

## **SPARC T7-1 Server Service Manual**



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## Using This Documentation

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- **Overview** – Describes how to troubleshoot and maintain the server
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware

## Product Documentation Library

Documentation and resources for this product and related products are available at <http://www.oracle.com/goto/t7-1/docs>.

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Provide feedback about this documentation at <http://www.oracle.com/goto/docfeedback>.





## Identifying Components

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

- [“Front Panel Components \(Service\)” on page 13](#)
- [“Rear Panel Components \(Service\)” on page 15](#)
- [“Internal Component Locations” on page 16](#)
- [“Server Block Diagram” on page 19](#)

### Related Information

- [“Detecting and Managing Faults” on page 23](#)
- [“Preparing for Service” on page 41](#)

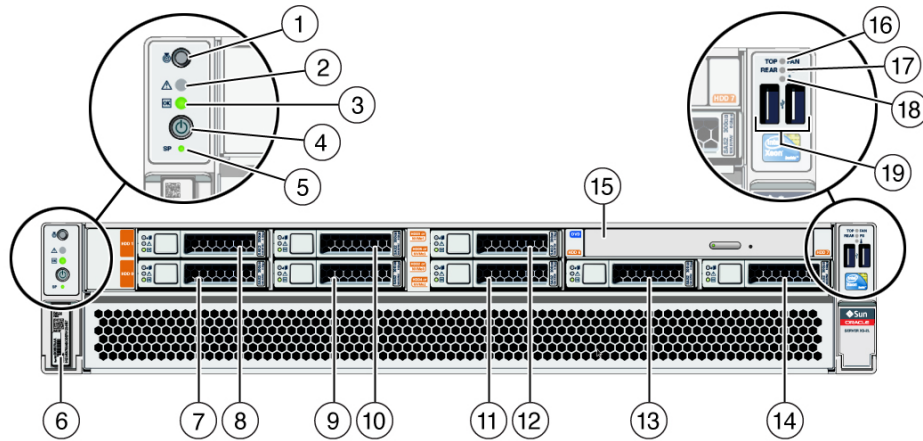
## Front Panel Components (Service)

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

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

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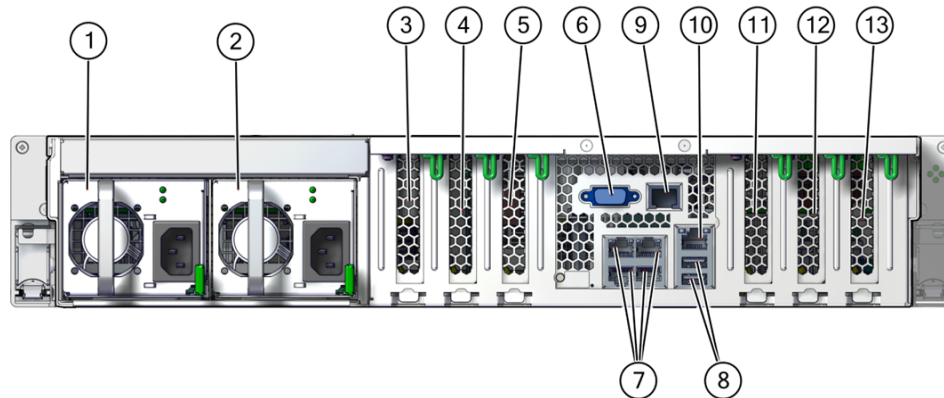
No.	Description	Links
1	Server Locator LED/Locator button (white)	<a href="#">“Front Panel Controls and LEDs” on page 30</a>
2	Service Required LED (amber)	<a href="#">“Front Panel Controls and LEDs” on page 30</a>
3	Power LED (green)	<a href="#">“Front Panel Controls and LEDs” on page 30</a>
4	Server Power button	<a href="#">“Front Panel Controls and LEDs” on page 30</a>
5	SP Fault LED (green or amber)	<a href="#">“Front Panel Controls and LEDs” on page 30</a>
6	Serial number	<a href="#">“Servicing the SPM” on page 129</a> <a href="#">“Find the Server Serial Number” on page 44</a>
7	HDD 0	<a href="#">“Servicing Drives” on page 61</a>
8	HDD 1	<a href="#">“Servicing Drives” on page 61</a>
9	HDD 2 or NVMe 0	<a href="#">“Servicing Drives” on page 61</a>
10	HDD 3 or NVMe 1	<a href="#">“Servicing Drives” on page 61</a>
11	HDD 4 or NVMe 2	<a href="#">“Servicing Drives” on page 61</a>
12	HDD 5 or NVMe 3	<a href="#">“Servicing Drives” on page 61</a>
13	HDD 6	<a href="#">“Servicing Drives” on page 61</a>
14	HDD 7	<a href="#">“Servicing Drives” on page 61</a>
15	DVD drive (SATA)	<a href="#">“Servicing the DVD Drive” on page 137</a>
16	Fan Service LEDs (amber)	<a href="#">“Servicing Fan Modules” on page 73</a>
17	Power Supply (PS) Service LED (amber)	<a href="#">“Servicing Power Supplies” on page 83</a>

No.	Description	Links
18	Server Overtemp LED (amber)	<a href="#">“Front Panel Controls and LEDs” on page 30</a>
19	USB 2.0 connectors (2)	<a href="#">“USB Ports” in SPARC T7-1 Server Installation Guide</a>

### Related Information

- [“Rear Panel Components \(Service\)” on page 15](#)
- [“Internal Component Locations” on page 16](#)
- [“Server Block Diagram” on page 19](#)

## Rear Panel Components (Service)



No.	Description	Links
1	Power supply 0 status indicator LEDs	<a href="#">“Servicing Power Supplies” on page 83</a>
2	Power supply 1 status indicator LEDs	<a href="#">“Servicing Power Supplies” on page 83</a>
3	PCIe card slot 1	<a href="#">“Servicing PCIe Cards” on page 113</a>
4	PCIe card slot 2	<a href="#">“Servicing PCIe Cards” on page 113</a>
5	PCIe card slot 3	<a href="#">“Servicing PCIe Cards” on page 113</a>
6	DB-15 video connector	

No.	Description	Links
7	10GbE ports (4), NET 0 to NET 3	
8	USB 3.0 connectors (2)	
9	Serial management (SER MGT) RJ-45 serial port	
10	Network management (NET MGT) port	
11	PCIe card slot 4	<a href="#">“Servicing PCIe Cards” on page 113</a>
12	PCIe card slot 5	<a href="#">“Servicing PCIe Cards” on page 113</a>
13	PCIe card slot 6	<a href="#">“Servicing PCIe Cards” on page 113</a>

### Related Information

- [“Front Panel Components \(Service\)” on page 13](#)
- [“Internal Component Locations” on page 16](#)
- [“Server Block Diagram” on page 19](#)

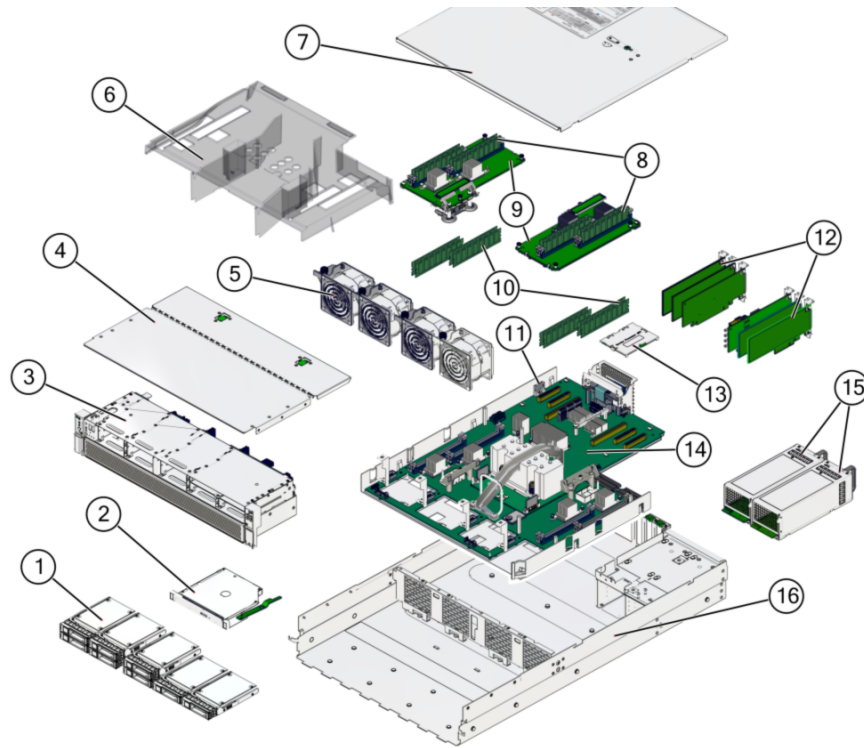
## Internal Component Locations

The following figure identifies the replaceable component locations with the top cover removed.

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**Note** - The two memory risers are optional.

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No.	Component	Oracle ILOM Target	Links
1	Drives	/SYS/DBP/HDD0 (lower left) /SYS/DBP/HDD1 /SYS/DBP/HDD2 or /SYS/DBP/NVME0 /SYS/DBP/HDD3 or /SYS/DBP/NVME1 /SYS/DBP/HDD4 or /SYS/DBP/NVME2 /SYS/DBP/HDD5 or /SYS/DBP/NVME3 /SYS/DBP/HDD6 /SYS/DBP/HDD7 (right)	<a href="#">“Servicing Drives” on page 61</a>
2	DVD drive	/SYS/MB/DBP/DVD	<a href="#">“Servicing the DVD Drive” on page 137</a>
3	Drive backplane (on drive cage)	/SYS/DBP	<a href="#">“Servicing the Drive Backplane” on page 163</a>
4	Fan module cover		<a href="#">“Remove the Fan Cover” on page 57</a>

## Internal Component Locations

No.	Component	Oracle ILOM Target	Links
5	Fan modules	As viewed from front of server:  /SYS/MB/FM0 (left)  /SYS/MB/FM1 (left center)  /SYS/MB/FM2 (right center)  /SYS/MB/FM3 (right)	<a href="#">“Replace the Fan Cover” on page 171</a> <a href="#">“Servicing Fan Modules” on page 73</a>
6	Airflow cover		<a href="#">“Open and Remove the Airflow Cover” on page 56</a>  <a href="#">“Install and Close the Airflow Cover” on page 173</a>
7	Top cover		<a href="#">“Remove the Top Cover” on page 55</a>  <a href="#">“Replace the Top Cover” on page 176</a>
8	DIMMs on memory risers	/SYS/MB/CM/CMP/BOB[0-3]/CH[0-1]/ DIMM0	<a href="#">“Servicing Memory Risers and DIMMs” on page 89</a>
9	Memory risers	/SYS/MB/CM/CMP/MR0  /SYS/MB/CM/CMP/MR1	<a href="#">“Servicing Memory Risers and DIMMs” on page 89</a>
10	DIMMs on motherboard	/SYS/MB/CM/CMP/BOB[0-3]/CH[0-1]/ DIMM0	<a href="#">“Servicing Memory Risers and DIMMs” on page 89</a>
11	Battery	/SYS/MB/BAT	<a href="#">“Servicing the Battery” on page 125</a>
12	PCIe cards	/SYS/MB/PCIE1  /SYS/MB/PCIE2  /SYS/MB/PCIE3  /SYS/MB/PCIE4  /SYS/MB/PCIE5  /SYS/MB/PCIE6	<a href="#">“Servicing PCIe Cards” on page 113</a>
13	SPM	/SYS/MB/SPM	<a href="#">“Servicing the SPM” on page 129</a>
14	Motherboard	/SYS/MB	<a href="#">“Servicing the Motherboard” on page 145</a>
14	Processor chip (replaceable only by replacing the motherboard)	/SYS/MB/CM/CMP	<a href="#">“Servicing the Motherboard” on page 145</a>
15	Power supplies	/SYS/PS0 (outer)  /SYS/PS1 (inner)	<a href="#">“Servicing Power Supplies” on page 83</a>
16	Chassis eUSB drive	/SYS/MB/EUSB_DISK	

### Related Information

- [“Component Names Displayed by Diagnostic Software” on page 27](#)
- [“Front Panel Components \(Service\)” on page 13](#)
- [“Rear Panel Components \(Service\)” on page 15](#)
- [“Internal Component Locations” on page 16](#)
- [“Server Block Diagram” on page 19](#)

## Server Block Diagram

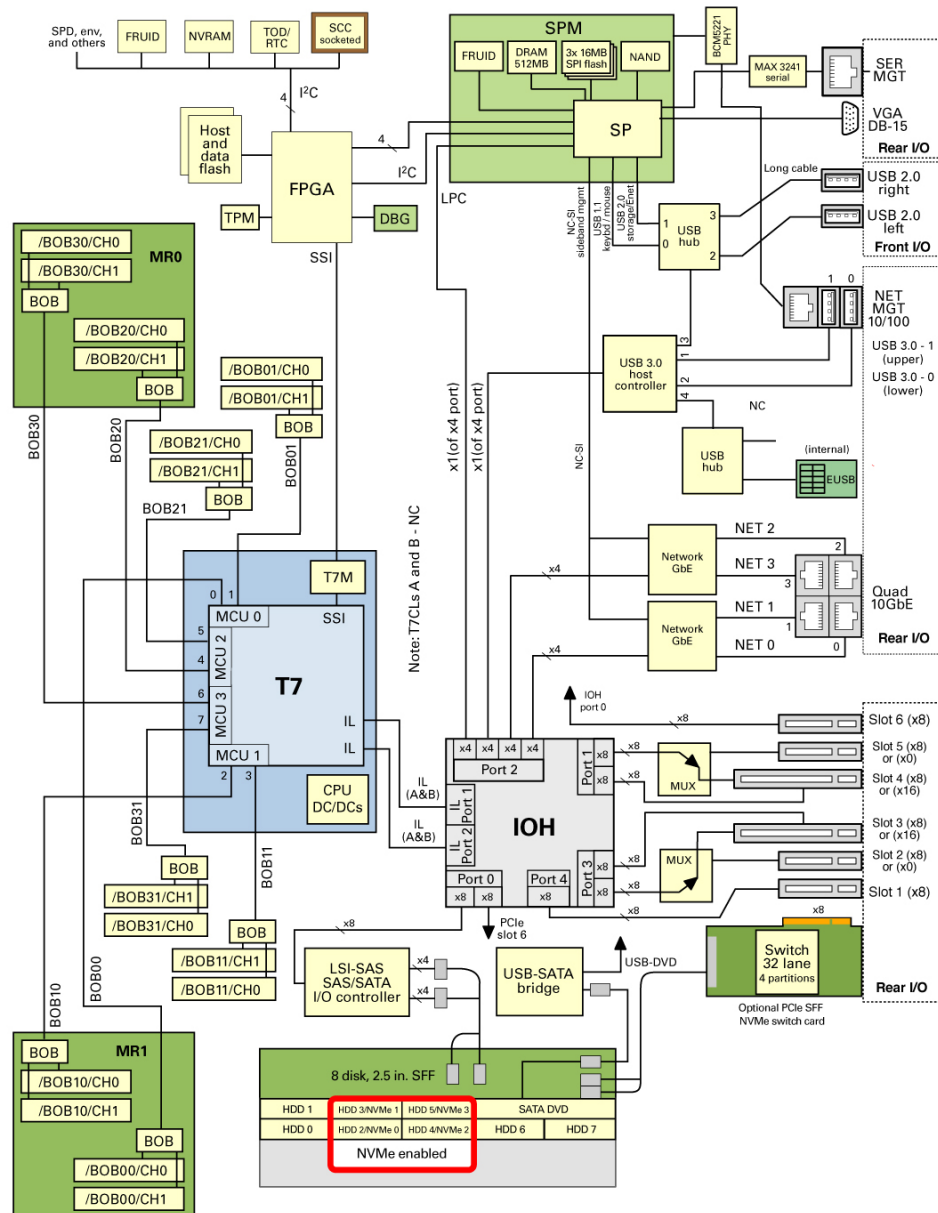
This block diagram shows the connections between and among components and device slots on the server. Use this diagram to determine the optimum locations for optional cards or other peripherals, based on your server's configuration and intended use.

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**Note** - For more detail on root complexes related to the PCIe slots, see [“I/O Root Complex Connections” on page 114](#).

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## Server Block Diagram



This table identifies some key path names in this server.



Device	Path
PCIe 1	/pci@304/pci@1
PCIe 2	/pci@303/pci@2
PCIe 3	/pci@303/pci@1
PCIe 4	/pci@302/pci@1
PCIe 5	/pci@302/pci@2
PCIe 6	/pci@301/pci@1
NET 0	/pci@300/pci@1/network@0
NET 1	/pci@300/pci@1/network@0,1
NET 2	/pci@300/pci@3/network@0
NET 3	/pci@300/pci@3/network@0,1
HDD 0	/pci@301/pci@2/scsi@0/disk@p0
HDD 1	/pci@301/pci@2/scsi@0/disk@p1
HDD 2	/pci@301/pci@2/scsi@0/disk@p2
NVMe 0	/pci@303/pci@1/pci@0/pci@6/nvme@0/disk@1
HDD 3	/pci@301/pci@2/scsi@0/disk@p3
NVMe 1	/pci@303/pci@1/pci@0/pci@7/nvme@0/disk@1
HDD 4	/pci@301/pci@2/scsi@0/disk@p4
NVMe 2	/pci@303/pci@1/pci@0/pci@4/nvme@0/disk@1
HDD 5	/pci@301/pci@2/scsi@0/disk@p4
NVMe 3	/pci@303/pci@1/pci@0/pci@5/nvme@0/disk@1
HDD 6	/pci@301/pci@2/scsi@0/disk@p6
HDD 7	/pci@301/pci@2/scsi@0/disk@p7
DVD	/pci@300/pci@2/usb@0/hub@8/device@1/storage@0/disk@0

## Related Information

- [“Component Names Displayed by Diagnostic Software” on page 27](#)
- [“Front Panel Components \(Service\)” on page 13](#)
- [“Rear Panel Components \(Service\)” on page 15](#)
- [“Internal Component Locations” on page 16](#)
- [“Server Block Diagram” on page 19](#)



## Detecting and Managing Faults

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When a SPARC T7 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.	<a href="#">“Checking for Faults” on page 23</a> <a href="#">“Interpreting LEDs” on page 29</a>
2.	Perform additional troubleshooting if needed.	<a href="#">“Performing Advanced Troubleshooting” on page 34</a>
3.	Manage faults following a service procedure.	<a href="#">“Clear a Fault Manually” on page 39</a>
4.	Contact technical support if the problem persists.	<a href="https://support.oracle.com">https://support.oracle.com</a>

### Related Information

- [“Identifying Components” on page 13](#)
- [“Preparing for Service” on page 41](#)
- [“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 <code>fmadm faulty</code> command to display information about components that require service.	<a href="#">“Log In to Oracle ILOM (Service)” on page 24</a> <a href="#">“Identify Faulted Components” on page 24</a>

Step	Description	Links
2.	Run the <code>show disabled</code> 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.	<a href="#">“Identify Disabled Components” on page 26</a>
3.	Identify the names of components that require service as reported by diagnostic software.	<a href="#">“Component Names Displayed by Diagnostic Software” on page 27</a>

### Related Information

- [“Interpreting LEDs” on page 29](#)
- [“Performing Advanced Troubleshooting” on page 34](#)
- [“Clear a Fault Manually” on page 39](#)

## ▼ 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 3.2.x
Copyright (c) 2014, Oracle and/or its affiliates, Inc. All rights reserved.
->
```

### Related Information

- [“Identify Faulted Components” on page 24](#)
- [“Identify Disabled Components” on page 26](#)
- [“Component Names Displayed by Diagnostic Software” on page 27](#)

## ▼ Identify Faulted Components

The `fmadm faulty` command displays the list of faults detected by PSH. 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 T7-1
```

```
Part_Number : 12345678+11+1
```

```
Serial_Number : 1238BDC0DF
```

```
-----
```

```
Suspect 1 of 1
```

```
Fault class : fault.component.misconfigured
```

```
Certainty : 100%
```

```
Affects : /SYS/MB/CM/CMP/BOB21/CH1/DIMM
```

```
Status : faulted
```

```
FRU
```

```
Status : faulty
```

```
Location : /SYS/MB/CM/CMP/BOB21/CH1/DIMM
```

```
Manufacturer : Hynix Semiconductor Inc.
```

```
Name : 8192MB DDR4 SDRAM DIMM
```

```
Part_Number : 70xx001,HMA4xxR7MFRxx-TFT7
```

```
Revision : 01
```

```
Serial_Number : 465769T+02xxx102WR
```

```
Chassis
```

```
Manufacturer : Oracle Corporation
```

```
Name : SPARC T7-1
```

```
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 39.

#### Related Information

- “Log In to Oracle ILOM (Service)” on page 24
- “Identify Disabled Components” on page 26
- “Component Names Displayed by Diagnostic Software” on page 27

## ▼ 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 27.

For example:

```
-> show -t /SYS/MB/CM/CMP/BOB21/CH1/DIMM
Target | Property | Value
-----+-----+-----
...
/SYS/MB/CM/CMP/BOB21/CH1/DIMM | type | DIMM
/SYS/MB/CM/CMP/BOB21/CH1/DIMM | ipmi name | P0/M3/B0/C1/D0
/SYS/MB/CM/CMP/BOB21/CH1/DIMM | requested_config_state | Enabled
/SYS/MB/CM/CMP/BOB21/CH1/DIMM | current_config_state | Enabled
/SYS/MB/CM/CMP/BOB21/CH1/DIMM | disable_reason | Configuration Rules
/SYS/MB/CM/CMP/BOB21/CH1/DIMM | fru_name | 8192MB DDR4 SDRAM DIMM
...
```

### Related Information

- [“Log In to Oracle ILOM \(Service\)”](#) on page 24
- [“Identify Faulted Components”](#) on page 24
- [“Component Names Displayed by Diagnostic Software”](#) on page 27

## 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	Links
Battery	/SYS/MB/BAT	<a href="#">“Servicing the Battery”</a> on page 125
DIMMs on motherboard	/SYS/MB/CM/CMP/BOBn/CHn/DIMM0	<a href="#">“Servicing Memory Risers and DIMMs”</a> on page 89

## Identify Disabled Components

Component	Oracle ILOM Target	Links
DIMMs on memory risers	/SYS/MB/CM/CMP/MRn/BOBn/CHn/DIMM0	<a href="#">“Servicing Memory Risers and DIMMs” on page 89</a>
Drive backplane	/SYS/DBP	<a href="#">“Servicing the Drive Backplane” on page 163</a>
Drives	/SYS/DBP/HDD0 (upper left) /SYS/DBP/HDD1 /SYS/DBP/HDD2 or /SYS/DBP/NVME0 /SYS/DBP/HDD3 or /SYS/DBP/NVME1 /SYS/DBP/HDD4 or /SYS/DBP/NVME2 /SYS/DBP/HDD5 or /SYS/DBP/NVME3 /SYS/DBP/HDD6 /SYS/DBP/HDD7 (right)	<a href="#">“Servicing Drives” on page 61</a>
DVD drive	/SYS/MB/DBP/DVD	<a href="#">“Servicing the DVD Drive” on page 137</a>
eUSB drive	/SYS/MB/EUSB_DISK	
Fan modules	As viewed from front of server: /SYS/MB/FM0 (left) /SYS/MB/FM1 /SYS/MB/FM2 /SYS/MB/FM3 (right)	<a href="#">“Servicing Fan Modules” on page 73</a>
Memory risers	/SYS/MB/CM/CMP/MR0 /SYS/MB/CM/CMP/MR1	<a href="#">“Servicing Memory Risers and DIMMs” on page 89</a>
Motherboard	/SYS/MB	<a href="#">“Servicing the Motherboard” on page 145</a>
PCIe cards	/SYS/MB/PCIE1 /SYS/MB/PCIE2 /SYS/MB/PCIE3 /SYS/MB/PCIE4 /SYS/MB/PCIE5 /SYS/MB/PCIE6	<a href="#">“Servicing PCIe Cards” on page 113</a>
Power supplies	/SYS/PS0 (outer) /SYS/PS1 (inner)	<a href="#">“Servicing Power Supplies” on page 83</a>



Component	Oracle ILOM Target	Links
SPM	/SYS/MB/SPM	<a href="#">“Servicing the SPM” on page 129</a>

### Related Information

- [“Log In to Oracle ILOM \(Service\)” on page 24](#)
- [“Identify Faulted Components” on page 24](#)
- [“Identify Disabled Components” on page 26](#)

## Interpreting LEDs

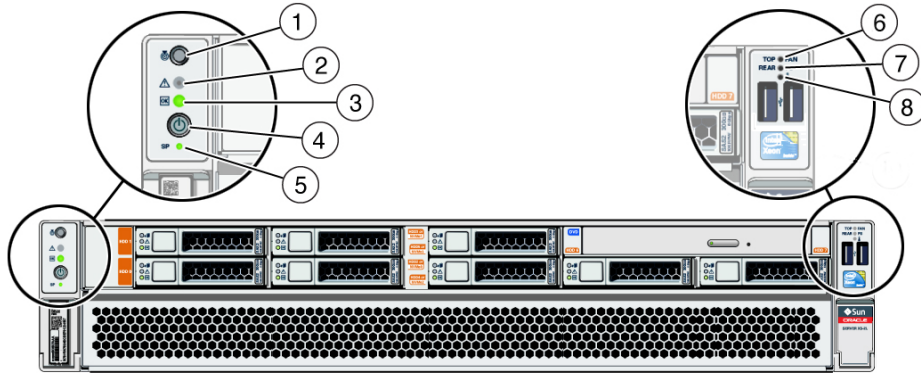
Use these steps to determine if an LED indicates that a component has failed.

Step	Description	Links
1.	Check the LEDs on the front and rear of the server.	<ul style="list-style-type: none"> <li>■ <a href="#">“Front Panel Controls and LEDs” on page 30</a></li> <li>■ <a href="#">“Rear Panel Controls and LEDs” on page 32</a></li> </ul>
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 if a component is faulty, see <a href="#">“Identify Faulted Components” on page 24</a> .	<ul style="list-style-type: none"> <li>■ <a href="#">“Servicing Drives” on page 61</a></li> <li>■ <a href="#">“Servicing Fan Modules” on page 73</a></li> <li>■ <a href="#">“Servicing Power Supplies” on page 83</a></li> <li>■ <a href="#">“Servicing Memory Risers and DIMMs” on page 89</a></li> <li>■ <a href="#">“Servicing PCIe Cards” on page 113</a></li> <li>■ <a href="#">“Servicing the Motherboard” on page 145</a></li> </ul>


### Related Information

- [“Checking for Faults” on page 23](#)
- [“Performing Advanced Troubleshooting” on page 34](#)
- [“Clear a Fault Manually” on page 39](#)

## Front Panel Controls and LEDs



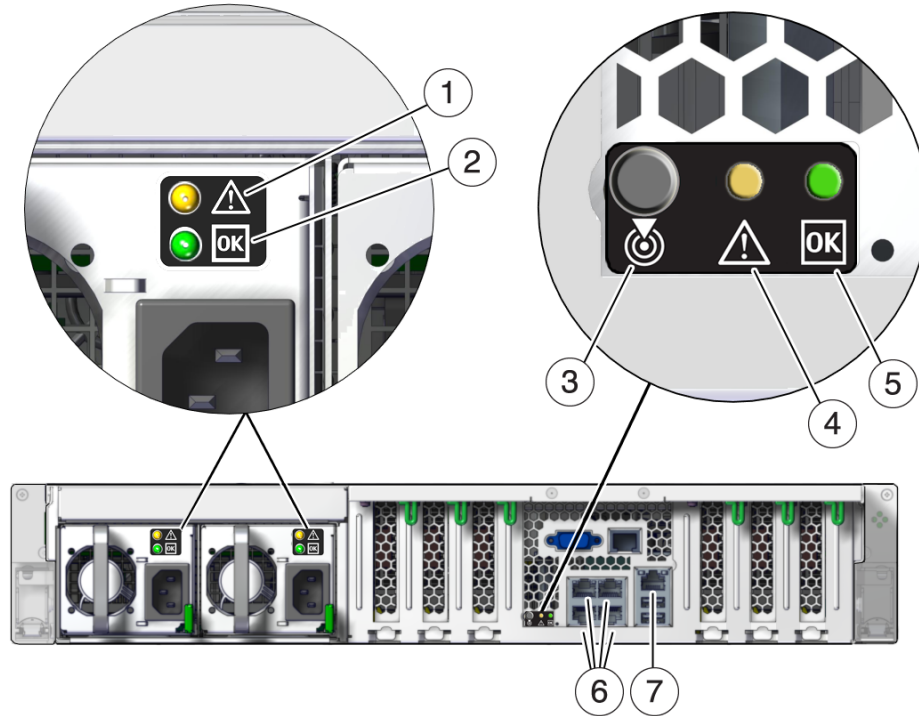
No.	LED	Icon or Label	Description
1	System Server Locator LED and button (white)		You can turn on the Locator LED to identify a particular server. When lit, the LED blinks rapidly. The blinking will time out after 15 minutes. Turn on the Locator LED by pressing the Locator button, or see <a href="#">“Locate the Server” on page 45.</a>
2	Service Required LED (amber)		The <code>fmadm faulty</code> command provides details about any faults that cause this indicator to light. See <a href="#">“Identify Faulted Components” on page 24.</a>  Under some fault conditions, individual component fault LEDs are lit in addition to the Service Required LED.
3	Power OK LED (green)		Indicates these conditions: <ul style="list-style-type: none"> <li>■ <b>Off</b> – Server is not running in its normal state. Server power might be off. The SP might be running.</li> <li>■ <b>Steady on</b> – Server is powered on and is running in its normal operating state. No service actions are required.</li> <li>■ <b>Fast blink</b> – Server is running in standby mode and can be quickly returned to full function.</li> <li>■ <b>Slow blink</b> – A normal but transitory activity is taking place. Slow blinking might indicate that server diagnostics are running or that the server is booting.</li> </ul>
4			
5	SP OK LED	SP	Indicates these conditions: <ul style="list-style-type: none"> <li>■ <b>Off</b> – AC power might have been connected to the power supplies.</li> </ul>

No.	LED	Icon or Label	Description
			<ul style="list-style-type: none"> <li>■ <b>Steady on, green</b> – SP is running in its normal operating state. No service actions are required.</li> <li>■ <b>Blink, green</b> – SP is initializing the Oracle ILOM firmware.</li> <li>■ <b>Steady on, amber</b> – An SP error has occurred and service is required.</li> </ul>
6	Fan Module Fault LED (amber)	FAN	<p>Indicates these conditions:</p> <ul style="list-style-type: none"> <li>■ <b>Off</b> – Steady state, no service action is required.</li> <li>■ <b>Steady on</b> – A fan module failure event has been acknowledged and a service action is required on at least one of the fan modules.</li> </ul>
7	Server Power Supply Fault LED (amber)	PS	<p>Indicates these conditions:</p> <ul style="list-style-type: none"> <li>■ <b>Off</b> – Steady state, no service action is required.</li> <li>■ <b>Steady on</b> – A fault has been detected on one of the two power supplies.</li> </ul>
8	Server Overtemp LED (amber)		<p>Indicates these conditions:</p> <ul style="list-style-type: none"> <li>■ <b>Off</b> – Steady state, no service action is required.</li> <li>■ <b>Steady on</b> – A temperature failure event has been acknowledged. A temperature limit has been exceeded, and a service action is required.</li> </ul>




## Related Information

- [“Rear Panel Controls and LEDs” on page 32](#)
- [“Checking for Faults” on page 23](#)

## Rear Panel Controls and LEDs



No.	LED	Icon or Label	Description
1	PS Fault LED (amber)		<p>Indicates these conditions:</p> <ul style="list-style-type: none"> <li>■ <b>Off</b> – Steady state, no service action is required.</li> <li>■ <b>Steady on</b> – A fault has been detected on this power supply.</li> </ul>
2	PS DC OK LED (green)		<p>Indicates these conditions:</p> <ul style="list-style-type: none"> <li>■ <b>Off</b> – 12V DC output from this power supply is disabled or not within specification.</li> <li>■ <b>Steady on</b> – 12V DC output from this power supply is present and within specifications.</li> </ul>

No.	LED	Icon or Label	Description
3	Locator LED and button (white)		Turn on the Locator LED by pressing the Locator button, or see <a href="#">“Locate the Server” on page 45</a> . When lit, the LED blinks rapidly. The blinking will time out after 15 minutes.
4	Service Required LED (amber)		The <code>fmadm faulty</code> command provides details about any faults that cause this indicator to light. See <a href="#">“Identify Faulted Components” on page 24</a> .  Under some fault conditions, individual component fault LEDs are lit in addition to the Service Required LED.
5	Power OK LED (green)		Indicates these conditions: <ul style="list-style-type: none"> <li>■ <b>Off</b> – Server is not running in its normal state. Server power might be off. The SP might be running.</li> <li>■ <b>Steady on</b> – Server is powered on and is running in its normal operating state. No service actions are required.</li> <li>■ <b>Fast blink</b> – Server is running in standby mode and can be quickly returned to full function.</li> <li>■ <b>Slow blink</b> – A normal but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running or that the system is booting.</li> </ul>
6	Host Ethernet Port Link/Activity LED (green)  From left to right, NET 1, NET 0, NET 3, and NET 2.		Indicates these conditions: <ul style="list-style-type: none"> <li>■ <b>Off</b> – No link is established.</li> <li>■ <b>Steady On</b> – A link is established.</li> <li>■ <b>Blinking</b> – A link is established, and there is activity on the port.</li> </ul>
7	NET MGT Port Link and Activity LED (green on left)  NET MGT Port Speed LED (green on right)	LINK/ACT  SPD	Indicates these conditions: <ul style="list-style-type: none"> <li>■ <b>Off</b> – No link is established.</li> <li>■ <b>Steady On</b> – A link is established.</li> <li>■ <b>Blinking</b> – A link is established and there is activity on the port.</li> </ul> Indicates these conditions: <ul style="list-style-type: none"> <li>■ <b>Off</b> – The link is operating as a 10 Mbps connection.</li> <li>■ <b>Steady On</b> – The link is operating as a 100 Mbps connection.</li> </ul>

## Related Information

- [“Front Panel Controls and LEDs” on page 30](#)
- [“Checking for Faults” on page 23](#)

## Performing Advanced Troubleshooting

If you are unable to diagnose faults using the methods provided in [“Checking for Faults” on page 23](#), use any of the following methods to diagnose faults on the server.

Description	Links
Generate and examine diagnostic information.	<a href="#">“Check the Message Buffer” on page 34</a>
Examine log files for additional information about the server.	<a href="#">“View Log Files (Oracle Solaris)” on page 35</a> <a href="#">“View Log Files (Oracle ILOM)” on page 35</a>
Generate and examine low-level diagnostic information generated by POST.	<a href="#">“POST Overview” on page 36</a> <a href="#">“Configure POST” on page 36</a> <a href="#">“Oracle ILOM Properties That Affect POST Behavior” on page 38</a>

### Related Information

- [“Checking for Faults” on page 23](#)
- [“Interpreting LEDs” on page 29](#)
- [“Clear a Fault Manually” on page 39](#)

## ▼ 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 35](#)

- [“View Log Files \(Oracle ILOM\)” on page 35](#)
- [“POST Overview” on page 36](#)

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

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

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

### Related Information

- [“Check the Message Buffer” on page 34](#)
- [“View Log Files \(Oracle Solaris\)” on page 35](#)
- [“POST Overview” on page 36](#)

## ▼ View Log Files (Oracle ILOM)

1. **View the event log.**
2. **View the audit log.**

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

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

### Related Information

- [“Check the Message Buffer” on page 34](#)
- [“View Log Files \(Oracle Solaris\)” on page 35](#)
- [“POST Overview” on page 36](#)

## 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 3.2.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 36](#)
- [“Oracle ILOM Properties That Affect POST Behavior” on page 38](#)

## ▼ Configure POST

1. **Log in to Oracle ILOM.**  
See [“Log In to Oracle ILOM \(Service\)” on page 24](#).
2. **Set the virtual keyswitch to the value that corresponds to the POST configuration you want to run.**



This example sets the virtual keyswitch default\_level to min, which configures POST to run according to other parameter values.

```
-> set /HOST 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 might not display any POST test status for extended periods of time on certain configurations.

---

3. **(Optional) Set the virtual keyswitch 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 3.2.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 36](#)
- [“Oracle ILOM Properties That Affect POST Behavior” on page 38](#)

## 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 3.2.x*.

### Related Information

- [“POST Overview” on page 36](#)
- [“Configure POST” on page 36](#)

## ▼ Clear a Fault Manually

When the server detects faults, the faults are logged and displayed on the console. In most cases, after the fault is repaired 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 replaced FRU
```

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

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

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

faulted and taken out of service.

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

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

**5. 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>

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

**Related Information**

- [“Checking for Faults” on page 23](#)
- [“Interpreting LEDs” on page 29](#)
- [“Performing Advanced Troubleshooting” on page 34](#)

# Preparing for Service

---

These topics describe how to prepare the server for servicing.

Step	Description	Links
1.	Review safety and handling information.	<a href="#">“Safety Information” on page 41</a>
2.	Gather the tools needed for service.	<a href="#">“Tools Needed For Service” on page 43</a>
3.	Consider filler options.	<a href="#">“Fillers” on page 43</a>
4.	Review component service categories.	<a href="#">“Component Service Categories” on page 45</a>
5.	Find the server serial number.	<a href="#">“Find the Server Serial Number” on page 44</a>
6.	Identify the server to be serviced.	<a href="#">“Locate the Server” on page 45</a>
7.	For cold-service operations, shut down the OS and remove power from the server.	<a href="#">“Removing Power From the Server” on page 46</a>
8.	Move the server out of the rack and remove covers as necessary to gain access to internal components.	<a href="#">“Accessing Server Components” on page 50</a>
9.	Attach devices to the server to perform service procedures.	<a href="#">“Attachment of Devices During Service” on page 59</a>

## 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 T7-1 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 50](#)
- [“Tools Needed For Service” on page 43](#)

## Tools Needed For Service

You need the following tools for most service operations:

- Antistatic wrist strap
- Antistatic mat
- No. 2 Phillips screwdriver
- No. 1 flat-blade screwdriver (battery removal)
- T6 Torx screwdriver
- T10 Torx screwdriver

### Related Information

- [“Safety Information” on page 41](#)
- [“Prevent ESD Damage” on page 50](#)

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

- Drive filler
- PCIe filler (covering back panel, not inserted in the PCIe slot)



---

**Caution** - When you remove a server 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 61](#)
- [“Servicing PCIe Cards” on page 113](#)
- [“Returning the Server to Operation” on page 171](#)

## ▼ Find the Server Serial Number

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

---

**Note** - When a drive backplane, SPM, or motherboard 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:

```
product_serial_number = BDL1026F8F
```



### Related Information

- [“Front Panel Components \(Service\)” on page 13](#)

## ▼ Locate the Server

You can use the Server Locator LEDs to identify one particular server from many other servers.

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

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

The white Server Locator LEDs (one on the front panel and one on the rear panel) blink for about 30 minutes before turning off.

2. **After locating the server with the blinking Locator LED, turn it off by pressing the Server Locator button.**

Alternatively, you can type an Oracle ILOM command to turn off the Locator LED.

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

### Related Information

- [“Front Panel Components \(Service\)” on page 13](#)

## 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. See [“Power Off the Server \(Server Power Button - Graceful\)” on page 48](#) for instructions.

The following table identifies the components in each category.

Component service Category	Component	Service information	Notes
Hot-service, replaceable by customer	Drive	<a href="#">“Servicing Drives” on page 61</a>	Drive must be offline.
	Drive filler	<a href="#">“Servicing Drives” on page 61</a>	Needed to preserve proper interior air flow.
	Power supply	<a href="#">“Servicing Power Supplies” on page 83</a>	Hot-service if two power supplies are in use. Otherwise, cold-service.
	Fan	<a href="#">“Servicing Fan Modules” on page 73</a>	Removal of a fan requires replacement within 5 minutes to avoid overheating.
Cold-service, replaceable by customer	Memory risers and DIMMs	<a href="#">“Servicing Memory Risers and DIMMs” on page 89</a>	
	PCIe cards	<a href="#">“Servicing PCIe Cards” on page 113</a>	
	Battery	<a href="#">“Servicing the Battery” on page 125</a>	
	SPM	<a href="#">“Servicing the SPM” on page 129</a>	
	SC PROM	<a href="#">“Servicing the Motherboard” on page 145</a>	
	eUSB Drive		
Cold-service, replaceable by authorized service personnel	Motherboard	<a href="#">“Servicing the Motherboard” on page 145</a>	Transfer system configuration PROM to new motherboard.
	Drive backplane	<a href="#">“Servicing the Drive Backplane” on page 163</a>	
	DVD drive	<a href="#">“Servicing the DVD Drive” on page 137</a>	Remove any media prior to replacement.  A drive must be installed to preserve proper interior air flow.
	LED indicator modules (front left and front right)		

## Related Information

- [“Internal Component Locations” on page 16](#)

# Removing Power From the Server

These topics describe how to power off the server.

Step	Description	Links
1.	Prepare the server for powering off.	<a href="#">“Prepare to Power Off the Server” on page 47</a>
2.	Power off the server by one of three methods.	<a href="#">“Power Off the Server (Oracle ILOM)” on page 48</a> <a href="#">“Power Off the Server (Server Power Button - Graceful)” on page 48</a> <a href="#">“Power Off the Server (Emergency Shutdown)” on page 49</a>
3.	Disconnect the power cords from the server.	<a href="#">“Disconnect Power Cords” on page 49</a>

### Related Information

- [“Front Panel Components \(Service\)” on page 13](#)
- [“Booting and Shutting Down Oracle Solaris” in SPARC T7 Series Servers Administration Guide](#)

## ▼ 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 LDoms.**  
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 48](#)

- [“Power Off the Server \(Emergency Shutdown\)” on page 49](#)
- [“Front Panel Components \(Service\)” on page 13](#)

## ▼ Power Off the Server (Oracle ILOM)

You can use the SP 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 [“Booting and Shutting Down Oracle Solaris” in \*SPARC T7 Series Servers Administration Guide\*](#).

---

1. **Prepare to power off the server.**  
See [“Prepare to Power Off the Server” on page 47](#).
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 48](#).)

---

### Related Information

- [“Prepare to Power Off the Server” on page 47](#)
- [“Power Off the Server \(Server Power Button - Graceful\)” on page 48](#)
- [“Power Off the Server \(Emergency Shutdown\)” on page 49](#)
- [“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 Power OK LED blinks rapidly.

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

See [“Prepare to Power Off the Server”](#) on page 47.

**2. Press and release the 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 47
- [“Power Off the Server \(Oracle ILOM\)”](#) on page 48
- [“Power Off the Server \(Emergency Shutdown\)”](#) on page 49
- [“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 47.

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

**Related Information**

- [“Prepare to Power Off the Server”](#) on page 47
- [“Power Off the Server \(Oracle ILOM\)”](#) on page 48
- [“Power Off the Server \(Server Power Button - Graceful\)”](#) on page 48
- [“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

- [“Safety Information” on page 41](#)
- [“Power Off the Server \(Oracle ILOM\)” on page 48](#)
- [“Power Off the Server \(Server Power Button - Graceful\)” on page 48](#)
- [“Power Off the Server \(Emergency Shutdown\)” on page 49](#)
- [“Rear Panel Components \(Service\)” on page 15](#)

## 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 50](#)
- [“Extend the Server to the Service Position” on page 51](#)
- [“Release the CMA” on page 52](#)
- [“Remove the Server From the Rack” on page 54](#)
- [“Remove the Top Cover” on page 55](#)
- [“Open and Remove the Airflow Cover” on page 56](#)
- [“Remove the Fan Cover” on page 57](#)

#### Related Information

- [“Safety Information” on page 41](#)

## ▼ 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 41](#).

**Related Information**

- [“Safety Information” on page 41](#)

## ▼ Extend the Server to the Service Position

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

- Drives or fillers
- DVD drive
- Power supplies
- Fans
- Memory risers
- DIMMs
- PCIe cards
- SPM
- eUSB drive
- Battery

---

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

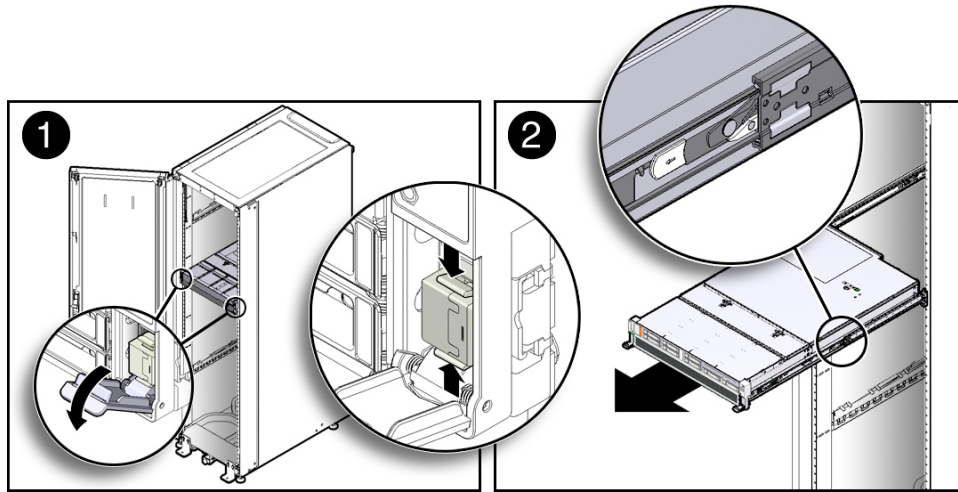
---

**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.**

#### Related Information

- [“Release the CMA” on page 52](#)
- [“Remove the Server From the Rack” on page 54](#)

## ▼ 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.

---

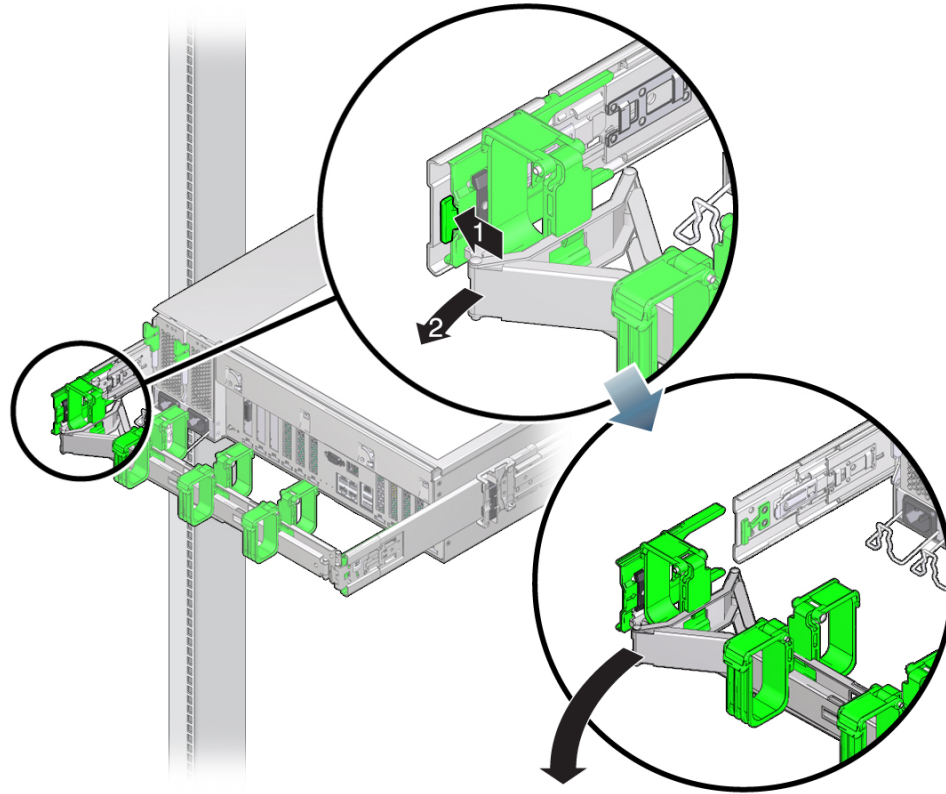
**Note** - For instructions on how to install the CMA for the first time, refer to [“Prepare the CMA for Installation” in SPARC T7-1 Server Installation Guide](#).

---

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 51](#)
- [“Remove the Server From the Rack” on page 54](#)
- [“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
- 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 46.](#)
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 51.](#)
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 52.](#)
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.**

### Related Information

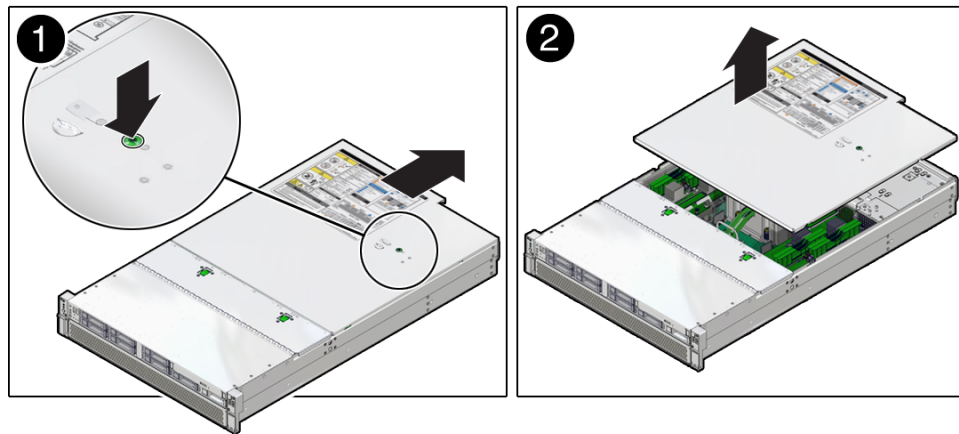
- [“Extend the Server to the Service Position” on page 51](#)
- [“Release the CMA” on page 52](#)
- [“Remove the Top Cover” on page 55](#)

## ▼ 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. Press the green button to release the top cover (panel 1).



3. Slide the cover towards the rear of the server chassis about 0.5 inch (12 mm).
4. Lift up and remove the top cover (panel 2).

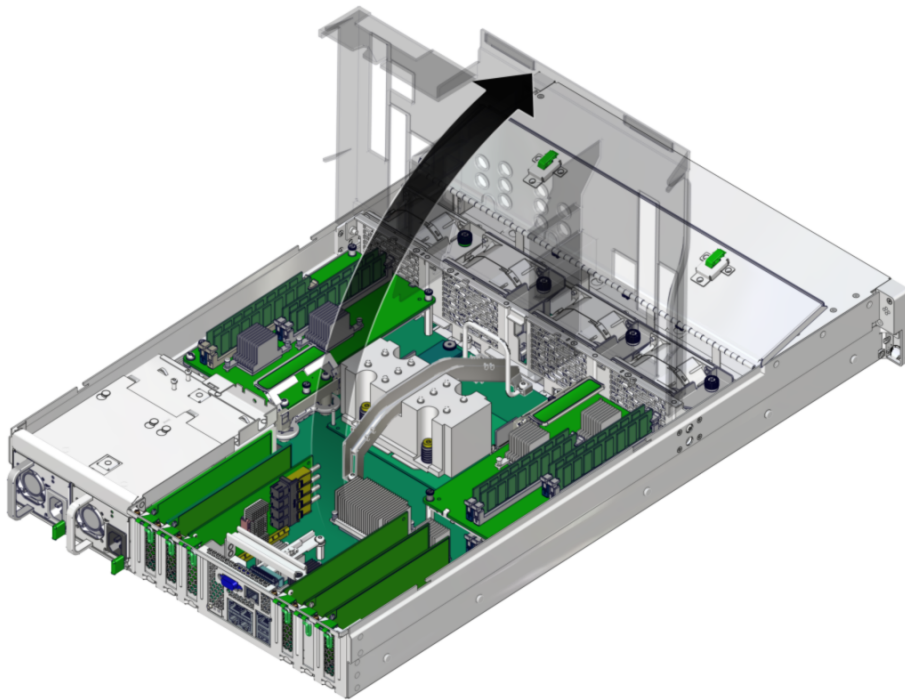
### Related Information

- [“Replace the Top Cover” on page 176](#)
- [“Open and Remove the Airflow Cover” on page 56](#)
- [“Remove the Fan Cover” on page 57](#)

## ▼ Open and Remove the Airflow Cover

To access some components, you must open or remove the transparent airflow cover.

1. **Lift the edge of the airflow cover closest to the rear of the server.**

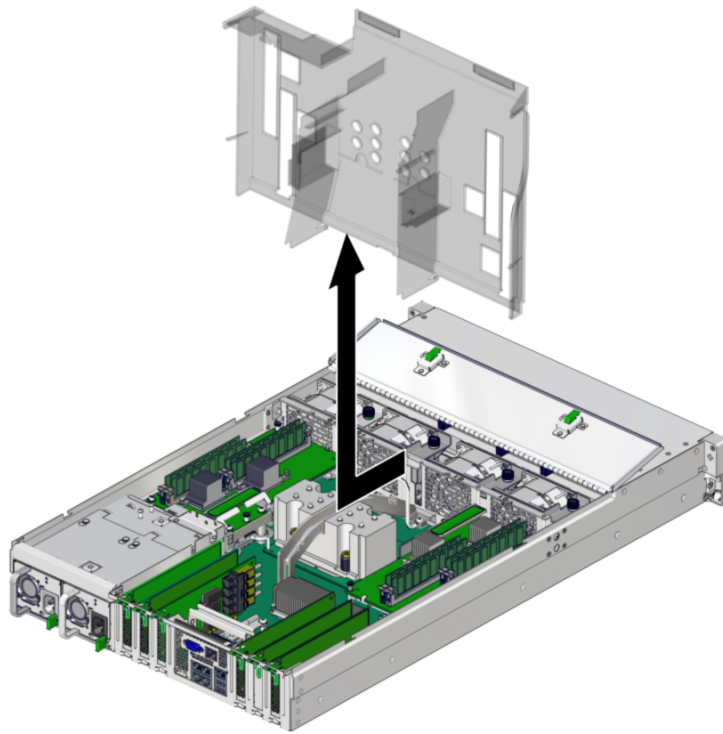


The airflow cover can stand in its upright position.

Perform the next steps if you need to remove the airflow cover.

2. **Open the fan cover.**

3. Pull open the plastic tabs to release the airflow cover's hinge edge from the server.



#### Related Information

- [“Install and Close the Airflow Cover” on page 173](#)
- [“Remove the Top Cover” on page 55](#)
- [“Remove the Fan Cover” on page 57](#)

## ▼ Remove the Fan Cover

To access some components, you must remove the fan cover.

1. Remove 12 screws on the top and side of the fan cover.

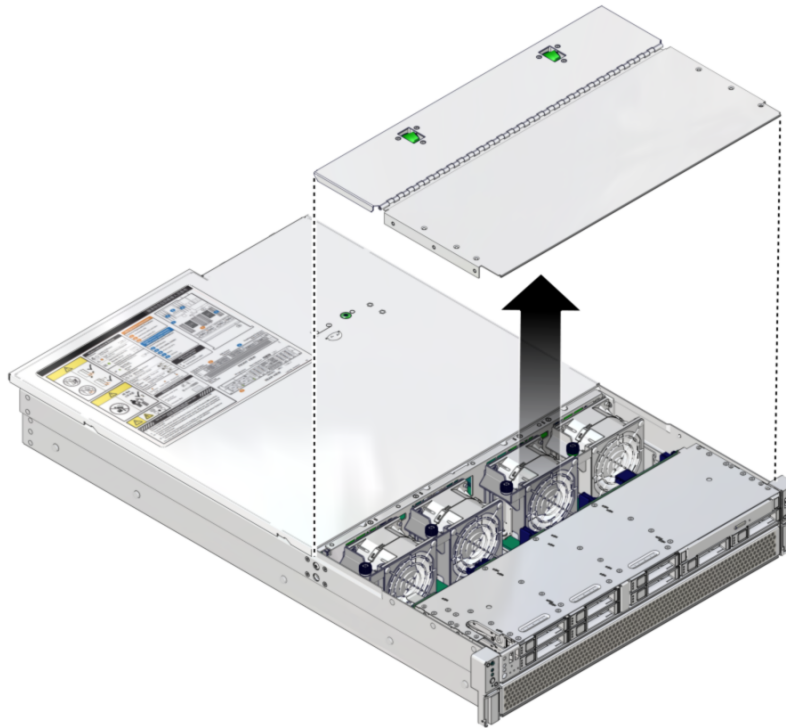
---

**Note** - The fan covers on some units are secured with T6 Torx screws. Other units are secured with No. 2 Phillips screws. (Illustration shows T6 Torx screws.)

---



2. **Lift the fan cover from the server.**



#### Related Information

- [“Replace the Fan Cover” on page 171](#)
- [“Open and Remove the Airflow Cover” on page 56](#)
- [“Remove the Top Cover” on page 55](#)

## Attachment of 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, or 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 the rear DB-15 video connector. For more details on connecting to the video port, refer to [“Connecting Cables” in SPARC T7-1 Server Installation 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 SP uses the NET MGT (out-of-band) port by default. You can configure the SP to share one of the server's four Ethernet ports instead. The SP uses only the configured Ethernet port.

---

- If you plan to access the Oracle ILOM CLI through the management 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 23](#)
- [“Connecting Cables” in SPARC T7-1 Server Installation Guide](#)



# Servicing Drives

---

The server provides eight 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.

---

**Note** - The server supports traditional, disk-based storage devices and Flash SSDs, which are diskless storage devices based on solid-state memory. The server also can support NVMe drives in four of the drive bays. Either type of drive can be a boot device. The term “drive” is used in a generic sense to refer to both types of internal storage devices.

---

These topics explain how to service drives.

- [“Drive LEDs” on page 62](#)
- [“Determine Which Drive Is Faulty” on page 63](#)
- [“Remove a Drive or Drive Filler” on page 63](#)
- [“Install a Drive or Drive Filler” on page 68](#)
- [“Verify a Drive” on page 69](#)





## Related Information

- [“Component Service Categories” on page 45](#)

## Drive LEDs



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

LED		Color	Description
1	Ready to Remove		Blue
2	Service Required		Amber
3	OK/Activity (hard drives)		Green
3	OK/Activity (SSDs)		Green

Indicates that a drive can be removed during a hot-service operation.

Indicates that the drive has experienced a fault condition.

Indicates the drive's availability for use.

- **On** – Read or write activity is in progress.
- **Off** – Drive is idle and available for use.

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 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 or Drive Filler” on page 63](#)
- [“Install a Drive or Drive Filler” on page 68](#)
- [“Verify a Drive” on page 69](#)

## ▼ Determine Which Drive Is Faulty

You must determine which drive is faulty before you replace it.

1. **Check to see if any System Service Required LEDs are lit or flashing.**  
See [“Interpreting LEDs” on page 29](#).
2. **Visually inspect the drive to see if any of its status LEDs are lit or flashing.**  
See [“Drive LEDs” on page 62](#).  
If the drive is faulty, replace it. See [“Remove a Drive or Drive Filler” on page 63](#).
3. **If you are unable to identify the faulty drive, seek further information.**  
See [“Detecting and Managing Faults” on page 23](#).
4. **Remove the faulty drive.**  
See [“Remove a Drive or Drive Filler” on page 63](#).

### Related Information

- [“Drive LEDs” on page 62](#)
- [“Remove a Drive or Drive Filler” on page 63](#)
- [“Install a Drive or Drive Filler” on page 68](#)
- [“Verify a Drive” on page 69](#)
- [“Detecting and Managing Faults” on page 23](#)

## ▼ Remove a Drive or Drive Filler

You can perform this procedure while the server is running. See [“Component Service Categories” on page 45](#) for more information about hot-service procedures.

To hot-service a drive, you must first take it offline. This action prevents applications from accessing the drive and removes software links to it.

1. **Determine which drive needs to be removed.**  
See [“Determine Which Drive Is Faulty” on page 63](#).
2. **Determine if you need to shut down the OS to replace the drive, and perform one of the following actions:**
  - If the drive contains the sole image of the OS or cannot be logically isolated from the server's online operations, shut down the OS as described in [“Power Off the Server \(Oracle ILOM\)” on page 48](#). Then go to [Step 4](#).
  - If the drive can be taken offline without shutting down the OS, go to [Step 3](#).
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. **Determine whether you can replace the drive using the hot-service procedure or whether you need to power off the server using the cold-service procedure.**

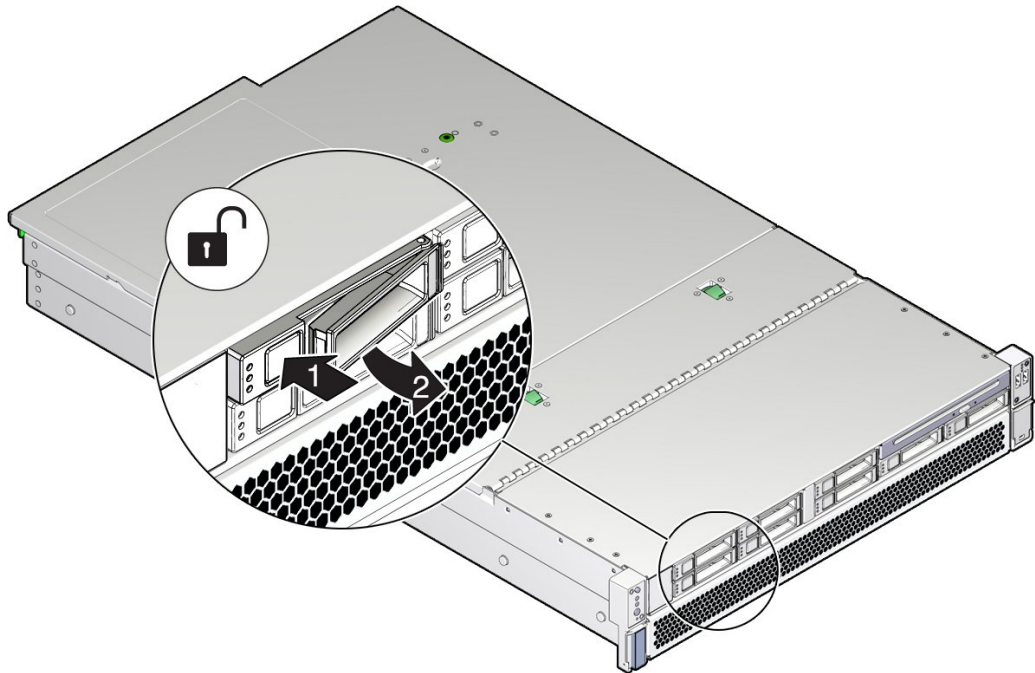
The cold-service procedure is required if the drive has one of these characteristics:

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

5. **Take one of the following actions:**

- **To cold-service the drive, power off the server. Complete one of the procedures described in [“Removing Power From the Server”](#) on page 46.**

- To hot-service the drive, take the drive offline using one of the procedures in [“Power Off the Server \(Server Power Button - Graceful\)” on page 48](#). This action removes the logical software links to the drive and prevents any applications from accessing it.
6. 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.
  7. Attach an antistatic wrist strap.
  8. On the drive or drive filler you want to remove, complete the following tasks.

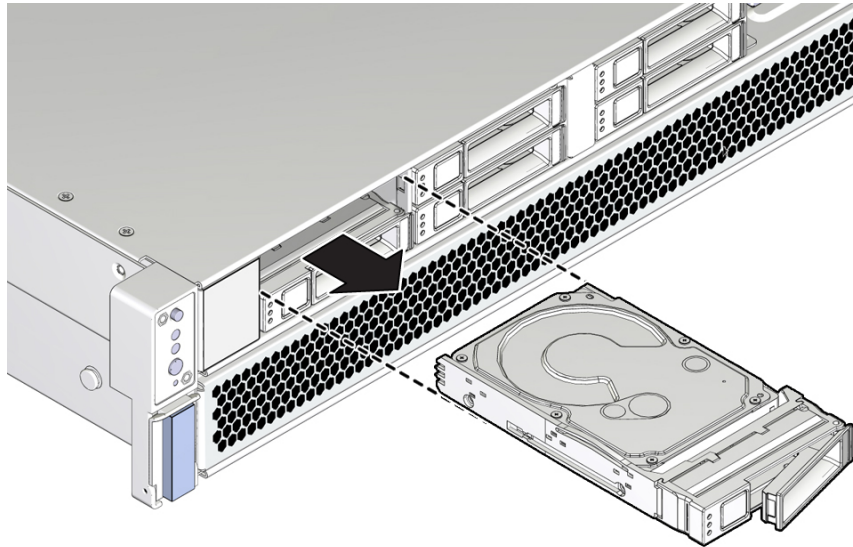


**Caution** - The latch is not an ejector. Do not bend it too far to the right. Doing so can damage the latch.

---

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

- 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 drive filler or another drive. Otherwise, the server might overheat due to improper airflow.

---

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

