

# **SPARC T4-1 Server**

## **Service Manual**



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# Using This Documentation

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This service manual contains instructions for troubleshooting, repairing, and upgrading Oracle’s SPARC T4-1 server components.

- “Related Documentation” on page xi
- “Feedback” on page xii
- “Support and Accessibility” on page xii

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## Related Documentation

Documentation	Links
All Oracle products	<a href="http://www.oracle.com/documentation">http://www.oracle.com/documentation</a>
SPARC T4-1 Server	<a href="http://www.oracle.com/pls/topic/lookup?ctx=SPARCT4-1">http://www.oracle.com/pls/topic/lookup?ctx=SPARCT4-1</a>
Oracle ILOM 3.0	<a href="http://www.oracle.com/pls/topic/lookup?ctx=ilom30">http://www.oracle.com/pls/topic/lookup?ctx=ilom30</a>
Oracle Solaris OS and other systems software	<a href="http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw">http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw</a> <a href="http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw">http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw</a> <a href="http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw">http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw</a> <a href="http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw">http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw</a>
Oracle VTS 7.0	<a href="http://www.oracle.com/pls/topic/lookup?ctx=OracleVTS7.0">http://www.oracle.com/pls/topic/lookup?ctx=OracleVTS7.0</a>

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# Support and Accessibility

Description	Links
Access electronic support through My Oracle Support	<a href="http://support.oracle.com">http://support.oracle.com</a>  For hearing impaired: <a href="http://www.oracle.com/accessibility/support.html">http://www.oracle.com/accessibility/support.html</a>
Learn about Oracle's commitment to accessibility	<a href="http://www.oracle.com/us/corporate/accessibility/index.html">http://www.oracle.com/us/corporate/accessibility/index.html</a>



# Identifying Server Components

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These topics identify key components of the SPARC T4-1 servers, including major boards and internal system cables, as well as front and rear panel features.

- [“Front Components” on page 1](#)
- [“Rear Components” on page 2](#)
- [“Infrastructure Boards in the SPARC T4-1 Server” on page 3](#)
- [“Internal System Cables” on page 4](#)
- [“Illustrated Parts Breakdown” on page 5](#)

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## Front Components

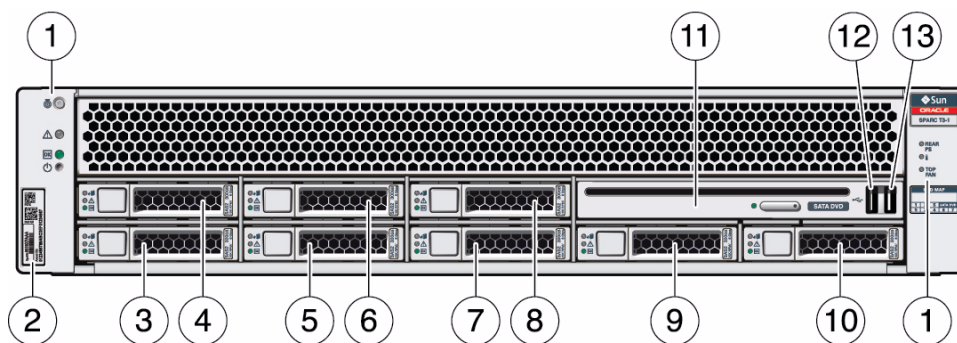
The following figure shows the layout of the server front panel, including the power and system locator buttons and the various status and fault LEDs.

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**Note** – The front panel also provides access to internal hard drives, the removable media drive, and the two front USB ports.

---

**FIGURE:** Components Accessible From the Front Panel



**Figure Legend**

1	System controls and indicators	8	Hard drive HDD5
2	RFID tag	9	Hard drive HDD6
3	Hard drive HDD0*	10	Hard drive HDD7
4	Hard drive HDD1	11	SATA DVD module
5	Hard drive HDD2	12	USB port 2
6	Hard drive HDD3	13	USB port 3
7	Hard drive HDD4		

\* In this server's documentation, hard drives are sometimes referred to by the initials HDD. The terms "Hard drive" and "HDD" are used for both disk drives and solid state drives.

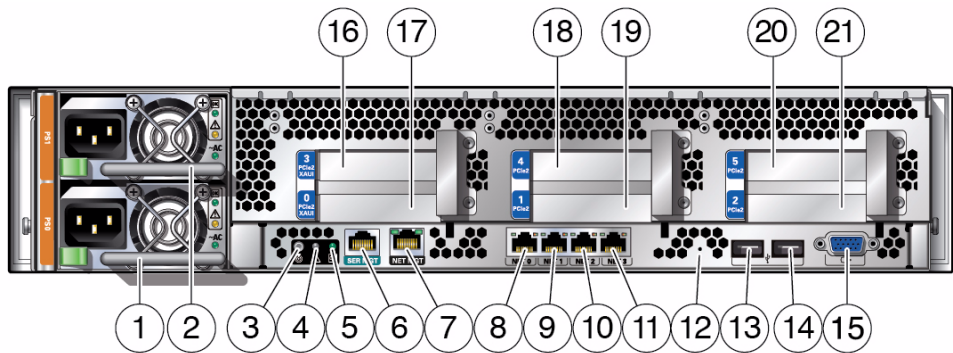
## Related Information

- ["Rear Components" on page 2](#)

# Rear Components

The following figure shows the layout of the I/O ports, PCIe ports, 10 Gbit Ethernet (XAUI) ports (if equipped) and power supplies on the rear panel.

**FIGURE:** Rear Panel Components and Indicators



**Figure Legend**

1 Power supply 0	12 Access hole for physical presence button
2 Power supply 1	13 USB port 0
3 Locator LED button	14 USB port 1
4 Service Required LED	15 VGA video port
5 Power OK LED	16 PCIe slot 3 or XAUI slot 1
6 Service processor SER MGT port	17 PCIe slot 0 or XAUI slot 0
7 Service processor NET MGT port	18 PCIe slot 4
8 Gbit Enet port NET0	19 PCIe slot 1
9 Gbit Enet port NET1	20 PCIe slot 5
10 Gbit Enet port NET2	21 PCIe slot 2
11 Gbit Enet port NET3	

**Related Information**

- [“Front Components” on page 1](#)

# Infrastructure Boards in the SPARC T4-1 Server

The following table provides an overview of the circuit boards used in SPARC T4-1 servers.

Board	Description
Motherboard	This board includes one CMP module, slots for 16 DIMM memory control subsystems, and a pluggable service processor module on which the Oracle Integrated Lights Out Manager (Oracle ILOM) runs. It also hosts a removable System Controller module (also called SCC), which contains all MAC addresses and host ID data.
Power distribution board	This board distributes main 12V power from the power supplies to the rest of the system. This board is directly connected to the connector board, and to the motherboard via a bus bar and ribbon cables. This board also supports a top cover safety interlock (“kill”) switch.
Power supply backplane	This board carries 12V power from the power supplies to the power distribution board over a pair of bus bars. It also delivers 3.3V standby power In SPARC T4-1 servers, the power supplies connect directly to the power distribution board.
Connector board	This board serves as the interconnect between the power distribution board and the fan power board, disk drive backplane, and front I/O board.
Fan power board	This board carries power to the system fan modules and fan module status LEDs. It also transmits status and control signals for the fan modules.
Hard drive backplane	This board provides connectors for the hard drive signal cables. It also serves as the interconnect for the front I/O board, Power and Locator buttons, and system/component status LEDs.
Front I/O board	This board connects directly to the hard drive backplane. It is packaged with the DVD drive as a single unit.

### Related Information

- [“Internal System Cables” on page 4](#)
- [“Cable Routing Diagram for the Onboard SAS RAID Controller” on page 12](#)
- [“Cable Routing Diagram for the PCIe SAS RAID HBA” on page 13](#)

## Internal System Cables

The following table identifies the internal system cables used in SPARC T4-1 servers.

Cable	Description
Top cover interlock cable	This cable connects the safety interlock switch on the top cover to the power distribution board. When the top cover is removed, this connection is broken, which causes the server to power down.
Power supply backplane signal cable (1 ribbon cable)	This cable carries signals between the power supply backplane and the power distribution board.
Motherboard signal cable (1 ribbon cable)	This cable carries signals between the power distribution board and the motherboard.
Hard drive data cables (2 bundled)	This cable carries data and control signals between the motherboard and the hard drive backplane.
SATA DVD data cable	This cable carries data and control signals between the motherboard and the DVD module.
Power and fan management data cables between the connector board and the fan power distribution board	These cables distribute power to the fan power board as well as carry control and sensor information between the fan modules and the connector board.

### Related Information

- [“Infrastructure Boards in the SPARC T4-1 Server” on page 3](#)

## Illustrated Parts Breakdown

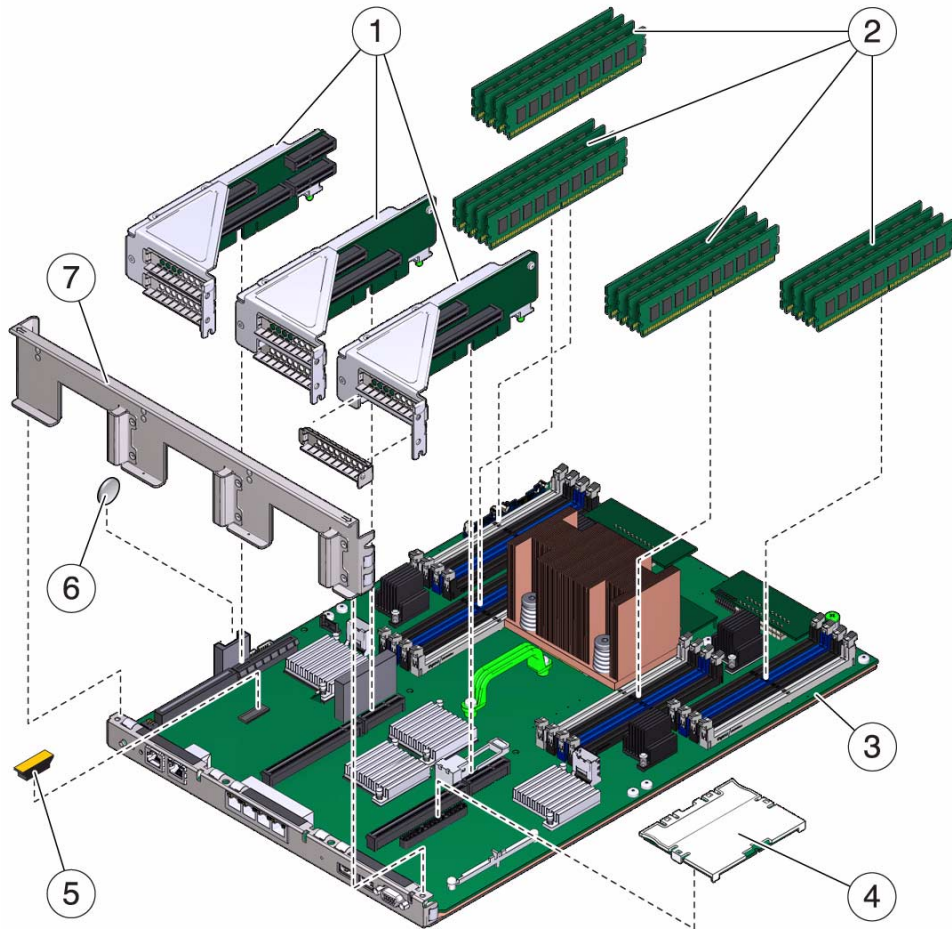
The following topics identify the components that may be individually replaced in the field. They are grouped into three functional categories:

- Components related to the motherboard, including the motherboard
- Components that support I/O functions
- Components related to power distribution and the fan modules

## Motherboard Components

The following figure illustrates field-replaceable components related to the motherboard.

**FIGURE:** Motherboard Components



The following table identifies the components located on the motherboard and points to instructions for servicing them.

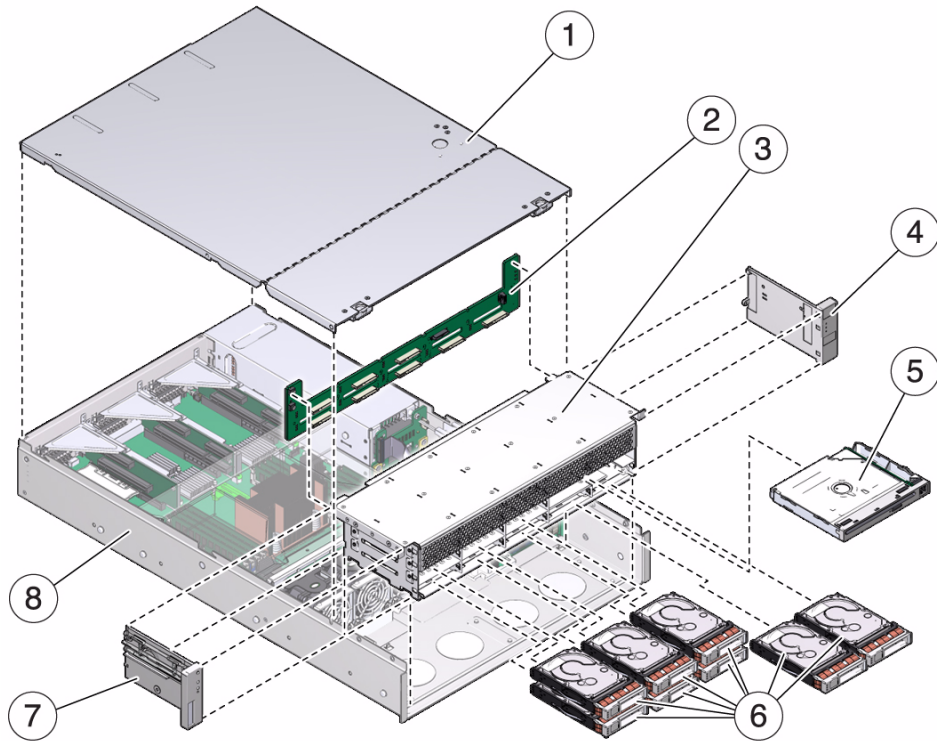
**TABLE:** Motherboard Components

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	PCIe/XAUI risers	<a href="#">“Servicing PCIe and PCIe/XAUI Risers” on page 143</a>	Back panel PCI cross beam must be removed to access risers.	/SYS/MB/RISER0 /SYS/MB/RISER1 /SYS/MB/RISER2
2	DIMMs	<a href="#">“Locate a Faulty DIMM (show faulty Command)” on page 91</a> <a href="#">“Locate a Faulty DIMM (DIMM Fault Remind Button)” on page 88</a>	See configuration rules before upgrading DIMMs.	See <a href="#">“DIMM Population Rules” on page 84</a>
3	Motherboard assembly	<a href="#">“Identifying Server Components” on page 1</a>	The motherboard assembly must be removed to access power distribution board, power supply backplane, and connector board.	/SYS/MB
4	Service Processor	<a href="#">“Servicing the Service Processor” on page 157</a>	The system management firmware (Oracle ILOM) runs on the Service Processor.	/SYS/MB/SP
5	SCC module	<a href="#">“Servicing the System Configuration PROM” on page 179</a>	Contains the host ID and MAC address.	/SYS/MB/SCC
6	Battery	<a href="#">“Servicing the System Battery” on page 163</a>	Necessary for system clock and other functions.	/SYS/MB/V_VBAT
7	Removable back panel cross beam	<a href="#">“Servicing PCIe and PCIe/XAUI Risers” on page 143</a>	Remove this component to service PCIe/XAUI risers and cards.	N/A

## I/O Components

The following figure illustrates field-replaceable components that support I/O functions.

**FIGURE:** I/O Components



The following table identifies the I/O components in the server and points to instructions for servicing them.



