the server out of the rack and gain access to internal components.	"Accessing Server Components" on page 54
9.	Attach devices to the server to perform service procedures.	"Attaching Devices During Service" on page 61

Related Information

- "Identifying Components" on page 13
- "Returning the Server to Operation" on page 171

Safety Information

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

- Follow all cautions and instructions marked on the equipment and described in the documentation shipped with your server.

- Follow all cautions and instructions marked on the equipment and described in the *SPARC T8-2 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.
- Follow the ESD safety practices as described in this section.

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.

ESD Measures

ESD sensitive devices, such as the cards, drives, and DIMMS, require special handling.

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.

Caution - You must disconnect all power supplies before servicing any of the components that are inside the chassis.

Antistatic Wrist Strap Use

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

attach an antistatic strap to your wrist and then to a metal area on the chassis. Following this practice equalizes the electrical potentials between you and the server.

Note - An antistatic wrist strap is no longer included in the accessory kit for this server. However, antistatic wrist straps are still included with options.

Antistatic Mat

Place ESD-sensitive components such as motherboards, memory, and other PCBs on an antistatic mat.

Related Information

- "Prevent ESD Damage" on page 55
- "Tools Needed For Service" on page 47

Tools Needed For Service

You need the following tools for most service operations:

- Antistatic wrist strap
- Antistatic mat
- No. 2 Phillips screwdriver
- 2.5 mm hex driver or key
- Pen or pencil (to power on server)

Related Information

- "Safety Information" on page 45

Fillers

A filler is an empty metal or plastic enclosure that is installed at the factory or in the field into a server component slot that does not contain a functioning component. The filler panels ensure

proper airflow through the system. Depending on the component configuration, the server can include the following types of fillers:

- Drive filler
- PCIe card filler (covering back panel, not filling the connector slot)

Caution - When you remove a component while the server is connected to power, insert a new component or filler within 60 seconds to ensure proper system chassis cooling. After you complete cold-servicing, ensure that all fillers are in place before connecting the server to power.

Related Information

- "Servicing Drives" on page 63
- "Servicing Memory Risers and DIMMs" on page 89
- "Servicing PCIe Cards" on page 119
- "Returning the Server to Operation" on page 171

Component Service Categories

The server components and assemblies that can be replaced in the field fall into three categories:

- Hot-service, replaceable by customer
- Cold-service, replaceable by customer
- Cold-service, replaceable by authorized service personnel

Cold service procedures require that you shut the server down and unplug the power cables that connect the power supplies to the power source.

Although hot service procedures can be performed while the server is running, you should usually bring it to standby mode as the first step in the replacement procedure. Refer to "Power Off the Server (Server Power Button - Graceful)" on page 53 for instructions.

The following table identifies the components in each category.

Component service Category	Component	Service information	Notes
Hot-service, replaceable by customer	Drive	"Servicing Drives" on page 63	Drive must be offline.

Component service Category	Component	Service information	Notes
	Drive filler	"Servicing Drives" on page 63	Needed to preserve proper interior air flow.
	Power supply	"Servicing Power Supplies" on page 83	If two power supplies are in use. Otherwise, cold service.
	Fan module	"Servicing Fan Modules" on page 75	Removal of a fan requires replacement within 30 seconds to avoid overheating.
Cold-service, replaceable by customer	Memory risers and DIMMs	"Servicing Memory Risers and DIMMs" on page 89	
	System battery	"Servicing the Battery" on page 111	
	I/O cards	"Servicing PCIe Cards" on page 119	
	eUSB	"Servicing the eUSB Drive" on page 115	
Cold-service, replaceable by authorized service personnel	Fan board	"Servicing the Fan Board" on page 137	
	Motherboard	"Servicing the Motherboard" on page 147	Transfer SCC PROM and SPM to new motherboard.
	Drive backplane	"Servicing the Drive Backplane" on page 159	
	Power supply backplane	"Servicing the PS Backplane" on page 165	
	SPM	"Servicing the SPM" on page 129	

Related Information

- "Identifying Components" on page 13

Find the Server Serial Number

You need the serial number of the server's chassis to obtain technical support for the server.

Note - When a PS backplane, fan board, or drive backplane is replaced, the chassis serial number and part number might need to be programmed into the new component. This must be done in a special service mode by trained service personnel.

- **Locate the serial number using one of the following methods:**
  - **Read the serial number from a sticker located on the front of the server or another sticker on the side of the server.**

- **At the Oracle ILOM prompt type:**

```
-> show /System

/System
   Targets:
. . .
```

In the output look for a line under Properties that identifies the product serial number. For example:

```
serial_number = BKL1026F8F
```

Related Information

- "Front Panel Components (Service)" on page 13

Locate the Server

You can use the Locate indicators to identify one particular server from many other servers.

1. **At the Oracle ILOM prompt, type,**

```
-> set /System locator_indicator=on
```

The white System Locate indicators (one on the front panel and one on the rear panel) blink.

2. **After locating the server with the blinking System Locate indicator, turn it off by pressing the Locate button with a stylus.**

Alternatively, you can type an Oracle ILOM command to turn off the System Locate indicator.

```
-> set /System locator_indicator=off
```

Related Information

- "Front Panel Components (Service)" on page 13

Removing Power From the Server

Step	Description	Links
1.	Prepare the server for powering off.	"Prepare to Power Off the Server" on page 51
2.	Power off the server by one of three methods.	"Power Off the Server (Oracle ILOM)" on page 52 "Power Off the Server (Server Power Button - Graceful)" on page 53 "Power Off the Server (Emergency Shutdown)" on page 53
3.	Disconnect the power cords from the server.	"Disconnect Power Cords" on page 54

Related Information

- "Front Panel Components (Service)" on page 13
- *Servers Administration*

▼ Prepare to Power Off the Server

Perform this procedure before powering off the server.

1. **Log in as superuser or equivalent.**

   Depending on the type of problem, you might want to view server status or log files. You also might want to run diagnostics before you shut down the server.

2. **Notify affected users that the server will be shut down.**

   Refer to the Oracle Solaris system administration documentation for additional information.

3. **Save any open files and quit all running programs.**

   Refer to your application documentation for specific information on these processes.

4. **Shut down all logical domains.**

   Refer to Oracle Solaris system administration and Oracle VM Server for SPARC documentation for additional information.

5. **Shut down the Oracle Solaris OS.**

   Refer to the Oracle Solaris system administration documentation for additional information.

Related Information

- "Power Off the Server (Server Power Button - Graceful)" on page 53
- "Power Off the Server (Emergency Shutdown)" on page 53
- "Front Panel Components (Service)" on page 13

▼ Power Off the Server (Oracle ILOM)

You can use the SPM to perform a graceful shutdown of the server, and to ensure that all of your data is saved and the server is ready for restart.

Note - Additional information about powering off the server is provided in *Servers Administration*.

---

1. **Prepare to power off the server.**

   See "Prepare to Power Off the Server" on page 51.

2. **Switch from the system console to the Oracle ILOM prompt by typing the `#.` (Hash-Dot) key sequence.**

3. **Power off the server.**

```
-> stop /System
```

Note - You can also use the Server Power button on the front of the server to initiate a graceful server shutdown. (See "Power Off the Server (Server Power Button - Graceful)" on page 53.) This button is recessed to prevent accidental server power-off.

Related Information

- "Prepare to Power Off the Server" on page 51
- "Power Off the Server (Server Power Button - Graceful)" on page 53
- "Power Off the Server (Emergency Shutdown)" on page 53
- "Front Panel Components (Service)" on page 13

Power Off the Server (Server Power Button - Graceful)

This procedure places the server in the power standby mode. In this mode, the System OK Indicator blinks rapidly.

1. **Prepare to power off the server.**

   See "Prepare to Power Off the Server" on page 51.

2. **Press and release the recessed Server Power button.**

   You might need to use a pointed object, such as a pen or pencil.

Related Information

- "Prepare to Power Off the Server" on page 51
- "Power Off the Server (Oracle ILOM)" on page 52
- "Power Off the Server (Emergency Shutdown)" on page 53
- "Front Panel Components (Service)" on page 13

Power Off the Server (Emergency Shutdown)

Caution - All applications and files will be closed abruptly without saving changes. File system corruption might occur.

1. **Prepare to power off the server.**

   See "Prepare to Power Off the Server" on page 51.

2. **Press and hold the Server Power button for five seconds.**

Related Information

- "Prepare to Power Off the Server" on page 51
- "Power Off the Server (Oracle ILOM)" on page 52
- "Power Off the Server (Server Power Button - Graceful)" on page 53
- "Front Panel Components (Service)" on page 13

▼ Disconnect Power Cords

Remove the power cords from the server only after powering off the server.

- **Unplug all power cords from the server.**

Caution - Because 3.3V standby power is always present in the server, you must unplug the power cords before accessing any cold-serviceable components.

Related Information

- "Power Off the Server (Oracle ILOM)" on page 52
- "Power Off the Server (Server Power Button - Graceful)" on page 53
- "Power Off the Server (Emergency Shutdown)" on page 53
- "Rear Panel Components (Service)" on page 15

Related Information

- "Safety Information" on page 45

Accessing Server Components

These topics explain how to access components on the outside and the inside of the server. Perform these tasks in this order, as needed.

- "Prevent ESD Damage" on page 55
- "Extend the Server to the Service Position" on page 55
- "Release the CMA" on page 57
- "Remove the Server From the Rack" on page 59
- "Remove the Top Cover" on page 60

Related Information

- "Safety Information" on page 45

Prevent ESD Damage

Many components housed within the chassis can be damaged by ESD. To protect these components from damage, perform the following steps before opening the chassis for service.

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

   Place ESD-sensitive components such as the printed circuit boards on an antistatic mat. The following items can be used as an antistatic mat:

   - Antistatic bag used to wrap a replacement part
   - ESD mat
   - Disposable ESD mat (shipped with some replacement parts or optional components)

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.

   See "Safety Information" on page 45.

Related Information

- "Safety Information" on page 45

Extend the Server to the Service Position

You can service the following components with the server in the service position:

- Drives
- Power supplies
- Fans
- Fan modules
- Memory risers
- DIMMs
- PCIe cards
- SPM card
- Battery
- eUSB drive

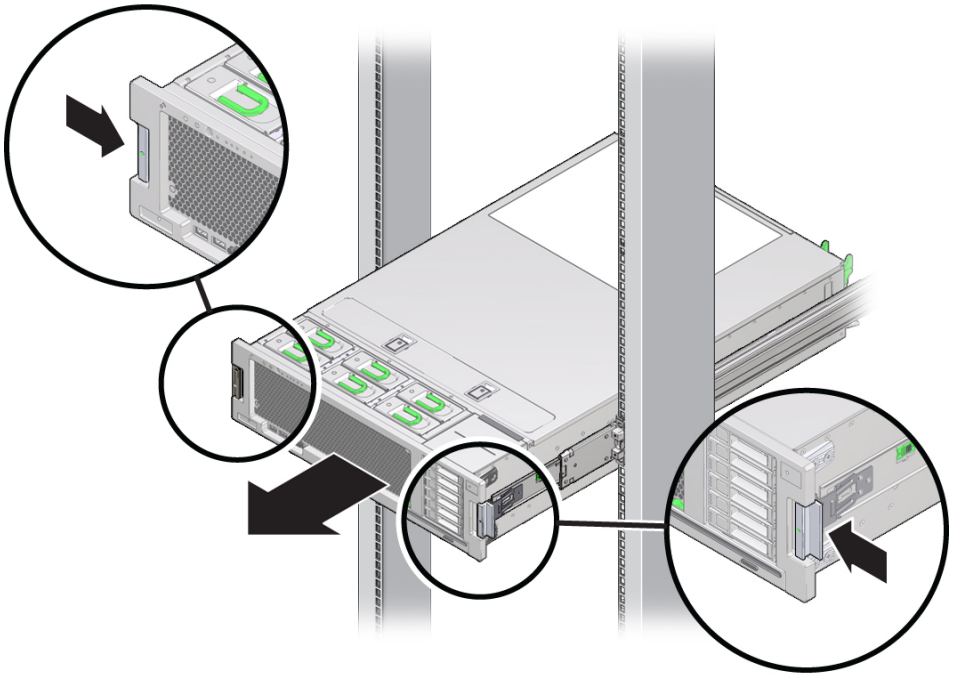
Note - You can replace the drives and power supplies without extending the server into the service position.

1. **Verify that no cables will be damaged or will interfere when the server is extended.**

   Although the CMA that is supplied with the server is hinged to accommodate extending the server, you should ensure that all cables and cords are capable of extending.

2. **From the front of the server, release the two slide release latches.**

   Squeeze the green slide release latches to release the slide rails.



3. **While squeezing the slide release latches, slowly pull the server forward until the slide rails latch.**

4. **Release the CMA.**

   See "Release the CMA" on page 57.

Related Information

- "Release the CMA" on page 57
- "Remove the Server From the Rack" on page 59

▼ Release the CMA

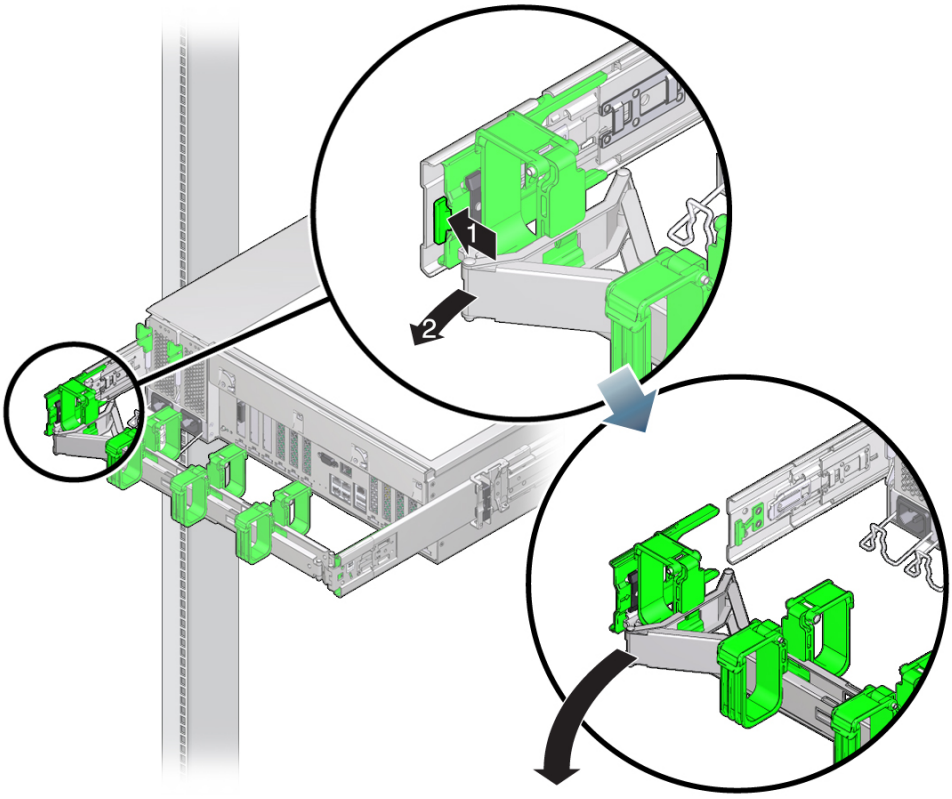
For some service procedures, such as replacing a power supply, if you are using a CMA, you might need to release the CMA to gain access to the rear of the chassis.

Note - For instructions on how to install the CMA for the first time, refer to *Server Installation*.

---

1. **Press and hold the tab.**

The tab is on the inside rear of the left side of the CMA.



2. **Swing the CMA out of the way.**
   Do not allow the CMA to hang unsupported while it is unattached.

3. **When you have finished the service steps that require the CMA to be out of the way, swing the CMA closed and latch it to the left rack rail.**
   Check that the CMA and the cables are functioning properly after completing service.

Related Information

- "Extend the Server to the Service Position" on page 55
- "Remove the Server From the Rack" on page 59
- "Returning the Server to Operation" on page 171

Remove the Server From the Rack

You must remove the server from the rack to remove or install these components:

- Motherboard
- PS backplane
- Drive backplane

Caution - The server chassis is heavy. To avoid personal injury, use two people to remove the server from the rack.

1. **Shut down the host.**
2. **Remove power from the server.**

   See "Removing Power From the Server" on page 51.
3. **Disconnect all the cables and power cords from the server.**
4. **Extend the server to the maintenance position.**

   See "Extend the Server to the Service Position" on page 55.
5. **Release the CMA from the rail assembly.**

   The CMA is still attached to the cabinet, but the server chassis is now disconnected from the CMA. See "Release the CMA" on page 57.
6. **From the front of the server, pull the release tabs forward and pull the server forward until it is free of the rack rails.**

   A release tab is located on each rail.
7. **Set the server on a sturdy work surface.**
8. **Remove the top cover.**

   See "Remove the Top Cover" on page 60.

Related Information

- "Extend the Server to the Service Position" on page 55
- "Release the CMA" on page 57
- "Remove the Top Cover" on page 60

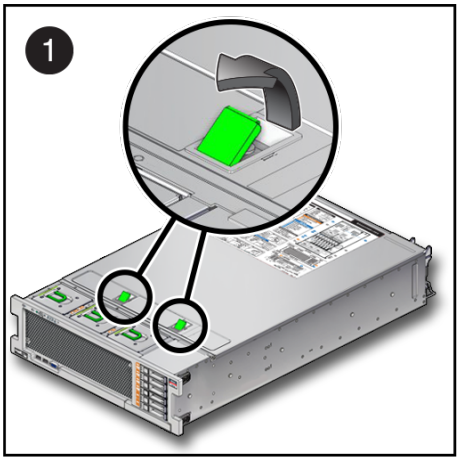
Remove the Top Cover

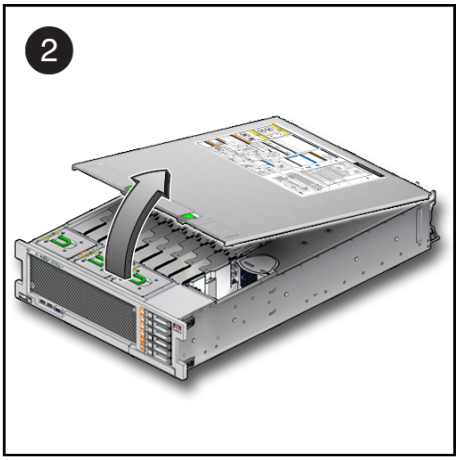
Caution - Removing the top cover without properly powering down the server and disconnecting the AC power cords from the power supplies results in a chassis intrusion switch failure. This failure causes the server to be immediately powered off. Any changes you make to the memory riser or DIMM configurations will not be properly reflected in the service processor's inventory until you replace the top cover.

1. **Ensure that the AC power cords are disconnected from the server power supplies.**

2. **Unlatch the server top cover.**

   Insert your fingers under the two cover latches and simultaneously lift both latches in an upward motion as shown in panel 1.





3. **Lift the cover slightly and slide it toward the front of the server chassis about 0.5 inch (12 mm).**

4. **Lift up and remove the top cover as shown in panel 2.**

   A metal air baffle is attached to the rear inside surface of the top cover. When you remove the top cover, lift it carefully so that the air baffle does not catch on anything inside the server.

5. **Service components as necessary.**

Related Information

- "Replace the Top Cover" on page 172
- "Extend the Server to the Service Position" on page 55
- "Release the CMA" on page 57
- "Remove the Top Cover" on page 60

Attaching Devices During Service

During service procedures, you might have to connect devices to the server.

- For OS support, connect an Ethernet cable to the one of the Ethernet connectors (NET 0, NET 1, NET 2, and NET 3).
- If you plan to interact with the system console directly, you can connect additional external devices, such as a mouse and keyboard, to the server's USB connectors, and connect a monitor to a DB-15 video connector. The front DB-15 video connector is active by default. To enable the rear port and disable the front port, you must enable the Oracle ILOM `VGA_REAR_PORT` policy: `-> set /SP/policy VGA_REAR_PORT=enabled`. For more details on selecting an active video port, refer to "Accessing the Server" in *SPARC T8 Series Servers Administration Guide*.
- If you plan to connect to the Oracle ILOM software over the network, connect an Ethernet cable to the Ethernet port labeled NET MGT.

Note - The SPM uses the NET MGT (out-of-band) port by default. You can configure the SPM to share one of the sever's four Ethernet ports instead. The SPM uses only the configured Ethernet port.

- If you plan to access the Oracle ILOM CLI through the SER MGT port, connect a serial null modem cable to the RJ-45 serial port labeled SER MGT.
- The USB connectors on the front panel support USB 2.0. The USB connectors on the rear panel support USB 3.0.

Related Information

- "Front Panel Components (Service)" on page 13
- "Rear Panel Components (Service)" on page 15
- "Detecting and Managing Faults" on page 27
- *Server Installation*

Servicing Drives

The server provides six 2.5-inch drive bays, accessible through the front panel. See "Front Panel Components (Service)" on page 13. Drives can be removed and installed while the server is running. This feature, referred to as being *hot-serviceable*, depends on how the drives are configured.

The server supports traditional, disk-based storage devices, Flash SSDs, which are diskless storage devices based on solid-state memory, and SFF-8639 NVMe PCIe SSDs, which are diskless storage devices based on solid-state memory using the NVMe software interface. NVMe drives are supported in the top four drive slots, while other drives are supported in any slot. Any of these drives can be a boot device.

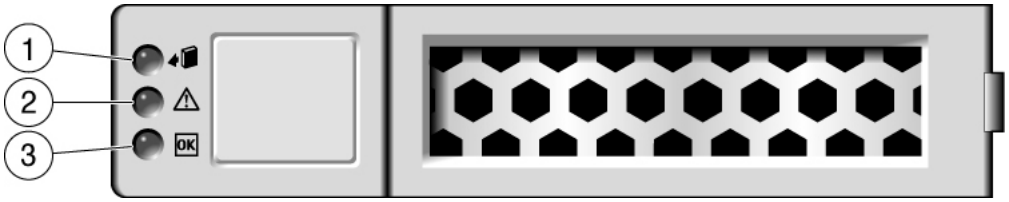
Note - The terms "drive" and "HDD" are used in a generic sense to refer to internal storage devices.

These topics explain how to service drives.

Related Information

- "Component Service Categories" on page 48
- "Front Panel Components (Service)" on page 13

Drive LEDs



The following table explains how to interpret the drive status LEDs.

No.	LED		Color	Description
1	Ready to Remove		Blue	Indicates that a drive can be removed during a hot-service operation.
2	Service Action Required		Amber	Indicates that the drive has experienced a fault condition.
3	Activity (hard drives)	OK	Green	Indicates the drive's availability for use. ■ **On –** Read or write activity is in progress. ■ **Off –** Drive is idle and available for use.
3	Activity (SSDs)	OK	Green	Indicates the drive's availability for use. ■ **On –** Read or write activity is in progress. ■ **Off –** Drive is idle and available for use. ■ **Flashes on and off –** This situation occurs during hot-service operations. You can ignore this situation.

Note - The front and rear panel Service Action Required LEDs are also lit when the server detects a drive fault. See "Front Panel Components (Service)" on page 13 and "Rear Panel Components (Service)" on page 15.

Related Information

- "Front Panel Components (Service)" on page 13
- "Rear Panel Components (Service)" on page 15

- "Remove a Drive" on page 65
- "Install a Drive" on page 70
- "Remove a Drive Filler" on page 69
- "Install a Drive Filler" on page 72
- "Verify a Drive" on page 73

Determine Which Drive Is Faulty

The following LEDs are lit when a drive fault is detected:

- System Service Required LEDs on the front and rear panels.
- Service Required LED on the faulty drive.