```
# hotplug list -lc
```

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

See [“Install a Drive or Drive Filler” on page 68](#).

### **Related Information**

- [“Determine Which Drive Is Faulty” on page 63](#)
- [“Install a Drive or Drive Filler” on page 68](#)
- [“Verify a Drive” on page 69](#)

## ▼ Install a Drive or Drive Filler

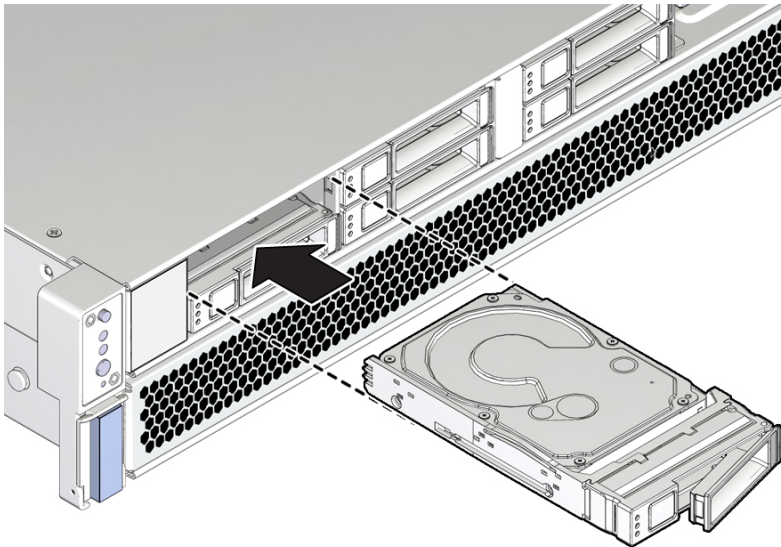
Installing a drive into a server is a two-step process. You must first install the drive into the drive slot and then configure that drive to the server.

---

**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. **Remove a drive or a drive filler.**  
See [“Remove a Drive or Drive Filler” on page 63](#).
2. **Unpack the drive and place it on an antistatic mat.**
3. **Fully open the release lever on the drive.**
4. **Install the drive or drive filler by completing the following tasks.**



- a. **Slide the drive or drive filler into the drive slot until it is fully seated.**
- b. **Close the latch to lock the drive or drive filler in place.**



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

- If you cold-serviced the drive, restore power to the server. Complete the procedure described in [“Power On the Server \(Oracle ILOM\)” on page 178](#) or [“Power On the Server \(System Power Button\)” on page 179](#).
- 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
```

6. **Verify the drive functionality.**

See [“Verify a Drive” on page 69](#).

### Related Information

- [“Determine Which Drive Is Faulty” on page 63](#)
- [“Remove a Drive or Drive Filler” on page 63](#)
- [“Verify a Drive” on page 69](#)

## ▼ Verify a Drive

Perform these steps after replacing a drive or installing a new 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/clt0d0	disk	connected	configured	unknown
c0::sd1	disk	connected	unconfigured	unknown
usb0/1	unknown	empty	unconfigured	ok
usb0/2	unknown	empty	unconfigured	ok
...				

3. **Configure each drive that is not already configured.**

For example, to configure the second disk listed in [Step 2](#), 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 63](#).

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/clt0d0	disk	connected	configured	unknown
c0::dsk/clt1d0	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 23](#).

- **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.

### **Related Information**

- [“Determine Which Drive Is Faulty” on page 63](#)
- [“Remove a Drive or Drive Filler” on page 63](#)
- [“Install a Drive or Drive Filler” on page 68](#)



# Servicing Fan Modules

---

The four 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 fans. Each fan module contains two fans mounted in an integrated, hot-serviceable component.

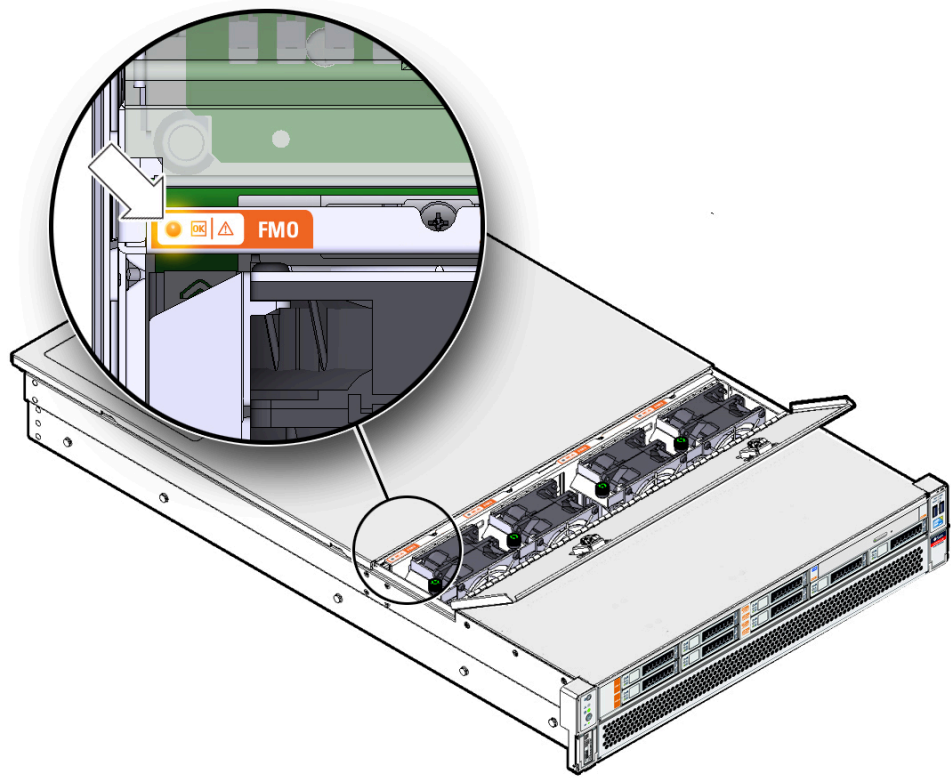
These topics describe how to service faulty fan modules.



- [“Fan Module LEDs” on page 74](#)
- [“Determine Which Fan Module Is Faulty” on page 75](#)
- [“Remove a Fan Module” on page 75](#)
- [“Install a Fan Module” on page 78](#)
- [“Verify a Fan Module” on page 81](#)

## Related Information

- [“Preparing for Service” on page 41](#)

# Fan Module LEDs



LED		Color	Status When Lit
Power OK		Green	The server is powered on, and the fan module is functioning correctly.
Service Required		Amber	The fan module is faulty.

### Related Information

- [“Determine Which Fan Module Is Faulty” on page 75](#)
- [“Detecting and Managing Faults” on page 23](#)

## ▼ Determine Which Fan Module Is Faulty

- **View the following LEDs, which are lit when a fan fault is detected.**
  - Fan (FAN) Fault LED on the front of the server. See [“Front Panel Components \(Service\)” on page 13](#).
  - Fan Fault LED on or adjacent to the faulty fan. See [“Fan Module LEDs” on page 74](#). Each fan contains an LED. When the amber Service Required LED is lit, a fault has occurred on that fan module.

---

**Note** - The front and rear panel Service Required LEDs are also lit when the server detects a fan fault. The Server Overtemp LED might also light if a fan 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 51](#)
- [“Remove a Fan Module” on page 75](#)
- [“Detecting and Managing Faults” on page 23](#)

## ▼ Remove a Fan Module



---

**Caution** - While the fans 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.

---



---

**Caution** - The fan module contains hazardous moving parts. Unless the power to the server is completely shut down, replacing the fan module is the only service permitted in the fan compartment.

---

You can perform this procedure while the server is running. See [“Component Service Categories” on page 45](#) for more information about hot-service procedures.

**1. Prepare for servicing.**

**a. Attach an antistatic wrist strap.**

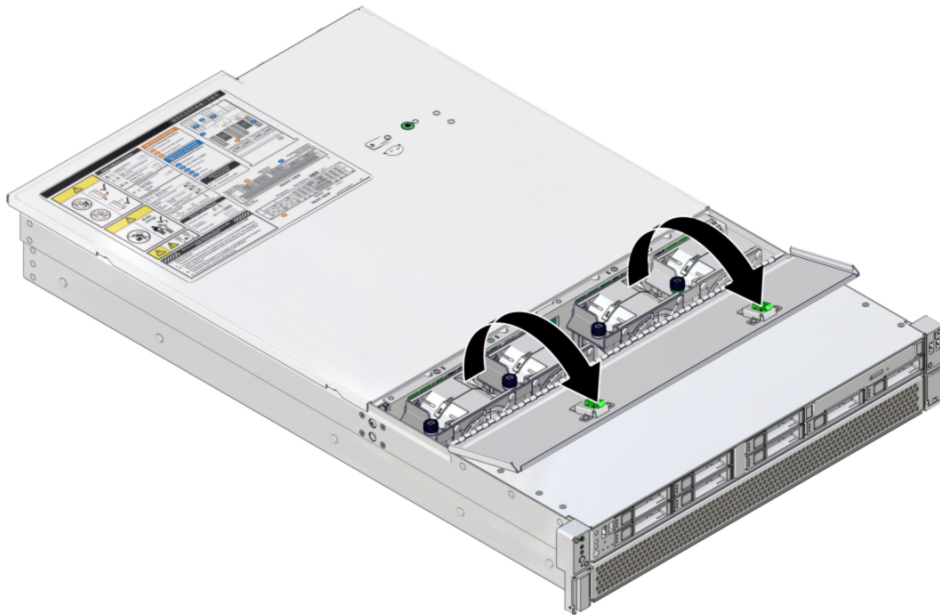
See [“Prevent ESD Damage” on page 50](#).

**b. Extend the server to the maintenance position.**

See [“Extend the Server to the Service Position” on page 51](#).

**2. Open the fan door.**

Slide the two green buttons to unlock the fan door, then swing it open.



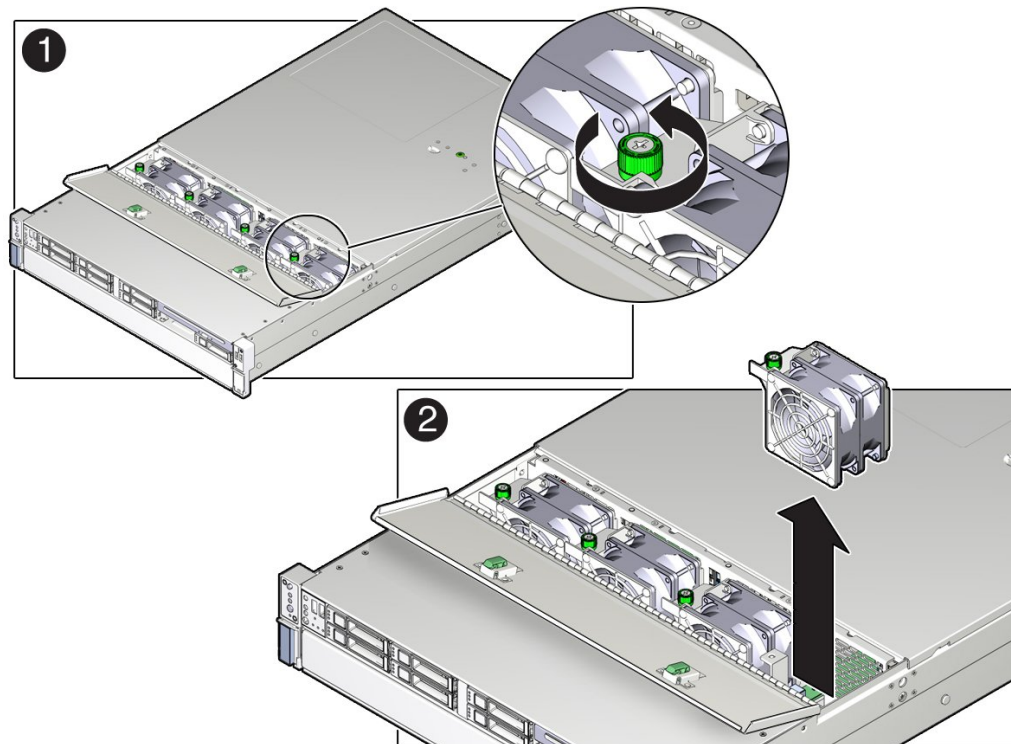
**3. Identify the faulty fan module with a corresponding Service Required LED.**



The Service Required LEDs are located near the fan modules as shown in [“Determine Which Fan Module Is Faulty” on page 75](#).

**4. Loosen the screw on the fan module (panel 1).**

The screws should only be finger tight. If you have difficulty loosening a screw by hand, use a No. 2 Phillips screwdriver.



**5. Grasp the fan module and lift it out of the server.**



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



**Caution** - When changing fan modules, note that only the fan modules can be removed or replaced. Do not service any other components in the fan compartment unless the server is shut down and the power cords are removed.

**6. Install a new fan module.**

See [“Install a Fan Module” on page 78.](#)

**Related Information**

- [“Determine Which Fan Module Is Faulty” on page 75](#)
- [“Extend the Server to the Service Position” on page 51](#)
- [“Install a Fan Module” on page 78](#)

## ▼ Install a Fan Module



---

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

---

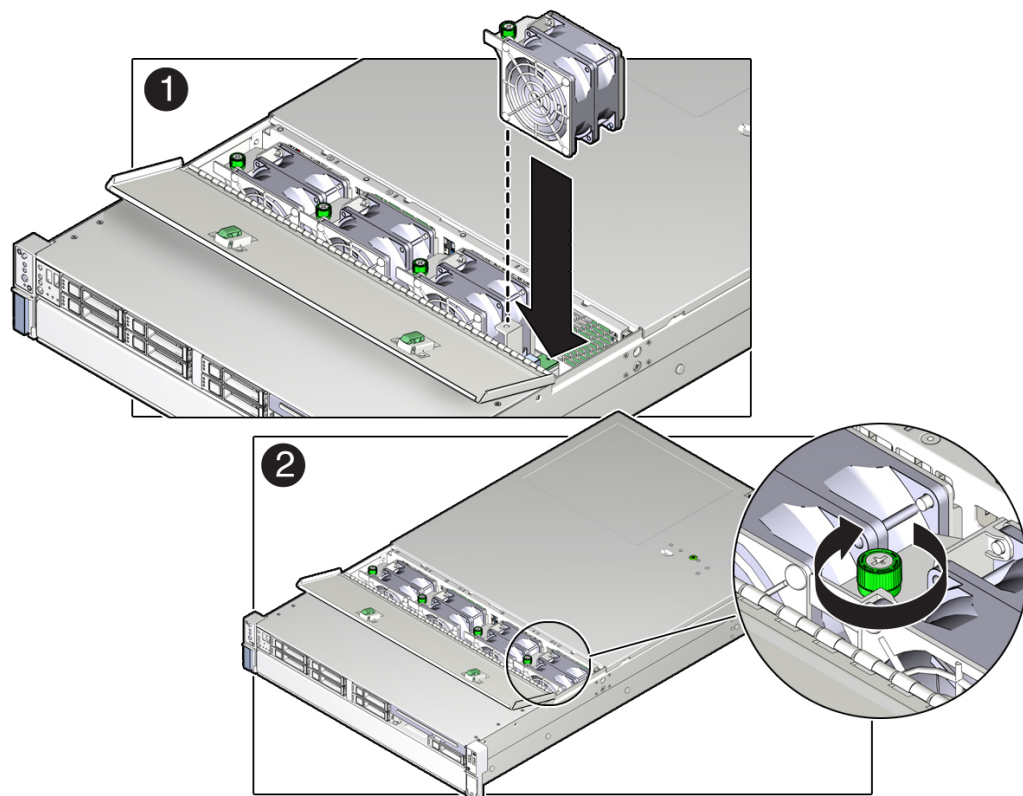
**1. Remove a fan module.**

See [“Remove a Fan Module” on page 75.](#)

**2. Unpack the replacement fan module and place it on an antistatic mat.**

**3. Open the fan door.**

4. **Install the replacement fan module into the server by completing the following tasks.**



- a. **Align the fan module and slide it into the fan slot (panel 1).**

---

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

---

Ensure that the cables threaded between the two middle fan modules are not caught.

- b. **Apply firm pressure to fully seat the fan module.**

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

- c. **Tighten the green screw to hold the fan module in place (panel 2).**

This screw should only be finger tight. Do not use a screwdriver to tighten it.