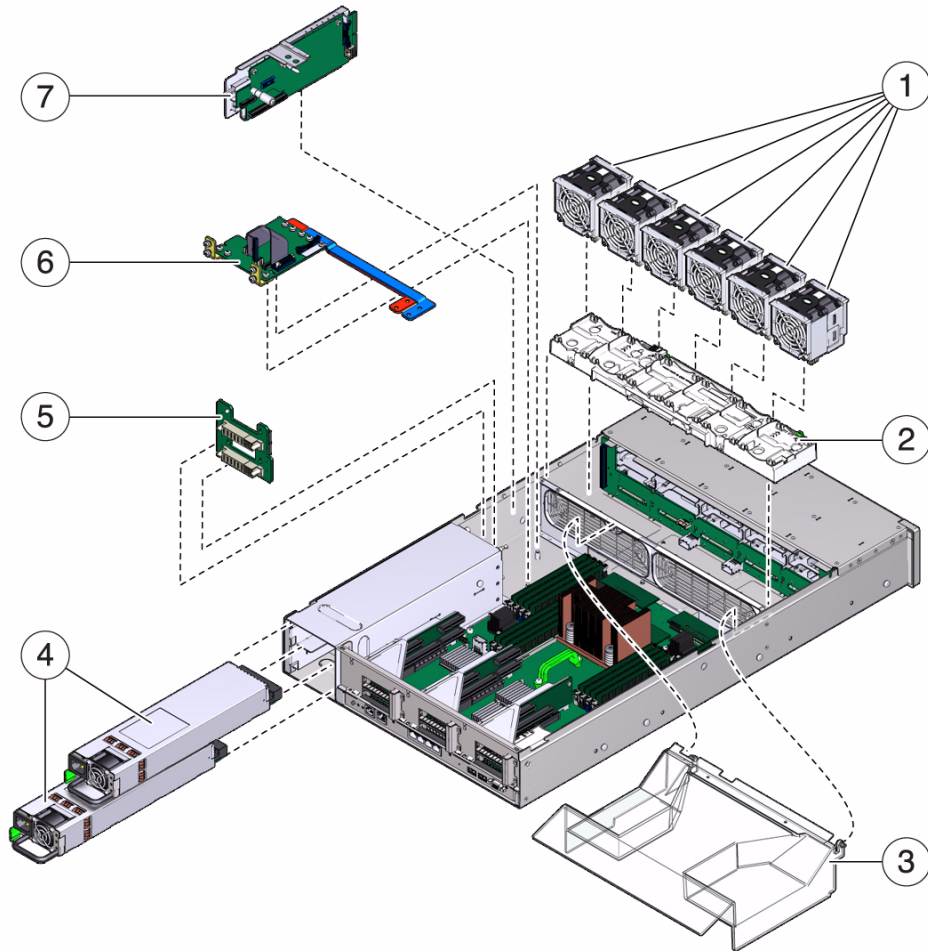
**TABLE:** I/O Components

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Top cover	<a href="#">“Remove the Top Cover” on page 80</a> <a href="#">“Replace the Top Cover” on page 215</a>	Removing top cover if the system is running will result in immediate shutdown.	N/A
2	Hard drive backplane	<a href="#">“Servicing the HDD Cage” on page 187</a>	The HDD backplane provides data and control signal connectors for the hard drives. It also provides connection to the front panel control and status components.	/SYS/SASBP
3	Hard drive cage	<a href="#">“Servicing the HDD Backplane” on page 193</a>	Must be removed to service hard drive backplane and front control panel light pipes.	N/A
4	Right control panel light pipe assembly	<a href="#">“Servicing the Front Panel Light Pipe Assemblies” on page 201</a>	The metal light pipe bracket is not a FRU.	N/A
5	DVD/USB module	<a href="#">“Identifying Server Components” on page 1</a>	Must be removed to service the hard drive backplane.	/SYS/DVD /SYS/USBBD
6	Hard drives	<a href="#">“Servicing Hard Drives” on page 105</a>	Hard drives must be removed to service the hard drive backplane.	See <a href="#">“Hard Drive Slot Configuration Reference” on page 106</a>
7	Left control panel light pipe assembly	<a href="#">“Servicing the Front Panel Light Pipe Assemblies” on page 201</a>	Metal light pipe bracket is not a FRU.	N/A

## Power Distribution and Fan Module Components

The following figure illustrates field-replaceable components related to power distribution and the fan modules.

**FIGURE:** Power Distribution/Fan Module Components



The following table identifies the power distribution and fan module components in the server and points to instructions for servicing them.

**TABLE:** Power Distribution/Fan Module Components

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Fan modules	<a href="#">“Servicing Fan Modules” on page 167</a>	All six fan modules must be installed in the server. Includes the top cover interlock switch.	/SYS/FANBD0/FM0 /SYS/FANBD0/FM1 /SYS/FANBD0/FM2 /SYS/FANBD0/FM3 /SYS/FANBD0/FM4 /SYS/FANBD0/FM5 /SYS/CONNBD
2	Fan power board	<a href="#">“Servicing the Fan Power Board” on page 173</a>	The fan power board delivers power to the fan modules and carries control and status signals for the fan modules. The fan power board is connected to the connector board.	/SYS/FANBD0
3	Air duct	N/A	This molded plastic part directs air flow within the chassis.	N/A
4	Power supplies	<a href="#">“Servicing the Power Supplies” on page 119</a>	Two power supplies provide N+1 redundancy.	/SYS/PS0 /SYS/PS1
5	Power supply backplane	<a href="#">“Servicing the Power Supply Backplane” on page 133</a>	This part is bundled with the power distribution board.	N/A
6	Power distribution board/bus bar	<a href="#">“Servicing the Power Distribution Board” on page 127</a>	The PDB distributes 12V power received from the power supplies. The bus bar is attached to the PDB by four screws. If you replace a PDB, you must transfer the bus to the new board.	/SYS/PDB
7	Connector board	<a href="#">“Servicing the Connector Board” on page 137</a>	It is connected to the connector board though power and data cables. The data cable carries control status signals.	/SYS/CONNBD

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# Understanding Hard Drive Data Cable Routing

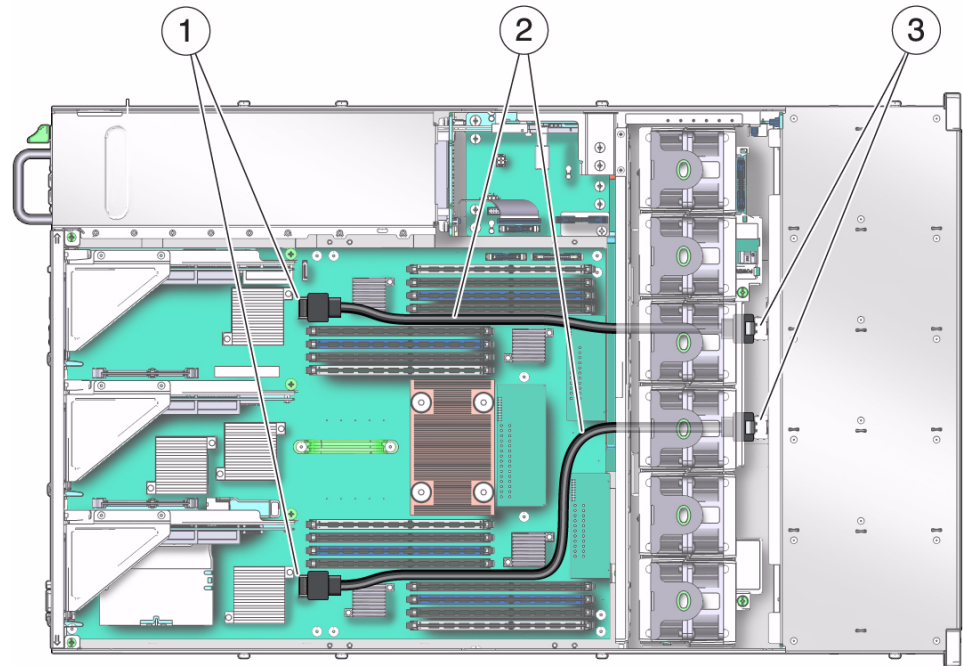
These topics describe the correct data cable routing paths for two different hard drive management configurations:

Description	Links
Servers that use the onboard SAS RAID controller for storage management on the hard drives	<a href="#">“Cable Routing Diagram for the Onboard SAS RAID Controller” on page 12</a>
Servers that use a PCIe SAS RAID HBA for storage management on the hard drives	<a href="#">“Cable Routing Diagram for the PCIe SAS RAID HBA” on page 13</a>

## Cable Routing Diagram for the Onboard SAS RAID Controller

The following figure shows the correct path for routing the two hard drive data cables from the SAS RAID controller connectors on the motherboard to the corresponding connectors on the hard drive backplane.

**FIGURE:** Internal Cables for the Onboard SAS Cables



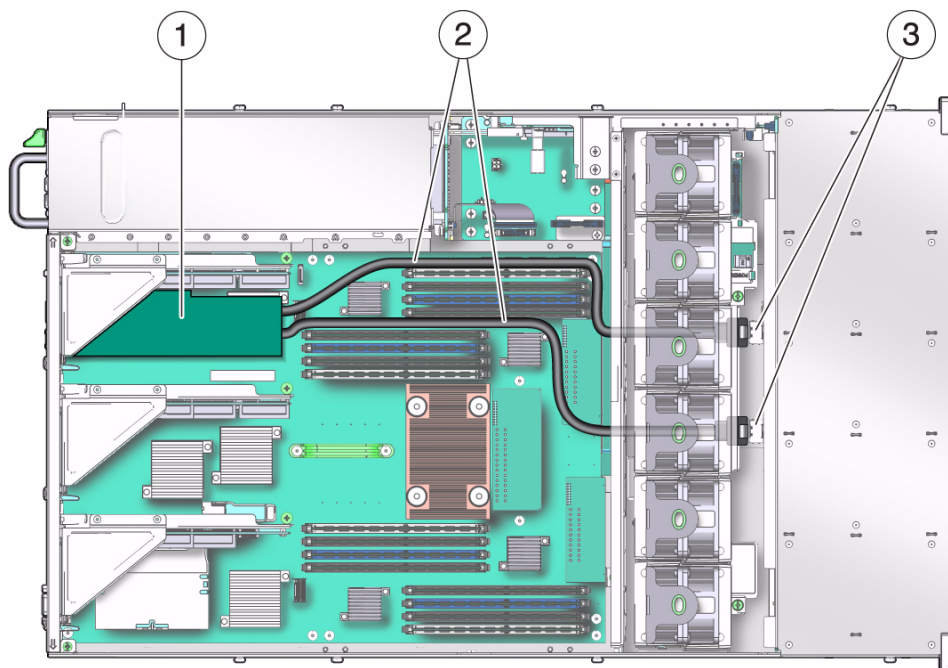
**Figure Legend**

- 
- 1 Connectors on motherboard
  - 2 HDD data cables
  - 3 Connectors on HDD backplane
- 

## Cable Routing Diagram for the PCIe SAS RAID HBA

The following figure shows the correct path for routing the two hard drive data cables from the PCIe SAS RAID HBA connectors to the corresponding connectors on the hard drive backplane.

**FIGURE:** HDD Data Cables for the SAS 2.0 RAID HBA



**Figure Legend**

- 
- 1 SAS PCIe RAID controller
  - 2 HDD data cables
  - 3 Connectors on HDD backplane
- 

**Related Information**

- [“Servicing SAS PCIe RAID HBA Cards” on page 153](#)

# Detecting and Managing Faults

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

- [“Diagnostics Overview” on page 15](#)
- [“Diagnostics Process” on page 16](#)
- [“Interpreting Diagnostic LEDs” on page 20](#)
- [“Memory Fault Handling Overview” on page 23](#)
- [“Managing Faults \(Oracle ILOM\)” on page 24](#)
- [“Understanding Fault Management Commands” on page 35](#)
- [“Interpreting Log Files and System Messages” on page 40](#)
- [“Checking if Oracle VTS Software Is Installed” on page 42](#)
- [“Managing Faults \(POST\)” on page 44](#)
- [“Managing Faults \(PSH\)” on page 54](#)
- [“Managing Components \(ASR\)” on page 60](#)

---

## Diagnostics Overview

You can use a variety of diagnostic tools, commands, and indicators to monitor and troubleshoot a server:

- **LEDs** – Provide a quick visual notification of the status of the server and of some of the FRUs.
- **Oracle ILOM 3.0** – Runs on the SP. In addition to providing the interface between the hardware and OS, Oracle ILOM also tracks and reports the health of key server components. Oracle ILOM works closely with POST and PSH to keep the system running even when there is a faulty component.
- **Power-on self-test (POST)** – Performs diagnostics on system components upon system reset to ensure the integrity of those components. POST is configurable and works with Oracle ILOM to take faulty components offline if needed.

- **PSH** - Continuously monitors the health of the CPU, memory, and other components, and works with Oracle ILOM to take a faulty component offline if needed. The PSH technology enables systems to accurately predict component failures and mitigate many serious problems before they occur.
- **Log files and command interface** – Provide the standard Oracle Solaris OS log files and investigative commands that can be accessed and displayed on the device of your choice.
- **Oracle VTS** – Exercises the system, provides hardware validation, and discloses possible faulty components with recommendations for repair.

The LEDs, Oracle ILOM, PSH, and many of the log files and console messages are integrated. For example, when the Oracle Solaris OS detects a fault, the software displays the fault, logs the fault, and passes the information to Oracle ILOM, where the fault is also logged. Depending on the fault, one or more LEDs might also be illuminated.

The diagnostic flowchart in [“Diagnostics Process” on page 16](#) illustrates an approach for using the server diagnostics to identify a faulty FRU. The diagnostics you use, and the order in which you use them, depend on the nature of the problem you are troubleshooting. So you might perform some actions and not others.

### Related Information

- [“Diagnostics Process” on page 16](#)
- [“Interpreting Diagnostic LEDs” on page 20](#)
- [“Managing Faults \(Oracle ILOM\)” on page 24](#)
- [“Understanding Fault Management Commands” on page 35](#)
- [“Interpreting Log Files and System Messages” on page 40](#)
- [“Checking if Oracle VTS Software Is Installed” on page 42](#)
- [“Managing Faults \(POST\)” on page 44](#)
- [“Managing Faults \(PSH\)” on page 54](#)
- [“Managing Components \(ASR\)” on page 60](#)

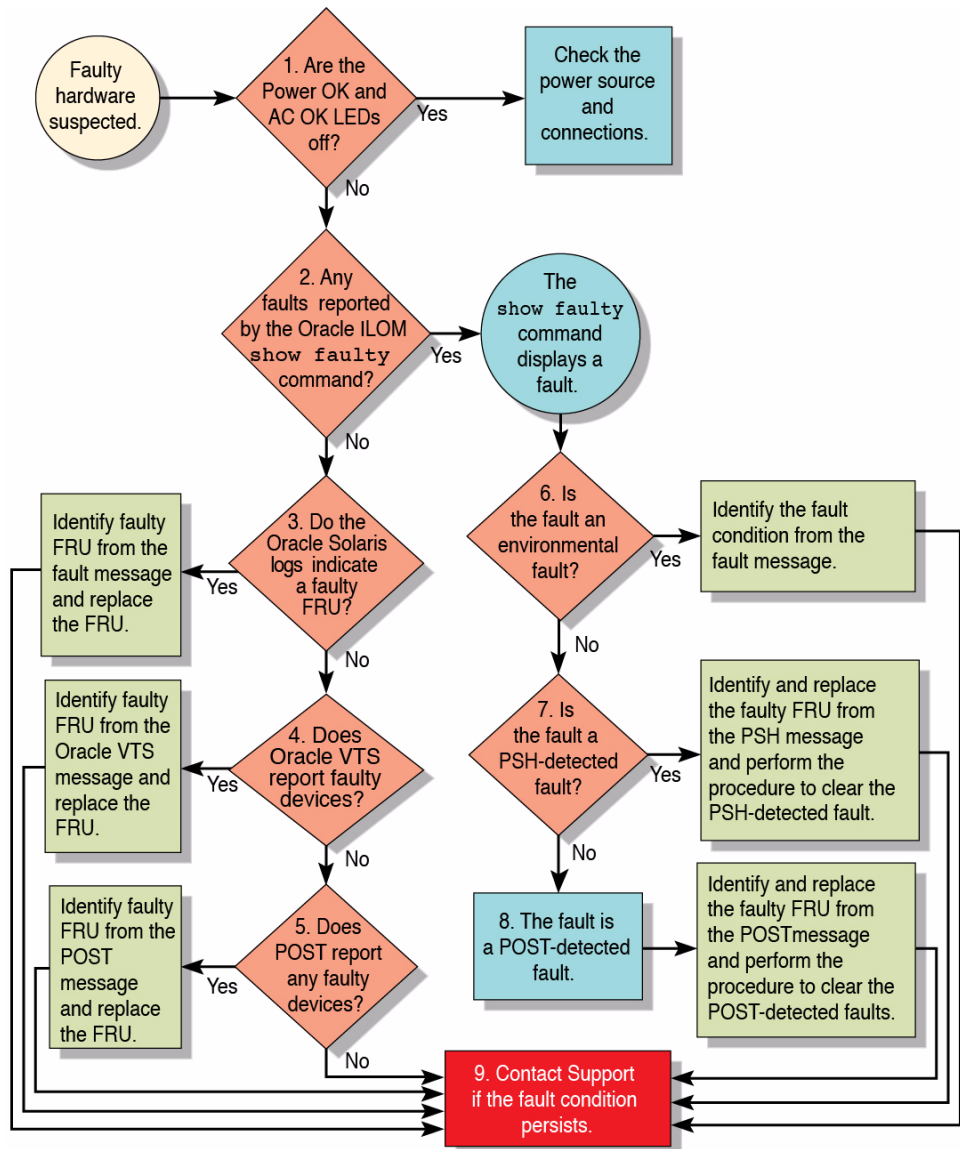
---

## Diagnostics Process

The following flowchart illustrates the diagnostic process, using different diagnostic tools through a default sequence. See also the table that follows the flowchart.