1. **Check to see if any System Service Required LEDs are lit or flashing.**
   See "Interpreting LEDs" on page 33.

2. **From the front of the server, check the drive LEDs to identify the faulty drive.**
   The amber Service Required LED is lit on the drive that needs to be replaced.
   See "Drive LEDs" on page 64.

3. **Remove the faulty drive.**
   See "Remove a Drive" on page 65.

Related Information

- "Drive LEDs" on page 64
- "Remove a Drive" on page 65
- "Install a Drive" on page 70
- "Verify a Drive" on page 73
- "Detecting and Managing Faults" on page 27

Remove a Drive

This is a hot-service procedure that can be performed by a customer while the server is running.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

1. **Locate the drive that you want to remove.**

   a. **See "Front Panel Components (Service)" on page 13 for the locations of the drives in the server.**

   b. **See "Determine Which Drive Is Faulty" on page 65.**

2. **If required, shut down the OS to replace the drive.**

   Shut down the OS if the drive:

   - Contains the OS, and the OS is not mirrored on another drive.
   - Cannot be logically isolated from the online operations of the server.

   To shut down the drive, see "Power Off the Server (Oracle ILOM)" on page 52 and go to step 5.

3. **Take the drive offline.**

   - **For a standard drive:**

     a. **At the Oracle Solaris prompt, list all drives in the device tree, including drives that are not configured.**

     ```
     # cfgadm -al
     ```

     This command lists dynamically reconfigurable hardware resources and shows their operational status. In this case, look for the status of the drive you plan to remove. This information is listed in the `Occupant` column.

     ```
     Ap_id                      Type         Receptacle   Occupant       Condition
     c0                         scsi-bus     connected    configured     unknown
     c0::dsk/c1t0d0             disk         connected    configured     unknown
     c0::dsk/c1t0d0             disk         connected    configured     unknown
     usb0/1                     unknown      empty        unconfigured   ok
     usb0/2                     unknown      empty        unconfigured   ok
     ...
     ```

     You must unconfigure any drive you plan to remove.

     b. **Unconfigure the drive using the `cfgadm -c unconfigure` command.**

     For example:

     ```
     # cfgadm -c unconfigure c0::dsk/c1t1d0
     ```

Replace `c0:dsk/c1t1d0` with the drive name that applies to your situation.

c. **Verify that the drive's blue Ready to Remove LED is lit.**

- **For an NVMe Drive:**

a. **Determine the name of the NVMe drive to be removed.**

```
# hotplug list -lc
```

Locate the name of the drive, such as /SYS/DBP/NVME0 in this example.

You can use this same command to check the state of the drive at other stages of the removal procedure.

b. **Disable the NVMe drive.**

```
# hotplug disable /SYS/DBP/NVME0
```

Check that the drive's state has changed from ENABLED to POWERED.

```
# hotplug list -lc
```

c. **Power down the NVMe drive.**

```
# hotplug poweroff /SYS/DBP/NVME0
```

Check that the drive's state has changed from POWERED to PRESENT.

```
# hotplug list -lc
```

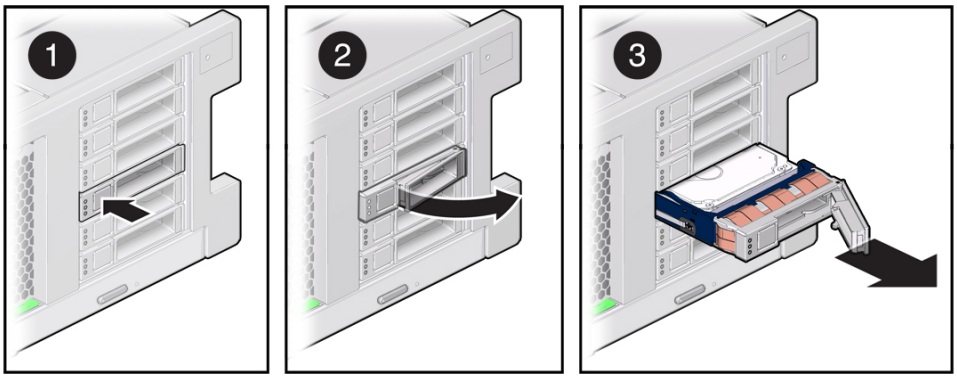
In this state, the blue OK to Remove LED on the NVMe drive is lit.

Note - Do not remove the drive unless the blue OK to Remove LED is lit.

---

4. **If you are hot-servicing the drive, locate the drive that displays the amber Fault LED and ensure that the blue Ready to Remove LED is lit.**

5. **On the drive you want to remove, complete the following tasks.**



Caution - The latch is not an ejector. Do not bend it too far to the right. Doing so can damage the latch.

a. **Push the release button to open the latch.**

b. **Unlock the drive by moving the latch to the right.**

c. **Grasp the latch and pull the drive out of the slot.**

Caution - When you remove a drive, replace it with a filler or another drive. Otherwise, the server might overheat due to improper airflow.

6. **After you remove an NVMe drive, check that the drive slot's state has changed to EMPTY.**

```
# hotplug list -lc
```

7. **Install a replacement drive or a drive filler.**

See "Install a Drive" on page 70 or "Install a Drive Filler" on page 72.

Related Information

- "Install a Drive" on page 70
- "Remove a Drive Filler" on page 69

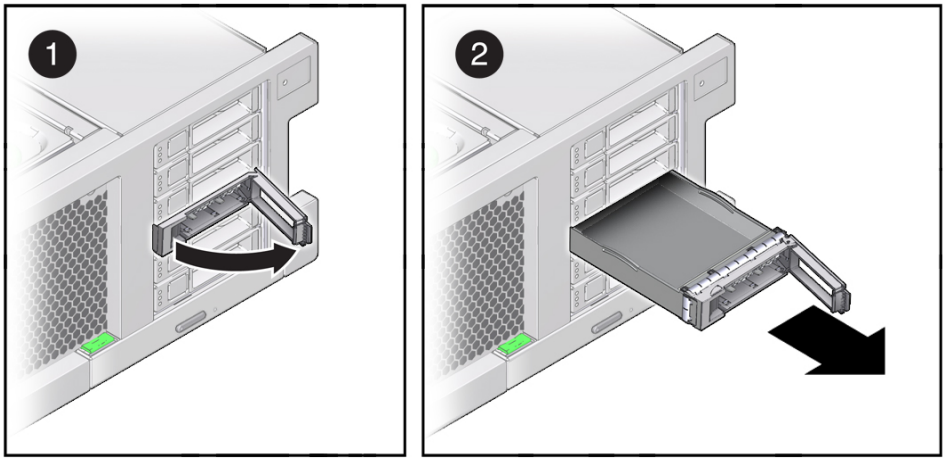
- "Install a Drive Filler" on page 72
- "Verify a Drive" on page 73

Remove a Drive Filler

This is a hot-service procedure that can be performed by a customer while the server is running.

1. **Take the necessary ESD precautions.**
   See "Prevent ESD Damage" on page 55.

2. **On the drive filler you want to remove, complete the following tasks.**



Caution - The latch is not an ejector. Do not bend it too far to the right. Doing so can damage the latch.

   a. **Push the release button to open the latch and unlock the drive panel by moving the latch to the right.**

   b. **Grasp the latch and pull the filler out of the drive slot.**

Caution - When you remove a drive filler, replace it with another filler or a drive. Otherwise, the server might overheat due to improper airflow.

3. **Install a drive or a replacement drive filler.**

   See "Install a Drive Filler" on page 72 or "Install a Drive" on page 70.

Related Information

- "Determine Which Drive Is Faulty" on page 65
- "Remove a Drive" on page 65
- "Install a Drive" on page 70
- "Install a Drive Filler" on page 72
- "Verify a Drive" on page 73

▼ Install a Drive

Installing a drive into a server is a two-step process. You must first install the drive into the drive slot and then configure that drive to the server.

Note - If you removed an existing drive from a slot in the server, you must install the replacement drive in the same slot as the drive that was removed. Drives are physically addressed according to the slot in which they are installed.

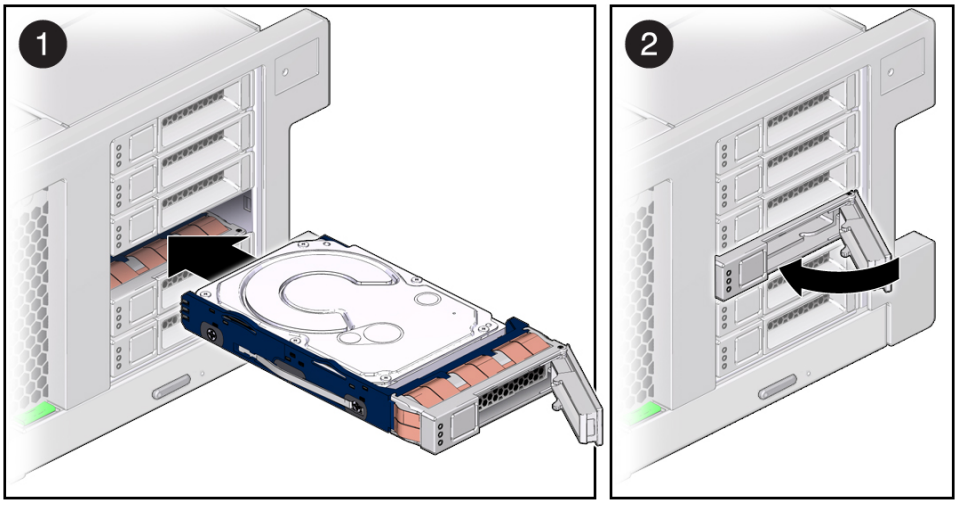
---

1. **Take the necessary ESD precautions.**

   See "Prevent ESD Damage" on page 55.

2. **Fully open the release lever on the drive.**

3. **Install the drive by completing the following tasks.**



   a. **Slide the drive into the drive slot until it is fully seated.**

   b. **Close the latch to lock the drive in place.**

4. **Return the drive to operation by doing one of the following:**

   - **If you cold-serviced the drive, restore power to the server.**

     See "Power On the Server (Oracle ILOM)" on page 174 or "Power On the Server (System Power Button)" on page 175.

   - **If you hot-serviced the drive, configure it using the `cfgadm -c configure` command. The following example shows the drive at `c0::dsk/c1t1d0` being configured.**

     ```
     # cfgadm -c configure c0::dsk/c1t1d0
     ```

     Replace `c0:dsk/c1t1d0` with the drive name that applies to your situation.

   - **If you hot-serviced an NVMe drive, it should automatically power up and attach. If not, power up and attach the drive manually.**

```
# hotplug enable /SYS/DBP/NVME0
```

Check that the drive's state has changed to ENABLED.

```
# hotplug list -lc
```

5. **Verify the drive functionality.**

   See "Verify a Drive" on page 73.

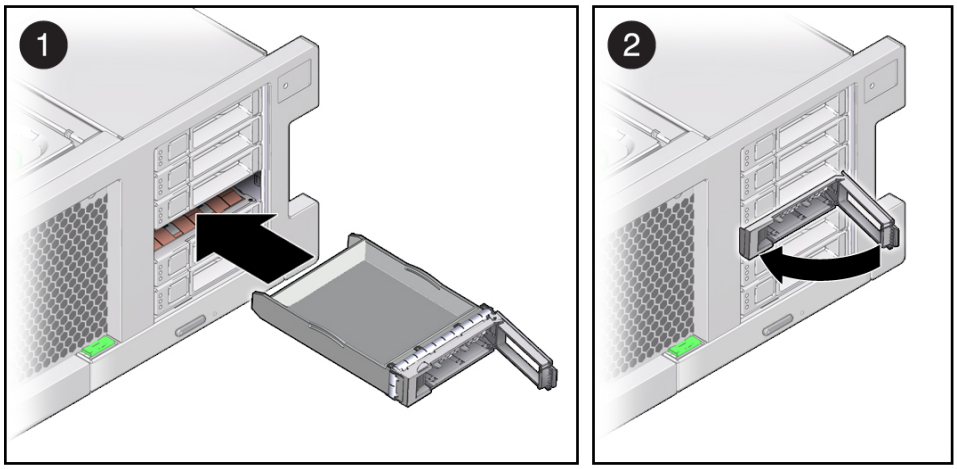
Related Information

- "Determine Which Drive Is Faulty" on page 65
- "Remove a Drive" on page 65
- "Remove a Drive Filler" on page 69
- "Install a Drive Filler" on page 72
- "Verify a Drive" on page 73

Install a Drive Filler

1. **Fully open the release lever on the drive filler.**

2. **Install the drive by completing the following tasks.**



a. **Slide the drive filler into the drive slot until it is fully seated.**

b. **Close the latch to lock the filler in place.**

Related Information

- "Determine Which Drive Is Faulty" on page 65
- "Remove a Drive" on page 65
- "Install a Drive" on page 70
- "Remove a Drive Filler" on page 69
- "Verify a Drive" on page 73

Verify a Drive

1. **If the OS is shut down, and the drive you replaced was not the boot device, boot the OS.**

   Depending on the nature of the replaced drive, you might need to perform administrative tasks to reinstall software before the server can boot. Refer to the Oracle Solaris OS administration documentation for more information.

2. **At the Oracle Solaris prompt, list all drives in the device tree, including any drives that are not configured.**

```
# cfgadm -al
```

   This command helps you identify the drive you installed.

```
Ap_id             Type        Receptacle   Occupant       Condition
c0                scsi-bus    connected    configured     unknown
c0::dsk/c1t0d0    disk        connected    configured     unknown
c0::sd1           disk        connected    unconfigured   unknown
usb0/1            unknown     empty        unconfigured   ok
usb0/2            unknown     empty        unconfigured   ok
...
```

3. **Configure the drive.**

   For example, to configure the second disk `c0::sd1`, type:

```
# cfgadm -c configure c0::sd1
```

Replace `c0::sd1` with the drive name for your configuration.

4. **Verify that the blue Ready to Remove LED is no longer lit on the drive that you installed.**

   See "Determine Which Drive Is Faulty" on page 65.

5. **At the Oracle Solaris prompt, list all drives in the device tree, including any drives that are not configured.**

```
# cfgadm -al
```

The replacement drive is now listed as configured, as shown in the following example.

```
Ap_Id            Type         Receptacle   Occupant      Condition
c0               scsi-bus     connected    configured    unknown
c0::dsk/c1t0d0   disk         connected    configured    unknown
c0::dsk/c1t1d0   disk         connected    configured    unknown
usb0/1           unknown      empty        unconfigured  ok
usb0/2           unknown      empty        unconfigured  ok
...
```

6. **Perform one of the following tasks based on your verification results:**

   - **If the previous steps did not verify the drive, see "Detecting and Managing Faults" on page 27.**
   - **If the previous steps indicate that the drive is functioning properly, perform the tasks required to configure the drive. These tasks are covered in the Oracle Solaris OS administration documentation.**

For additional drive verification, you can run Oracle VTS. Refer to the Oracle VTS documentation for details. Refer to `http://docs.oracle.com/cd/E19719-01/index.html`.

Related Information

- "Determine Which Drive Is Faulty" on page 65
- "Remove a Drive" on page 65
- "Install a Drive" on page 70

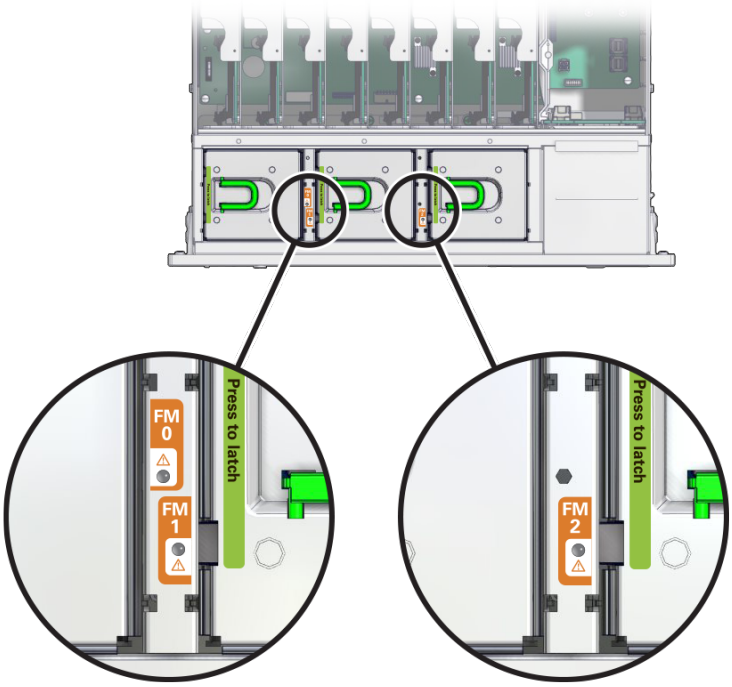
Servicing Fan Modules

The six fan modules in the server are located at the front of the chassis. See "Identifying Components" on page 13. You can access the fan modules without removing the server cover. You might need to extend the server from the rack to access the fan modules. Each fan module is an integrated, hot-serviceable component.

These topics explain how to service faulty fan modules.

Related Information

Fan Module LEDs



LED	Status
Service Action Required	When the LED is on, the fan module is faulty. When the LED is off, the server is powered on and the fan module is functioning correctly.

Related Information

- “Determine Which Fan Module Is Faulty” on page 77
- “Detecting and Managing Faults” on page 27

Determine Which Fan Module Is Faulty

- **Check to see if any of the following LEDs are lit when a fan module fault is detected.**
  - Service Action Required LEDs on the front and rear panels.
  - Fan Module (FAN) Fault LED on the front panel.
  - Fan Module Fault LED on or adjacent to the faulty fan module.

Note - The server Overtemp LED might also light if a fan module fault causes an increase in server operating temperature.

Related Information

- "Front Panel Components (Service)" on page 13
- "Rear Panel Components (Service)" on page 15
- "Extend the Server to the Service Position" on page 55
- "Remove a Fan Module" on page 77
- "Detecting and Managing Faults" on page 27

Remove a Fan Module

This is a hot-service procedure that can be performed by a customer while the server is running.

Caution - While the fan modules provide some cooling redundancy, if a fan module fails, replace it as soon as possible to maintain server availability. When you remove one of the fan modules, you must replace it within 30 seconds to prevent overheating of the server.

---

1. **Prepare for servicing.**

   See "Preparing for Service" on page 45.

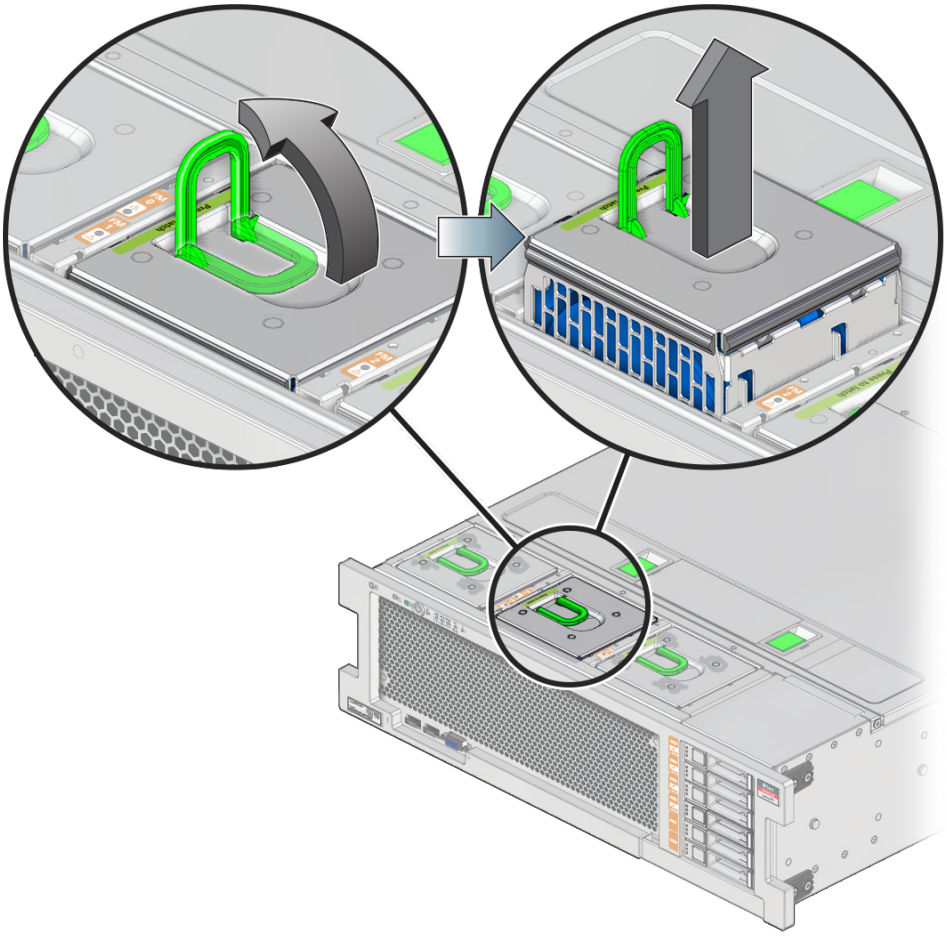
2. **Identify the faulty fan module with a corresponding Service Required LED.**

   The Service Action Required LEDs are located on the fan module as shown in "Determine Which Fan Module Is Faulty" on page 77.

3. **Using your thumb and forefinger, grasp the handle on the fan module and lift it out of the server.**

Caution - When removing a fan module, do not rock it back and forth. Rocking fan modules can damage the fan board connectors.

Caution - When changing fan modules, you can only remove or replace the fan modules. Do not service any other components in the fan compartment unless the server is shut down and the power cords are removed.



4. **Install a new fan module.**

See “Install a Fan Module” on page 79.

Related Information

- “Extend the Server to the Service Position” on page 55
- “Install a Fan Module” on page 79

Install a Fan Module

This is a hot-service procedure that can be performed by a customer while the server is running.

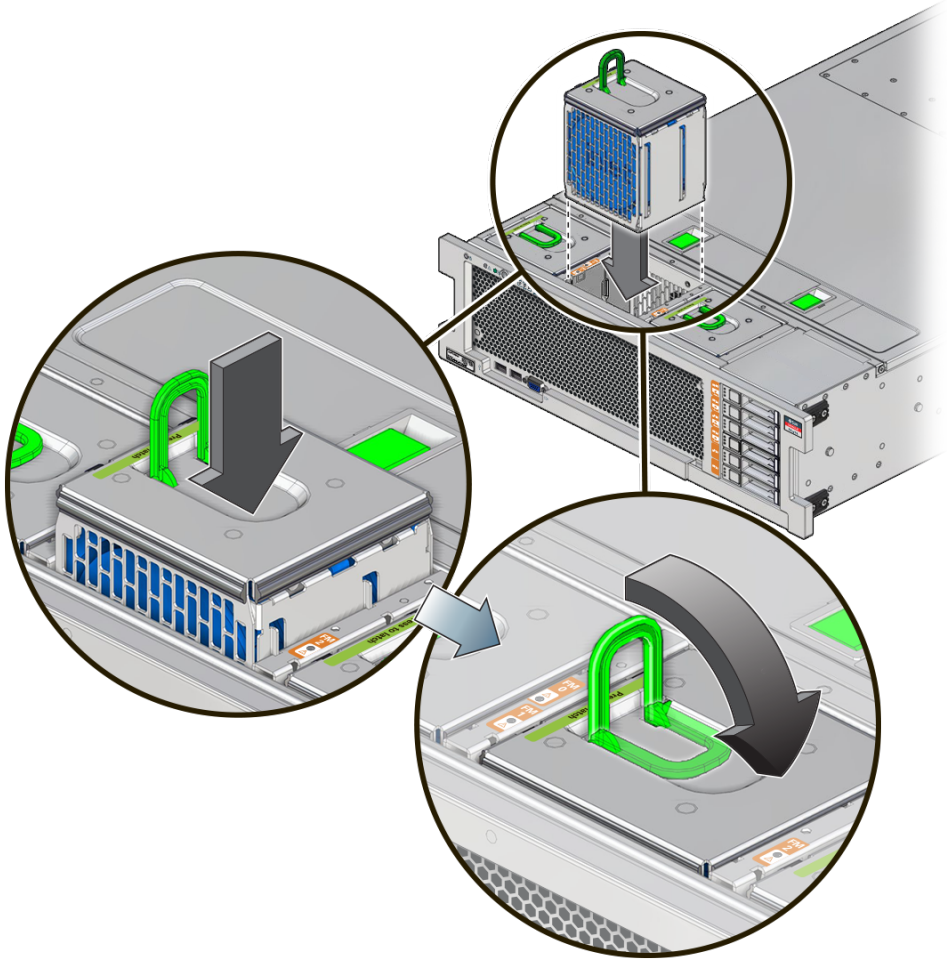
Caution - To ensure proper cooling, ensure that you install the replacement fan module in the same slot from which the faulty fan module was removed.