5. **If the server is powered during this procedure, verify the new fan module.**  
See [“Verify a Fan Module” on page 81.](#)

6. **Close the fan door.**  
Swing the fan door closed, then press down until the two green buttons snap into place.



7. **Return the server to the normal operating position.**  
See [“Return the Server to the Normal Operating Position” on page 177.](#)
8. **When the server is powered, verify the new fan module.** See [“Verify a Fan Module” on page 81.](#)

### Related Information

- [“Return the Server to the Normal Operating Position” on page 177.](#)
- [“Remove a Fan Module” on page 75](#)
- [“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 74.](#)

2. **Verify that the Top Fan LED and the Service Required LED on the front of the server are not lit.**  
See [“Front Panel Controls and LEDs” on page 30.](#)

---

**Note** - If you are replacing a fan module when the server is powered down, the LEDs might stay lit until power is restored to the server and the server can determine that the fan module is functioning properly.

---

3. **Use the Oracle ILOM `show faulty` command to verify that the fault has been cleared.**  
See [“Identify Faulted Components” on page 24](#) for more information on using the `show faulty` command.

Consider these two possibilities.

- **If the previous steps did not clear the fault, see [“Detecting and Managing Faults” on page 23](#) for information about the tools and methods you can use to diagnose component faults.**
- **If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.**

### Related Information

- [“Determine Which Fan Module Is Faulty” on page 75](#)
- [“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 [“Configuring Policy Settings” in SPARC T7 Series Servers Administration Guide](#) and the Oracle ILOM documentation.

These topics describe how to service power supply modules.

- [“Locate a Faulty Power Supply” on page 83](#)
- [“Remove a Power Supply” on page 84](#)
- [“Install a Power Supply” on page 85](#)
- [“Verify a Power Supply” on page 87](#)

### Related Information

- [“Rear Panel Components \(Service\)” on page 15](#)

## ▼ Locate a Faulty Power Supply

- **View the following LEDs, which are lit when a power supply fault is detected.**
  - Rear PS Fault LED on the front bezel of the server. See [“Front Panel Controls and LEDs” on page 30](#).
  - Service Required LED on the faulted power supply. See [“Rear Panel Controls and LEDs” on page 32](#).

---

**Note** - The front and rear panel Service Required LEDs are also lit when the server detects a power supply fault. See [“Front Panel Controls and LEDs” on page 30](#) and [“Rear Panel Controls and LEDs” on page 32](#).

---

### Related Information

- [“Front Panel Components \(Service\)” on page 13](#)
- [“Rear Panel Components \(Service\)” on page 15](#)
- [“Remove a Power Supply” on page 84](#)

## ▼ Remove a Power Supply



---

**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.

---

You can perform this procedure while the server is running. See [“Component Service Categories” on page 45](#) for more information about hot service procedures.

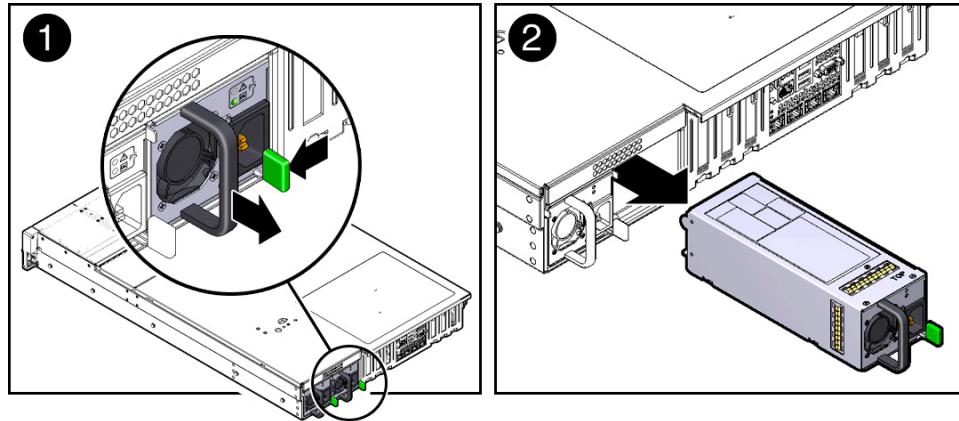
1. **Prepare for servicing.**
  - a. **Attach an antistatic wrist strap.**
  - b. **If necessary, release the CMA to access the power supplies.**

See [“Release the CMA” on page 52](#).

Do not allow the CMA to hang unsupported while it is unattached.
2. **Disconnect the power cord from the power supply that displays a lit amber Service Required LED.**



3. Press the release latch to the left to open the ejector arm (panel 1).



4. Slide the power supply out of the chassis (panel 2).



**Caution** - There is no restraint 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.



**Caution** - Whenever you remove a power supply, you should replace it with another power supply. Otherwise, the server might overheat due to improper airflow. If a new power supply is not available, leave the failed power supply installed until it can be replaced.

5. Install a new power supply.  
See [“Install a Power Supply” on page 85](#).

#### Related Information

- [“Locate a Faulty Power Supply” on page 83](#)
- [“Install a Power Supply” on page 85](#)

## ▼ Install a Power Supply

1. Remove a power supply.

See [“Remove a Power Supply” on page 84](#).

2. **If necessary, release the CMA to access the power supplies.**

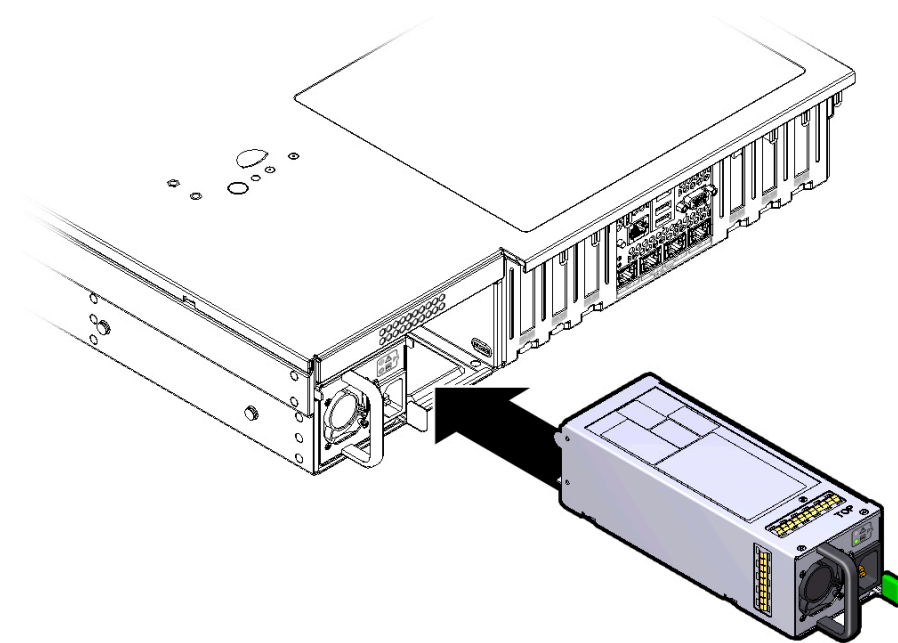
See [“Release the CMA” on page 52](#).

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

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

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

You will hear an audible click when the power supply is fully seated.



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

6. **If you disconnected the two CMA left-side connectors, reconnect the CMA.**

For instructions on reconnecting the CMA see [“Attach the CMA to the Server” in SPARC T7-1 Server Installation Guide](#).

7. **Verify that the AC OK LED is lit.**

See [“Locate a Faulty Power Supply” on page 83](#).

**8. Verify that the following LEDs are not lit:**

- Service Required LED on the power supply
- Front and rear Service Required LEDs
- Rear PS Failure LED on the bezel of the server

See [“Interpreting LEDs” on page 29](#).

**9. Verify the power supply.**

See [“Verify a Power Supply” on page 87](#).

**Related Information**

- [“Remove a Power Supply” on page 84](#)
- [“Verify a Power Supply” on page 87](#)

## ▼ Verify a Power Supply

1. **Verify that the amber Service Required LED on the replaced power supply is not lit.**
2. **Verify that the PS Fault LED on the front of the server is not lit.**
3. **Use the Oracle ILOM `show faulty` command to verify that the fault has been cleared.**

See [“Identify Faulted Components” on page 24](#) for more information on using the `show faulty` command.

Consider these possibilities.

- If the previous steps did not clear the fault, see [“Detecting and Managing Faults” on page 23](#) for information about the tools and methods you can use to diagnose component faults.
- If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

**Related Information**

- [“Locate a Faulty Power Supply” on page 83](#)
- [“Front Panel Components \(Service\)” on page 13](#)

- [“Rear Panel Components \(Service\)” on page 15](#)

## Servicing Memory Risers and DIMMs

---

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

- [“Memory Riser and DIMM Configuration” on page 89](#)
- [“Checking DIMM Compatibility” on page 90](#)
- [“Memory Riser and DIMM FRU Names” on page 91](#)
- [“Add Memory to the Server” on page 93](#)
- [“Locating and Replacing a Faulty DIMM” on page 94](#)
- [“Remove a Memory Riser” on page 97](#)
- [“Remove a DIMM or DIMM Filler” on page 101](#)
- [“Install a DIMM or DIMM Filler” on page 102](#)
- [“Install a Memory Riser” on page 105](#)
- [“Enable and Verify a DIMM” on page 109](#)
- [“DIMM Configuration Errors” on page 111](#)

### Memory Riser and DIMM Configuration

The motherboard provides eight slots for DIMMs. You can add a pair of memory risers, each with four DIMM slots, making a total of 16 DIMMs in the server.

The memory configuration rules for the server are as follows:

- In all configurations, DIMMs must be identical (same size, same rank classification).
- In base configurations, all DIMM slots on the motherboard must be fully occupied (eight DIMMs).
- In upgrade configurations (16 DIMMs):
  - DIMM slots on the motherboard must be fully occupied.
  - Both memory risers must be installed, and both fully occupied.

---

**Note** - The DIMM sparing feature is available only when the optional memory risers are installed and fully occupied.

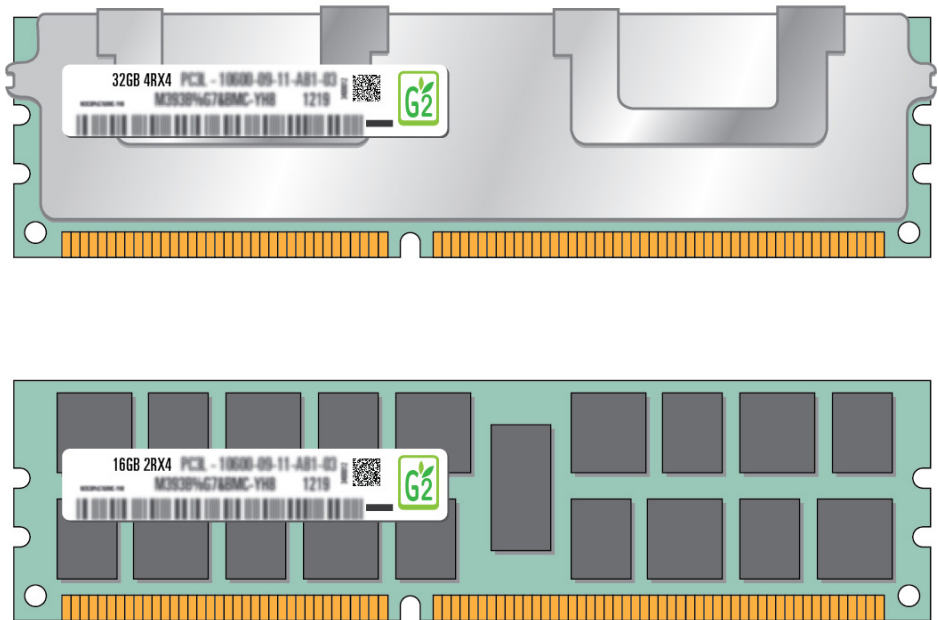
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### Related Information

- [“Checking DIMM Compatibility” on page 90](#)
- [“Memory Riser and DIMM FRU Names” on page 91](#)
- [“Locate a Faulty DIMM \(LEDs\)” on page 95](#)
- [“Remove a Memory Riser” on page 97](#)
- [“Remove a DIMM or DIMM Filler” on page 101](#)
- [“Install a DIMM or DIMM Filler” on page 102](#)

## Checking DIMM Compatibility

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.



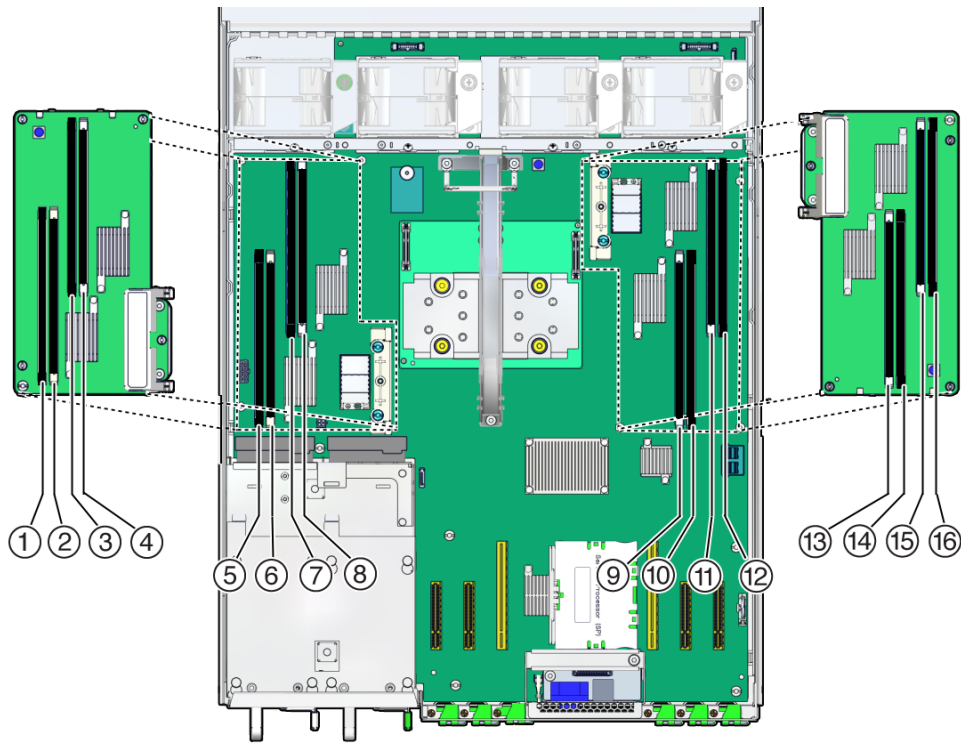
The following DIMMs are supported.

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 x8	2Rx4
64 Gbyte	8 Gbit	Quad-rank x8	4Rx4

## Memory Riser and DIMM FRU Names

The server can contain 16 DIMMs. Eight DIMMs are installed on the motherboard. An optional eight DIMMs can be installed on two memory risers, mounted on the motherboard above the initial DIMMs. Four DIMMs are installed on each memory riser.

Labels on the transparent airflow cover identify the naming of memory risers and DIMMs.



DIMM FRU names are based on the location of the DIMM on the motherboard or on one of the two memory risers. For example, the full FRU name for the DIMM slot on the motherboard farthest from the power supplies is /SYS/MB/CM/CMP/BOB21/CH0.

Physical Location (Seen From Rear)	Memory Riser or DIMM FRU Name	Ejector Color
Left Memory Riser	/SYS/MB/CM/CMP/MR1 (riser)	Black
1	/SYS/MB/CM/CMP/MR1/BOB00/CH0	White
2	/SYS/MB/CM/CMP/MR1/BOB00/CH1	Black
3	/SYS/MB/CM/CMP/MR1/BOB10/CH0	White
4	/SYS/MB/CM/CMP/MR1/BOB10/CH1	Black
Left motherboard	/SYS/MB/CM/CMP/BOB11/CH0	Black
5	/SYS/MB/CM/CMP/BOB11/CH1	White
6		Black



Physical Location (Seen From Rear)	Memory Riser or DIMM FRU Name	Ejector Color
7	/SYS/MB/CM/CMP/BOB31/CH0	White
8	/SYS/MB/CM/CMP/BOB31/CH1	
Right motherboard		
9	/SYS/MB/CM/CMP/BOB01/CH1	White
10	/SYS/MB/CM/CMP/BOB01/CH0	Black
11	/SYS/MB/CM/CMP/BOB21/CH1	White
12	/SYS/MB/CM/CMP/BOB21/CH0	Black
Right memory riser	/SYS/MB/CM/CMP/MR0 (riser)	White
13	/SYS/MB/CM/CMP/MR0/BOB20/CH1	Black
14	/SYS/MB/CM/CMP/MR0/BOB20/CH0	White
15	/SYS/MB/CM/CMP/MR0/BOB30/CH1	Black
16	/SYS/MB/CM/CMP/MR0/BOB30/CH0	

## Related Information

- [“Memory Riser and DIMM Configuration” on page 89](#)
- [“Checking DIMM Compatibility” on page 90](#)
- [“Locate a Faulty DIMM \(LEDs\)” on page 95](#)
- [“Locate a Faulty DIMM \(Oracle ILOM\)” on page 94](#)
- [“Enable and Verify a DIMM” on page 109](#)

## ▼ 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 45](#) 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.

After locating 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. **Type `show faulty` at the Oracle ILOM prompt.**

If a DIMM is faulty, the show faulty output is similar to this example.

```
-> show faulty
Target          | Property          | Value
-----+-----+-----
/SP/faultmgmt/0 | fru               | /SYS/MB/CM/CMP/BOB21/CH0
/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/CM/CMP/BOB21/CH0
faults/0        |                   | Forced fail(POST)
```

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

In this example, /SYS/MB/CM/CMP/BOB21/CH0 indicates the DIMM slot on the motherboard that is farthest from the power supplies.

### Related Information

- [“Locate a Faulty DIMM \(LEDs\)” on page 95](#)
- [“Checking DIMM Compatibility” on page 90](#)
- [“Memory Riser and DIMM FRU Names” on page 91](#)
- [“Remove a Memory Riser” on page 97](#)
- [“Remove a DIMM or DIMM Filler” on page 101](#)

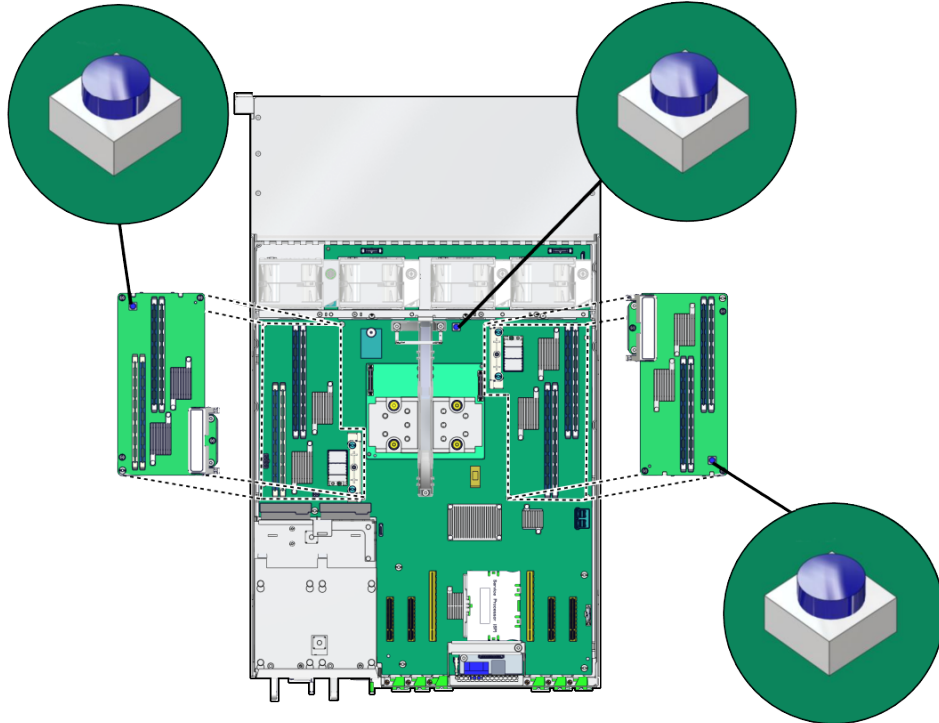
## ▼ Locate a Faulty DIMM (LEDs)

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.



### Related Information

- [“Locate a Faulty DIMM \(Oracle ILOM\)” on page 94](#)
- [“Remove a Memory Riser” on page 97](#)
- [“Remove a DIMM or DIMM Filler” on page 101](#)

## ▼ 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 45](#) 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



---

**Caution** - These procedures require that you handle components that are sensitive to ESD. [Follow antistatic practices](#) to avoid damage or component failure.

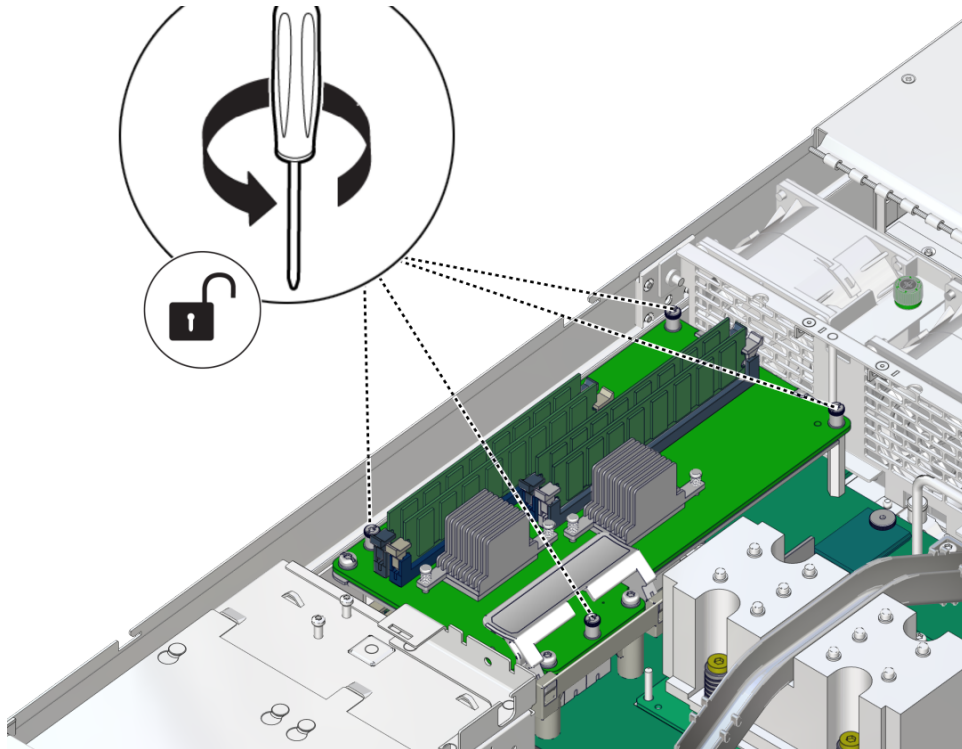
---

You can perform this procedure, but the system must first be completely powered down and all power cords unplugged. See [“Component Service Categories” on page 45](#) for more information about cold-service procedures.

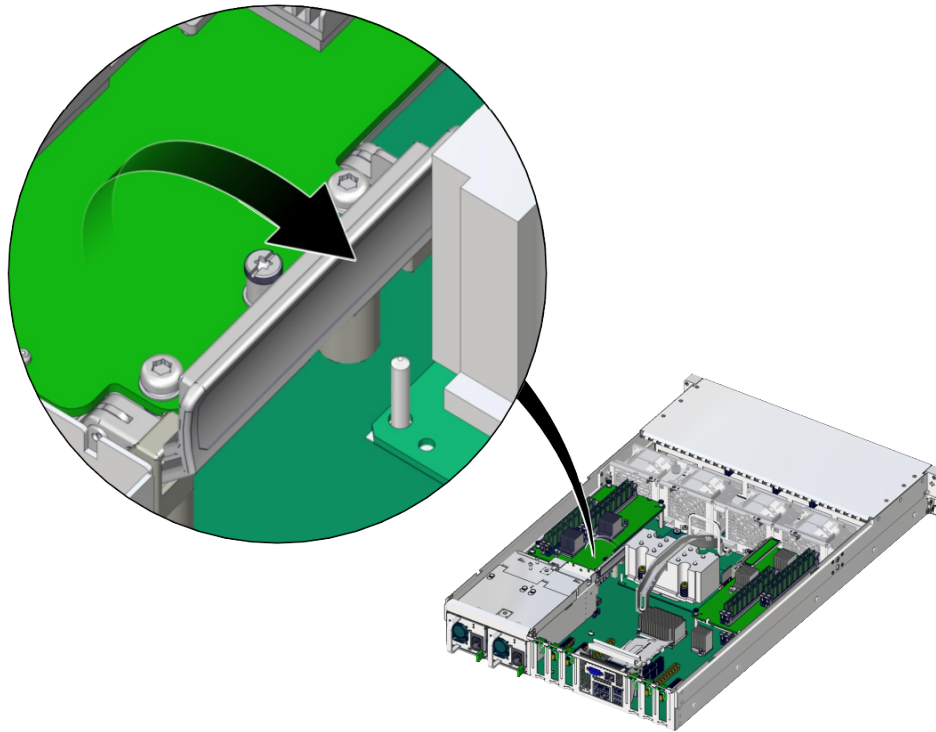
Perform this procedure to replace a faulty memory riser or to access the DIMMs on the motherboard below a memory riser.

1. **Prepare for servicing.**
  - a. **Attach an antistatic wrist strap.**
  - b. **Power off the server and unplug the power cords.**
  - c. **Extend the server to the service position.**
  - d. **Remove the top cover.**
2. **Loosen the four screws that attach the memory riser to the standoffs.**

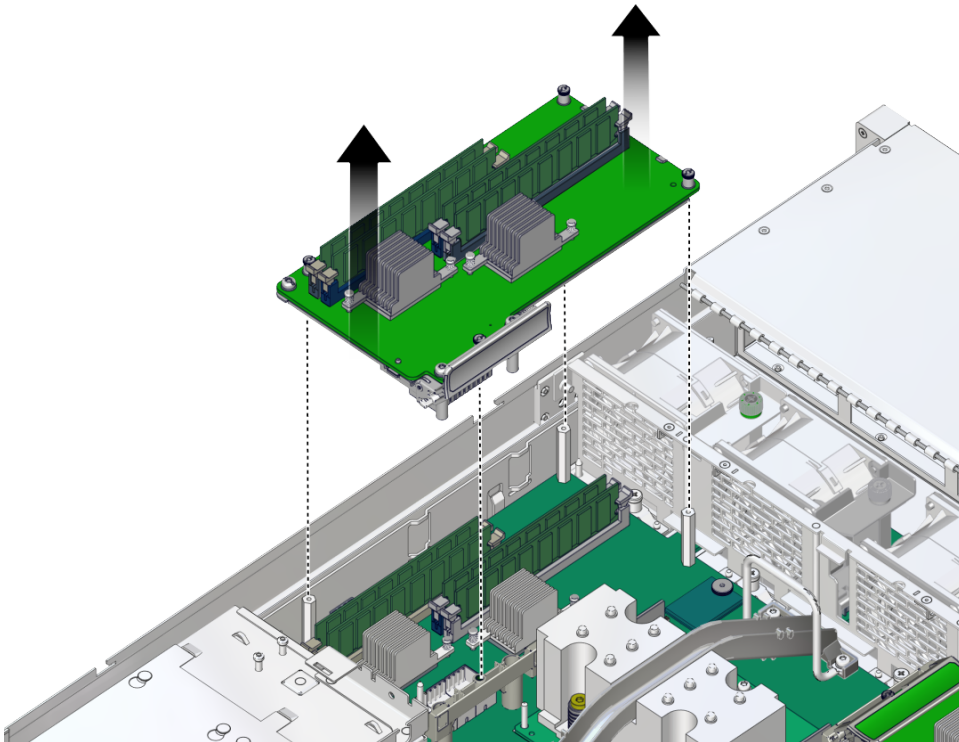
Use a No. 2 Phillips screwdriver to loosen the captive screws.