**FIGURE:** Diagnostics Flowchart



**TABLE:** Diagnostic Flowchart Reference Table

Diagnostic Action	Possible Outcome	Additional Information
Check Power OK and AC Present LEDs on the server. (Flowchart item 1)	<p>The Power OK LED is located on the front and rear of the chassis.</p> <p>The AC Present LED is located on the rear of the server on each power supply.</p> <p>If these LEDs are not on, check the power source and power connections to the server.</p>	<ul style="list-style-type: none"> <li>• “Front Components” on page 1</li> </ul>
Run the Oracle ILOM <code>show faulty</code> command to check for faults. (Flowchart item 2)	<p>The <code>show faulty</code> command displays the following kinds of faults:</p> <ul style="list-style-type: none"> <li>• Environmental and configuration faults</li> <li>• Oracle Solaris Predictive Self-Healing (PSH) detected faults</li> <li>• POST detected faults</li> </ul> <p>Faulty FRUs are identified in fault messages using the FRU name.</p>	<ul style="list-style-type: none"> <li>• TABLE: Oracle ILOM Properties Used to Manage POST Operations on page 46</li> <li>• “Check for Faults (show faulty Command)” on page 30</li> </ul>
Check the Oracle Solaris log files for fault information. (Flowchart item 3)	<p>The Oracle Solaris message buffer and log files record system events, and provide information about faults.</p> <ul style="list-style-type: none"> <li>• If system messages indicate a faulty device, replace the FRU.</li> <li>• For more diagnostic information, review the Oracle VTS report. (Flowchart item 4)</li> </ul>	<ul style="list-style-type: none"> <li>• “Interpreting Log Files and System Messages” on page 40</li> </ul>
Run Oracle VTS software. (Flowchart item 4)	<p>Oracle VTS is an application you can run to exercise and diagnose FRUs. To run Oracle VTS, the server must be running the Oracle Solaris OS.</p> <ul style="list-style-type: none"> <li>• If Oracle VTS reports a faulty device, replace the FRU.</li> <li>• If Oracle VTS does not report a faulty device, run POST. (Flowchart item 5)</li> </ul>	<ul style="list-style-type: none"> <li>• “Checking if Oracle VTS Software Is Installed” on page 42</li> </ul>
Run POST. (Flowchart item 5)	<p>POST performs basic tests of the server components and reports faulty FRUs.</p>	<ul style="list-style-type: none"> <li>• “Managing Faults (POST)” on page 44</li> <li>• TABLE: Oracle ILOM Properties Used to Manage POST Operations on page 46</li> </ul>
Determine if the fault was detected by Oracle ILOM. (Flowchart item 6)	<p>All Oracle ILOM-detected fault messages begin with the characters “SPT”.</p> <p>For additional information on the reported fault, including possible corrective action, sign into the Oracle support web site (<a href="http://support.oracle.com">http://support.oracle.com</a>) and type the message ID contained in the fault message into the Search Knowledge Base search window.</p>	<ul style="list-style-type: none"> <li>• “Check for Faults (show faulty Command)” on page 30</li> <li>• “Check for Faults (fmadm faulty Command)” on page 31</li> </ul>

**TABLE:** Diagnostic Flowchart Reference Table (*Continued*)

Diagnostic Action	Possible Outcome	Additional Information
Determine if the fault was detected by PSH. (Flowchart item 7)	If the fault message does <i>not</i> begin with the characters “SPT”, the fault was detected by PSH. For additional information on the reported fault, including possible corrective action, go to this web site: <a href="http://support.oracle.com">http://support.oracle.com</a> Search for the message ID contained in the fault message. After you replace the FRU, perform the procedure to clear PSH-detected faults.	<ul style="list-style-type: none"><li>• “Managing Faults (PSH)” on page 54</li><li>• “Clear PSH-Detected Faults” on page 58</li></ul>
Determine if the fault was detected by POST. (Flowchart item 8)	POST performs basic tests of the server components and reports faulty FRUs. When POST detects a faulty FRU, it logs the fault and if possible, takes the FRU offline. POST detected FRUs display the following text in the fault message: <code>Forced fail reason</code> In a POST fault message, <i>reason</i> is the name of the power-on routine that detected the failure.	<ul style="list-style-type: none"><li>• “Managing Faults (POST)” on page 44</li><li>• “Clear POST-Detected Faults” on page 50</li></ul>
Contact technical support. (Flowchart item 9)	The majority of hardware faults are detected by the server’s diagnostics. In rare cases a problem might require additional troubleshooting. If you are unable to determine the cause of the problem, contact your service representative for support.	

### Related Information

- “Diagnostics Overview” on page 15
- “Interpreting Diagnostic LEDs” on page 20
- “Managing Faults (Oracle ILOM)” on page 24
- “Understanding Fault Management Commands” on page 35
- “Interpreting Log Files and System Messages” on page 40
- “Checking if Oracle VTS Software Is Installed” on page 42
- “Managing Faults (POST)” on page 44
- “Managing Faults (PSH)” on page 54
- “Managing Components (ASR)” on page 60

# Interpreting Diagnostic LEDs

The server's LEDs provide status information at the system level as well as for individual components. The following topics explain how to interpret the information they provide.

Type of LED	LED Location	Links
Server-level LEDs	Front and rear panels of the server	<ul style="list-style-type: none"><li>• <a href="#">“Front Panel System Controls and LEDs” on page 20</a></li><li>• <a href="#">“Rear Panel System LEDs” on page 22</a></li></ul>
Component-level LEDs	On or near the individual components	<ul style="list-style-type: none"><li>• <a href="#">“LEDs for the Ethernet Ports and NET MGT port” on page 22</a></li><li>• <a href="#">“Hard Drive LEDs” on page 107</a></li><li>• <a href="#">“Power Supply LEDs” on page 119</a></li><li>• <a href="#">“Fan Module LEDs” on page 168</a></li></ul>






## Related Information

- [“Interpreting Diagnostic LEDs” on page 20](#)
- [“Diagnostics Process” on page 16](#)
- [“Managing Faults \(Oracle ILOM\)” on page 24](#)
- [“Understanding Fault Management Commands” on page 35](#)
- [“Interpreting Log Files and System Messages” on page 40](#)
- [“Checking if Oracle VTS Software Is Installed” on page 42](#)
- [“Managing Faults \(POST\)” on page 44](#)
- [“Managing Faults \(PSH\)” on page 54](#)
- [“Managing Components \(ASR\)” on page 60](#)

## Front Panel System Controls and LEDs

The following table explains how to interpret the behavior of the system-level LEDs provided on the front panel.

**TABLE:** Front Panel System Controls and LEDs

LED or Button	Icon or Label	Description
Locator LED and button (white)		<p>The Locator LED can be turned on to identify a particular server. When on, it blinks rapidly. There are two methods for turning a Locator LED on:</p> <ul style="list-style-type: none"> <li>• Issuing the Oracle ILOM command <code>set /SYS/LOCATE value=Fast_Blink</code></li> <li>• Pressing the Locator button.</li> </ul>
Service Required LED (amber)		<p>Indicates that service is required. POST and Oracle ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication.</p> <p>The Oracle ILOM show <code>faulty</code> command provides details about any faults that cause this indicator to light.</p> <p>Under some fault conditions, individual component fault LEDs are turned on in addition to the Service Required LED.</p>
Power OK LED (green)		<p>Indicates the following conditions:</p> <ul style="list-style-type: none"> <li>• Off – System is not running in its normal state. System power might be off. The SP might be running.</li> <li>• Steady on – System is powered on and is running in its normal operating state. No service actions are required.</li> <li>• Fast blink – System is running in standby mode and can be quickly returned to full function.</li> <li>• Slow blink – A normal, but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running, or the system is booting.</li> </ul>
Power button		<p>The recessed Power button toggles the system on or off.</p> <ul style="list-style-type: none"> <li>• Press once to turn the system on.</li> <li>• Press once to shut the system down in a normal manner.</li> <li>• Press and hold for 4 seconds to perform an emergency shutdown.</li> </ul>
Power Supply Fault LED (amber)	REAR PS	<p>Provides the following operational PSU indications:</p> <ul style="list-style-type: none"> <li>• Off – Indicates a steady state, no service action is required.</li> <li>• Steady on – Indicates that a power supply failure event has been acknowledged and a service action is required on at least one PSU.</li> </ul>
Overtemp LED (amber)		<p>Provides the following operational temperature indications:</p> <ul style="list-style-type: none"> <li>• Off – Indicates a steady state, no service action is required.</li> <li>• Steady on – Indicates that a temperature failure event has been acknowledged and a service action is required.</li> </ul>
Fan Fault LED (amber)	TOP FAN	<p>Provides the following operational fan indications:</p> <ul style="list-style-type: none"> <li>• Off – Indicates a steady state, no service action is required.</li> <li>• Steady on – Indicates that a fan failure event has been acknowledged and a service action is required on at least one of the fan modules.</li> </ul>




## Related Information

- [“Rear Panel System LEDs” on page 22](#)

# Rear Panel System LEDs

The following table explains how to interpret the behavior of the system-level LEDs provided on the rear panel.

**TABLE:** Rear Panel Controls and Indicators

LED or Button	Icon or Label	Description
Locator LED and button (white)		<p>The Locator LED can be turned on to identify a particular system. When on, it blinks rapidly. There are two methods for turning a Locator LED on:</p> <ul style="list-style-type: none"><li>• Issuing the Oracle ILOM command <code>set /SYS/LOCATE value=Fast_Blink</code></li><li>• Pressing the Locator button.</li></ul>
Service Required LED (amber)		<p>Indicates that service is required. POST and Oracle ILOM are two diagnostics tools that can detect a fault or failure resulting in this indication.</p> <p>The Oracle ILOM <code>show faulty</code> command provides details about any faults that cause this indicator to light.</p> <p>Under some fault conditions, individual component fault LEDs are turned on in addition to the Service Required LED.</p>
Power OK LED (green)		<p>Indicates the following conditions:</p> <ul style="list-style-type: none"><li>• Off – System is not running in its normal state. System power might be off. The SP might be running.</li><li>• Steady on – System is powered on and is running in its normal operating state. No service actions are required.</li><li>• Fast blink – System is running in standby mode and can be quickly returned to full function.</li><li>• Slow blink – A normal, but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running, or the system is booting.</li></ul>

## Related Information

- [“Front Panel System Controls and LEDs” on page 20](#)

# LEDs for the Ethernet Ports and NET MGT port

The following table describes the status LEDs assigned to each Ethernet port.

**TABLE:** Ethernet LEDs (NET0, NET1, NET2, NET3)

LED	Color	Description
Left LED	Green	Link/Activity indicator: <ul style="list-style-type: none"><li>• Blinking – A link is established.</li><li>• Off – No link is established.</li></ul>
Right LED	Amber/ Green	Speed indicator: <ul style="list-style-type: none"><li>• Amber on – The link is operating as a 100-Mbps connection.</li><li>• Green on – The link is operating as a Gigabit connection (1000 Mbps).</li><li>• Off – The link is operating as a 10-Mbps connection, or no link is established.</li></ul>

The following table describes the status LEDs assigned to the NET MGT port.

**TABLE:** NET MGT Port LEDs

LED	Color	Description
Left LED	Green	Link/Activity indicator: <ul style="list-style-type: none"><li>• On or blinking – A link is established.</li><li>• Off – No link is established.</li></ul>
Right LED	Green	Speed indicator: <ul style="list-style-type: none"><li>• On or blinking – The link is operating as a 100-Mbps connection.</li><li>• Off – The link is operating as a 10-Mbps connection.</li></ul>

### Related Information

- [“Front Panel System Controls and LEDs” on page 20](#)
- [“Rear Panel System LEDs” on page 22](#)

---

## Memory Fault Handling Overview

A variety of features play a role in how the memory subsystem is configured and how memory faults are handled. Understanding the underlying features helps you identify and repair memory problems.

The following server features manage memory faults:

- **POST**—By default, POST runs when the server is powered on.

For correctable memory errors, POST forwards the error to the PSH daemon for error handling. If an uncorrectable memory fault is detected, POST displays the fault with the device name of the faulty DIMMs, and logs the fault. POST then disables the faulty DIMMs. Depending on the memory configuration and the location of the faulty DIMM, POST disables half of physical memory in the system, or half the physical memory and half the processor threads. When this offlining process occurs in normal operation, you must replace the faulty DIMMs based on the fault message and enable the disabled DIMMs with the Oracle ILOM command `set device component_state=enabled`, where *device* is the name of the DIMM being enabled (for example, `set /SYS/MB/CMP0/BR0/CH0/D0 component_state=enabled`).

- **PSH technology**—PSH uses the Fault Manager daemon (`fmd`) to monitor various kinds of faults. When a fault occurs, the fault is assigned a unique fault ID (UUID), and logged. PSH reports the fault and suggests a replacement for the DIMMs associated with the fault.

If you suspect the server has a memory problem, run the Oracle ILOM `show faulty` command. This command lists memory faults and identifies the DIMM modules associated with the fault.

### Related Information

- [“POST Overview” on page 45](#)
- [“PSH Overview” on page 55](#)
- [“PSH-Detected Fault Example” on page 56](#)
- [“Locate a Faulty DIMM \(show faulty Command\)” on page 91](#)
- [“DIMM Configuration Errors—System Console” on page 99](#)

---

## Managing Faults (Oracle ILOM)

These topics explain how to use Oracle ILOM, the SP firmware, to diagnose faults and verify successful repairs.

- [“Oracle ILOM Troubleshooting Overview” on page 25](#)
- [“Access the SP \(Oracle ILOM\)” on page 27](#)
- [“Display FRU Information \(show Command\)” on page 29](#)
- [“Check for Faults \(show faulty Command\)” on page 30](#)
- [“Check for Faults \(fmadm faulty Command\)” on page 31](#)



- “Clear Faults (clear\_fault\_action Property)” on page 32
- “Service-Related Oracle ILOM Commands” on page 34

### Related Information

- “Diagnostics Overview” on page 15
- “Diagnostics Process” on page 16
- “Interpreting Diagnostic LEDs” on page 20
- “Understanding Fault Management Commands” on page 35
- “Interpreting Log Files and System Messages” on page 40
- “Checking if Oracle VTS Software Is Installed” on page 42
- “Managing Faults (POST)” on page 44
- “Managing Faults (PSH)” on page 54
- “Managing Components (ASR)” on page 60

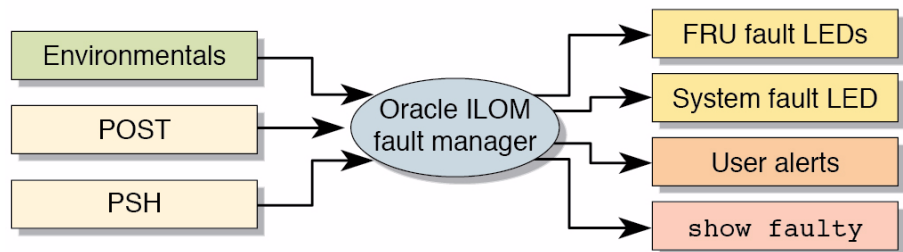
## Oracle ILOM Troubleshooting Overview

Oracle ILOM enables you to remotely run diagnostics, such as POST, that would otherwise require physical proximity to the server’s serial port. You can also configure Oracle ILOM to send email alerts of hardware failures, hardware warnings, and other events related to the server or to Oracle ILOM.

The SP runs independently of the server, using the server’s standby power. Therefore, Oracle ILOM firmware and software continue to function when the server OS goes offline or when the server is powered off.

Error conditions detected by Oracle ILOM, POST, and PSH are forwarded to Oracle ILOM for fault handling.

**FIGURE:** Fault Reporting Through the Oracle ILOM Fault Manager



The Oracle ILOM fault manager evaluates error messages the manager receives to determine whether the condition being reported should be classified as an alert or a fault.

- **Alerts** -- When the fault manager determines that an error condition being reported does not indicate a faulty FRU, the fault manager classifies the error as an alert.

Alert conditions are often caused by environmental conditions, such as computer room temperature, which might improve over time. Alerts might also be caused by a configuration error, such as the wrong DIMM type being installed.

If the conditions responsible for the alert go away, the fault manager detects the change and stops logging alerts for that condition.

- **Faults** -- When the fault manager determines that a particular FRU has an error condition that is permanent, that error is classified as a fault. This classification causes the Service Required LEDs to be turned on, the FRUID PROMs updated, and a fault message logged. If the FRU has status LEDs, the Service Required LED for that FRU is also turned on.

A FRU identified as having a *fault* condition must be replaced.

The SP can automatically detect when a FRU has been replaced. In many cases, the SP performs this action even if the FRU is removed while the system is not running (for example, if the system power cables are unplugged during service procedures). This function enables Oracle ILOM to sense that a fault, diagnosed to a specific FRU, has been repaired.