1. **Take the necessary ESD precautions.**

   See “Prevent ESD Damage” on page 55.

2. **Align the fan module and slide it into the fan module slot.**

Note - Fan modules are keyed to ensure that they are installed in the correct orientation.



3. **Apply firm pressure to fully seat the fan module.**

   You hear a click when the fan module is properly seated.

4. **Return the server to the normal operating position.**

   See "Return the Server to the Normal Operating Position" on page 173.

Related Information

- "Return the Server to the Normal Operating Position" on page 173.
- "Remove a Fan Module" on page 77
- "Verify a Fan Module" on page 81

▼ Verify a Fan Module

1. **Verify that the Service Required LED on the replaced fan module is not lit.**

   See "Fan Module LEDs" on page 76.

2. **At the Oracle ILOM prompt, start the fault management shell.**

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

faultmgmtsp>
```

3. **Type `fmadm faulty` to check for faults.**

   - If faults are reported, see "Detecting and Managing Faults" on page 27.
   - If no faults are reported, then the component has been replaced successfully.

4. **Consider these possibilities:**

   - If any of the LEDs are illuminated, see "Interpreting LEDs" on page 33.
   - If none of the LEDs are illuminated, the fan module has been replaced successfully.

Related Information

- "Determine Which Fan Module Is Faulty" on page 77
- "Front Panel Components (Service)" on page 13
- "Rear Panel Components (Service)" on page 15

Servicing Power Supplies

The server has redundant hot-serviceable power supplies. You can remove and replace a power supply without shutting the server down, provided that the other power supply is online and working.

For information about power configuration policies, refer to *Servers Administration* and the Oracle ILOM documentation.

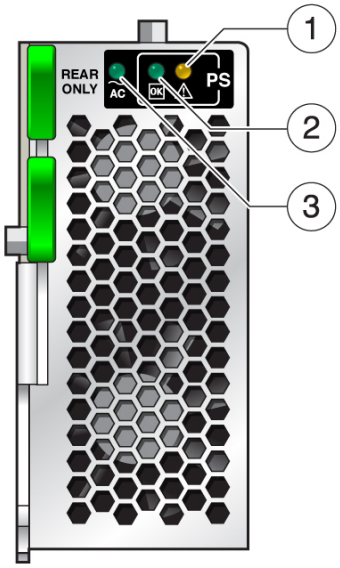
These topics describe how to service power supply modules.

Related Information

- "Servicing the PS Backplane" on page 165

Power Supply LEDs

Each power supply has LEDs that indicate its state.



No.	LED	Symbol	Color	Status When Lit
1	Service Action Required	⚠	Amber	The power supply is faulty. Service is required.
2	OK	OK	Green	Both DC outputs (3.3V standby and 12V main) are active and within regulation.
3	AC Present	~AC	Green	AC voltage is applied to the power supply.

Note - The front and rear panel Service Action Required LEDs are also lit when the server detects a power supply fault. See "Front Panel Components (Service)" on page 13 and "Rear Panel Components (Service)" on page 15.

Related Information

- "Determine Which Power Supply Is Faulty" on page 85
- "Verify a Power Supply" on page 88

Determine Which Power Supply Is Faulty

- **Check if the following LEDs are lit when a power supply fault is detected.**
  - Service Required LEDs on the front and rear panels.
  - Rear PS Fault LED on the front panel.
  - Service Required LED on the faulted power supply.

Related Information

- "Power Supply LEDs" on page 83
- "Front Panel Components (Service)" on page 13
- "Rear Panel Components (Service)" on page 15
- "Remove a Power Supply" on page 85

Remove a Power Supply

This is a hot-service procedure that can be performed by a customer while the server is running.

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

Caution - If a power supply fails and you do not have a replacement available, to ensure proper airflow, leave the failed power supply installed in the server until you replace it with a new power supply.

1. **Prepare for servicing.**

   See "Preparing for Service" on page 45.

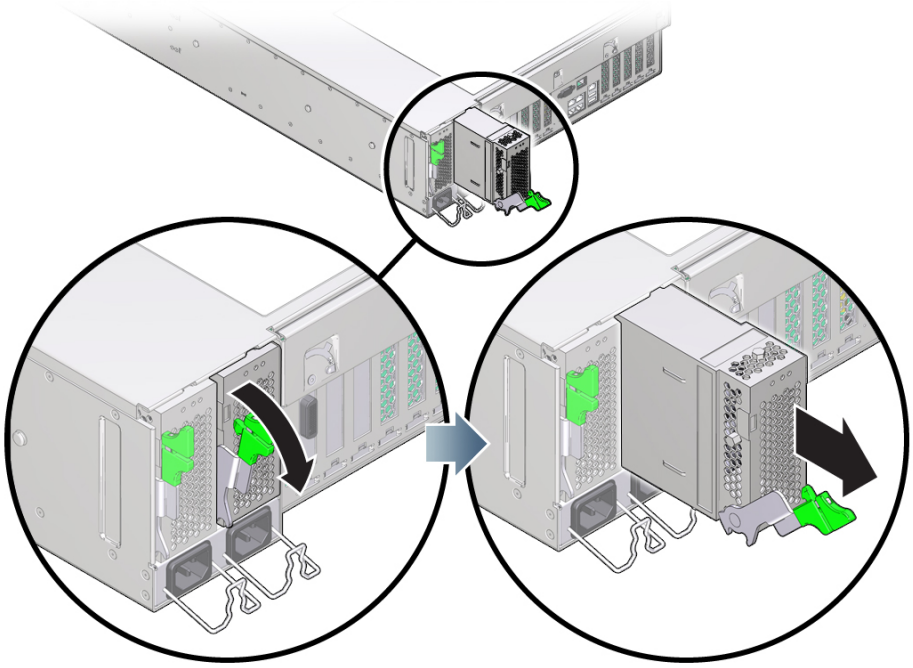
   If necessary, release the CMA to access the power supplies. Do not allow the CMA to hang unsupported while it is unattached.

2. **Disconnect the power cord from the power supply that displays an amber lit Service Action Required LED.**

3. **Press down on the release latch to open the ejector arm.**

4. **Slide the power supply out of the chassis.**

Caution - There is no “catch” mechanism on the power supply to prevent it from sliding completely out of the chassis. Use care when removing the power supply to prevent it from falling.



5. **Install a new power supply.**
   See “Install a Power Supply” on page 86.

Related Information

- “Determine Which Power Supply Is Faulty” on page 85
- “Install a Power Supply” on page 86

Install a Power Supply

This is a hot-service procedure that can be performed by a customer while the server is running.

1. **If necessary, release the cable management arm to access the power supplies.**

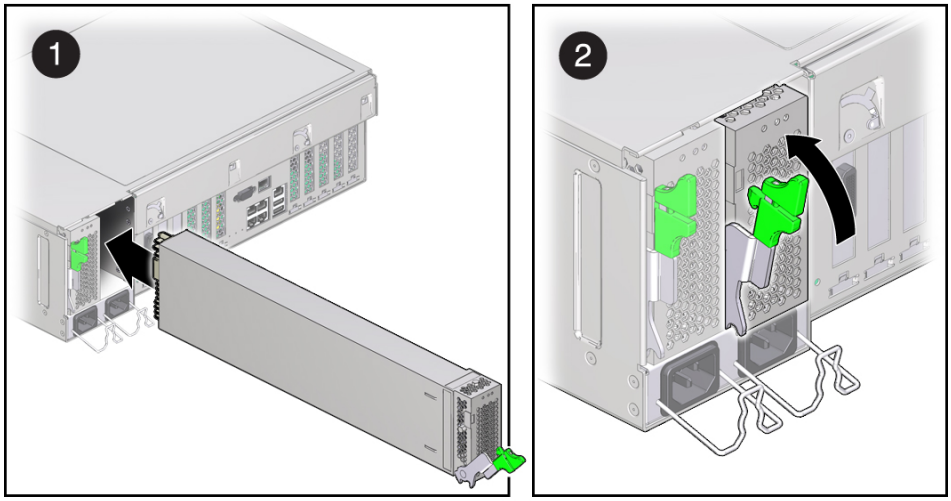
   See "Release the CMA" on page 57.

   Do not allow the CMA to hang unsupported while it is unattached.

2. **Align the power supply with the empty power supply chassis bay.**

3. **Slide the power supply into the bay until it is fully seated.**

4. **Move the release latch up to secure the power supply in place.**



5. **Reconnect the power cord to the power supply.**

6. **Verify power supply functionality.**

   See "Verify a Power Supply" on page 88.

Related Information

- "Remove a Power Supply" on page 85
- "Verify a Power Supply" on page 88

Verify a Power Supply

1. **Verify that the power supply OK and AC Present LEDs are lit, and that the fault LED is not lit.**

   See "Power Supply LEDs" on page 83.

2. **Verify that the front and rear Service Required LEDs are not lit.**

   See "Interpreting LEDs" on page 33.

3. **Consider these possibilities:**

   - If any of the LEDs are illuminated, see "Interpreting LEDs" on page 33.
   - If none of the LEDs are illuminated, the power supply has been replaced successfully.

Related Information

- "Determine Which Power Supply Is Faulty" on page 85
- "Front Panel Components (Service)" on page 13
- "Rear Panel Components (Service)" on page 15

Servicing Memory Risers and DIMMs

These topics explain how to remove and install memory risers and DIMMs in the server.

Memory Riser and DIMM Configuration

The server includes eight memory risers, each containing four DIMM slots. Four memory risers are associated with each CPU.

The memory configuration rules for the server are as follows:

- All eight memory risers must be installed in all configurations.
- In half-populated configurations (16 DIMMs) DIMMs must be installed in all `CH0` slots.

  These slots have black ejector levers.
- In fully-populated configurations (32 DIMMs), DIMMs must be installed in all slots (`CH0` and `CH1`)

Note - The DIMM sparing feature is available only in fully-populated servers.

- All DIMMs associated with each processor must be identical (same size, same rank classification).

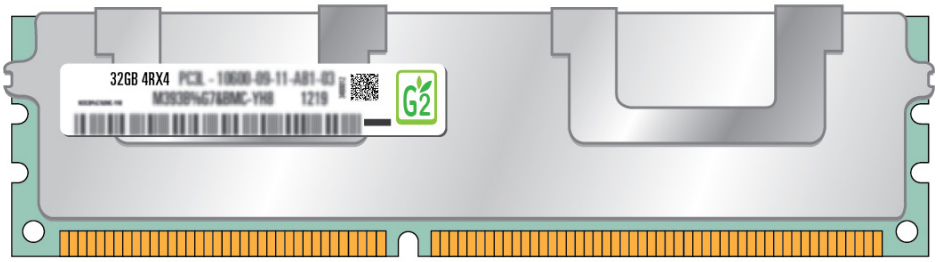
Mixed configurations are supported (DIMMs associated with `CM0` with one size, and DIMMs associated with `CM1` with a different size) *as long as all DIMMs in the server have the same rank classification*, and the number of DIMM in CM0 and CM1 are the same. For example, sixteen 32 Gbyte DIMMs associated with CM0, and sixteen 64 Gbyte DIMMs associated with CM1.

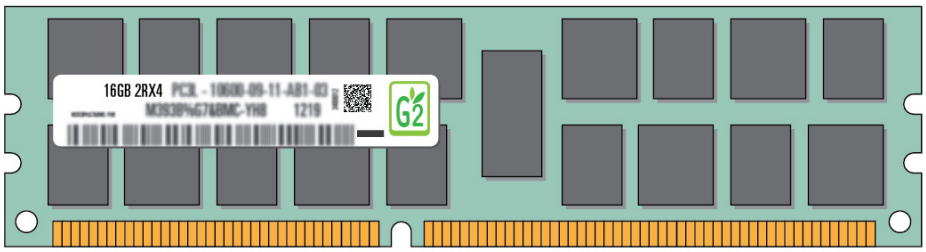
Related Information

- "Identifying DIMMs" on page 90
- "Memory Riser and DIMM FRU Names" on page 91
- "Locate a Faulty DIMM (LEDs)" on page 95
- "Remove a DIMM" on page 100
- "Install a Memory Riser" on page 104

Identifying DIMMs

Each DIMM is affixed with an identifying label. The first four characters on the label describe the DIMM memory capacity; the second four characters describe the rank classification. Use these labels to identify the DIMMs installed in the server, to verify that any replacement DIMMs are compatible, or to confirm that upgrade DIMMs may be installed in a supported configuration.





As of System Firmware version 9.10.3, the following DIMM configurations are supported.

DIMM Capacity	DRAM Density	Rank Classification	Label
16 Gbyte	4 Gbit	Dual-rank x4	2Rx4
32 Gbyte	4 Gbit	Quad-rank x4	4Rx4
32 Gbyte	8 Gbit	Dual-rank x4	2Rx4
64 Gbyte	8 Gbit	Quad-rank x4	4Rx4
128 Gbyte	16 Gbit	Quad-rank x4	2S2Rx4

Memory Riser and DIMM FRU Names

This server includes eight memory risers. Four memory risers are associated with each CMP in the server. A label is next to each memory riser that shows the number of the CMP and of the riser. Four DIMM slots are on each memory riser.

Note - The server fails to boot unless all memory riser slots are populated. For more information about memory riser configuration, see "Memory Riser and DIMM Configuration" on page 89.

DIMM FRU names are based on the location of the memory riser in the server, the DIMM slot on the memory riser, and the CPU module associated with the memory riser. For example, the full FRU name for the top-most DIMM slot (`BOB1/CH0/DIMM`) on the first memory riser associated with CPU module 0 (`CM0/CMP/MR0`) is:

```
/SYS/MB/CM0/CMP/MR0/BOB1/CH0/DIMM
```

Memory Riser Label	Memory Riser or DIMM FRU Name	Ejector Color
CM0/MR0	`/SYS/MB/CM0/CMP/MR0` (riser)	
	`/SYS/MB/CM0/CMP/MR0/BOB0/CH0/DIMM`	Black
	`/SYS/MB/CM0/CMP/MR0/BOB0/CH1/DIMM`	White
	`/SYS/MB/CM0/CMP/MR0/BOB1/CH0/DIMM`	Black
	`/SYS/MB/CM0/CMP/MR0/BOB1/CH1/DIMM`	White
CM0/MR1	`/SYS/MB/CM0/CMP/MR1` (riser)	
	`/SYS/MB/CM0/CMP/MR1/BOB0/CH0/DIMM`	Black
	`/SYS/MB/CM0/CMP/MR1/BOB0/CH1/DIMM`	White
	`/SYS/MB/CM0/CMP/MR1/BOB1/CH0/DIMM`	Black
	`/SYS/MB/CM0/CMP/MR1/BOB1/CH1/DIMM`	White
CM0/MR2	`/SYS/MB/CM0/CMP/MR2` (riser)	
	`/SYS/MB/CM0/CMP/MR2/BOB0/CH0/DIMM`	Black
	`/SYS/MB/CM0/CMP/MR2/BOB0/CH1/DIMM`	White
	`/SYS/MB/CM0/CMP/MR2/BOB1/CH0/DIMM`	Black
	`/SYS/MB/CM0/CMP/MR2/BOB1/CH1/DIMM`	White
CM0/MR3	`/SYS/MB/CM0/CMP/MR3` (riser)	
	`/SYS/MB/CM0/CMP/MR3/BOB0/CH0/DIMM`	Black
	`/SYS/MB/CM0/CMP/MR3/BOB0/CH1/DIMM`	White
	`/SYS/MB/CM0/CMP/MR3/BOB1/CH0/DIMM`	Black
	`/SYS/MB/CM0/CMP/MR3/BOB1/CH1/DIMM`	White

Memory Riser Label	Memory Riser or DIMM FRU Name	Ejector Color
CM1/MR0	/SYS/MB/CM1/CMP/MR0 (riser)	
	/SYS/MB/CM1/CMP/MR0/BOB0/CH0/DIMM	Black
	/SYS/MB/CM1/CMP/MR0/BOB0/CH1/DIMM	White
	/SYS/MB/CM1/CMP/MR0/BOB1/CH0/DIMM	Black
	/SYS/MB/CM1/CMP/MR0/BOB1/CH1/DIMM	White
CM1/MR1	/SYS/MB/CM1/CMP/MR1 (riser)	
	/SYS/MB/CM1/CMP/MR1/BOB0/CH0/DIMM	Black
	/SYS/MB/CM1/CMP/MR1/BOB0/CH1/DIMM	White
	/SYS/MB/CM1/CMP/MR1/BOB1/CH0/DIMM	Black
	/SYS/MB/CM1/CMP/MR1/BOB1/CH1/DIMM	White
CM1/MR2	/SYS/MB/CM1/CMP/MR2 (riser)	
	/SYS/MB/CM1/CMP/MR2/BOB0/CH0/DIMM	Black
	/SYS/MB/CM1/CMP/MR2/BOB0/CH1/DIMM	White
	/SYS/MB/CM1/CMP/MR2/BOB1/CH0/DIMM	Black
	/SYS/MB/CM1/CMP/MR2/BOB1/CH1/DIMM	White
CM1/MR3	/SYS/MB/CM1/CMP/MR3 (riser)	
	/SYS/MB/CM1/CMP/MR3/BOB0/CH0/DIMM	Black
	/SYS/MB/CM1/CMP/MR3/BOB0/CH1/DIMM	White
	/SYS/MB/CM1/CMP/MR3/BOB1/CH0/DIMM	Black
	/SYS/MB/CM1/CMP/MR3/BOB1/CH1/DIMM	White

Related Information

- "Memory Riser and DIMM Configuration" on page 89

▼ Add Memory to the Server

Caution - These procedures require that you handle components that are sensitive to ESD. Follow antistatic practices to avoid damage or component failure.

Customers can perform this procedure, but the server must first be completely powered down and all power cords unplugged. See "Component Service Categories" on page 48 for more information about cold-service procedures.

1. **Review the memory riser and DIMM configuration rules.**
2. **Prepare the system for service.**
3. **Unplug the power cords.**
4. **Remove the memory risers.**
5. **Remove any DIMM fillers installed on the memory risers.**
6. **Determine your upgrade path.**
   - **If you are adding DIMMs to the memory risers only, ensure the new DIMMs have the same rank classification as the DIMMs already installed on the motherboard.**
   - **If you are upgrading all of the memory in the server, remove all of the existing DIMMs on the memory risers and the motherboard.**
7. **Install the new DIMMs.**
8. **Install the memory risers.**
9. **Return the server to operation.**
10. **Enable and verify the new DIMMs.**

Locating and Replacing a Faulty DIMM

You can locate a failed DIMM either by using the Oracle ILOM show faulty command, or with the DIMM fault LEDs located on the motherboard and the memory risers. Locate the memory risers using the "Server Top View" on page 16.

After locating and removing the faulty DIMM, install and verify the replacement DIMM.

Locate a Faulty DIMM (Oracle ILOM)

The Oracle ILOM `show faulty` command displays current faults, including DIMM failures.

1. **At the Oracle ILOM prompt, type:**