3. Lift the handle on the memory riser to release it from the connector.



4. **Lift the memory riser from the four standoffs attached to the motherboard.**



5. **Place the memory riser on an antistatic mat.**
6. **[Install a new memory riser](#)** or continue with the service task that required removing the memory riser for access.

#### **Related Information**

- [“Remove a DIMM or DIMM Filler” on page 101](#)
- [“Install a DIMM or DIMM Filler” on page 102](#)
- [“Install a Memory Riser” on page 105](#)



## ▼ Remove a DIMM or DIMM Filler



---

**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 45](#) for more information about cold-service procedures.

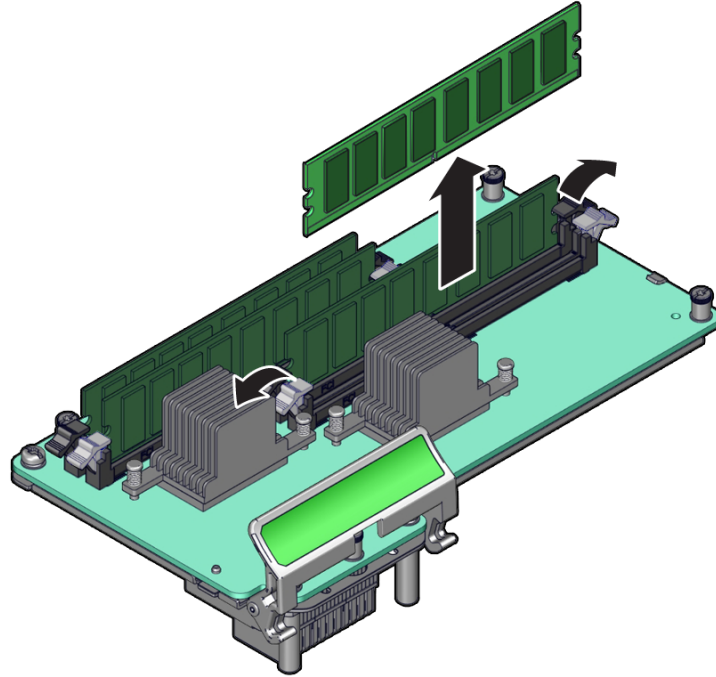


---

**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 or DIMM Filler” on page 102](#)
- [“Remove a Memory Riser” on page 97](#)
- [“Install a Memory Riser” on page 105](#)

## ▼ Install a DIMM or DIMM Filler



**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 45](#) for more information about cold-service procedures.



---

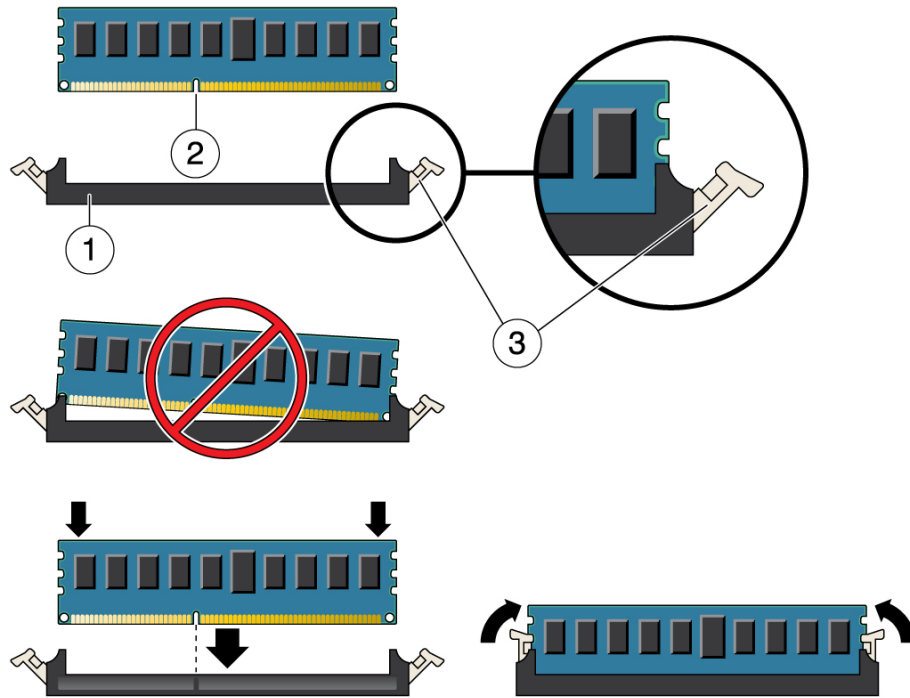
**Caution** - Whenever you remove a DIMM, you should replace it with another DIMM before applying power to the server. Otherwise, the server might overheat due to improper airflow.

---

**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

- [“Memory Riser and DIMM Configuration” on page 89](#)

- [“Checking DIMM Compatibility” on page 90](#)
- [“Remove a Memory Riser” on page 97](#)
- [“Remove a DIMM or DIMM Filler” on page 101](#)
- [“Install a Memory Riser” on page 105](#)
- [“Enable and Verify a DIMM” on page 109](#)

## ▼ Install a Memory Riser



---

**Caution** - This procedure requires handling components that are sensitive to ESD. [Follow antistatic practices](#) to avoid damage or component failure.

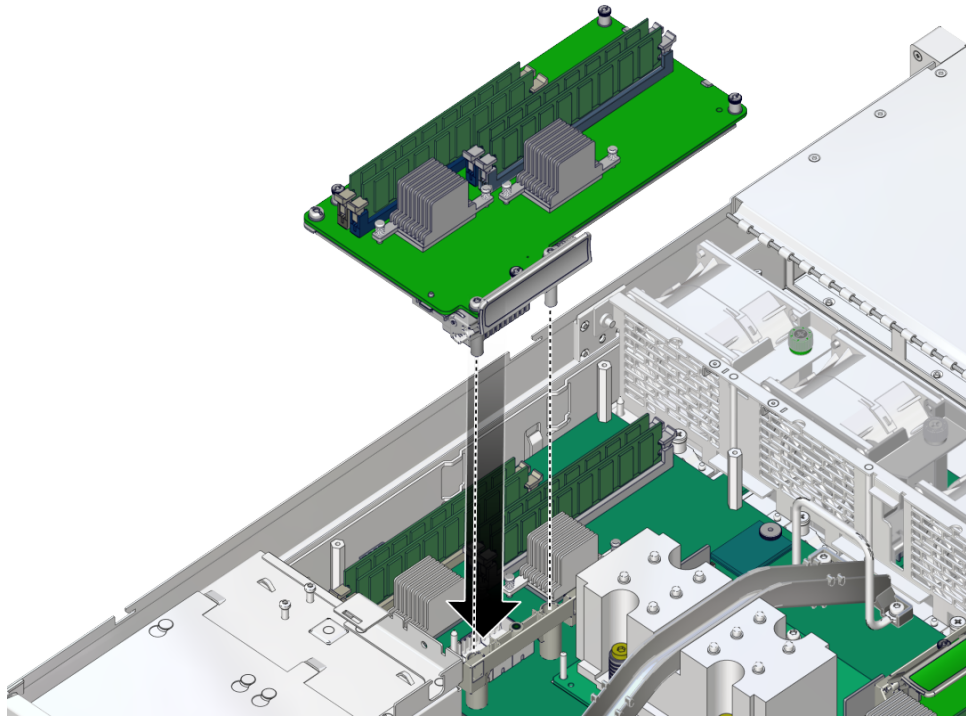
---

You can perform this procedure. The system must be completely powered down before performing this procedure. See [“Component Service Categories” on page 45](#) for more information about cold-service procedures.

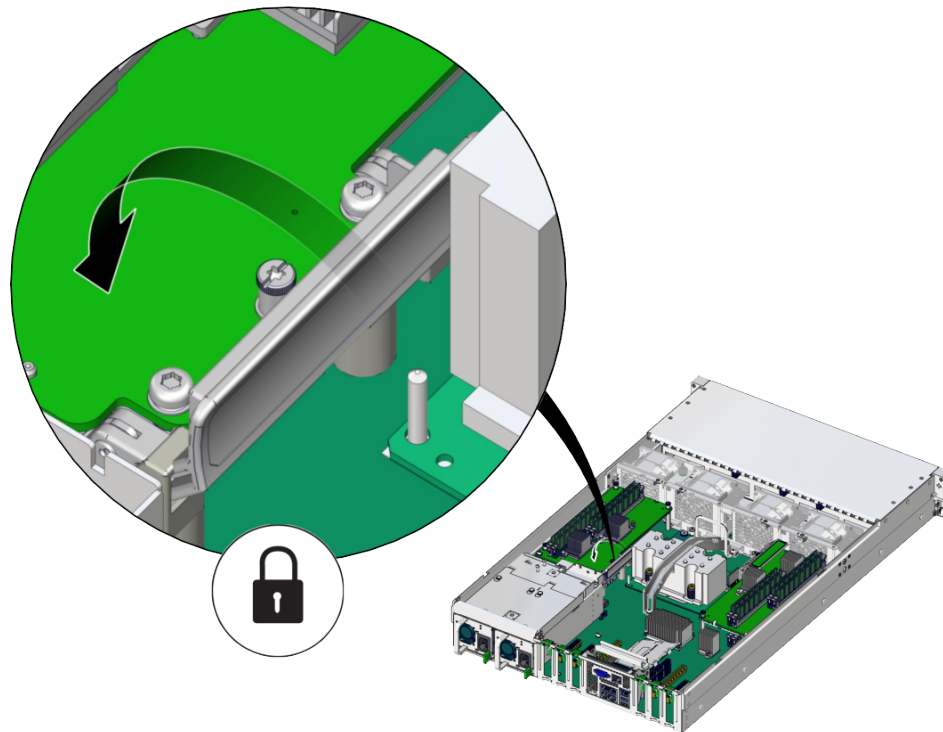
Perform this procedure to install a memory riser in order to replace a faulty memory riser or to install a memory riser you removed to access other components, such as the DIMMs on the motherboard.

1. **Align the memory riser with the four standoffs.**

The handle on the memory riser is closest to the center of the server.

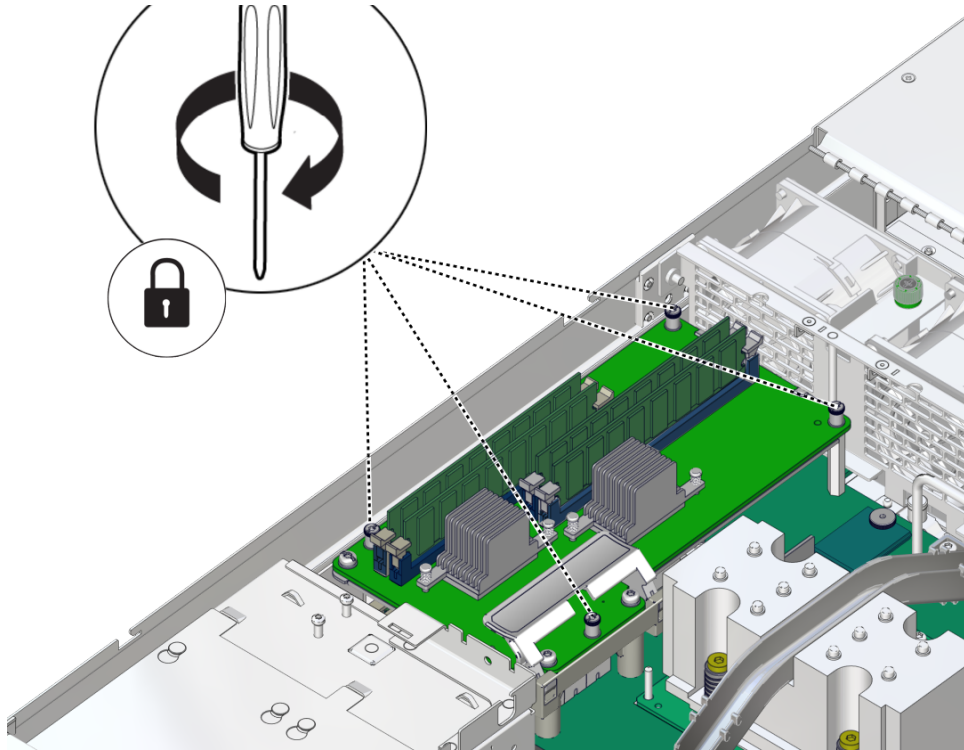


2. Lower the handle on the memory riser to seat the connector.



3. Tighten the four screws that secure the memory riser to the standoffs.

Use a No. 2 Phillips screwdriver to tighten the captive screws.



**4. Install any remaining DIMMs in the memory riser slots.**

See [“Install a DIMM or DIMM Filler”](#) on page 102.

**Related Information**

- [“Memory Riser and DIMM Configuration”](#) on page 89
- [“Checking DIMM Compatibility”](#) on page 90
- [“Remove a Memory Riser”](#) on page 97
- [“Remove a DIMM or DIMM Filler”](#) on page 101
- [“Install a Memory Riser”](#) on page 105
- [“Enable and Verify a DIMM”](#) on page 109



## ▼ Enable and Verify a DIMM

1. **Access the Oracle ILOM prompt.**  
Refer to [“Display the Oracle ILOM Prompt” in SPARC T7 Series Servers Administration Guide.](#)
2. **Use the `show faulty` command to determine how to clear the fault.**
  - If the output indicates a POST-detected fault, go to [Step 3](#).
  - If the output displays a UUID, which indicates a host-detected fault, skip [Step 3](#) and go directly to [Step 4](#).
3. **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 service processor is power cycled. In those cases, the fault is automatically cleared from the server. If `show faulty` still displays the fault, the `set` command will clear it.  
  
-> `set /SYS/MB/CM/CMP/BOB21/CH0 requested_config_state=Enabled`
4. **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. **Power cycle the server.**  
  
-> `stop /System`  
Are you sure you want to stop /System (y/n)? `y`  
Stopping /System  
-> `start /System`  
Are you sure you want to start /System (y/n)? `y`  
Starting /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. **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 directly to [Step 4f](#). If the server remains at the OpenBoot prompt (ok) go to [Step 4e](#).

---

- e. If the server remains at the OpenBoot prompt, type **boot**.
- f. Return the virtual keyswitch to Normal mode.

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

- g. Switch to the system console and type the Oracle Solaris **fmadm faulty** command.

```
# fmadm faulty
```

If any faults are reported, refer to the diagnostics instructions described in [“Identify Faulted Components”](#) on page 24.

- 5. Switch to the Oracle ILOM command shell.

- 6. Type:

```
-> show faulty
```

Target	Property	Value
/SP/faultmgmt/0	fru	/SYS/MB/CM/CMP/BOB21/CH0
/SP/faultmgmt/0	timestamp	Dec 14 22:43:59
/SP/faultmgmt/0/faults/0	sunw-msg-id	SUN4V-8000-DX
/SP/faultmgmt/0/faults/0	uuid	3aa7c854-9667-e176-efe5-e487e5207a8a
/SP/faultmgmt/0/faults/0	timestamp	Dec 14 22:43:59

If the output reports a fault with a UUID go to [Step 7](#). If the output does *not* report a fault with a UUID, you are done with the verification process.

- 7. 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.

```
# fmdm repair 3aa7c854-9667-e176-efe5-e487e520
```

### Related Information

- [“Memory Riser and DIMM Configuration” on page 89](#)
- [“Checking DIMM Compatibility” on page 90](#)
- [“Memory Riser and DIMM FRU Names” on page 91](#)
- [“Locate a Faulty DIMM \(LEDs\)” on page 95](#)
- [“Locate a Faulty DIMM \(Oracle ILOM\)” on page 94](#)

## 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 `fmdm faulty` command as described in [“Checking for Faults” on page 23](#).



# Servicing PCIe Cards

---

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

- [“PCIe Card Configuration” on page 113](#)
- [“I/O Root Complex Connections” on page 114](#)
- [“Remove a PCIe Card or Filler” on page 114](#)
- [“Install a PCIe Card or Filler” on page 117](#)

## PCIe Card Configuration

---

**Note** - Before installing PCIe cards, refer to the *SPARC T7-1 Server Product Notes* and the documentation for each PCIe card for detailed information about known issues and configuration limitations.

---

This server has six PCIe 3.0 slots that accommodate low-profile PCIe cards. All slots support x8 PCIe cards and two slots can support x16 PCIe cards.

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 T7-1 Server Product Notes* and the documentation for each card to determine if there are slot requirements.  
The switch card supporting NVMe drives must be in slot 3, because of cable lengths.
2. x16 cards can only be in slots 3 and 4.  
If a x16 card is in slot 3, any card in slot 2 is ignored.  
If a x16 card is in slot 4, any card in slot 5 is ignored.

### Related Information

- [“I/O Root Complex Connections” on page 114](#)

- [“Rear Panel Components \(Service\)” on page 15](#)
- [“Remove a PCIe Card or Filler” on page 114](#)
- [“Install a PCIe Card or Filler” on page 117](#)

## I/O Root Complex Connections

The single IOH connects to all six of the PCIe slots.

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

PCIe Slot	CPU	IOS	RP	Root Complex Path	Oracle ILOM Target
1	0	4	0	/pci@304/pci@1	/SYS/MB/PCIE1
2	0	3	1	/pci@303/pci@2	/SYS/MB/PCIE2
3	0	3	0	/pci@303/pci@1	/SYS/MB/PCIE3
4	0	1	0	/pci@302/pci@1	/SYS/MB/PCIE4
5	0	1	1	/pci@302/pci@2	/SYS/MB/PCIE5
6	0	0	0	/pci@301/pci@1	/SYS/MB/PCIE6

### Related Information

- [“Rear Panel Components \(Service\)” on page 15](#)
- [“Server Block Diagram” on page 19](#)
- [“PCIe Card Configuration” on page 113](#)
- [“Remove a PCIe Card or Filler” on page 114](#)
- [“Install a PCIe Card or Filler” on page 117](#)

## ▼ Remove a PCIe Card or Filler



---

**Caution** - This procedure requires that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“ESD Measures” on page 42](#).

---

You can perform this procedure. The server must be completely powered down before performing this procedure. See [“Component Service Categories” on page 45](#) for more information about cold-service procedures.

1. **Prepare for servicing.**
  - a. **Attach an antistatic wrist strap.**
  - b. **Power off the server and disconnect all power cords from the server power supplies.**

See [“Removing Power From the Server” on page 46](#).
  - c. **Extend the server to the maintenance position.**

See [“Extend the Server to the Service Position” on page 51](#).
  - d. **Remove the top cover.**

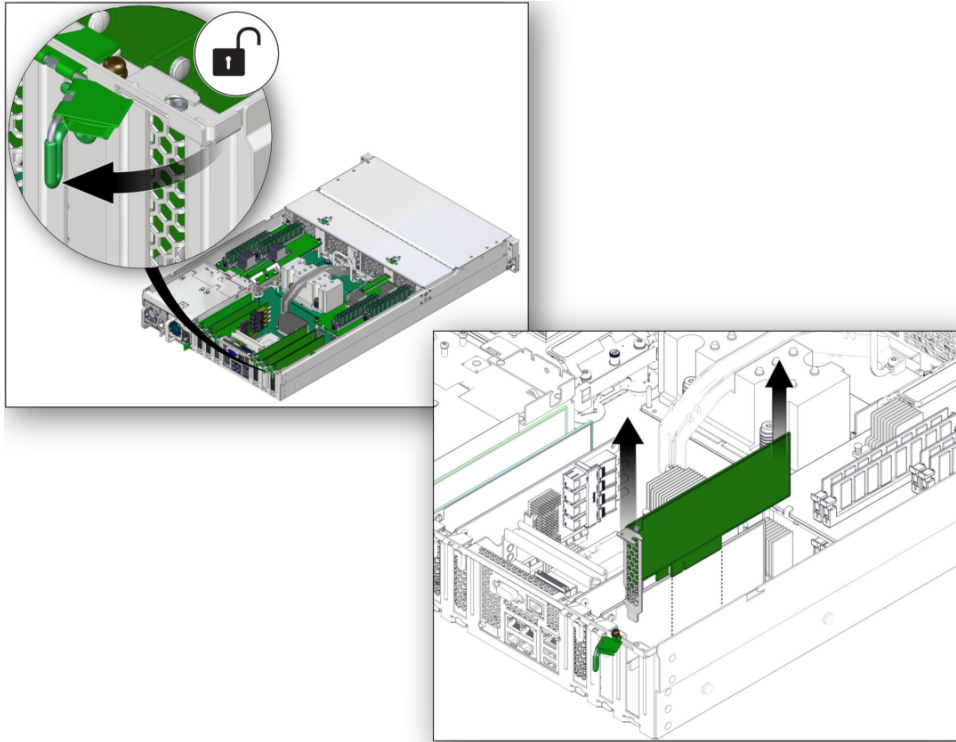
See [“Remove the Top Cover” on page 55](#).
2. **Locate the PCIe card or filler that you want to remove.**

See [“Rear Panel Components \(Service\)” on page 15](#) for information about PCIe slots and their locations.

If you are removing a PCIe filler, go to [Step 6](#).
3. **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. **Remove any transceivers from the PCIe card before removing the card.**

**6. Remove the PCIe card by completing the following tasks.**



- a. Rotate the PCIe card locking mechanism (panel 1).
  - b. Carefully lift the PCIe card or filler from the card slot (panel 2).
7. Replace with another PCIe card or filler before the server is connected to power again.  
See [“Install a PCIe Card or Filler” on page 117](#).

**Related Information**

- [“Install a PCIe Card or Filler” on page 117](#)



## ▼ Install a PCIe Card or Filler



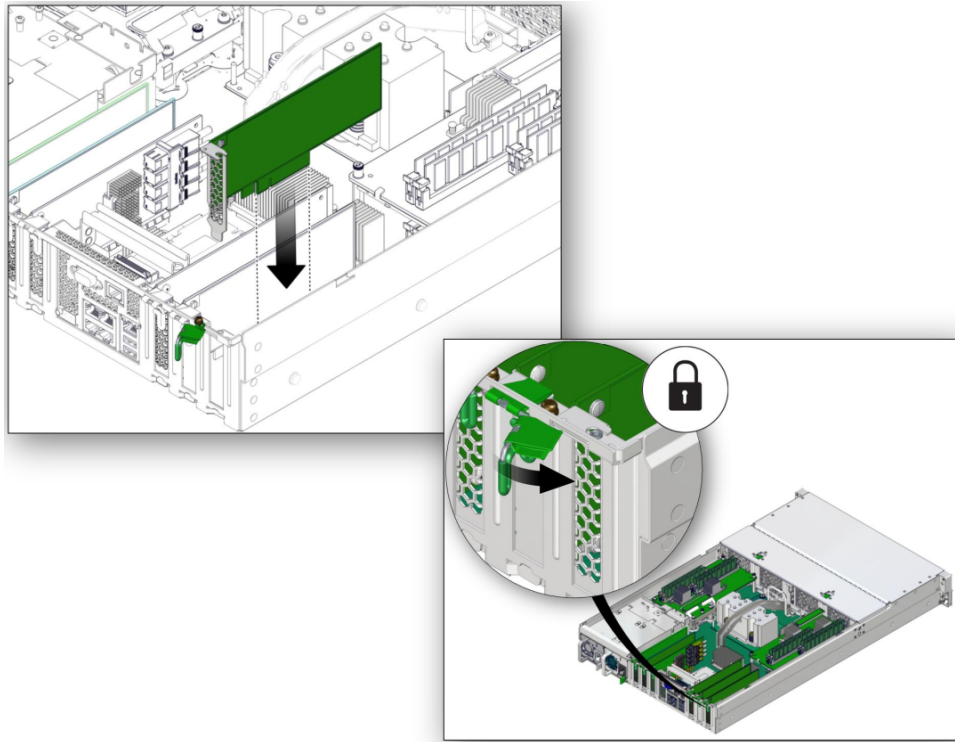
---

**Caution** - This procedure requires that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“ESD Measures” on page 42](#).

---

1. **Remove a PCIe card or filler.**  
See [“Remove a PCIe Card or Filler” on page 114](#).
2. **Attach an antistatic wrist strap, unpack the PCIe card or PCIe filler, and place on an antistatic mat.**
3. **Remove any transceivers from the PCIe card before installing the card.**
4. **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 46](#).
5. **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 113](#).
6. **Open the PCIe card locking mechanism for this PCIe card slot.**  
The locking mechanism might already be disengaged if you removed a PCIe card or filler from that slot.

7. **Install the PCIe card or filler into the slot (panel 1) and rotate the PCIe locking mechanism to secure the PCIe card or filler in place (panel 2).**



8. **Return the server to operation.**
  - a. **Install the top cover.**  
See [“Replace the Top Cover” on page 176.](#)
  - b. **Return the server to the normal operating position.**  
See [“Return the Server to the Normal Operating Position” on page 177.](#)
  - c. **Reconnect all power cords to the server power supplies.**  
See [“Attach Power Cords” on page 178.](#)
  - d. **Power on the server.**

See “Power On the Server (Oracle ILOM)” on page 178 or “Power On the Server (System Power Button)” on page 179.

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

To create or recover RAID configurations, refer to the *LSI MegaRAID SAS Software User's Guide*, which is available at:

<https://www.broadcom.com/support/oem/oracle/>

### **Related Information**

- “PCIe Card Configuration” on page 113
- “Remove a PCIe Card or Filler” on page 114



## Servicing the eUSB Drive

---

The eUSB drive is mounted on the motherboard towards the front on the power supply side.

These topics describe how to service the eUSB drive.

- [“Install the eUSB Drive” on page 123](#)
- [“Remove the eUSB Drive” on page 121](#)

### Related Information

- [“Detecting and Managing Faults” on page 23](#)

## ▼ Remove the eUSB Drive

You can perform this cold-service procedure. Power down the server completely before performing this procedure.