---

**Note** – Oracle ILOM does not automatically detect hard drive replacement.

---

PSH does not monitor hard drives for faults. As a result, the SP does not recognize hard drive faults and does not light the fault LEDs on either the chassis or the hard drive itself. Use the Oracle Solaris message files to view hard drive faults.

For general information about Oracle ILOM, refer to the Oracle ILOM documentation.

For detailed information about Oracle ILOM features that are specific to this server, refer to *Server Administration*.

## Related Information

- [“Access the SP \(Oracle ILOM\)” on page 27](#)
- [“Display FRU Information \(show Command\)” on page 29](#)
- [“Check for Faults \(show faulty Command\)” on page 30](#)
- [“Check for Faults \(fmadm faulty Command\)” on page 31](#)
- [“Clear Faults \(clear\\_fault\\_action Property\)” on page 32](#)

## ▼ Access the SP (Oracle ILOM)

There are two approaches to interacting with the SP:

- Oracle ILOM CLI shell (default) – The Oracle ILOM shell provides access to Oracle ILOM's features and functions through a CLI.
- Oracle ILOM browser interface – The Oracle ILOM web interface supports the same set of features and functions as the shell.

---

**Note** – Unless indicated otherwise, all examples of interaction with the SP are depicted with Oracle ILOM shell commands.

---

---

**Note** – The CLI includes a feature that enables you to access Oracle Solaris Fault Manager commands, such as `fmadm`, `fmdump`, and `fmstat`, from within the Oracle ILOM shell. This feature is referred to as the Oracle ILOM `faultmgmt` shell. For more information about the Oracle Solaris Fault Manager commands, see the SPARC T4-1 administration documentation and the Oracle Solaris documentation.

---

You can log into multiple SP accounts simultaneously and have separate Oracle ILOM shell commands executing concurrently under each account.

### 1. Establish connectivity to the SP using one of the following methods:

- **SER MGT** – Connect a terminal device (such as an ASCII terminal or laptop with terminal emulation) to the serial management port.

Set up your terminal device for 9600 baud, 8 bit, no parity, 1 stop bit and no handshaking. Use a null-modem configuration (transmit and receive signals crossed over to enable DTE-to-DTE communication). The crossover adapters supplied with the server provide a null-modem configuration.

- **NET MGT** – Connect this port to an Ethernet network. This port requires an IP address. By default, the port is configured for DHCP, or you can assign an IP address.

### 2. Decide which interface to use, the Oracle ILOM CLI or the Oracle ILOM web interface.

- **Oracle ILOM CLI** – Is the default Oracle ILOM user interface and most of the commands and examples in this service manual use this interface. The default login account is `root` with a password of `changeme`.
- **Oracle ILOM web interface** – Can be used when you access the SP through the NET MGT port and have a browser. Refer to the Oracle ILOM 3.0 documentation for details. This interface is not referenced in this service manual.

### 3. Open an SSH session and connect to the SP by specifying its IP address.

The Oracle ILOM default username is `root`, and the default password is `changeme`.

```
% ssh root@xxx.xxx.xxx.xxx
...
Are you sure you want to continue connecting (yes/no) ? yes
...
Password: password (nothing displayed)

Oracle(R) Integrated Lights Out Manager

Version 3.0.12.x xxxxxx

Copyright (c) 2010 Oracle and/or its affiliates. All rights
reserved.

->
```

---

**Note** – To provide optimum server security, change the default server password.

---

The Oracle ILOM `->` prompt indicates that you are accessing the SP with the Oracle ILOM CLI.

### 4. Perform Oracle ILOM commands that provide the diagnostic information you need.

The following Oracle ILOM commands are commonly used for fault management:

- `show command` – Displays information about individual FRUs. See [“Display FRU Information \(show Command\)” on page 29](#).
- `show faulty command` – Displays environmental, POST-detected, and PSH-detected faults.

---

**Note** – You can use `fmadm faulty` in the `faultmgmt` shell as an alternative to `show faulty`. See [“Check for Faults \(fmadm faulty Command\)” on page 31](#)

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- `clear_fault_action property of the set command` – Manually clears PSH-detected faults. See [“Clear Faults \(clear\\_fault\\_action Property\)” on page 32](#).

### Related Information

- [“Oracle ILOM Troubleshooting Overview” on page 25](#)
- [“Display FRU Information \(show Command\)” on page 29](#)

- “Check for Faults (show faulty Command)” on page 30
- “Check for Faults (fmadm faulty Command)” on page 31
- “Clear Faults (clear\_fault\_action Property)” on page 32
- “Service-Related Oracle ILOM Commands” on page 34

## ▼ Display FRU Information (show Command)

- **At the Oracle ILOM prompt, type the show command.**

In the following example, the show command displays information about a DIMM.

```
-> show /SYS/MB/CMP0/B0B0/CH0/D0

/SYS/MB/CMP0/B0B0/CH0/D0
Targets:
  T_AMB
  SERVICE

Properties:
  Type = DIMM
  ipmi_name = B0/C0/D0
  component_state = Enabled
  fru_name = 2048MB DDR3 SDRAM
  fru_description = DDR3 DIMM 2048 Mbytes
  fru_manufacturer = Samsung
  fru_version = 0
  fru_part_number = *****
  fru_serial_number = *****
  fault_state = OK
  clear_fault_action = (none)

Commands:
  cd
  set
  show
```

### Related Information

- Oracle ILOM 3.0 documentation
- “Oracle ILOM Troubleshooting Overview” on page 25
- “Access the SP (Oracle ILOM)” on page 27
- “Check for Faults (show faulty Command)” on page 30
- “Check for Faults (fmadm faulty Command)” on page 31

- [“Clear Faults \(clear\\_fault\\_action Property\)” on page 32](#)
- [“Service-Related Oracle ILOM Commands” on page 34](#)

## ▼ Check for Faults (show faulty Command)

Use the `show faulty` command to display information about faults and alerts diagnosed by the system.

See [“Understanding Fault Management Commands” on page 35](#) for examples of the kind of information the command displays for different types of faults.

- **At the Oracle ILOM prompt, type the `show faulty` command.**

```
-> show faulty
```

Target	Property	Value
/SP/faultmgmt/0	fru	/SYS/PS0
/SP/faultmgmt/0/ faults/0	class	fault.chassis.power.volt-fail
/SP/faultmgmt/0/ faults/0	sunw-msg-id	SPT-8000-LC
/SP/faultmgmt/0/ faults/0	uuid	*****-****-****-****-*****
/SP/faultmgmt/0/ faults/0	timestamp	2010-08-11/14:54:23
/SP/faultmgmt/0/ faults/0	fru_part_number	*****
/SP/faultmgmt/0/ faults/0	fru_serial_number	*****
/SP/faultmgmt/0/ faults/0	product_serial_number	*****
/SP/faultmgmt/0/ faults/0	chassis_serial_number	*****
/SP/faultmgmt/0/ faults/0	detector	/SYS/PS0/VOLT_FAULT

### Related Information

- [“Diagnostics Process” on page 16](#)
- [“Oracle ILOM Troubleshooting Overview” on page 25](#)
- [“Access the SP \(Oracle ILOM\)” on page 27](#)
- [“Display FRU Information \(show Command\)” on page 29](#)
- [“Check for Faults \(fmadm faulty Command\)” on page 31](#)
- [“Clear Faults \(clear\\_fault\\_action Property\)” on page 32](#)

- [“Service-Related Oracle ILOM Commands” on page 34](#)

## ▼ Check for Faults (fmadm faulty Command)

The following is an example of the `fmadm faulty` command reporting on the same power supply fault as shown in the `show faulty` example. See [“Check for Faults \(show faulty Command\)” on page 30](#). Note that the two examples show the same UUID value.

The `fmadm faulty` command was run from within the Oracle ILOM `faultmgmt` shell.

---

**Note** – The characters SPT at the beginning of the message ID indicate that the fault was detected by Oracle ILOM.

---

1. At the Oracle ILOM prompt, type the `fmadm faulty` command.

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

2. At the `faultmgmtsp>` prompt, enter the `fmadm faulty` command.

```
faultmgmtsp> fmadm faulty
-----
Time                UUID                                msgid            Severity
-----
2010-08-11/14:54:23 *****-****-****-****-***** SPT-8000-LC    Critical

Fault class : fault.chassis.power.volt-fail

Description : A Power Supply voltage level has exceeded acceptable limits.

Response    : The service required LED on the chassis and on the affected
              Power Supply may be illuminated.

Impact      : Server will be powered down when there are insufficient
              operational power supplies

Action      : The administrator should review the ILOM event log for
              additional information pertaining to this diagnosis. Please
              refer to the Details section of the Knowledge Article for
              additional information.

faultmgmtsp>
```

### 3. Exit the faultmgmt shell.

```
faultmgmtsp> exit  
->
```

#### Related Information

- [“Diagnostics Process” on page 16](#)
- [“Oracle ILOM Troubleshooting Overview” on page 25](#)
- [“Access the SP \(Oracle ILOM\)” on page 27](#)
- [“Display FRU Information \(show Command\)” on page 29](#)
- [“Check for Faults \(show faulty Command\)” on page 30](#)
- [“Clear Faults \(clear\\_fault\\_action Property\)” on page 32](#)
- [“Service-Related Oracle ILOM Commands” on page 34](#)

## ▼ Clear Faults (clear\_fault\_action Property)

Use the `clear_fault_action` property of a FRU with the `set` command to manually clear Oracle ILOM-detected faults from the SP.

If Oracle ILOM detects a FRU replacement, Oracle ILOM automatically clears the fault. For PSH-diagnosed faults, if the replacement of the FRU is detected by the system or you manually clear the fault on the host, the fault is also cleared from the SP. In such cases, you do not need to clear the fault manually.

---

**Note** – For PSH-detected faults, this procedure clears the fault from the SP but not from the host. If the fault persists in the host, clear the fault manually as described in [“Clear PSH-Detected Faults” on page 58](#).

---

- **At the Oracle ILOM prompt, use the `set` command with the `clear_fault_action=True` property.**

This example begins with an excerpt from the `fmadm faulty` command showing power supply 0 with a voltage failure. After the fault condition is corrected (a new power supply has been installed), the fault state is cleared.



---

**Note** – In this example, the characters SPT at the beginning of the message ID indicate that the fault was detected by Oracle ILOM.

---

```
[...]  
faultmgmtsp> fmadm faulty  
-----  
Time                UUID                msgid                Severity  
-----  
2010-08-11/14:54:23 *****-****-****-****-***** SPT-8000-LC  Critical  
  
Fault class : fault.chassis.power.volt-fail  
  
Description : A Power Supply voltage level has exceeded acceptable limits.  
  
[...]  
  
-> set /SYS/PS0 clear_fault_action=true  
Are you sure you want to clear /SYS/PS0 (y/n)? y  
  
-> show  
  
/SYS/PS0  
Targets:  
    VINOK  
    PWROK  
    CUR_FAULT  
    VOLT_FAULT  
    FAN_FAULT  
    TEMP_FAULT  
    V_IN  
    I_IN  
    V_OUT  
    I_OUT  
    INPUT_POWER  
    OUTPUT_POWER  
Properties:  
    type = Power Supply  
    ipmi_name = PS0  
    fru_name = /SYS/PS0  
    fru_description = Powersupply  
    fru_manufacturer = Delta Electronics  
    fru_version = 03  
    fru_part_number = *****  
    fru_serial_number = *****  
    fault_state = OK
```

```
clear_fault_action = (none)
```

Commands:

```
cd
set
show
```

### Related Information

- [“Oracle ILOM Troubleshooting Overview” on page 25](#)
- [“Access the SP \(Oracle ILOM\)” on page 27](#)
- [“Display FRU Information \(show Command\)” on page 29](#)
- [“Check for Faults \(show faulty Command\)” on page 30](#)
- [“Check for Faults \(fmadm faulty Command\)” on page 31](#)
- [“Service-Related Oracle ILOM Commands” on page 34](#)

## Service-Related Oracle ILOM Commands

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

**TABLE:** Service-Related Oracle ILOM Commands

Oracle ILOM Command	Description
<code>help [command]</code>	Displays a list of all available commands with syntax and descriptions. Specifying a command name as an option displays help for that command.
<code>set /HOST send_break_action=break</code>	Takes the host server from the OS to either <code>kmdb</code> or <code>OBP</code> (equivalent to a Stop-A), depending on the mode Oracle Solaris software was booted.
<code>set /SYS/component clear_fault_action=true</code>	Manually clears host-detected faults. The <i>UUID</i> is the unique fault ID of the fault to be cleared.
<code>start /HOST/console</code>	Connects you to the host system.
<code>show /HOST/console/history</code>	Displays the contents of the system’s console buffer.
<code>set /HOST/bootmode property=value</code> [where <i>property</i> is state, config, or script]	Controls the host server OBP firmware method of booting.
<code>stop /SYS; start /SYS</code>	Performs a poweroff followed by poweron.
<code>stop /SYS</code>	Powers off the host server.
<code>start /SYS</code>	Powers on the host server.

**TABLE:** Service-Related Oracle ILOM Commands (*Continued*)

Oracle ILOM Command	Description
<code>reset /SYS</code>	Generates a hardware reset on the host server.
<code>reset /SP</code>	Reboots the SP.
<code>set /SYS keyswitch_state=<i>value</i></code> <code>normal   standby   diag   locked</code>	Sets the virtual keyswitch.
<code>set /SYS/LOCATE value=<i>value</i></code> <code>[Fast_blink   Off]</code>	Turns the Locator LED on the server on or off.
<code>show faulty</code>	Displays current system faults. See <a href="#">“Check for Faults (show faulty Command)” on page 30</a> .
<code>show /SYS keyswitch_state</code>	Displays the status of the virtual keyswitch.
<code>show /SYS/LOCATE</code>	Displays the current state of the Locator LED as either on or off.
<code>show /SP/logs/event/list</code>	Displays the history of all events logged in the SP event buffers (in RAM or the persistent buffers).
<code>show /HOST</code>	Displays information about the operating state of the host system, the system serial number, and whether the hardware is providing service.

**Related Information**

- [“Oracle ILOM Troubleshooting Overview” on page 25](#)
- [“Access the SP \(Oracle ILOM\)” on page 27](#)
- [“Display FRU Information \(show Command\)” on page 29](#)
- [“Check for Faults \(show faulty Command\)” on page 30](#)
- [“Check for Faults \(fmadm faulty Command\)” on page 31](#)
- [“Clear Faults \(clear\\_fault\\_action Property\)” on page 32](#)

---

# Understanding Fault Management Commands

This topic provides the following information:

- [“No Faults Detected Example \(show faulty Command\)” on page 36](#)
- [“Power Supply Fault Example \(show faulty Command\)” on page 36](#)

- “Power Supply Fault Example (fmadm faulty Command)” on page 37
- “POST-Detected Fault Example (show faulty Command)” on page 39
- “PSH-Detected Fault Example (show faulty Command)” on page 39

### Related Information

- “Diagnostics Overview” on page 15
- “Diagnostics Process” on page 16
- “Interpreting Diagnostic LEDs” on page 20
- “Managing Faults (Oracle ILOM)” on page 24
- “Interpreting Log Files and System Messages” on page 40
- “Checking if Oracle VTS Software Is Installed” on page 42
- “Managing Faults (POST)” on page 44
- “Managing Faults (PSH)” on page 54
- “Managing Components (ASR)” on page 60

## No Faults Detected Example (show faulty Command)

When no faults have been detected, the `show faulty` command output looks like this:

```
-> show faulty
```

Target	Property	Value
-----+	-----+	-----
-----		

## Power Supply Fault Example (show faulty Command)

The following is an example of the `show faulty` command reporting a power supply fault.

**Note** – The characters SPT at the beginning of the message ID indicate that the fault was detected by Oracle ILOM.

-> **show faulty**

Target	Property	Value
/SP/faultmgmt/0	fru	/SYS/PS0
/SP/faultmgmt/0/faults/0	class	fault.chassis.power.volt-fail
/SP/faultmgmt/0/faults/0	sunw-msg-id	SPT-8000-LC
/SP/faultmgmt/0/faults/0	uuid	*****_*****_*****_*****_*****
/SP/faultmgmt/0/faults/0	timestamp	2010-08-11/14:54:23
/SP/faultmgmt/0/faults/0	fru_part_number	*****
/SP/faultmgmt/0/faults/0	fru_serial_number	*****
/SP/faultmgmt/0/faults/0	product_serial_number	*****
/SP/faultmgmt/0/faults/0	chassis_serial_number	*****
/SP/faultmgmt/0/faults/0	detector	/SYS/PS0/VOLT_FAULT

**Related Information**

- [“Power Supply Fault Example \(show faulty Command\)” on page 36](#)
- [“Power Supply Fault Example \(fmadm faulty Command\)” on page 37](#)
- [“POST-Detected Fault Example \(show faulty Command\)” on page 39](#)
- [“PSH-Detected Fault Example \(show faulty Command\)” on page 39](#)
- [“Service-Related Oracle ILOM Commands” on page 34](#)

## Power Supply Fault Example (fmadm faulty Command)

The following is an example of the `fmadm faulty` command reporting on the same power supply fault as shown in the `show faulty` example. See [“Power Supply Fault Example \(show faulty Command\)” on page 36](#). Both examples show the same UUID value.