```
-> show faulty
Target              | Property          | Value
--------------------+-------------------+-------------------
/SP/faultmgmt/0     | fru               | /SYS/MB/CM0/CMP/MR0/BOB1/CH0/DIMM
/SP/faultmgmt/0     | timestamp         | Dec 21 16:40:56
/SP/faultmgmt/0/    | timestamp         | Dec 21 16:40:56 faults/0
/SP/faultmgmt/0/    | sp_detected_fault | /SYS/MB/CM0/CMP/MR0/BOB1/CH0/DIMM
faults/0            |                   | Forced fail(POST)
```

2. **Locate the DIMM that corresponds to the listed name.**

   See "Memory Riser and DIMM FRU Names" on page 91.

   In this example, `/SYS/MB/CM0/CMP/MR1/BOB1/CH0/DIMM` indicates the memory riser that is second farthest from the power supplies and the DIMM in a slot with white handles and a black slot.

Related Information

- "Locate a Faulty DIMM (LEDs)" on page 95
- "Remove a DIMM" on page 100

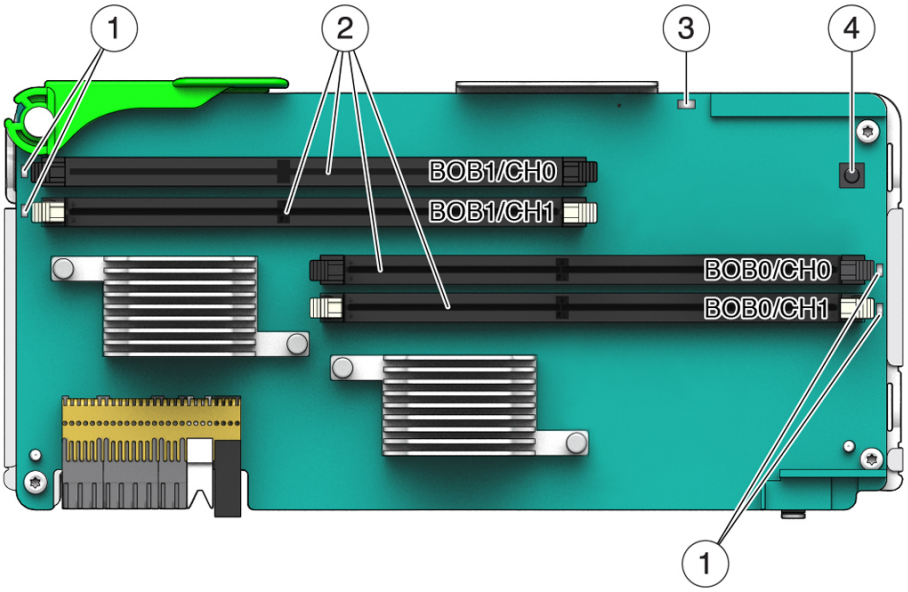
Locate a Faulty DIMM (LEDs)

This procedure describes how to identify a faulty DIMM using buttons and LEDs on the motherboard and the two memory risers.

- **Press a button on the motherboard or a memory riser to identify a faulty DIMM.**

  Pressing any of these buttons activates the amber LED for all faulty DIMMs on the motherboard and memory risers.

Press the button briefly to avoid using up the stored power available to illuminate fault LEDs.



No.	LED	Color	Description
1	DIMM Fault LED	Amber	Identifies each faulty or misconfigured DIMM when you press the memory riser remind button.
2	DIMM slots		A notch toward the middle of each slot ensures that the DIMM is correctly oriented.
3	Memory Riser Power LED	Green	Indicates that the riser is operating normally.
		Amber	Indicates that the riser has a fault.
4	Memory Riser Remind button	Blue	Push this button to identify the faulty or misconfigured DIMMs.

Note - The front and rear panel Service Required LEDs are also lit when the server detects a DIMM fault.

Related Information

- "Locate a Faulty DIMM (Oracle ILOM)" on page 95

- "Remove a DIMM" on page 100
- "Server Top View" on page 16

Replace a Faulty DIMM

Caution - This procedure requires handling components that are sensitive to ESD. Follow antistatic practices to avoid damage or component failure.

Customers can perform this procedure, but the system must first be completely powered down and all power cords unplugged. See "Component Service Categories" on page 48 for more information about cold-service procedures.

Perform this procedure to replace a faulty DIMM on the motherboard or a memory riser.

1. **Identify the faulty DIMM to be removed using the ILOM `show faulty` command.**
2. **Prepare the system for service.**
3. **Unplug the power cords.**
4. **Remove the appropriate memory riser.**

   To remove a DIMM from the motherboard, you must remove the memory riser above that DIMM to enable access.
5. **Locate the faulty DIMM on the motherboard or memory riser using the DIMM fault LEDs.**
6. **Remove the faulty DIMM.**
7. **Ensure the replacement DIMM has the same rank classification as the faulty DIMM.**
8. **Install the replacement DIMM.**
9. **Install the memory riser that you removed.**
10. **Return the server to operation.**
11. **Enable and verify the replacement DIMM.**

Remove a Memory Riser

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

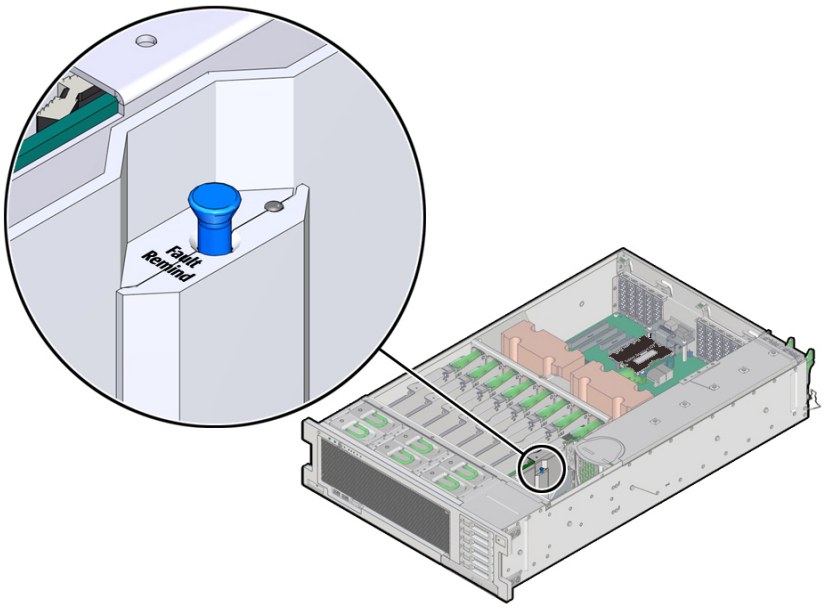
Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

Note - Your server could include a memory riser that is secured with a flat-head screw. If that is the case, use a No. 1 flat-blade screwdriver to service that memory riser.

1. **Prepare for servicing.**

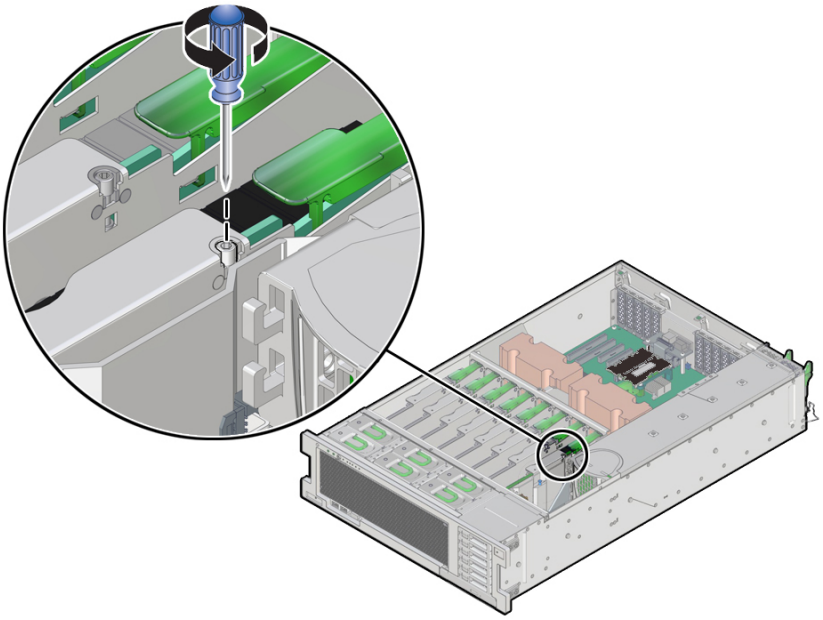
   See "Preparing for Service" on page 45.

2. **Identify the memory riser with the faulty DIMM by pressing the Remind button on the air divider as shown in the following figure.**

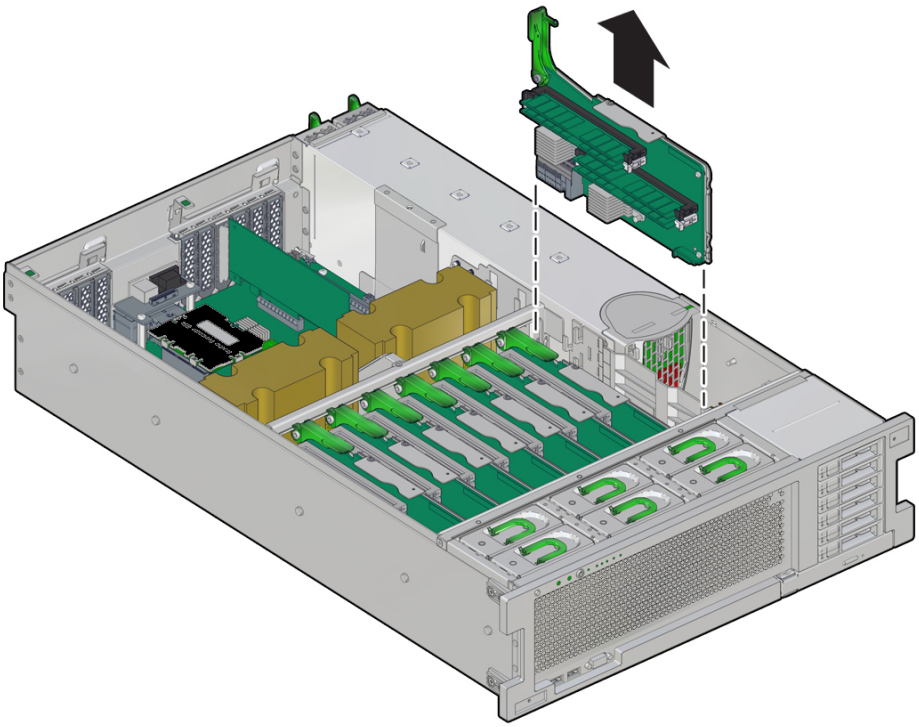


- If the memory riser Service Action Required LED is off, all DIMMs on this riser are operating properly.
- If the memory riser Service Action Required LED is on (amber), one or more of the DIMMs installed on this riser is faulty or misconfigured.

3. **Loosen the captive screw that secures the memory riser to the chassis.**



4. **Open the latch and lift the memory riser straight up to remove the memory riser from the memory module socket.**



Related Information

- "Install a Memory Riser" on page 104
- "Remove a DIMM" on page 100

Remove a DIMM

Caution - This procedure requires handling components that are sensitive to ESD. Follow antistatic practices to avoid damage or component failure.

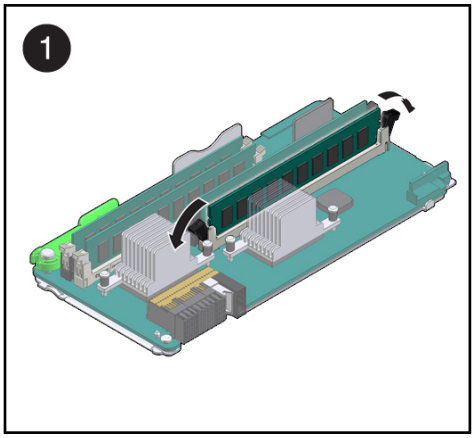
DIMMs or DIMM fillers must be removed:

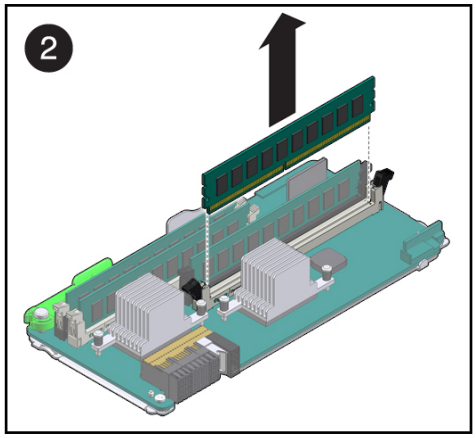
- When adding memory to the server.
- When replacing faulty DIMMs.
- When replacing a faulty motherboard.

You can perform this procedure, but the server must first be completely powered down and all power cords unplugged. See "Component Service Categories" on page 48 for more information about cold-service procedures.

Caution - Whenever you remove a DIMM or a DIMM filler, you should replace it with another DIMM or DIMM filler before powering on the server. Otherwise, the server might overheat due to improper airflow.

1. **Press down both DIMM slot ejector tabs as far as they can go.**





2. **Carefully lift the DIMM straight up and place it on an antistatic mat.**

Related Information

- "Install a DIMM" on page 102
- "Install a Memory Riser" on page 104

Install a DIMM

Caution - This procedure requires handling components that are sensitive to ESD. Follow antistatic practices to avoid damage or component failure.

DIMMs are installed:

- When adding memory to the server.
- When replacing faulty DIMMs.
- When replacing a faulty motherboard.

To ensure proper airflow, DIMM fillers must be installed if you are downgrading memory in the server, or are replacing a faulty memory riser without upgrading memory.

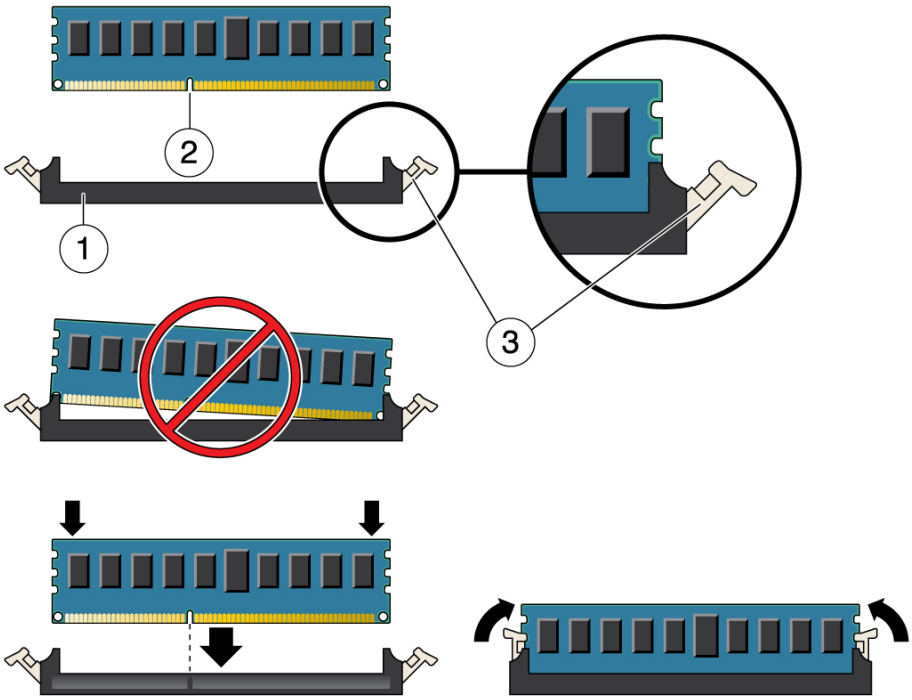
You can perform this procedure, but the server must first be completely powered down and all power cords unplugged. See "Component Service Categories" on page 48 for more information about cold-service procedures.

Caution - Whenever you remove a DIMM, you should replace it with another DIMM before applying power to the server. Otherwise, the server might overheat due to improper airflow.

1. **Attach an antistatic wrist strap.**

   Then unpack the DIMMs and place them on an antistatic mat.

2. **Ensure that the ejector levers are fully open at both ends of the DIMM slot.**



No.	Description
1	DIMM connector slot
2	DIMM connector key
3	DIMM ejector lever

3. **Align each DIMM with the empty connector slot, aligning the notch in the DIMM with the key in the connector.**

   The notch ensures that the DIMM is oriented correctly.

4. **Gently press the DIMM into the slot until the ejector tabs lock the DIMM in place.**

Related Information

- "Install a Memory Riser" on page 104

- "Remove a DIMM" on page 100
- "Enable and Verify a DIMM" on page 106

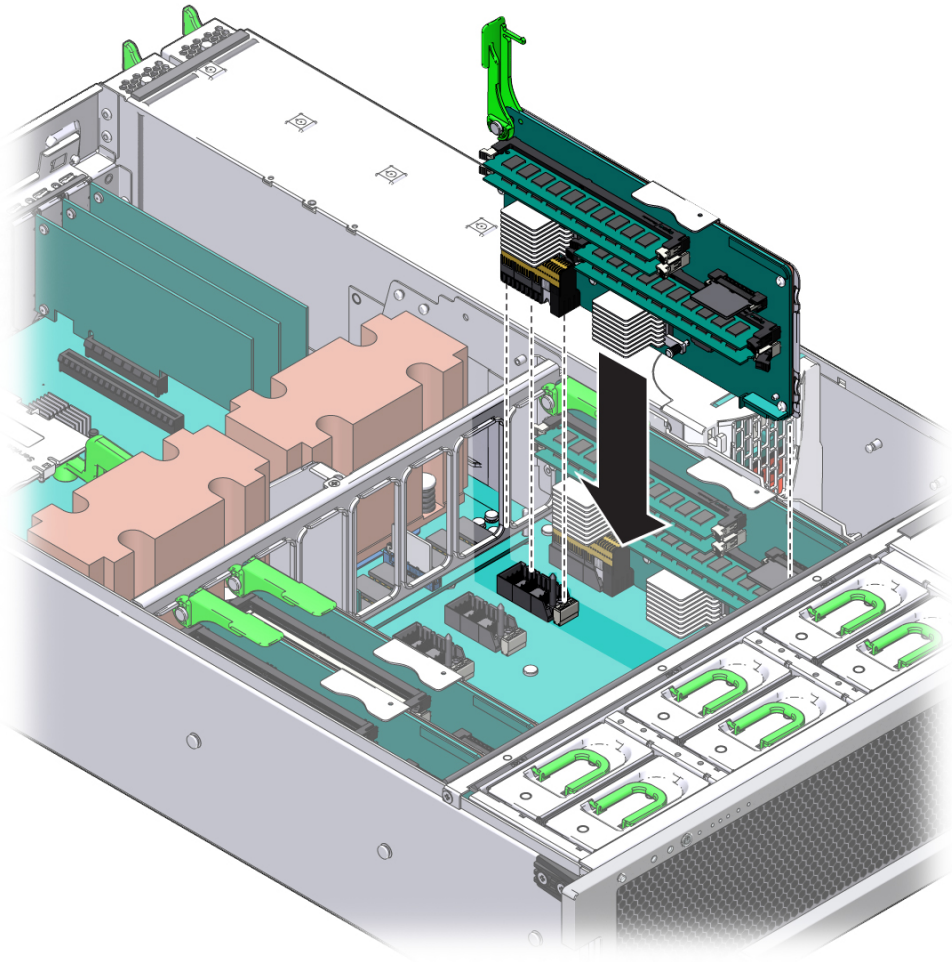
Install a Memory Riser

Note - Your server might include a memory riser that is secured with a flat-head screw. If that is the case, use a No. 1 flat-blade screwdriver to service that memory riser.

1. **Take the necessary ESD precautions.**

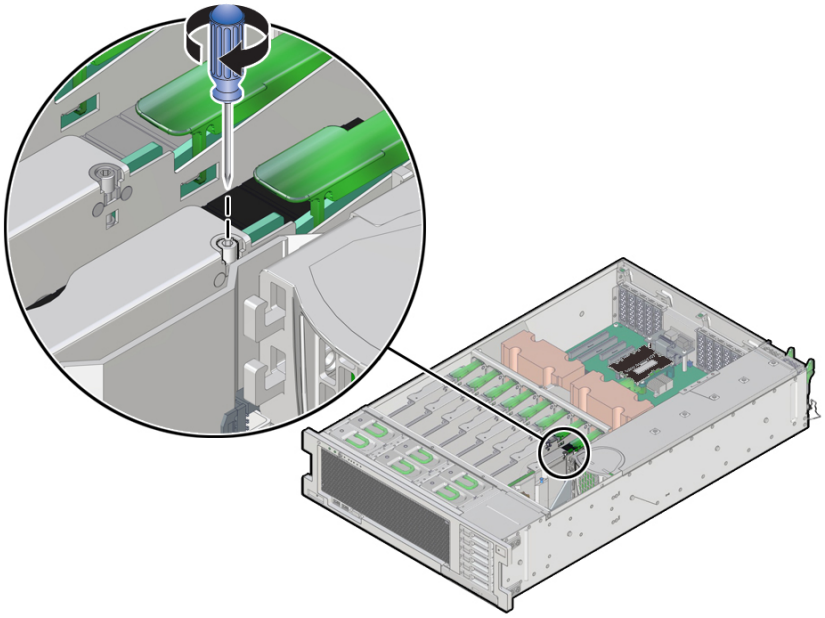
   See "Prevent ESD Damage" on page 55.

2. **Push the memory riser module into the associated CPU memory riser slot until the riser module locks in place.**



3. **Tighten the captive screw that secures the memory riser to the chassis.**

Tighten the screw six turns to secure.



4. **Return the server to operation.**

   See "Returning the Server to Operation" on page 171.

Related Information

- "Memory Riser and DIMM Configuration" on page 89
- "Remove a DIMM" on page 100
- "Enable and Verify a DIMM" on page 106

▼ Enable and Verify a DIMM

1. **At the Oracle ILOM prompt type `show faulty`.**

   - **If the output indicates a POST-detected fault, go to step 2.**

- **If the output displays a UUID, which indicates a host-detected fault, go directly to step 3.**

2. **Use the `set` command to enable the DIMM that was disabled by POST.**

   In most cases, replacement of a faulty DIMM is detected when the SPM is power cycled. In those cases, the fault is automatically cleared from the server. If `show faulty` still displays the fault, the `set` command clears it.

```
-> set /SYS/MB/CM0/CMP/MR0/BOB1/CH0/DIMM clear_fault_action=true
Are you sure you want to clear /SYS/MB/CM0/CMP/MR0/BOB1/CH0/DIMM (y/n)? y
Set 'clear_fault_action' to ‘true’
```

3. **For a host-detected fault, perform the following steps to verify the new DIMM.**

   a. **Set the virtual keyswitch to `diag` so that POST runs in Service mode.**

```
-> set /HOST keyswitch_state=Diag
Set 'keyswitch_state' to 'Diag'
```

   b. **Stop the host.**

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

   c. **Check if the host has been powered off.**

   Allow approximately one minute before performing this step. Type the `show /HOST` command. When the host is powered off, the console displays `status=Powered Off`.

   d. **Start the host.**

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

   e. **Switch to the system console to view POST output.**

   Watch the POST output for possible fault messages. The following output indicates that POST did not detect any faults:

```
-> start /HOST/console
...
0:0:0>INFO:
0:0:0>    POST Passed all devices.
```

```
0:0:0>POST:    Return to VBSC.
0:0:0>Master set ACK for vbsc runpost command and spin...
```

Note - The server might boot automatically at this point. If so, go to step f. If the server remains at the OpenBoot prompt (`ok`) go to the next step.

f. **If the server remains at the OpenBoot prompt, type `boot`.**

g. **Return the virtual keyswitch to Normal mode.**

```
-> set /HOST keyswitch_state=Normal
Set 'keyswitch_state' to 'Normal'
```

h. **Switch to the system console and type:**

```
# fmadm faulty
```

If any faults are reported, refer to the diagnostics instructions described in "Identify Faulted Components" on page 29.

4. **Switch to the Oracle ILOM command shell.**

5. **Type:**

```
-> show faulty
Target              | Property               | Value
--------------------+------------------------+-------------------------------
/SP/faultmgmt/0     | fru                    | /SYS/MB/CMP0/CMP/MR0/BOB1/CH0/DIMM
/SP/faultmgmt/0     | timestamp              | Nov 18 16:02:56
/SP/faultmgmt/0/    | sunw-msg-id            | SPSUN4V-8000-CQ
faults/0            |                        |
/SP/faultmgmt/0/    | uuid                   | 7c7efb20-3333-e2d7-b8ea-986b3e9dbaa9
faults/0            |                        |
/SP/faultmgmt/0/    | timestamp              | Nov 18 16:02:56
faults/0            |                        |
```

If the `show faulty` command reports a fault with a UUID go to the next step. If `show faulty` does *not* report a fault with a UUID, you are done with the verification process.

6. **Switch to the system console and type the `fmadm repair` command with the UUID.**

Use the same UUID that was displayed from the output of the Oracle ILOM `show faulty` command.