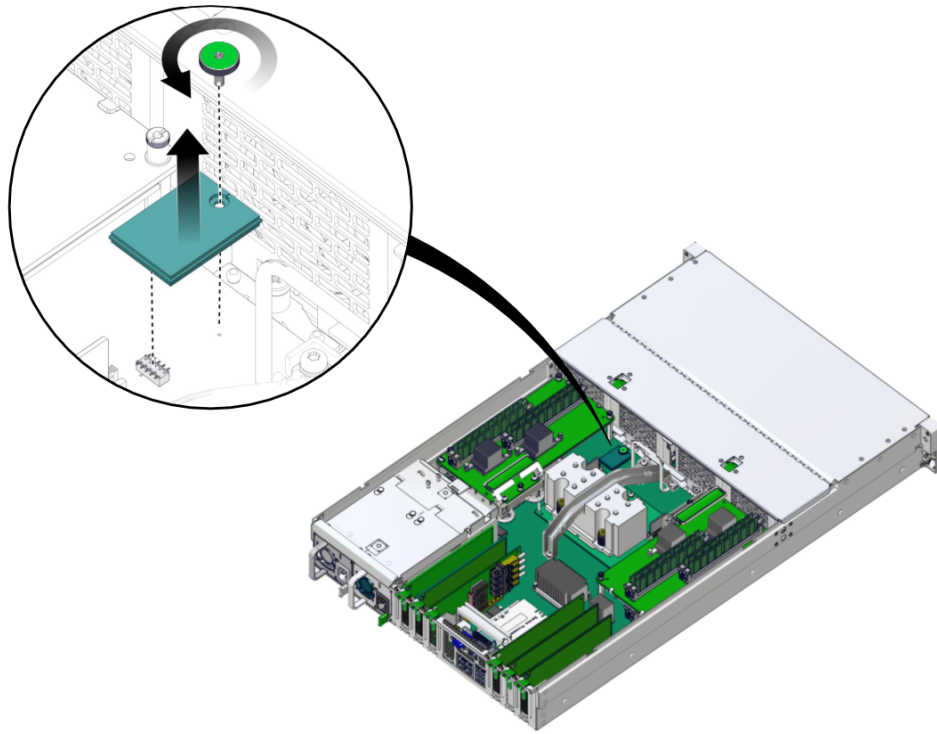
---

**Caution** - This procedure requires that you handle components that are sensitive to ESD. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Prevent ESD Damage” on page 50](#).

---

1. **Prepare the system for service.**  
See [“Preparing for Service” on page 41](#).
2. **Remove the screw that attaches the eUSB drive to the motherboard.**

This screw is not a captive screw, so be careful not to drop it inside the server. Retain the screw to use with the new eUSB drive.



If the screw is too tight to remove by hand, use a Torx 10 driver to loosen it.

**3. Lift the eUSB drive up to disconnect it from the motherboard.**

**4. Install a new eUSB drive.**

See [“Install the eUSB Drive” on page 123](#).

### Related Information

- [“Install the eUSB Drive” on page 123](#)

## ▼ Install the eUSB Drive

You can perform this cold-service procedure. Power down the server completely before performing this procedure.



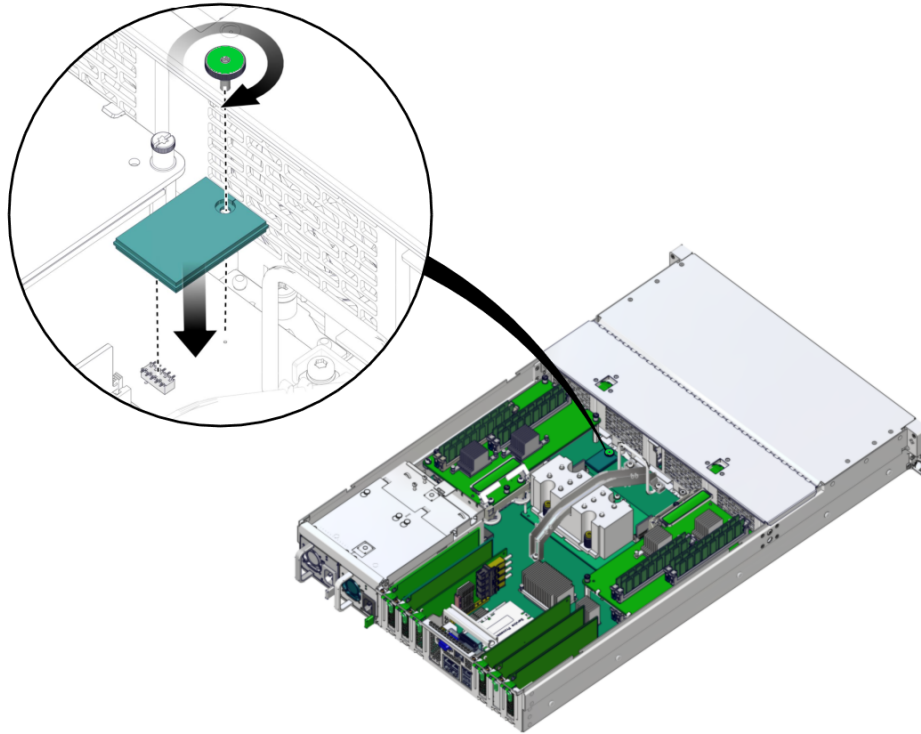
---

**Caution** - This procedure requires that you handle components that are sensitive to ESD. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Prevent ESD Damage” on page 50](#).

---

1. **Remove the eUSB drive.**  
See [“Remove the eUSB Drive” on page 121](#).
2. **Ensure you are taking all ESD precautions before handling the eUSB drive.**  
See [“Prevent ESD Damage” on page 50](#).

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



4. **Hand tighten the screw to secure the drive to the motherboard.**  
Do not use a tool to tighten the screw further.
5. **Return the server to operation.**  
See [“Returning the Server to Operation” on page 171.](#)

#### **Related Information**

- [“Remove the eUSB Drive” on page 121](#)



## Servicing the Battery

---

The battery is located inside the chassis. See [“Internal Component Locations” on page 16](#). The battery maintains system time when the server is powered off and disconnected from AC power. If the IPMI logs 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 125](#)

### Related Information

- [“Detecting and Managing Faults” on page 23](#)

## ▼ Replace the Battery

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

To correctly reset the date and time before replacing a battery, you must revert 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.**

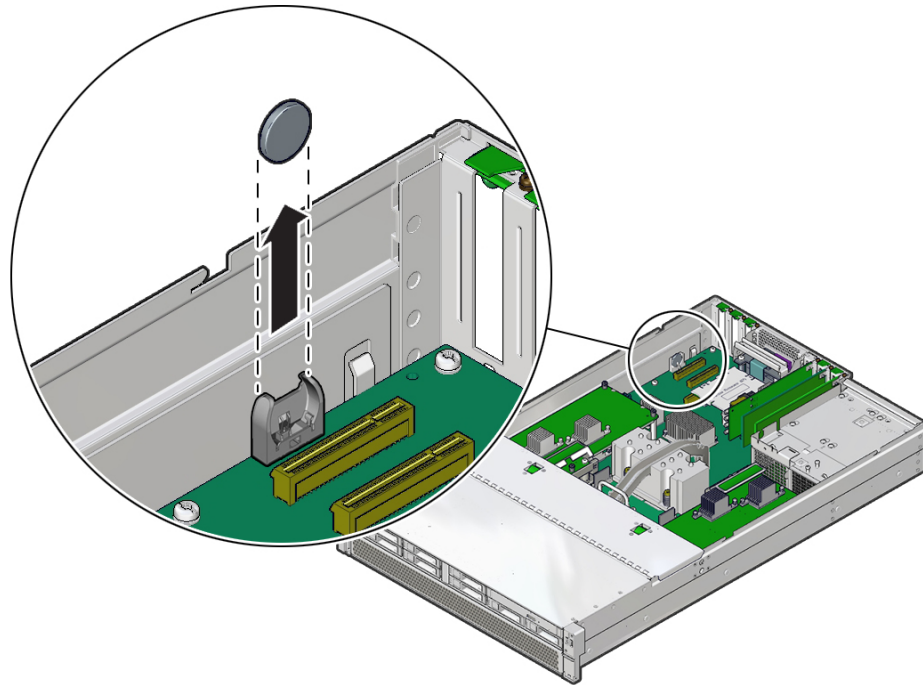
```
-> set /SP/clock usentpserver=disabled
```

**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. **If a PCIe card is in slot 6, remove it to improve access to the battery.**  
See [“Remove a PCIe Card or Filler” on page 114.](#)
- c. **Remove the old battery**

Gently push the battery toward the service processor 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. If you needed to remove a PCIe card from slot 6, replace that card.**

See [“Install a PCIe Card or Filler” on page 117](#).

**f. [Return the Server to Operation](#).**

**3. Reset the system clock.**

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

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

```
-> set /SP/c!ock datetime=081221302016timezone=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\_POWER\_ON was enabled before you replaced the battery, you must re-enable it.**

```
-> set /SP/policy HOST_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 24](#)

# Servicing the SPM

---

These topics describe how to service the SPM.

- [“SPM Firmware and Configuration” on page 129](#)
- [“Remove the SPM” on page 130](#)
- [“Install the SPM” on page 132](#)
- [“Verify the SPM” on page 135](#)

## SPM Firmware and Configuration

System firmware consists of two components, an SP component and a host component. The SP 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 132](#).

### Related Information

- Oracle ILOM documentation
- [“Servicing the Motherboard” on page 145](#)
- [“Remove the SPM” on page 130](#)
- [“Install the SPM” on page 132](#)

## ▼ Remove the SPM



---

**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** - These procedures require that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“ESD Measures” on page 42](#).

---

You can perform this cold-service procedure. The server must be completely powered down before performing this procedure. See [“Component Service Categories” on page 45](#) for more information about this category of service procedures.

The amber SP OK/Fault LED on the front panel will be lit when an SPM fault is detected.

**1. If possible, back up the Oracle ILOM configuration before removing the SPM.**

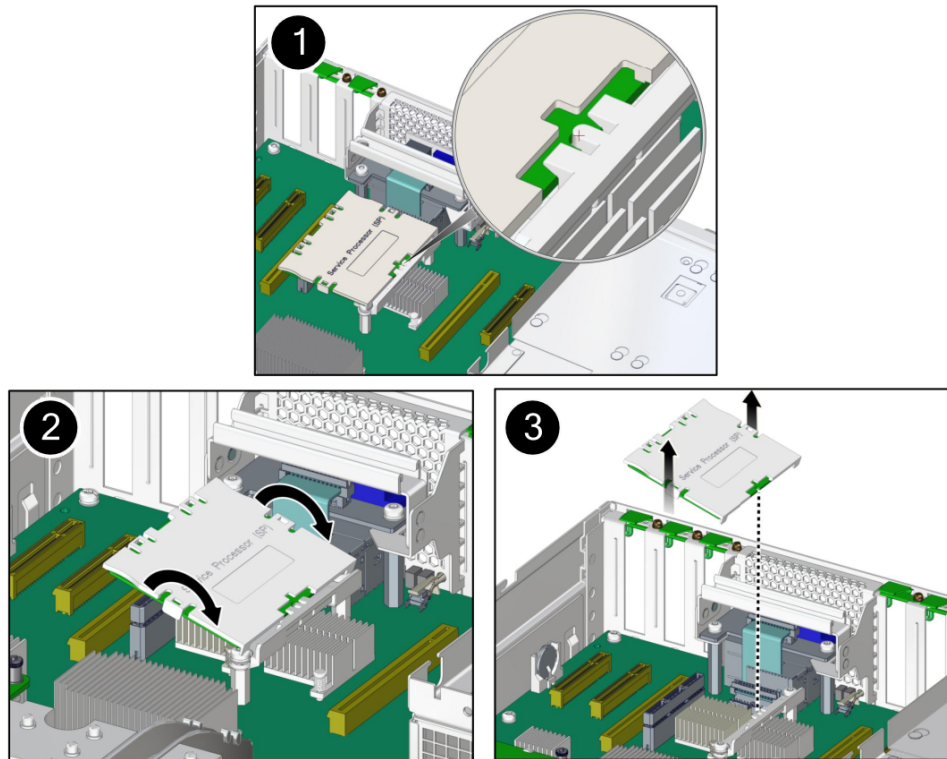
After you replace the SPM, restoring the SPM configuration will be easier if you previously saved the configuration using the Oracle ILOM backup utility. Refer to the Oracle ILOM documentation for instructions on backing up and restoring the Oracle ILOM configuration.

To retain the same version of the system firmware with the new SPM, note the current version before removing the SPM.

**2. Prepare for servicing.**

- a. **Attach an antistatic wrist strap.**
- b. **Power off the server and unplug power cords from the power supplies.**  
See [“Removing Power From the Server” on page 46](#).
- c. **Remove the server from the rack.**  
See [“Remove the Server From the Rack” on page 54](#).
- d. **Remove the top cover.**  
See [“Remove the Top Cover” on page 55](#).

3. Locate the SPM (panel 1).



4. Remove the SPM.

---

**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.

---

- a. Grasp the SPM by the two grasp points (panel 2) and lift up to disengage the SPM from the connectors on the motherboard.
- b. Lift the SPM up and away from the motherboard (panel 3).

5. Install a new SPM.

See [“Install the SPM” on page 132](#).

### Related Information

- [“SPM Firmware and Configuration” on page 129](#)
- [“Install the SPM” on page 132](#)

## ▼ Install the SPM

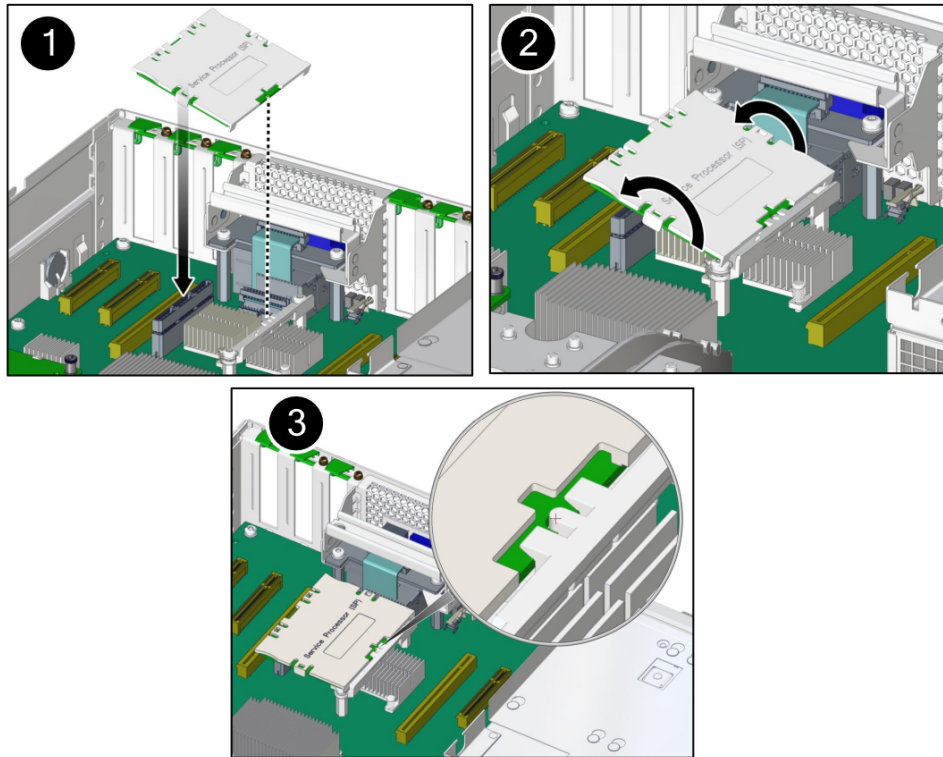
You can perform this cold-service procedure. The server must be completely powered down before performing this procedure. See [“Component Service Categories” on page 45](#) for more information about this category of service procedures.

1. **Remove a defective SPM or remove the SPM you will install in a new motherboard.**

See [“Remove the SPM” on page 130](#).



2. Lower the side of the SPM with the Align Tab sticker at an angle onto the SPM support on the motherboard (panel 1).



3. Press the SPM straight down until it is fully seated in its socket (panel 2).  
Ensure that the notched tab at the other end of the SPM is held in place (panel 3).
4. Return the server to an operational condition.
  - a. Install the top cover.  
See [“Replace the Top Cover” on page 176](#).
  - b. Return the server to the normal operating position.  
See [“Return the Server to the Normal Operating Position” on page 177](#).
  - c. Reconnect the power cords to the power supplies.

See [“Attach Power Cords” on page 178](#).

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

Refer to [“Connect a Terminal or Emulator to the SER MGT Port” in SPARC T7-1 Server Installation Guide](#).

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.

---

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

Refer to [“Configuring SP and Host Network Addresses” in SPARC T7 Series Servers Administration Guide](#), or the Oracle ILOM documentation for network configuration instructions.

7. **Download the system firmware.**

Follow the firmware download instructions in [“Updating the System Firmware” in SPARC T7 Series Servers Administration Guide](#), 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.

---

8. **If you created a backup of your Oracle ILOM configuration, use the Oracle ILOM restore utility to restore the configuration of the replacement SPM.**

Refer to the Oracle ILOM documentation for instructions.

9. **Power on the server.**

See [“Power On the Server \(Oracle ILOM\)” on page 178](#) or [“Power On the Server \(System Power Button\)” on page 179](#).

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. Verify the SPM.

See [“Verify the SPM” on page 135](#).

## 12. Verify that the SPM date is correct.

```
-> show /SP/clock
```

```
/SP/clock
Properties:
  datetime = Tue Sep 07 08:09:59 2013
  timezone = GMT (GMT)
  uptime = 0 days, 00:01:18
  usentpserver = disabled
->
```

- a. **Set the datetime property, if necessary.**

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

- b. **Set the timezone property, if necessary.**

```
-> set /SP/clock timezone=3-to-4-characters
```

where the timezone value equals a three- or four-character timezone abbreviation, such as EST.

### Related Information

- Oracle ILOM documentation
- [“Remove the SPM” on page 130](#)
- [“Verify the SPM” on page 135](#)

## ▼ Verify the SPM

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

Note that the LED flashes green while the SPM initializes the Oracle ILOM firmware. See [“Interpreting LEDs” on page 29](#) for information about the status of the SP LED.

**2. Use the Oracle ILOM `show faulty` command to verify that the fault has been cleared.**

See [“Identify Faulted Components” on page 24](#) for more information on using the `show faulty` command.

Consider these possibilities.

- If the previous steps did not clear the fault, see [“Detecting and Managing Faults” on page 23](#) for information about the tools and methods you can use to diagnose component faults.
- If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

**Related Information**

- Oracle ILOM documentation
- [“Install the SPM” on page 132](#)

## Servicing the DVD Drive

---

The SATA DVD drive is mounted in a slot that is accessed from the system's front panel. You also must detach cables inside the chassis to remove the DVD drive. See [“Internal Component Locations” on page 16](#). The DVD drive must be removed from the drive cage in order to service the drive backplane.



---

**Caution** - Do not operate the server without a DVD drive installed. Otherwise the server might overheat due to improper airflow.

---

These topics describe how to service a DVD drive.

- [“Remove a DVD Drive” on page 137](#)
- [“Install a DVD Drive” on page 140](#)

### Related Information

- [“Front Panel Components \(Service\)” on page 13](#)

## ▼ Remove a DVD Drive

This component must be replaced by authorized service personnel. The server must be completely powered down before performing this procedure. See [“Component Service Categories” on page 45](#) for more information about cold-service procedures.

1. **Prepare for servicing.**
  - a. **Attach an antistatic wrist strap.**
  - b. **Remove any media from the drive.**
  - c. **Power off the server and unplug power cords from the power supplies.**

See [“Removing Power From the Server” on page 46.](#)

**2. Prepare the server for service.**

- a. Power off the server and disconnect the power cords from the server power supplies.**

See [“Removing Power From the Server” on page 46.](#)

- b. Extend the server into the maintenance position.**

See [“Extend the Server to the Service Position” on page 51.](#)

- c. Attach an antistatic wrist strap.**

See [“Safety Information” on page 41.](#)

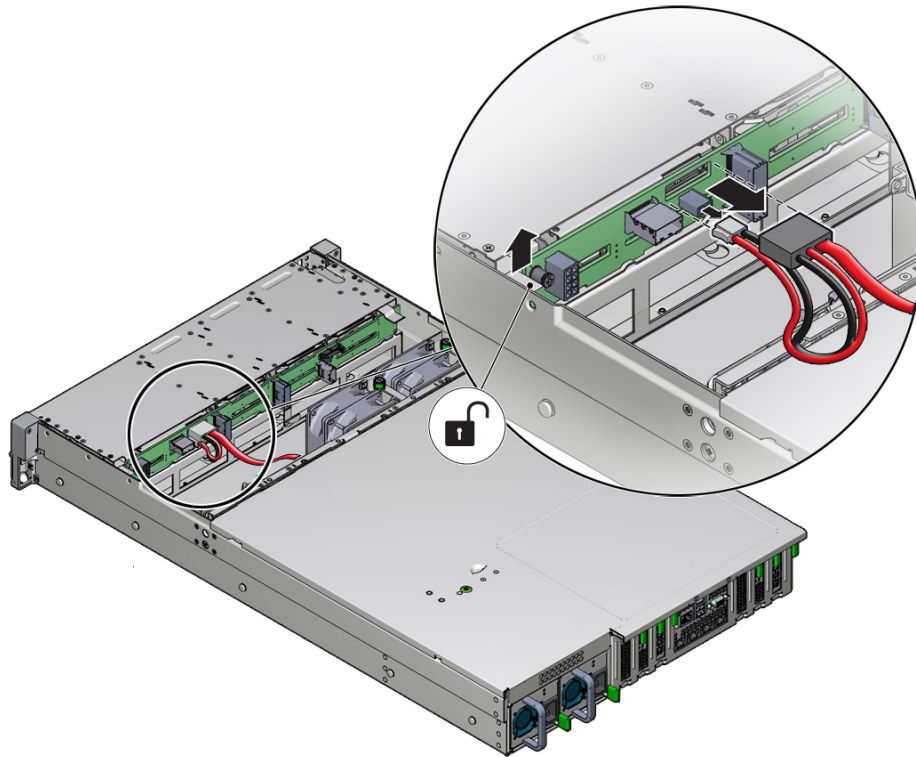
- d. Remove the fan cover.**

See [“Remove the Fan Cover” on page 57.](#)

**3. If necessary, remove fan modules from the chassis.**

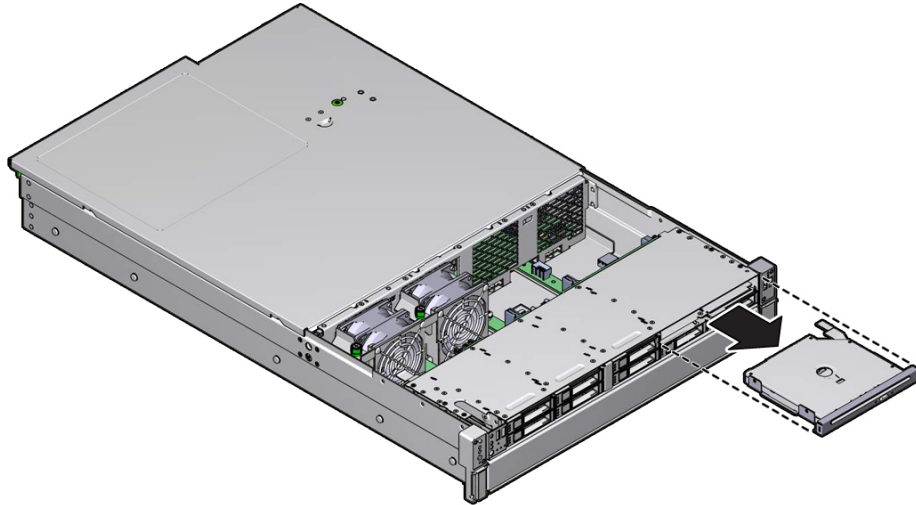
See [“Remove a Fan Module” on page 75.](#)

4. Reach into the server directly behind the DVD drive, and disconnect the power and DVD data connectors from rear of the DVD drive.



5. Lift up on the release tab on the rear of the DVD drive to disengage the drive from the chassis.

6. Gently push the DVD drive forward and out of the front of the chassis.



7. Standing in front of the chassis, grasp the DVD drive with both hands, and continue to pull the DVD drive from the chassis until it clears the front of the server.
8. Place the DVD drive on an antistatic mat.
9. Replace the DVD drive or continue to access other parts for service.  
See [“Install a DVD Drive” on page 140](#).

#### Related Information

- [“Install a DVD Drive” on page 140](#)

## ▼ Install a DVD Drive

Authorized service personnel can perform this procedure. The server must be completely powered down before performing this procedure. See [“Component Service Categories” on page 45](#) for more information about cold-service procedures.

1. Remove the defective DVD drive.



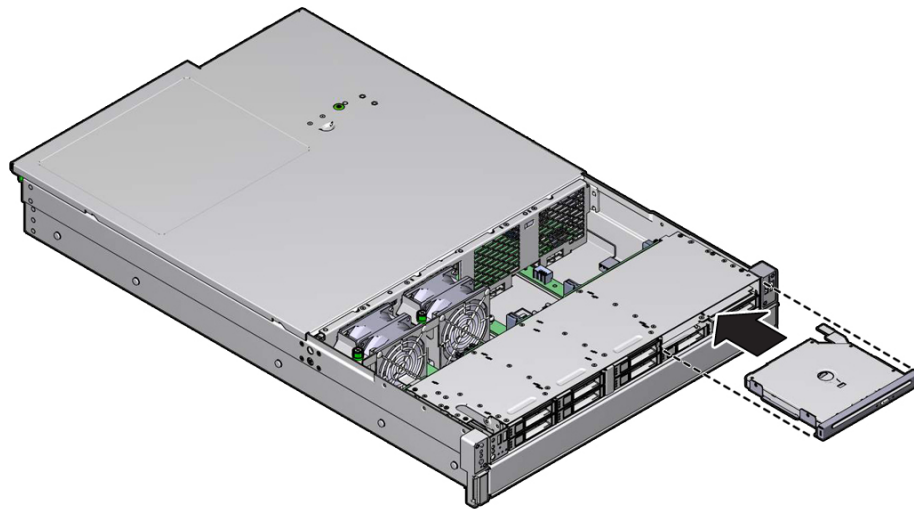
See [“Remove a DVD Drive” on page 137](#).

**2. Unpack the DVD drive.**

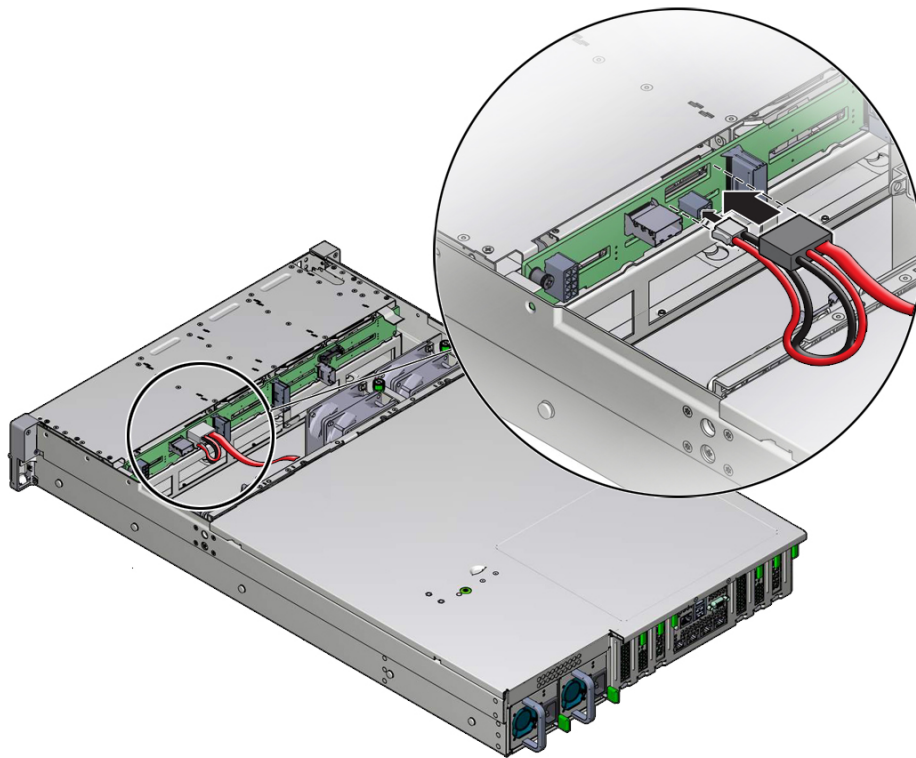
Attach an antistatic wrist wrap and place the drive on an antistatic mat.