The `fmadm faulty` command was run from within the Oracle ILOM `faultmgmt` shell.

---

**Note** – The characters SPT at the beginning of the message ID indicate that the fault was detected by Oracle ILOM.

---

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

faultmgmtsp> fmadm faulty
-----
Time                UUID                msgid                Severity
-----
2010-08-11/14:54:23 *****_****_****_****_***** SPT-8000-LC    Critical

Fault class : fault.chassis.power.volt-fail

Description : A Power Supply voltage level has exceeded acceptable limits.

Response    : The service required LED on the chassis and on the affected
               Power Supply may be illuminated.

Impact      : Server will be powered down when there are insufficient
               operational power supplies

Action      : The administrator should review the ILOM event log for
               additional information pertaining to this diagnosis. Please
               refer to the Details section of the Knowledge Article for
               additional information.

faultmgmtsp> exit
```

### Related Information

- [“No Faults Detected Example \(show faulty Command\)”](#) on page 36
- [“Power Supply Fault Example \(show faulty Command\)”](#) on page 36
- [“POST-Detected Fault Example \(show faulty Command\)”](#) on page 39
- [“PSH-Detected Fault Example \(show faulty Command\)”](#) on page 39
- [“Service-Related Oracle ILOM Commands”](#) on page 34

## POST-Detected Fault Example (show faulty Command)

The following is an example of the `show faulty` command displaying a fault that was detected by POST. These kinds of faults are identified by the message `Forced fail reason`, where *reason* is the name of the power-on routine that detected the fault.

```
-> show faulty
```

Target	Property	Value
/SP/faultmgmt/0	fru	/SYS/PM0/CMP0/B0B0/CH0/D0
/SP/faultmgmt/0	timestamp	Oct 12 16:40:56
/SP/faultmgmt/0/ faults/0	timestamp	Oct 12 16:40:56
/SP/faultmgmt/0/ faults/0	sp_detected_fault	/SYS/PM0/CMP0/B0B0/CH0/D0 Forced fail (POST)

### Related Information

- [“No Faults Detected Example \(show faulty Command\)” on page 36](#)
- [“Power Supply Fault Example \(show faulty Command\)” on page 36](#)
- [“Power Supply Fault Example \(fmadm faulty Command\)” on page 37](#)
- [“PSH-Detected Fault Example \(show faulty Command\)” on page 39](#)
- [“Service-Related Oracle ILOM Commands” on page 34](#)

## PSH-Detected Fault Example (show faulty Command)

The following is an example of the `show faulty` command displaying a fault that was detected by PSH. These kinds of faults are identified by the absence of the characters `SPT` at the beginning of the message ID.

```
-> show faulty
```

Target	Property	Value
/SP/faultmgmt/0	fru	/SYS/MB
/SP/faultmgmt/0/ faults/0	class	fault.cpu.generic-sparc.strand
/SP/faultmgmt/0/ faults/0	sunw-msg-id	SUN4V-8002-6E

/SP/faultmgmt/0/ faults/0	uuid	*****-****-****-****-*****
/SP/faultmgmt/0/ faults/0	timestamp	2010-08-13/15:48:33
/SP/faultmgmt/0/ faults/0	chassis_serial_number	*****
/SP/faultmgmt/0/ faults/0	product_serial_number	*****
/SP/faultmgmt/0/ faults/0	fru_serial_number	*****-*****
/SP/faultmgmt/0/ faults/0	fru_part_number	541-3857-07
/SP/faultmgmt/0/ faults/0	mod-version	1.16
/SP/faultmgmt/0/ faults/0	mod-name	eft
/SP/faultmgmt/0/ faults/0	fault_diagnosis	/HOST
/SP/faultmgmt/0/ faults/0	severity	Major

### Related Information

- [“No Faults Detected Example \(show faulty Command\)” on page 36](#)
- [“Power Supply Fault Example \(show faulty Command\)” on page 36](#)
- [“Power Supply Fault Example \(fmadm faulty Command\)” on page 37](#)
- [“POST-Detected Fault Example \(show faulty Command\)” on page 39](#)
- [“Service-Related Oracle ILOM Commands” on page 34](#)

---

## Interpreting Log Files and System Messages

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

If POST or PSH do not indicate the source of a fault, check the message buffer and log files for notifications of faults. Hard drive faults are usually captured by the Oracle Solaris message files.

- [“Check the Message Buffer” on page 41](#)



- [“View the System Message Log Files” on page 41](#)

### Related Information

- [“Diagnostics Overview” on page 15](#)
- [“Diagnostics Process” on page 16](#)
- [“Interpreting Diagnostic LEDs” on page 20](#)
- [“Managing Faults \(Oracle ILOM\)” on page 24](#)
- [“Understanding Fault Management Commands” on page 35](#)
- [“Checking if Oracle VTS Software Is Installed” on page 42](#)
- [“Managing Faults \(POST\)” on page 44](#)
- [“Managing Faults \(PSH\)” on page 54](#)
- [“Managing Components \(ASR\)” on page 60](#)

## ▼ Check the Message Buffer

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

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

```
# dmesg
```

### Related Information

- [“View the System Message Log Files” on page 41](#)

## ▼ View the System Message Log Files

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

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

1. Log in as superuser.
2. Type:

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

3. If you want to view all logged messages, type:

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

### Related Information

[“Check the Message Buffer” on page 41](#)

---

## Checking if Oracle VTS Software Is Installed

Oracle VTS is a validation test suite that you can use to test this server. These topics provide an overview and a way to check if the Oracle VTS software is installed. For comprehensive Oracle VTS information, refer to the SunVTS 6.1 and Oracle VTS 7.0 documentation.

- [“Oracle VTS Overview” on page 43](#)
- [“Check if Oracle VTS Is Installed” on page 43](#)

### Related Information

- [“Diagnostics Overview” on page 15](#)
- [“Diagnostics Process” on page 16](#)
- [“Interpreting Diagnostic LEDs” on page 20](#)
- [“Managing Faults \(Oracle ILOM\)” on page 24](#)
- [“Understanding Fault Management Commands” on page 35](#)
- [“Interpreting Log Files and System Messages” on page 40](#)
- [“Managing Faults \(POST\)” on page 44](#)
- [“Managing Faults \(PSH\)” on page 54](#)
- [“Managing Components \(ASR\)” on page 60](#)

# Oracle VTS Overview

Oracle VTS is a validation test suite that you can use to test this server. The Oracle VTS software provides multiple diagnostic hardware tests that verify the connectivity and functionality of most hardware controllers and devices for this server. The software provides these kinds of test categories:

- Audio
- Communication (serial and parallel)
- Graphic and video
- Memory
- Network
- Peripherals (hard disk drives, CD-DVD devices, and printers)
- Processor
- Storage

Use the Oracle VTS software to validate a system during development, production, receiving inspection, troubleshooting, periodic maintenance, and system or subsystem stressing.

You can run the Oracle VTS software through a web browser, a terminal interface, or a CLI.

You can run tests in a variety of modes for online and offline testing.

The Oracle VTS software also provides a choice of security mechanisms.

The Oracle VTS software is provided on the preinstalled Oracle Solaris OS that shipped with the server, however, Oracle VTS might not be installed.

## Related Information

- Oracle VTS documentation
- [“Checking if Oracle VTS Software Is Installed” on page 42](#)
- [“Check if Oracle VTS Is Installed” on page 43](#)

## ▼ Check if Oracle VTS Is Installed

1. Log in as superuser.
2. Check for the presence of Oracle VTS packages using the `pkginfo` command.

```
# pkginfo -l SUNvts SUNWvtsr SUNWvtsts SUNWvtsmn
```

- If information about the packages is displayed, then Oracle VTS software is installed.
- If you receive messages reporting `ERROR: information for package was not found`, then the Oracle VTS software is not installed. You must install the software before you can use it. You can obtain the Oracle VTS software from the following places:
  - Oracle Solaris OS media kit (DVDs)
  - As a download from the web

#### **Related Information**

- [“Oracle VTS Overview” on page 43](#)
- [Oracle VTS documentation](#)

---

## Managing Faults (POST)

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

- [“POST Overview” on page 45](#)
- [“Oracle ILOM Properties That Affect POST Behavior” on page 45](#)
- [“Configure POST” on page 48](#)
- [“Run POST With Maximum Testing” on page 49](#)
- [“Interpret POST Fault Messages” on page 50](#)
- [“Clear POST-Detected Faults” on page 50](#)
- [“POST Output Reference” on page 52](#)

#### **Related Information**

- [“Diagnostics Overview” on page 15](#)
- [“Diagnostics Process” on page 16](#)
- [“Interpreting Diagnostic LEDs” on page 20](#)
- [“Managing Faults \(Oracle ILOM\)” on page 24](#)
- [“Understanding Fault Management Commands” on page 35](#)
- [“Interpreting Log Files and System Messages” on page 40](#)
- [“Checking if Oracle VTS Software Is Installed” on page 42](#)
- [“Managing Faults \(PSH\)” on page 54](#)
- [“Managing Components \(ASR\)” on page 60](#)

# POST Overview

POST is a group of PROM-based tests that run when the server is powered on or is reset. POST checks the basic integrity of the critical hardware components in the server (CMP, memory, and I/O subsystem).

You can also run POST as a system-level hardware diagnostic tool. Use the Oracle ILOM `set` command to set the parameter `keyswitch_state` to `diag`.

You can also set other Oracle ILOM properties to control various other aspects of POST operations. For example, you can specify the events that cause POST to run, the level of testing POST performs, and the amount of diagnostic information POST displays. These properties are listed and described in [“Oracle ILOM Properties That Affect POST Behavior” on page 45](#).

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

## Related Information

- [“Oracle ILOM Properties That Affect POST Behavior” on page 45](#)
- [“Configure POST” on page 48](#)
- [“Run POST With Maximum Testing” on page 49](#)
- [“Interpret POST Fault Messages” on page 50](#)
- [“Clear POST-Detected Faults” on page 50](#)
- [“POST Output Reference” on page 52](#)

## Oracle ILOM Properties That Affect POST Behavior

These Oracle ILOM properties determine how POST performs its operations. See also the flowchart that follows the table.

---

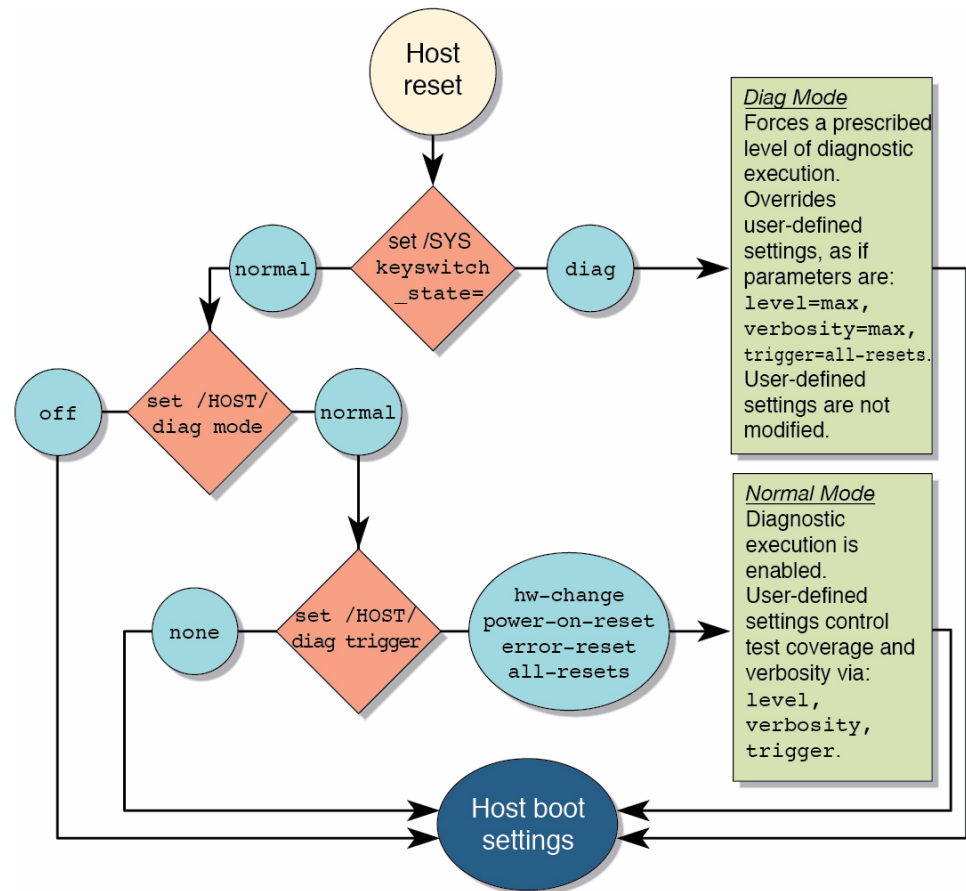
**Note** – The value of `keyswitch_state` must be `normal` when individual POST parameters are changed.

---

**TABLE:** Oracle ILOM Properties Used to Manage POST Operations

Parameter	Values	Description
/SYS keyswitch_state	normal	The system can power on and run POST (based on the other parameter settings). This parameter overrides all other commands.
	diag	The system runs POST based on predetermined settings.
	standby	The system cannot power on.
	locked	The system can power on and run POST, but no flash updates can be made.
/HOST/diag mode	off	POST does not run.
	normal	Runs POST according to diag_level value.
	service	Runs POST with preset values for diag_level and diag_verbosity.
/HOST/diag_level	max	If diag_mode = normal, runs all the minimum tests plus extensive processor and memory tests.
	min	If diag_mode = normal, runs minimum set of tests.
/HOST/diag_trigger	none	Does not run POST on reset.
	hw-change	(Default) Runs POST following an AC power cycle and when the top cover is removed.
	power-on-reset	Only runs POST for the first power on.
	error-reset	(Default) Runs POST if fatal errors are detected.
	all-resets	Runs POST after any reset.
/HOST/diag_verbosity	normal	POST output displays all test and informational messages.
	min	POST output displays functional tests with a banner and pinwheel.
	max	POST output displays all test, informational, and some debugging messages.
	debug	POST output displays extensive debugging messages, including devices being tested and the debug results of each test.
	none	No POST output is displayed.

**FIGURE:** Flowchart of Oracle ILOM Properties Used to Manage POST Operations



### Related Information

- [“POST Overview” on page 45](#)
- [“Configure POST” on page 48](#)
- [“Run POST With Maximum Testing” on page 49](#)
- [“Interpret POST Fault Messages” on page 50](#)
- [“Clear POST-Detected Faults” on page 50](#)
- [“POST Output Reference” on page 52](#)

## ▼ Configure POST

### 1. Access the Oracle ILOM prompt.

See [“Access the SP \(Oracle ILOM\)” on page 27](#).

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

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

```
-> set /SYS keyswitch_state=normal
Set 'keyswitch_state' to 'Normal'
```

For possible values for the `keyswitch_state` parameter, see [“Oracle ILOM Properties That Affect POST Behavior” on page 45](#).

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

Syntax:

```
set /HOST/diag property=value
```

See [“Oracle ILOM Properties That Affect POST Behavior” on page 45](#) for a list of parameters and values.

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

### 4. To see the current values for settings, use the `show` command.

```
-> show /HOST/diag

/HOST/diag
  Targets:

  Properties:
    level = min
    mode = normal
    trigger = hw-change error-reset
    verbosity = normal

  Commands:
    cd
    set
    show

->
```



## Related Information

- [“POST Overview” on page 45](#)
- [“Oracle ILOM Properties That Affect POST Behavior” on page 45](#)
- [“Run POST With Maximum Testing” on page 49](#)
- [“Interpret POST Fault Messages” on page 50](#)
- [“Clear POST-Detected Faults” on page 50](#)
- [“POST Output Reference” on page 52](#)

## ▼ Run POST With Maximum Testing

### 1. Access the Oracle ILOM prompt:

See [“Access the SP \(Oracle ILOM\)” on page 27](#).

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

```
-> set /SYS/keyswitch_state=diag
Set 'keyswitch_state' to 'Diag'
```

### 3. Reset the system so that POST runs.

There are several ways to initiate a reset. The following example shows a reset by using **commands** that power cycle the host.

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

---

**Note** – The server takes about one minute to power off. Use the `show /HOST` command to determine when the host has been powered off. The console displays `status=Powered Off`.

---

### 4. Switch to the system console to view the POST output.