```
# fmadm repair 7c7efb20-3333-e2d7-b8ea-986b3e9dbaa9
```

Related Information

- "Memory Riser and DIMM Configuration" on page 89
- "Remove a DIMM" on page 100
- "Enable and Verify a DIMM" on page 106

DIMM Configuration Errors

When the server boots, system firmware checks the memory configuration against the rules described in "Memory Riser and DIMM Configuration" on page 89. Any violations of these rules produce a general error message:

```
Please refer to the service documentation for supported memory
configurations.
```

In some cases, the server boots a degraded state:

```
WARNING: Running with a nonstandard DIMM configuration. Refer to service document for
 details.
```

In other cases, the configuration error is fatal:

```
Fatal configuration error - forcing power-down
```

In addition to these general memory configuration errors, one or more rule-specific messages is displayed, indicating the type of configuration error detected. To identify the DIMMs affected, use the `fmadm faulty` command as described in "Checking for Faults" on page 27.

Servicing the Battery

The battery is located inside the chassis. See "Motherboard Component Locations" on page 19. The battery maintains system time when the server is powered off and disconnected from AC power. If the `show faulty` or `fmadm faulty` commands indicate a battery failure, replace the battery.

Caution - Ensure that all power is removed from the server before removing or installing the battery. You must disconnect the power cords from the server before performing these procedures.

- "Replace the Battery" on page 111

Related Information

- "Detecting and Managing Faults" on page 27
- "Preparing for Service" on page 45
- "Disconnect Power Cords" on page 54

Replace the Battery

1. **Prepare the host for battery replacement.**

   To correctly reset the date and time before replacing a battery, you must revent the host from automatically powering on and disable any NTP connections.

   a. **Check the `HOST_AUTO_POWER_ON` property.**

   ```
   -> show /SP/policy HOST_AUTO_POWER_ON
     Properties:
        HOST_AUTO_POWER_ON = enabled
   ```

   b. **If enabled, set the `HOST_AUTO_POWER_ON` property to `disabled`.**

   ```
   -> set /SP/policy HOST_AUTO_POWER_ON=disabled
   ```

c. **Check the NTP policy for the `/SP/clock`.**

```
-> show /SP/clock usentpserver
   Properties:
      usentpserver = enabled
```

d. **If enabled, set the property to `disabled`.**

```
-> set /SP/clock usentpserver=disabled
```

2. **Replace the battery.**

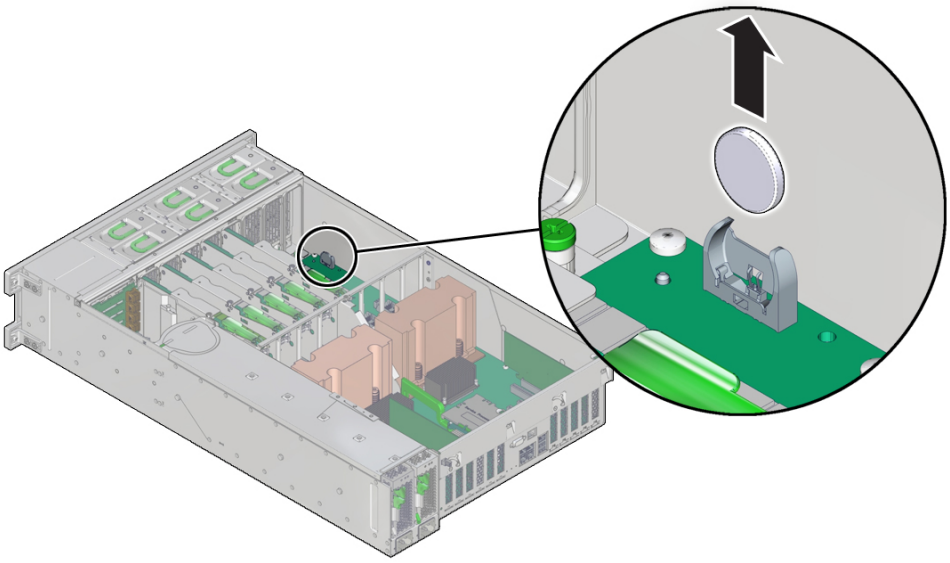
Replacing the battery is a cold-service procedure. The server must be completely powered off and power cables disconnected before performing this procedure.

a. **Prepare the server for service.**

b. **Remove memory risers CM0/MR0, CM0/MR2 and CM0/MR3.**

c. **Remove the old battery.**

Gently push the battery toward the memory risers to release it from the retention clip.



d. **Unpack and install the new battery.**

Press the new battery into the battery holder with the positive side (+) facing away from the metal tab that holds it in place.

e. **Install memory risers CM0/MR0, CM0/MR2 and CM0/MR3.**

f. **Return the Server to Operation.**

3. **Reset the system clock.**

a. **Use the Oracle ILOM `clock` command to reset the system clock.**

The following example sets the date to August 22, 2016, and the timezone to EDT.

```
-> set /SP/clock datetime=081221302016 timezone=EDT
Set 'datetime' to '081221302016'
set 'timezone' to 'EDT'

-> show -d properties /SP/clock
 Properties
    datetime = Mon Aug 22 13:20:16 2016
    timezone = EDT (EST5EDT)
    uptime = 2 days 19:56:49
    usentpserver = disabled
```

b. **If the SP policy `HOST_AUTO_POWER_ON` was enabled before you replaced the battery, you must re-enable it.**

```
-> set /SP/policy HOST_AUTO_POWER_ON=enabled
```

c. **If the `/SP/clock` `usentpserver` property was enabled before you replaced the battery, you must re-enable it.**

```
-> set /SP/clock usentpserver=enabled
```

4. **Verify the battery.**

```
-> show /SYS/MB/BAT
```

Related Information

- "Identify Faulted Components" on page 29

Servicing the eUSB Drive

The eUSB drive is mounted on the motherboard beneath memory risers CM0/MR0, CM0/MR2, and CM0/MR3. See "Front Panel Components (Service)" on page 13.

These topics describe how to service the eUSB drive.

Related Information

- "Detecting and Managing Faults" on page 27

▼ Remove the eUSB Drive

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

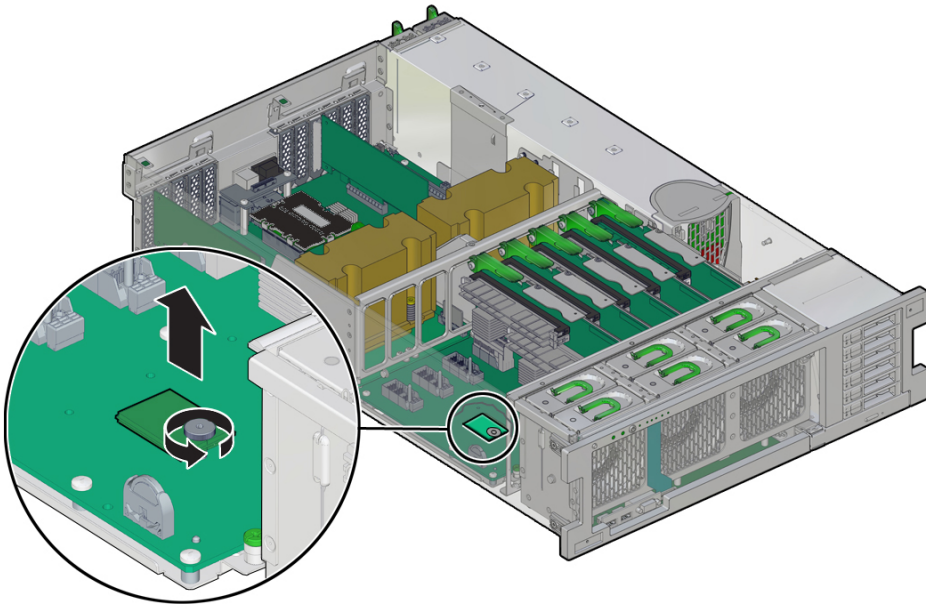
Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. Static discharges can cause the components to fail.

1. **Prepare the system for service.**

   See "Preparing for Service" on page 45.

2. **Remove memory risers CM0/MR0, CM0/MR2 and CM0/MR3. The eUSB drive is located under CM0/MR2.**

See “Remove a Memory Riser” on page 98.



3. **Loosen the screw that attaches the eUSB drive to the motherboard.**
   Retain the screw to use with the new eUSB drive.
4. **Lift the eUSB drive up to disconnect it from the motherboard.**
5. **Install a new eUSB drive.**
   See “Install the eUSB Drive” on page 116.

Related Information

- “Install the eUSB Drive” on page 116

Install the eUSB Drive

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

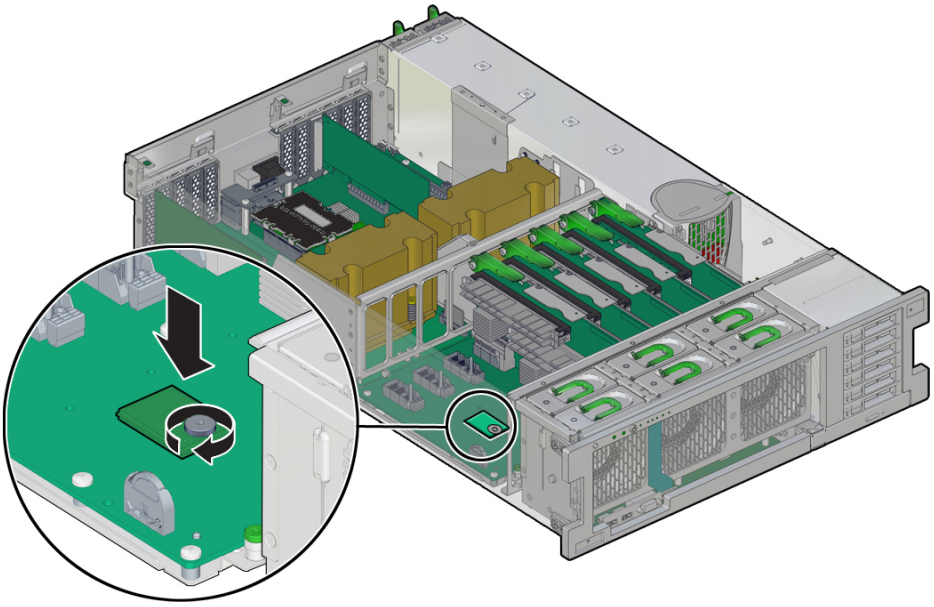
Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. Static discharges can cause the components to fail.

1. **Take the necessary ESD precautions.**

   See "Prevent ESD Damage" on page 55.

2. **Press the eUSB drive into the socket on the motherboard.**

3. **Tighten the screw to secure the drive to the motherboard.**



4. **Install memory risers CM0/MR0, CM0/MR2 and CM0/MR3.**

   See "Install a Memory Riser" on page 104.

5. **Return the server to operation.**

   See "Returning the Server to Operation" on page 171.

Related Information

- “Remove the eUSB Drive” on page 115

Servicing PCIe Cards

These topics describe how to service PCIe cards and PCIe card fillers.

PCIe Card Configuration

Note - Before installing PCIe cards, refer to the *SPARC T8-2 Server Product Notes* and the documentation for each PCIe card for detailed information about known issues and configuration limitations.

This server has eight PCI Express 3.0 slots that accommodate low-profile PCIe cards. All slots support x8 PCIe cards. Four slots are also capable of supporting x16 PCIe cards:

- **All Slots –** x8 electrical interface
- **Slots 1, 2, 7 and 8 –** x16 electrical interface

To determine the slot in which to install a PCIe card, follow these guidelines:

1. Install cards that require a specific slot. Refer to the *SPARC T8-2 Server Product Notes* and the documentation for each card to determine if there are slot requirements.
2. Install the first NMVe switch card in slot 1. Install a second NMVe switch card in slot 2.
3. Install the remaining cards so that the load on the server is balanced.

   In general, install the biggest and hottest cards in the outside slots and work your way to the middle, alternating sides to evenly distribute cooling.

   - Fill the PCIe slots in this sequence: 8, 1, 7, 2, 6, 3, 5, 4.
   - Place the cards in this order: Expansion cards, storage cards, network cards, other cards.

Related Information

- "I/O Root Complex Connections" on page 121
- "Rear Panel Components (Service)" on page 15
- "Remove a PCIe Card or Filler" on page 123
- "Install a PCIe Card or Filler" on page 125
- "NVMe Card Configuration" on page 120

NVMe Card Configuration

You can install one or two NVMe switch cards in the server to support your NMVe drives. Two drives to support a redundant NMVe configuration. Use these tables and the labels on the NMVe cable to properly connect the NMVe switch cards to the disk backplane.

TABLE 1 Single NMVe Card Configuration

DBP NVMe Connector	NVMe Card Connectors (Slot 1)
3	3
2	2
1	1
0	0

TABLE 2 Dual NVMe Card Configuration

DBP NVMe Connector	NVMe Card Connectors (Slot 1)	NVMe Card Connectors (Slot 2)
3		3
2		2
1	3	
0	2	

Related Information

- "Remove a PCIe Card or Filler" on page 123
- "Install a PCIe Card or Filler" on page 125

I/O Root Complex Connections

SPARC T8 servers use a dedicated chip (IO Hub) to host the PCIe fabric. Each IOH chip has five root complexes, four are sixteen lanes wide (x16), and one is eight lanes wide (x8). The root complexes are divided up and assigned to all of the I/O devices in the server. The SPARC T8-2 server contains two IOH chips. Each IOH chip connects to four of the PCIe slots. The following table describes the device paths for the server.

The `pci@` values reported in the OpenBoot `show-devs` command output are paths in the I/O root complex topology.

Device Name	IOH	Root Complex (IOS)	Width	Root Complex Path	Oracle ILOM Target
PCIeSlot1	0	3	x16	`/pci@306/pci@1`	`/SYS/MB/PCIE1`
PCIeSlot2	0	2	x16	`/pci@307/pci@1`	`/SYS/MB/PCIE2`
PCIeSlot3	0	1	x8	`/pci@300/pci@2`	`/SYS/MB/PCIE3`
PCIeSlot4	0	0	x8	`/pci@301/pci@2`	`/SYS/MB/PCIE4`
PCIeSlot5	1	3	x8	`/pci@302/pci@2`	`/SYS/MB/PCIE5`
PCIeSlot6	1	0	x8	`/pci@303/pci@2`	`/SYS/MB/PCIE6`
PCIeSlot7	1	2	x16	`/pci@304/pci@1`	`/SYS/MB/PCIE7`
PCIeSlot8	1	1	x16	`/pci@305/pci@1`	`/SYS/MB/PCIE8`
NET0	0	1	x8	`/pci@300/pci@1/network@0`	`/SYS/MB/NET0`
NET1	0	1	x8	`/pci@300/pci@1/network@0,1`	`/SYS/MB/NET1`
NET2	0	1	x8	`/pci@300/pci@1/network@0,2`	`/SYS/MB/NET2`
NET3	0	1	x8	`/pci@300/pci@1/network@0,3`	`/SYS/MB/NET3`
SAS0	0	0	x8	`/pci@301/pci@1`	`/SYS/MB/SASHBA0`
SAS1	1	0	x8	`/pci@303/pci@1`	`/SYS/MB/SASHBA1`
SPM	0	4	1x of x4	`/pci@309/pci@1`	`/SYS/MB/SPM`
USB	1	4	x4	`/pci@308/pci@1`	`/SYS/MB/USB_CTRL`
eUSB	1	4	x1	`/pci@308/pci@1/usb@0/hub@1/storage@3`	`/SYS/MB/EUSB_DISK`
USB - Rear Top	1	4	x1	`/pci@308/pci@1/usb@0/storage@7`	`/SYS/MB/USB1`
USB - Rear Bottom	1	4	x1	`/pci@308/pci@1/usb@0/storage@2`	`/SYS/MB/USB0`
USB - Front Left	1	4	x1	`/pci@308/pci@1/usb@0/hub@4/storage@2`	`/SYS/FANBD/USB0`
USB - Front Right	1	4	x1	`/pci@308/pci@1/usb@0/hub@4/storage@1`	`/SYS/FANBD/USB1`

Device Name	IOH	Root Complex (IOS)	Width	Root Complex Path	Oracle ILOM Target
HDD0	0	0	x4	`/pci@301/pci@1/scsi@0/disk@p0`	`/SYS/DBP/HDD0`
HDD1	0	0	x4	`/pci@301/pci@1/scsi@0/disk@p1`	`/SYS/DBP/HDD1`
HDD2	0	0	x4	`/pci@301/pci@1/scsi@0/disk@p2`	`/SYS/DBP/HDD2`
HDD3	0	0	x4	`/pci@301/pci@1/scsi@0/disk@p3`	`/SYS/DBP/HDD3`
HDD4	1	0	x4	`/pci@303/pci@1/scsi@0/disk@p0`	`/SYS/DBP/HDD4`
HDD5	1	0	x4	`/pci@303/pci@1/scsi@0/disk@p1`	`/SYS/DBP/HDD5`

NVMe0
Single NMVe card (Slot 1)
Single NVMe Card (Slot 2)
Dual NVMe Switch Cards
	0	0	x4	`/pci@306/pci@1/pci@0/pci@4/nvme@0/disk@1`
				`/pci@307/pci@1/pci@0/pci@4/nvme@0/disk@1`
				`/pci@306/pci@1/pci@0/pci@6/nvme@0/disk@1`	

NVMe1
Single NMVe card (Slot 1)
Single NVMe Card (Slot 2)
Dual NVMe Switch Cards
	0	0	x4	`/pci@306/pci@1/pci@0/pci@5/nvme@0/disk@1`
				`/pci@307/pci@1/pci@0/pci@5/nvme@0/disk@1`
				`/pci@306/pci@1/pci@0/pci@7/nvme@0/disk@1`	

NVMe2
Single NMVe card (Slot 1)
Single NVMe Card (Slot 2)
Dual NVMe Switch Cards
	1	0	x4	`/pci@306/pci@1/pci@0/pci@6/nvme@0/disk@1`
				`/pci@307/pci@1/pci@0/pci@6/nvme@0/disk@1`
				`/pci@307/pci@1/pci@0/pci@6/nvme@0/disk@1`	

NVME3
Single NMVe card (Slot 1)
Single NVMe Card (Slot 2)
Dual NVMe Switch Cards
	1	0	x4	`/pci@306/pci@1/pci@0/pci@7/nvme@0/disk@1`
				`/pci@307/pci@1/pci@0/pci@7/nvme@0/disk@1`
				`/pci@307/pci@1/pci@0/pci@7/nvme@0/disk@1`	

Related Information

- "Server Block Diagram" on page 23
- "PCIe Card Configuration" on page 119
- "Rear Panel Components (Service)" on page 15
- "Remove a PCIe Card or Filler" on page 123
- "Install a PCIe Card or Filler" on page 125

Remove a PCIe Card or Filler

This is a cold-service procedure that can be performed by a customer. Power down the server completely before performing this procedure.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

1. **Prepare for servicing.**

   See "Preparing for Service" on page 45.

2. **Locate the PCIe card or filler that you want to remove.**

   See "Rear Panel Components (Service)" on page 15 for information about PCIe slots and their locations.

   If you are removing a PCIe card filler, go to step 5.

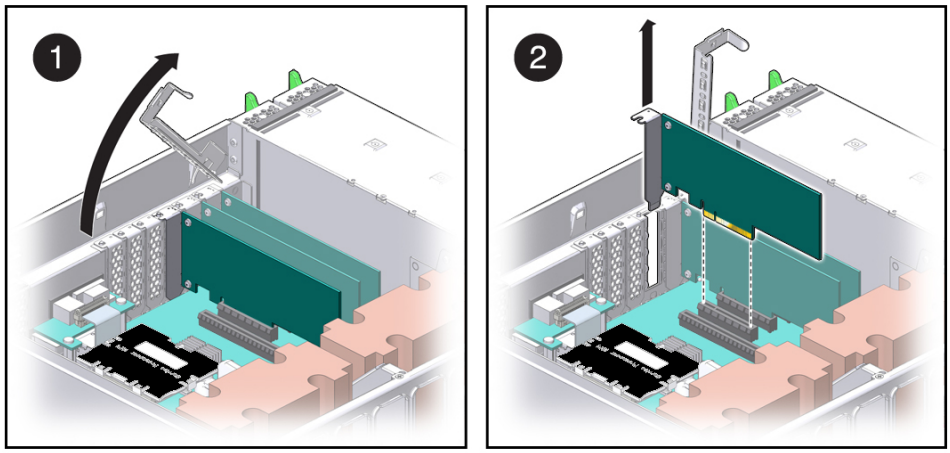
3. **If necessary, note the slot location for each PCIe card you plan to remove.**

4. **Unplug all data cables from the PCIe card.**

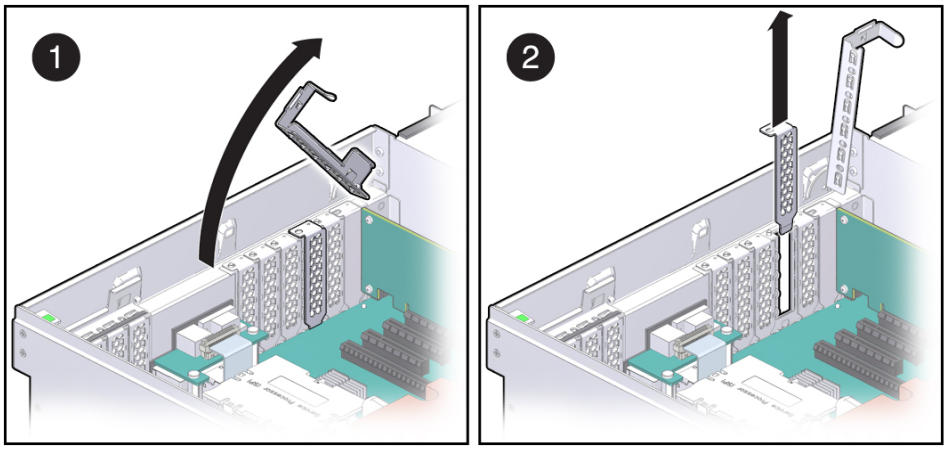
   Note the location of all cables for reinstallation later.

5. **Disengage the PCIe card slot crossbar from its locked position by pulling it toward the interior of the chassis.**

- **See these figures if you are removing a PCIe card.**



- **See these figures if you are removing a PCIe card filler.**



6. **Disengage the PCIe card slot crossbar from its locked position by pulling it toward the interior of the chassis.**

7. **Rotate the crossbar to an upright position (panel 1).**

8. **Carefully remove the PCIe card or filler from the card slot (panel 2).**

9. **Replace with another PCIe card or filler before the server is connected to power again.**

   See "Install a PCIe Card or Filler" on page 125.

Related Information

- "Install a PCIe Card or Filler" on page 125

Install a PCIe Card or Filler

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

Note - Always update optional PCIe card firmware to the latest supported version. Refer to the PCIe card documentation for firmware update instructions.

1. **Take the necessary ESD precautions.**

   See "Prevent ESD Damage" on page 55.

2. **Ensure that the server is powered off and all power cords are disconnected from the server power supplies.**

   See "Removing Power From the Server" on page 51.

3. **Determine which slot to install the PCIe card in.**

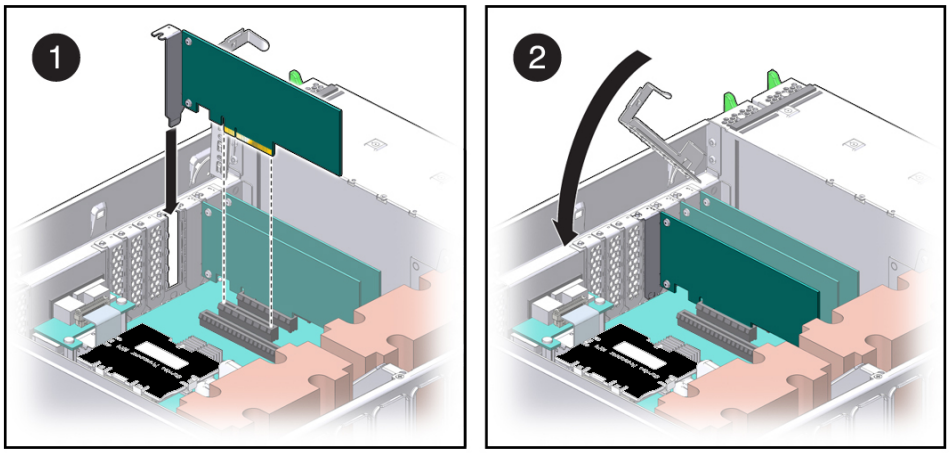
   If you are not replacing an existing PCIe card and need information about deciding which slot to install the card in, see "PCIe Card Configuration" on page 119.

4. **Disengage the PCIe card slot crossbar from its locked position by pulling it toward the interior of the chassis.**

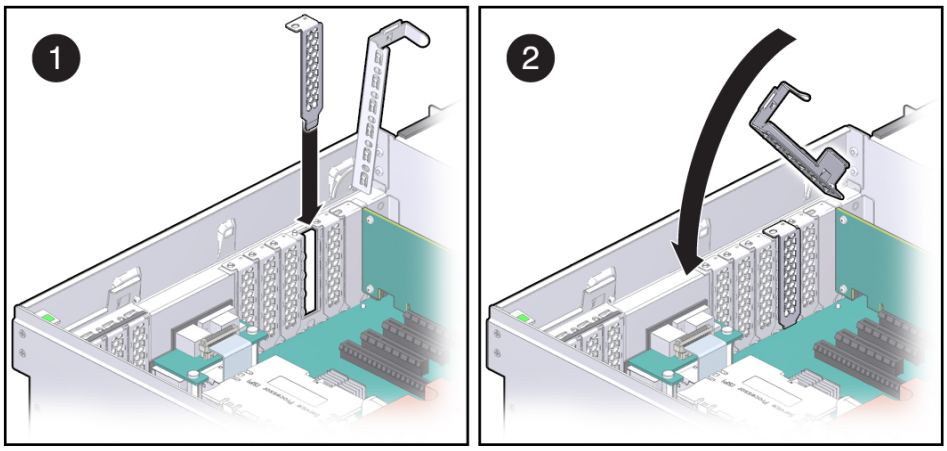
   The crossbar might already be disengaged if you removed a PCIe card or filler from that slot.

5. **Install the PCIe card or filler into the card slot and return the crossbar to its closed and locked position.**

- **See these figures if you are installing a PCIe card.**



- **See these figures if you are installing a PCIe card filler.**



6. **Return the server to operation.**

   See "Returning the Server to Operation" on page 171.

7. **Verify that the card is properly installed.**

   See "Verify a PCIe Card" on page 127.

8. **Configure the PCIe card.**

   Refer to the documentation shipped with the PCIe card for information about configuring the PCIe card, including installing required operating systems.

Related Information

- "Remove a PCIe Card or Filler" on page 123
- "Verify a PCIe Card" on page 127

▼ Verify a PCIe Card

1. **Verify that the System Service Required LEDs are not illuminated.**

2. **Perform one of the following actions based on your verification results:**

   - **If any of the LEDs are illuminated, see "Interpreting LEDs" on page 33.**

   - **If none of the LEDs are illuminated, configure the PCIe card as described in the documentation shipped with the card.**

Related Information

- "Install a PCIe Card or Filler" on page 125
- "Remove a PCIe Card or Filler" on page 123
- "PCIe Card Configuration" on page 119

Servicing the SPM

These topics describe how to service the SPM module.

SPM Firmware and Configuration

System firmware consists of two components, an SPM component and a host component. The SPM firmware component is located on the SPM, and the host component is located on the motherboard. For the server to operate correctly, the firmware in these two components must be compatible.

When replacing the SPM, you must restore the configuration settings maintained in the SPM. Before replacing the SPM, save the configuration using the Oracle ILOM backup utility. Refer to the Oracle ILOM documentation for instructions on backing up and restoring the Oracle ILOM configuration.

After replacing the SPM, the new SPM firmware component and the existing host firmware component must be consistent with each other. To ensure that the firmware is compatible throughout the server, load new system firmware as described in "Install the SPM" on page 131.

Related Information

- Oracle ILOM documentation in `http://www.oracle.com/goto/ilom/docs`
- "Servicing the Motherboard" on page 147
- "Remove the SPM" on page 130
- "Install the SPM" on page 131

Remove the SPM

Replacing the SPM is a cold-service procedure that must be performed by qualified service personnel. The server must be completely powered down before performing this procedure.

Caution - Ensure that all power is removed from the server before working with the motherboard assembly. You must disconnect the power cables from the server before performing these procedures.

Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. Static discharges can cause the components to fail.

The SP OK indicator on the front panel will be off when an SPM fault is detected.

1. **Back up the Oracle ILOM configuration before removing the SPM.**

   At the Oracle ILOM prompt, type:

   ```
   -> cd /SP/config
   -> dump -destination uritarget
   ```

   where acceptable values for *uri* are: tftp, ftp, sftp, scp, http, https

   and *target* is the location where you want to store the configuration information. For example:

   ```
   -> dump -destination tftp://129.99.99.99/pathname
   ```

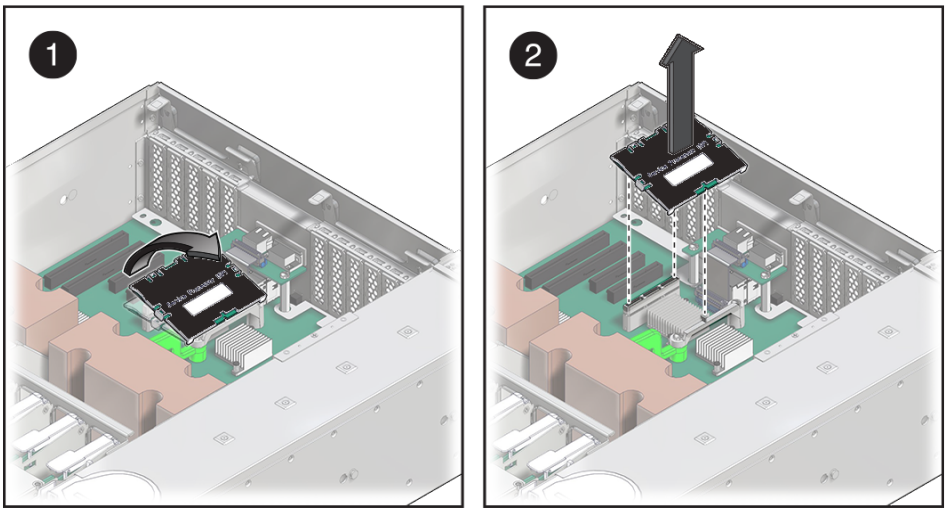
2. **Prepare for servicing.**

   See "Preparing for Service" on page 45.

3. **Locate the SPM.**

   See "Internal Component Locations" on page 17.

4. **Grasp the SPM by the two side grasp points and tilt up to disengage the SPM from the connectors on the motherboard (panel 1).**



Note - If you are removing the SPM because you are replacing the motherboard, set the SPM aside where it is protected from static. You must reinstall the SPM on the new motherboard.

---

5. **Lift the SPM up and away from the motherboard (panel 2).**

6. **Install a new SPM.**

   See "Install the SPM" on page 131.

Related Information

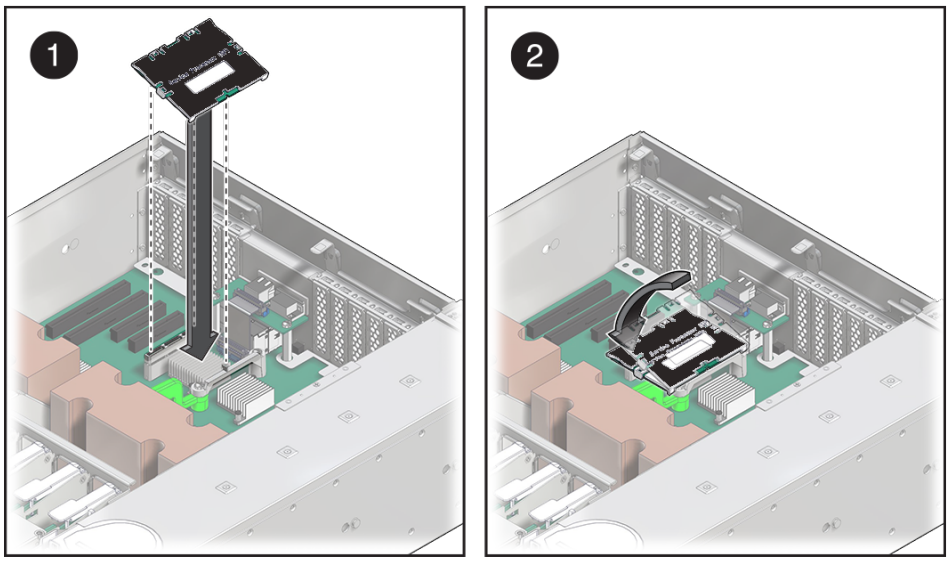
- "SPM Firmware and Configuration" on page 129
- "Install the SPM" on page 131

▼ Install the SPM

Replacing the SPM is a cold-service procedure that must be performed by qualified service personnel. The server must be completely powered down before performing this procedure.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

1. **Lower the side of the SPM with the Align Tab sticker down, at an angle, on to the SPM tab on the motherboard (panel 1).**



2. **Press the SPM down until it is fully seated in its socket (panel 2).**

3. **Return the server to operation.**
   See "Returning the Server to Operation" on page 171.

4. **Prior to powering on the server, connect a terminal or a terminal emulator (PC or workstation) to the SPM SER MGT port.**
   Refer to *Server Installation* for instructions.
   If the replacement SPM detects that the SPM firmware is not compatible with the existing host firmware, further action will be suspended and the following message will be displayed:

```
Unrecognized Chassis: This module is installed in an unknown or
unsupported chassis. You must upgrade the firmware to a newer
version that supports this chassis.
```

Note - Whenever you replace the SPM or the motherboard, update the firmware on the server so the portions of firmware in the two components remain consistent.

---

5. **Configure the SPM NET MGT port so that it can access the network, and log in to the SPM through the NET MGT port.**

   Refer to *Servers Administration* or the Oracle ILOM documentation for network configuration instructions.

6. **Download the system firmware.**

   Follow the firmware download instructions in *Servers Administration* or the Oracle ILOM documentation.

Note - You can load any supported system firmware version, including the firmware version that was installed prior to replacing the SPM.

---

7. **If you are replacing an SPM, download the fallback miniroot image for your hardware and your Oracle Solaris version from My Oracle Support at `https://support.oracle.com`.**

   Then follow the procedure "Uploading a New Solaris Miniroot Package From SP to Host" in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance*.

8. **Restore the SPM configuration information you backed up earlier.**

   At the Oracle ILOM prompt, type:

```
-> cd /SP/config
-> load -source uritarget
```

   Where acceptable values for *uri* are: tftp, ftp, sftp, scp, http, https

   and *target* is the location where you stored the configuration information. For example:

```
-> load -source tftp://129.99.99.99/pathname
```

9. **Set the time and date on the new SPM.**

```
-> set SP/clock datetime
```

10. **If TPM was initialized on the replaced SPM, complete these steps:**

    a. **Reinitialize TPM and reset the `tpmadm failover` command if it was previously in use.**

For information about initializing TPM using the Oracle ILOM interface to enable failover, see Securing Systems and Attached Devices in Oracle Solaris 11.3.

b. **Restore the TPM data and keys that were backed up to the new SP you install.**

For information about migrating or restoring TPM data and keys, see Securing Systems and Attached Devices in Oracle Solaris 11.3.

11. **Power on the server.**

See "Power On the Server (Oracle ILOM)" on page 174 or "Power On the Server (System Power Button)" on page 175.

12. **Verify the SPM.**

See "Verify the SPM" on page 134.

Related Information

- Oracle ILOM documentation
- "Remove the SPM" on page 130
- "Verify the SPM" on page 134

Verify the SPM

1. **Verify that the SPM Status LED is illuminated green.**

The LED flashes green while the SPM initializes the Oracle ILOM firmware. See "Interpreting LEDs" on page 33 for information about the status of the SPM LED.

2. **At the Oracle ILOM prompt, start the fault management shell.**

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

faultmgmtsp>
```

3. **Type `fmadm faulty` to check for faults.**

- If faults are reported, see "Detecting and Managing Faults" on page 27 .
- If no faults are reported, then the SPM has been replaced successfully.

Related Information

- Oracle ILOM documentation
- “Install the SPM” on page 131

Servicing the Fan Board

This board carries power to the fan modules and fan status LEDs. This board also transmits status and control signals for the fan modules.

These topics describe how to service the fan board.

- "Remove the Fan Board" on page 137
- "Install the Fan Board" on page 141
- "Verify the Fan Board" on page 145

▼ Remove the Fan Board

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

1. **Prepare for servicing.**

   See "Preparing for Service" on page 45.

2. **Remove all fan modules.**

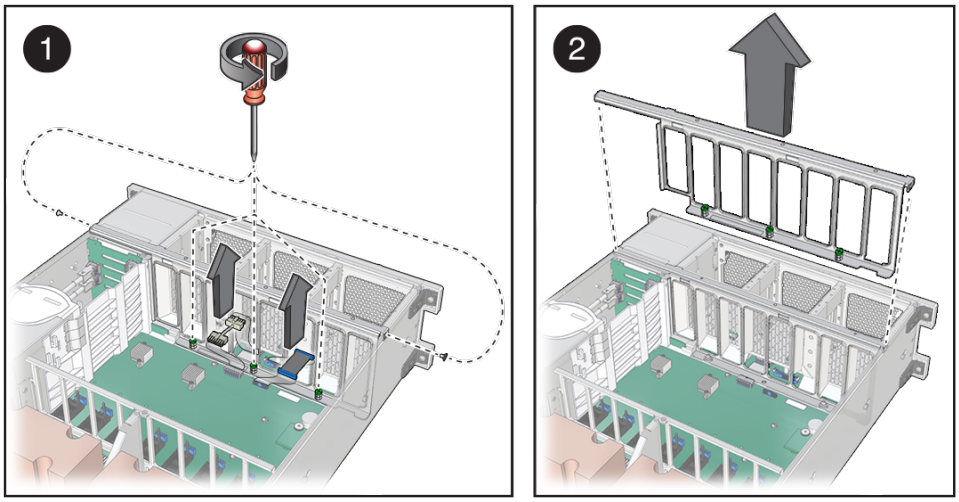
   See "Remove a Fan Module" on page 77.

3. **Remove all memory risers.**

   See "Remove a DIMM" on page 100.

4. **Disconnect any cables plugged into the USB or video connectors on the front of the server.**

5. **Loosen the three captive screws connecting the front memory riser guide to the motherboard, and remove the two screws on each side of the outside of the chassis that hold the fan board in place (panel 1).**



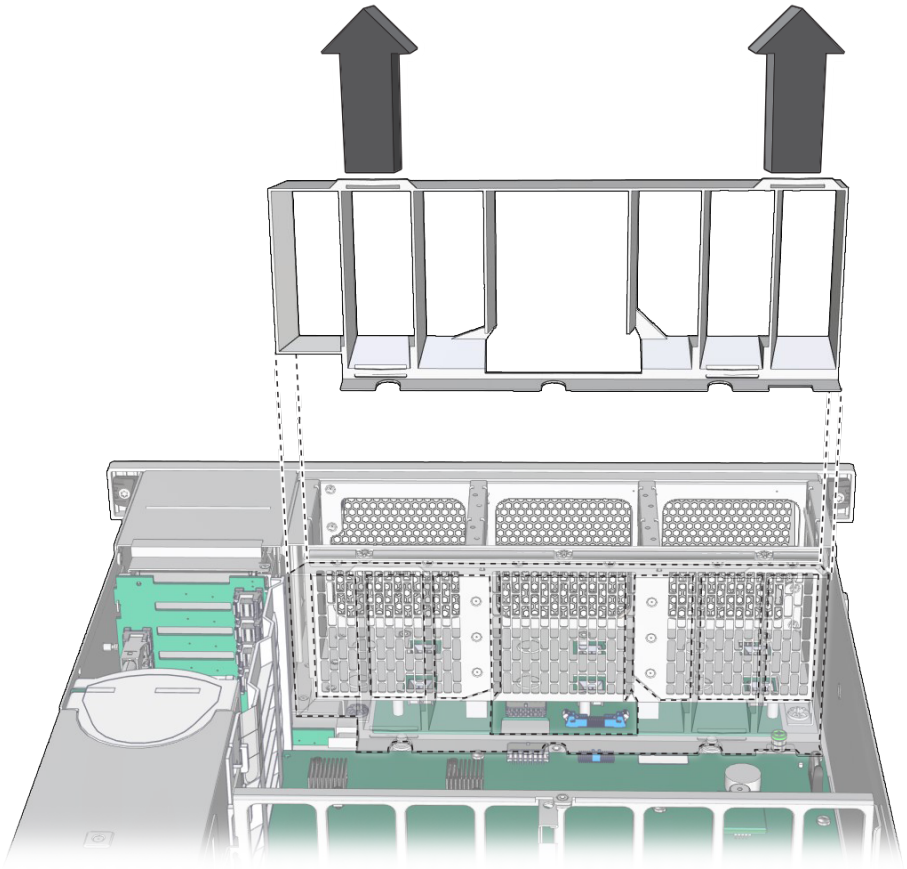
6. **Carefully unplug the fan board cable and the power cable from motherboard (panel 1).**

Caution - When removing the ribbon cable from the motherboard, grasp the cable connector on either side and pull straight up to disconnect the cable. **Do not** rock the cable side to side. Doing so could damage the connector.

Save the cables for use with the new fan board.

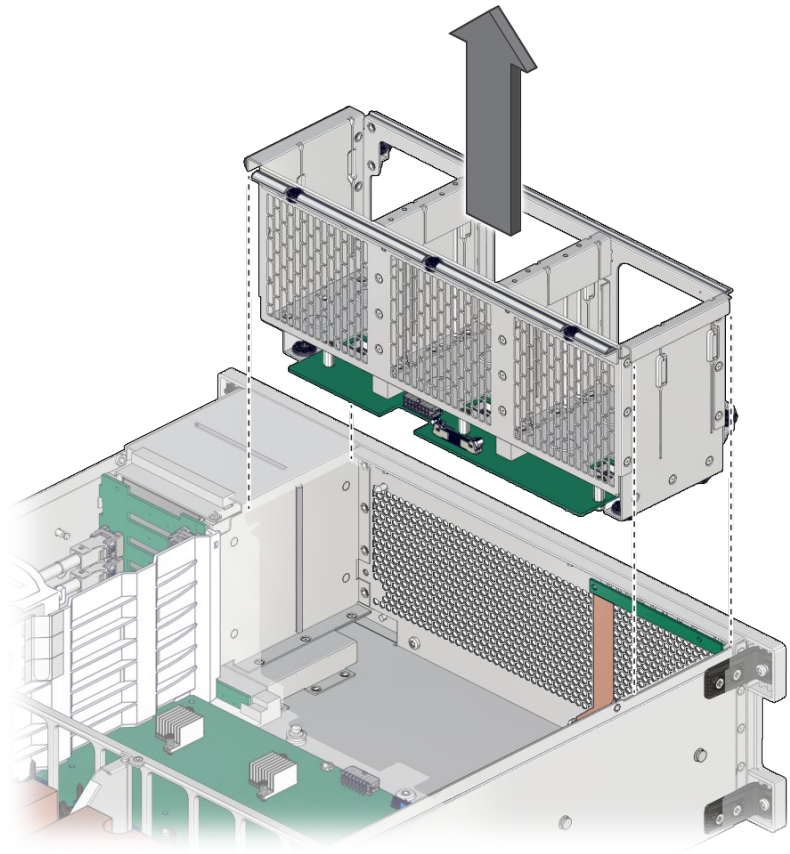
7. **Remove the front memory riser guide by pulling it up and out of the chassis (panel 2).**

8. **Remove the air baffle by pulling it up and out of the chassis.**



9. **Pull the fan board back and out of chassis.**

The circuit board and the fan holder portions of the fan board should remain together.



10. Install a new fan board.

See "Install the Fan Board" on page 141.

Related Information

- "Install the Fan Board" on page 141

Install the Fan Board

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

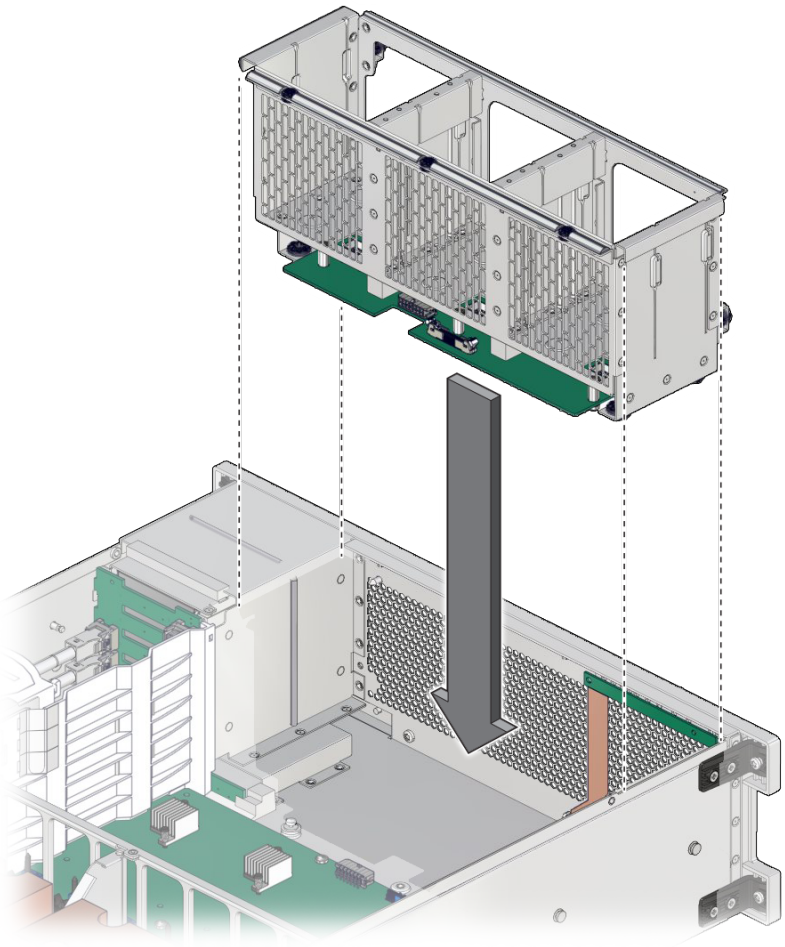
Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

1. **Take the necessary ESD precautions.**

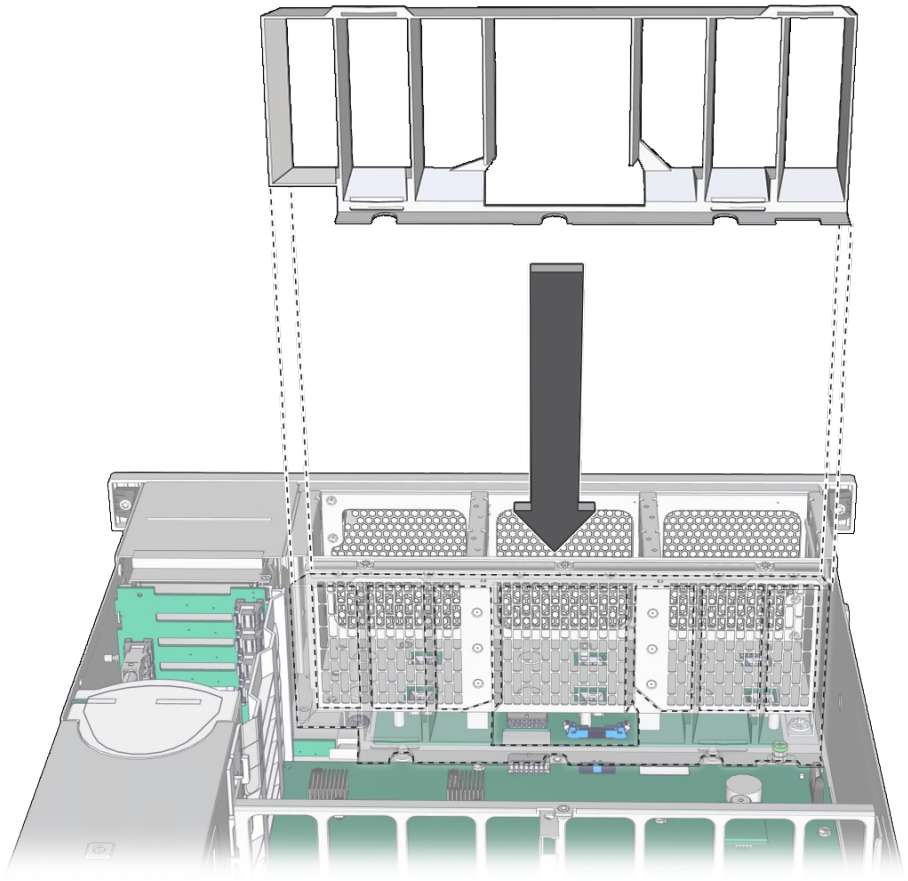
   See "Prevent ESD Damage" on page 55.