**3. Gently push the replacement DVD drive into the chassis.**

Continue to push the DVD drive into the chassis until the release tab on the rear of the drive engages the chassis with an audible click.



4. **Reach into the server directly behind the DVD drive, and reconnect the power and DVD data connectors to the rear of the DVD drive.**



5. **If removed, reinstall fan modules in the chassis.**  
See [“Install a Fan Module” on page 78.](#)
6. **Install the fan cover, and close its latch.**  
See [“Replace the Fan Cover” on page 171.](#)
7. **Install the top cover.**  
See [“Replace the Top Cover” on page 176.](#)
8. **Return the server to operation.**
  - a. **Return the server to the normal rack position.**

See [“Return the Server to the Normal Operating Position” on page 177](#).

- b. Reconnect the power cords to the server power supplies, and power on the server.**

See [“Attach Power Cords” on page 178](#) and [“Power On the Server \(Oracle ILOM\)” on page 178](#) or [“Power On the Server \(System Power Button\)” on page 179](#).  
Verify that the power supply AC OK LED is lit.

### **Related Information**

- [“Remove a DVD Drive” on page 137](#)



## Servicing the Motherboard

---

The motherboard includes one CMP module, memory control subsystems, and all SP (Oracle ILOM) logic. The motherboard hosts a removable SC PROM, which contains MAC addresses and host ID.

These topics describe how to service the motherboard.

- [“Remove the Motherboard” on page 145](#)
- [“Install the Motherboard” on page 152](#)
- [“Reactivate RAID Volumes” on page 159](#)
- [“Verify the Motherboard” on page 162](#)

### Related Information

- [“Component Service Categories” on page 45](#)
- [“Remove the Motherboard” on page 145](#)
- [“Install the Motherboard” on page 152](#)
- [“Verify the Motherboard” on page 162](#)
- [“Servicing the SPM” on page 129](#)

## ▼ Remove the Motherboard



---

**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** - These procedures require that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“ESD Measures” on page 42](#).

---

This is a cold-service procedure that must be performed by qualified service personnel. The server must be completely powered down before performing this procedure. See [“Component Service Categories” on page 45](#) for more information about this category of service procedures.

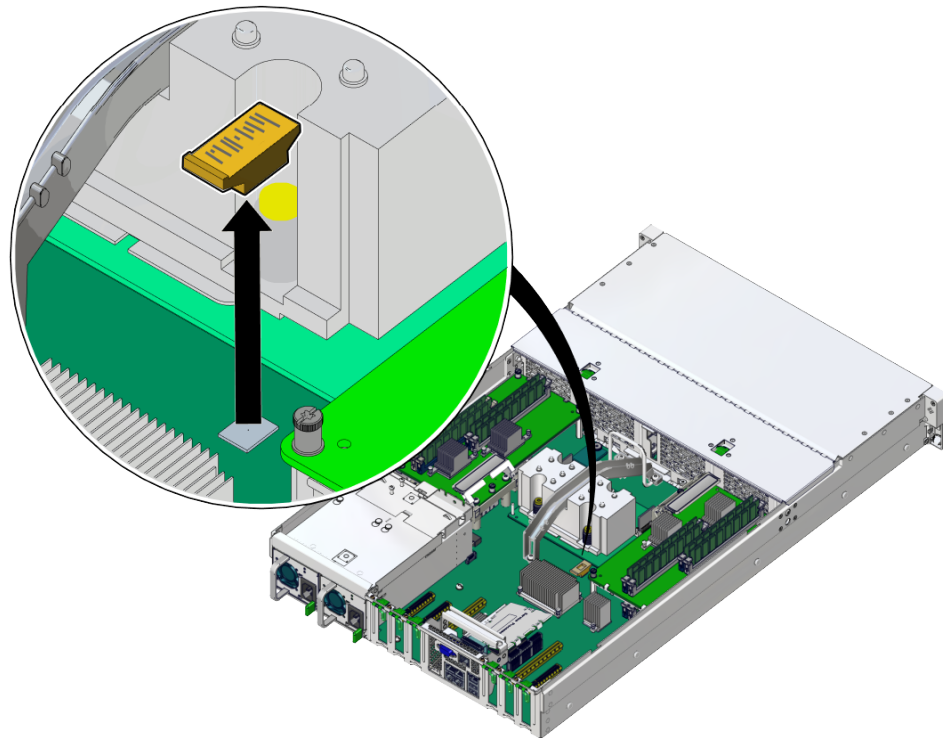
---

**Note** - When replacing the motherboard, remove the SPM and SC PROM from the old motherboard, and install these components on the new motherboard. The SPM contains the Oracle ILOM system configuration data, and the SC 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.**
  - a. **Attach an antistatic wrist strap.**
  - b. **Power off the server and unplug power cords from the power supplies.**  
See [“Removing Power From the Server” on page 46](#).
  - c. **Remove the server from the rack.**  
See [“Remove the Server From the Rack” on page 54](#).
  - d. **Remove the top cover.**  
See [“Remove the Top Cover” on page 55](#).
2. **Remove the airflow cover.**  
See [“Open and Remove the Airflow Cover” on page 56](#).
3. **Remove all PCIe cards.**  
See [“Remove a PCIe Card or Filler” on page 114](#).  
  
Always remove transceivers from a PCIe card before removing the card from the server.  
  
Keep track of which slot each PCIe card was in so you can return them to their original positions.
4. **Remove the SC 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 any memory risers.**

See [“Remove a Memory Riser” on page 97](#).

You will reinstall the memory risers on the new motherboard. Keep track of which side each memory riser came from and return them to their original position.

**7. Remove DIMMs from the motherboard.**

See [“Remove a DIMM or DIMM Filler” on page 101](#).

You will reinstall the DIMMs on the new motherboard. Keep track of which slot each DIMM came from and return them to their original position.

**8. Remove the eUSB drive.**

You will reinstall the eUSB drive on the new motherboard. See [“Remove the eUSB Drive” on page 121](#).

**9. Open the fan cover and remove the fan modules.**

**10. Disconnect the ribbon cables from the motherboard that go to the left and right LED indicator modules (panel 1).**

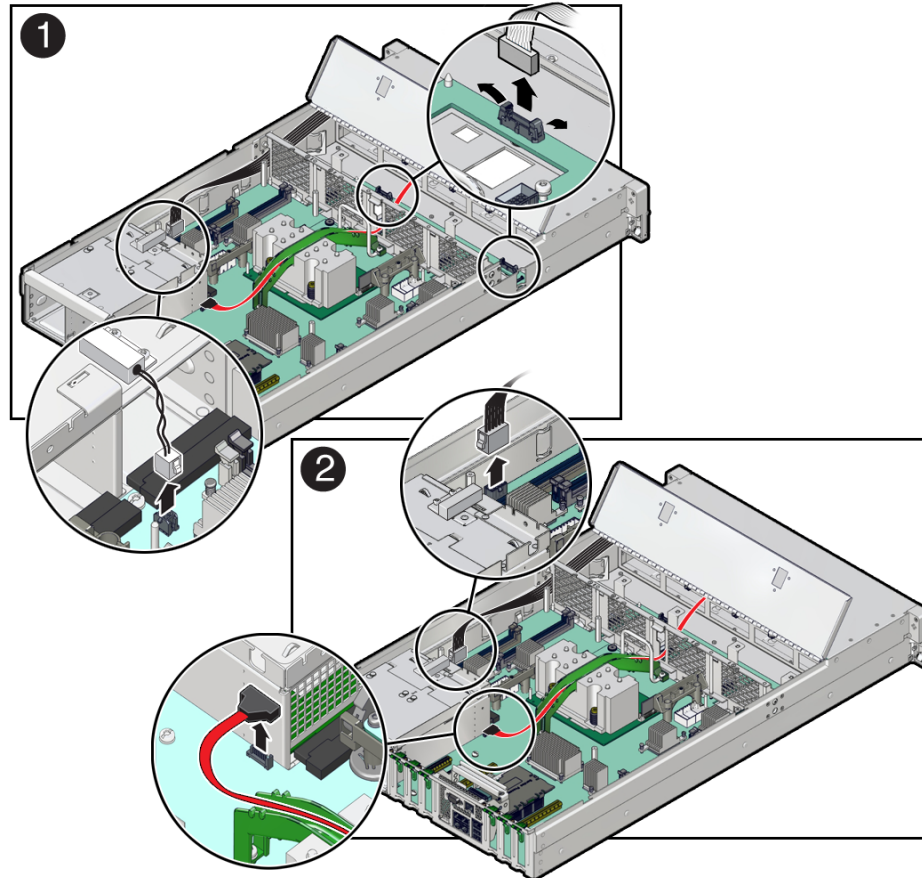
The right LED indicator module include the front USB 2.0 ports. The left and right LED indicator modules do not need to be removed to replace the motherboard.

**11. Disconnect the cable from the server intrusion switch (panel 1).**

**12. Disconnect the DVD drive cable from the motherboard (panel 2).**



Carefully guide the DVD drive cable through the chassis mid-wall. Place the cable on top of the disk cage so that it is away from the motherboard. You do not need to disconnect the DVD drive cable from the DVD drive.

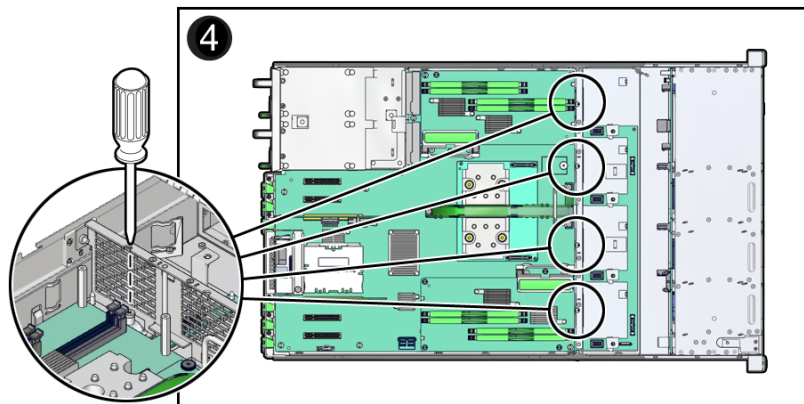
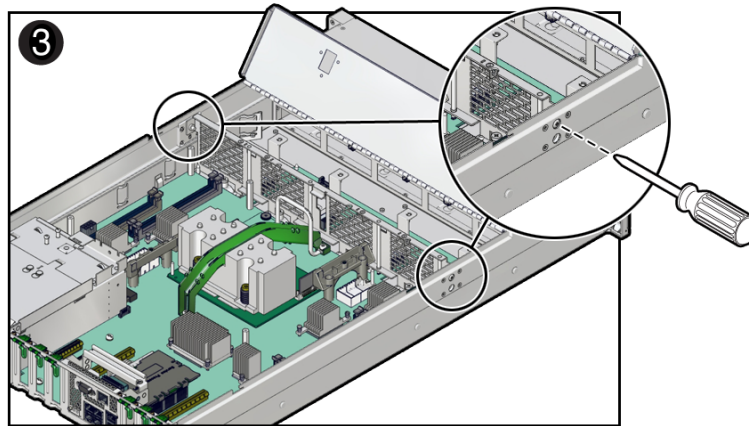


13. **Disconnect the signal cable and power cable from the motherboard to the drive backplane.**

See [“Remove the Drive Backplane”](#) on page 163.

14. **Disconnect the mid-wall from the chassis.**

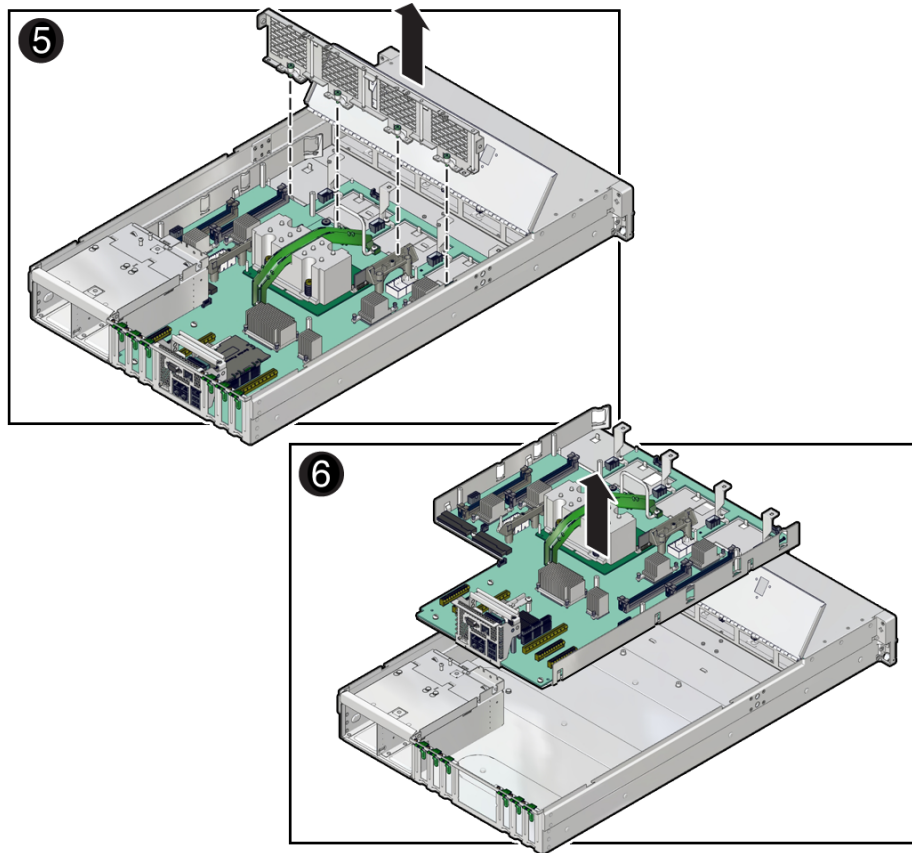
- a. Remove the screw on each side of the chassis that secures the mid-wall to the chassis (panel 3).



- b. Loosen the four green captive screws that secure the mid-wall to the bottom of the chassis (panel 4).

Use a No. 2 Phillips screwdriver to loosen the captive screws.

**15. Lift the mid-wall out of the chassis (panel 5)**



**16. Release the power supplies and pull them slightly out of the server.**

The power supplies do not need to be removed from the chassis to lift out the motherboard.

**17. Lift the motherboard out of the chassis.**

You can use the bar by the rear I/O panel and the metal handle in front of the cable channel as handles to lift the motherboard.

**18. Place the motherboard on an antistatic mat.**

**19. Install a new motherboard.**

See [“Install the Motherboard” on page 152](#).

### Related Information

- [“Install the Motherboard” on page 152](#)
- [“Verify the Motherboard” on page 162](#)

## ▼ Install the Motherboard

When replacing the motherboard, remove the SPM and SC PROM from the old motherboard and install these components on the new motherboard. The SPM contains the Oracle ILOM system configuration data, and the SC 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.

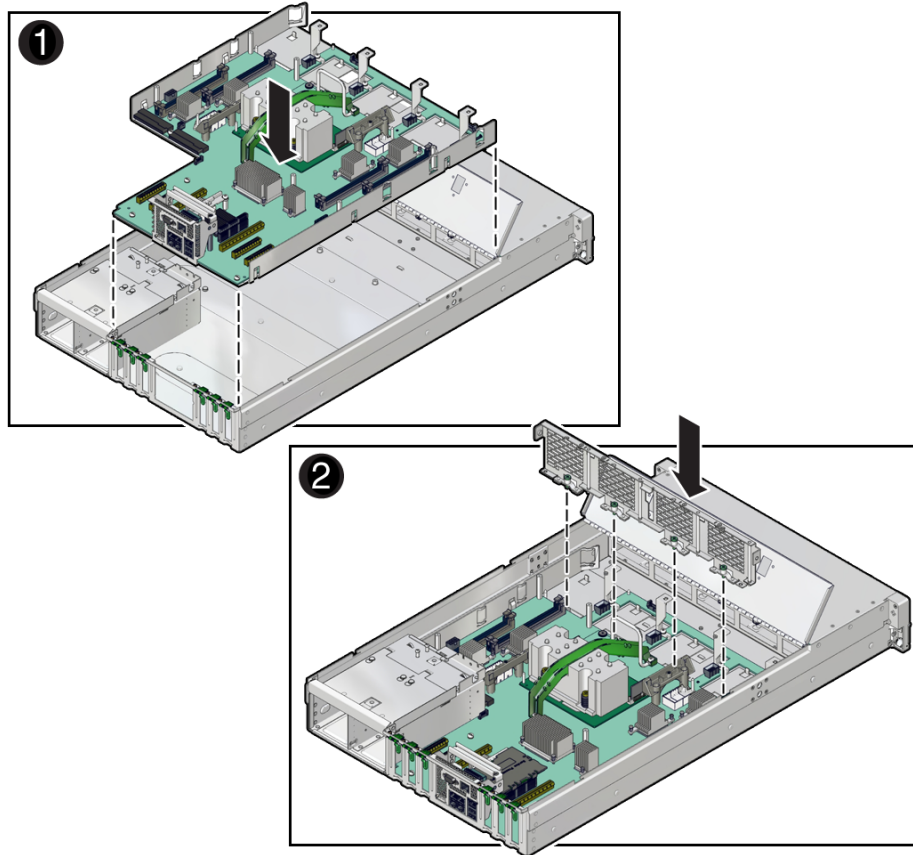
- 1. Remove the old motherboard from the server.**

See [“Remove the Motherboard” on page 145](#).

Keep track of the original locations of parts that will be installed on the new motherboard.

- 2. Unpack the replacement motherboard and place it on an antistatic mat.**

3. Grasp the motherboard by the handle and place it into the chassis (panel 1).



You can use the metal handle in front of the cable channel and the bar by the rear I/O panel as handles to lift the motherboard.

Ensure that the remaining cables do not get caught on edges of the motherboard.

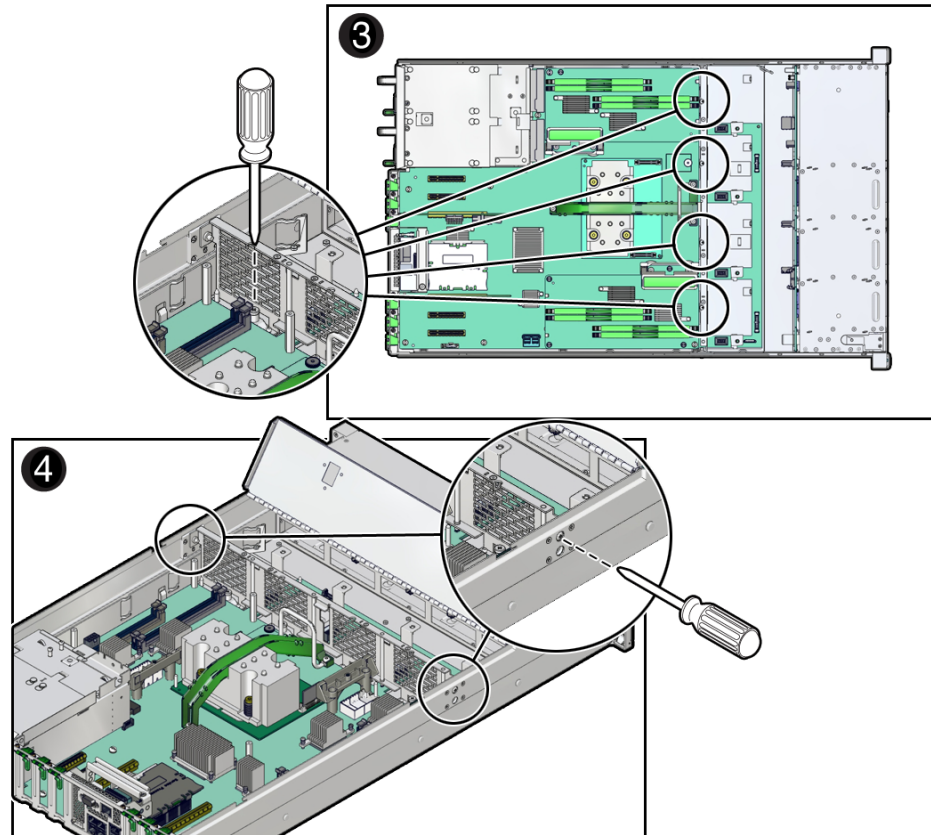
- a. **Tilt the motherboard to the right side so it gets under the power supplies.**

Be sure the power supplies are pulled out slightly from their slots when you insert the motherboard.

- b. **Level the motherboard in the server chassis.**

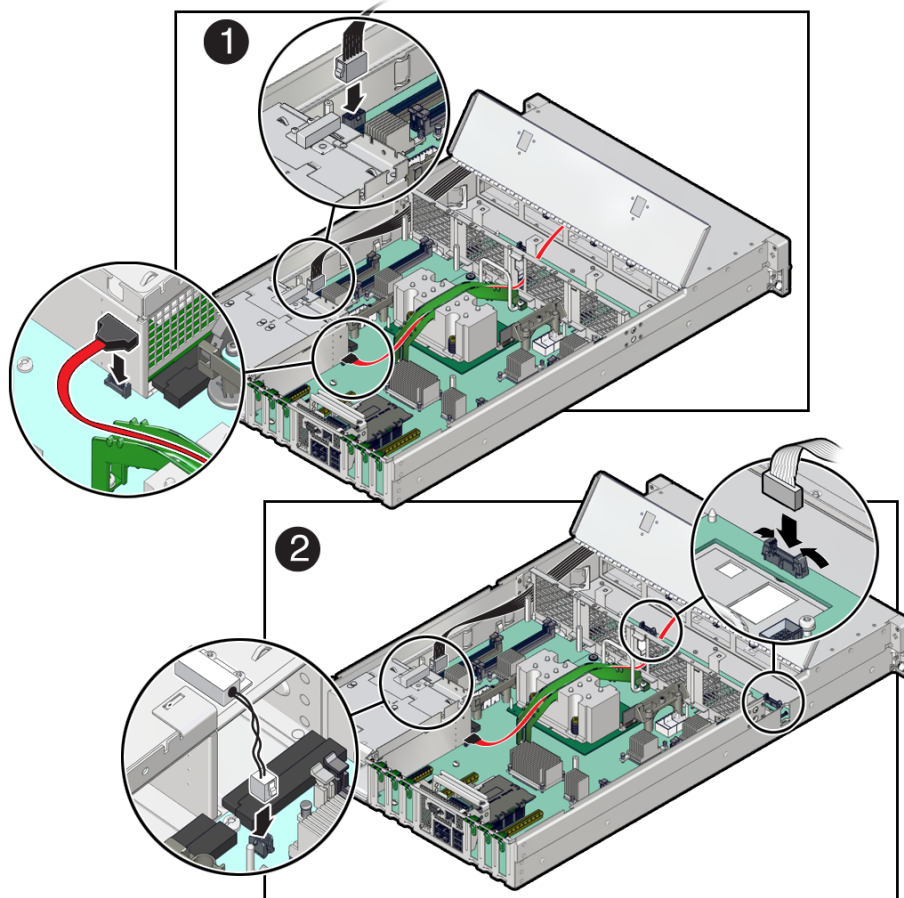
- c. **Slide the motherboard to the rear of the server to engage the raised standoffs.**
  - d. **Push the power supplies in to engage securely with the motherboard.**
- 4. **Insert the mid-wall into the chassis (panel 2).**
- 5. **Fasten the mid-wall to the chassis.**
  - a. **Tighten the four green captive screws that secure the mid-wall to the bottom of the chassis (panel 3).**

Use a No. 2 Phillips screwdriver to tighten the captive screws.



- b. Fasten a screw on each side of the chassis to secure the mid-wall to the chassis (panel 4).

6. **Reconnect the cable from the server intrusion switch (panel 1).**



7. **Reconnect the ribbon cables to the motherboard from the left and right LED indicator modules (panel 2).**
8. **Reconnect the signal cable and power cable from the motherboard to the drive backplane.**

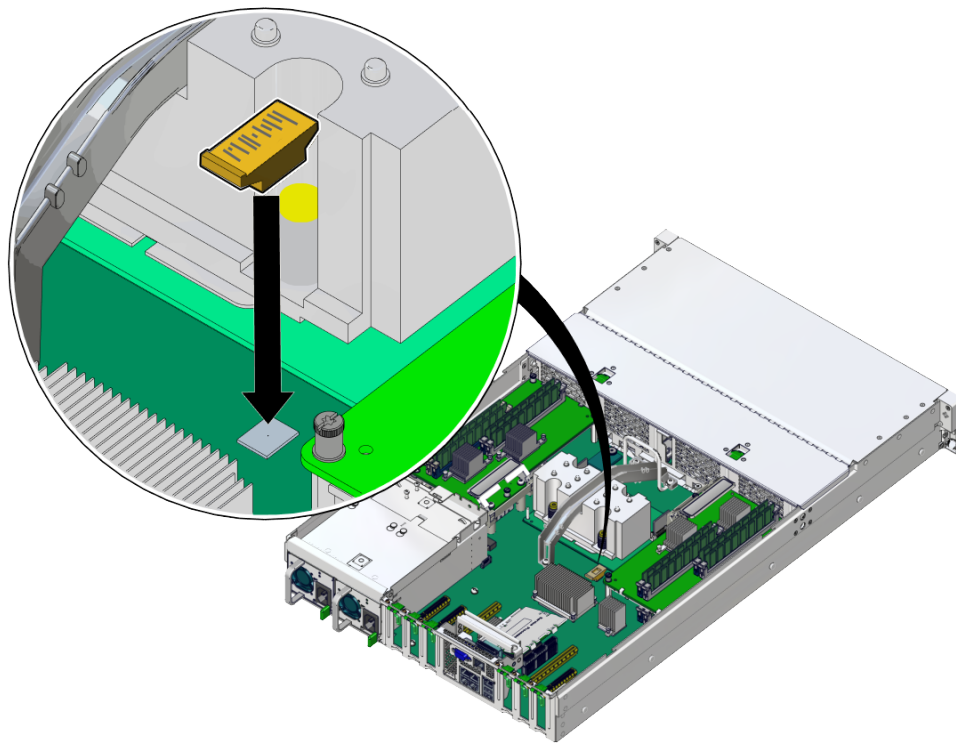
See [“Install the Drive Backplane” on page 166](#).