```
-> start /HOST/console
```

### 5. If you receive POST error messages, learn how to interpret them. See [“Interpret POST Fault Messages” on page 50](#).

### Related Information

- [“POST Overview” on page 45](#)
- [“Oracle ILOM Properties That Affect POST Behavior” on page 45](#)
- [“Configure POST” on page 48](#)
- [“Interpret POST Fault Messages” on page 50](#)
- [“Clear POST-Detected Faults” on page 50](#)
- [“POST Output Reference” on page 52](#)

## ▼ Interpret POST Fault Messages

### 1. Run POST.

See [“Run POST With Maximum Testing” on page 49](#).

### 2. View the output and watch for messages that look similar to the POST syntax.

See [“POST Output Reference” on page 52](#)

### 3. To obtain more information on faults, run the `show faulty` command.

See [“Check for Faults \(show faulty Command\)” on page 30](#).

### Related Information

- [“POST Overview” on page 45](#)
- [“Oracle ILOM Properties That Affect POST Behavior” on page 45](#)
- [“Configure POST” on page 48](#)
- [“Run POST With Maximum Testing” on page 49](#)
- [“Clear POST-Detected Faults” on page 50](#)
- [“POST Output Reference” on page 52](#)

## ▼ Clear POST-Detected Faults

Use this procedure if you suspect that a fault was not automatically cleared. This procedure describes how to identify a POST-detected fault and, if necessary, manually clear the fault.

In most cases, when POST detects a faulty component, POST logs the fault and automatically takes the failed component out of operation by placing the component in the ASR blacklist. See [“Managing Components \(ASR\)” on page 60](#)).

Usually, when a faulty component is replaced, the replacement is detected when the SP is reset or power cycled. The fault is automatically cleared from the system.

1. Replace the faulty FRU.

2. At the Oracle ILOM prompt, type the `show faulty` command to identify POST-detected faults.

POST-detected faults are distinguished from other kinds of faults by the text: `Forced fail`. No UUID number is reported. For example:

```
-> show faulty
```

Target	Property	Value
/SP/faultmgmt/0	fru	/SYS/MB/CMP0/B0B0/CH0/D0
/SP/faultmgmt/0	timestamp	Dec 21 16:40:56
/SP/faultmgmt/0/ faults/0	timestamp	Dec 21 16:40:56
/SP/faultmgmt/0/ faults/0	sp_detected_fault	/SYS/MB/CMP0/B0B0/CH0/D0 Forced fail (POST)

3. Take one of the following actions based on the output:

- No fault is reported – The system cleared the fault and you do not need to manually clear the fault. Do not perform the subsequent steps.
- Fault reported – Go to [Step 4](#).

4. Use the `component_state` property of the component to clear the fault and remove the component from the ASR blacklist.

Use the FRU name that was reported in the fault in [Step 2](#).

```
-> set /SYS/MB/CMP0/B0B0/CH0/D0 component_state=Enabled
```

The fault is cleared and should not show up when you run the `show faulty` command. Additionally, the System Fault (Service Required) LED is no longer lit.

5. Reset the server.

You must reboot the server for the `component_state` property to take effect.

6. At the Oracle ILOM prompt, type the `show faulty` command to verify that no faults are reported.

```
-> show faulty
```

Target	Property	Value
-----+-----+-----		
->		

## Related Information

- “POST Overview” on page 45
- “Oracle ILOM Properties That Affect POST Behavior” on page 45
- “Configure POST” on page 48
- “Run POST With Maximum Testing” on page 49
- “Interpret POST Fault Messages” on page 50
- “POST Output Reference” on page 52

## POST Output Reference

POST error messages use the following syntax:

```
n:c:s > ERROR: TEST = failing-test
n:c:s > H/W under test = FRU
n:c:s > Repair Instructions: Replace items in order listed by H/W
under test above
n:c:s > MSG = test-error-message
n:c:s > END_ERROR
```

In this syntax, *n* = the node number, *c* = the core number, *s* = the strand number.

Warning messages use the following syntax:

```
WARNING: message
```

Informational messages use the following syntax:

```
INFO: message
```

In the following example, POST reports an uncorrectable memory error affecting DIMM locations /SYS/MB/CMP0/B0B0/CH0/D0 and /SYS/MB/CMP0/B0B1/CH0/D0. The error was detected by POST running on node 0, core 7, strand 2.

```
2010-07-03 18:44:13.359 0:7:2>Decode of Disrupting Error Status Reg
(DESR HW Corrected) bits 00300000.00000000
2010-07-03 18:44:13.517 0:7:2>          1    DESR_SOCSRE:      SOC
(non-local) sw_recoverable_error.
2010-07-03 18:44:13.638 0:7:2>          1    DESR_SOCHCCE:     SOC
(non-local) hw_corrected_and_cleared_error.
2010-07-03 18:44:13.773 0:7:2>
2010-07-03 18:44:13.836 0:7:2>Decode of NCU Error Status Reg bits
```

```

00000000.22000000
2010-07-03 18:44:13.958 0:7:2>          1      NESR_MCU1SRE:      MCU1 issued
a Software Recoverable Error Request
2010-07-03 18:44:14.095 0:7:2>          1      NESR_MCU1HCCE:      MCU1
issued a Hardware Corrected-and-Cleared Error Request
2010-07-03 18:44:14.248 0:7:2>
2010-07-03 18:44:14.296 0:7:2>Decode of Mem Error Status Reg Branch 1
bits 33044000.00000000
2010-07-03 18:44:14.427 0:7:2>          1      MEU 61      R/W1C Set to 1
on an UE if VEU = 1, or VEF = 1, or higher priority error in same cycle.
2010-07-03 18:44:14.614 0:7:2>          1      MEC 60      R/W1C Set to 1
on a CE if VEC = 1, or VEU = 1, or VEF = 1, or another error in same cycle.
2010-07-03 18:44:14.804 0:7:2>          1      VEU 57      R/W1C Set to 1
on an UE, if VEF = 0 and no fatal error is detected in same cycle.
2010-07-03 18:44:14.983 0:7:2>          1      VEC 56      R/W1C Set to 1
on a CE, if VEF = VEU = 0 and no fatal or UE is detected in same cycle.
2010-07-03 18:44:15.169 0:7:2>          1      DAU 50      R/W1C Set to 1
if the error was a DRAM access UE.
2010-07-03 18:44:15.304 0:7:2>          1      DAC 46      R/W1C Set to 1
if the error was a DRAM access CE.
2010-07-03 18:44:15.440 0:7:2>
2010-07-03 18:44:15.486 0:7:2>          DRAM Error Address Reg for Branch
1 = 00000034.8647d2e0
2010-07-03 18:44:15.614 0:7:2>          Physical Address is
00000005.d21bc0c0
2010-07-03 18:44:15.715 0:7:2>          DRAM Error Location Reg for Branch
1 = 00000000.00000800
2010-07-03 18:44:15.842 0:7:2>          DRAM Error Syndrome Reg for Branch
1 = dd1676ac.8c18c045
2010-07-03 18:44:15.967 0:7:2>          DRAM Error Retry Reg for Branch 1
= 00000000.00000004
2010-07-03 18:44:16.086 0:7:2>          DRAM Error RetrySyndrome 1 Reg for
Branch 1 = a8a5f81e.f6411b5a
2010-07-03 18:44:16.218 0:7:2>          DRAM Error Retry Syndrome 2 Reg
for Branch 1 = a8a5f81e.f6411b5a
2010-07-03 18:44:16.351 0:7:2>          DRAM Failover Location 0 for
Branch 1 = 00000000.00000000
2010-07-03 18:44:16.475 0:7:2>          DRAM Failover Location 1 for
Branch 1 = 00000000.00000000
2010-07-03 18:44:16.604 0:7:2>
2010-07-03 18:44:16.648 0:7:2>ERROR: POST terminated prematurely. Not
all system components tested.
2010-07-03 18:44:16.786 0:7:2>POST: Return to VBSC
2010-07-03 18:44:16.795 0:7:2>ERROR:
2010-07-03 18:44:16.839 0:7:2>      POST toplevel status has the following
failures:
2010-07-03 18:44:16.952 0:7:2>      Node 0 -----

```

2010-07-03 18:44:17.051 0:7:2>	/SYS/MB/CMP0/BOB0/CH1/D0 (J1001)
2010-07-03 18:44:17.145 0:7:2>	/SYS/MB/CMP0/BOB1/CH1/D0 (J3001)
2010-07-03 18:44:17.241 0:7:2>	END_ERROR

### Related Information

- [“POST Overview” on page 45](#)
- [“Oracle ILOM Properties That Affect POST Behavior” on page 45](#)
- [“Configure POST” on page 48](#)
- [“Run POST With Maximum Testing” on page 49](#)
- [“Interpret POST Fault Messages” on page 50](#)
- [“Clear POST-Detected Faults” on page 50](#)

---

## Managing Faults (PSH)

The following topics describe the Oracle Solaris PSH feature:

- [“PSH Overview” on page 55](#)
- [“PSH-Detected Fault Example” on page 56](#)
- [“Check for PSH-Detected Faults” on page 56](#)
- [“Clear PSH-Detected Faults” on page 58](#)

### Related Information

- [“Diagnostics Overview” on page 15](#)
- [“Diagnostics Process” on page 16](#)
- [“Interpreting Diagnostic LEDs” on page 20](#)
- [“Managing Faults \(Oracle ILOM\)” on page 24](#)
- [“Understanding Fault Management Commands” on page 35](#)
- [“Interpreting Log Files and System Messages” on page 40](#)
- [“Checking if Oracle VTS Software Is Installed” on page 42](#)
- [“Managing Faults \(POST\)” on page 44](#)
- [“Managing Faults \(PSH\)” on page 54](#)

# PSH Overview

PSH enables the server to diagnose problems while the Oracle Solaris OS is running and mitigate many problems before they negatively affect operations.

The Oracle Solaris OS uses the fault manager daemon, `fmd(1M)`, which starts at boot time and runs in the background to monitor the system. If a component generates an error, the daemon correlates the error with data from previous errors and other relevant information to diagnose the problem. Once diagnosed, the fault manager daemon assigns a Universal Unique Identifier (UUID) to the error. This value distinguishes this error across any set of systems.

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

The PSH technology covers the following server components:

- CPU
- Memory
- I/O subsystem

The PSH console message provides the following information about each detected fault:

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

If PSH detects a faulty component, use the `fmadm faulty` command to display information about the fault. Alternatively, you can use the Oracle ILOM command `show faulty` for the same purpose.

## Related Information

- [“PSH-Detected Fault Example” on page 56](#)
- [“Check for PSH-Detected Faults” on page 56](#)
- [“Clear PSH-Detected Faults” on page 58](#)

## PSH-Detected Fault Example

When a PSH fault is detected, an Oracle Solaris console message similar to the following example is displayed.

```
SUNW-MSG-ID: SUN4V-8000-DX, TYPE: Fault, VER: 1, SEVERITY: Minor
EVENT-TIME: Wed Jun 17 10:09:46 EDT 2009
PLATFORM: SUNW,system_name, CSN: -, HOSTNAME: server48-37
SOURCE: cpumem-diagnosis, REV: 1.5
EVENT-ID: f92e9fbe-735e-c218-cf87-9e1720a28004
DESC: The number of errors associated with this memory module has
exceeded acceptable levels. Refer to
http://sun.com/msg/SUN4V-8000-DX for more information.
AUTO-RESPONSE: Pages of memory associated with this memory module
are being removed from service as errors are reported.
IMPACT: Total system memory capacity will be reduced
as pages are retired.
REC-ACTION: Schedule a repair procedure to replace the affected
memory module. Use fmdump -v -u <EVENT_ID> to identify the module.
```

---

**Note** – The Service Required LED is also turned on for PSH-diagnosed faults.

---

### Related Information

- “PSH Overview” on page 55
- “Check for PSH-Detected Faults” on page 56
- “Clear PSH-Detected Faults” on page 58

## ▼ Check for PSH-Detected Faults

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

As an alternative, you can display fault information by running the Oracle ILOM command `show`.



## 1. Check the event log.

```
# fmadm faulty
TIME          EVENT-ID                      MSG-ID          SEVERITY
Aug 13 11:48:33 f92e9fbe-735e-c218-cf87-9e1720a28004 SUN4V-8002-6E Major

Platform      : sun4v      Chassis_id   :
Product_sn    :

Fault class   : fault.cpu.generic-sparc.strand
Affects       : cpu:///cpuid=**/serial=*****
                faulted and taken out of service
FRU           : "/SYS/MB"
(hc:///product-id=****:product-sn=*****:server-id=***-*****-****:
chassis-id=*****:*****-*****:serial=*****:revision=05/
chassis=0/motherboard=0)
                faulty

Description   : The number of correctable errors associated with this strand has
                exceeded acceptable levels.
                Refer to http://sun.com/msg/SUN4V-8002-6E for more information.

Response      : The fault manager will attempt to remove the affected strand
                from service.

Impact        : System performance may be affected.

Action        : Schedule a repair procedure to replace the affected resource, the
                identity of which can be determined using 'fmadm faulty'.
```

In this example, a fault is displayed, indicating the following details:

- Date and time of the fault (Aug 13 11:48:33).
- EVENT-ID, which is unique for every fault  
(21a8b59e-89ff-692a-c4bc-f4c5cccca8c8).
- MSG-ID, which can be used to obtain additional fault information  
(SUN4V-8002-6E).
- Faulted FRU. The information provided in the example includes the part number of the FRU (part=511127809) and the serial number of the FRU (serial=1005LCB-1019B100A2). The FRU field provides the name of the FRU (/SYS/MB for motherboard in this example).

## 2. Use the MSG-ID to obtain more information about this type of fault:

- a. Obtain the MSG-ID from console output or from the Oracle ILOM `show faulty` command.

**b. Sign into the Oracle support site:**

<http://support.oracle.com>

**c. Type the MSG-ID in the Search Knowledge Base search window.**

The following example shows the knowledge article information provided for MSG-ID SUN4V-8002-6E.

Correctable strand errors exceeded acceptable levels	
Type	Fault
Severity	Major
Description	The number of correctable errors associated with this strand has exceeded acceptable levels.
Automated Response	The fault manager will attempt to remove the affected strand from service.
Impact	System performance may be affected.
Suggested Action for System Administrator	Schedule a repair procedure to replace the affected resource, the identity of which can be determined using fmadm faulty.
Details	There is no more information available at this time.

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

**Related Information**

- [“PSH Overview” on page 55](#)
- [“PSH-Detected Fault Example” on page 56](#)
- [“Clear PSH-Detected Faults” on page 58](#)

## ▼ Clear PSH-Detected Faults

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

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

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

```
# fmadm faulty
TIME          EVENT-ID                      MSG-ID          SEVERITY
Aug 13 11:48:33 21a8b59e-89ff-692a-c4bc-f4c5cccca8c8  SUN4V-8002-6E  Major

Platform      : sun4v      Chassis_id   :
Product_sn    :

Fault class   : fault.cpu.generic-sparc.strand
Affects       : cpu:///cpuid=**/serial=*****
                faulted and taken out of service
FRU           : "/SYS/MB"
(hc:///product-id=****:product-sn=*****:server-id=***-*****-****:
chassis-id=*****:*****-*****:serial=*****:revision=05/
chassis=0/motherboard=0)
                faulty

Description   : The number of correctable errors associated with this strand has
                exceeded acceptable levels.
                Refer to http://sun.com/msg/SUN4V-8002-6E for more information.

Response      : The fault manager will attempt to remove the affected strand
                from service.

Impact        : System performance may be affected.

Action        : Schedule a repair procedure to replace the affected resource, the
                identity of which can be determined using 'fmadm faulty'.
```

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

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

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

```
# fmadm repair UUID
```

For the UUID in the example shown in [Step 2](#), type this command:

```
# fmadm repair 21a8b59e-89ff-692a-c4bc-f4c5cccc
```

#### 4. Use the `clear_fault_action` property of the FRU to clear the fault.