2. **Using the fan board cable and power cables from the faulty fan board, plug the cables into the corresponding connectors on the replacement fan board.**

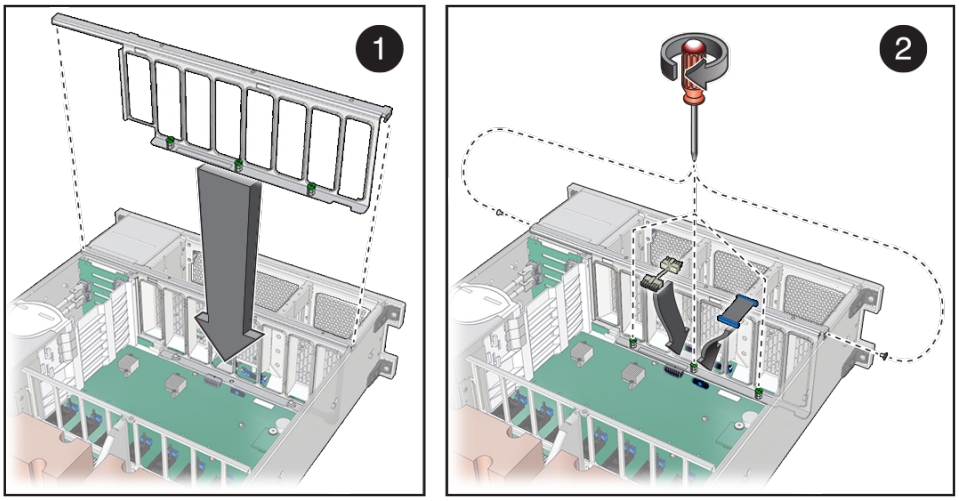
3. **Insert the fan board into the chassis, moving it down, and then toward the front of the server.**



4. **Insert the air baffle, aligning the cutouts in the bottom of the air baffle with the three captive screw holes in the chassis.**



5. **Reposition the front memory riser guide, routing the fan board and power cable through the riser guide (panel 1).**



6. **Plug the fan board cable and power cable into the connectors on the motherboard (panel 2).**

Caution - When connecting the ribbon cable to the motherboard, take care to center the cable on the connector before inserting the cable.

7. **Secure the fan board by reinserting and tightening the two screws on each side of the outside of the chassis (panel 2).**

8. **Tighten the three captive screws to hold the front memory riser guide in place (panel 2).**

9. **Reinstall all fan modules.**

   See "Remove a Fan Module" on page 77.

10. **Reinstall all memory risers.**

    See "Install a Memory Riser" on page 104.

11. **Return the server to operation.**

    See "Returning the Server to Operation" on page 171.

Note - Authorized service personnel might need to reprogram the product serial number on the fan board. This number is used for service entitlement and warranty coverage. The correct product serial number is located on a label on the front of the chassis.

Related Information

- "Remove the Fan Board" on page 137
- "Verify the Fan Board" on page 145

Verify the Fan Board

1. **At the Oracle ILOM prompt, start the fault management shell.**

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

faultmgmtsp>
```

2. **Type `fmadm faulty` to check for faults.**

   - If faults are reported, see "Detecting and Managing Faults" on page 27 .
   - If no faults are reported, then the fan board has been replaced successfully.

Related Information

- "Install the Fan Board" on page 141
- "Remove the Fan Board" on page 137

Servicing the Motherboard

The motherboard includes two CMP modules, two MR I/O modules, memory control subsystems, host ID/MAC addresses, and all SPM (Oracle ILOM) logic. The host ID and all MAC addresses reside on a removable SCC PROM. Oracle ILOM system configuration data resides on the service processor module (SPM).

The motherboard also hosts the PS backplane, which distributes main 12V power from the power supplies to the rest of the server. The PS backplane is connected directly to the motherboard through a bus bar and ribbon cable, and includes a top cover safety interlock switch.

These topics describe how to service the motherboard.

Related Information

- "Component Service Categories" on page 48
- "Servicing the SPM" on page 129

▼ Remove the Motherboard

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

Caution - Ensure that all power is removed from the server before removing or installing the motherboard assembly. You must disconnect the power cables from the server before performing these procedures.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

When replacing the motherboard, remove the SPM and SCC PROM from the old motherboard and install these components on the new motherboard. The SPM contains the Oracle ILOM system configuration data, and the SCC PROM contains the system host ID and MAC address. Transferring these components preserves the system-specific information stored on these modules. Whenever you replace the motherboard or the SPM, you must update the firmware so the portions of firmware in the SPM and on the motherboard are consistent.

1. **Prepare for servicing.**

   See "Preparing for Service" on page 45.

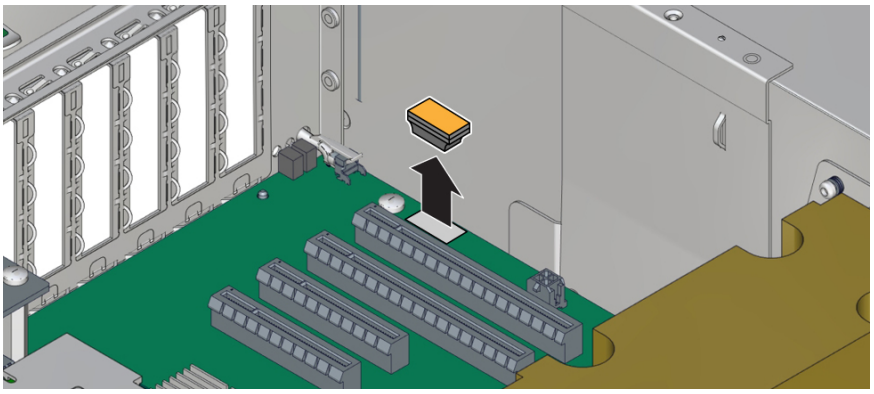
2. **Remove all PCIe cards.**

   See "Remove a PCIe Card or Filler" on page 123.

3. **If installed, remove any NVMe cables that are connected to the drive backplane.**

4. **Remove the SCC PROM from the motherboard.**

   You will reinstall it on the new motherboard.



5. **Remove the SPM.**

   You will reinstall the SPM on the new motherboard. See "Remove the SPM" on page 130.

6. **Remove the eUSB drive.**

You will reinstall the eUSB drive on the new motherboard. See "Remove the eUSB Drive" on page 115.

7. **Remove all memory risers.**

   See "Remove a DIMM" on page 100.

8. **Remove the System Remind button assembly (air divider) by lifting it up and away from the power supplies.**

9. **Disconnect all cables connected to the motherboard.**

   a. **Disconnect two longer cables that connect the motherboard to the drive backplane.**

      Push down a metal tab on each connector and pull up.

   b. **Disconnect two shorter cables from the motherboard.**

      One cable goes to the drive backplane. The other is a ribbon cable to the power supply.

   c. **Disconnect the fan board power cable and the ribbon cable from the motherboard.**

Caution - When removing the ribbon cable from the motherboard, grasp the cable connector on either side and pull straight up to disconnect the cable. **Do not** rock the cable side to side. Doing so could damage the connector.

   d. **If necessary, disconnect the four NVMe drive cables from the drive backplane.**

      Note the order in which the cables are connected, you must reinstall them into the same connectors.

10. **Remove the power supply cover.**

    You must guide two slots on the PS backplane cover around two pins on the inside of the power supply cage.

    a. **Lift the cover up a little to clear the first part of the slots.**

    b. **Pull the cover a little towards the front of the chassis.**

    c. **Push the tooth at the bottom of the cover to clear the edge of the power supply cage.**

d. **Lift the cover out of the chassis.**

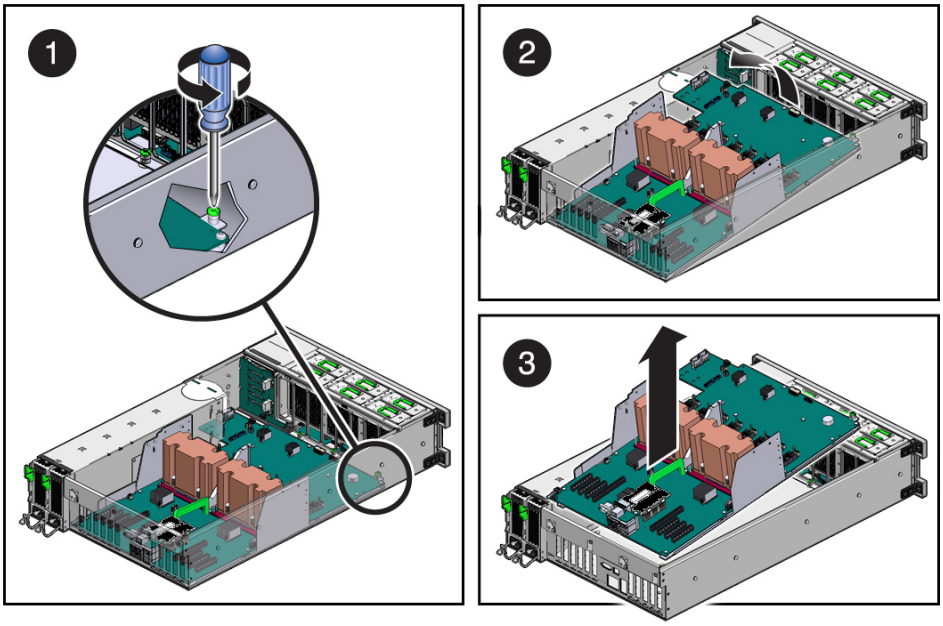
The two cables are now exposed. Be prepared to move those cables out of the way when you lift the motherboard.

11. **Remove the four bus bar screws that secure the motherboard to the PS backplane.**

See "Remove the PS Backplane" on page 165.

12. **Position the drive end of the cables off to the side using the tab on the top of the plastic power supply cover.**

13. **Remove the motherboard.**



a. **Loosen the captive screw (in the corner near the fans) that secures the motherboard to the chassis (panel 1).**

b. **Grasp the handle on the motherboard and slide it toward the front of the chassis (panel 2).**

Tilt up the end of the motherboard that is near the front of the chassis.

c. **Lift the motherboard out of the chassis (panel 3).**
Ensure that the remaining cables do not get caught on edges of the motherboard.

14. **Install a new motherboard.**
See "Install the Motherboard" on page 151.

Related Information

- "Install the Motherboard" on page 151
- "Verify the Motherboard" on page 158

Install the Motherboard

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

When replacing the motherboard, remove the SPM and SCC PROM from the old motherboard and install these components on the new motherboard. The SPM contains the Oracle ILOM system configuration data, and the SCC PROM contains the system host ID and MAC address. Transferring these components preserves the system-specific information stored on these modules. Whenever you replace the motherboard or the SPM, you must update the firmware so the portions of firmware in the SPM and on the motherboard are consistent.

1. **Take the necessary ESD precautions.**
See "Prevent ESD Damage" on page 55.

2. **Grasp the motherboard by the handle and place it into the chassis.**
Ensure that remaining cables do not get caught on edges of the motherboard.
Set the motherboard towards the front of the chassis, then slide it toward the rear of the chassis.

3. **Tighten the captive screw (in the corner near the fans) that secures the motherboard to the chassis.**

4. **Reinsert and tighten the four bus bar screws that secure the motherboard to the power supply backplane.**

Using a No. 2 screwdriver, tighten the bus bar screws until the PS backplane and the motherboard securely fasten to the bus bars.

See "Install the PS Backplane" on page 167.

5. **Replace the PS backplane cover.**

   a. **Align the PS backplane cover.**

      Ensure that the tooth at the bottom of the cover is clear of the power supply cage.

      You must guide two slots on the PS backplane cover around two pins on the inside of the power supply cage.

   b. **Fit the two slots on the cover around the two pins.**

   c. **Lift up the cover a little to guide the two pins into the other part of the slots.**

   d. **Attach the screw to fasten the power supply backplane cover in place.**

6. **Push the power supplies back into place.**

7. **Reattach all cables to the motherboard.**

   a. **In the center rear of the motherboard, connect the fan board power cable and the ribbon cable to the motherboard.**

Caution - When connecting the ribbon cable to the motherboard, take care to center the cable on the connector before inserting the cable.

   b. **Near the drives, connect two shorter cables to the motherboard.**

      One cable goes to the drive backplane. The other is a ribbon cable to the power supply.

Caution - When connecting the ribbon cable to the drive backplane, take care to center the cable on the connector before inserting the cable.

   c. **Near the drives, connect two longer cables between the motherboard and the drive backplane.**

   d. **If necessary, connect the four NMVe drive cables to the NVMe drive.**

      Install cables to their original positions.

8. **Reinstall the System Remind button assembly (air divider) by sliding it into the chassis.**

Caution - After replacing the motherboard, inspect the gasket on the air divider before installing the air divider securely. This dividing wall maintains a pressurized seal between the server cooling zones. Without this pressurized seal, the power supply fans will not be able to draw enough air to cool the drives properly.

9. **Reconnect all cables from the power supply backplane, drive backplane, and fan board to their original locations on the motherboard.**

10. **Reinstall all memory risers.**

    See "Install a Memory Riser" on page 104.

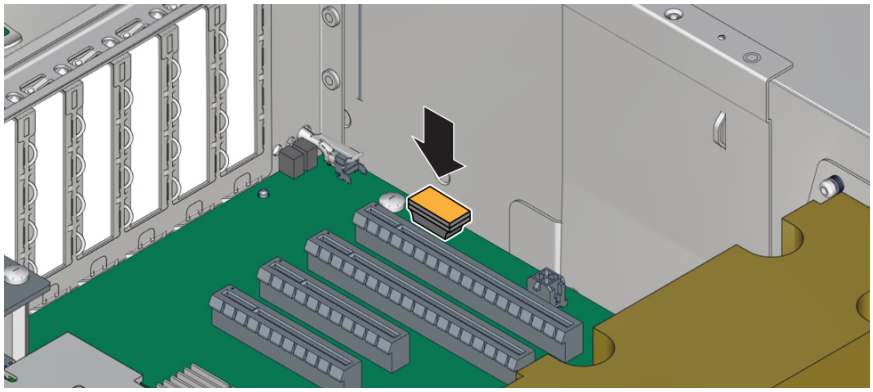
11. **Install the SPM that you removed from the old motherboard.**

    See "Install the SPM" on page 131.

12. **Install the eUSB drive that you removed from the old motherboard.**

    See "Install the eUSB Drive" on page 116.

13. **Install the SCC PROM that you removed from the old motherboard.**



14. **Reinstall all PCIe cards.**

    See "Install a PCIe Card or Filler" on page 125.

15. **If necessary, reinstall NVMe cables.**

16. **Install the top cover.**

    See "Replace the Top Cover" on page 172.

17. **Return the server to the normal operating position.**

    See "Return the Server to the Normal Operating Position" on page 173.

18. **Reconnect the power cords to the power supplies.**

    See "Attach Power Cords" on page 174.

19. **Prior to powering on the server, connect a terminal or a terminal emulator (PC or workstation) to the SPM through the SER MGT port.**

    Refer to *Server Installation* for instructions.

    The SPM detects the host firmware on the replacement motherboard is not compatible with the existing SPM firmware, further action will be suspended and the following message will be displayed:

    ```
    Unrecognized Chassis: This module is installed in an unknown or
    unsupported chassis. You must upgrade the firmware to a newer
    version that supports this chassis.
    ```

    Note - Whenever you replace the motherboard or the SPM, update the firmware on the server so the portions of firmware in the two components remain consistent.

20. **Prepare to download the system firmware.**

    If necessary, configure the server's NET MGT port so that it can access the network. Log in to the SPM through the NET MGT port.

    Refer to the Oracle ILOM documentation for network configuration instructions.

21. **Download the system firmware.**

    Follow the firmware download instructions in the Oracle ILOM documentation.

    Note - You can load any supported system firmware version, including the firmware version that was installed prior to replacing the motherboard.

22. **If necessary, reactivate any RAID volumes that existed prior to replacing the motherboard.**

    If your server contained RAID volumes prior to replacing the motherboard, see "Reactivate RAID Volumes" on page 155 for instructions.

23. **Power on the server.**

    See "Power On the Server (Oracle ILOM)" on page 174 or "Power On the Server (System Power Button)" on page 175.

24. **(Optional) Transfer the serial number and product number to the FRUID of the new motherboard.**

    If the replacement motherboard must have the same serial number as the server prior to servicing, trained service personnel must take this action in a special service mode.

Related Information

- Oracle ILOM documentation
- "Remove the Motherboard" on page 147
- "Reactivate RAID Volumes" on page 155
- "Verify the Motherboard" on page 158

▼ Reactivate RAID Volumes

Perform this task only if your server had RAID volumes prior to replacing the motherboard.

1. **Prior to powering on the server, log in to the SPM.**

   Refer to *Servers Administration* for instructions.

2. **At the Oracle ILOM prompt, disable `auto-boot` so that the server will not boot the OS when the server powers on.**

```
-> set /HOST/bootmode script="setenv auto-boot? false"
```

3. **Power on the server.**

   See "Power On the Server (Oracle ILOM)" on page 174 or "Power On the Server (System Power Button)" on page 175.

4. **At the OpenBoot prompt, list the device paths on the server.**

```
ok show-devs
...
/pci@400/pci@2/pci@0/pci@e/scsi@0
...
```

You can also use the `devalias` command to locate device paths specific to your server.

```
ok devalias
...
scsi0                    /pci@400/pci@2/pci@0/pci@e/scsi@0
scsi                     /pci@400/pci@2/pci@0/pci@e/scsi@0
...
```

5. **Choose the RAID module on the motherboard.**

```
ok select scsi
```

Instead of using the alias name `scsi`, you could type the full device path name (such as `/pci@400/pci@2/pci@0/pci@e/scsi@0`).

6. **List all connected logical RAID volumes to determine which volumes are in an inactive state.**

```
ok show-volumes
```

For example, the following output shows an inactive volume:

```
ok show-volumes
Volume 0 Target 389  Type RAID1 (Mirroring)
  WWID 03b2999bca4dc677
  Optimal  Enabled  Inactive
  2 Members                    583983104 Blocks, 298 GB
  Disk 1
    Primary  Optimal
    Target 9      HITACHI  H103030SCSUN300G A2A8
  Disk 0
    Secondary  Optimal
    Target c      HITACHI  H103030SCSUN300G A2A8
```

7. **For each RAID volume listed as inactive, type the following command to activate that volume.**

ok *inactive_volume* **activate-volume**

where *inactive_volume* is the name of the RAID volume that you are activating. For example:

```
ok 0 activate-volume
Volume 0 is now activated
```

Note - For more information on configuring hardware RAID on the server, refer to *Servers Administration*.

---

8. **Unselect the SCSI device.**

```
ok unselect-dev
```

9. **Confirm that you reactivated the volume.**

```
ok probe-scsi-all
/pci@400/pci@2/pci@0/pci@e/scsi@0

FCode Version 1.00.54, MPT Version 2.00, Firmware Version 5.00.17.00

Target a
  Unit 0   Removable Read Only device   TEAC    DV-W28SS-R      1.0C
  SATA device  PhyNum 3
Target b
GB  Unit 0   Disk   SEAGATE  ST914603SSUN146G 0868    286739329 Blocks, 146
  SASDeviceName 5000c50016f75e4f  SASAddress 5000c50016f75e4d  PhyNum 1
Target 389 Volume 0
  Unit 0   Disk   LSI      Logical Volume   3000    583983104 Blocks, 298 GB
  VolumeDeviceName 33b2999bca4dc677  VolumeWWID 03b2999bca4dc677

/pci@400/pci@1/pci@0/pci@b/pci@0/usb@0,2/hub@2/hub@3/storage@2
  Unit 0   Removable Read Only device    AMI     Virtual CDROM   1.00
```

10. **Set the `auto-boot?` OpenBoot PROM variable to `true` so the server boots the OS when powered on.**

```
ok setenv auto-boot? true
```

11. **Reboot the server.**

    See *Server Administration*.

Related Information

- "Install the Motherboard" on page 151
- "Verify the Motherboard" on page 158

Verify the Motherboard

1. **At the Oracle ILOM prompt, start the fault management shell.**

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

faultmgmtsp>
```

2. **Type `fmadm faulty` to check for faults.**

   - **If faults are reported, see "Detecting and Managing Faults" on page 27 .**
   - **If no faults are reported, then the motherboard has been replaced successfully.**

Related Information

- "Install the Motherboard" on page 151
- "Reactivate RAID Volumes" on page 155

Servicing the Drive Backplane

This board provides connectors for the drive signal cables. This board also serves as the interconnect for the front I/O board, the Power and Locate buttons, and server or component status LEDs.

These topics describe how to service the drive backplane.

- "Remove the Drive Backplane" on page 159
- "Install the Drive Backplane" on page 160
- "Verify the Drive Backplane" on page 163

Remove the Drive Backplane

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

1. **Prepare for servicing.**
   See "Preparing for Service" on page 45.

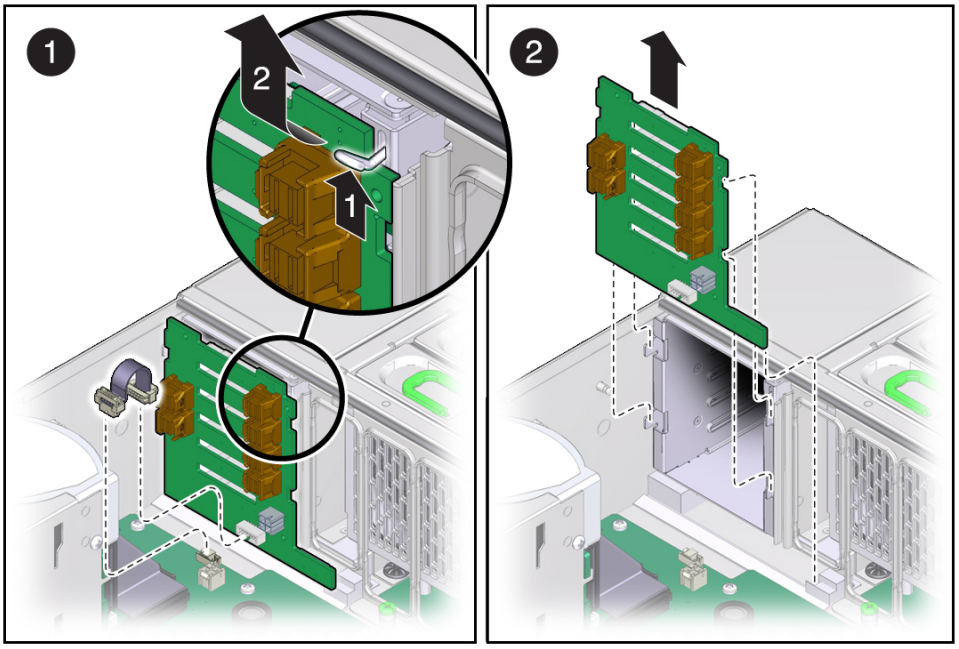
2. **Remove all drives and fillers.**
   See "Remove a Drive" on page 65.

   Note - Note the positions of the drives so you can return them to the correct slots.