9. **Connect the DVD drive cable to the motherboard.**

Thread the DVD cable through the chassis mid-wall to reach the motherboard connector.



10. **Install the four fan modules.**  
See [“Install a Fan Module” on page 78](#).
11. **Install DIMMs on the motherboard.**  
Place each DIMM in the same motherboard slot where it had been before.
12. **Install the SPM on the motherboard.**  
Use the SPM you removed from a motherboard. See [“Install the SPM” on page 132](#).
13. **Remove the eUSB device that comes with the new motherboard, and install it onto the old motherboard.**  
Install the eUSB drive that you removed from the old motherboard onto the new motherboard. See [“Remove the eUSB Drive” on page 121](#) and [“Install the eUSB Drive” on page 123](#).
14. **Install the SC PROM on the motherboard.**  
Use the SC PROM you removed from a motherboard.



**15. Install any memory risers.**

Install each memory riser on the side where it had been located. See [“Install a DIMM or DIMM Filler” on page 102.](#)

Always install a transceiver in a PCIe card after installing the card in the server.

**16. Install all PCIe cards.**

Place each PCIe card in the slot where it had been located.

See [“Install a PCIe Card or Filler” on page 117.](#)

**17. Install the airflow cover.**

See [“Install and Close the Airflow Cover” on page 173.](#)

**18. Attach the top cover.**

See [“Replace the Top Cover” on page 176.](#)

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

See [“Return the Server to the Normal Operating Position” on page 177.](#)

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

See [“Attach Power Cords” on page 178.](#)

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

Refer to [“Connect a Terminal or Emulator to the SER MGT Port” in SPARC T7-1 Server Installation Guide.](#)

The SP detects the host firmware on the replacement motherboard is not compatible with the existing SP 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.

---

**22. 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 SP through the NET MGT port.

Refer to the Oracle ILOM documentation for network configuration instructions.

**23. 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.

---

**24. 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 159](#) for instructions.

**25. Power on the server.**

See [“Power On the Server \(Oracle ILOM\)” on page 178](#) or [“Power On the Server \(System Power Button\)” on page 179](#).

**26. (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 145](#)
- [“Reactivate RAID Volumes” on page 159](#)
- [“Verify the Motherboard” on page 162](#)

## ▼ 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 SP.**

Refer to [“Log In to Oracle ILOM” in SPARC T7 Series Servers Administration Guide](#) 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 178 or [“Power On the Server \(System Power Button\)”](#) on page 179.

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

```
ok show-devs
...
/pci@301/pci@2/scsi@0/disk@p0
...
```

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

```
ok devalias
...
scsi0                /pci@301/pci@2/scsi@0
scsi                  /pci@301/pci@2/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@301/pci@2/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 [“Configuring Hardware RAID” in SPARC T7 Series Servers Administration Guide](#).

---

## 8. Unselect the SCSI device.

```
ok unselect-dev
```

## 9. Confirm that you reactivated the volume.

```
ok probe-scsi-all
/pci@301/pci@2/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@300/pci@2/usb@0/hub@3/storage@1/disk@0
  Unit 0   Removable Read Only device   AMI   Virtual CDROM  1.00
```

## 10. Set the server to boot the OS when powered on.

```
ok setenv auto-boot? true
```

## 11. Reboot the server.

See *Server Administration*, booting and shutting down Oracle Solaris.

## Related Information

- [“Install the Motherboard” on page 152](#)
- [“Verify the Motherboard” on page 162](#)

## ▼ Verify the Motherboard

1. **Use the Oracle ILOM `show faulty` command to verify that the fault has been cleared.**

See [“Identify Faulted Components” on page 24](#) for more information on using the `show faulty` command.

2. **Perform one of the following tasks based on your verification results:**
  - If the previous steps did not clear the fault, see [“Detecting and Managing Faults” on page 23](#) for information about the tools and methods you can use to diagnose component faults.
  - If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

### Related Information

- [“Install the Motherboard” on page 152](#)
- [“Reactivate RAID Volumes” on page 159](#)

# Servicing the Drive Backplane

---

This board provides connectors for the drive signal cables.

These topics describe how to service the drive backplane.

- [“Remove the Drive Backplane” on page 163](#)
- [“Install the Drive Backplane” on page 166](#)
- [“Verify the Drive Backplane” on page 169](#)

## ▼ Remove the Drive Backplane

1. **Prepare the server for service.**
  - a. **Power off the server and disconnect the power cords from the power supplies.**  
See [“Removing Power From the Server” on page 46](#).
  - b. **Attach an antistatic wrist strap to your wrist, and then to a metal area on the chassis.**  
See [“Prevent ESD Damage” on page 50](#).
  - c. **Extend the server into the service position.**  
See [“Extend the Server to the Service Position” on page 51](#).
  - d. **Remove the fan cover.**  
See [“Remove the Fan Cover” on page 57](#).
  - e. **If necessary, remove the fan modules from the server.**  
See [“Remove a Fan Module” on page 75](#).
2. **Pull each drive out far enough to disengage it from the drive backplane.**

See [“Remove a Drive or Drive Filler” on page 63](#).

---

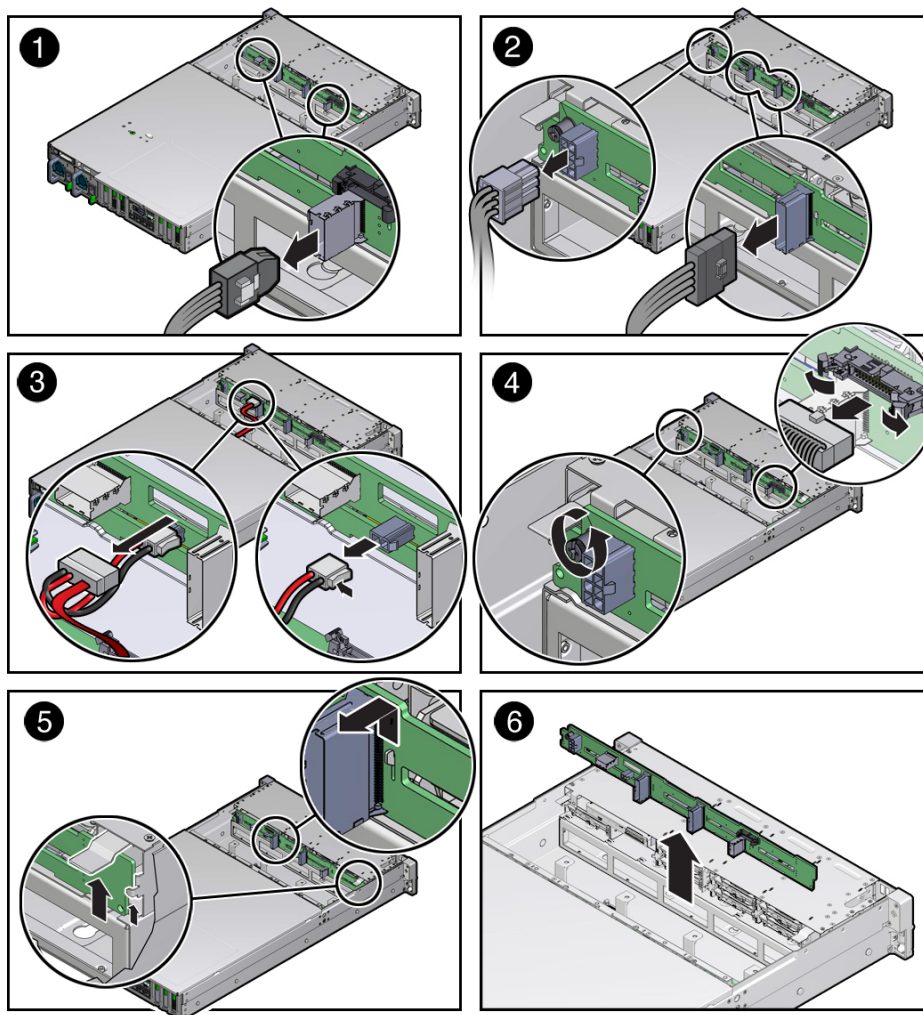
**Note** - You do not need to completely remove the storage drives from the server. Simply pull them out far enough to disengage them from the drive backplane. If you do remove the storage drives from the server, record their locations so that you can reinstall them in the same locations.

---

3. **Disconnect the cables from the drive backplane.**
  - a. **Disconnect the two SAS cables from the drive backplane to the motherboard (panel 1).**



Note the cable connections in order to ease proper reconnection of the cables.



- b. Disconnect the power cable from the drive backplane (panel 2).
- c. If present, disconnect the two optional NVMe cables from the drive backplane (panel 2).

- d. **If the server has a DVD drive, disconnect the power and DVD data connections from the drive backplane (panel 3).**  
See [“Remove a DVD Drive” on page 137](#).
- e. **Disconnect the auxiliary signal cable from the drive backplane (panel 4).**
4. **Using a No. 2 Phillips screwdriver, loosen the right-side spring-mounted screw (on the power supply side of the server) that secures the drive backplane to the chassis [4].**
5. **Lift up on the left-side spring tab, and then gently release the drive backplane from the standoff hooks and out from under the spring tab (panel 5).**
6. **Pull the drive backplane away from the standoff hooks and spring tab and out of the chassis (panel 6).**
7. **Place the drive backplane on an antistatic mat.**
8. **Install a drive backplane or continue the service procedure that required access.**  
See [“Install the Drive Backplane” on page 166](#).

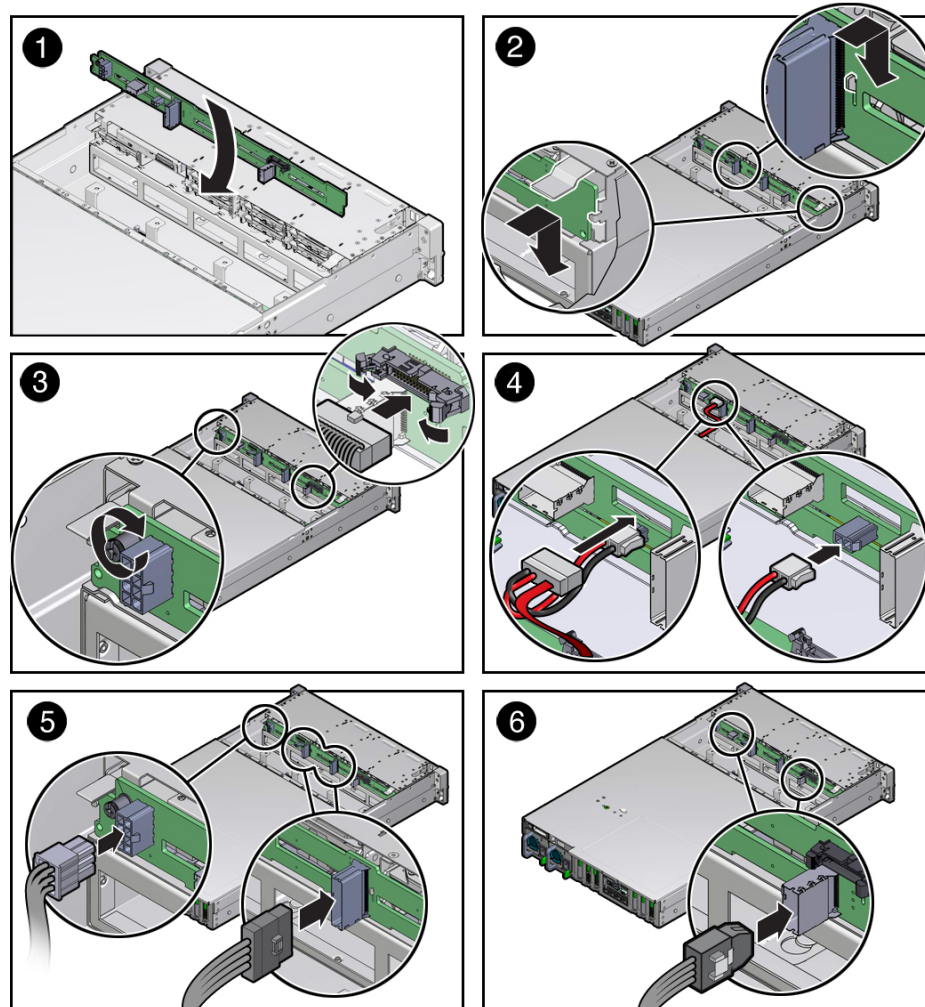
#### **Related Information**

- [“Internal Component Locations” on page 16](#)
- [“Install the Drive Backplane” on page 166](#)

## **▼ Install the Drive Backplane**

1. **Remove the drive backplane.**  
See [“Remove the Drive Backplane” on page 163](#).
2. **Lower the drive backplane into the server, and then position it under the spring tab to engage the standoff hooks (panels 1 and 2).**  
The standoff hooks fit into small openings in the drive backplane.

Ensure that ribbon cables aren't caught under the drive backplane.



3. Using a No. 2 Phillips screwdriver, install and tighten the spring-mounted screw (on the power supply side of the server) to secure the drive backplane to the chassis (panel 3).
4. Reconnect the cables to the drive backplane.

- a. **Reconnect the auxiliary signal cable to the drive backplane (panel 3).**
  - b. **If the server has a DVD drive, reconnect the power and DVD data connections to the drive backplane (panel 4).**  
See [“Install a DVD Drive” on page 140.](#)
  - c. **Reconnect the power cable to the drive backplane (panel 5).**
  - d. **If present, reconnect the two optional NVMe cables to the storage drive backplane (panel 5).**
  - e. **Reconnect the two SAS cables to the drive backplane from the motherboard (panel 6).**
5. **Return the server to operation.**
- a. **If removed, install the fan modules.**  
See [“Install a Fan Module” on page 78.](#)
  - b. **Install the fan cover, and close the fan door.**  
See [“Replace the Fan Cover” on page 171.](#)
  - c. **Fully install all storage drives you disengaged or removed.**  
See [“Install a Drive or Drive Filler” on page 68.](#)
  - d. **Return the server to the normal operating position.**  
See [“Return the Server to the Normal Operating Position” on page 177.](#)
  - e. **Reconnect the power cords to the power supplies, and power on the server.**  
See [“Attach Power Cords” on page 178](#) and [“Power On the Server \(Oracle ILOM\)” on page 178](#) or [“Power On the Server \(System Power Button\)” on page 179.](#)  
Verify that the power supply AC OK LED is lit.

---

**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.

---

6. **Verify the drive backplane.**

See [“Verify the Drive Backplane” on page 169](#).

#### Related Information

- [“Internal Component Locations” on page 16](#)
- [“Remove the Drive Backplane” on page 163](#)

## ▼ Verify the Drive Backplane

1. Use the Oracle ILOM `show faulty` command to verify that the fault has been cleared.

See [“Identify Faulted Components” on page 24](#) for more information on using the `show faulty` command.

2. Perform one of the following tasks based on your verification results:
  - If the previous steps did not clear the fault, see [“Detecting and Managing Faults” on page 23](#) for information about the tools and methods you can use to diagnose component faults.
  - If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

#### Related Information

- [“Remove the Drive Backplane” on page 163](#)
- [“Install the Drive Backplane” on page 166](#)



# Returning the Server to Operation

---

These topics describe how to return the server to operation.

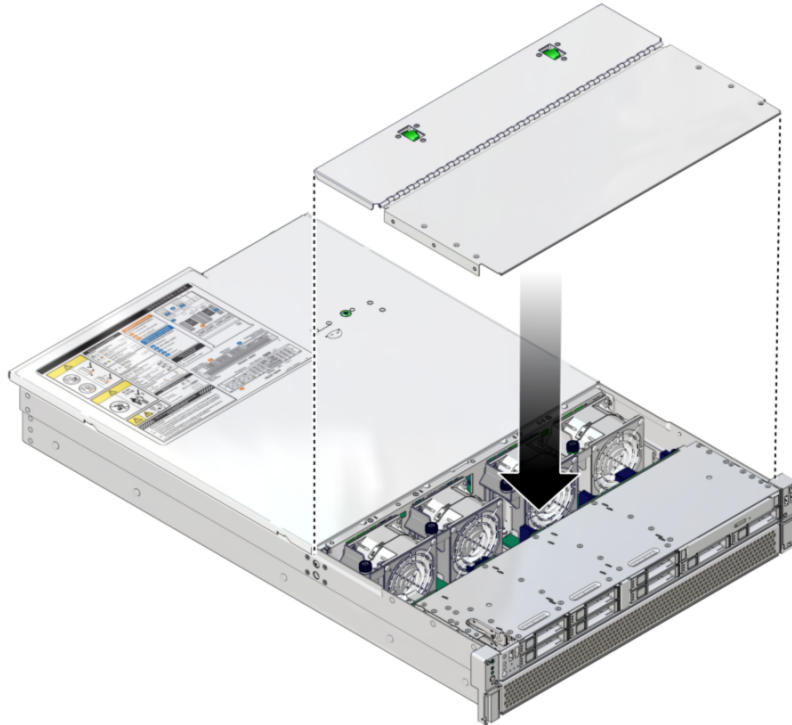
Step	Description	Links
1.	Replace (as necessary) the fan cover, airflow cover, and top cover and return the server to its normal operating position	<a href="#">“Replace the Fan Cover” on page 171</a> <a href="#">“Install and Close the Airflow Cover” on page 173</a> <a href="#">“Replace the Top Cover” on page 176</a> <a href="#">“Return the Server to the Normal Operating Position” on page 177</a>
2.	Connect the power cords to the server.	<a href="#">“Attach Power Cords” on page 178</a>
3.	Power on the server.	<a href="#">“Power On the Server (Oracle ILOM)” on page 178</a> <a href="#">“Power On the Server (System Power Button)” on page 179</a>

▼

## Replace the Fan Cover

1. Align the fan cover with the screw holes.

There are 12 screws securing the fan cover.



- 2. Fasten the 12 screws to the top and side.**



---

**Note** - The fan covers on some units are secured with T6 Torx screws. Other units are secured with No. 2 Phillips screws. (Illustration shows T6 Torx screws.)

---



3. Check that the two latches will engage when you close the fan cover.

#### Related Information

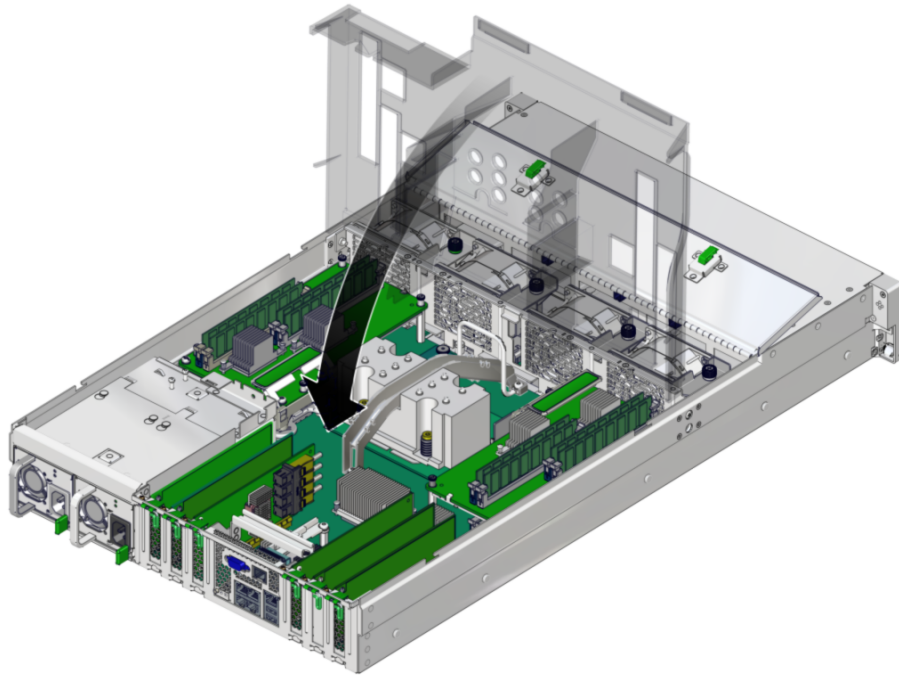
- [“Replace the Top Cover” on page 176](#)

## ▼ Install and Close the Airflow Cover

Follow this procedure to reattach or install an airflow cover and to lower and secure the airflow cover.

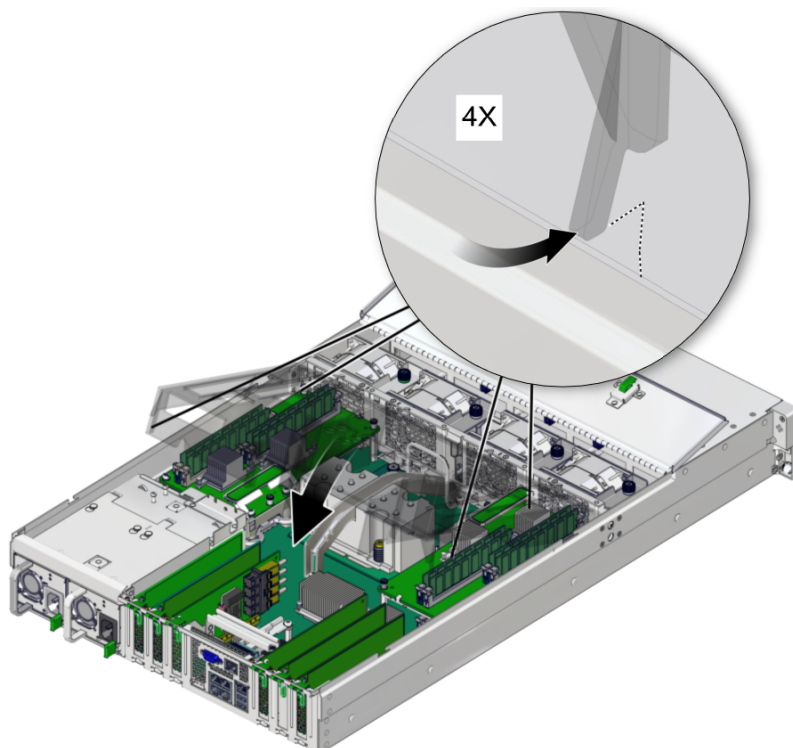
1. If you need to reattach the airflow cover, open the fan cover.

2. **Align the airflow cover on its hinge edge.**



3. **Attach the hinged tabs to the server.**
4. **Lower the airflow cover.**

Make sure the two pairs of side tabs clear the sides of the server.



### Related Information

- [“Replace the Top Cover” on page 176](#)

## ▼ Replace the Top Cover

1. Place the top cover on the chassis.



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.**

When the top cover is seated, the green button clicks into place.

### Related Information

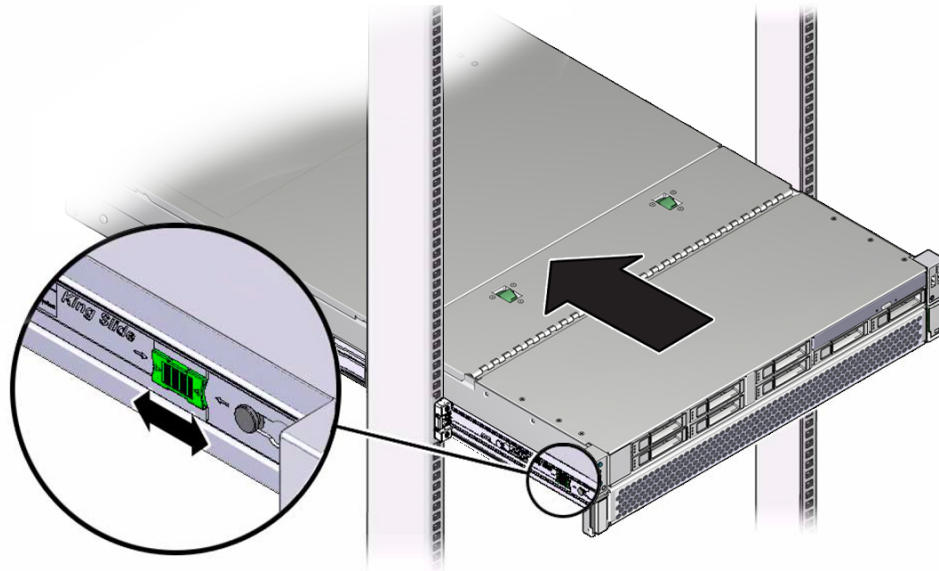
- [“Remove the Top Cover” on page 55](#)
- [“Return the Server to the Normal Operating Position” on page 177](#)

## ▼ 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 52](#).
4. **Reconnect the CMA.**  
Swing the CMA closed and latch it to the left rack rail. Refer to [“Attach the CMA to the Server” in SPARC T7-1 Server Installation Guide](#).

### Related Information

- [“Remove the Server From the Rack” on page 54](#)
- [“Attach Power Cords” on page 178](#)

## ▼ 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 178](#) or [“Power On the Server \(System Power Button\)” on page 179](#).

### Related Information

- [“Power On the Server \(Oracle ILOM\)” on page 178](#)
- [“Power On the Server \(System Power Button\)” on page 179](#)

## ▼ 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 `poweron` command.

---

- **Type this command at the Oracle ILOM prompt.**

-> `poweron`

You will see an alert message on the system console. This message indicates that the server is reset. You will also see a message indicating that the VCORE has been margined up to the value specified in the default `.scr` file that was previously configured. For example:

-> `start /System`

### Related Information

- [“Power On the Server \(System Power Button\)” on page 179](#)
- [“Clear a Fault Manually” on page 39](#)

## ▼ 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 SP OK/Fault LED blinks as the SP boots. The SP OK/Fault LED is illuminated solid green when the SP has successfully booted. After the SP has booted, the Power OK/LED on the front panel begins flashing slowly, indicating that the host is in standby power mode.

**2. Press and release server power button on the server front panel.**

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

When main power is applied to the server, the main Power/OK LED begins to blink more quickly while the server boots and lights solidly once the operating system 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 178](#)
- [“Clear a Fault Manually” on page 39](#)





## Glossary

---

### B

**BOB** Memory buffer on board.

### C

**chassis** Server enclosure.

**CMA** Cable management arm (SPARC T7-1 and SPARC T7-2). Cable management assembly (SPARC T7-4).

**CMP** Chip multiprocessor.

**CRU** Customer-replaceable unit.

### E

**ESD** Electrostatic discharge.

**eUSB drive** Embedded universal serial bus drive.

### F

**FRU** Field-replaceable unit.

**H**

**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](#).

**I**

**IP** Internet Protocol.

**L**

**LDom** Logical domain managed by Oracle VM Server for SPARC. See [Oracle VM Server for SPARC](#).

**M**

**MAC** Machine access code.

**MAC address** Media access controller address.

**MSGID** Message identifier.

**N**

**NET MGT** Network management port. An Ethernet port on the server SP.

**NMI** Nonmaskable interrupt.

**NVMe** Nonvolatile memory express controller. The optional NVMe switch card provides NVMe services in the server.

**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.

**SER MGT port** Serial management port. A serial port on the server SP.

**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

---

**SSD** Solid-state drive.

**SSH** Secure shell.

## U

**UUID** Universal unique identifier.

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