```
-> set /SYS/MB clear_fault_action=True
Are you sure you want to clear /SYS/MB (y/n)? y
set 'clear_fault_action' to 'true'
```

#### Related Information

- [“PSH Overview” on page 55](#)
- [“PSH-Detected Fault Example” on page 56](#)
- [“Check for PSH-Detected Faults” on page 56](#)

---

## Managing Components (ASR)

These topics explain the role played by ASR and how to manage the components that ASR controls.

- [“ASR Overview” on page 61](#)
- [“Display System Components” on page 62](#)
- [“Disable System Components” on page 62](#)
- [“Enable System Components” on page 63](#)

#### Related Information

- [“Diagnostics Overview” on page 15](#)
- [“Diagnostics Process” on page 16](#)
- [“Interpreting Diagnostic LEDs” on page 20](#)
- [“Managing Faults \(Oracle ILOM\)” on page 24](#)
- [“Understanding Fault Management Commands” on page 35](#)
- [“Interpreting Log Files and System Messages” on page 40](#)
- [“Checking if Oracle VTS Software Is Installed” on page 42](#)
- [“Managing Faults \(POST\)” on page 44](#)
- [“Managing Faults \(PSH\)” on page 54](#)

# ASR Overview

The ASR feature enables the server to automatically configure failed components out of operation until they can be replaced. In the server, ASR manages the following components:

- CPU strands
- Memory DIMMs
- I/O subsystem

The database that contains the list of disabled components is the ASR blacklist (*asr-db*).

In most cases, POST automatically disables a faulty component. After the cause of the fault is repaired (FRU replacement, loose connector reseated, and so on), you might need to remove the component from the ASR blacklist.

The following ASR commands enable you to view, add, or remove components (*asrkeys*) from the ASR blacklist. You run these commands from the Oracle ILOM prompt.

**TABLE:** ASR Commands

Command	Description
<code>show components</code>	Displays system components and their current state.
<code>set <i>asrkey</i> component_state=Enabled</code>	Removes a component from the <i>asr-db</i> blacklist, where <i>asrkey</i> is the component to enable.
<code>set <i>asrkey</i> component_state=Disabled</code>	Adds a component to the <i>asr-db</i> blacklist, where <i>asrkey</i> is the component to disable.

**Note** – The *asrkeys* vary from system to system, depending on how many cores and memory are present. Use the `show components` command to see the *asrkeys* on a given system.

After you enable or disable a component, you must reset (or power cycle) the system for the component's change of state to take effect.

## Related Information

- [“Display System Components” on page 62](#)
- [“Disable System Components” on page 62](#)
- [“Enable System Components” on page 63](#)

## ▼ Display System Components

The `show components` command displays the system components (asrkeys) and reports their status.

- **At the Oracle ILOM prompt, type `show components`.**

In the following example, PCIE3 is shown as disabled.

-> <b>show components</b>		
Target	Property	Value
-----		
/SYS/MB/RISER0/ PCIE0	component_state	Enabled
/SYS/MB/RISER0/ PCIE3	component_state	Disabled
/SYS/MB/RISER1/ PCIE1	component_state	Enabled
/SYS/MB/RISER1/ PCIE4	component_state	Enabled
/SYS/MB/RISER2/ PCIE2	component_state	Enabled
/SYS/MB/RISER2/ PCIE5	component_state	Enabled
/SYS/MB/NET0	component_state	Enabled
/SYS/MB/NET1	component_state	Enabled
/SYS/MB/NET2	component_state	Enabled
/SYS/MB/NET3	component_state	Enabled
/SYS/MB/PCIE	component_state	Enabled

### Related Information

- [“ASR Overview” on page 61](#)
- [“Disable System Components” on page 62](#)
- [“Enable System Components” on page 63](#)

## ▼ Disable System Components

You disable a component by setting its `component_state` property to `Disabled`. This action adds the component to the ASR blacklist.

1. **At the Oracle ILOM prompt, set the `component_state` property to `Disabled`.**

```
-> set /SYS/MB/CMP0/B0B0/CH0/D0 component_state=Disabled
```

## 2. Reset the server so that the ASR command takes effect.

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

---

**Note** – In the Oracle ILOM shell, there is no notification when the system is powered off. Powering off takes about a minute. Use the `show /HOST` command to determine if the host has powered off.

---

### Related Information

- [“View the System Message Log Files” on page 41](#)
- [“ASR Overview” on page 61](#)
- [“Display System Components” on page 62](#)
- [“Enable System Components” on page 63](#)

## ▼ Enable System Components

You enable a component by setting its `component_state` property to `Enabled`. This action removes the component from the ASR blacklist.

### 1. At the Oracle ILOM prompt, set the `component_state` property to `Enabled`.

```
-> set /SYS/MB/CMP0/B0B0/CH0/D0 component_state=Enabled
```

### 2. Reset the server so that the ASR command takes effect.

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

---

**Note** – In the Oracle ILOM shell, there is no notification when the system is powered off. Powering off takes about a minute. Use the `show /HOST` command to determine if the host has powered off.

---

**Related Information**

- [“View the System Message Log Files” on page 41](#)
- [“ASR Overview” on page 61](#)
- [“Display System Components” on page 62](#)
- [“Disable System Components” on page 62](#)



# Preparing for Service

---

These topics describe how to prepare the server for servicing.

- [“Safety Information” on page 65](#)
  - [“Tools Needed for Service” on page 67](#)
  - [“Find the Chassis Serial Number” on page 67](#)
  - [“Locate the Server” on page 68](#)
  - [“Understanding Component Replacement Categories” on page 68](#)
  - [“Removing Power From the System” on page 72](#)
  - [“Positioning the System for Service” on page 74](#)
  - [“Accessing Internal Components” on page 79](#)
- 

## 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 system.
- Follow all cautions and instructions marked on the equipment and described in the *SPARC T4-1 Server 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 electrostatic discharge safety practices as described in this section.

## Safety Symbols

You will see the following symbols in various places in the server documentation. Note the explanations provided next to each symbol.



---

**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 motherboards, PCI cards, hard drives, and memory cards require special handling.



---

**Caution** – Circuit boards and hard 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 both power supplies before servicing any of the components documented in this chapter.

---

## Antistatic Wrist Strap Use

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

## Antistatic Mat

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

---

## Tools Needed for Service

The following tools should be available for most service operations:

- Antistatic wrist strap
- Antistatic mat
- No. 1 Phillips screwdriver
- No. 2 Phillips screwdriver
- No. 1 flat-blade screwdriver (battery removal)
- Pen or pencil (to power on server)

---

## ▼ Find the Chassis Serial Number

If you require technical support for your system, you will be asked to provide the server's chassis serial number. You can find the chassis serial number on a sticker located on the front of the server and on another sticker on the side of the server.

If it is not convenient to read either sticker, you can run the Oracle ILOM `show /SYS` command to obtain the chassis serial number.

- **Type `show /SYS` at the Oracle ILOM prompt.**

```
-> show /SYS

/SYS
  Targets:
    SERVICE
    LOCATE
    ACT
    PS_FAULT
    TEMP_FAULT
    FAN_FAULT
  ...
  Properties:
    type = Host System
    keyswitch_state = Normal
    product_name = SPARC T4-1
    product_serial_number = 0723BBC006
    fault_state = OK
    clear_fault_action = (none)
```

```
power_state = On

Commands:
  cd
  reset
  set
  show
  start
  stop
```

---

## ▼ Locate the Server

You can use the Locator LEDs to pinpoint the location of a server. This procedure is helpful when you need to identify one particular server from many other servers.

1. **At the Oracle ILOM command line, type:**

```
-> set /SYS/LOCATE value=Fast_Blink
```

The white Locator LEDs (one on the front panel and one on the rear panel) blink.

2. **After locating the server, turn the Locator LED off by pressing the Locator button.**

---

**Note** – Alternatively, you can turn off the Locator LED by running the Oracle ILOM `set /SYS/LOCATE value=off` command.

---

---

## Understanding Component Replacement Categories

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

- “FRU Reference” on page 69
- “Hot Service, Replaceable by Customer” on page 70
- “Cold Service, Replaceable by Customer” on page 70

- [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#)

## FRU Reference

The following table identifies the server components that are field-replaceable.

**TABLE:** List of Field-replaceable Units

Description	Quantity	FRU Name	Remove and Replace Instructions
Motherboard assembly	1	/SYS/MB	<a href="#">“Servicing the Motherboard Assembly” on page 207</a>
DIMMs	4, 8, or 16	/SYS/MB/CMP0/BOBn/CHn/Dn	<a href="#">“Servicing DIMMs” on page 83</a>
Power supplies (or filler panel)	1 or 2 based on power supply configuration	/SYS/PSn	<a href="#">“Servicing the Power Supplies” on page 119</a>
PCIe cards (optional)	0 to 6	/SYS/MB/RISERn/PCIEn	<a href="#">“Servicing PCIe Cards” on page 147</a>
PCIe risers	1, 2, or 3	/SYS/MB/RISERn	<a href="#">“Servicing PCIe and PCIe/XAUI Risers” on page 143</a>
Service processor	1	/SYS/MB/SP	<a href="#">“Servicing the Service Processor” on page 157</a>
System battery	1	/SYS/MB/BAT	<a href="#">“Servicing the System Battery” on page 163</a>
System Configuration PROM	1	/SYS/MB/SCC	<a href="#">“Servicing the System Configuration PROM” on page 179</a>
Hard drives (“HDDs” applies to both disk and SSD technologies)	1 - 8	/SYS/HDDn	<a href="#">“Servicing Hard Drives” on page 105</a>
DVD/USB assembly	1	/SYS/DVD	<a href="#">“Servicing the DVD/USB Assembly” on page 115</a>
Fan modules	6	/SYS/FANBD/FMn	<a href="#">“Servicing Fan Modules” on page 167</a>
Fan power board	1	/SYS/FANBD	<a href="#">“Servicing the Fan Power Board” on page 173</a>
Hard Drive backplane	1	/SYS/SASBP	<a href="#">“Servicing the HDD Backplane” on page 193</a>

**TABLE:** List of Field-replaceable Units *(Continued)*

Description	Quantity	FRU Name	Remove and Replace Instructions
Power Distribution Board (PDB)	1	/SYS/PDB	<a href="#">“Servicing the Power Distribution Board” on page 127</a>
Connector board	1	/SYS/CONNBD	<a href="#">“Servicing the Connector Board” on page 137</a>
Light pipe kits	1 each, left, right		<a href="#">“Servicing the Front Panel Light Pipe Assemblies” on page 201</a>

**Related Information**

- [“Preparing for Service” on page 65](#)
- [“Returning the Server to Operation” on page 215](#)

## Hot Service, Replaceable by Customer

The following table identifies the components that can be replaced while power is present on the server. These components can be replaced by customers.

Hot Service Components (system can have power present)	Notes
Hard disk drive (HDD)	Drive must be offline
HDD filler	Needed to preserve proper interior air flow
Power supply	If two power supplies are in use
Fan module	

Although hot service procedures can be performed while the server is running, you should usually bring it to standby mode as the first step in the replacement procedure. Refer to [“Power Off the Server \(Power Button - Graceful\)” on page 74](#) for instructions.

## Cold Service, Replaceable by Customer

The following table identifies the components that require the server to be powered down. These components can be replaced by customers.

Cold Service (power down system and unplug power cables)	Notes
SATA optical drive/USB assembly	Remove any media
DDR3 DIMMs	
System battery	
I/O cards (PCIe/XAUI)	
SP	
SCC	
Internal USB	

Cold service procedures require that you shut the server down and unplug the power cables that connect the power supplies to the power source. To shut the server down, perform the following steps:

1. Log in as superuser or equivalent.

---

**Tip** – Depending on the reason for shutting down system power, 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 your Oracle Solaris system administration documentation for additional information.

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

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

4. Shut down all logical domains.

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

5. Shut down the Oracle Solaris OS.

Refer to the Solaris system administration documentation for additional information about logical domains.

6. Switch from the system console to the -> prompt by typing the #. (Hash Period) key sequence.

7. At the -> prompt, type the `stop /SYS` command.

8. Disconnect the power cables from the power supplies.

# Cold Service, Replaceable by Authorized Service Personnel

The following table identifies components that must be replaced by authorized service personnel. These replacement procedures can only be done when the server is powered down and power cables are unplugged.

Authorized Service Personnel Only - Cold Service (power down system and disconnect power cables)	Notes
Motherboard	Transfer System Configuration PROM to new motherboard.
Fan power board	
Power Distribution Board (PDB)	Configure new PDB with the chassis serial and part numbers.
Power supply backplane	
Connector board	
Hard Drive backplane	This requires removal of the Hard Drive cage first.
Light pipe assembly	This requires removal of the Hard Drive cage first.

See [“Cold Service, Replaceable by Customer” on page 70](#) for the steps involved in shutting down the server.

---

## Removing Power From the System

These topics describe different methods for removing power from the chassis.

- [“Power Off the Server \(SP Command\)” on page 73](#)
- [“Power Off the Server \(Power Button - Graceful\)” on page 74](#)
- [“Power Off the Server \(Emergency Shutdown\)” on page 74](#)
- [“Disconnect Power Cords” on page 74](#)



## ▼ Power Off the Server (SP Command)

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 the *SPARC T4 Series Servers Administration Guide*.

---

**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 your Oracle Solaris system administration documentation for additional information.

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

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

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

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

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

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

**6. Switch from the system console to the -> prompt by typing the #. (Hash Period) key sequence.**

**7. At the -> prompt, type the `stop /SYS` command.**

---

**Note** – You can also use the Power button on the front of the server to initiate a graceful server shutdown. (See [“Power Off the Server \(Power Button - Graceful\)” on page 74](#).) This button is recessed to prevent accidental server power-off. Use the tip of a pen to operate this button.

---

### Related Information

- [“Power Off the Server \(Power Button - Graceful\)” on page 74](#)
- [“Power Off the Server \(Emergency Shutdown\)” on page 74](#)

## ▼ Power Off the Server (Power Button - Graceful)

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

- **Press and release the recessed Power button.**

Use the tip of a pen to operate this button.

### **Related Information**

- [“Power Off the Server \(SP Command\)” on page 73](#)
- [“Power Off the Server \(Emergency Shutdown\)” on page 74](#)

## ▼ Power Off the Server (Emergency Shutdown)



---

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

---

- **Press and hold the Power button for four seconds.**

### **Related Information**

- [“Power Off the Server \(SP Command\)” on page 73](#)
- [“Power Off the Server \(Power Button - Graceful\)” on page 74](#)

## ▼ Disconnect Power Cords

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



---

**Caution** – Because 3.3v standby power is always present in the system, you must unplug the power cords before accessing any cold-serviceable components.

---

---

## Positioning the System for Service

These topics explain how to position the system so you can access the components that need servicing.

- “Extend the Server” on page 75
- “Remove the Server From the Rack” on page 77

## ▼ Extend the Server

The following components can be serviced with the server in the maintenance position:

- Hard drives
- Fan modules
- DVD/USB module
- Fan power board
- PCIe/XAUI cards
- DDR3 DIMMs
- Motherboard battery
- SCC module
- Service processor module

If the server is installed in a rack with extendable slide rails, use this procedure to extend the server to the maintenance position.

1. **(Optional) Use the `set /SYS/LOCATE` command from the `->` prompt to locate the system that requires maintenance.**