3. **Remove one or more memory risers to have easier access to components in the drive area.**
   See "Remove a Memory Riser" on page 98.

4. **Remove the System Remind button assembly (air divider) by lifting it up and away from the power supplies.**

5. **Unplug the two SAS cables, power cables, ribbon cable, and four NVMe drive cables (if installed) from the drive backplane (panel 1).**



6. **Push up on the wire tab in the upper corner of the drive backplane (panel 1).**

7. **Swing the drive backplane back and out of the chassis (panel 2).**

8. **Install a new drive backplane.**

   See "Install the Drive Backplane" on page 160.

Related Information

- "Install the Drive Backplane" on page 160

Install the Drive Backplane

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

1. **Take the necessary ESD precautions.**

   See "Prevent ESD Damage" on page 55.

2. **Insert the drive backplane into the chassis.**

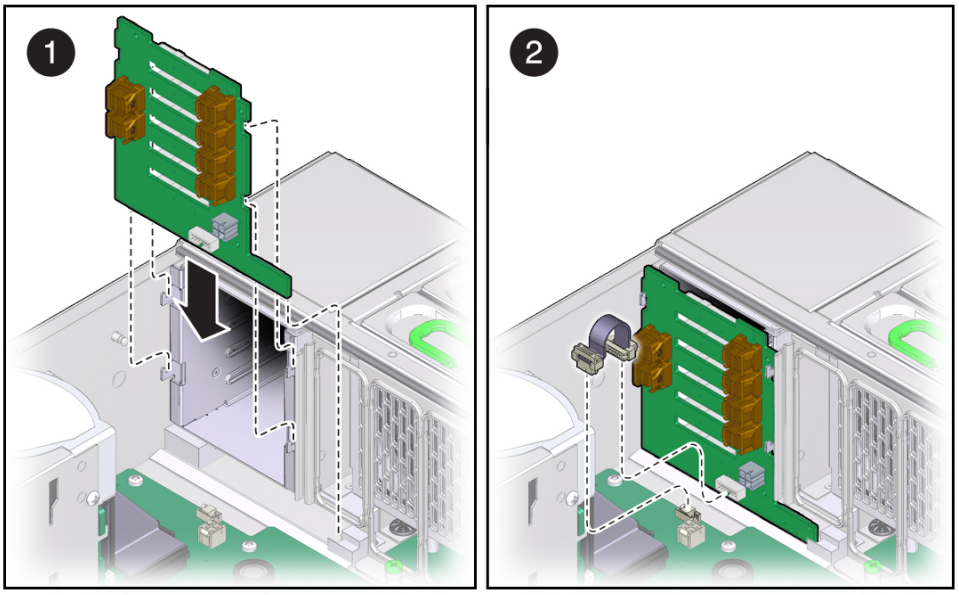
   Angle the bottom of the backplane into position first, then move the backplane forward to align the side hooks, then press the backplane into position.

   Verify that the drive backplane is seated properly at the bottom in the small slot.

3. **Lift up the metal hook and press the drive backplane to the front until it snaps into place.**

4. **Replace the power cable, ribbon data cable, SAS cables, and four NVMe cables to their original locations.**

Note - The SAS cable connectors on the motherboard are labeled top and bottom. Plug the both SAS cables into the drive backplane, then install the top SAS cable into the motherboard connector labeled top. Install the other SAS cable into the bottom connector.



5. **Replace the System Remind button assembly (air divider).**

6. **Replace all memory risers you removed.**

   See "Install a Memory Riser" on page 104.

7. **Replace all drives and filler panels.**

   See "Install a Drive" on page 70.

8. **Return the server to operation.**

   See "Returning the Server to Operation" on page 171.

Note - Authorized service personnel might need to reprogram the product serial number on the drive backplane. This number is used for service entitlement and warranty coverage. The correct product serial number is located on a label on the front of the chassis.

9. **Verify that the component was successfully installed.**

   See "Verify the Drive Backplane" on page 163.

Related Information

- "Remove the Drive Backplane" on page 159
- "Verify the Drive Backplane" on page 163

Verify the Drive Backplane

1. **At the Oracle ILOM prompt, start the fault management shell.**

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

faultmgmtsp>
```

2. **Type `fmadm faulty` to check for faults.**

   - **If faults are reported, see "Detecting and Managing Faults" on page 27 .**
   - **If no faults are reported, then the drive backplane has been replaced successfully.**

Related Information

- "Remove the Drive Backplane" on page 159
- "Install the Drive Backplane" on page 160

Servicing the PS Backplane

The power supplies connect directly to the PS backplane, which carries 12v power to the server components.

These topics describe how to service the PS backplane.

▼ Remove the PS Backplane

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

Caution - Power is supplied to the PS backplane even when the server is powered off. To avoid personal injury or damage to the server, you must disconnect power cords before you service the PS backplane.

1. **Prepare for servicing.**

   See "Preparing for Service" on page 45.

2. **Pull both power supplies at least part-way out of the chassis, to disconnect them from the PS backplane.**

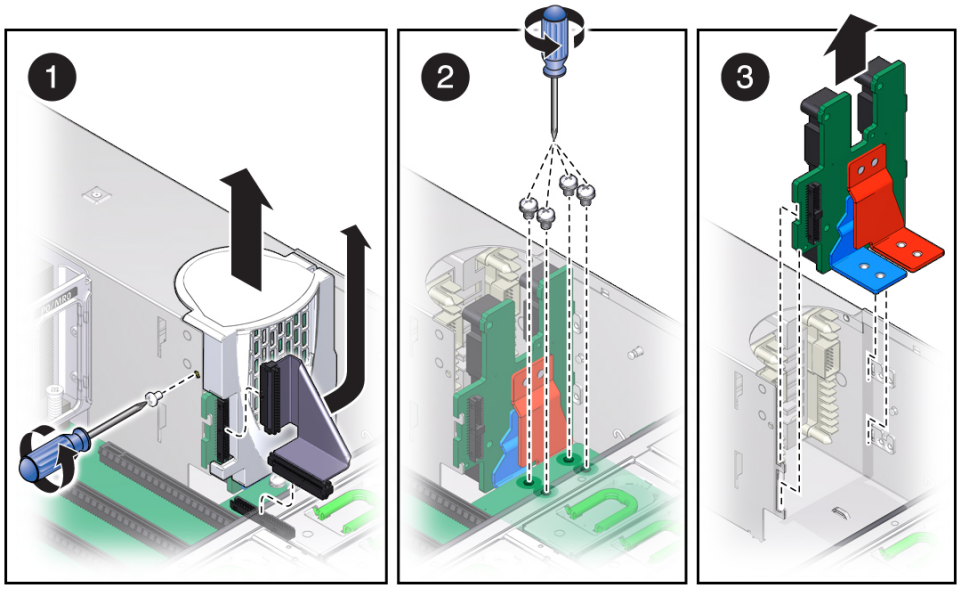
   See "Remove a Power Supply" on page 85.

3. **Remove all memory risers.**

   See "Remove a DIMM" on page 100.

4. **Remove the air divider by pulling it up and out of the chassis.**

5. **Remove the ribbon cable connecting the PS backplane to the motherboard (panel 1).**



6. **Remove the screw that holds the PS backplane cover in place (panel 2).**

7. **Remove the power supply cover (panel 3).**

   You must guide two slots on the PS backplane cover around two pins on the inside of the power supply cage.

   a. **Lift the cover up a little to clear the first part of the slots.**

   b. **Push the cover a little towards the front of the chassis.**

   c. **Push the tooth at the bottom of the cover to clear the edge of the power supply cage.**

   d. **Lift the cover out of the chassis.**

8. **Remove the four bus bar screws that secure the motherboard to the PS backplane.**

9. **Lift the PS backplane out of the chassis.**

   a. **Slide the PS backplane back towards the power supplies to remove the PS backplane mount from underneath the motherboard.**

   b. **Tilt the PS backplane to remove it from the power supply shroud.**

   c. **Disconnect the AC cables from the PS backplane.**

      Tilt the PS backplane to access the cable connectors.

10. **Install a new PS backplane.**

    See "Install the PS Backplane" on page 167.

Related Information

- "Install the PS Backplane" on page 167.

Install the PS Backplane

This is a cold-service procedure that must be performed by qualified service personnel. Power down the server completely before performing this procedure.

Caution - This procedure requires that you handle components that are sensitive to ESD which can cause server components to fail.

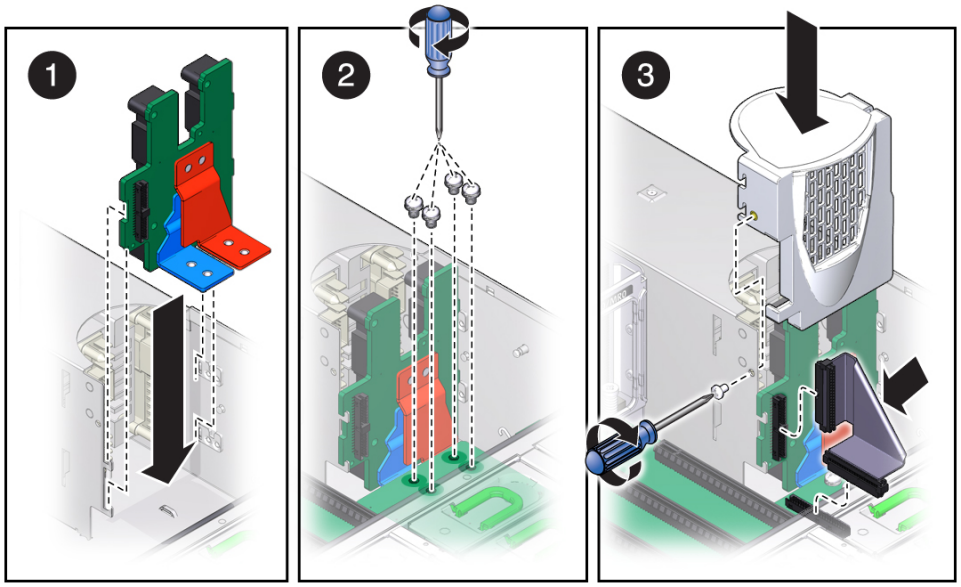
1. **Unpack the replacement PS backplane and place it on an antistatic mat.**

2. **Hold the PS backplane at the end of the power supply cage at an angle, and connect the AC cables to the AC connectors on the PS backplane.**

   Ensure that each AC cable is connected to the appropriate connector. You must connect the AC cable on the right to the AC connector on the right, and connect the AC cable on the left to the AC connector on the left.

3. **Insert the PS backplane into position (panel 1).**

Ensure that the tabs on the power board slide onto the hooks on the power supply cage.



4. **Reconnect the ribbon cable from the motherboard to the PS backplane.**

5. **Install the four bus bar screws to secure the mother board to the PS backplane (panel 2).**

   Use a No. 2 Phillips screwdriver to tighten the bus bar screws until the PS backplane and the motherboard are securely fastened to the bus bars.

6. **Replace the PS backplane cover (panel 3).**

   a. **Align the PS backplane cover.**

      Ensure that the tooth at the bottom of the cover is clear of the power supply cage.

      You must guide two slots on the PS backplane cover around two pins on the inside of the power supply cage.

   b. **Fit the two slots on the cover around the two pins.**

   c. **Lift up the cover a little to guide the two pins into the other part of the slots.**

d. **Attach the screw to fasten the PS backplane cover in place.**

7. **Reinstall the air divider by sliding it into the chassis.**

8. **Reinstall the memory risers.**

   See "Install a Memory Riser" on page 104.

9. **Push the power supplies all the way back into the chassis.**

   See "Install a Power Supply" on page 86.

10. **Return the server to operation.**

    See "Returning the Server to Operation" on page 171.

Related Information

- "Remove the PS Backplane" on page 165
- "Verify the PS Backplane" on page 169

▼ Verify the PS Backplane

1. **At the Oracle ILOM prompt, start the fault management shell.**

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

faultmgmtsp>
```

2. **Type `fmadm faulty` to check for faults.**

   - If faults are reported, see "Detecting and Managing Faults" on page 27 .
   - If no faults are reported, then the PS backplane has been replaced successfully.

Related Information

- "Remove the PS Backplane" on page 165
- "Install the PS Backplane" on page 167

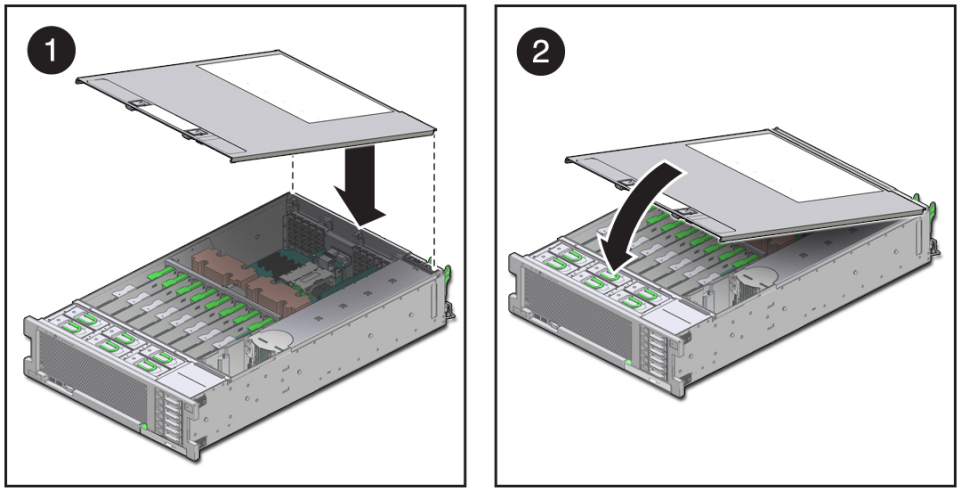
Returning the Server to Operation

These topics describe how to return the server to operation.

Step	Description	Links
1.	Replace the top cover and return the server to its normal operating position	"Replace the Top Cover" on page 172 "Return the Server to the Normal Operating Position" on page 173
2.	Connect the power cords to the server.	"Attach Power Cords" on page 174
3.	Power on the server.	"Power On the Server (Oracle ILOM)" on page 174 "Power On the Server (System Power Button)" on page 175

Replace the Top Cover

1. **Place the top cover on the chassis (panel 1).**



A metal air baffle is attached to the rear inside surface of the top cover. When you place the top cover on the server, ensure that the air baffle does not catch on anything inside the server. Set the cover down so that it is about 1 inch (2.5 cm) forward of the rear of the server.

2. **Slide the top cover toward the rear of the chassis until the rear cover lip engages with the rear of the chassis.**

3. **Close the top cover by pressing down firmly on the cover with both hands, on the two locations highlighted in green marked "Push here to latch", until both latches engage.**

Caution - Failure to completely secure the top cover may cause the server to malfunction.

4. **Return the server to its normal operating position.**
See "Return the Server to the Normal Operating Position" on page 173.

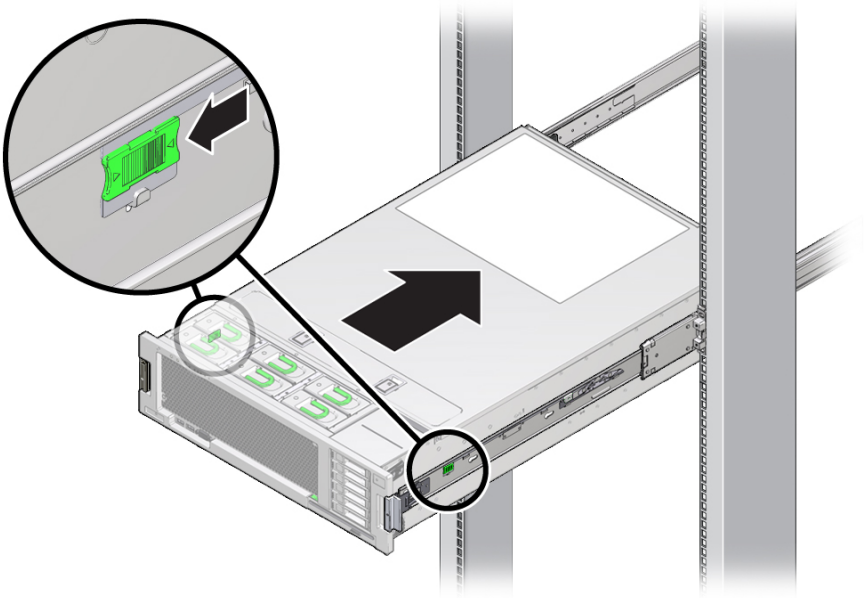
Related Information

- "Remove the Top Cover" on page 60

Return the Server to the Normal Operating Position

Caution - The chassis is heavy. To avoid personal injury, use two people to lift the server and set it in the rack.

1. **Release the slide rails from the fully extended position by pushing the release tabs on the side of each rail.**



2. **While pushing on the release tabs, slowly push the server into the rack.**

   Ensure that the cables do not get in the way.

3. **Reconnect the cables to the rear of the server.**

   If the CMA is in the way, disconnect the left CMA release and swing the CMA open. See "Release the CMA" on page 57.

4. **Reconnect the CMA.**

   Swing the CMA closed and latch it to the left rack rail. See *Server Installation* for more detail about attaching the CMA.

5. **Attach the power cords to the server.**

   See "Attach Power Cords" on page 174.

Related Information

- "Remove the Server From the Rack" on page 59

Attach Power Cords

1. **Attach both power cords to the power supplies.**

   Note - As soon as the power cords are connected to a power source, standby power is applied in the server. Depending on how the firmware is configured, the server might boot at this time.

2. **Power on the server.**

   See "Power On the Server (Oracle ILOM)" on page 174 or "Power On the Server (System Power Button)" on page 175.

Related Information

- "Power On the Server (Oracle ILOM)" on page 174
- "Power On the Server (System Power Button)" on page 175

Power On the Server (Oracle ILOM)

Note - If you are powering on the server following an emergency shutdown that was triggered by the top cover interlock switch, you must use the `start /System` command.

- **At the Oracle ILOM prompt type:**

```
-> start /System
```

Related Information

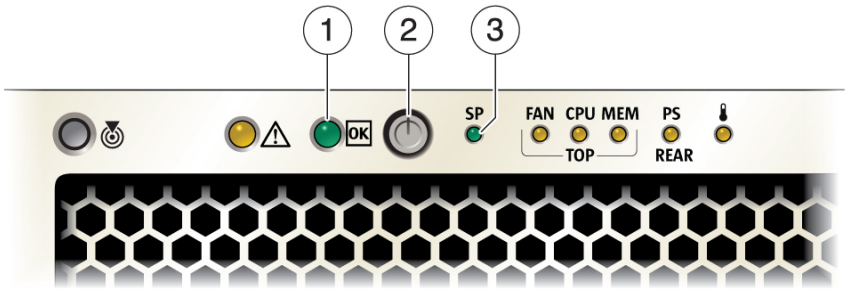
- "Power On the Server (System Power Button)" on page 175

Power On the Server (System Power Button)

Caution - Do not operate the server without all fans, component heat sinks, air baffles, fillers, and the cover installed. Severe damage to server components can occur if the server is operated without adequate cooling mechanisms.

1. **Verify that the power cords are connected and that standby power is on.**

   Shortly after power is applied to the server, the SPM Fault LED blinks as the SPM boots. The SP Fault LED is illuminated solid green when the SPM has successfully booted. After the SPM has booted, the Power LED on the front panel begins flashing slowly, indicating that the host is in standby power mode.



2. **Press and release the recessed system Power button on the server front panel.**

No.	Description
1	Power LED
2	Power button
3	SP Fault LED

When main power is applied to the server, the main Power LED begins to blink more quickly, while the server boots and lights solidly once the OS boots.

Each time the server powers on, POST can take several minutes to complete tests.

Related Information

- "Power On the Server (Oracle ILOM)" on page 174

Glossary

A

ANSI SIS American National Standards Institute Status Indicator Standard.

ASR Auto Service Request.

ASR Automatic system recovery.

AWG American wire gauge.

B

BMC Baseboard management controller.

BOB Memory buffer on board.

C

chassis Server enclosure.

CMA Cable management arm (SPARC T8-1 and SPARC T8-2). Cable management assembly (SPARC T8-4).

CMP Chip multiprocessor.

CRU Customer-replaceable unit.

D

DHCP Dynamic Host Configuration Protocol.

DMP Dynamic multipathing.

DTE Data terminal equipment.

E

EIA Electronics Industries Alliance.

ESD Electrostatic discharge.

eUSB drive Embedded universal serial bus drive.

F

FRU Field-replaceable unit.

H

HBA Host bus adapter.

host The part of the server or server module with the CPU and other hardware that runs the Oracle Solaris OS and other applications. The term *host* is used to distinguish the primary computer from the SP. *See* SP.

hot-pluggable Describes a component that can be replaced with power applied, but the component must be prepared for removal.

hot-swappable Describes a component that can be replaced with power applied, and no preparation is required.

I

ID PROM Chip that contains system information for the server or server module.

IP Internet Protocol.

K

KVM Keyboard, video, and mouse. Refers to using a switch to enable sharing of one keyboard, one display, and one mouse with more than one computer.

L

LDom Logical domain managed by Oracle VM Server for SPARC. *See* Oracle VM Server for SPARC.

LwA Sound power level.

M

MAC Machine access code.

MAC address Media access controller address.

MSGID Message identifier.

N

NAC name Network device container name. Physical device address used for remote access, configuration, management. *See* Oracle ILOM*and* SDM name.

name space Top-level Oracle ILOM target.

NEBS Network Equipment-Building System (Netra products only).

NET MGT Network management port. An Ethernet port on the server SP.

NIC Network interface card or controller.

NMI Nonmaskable interrupt.

NVMe Nonvolatile memory express controller. The optional NVMe switch card provides NVMe services in the server.

NVMHCI Non-volatile memory host controller interface. A specification for accessing solid-state drives (SSDs) through a PCI Express bus device. *See* NVMe.

O

OBP OpenBoot PROM. Sometimes OBP is used in file names and messages to indicate a relationship to OpenBoot.

Oracle ILOM Oracle Integrated Lights Out Manager. Oracle ILOM firmware is preinstalled on a variety of Oracle systems. Oracle ILOM enables you to remotely manage your Oracle servers regardless of the state of the host system.

Oracle Solaris OS Oracle Solaris operating system.

Oracle VM Server for SPARC Virtualization server for SPARC platforms.

P

PCI Peripheral component interconnect.

PCIe PCI Express, an industry-standard bus architecture that supports high-bandwidth peripherals and I/O devices.

POST Power-on self-test.

PROM Programmable read-only memory.

PSH Predictive self healing.

S

SAS Serial attached SCSI.

SCC System configuration chip.

SCC PROM System configuration chip on programmable read-only memory. Removable module containing system configuration data.

SDM name Simplified data model name. A way of providing device information on Oracle ILOM consistently across different types of servers. See NAC name.

SER MGT port Serial management port. A serial port on the server SP.

SFF Small form factor.

SP Service processor. In the server, the SP is a card with its own OS that is operating and accessible whenever the server power cords are connected and energized, regardless of host power state. The SP processes Oracle ILOM commands providing lights out management control of the host. *See*host.

SPM Service processor module. This is the physical component that contains the service processor firmware.

SSD Solid-state drive.

SSH Secure shell.

T

Tma Maximum ambient temperature.

U

U.S. NEC United States National Electrical Code.

UCP Universal connector port.

UI User interface.

UL Underwriters Laboratory Inc.

UTC Coordinated Universal Time.

UUID Universal unique identifier.

W

WWN World wide name. A unique number that identifies a SAS target.

Index

M

N

O

P