```
-> set /SYS/LOCATE value=Fast_Blink
```

Once you have located the server, press the Locator LED and button to turn it off.

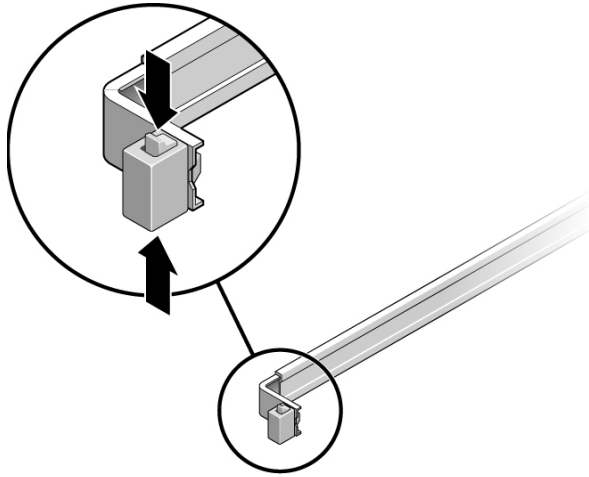
2. **Verify that no cables will be damaged or will interfere when the server is extended.**

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.

3. **From the front of the server, release the two slide release latches, as shown in the following figure.**

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

**FIGURE:** Slide Release Latches



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

## ▼ Release the CMA

For some service procedures, if you are using a CMA, you might need to release it to gain access to the rear of the chassis.

---

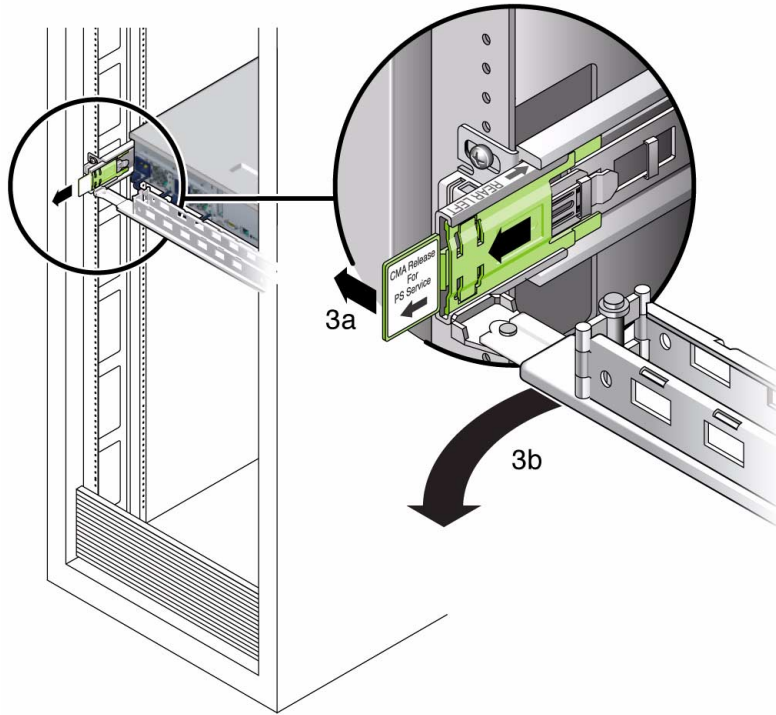
**Note** – For instructions on how to install the CMA for the first time, refer to your server Installation Guide.

---

- **Complete the following tasks to release the CMA:**

- a. **Press and hold the tab (step A).**
- b. **Swing the CMA out of the way (step B).**

When you have finished with the service procedure, swing the CMA closed and latch it to the left rack rail.



## ▼ Remove the Server From the Rack

The server must be removed from the rack to remove or install the following components:

- Motherboard
- Power distribution board
- Power supply backplane
- Connector card
- Hard drive backplane
- Front panel light-pipe assemblies



---

**Caution** – If necessary, use two people to dismount and carry the chassis.

---

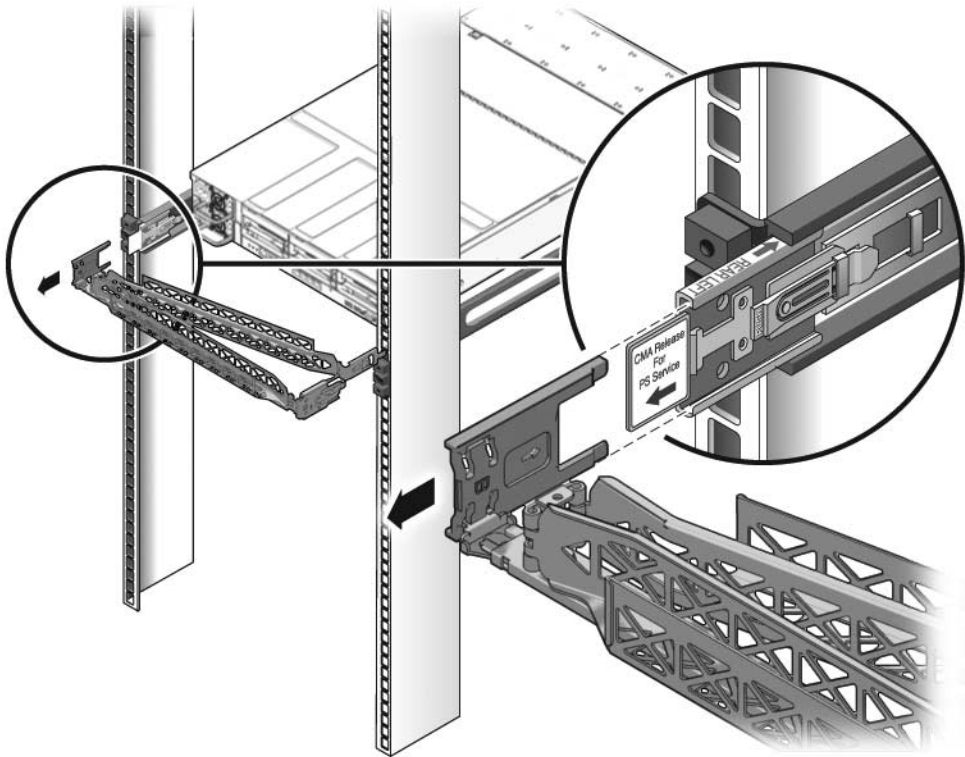
1. Disconnect all the cables and power cords from the server.

2. Extend the server to the maintenance position.

See “Power Off the Server (SP Command)” on page 73.

3. Press the metal lever that is located on the inner side of the rail to disconnect the cable management arm (CMA) from the rail assembly, as shown in the following figure.

The CMA is still attached to the cabinet, but the server chassis is now disconnected from the CMA.



---

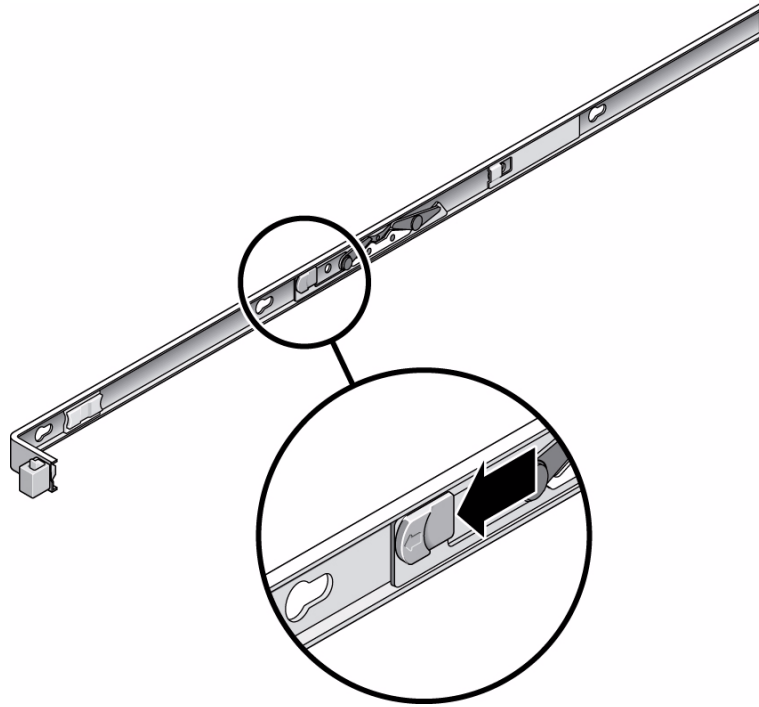
**Caution** – If necessary, use two people to dismount and carry the chassis.

---

4. From the front of the server, pull the release tabs forward and pull the server forward until it is free of the rack rails as shown in the following figure.

A release tab is located on each rail.

**FIGURE:** Release Tabs and Slide Assembly



5. Set the server on a sturdy work surface.

---

## Accessing Internal Components

These topics explain how to access components contained within the chassis and the steps needed to protect against damage or injury from electrostatic discharge.

- [“Perform Electrostatic Discharge Prevention Measures” on page 80](#)
- [“Remove the Top Cover” on page 80](#)

## ▼ Perform Electrostatic Discharge Prevention Measures

Many components housed within the chassis can be damaged by electrostatic discharge. 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, installation, or replacement 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
- A disposable ESD mat (shipped with some replacement parts or optional system 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.

### Related Information

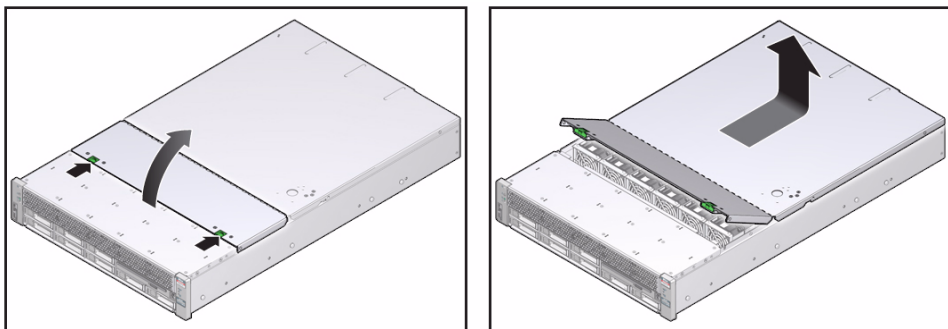
- [“Safety Information” on page 65](#)

## ▼ Remove the Top Cover

### 1. Unlatch the fan module door.

Pull the release tabs back to release the door.

### 2. Press the top cover release button and slide the top cover to the rear about a 0.5 inch (12.7 mm).





**3. Remove the top cover.**

Lift up and remove the cover.

**Related Information**

- [“Replace the Top Cover” on page 215](#)



# Servicing DIMMs

---

These topics explain how to identify, locate, and replace faulty DIMMs. They also describe procedures for upgrading memory capacity and provide guidelines for achieving and maintaining valid memory configurations.

- [“About DIMMs” on page 83](#)
- [“Locate a Faulty DIMM \(DIMM Fault Remind Button\)” on page 88](#)
- [“Locate a Faulty DIMM \(show faulty Command\)” on page 91](#)
- [“Remove a DIMM” on page 91](#)
- [“Install a DIMM” on page 92](#)
- [“Increase System Memory With Additional DIMMs” on page 94](#)
- [“Verify DIMM Functionality” on page 96](#)
- [“DIMM Configuration Error Messages” on page 99](#)

---

## About DIMMs

This topic includes the following sections:

- [“DIMM Population Rules” on page 84](#)
- [“DIMM FRU Names” on page 85](#)
- [“Supported DIMM Configurations” on page 86](#)
- [“DIMM Rank Classification Labels” on page 87](#)

# DIMM Population Rules

Keep the following guidelines in mind when installing, upgrading, or replacing DIMMs:

- Up to 16 DDR3 DIMMs can be installed on the server.
- Four DIMM capacities are supported: 4 GBytes, 8 GBytes, 16 GBytes, and 32 GBytes.
- All DIMMs installed in the server must have identical architecture, including identical capacity and rank classification. To identify DIMM architecture, see [“DIMM Rank Classification Labels” on page 87](#).

---

**Note** – 2Rx4 16 GByte DIMMs and all 32 GByte DIMMs require System Firmware 8.2.1.b or later. See [“DIMM Rank Classification Labels” on page 87](#).

---

- The DIMM slots may be populated as 1/4 full, 1/2 full, or full. Use the following figure as a guide for populating the DIMM slots.
  - 1/4 Full—Install DIMMs in the slots labeled 1 only.
  - 1/2 Full—Install DIMMs in the slots labeled 1 and 2 only.
  - Full—Install DIMMs in every slot (1, 2, and 3).
- Any DIMM slot that does not have a DIMM installed must have a DIMM filler.

---

**Note** – The server *must* have at least a 1/4-full memory configuration.

---

If the server’s memory configuration fails to meet any of these rules, applicable error messages are reported. See [“DIMM Configuration Errors—System Console” on page 99](#) for a description of these messages.

## Related Information

- [“DIMM FRU Names” on page 85](#)
- [“Supported DIMM Configurations” on page 86](#)
- [“DIMM Rank Classification Labels” on page 87](#)
- [“Increase System Memory With Additional DIMMs” on page 94](#)
- [“Verify DIMM Functionality” on page 96](#)
- [“DIMM Configuration Error Messages” on page 99](#)

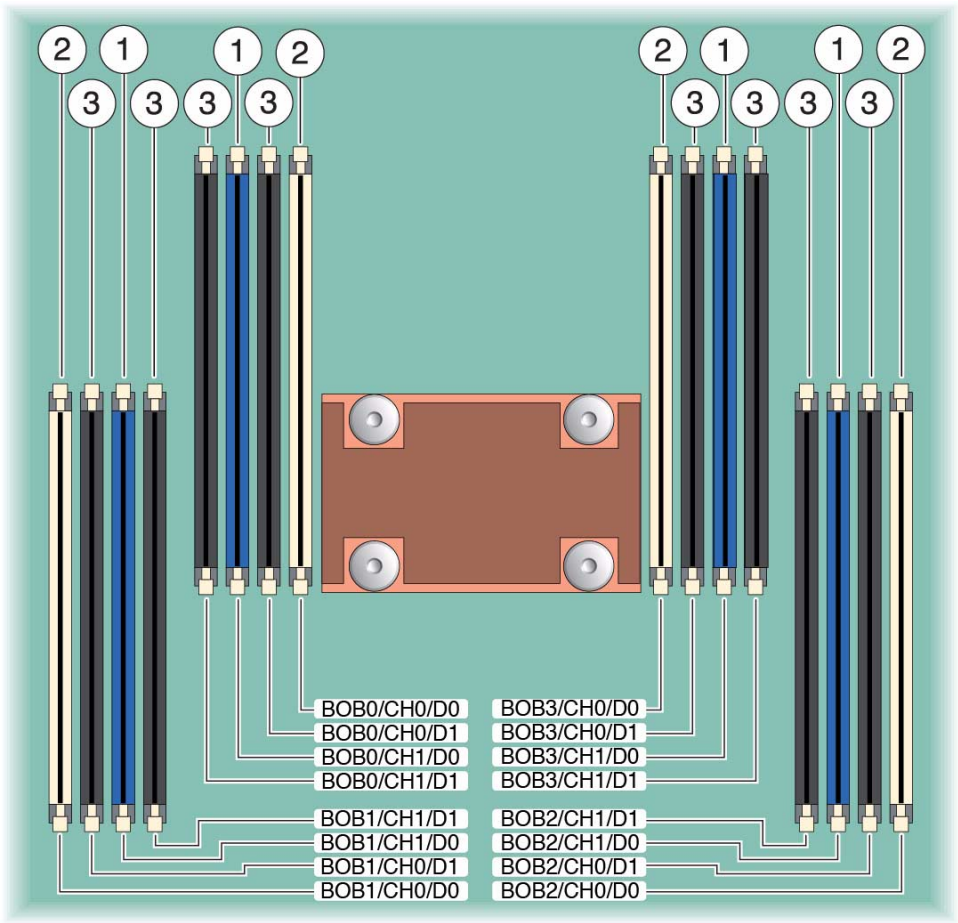
# DIMM FRU Names

DIMM FRU IDs are based on their corresponding location on the motherboard, and are identified using the following convention:

/SYS/MB/CMP0/BOBx/CHx/Dx

Specific DIMM FRU IDs are described in the following illustration.

**FIGURE:** DIMM Slot FRU IDs



**Figure Legend**

- 1 For a 1/4-full configuration, populate *only* the slot locations labeled 1.
- 2 For a 1/2-full configuration, populate the slot locations labeled 1 and 2.
- 3 For a fully populated configuration, fill all the DIMM slots.

## Related Information

- [“DIMM Population Rules” on page 84](#)
- [“Supported DIMM Configurations” on page 86](#)
- [“DIMM Rank Classification Labels” on page 87](#)
- [“Increase System Memory With Additional DIMMs” on page 94](#)
- [“Verify DIMM Functionality” on page 96](#)
- [“DIMM Configuration Error Messages” on page 99](#)

## Supported DIMM Configurations

The following table describes supported memory configurations.

---

**Note** – All 1/4 and 1/2 configurations must have DIMM filler panels installed in all empty slots.

---

**TABLE:** Supported DIMM Configurations

DIMM Capacity	Number of DIMMs Installed	Total Memory Capacity
4 GB	4 (1/4 population)	16 GB
	8 (1/2 population)	32 GB
	16 (full population)	64 GB
8 GB	4 (1/4 population)	32 GB
	8 (1/2 population)	64 GB
	16 (full population)	128 GB
16 GB	4 (1/4 population)	64 GB
	8 (1/2 population)	128 GB
	16 (full population)	256 GB
32 GB	4 (1/4 population)	128 GB
	8 (1/2 population)	256 GB
	16 (full population)	512 GB

## Related Information

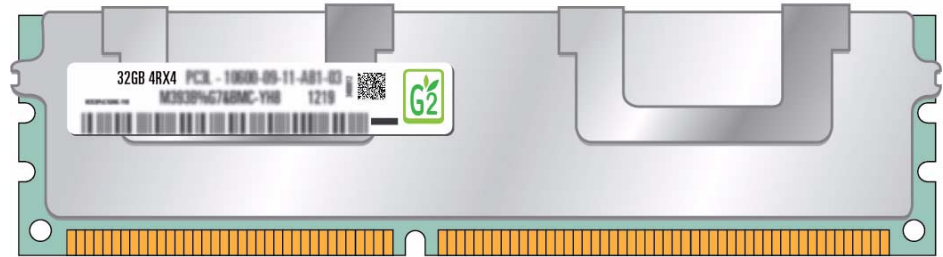
- [“DIMM Population Rules” on page 84](#)
- [“DIMM FRU Names” on page 85](#)

- “DIMM Rank Classification Labels” on page 87
- “Increase System Memory With Additional DIMMs” on page 94
- “Verify DIMM Functionality” on page 96
- “DIMM Configuration Error Messages” on page 99

## DIMM Rank Classification Labels

All DIMMs installed in the server must be identical (same capacity, same rank classification).

Each DIMM includes a printed label identifying its rank classification (examples below). Use these rank classification labels to identify the architecture of the DIMMs installed in the server, as well as any replacement or upgrade DIMMs you intend to install.




---

**Tip** – To determine the rank classification of installed DIMMs, remove the server top cover and read the labels on the DIMMs. For top cover removal instructions, see [“Preparing for Service” on page 65](#).

---

The following table identifies the corresponding rank classification labels on supported DIMMs.

**TABLE:** DIMM Rank Classifications

Rank Type	Capacity	Label
Dual-rank x8 DIMMs	4 GByte	2Rx8
Dual-rank x4 DIMMs	8 GByte	2Rx4
	16 GByte*	2Rx4
Quad-rank x4 DIMMs	16 GByte	4Rx4
	32 GByte*	4Rx4

\* Requires System Firmware 8.2.1.b or later.

---

**Note** – DIMMs installed must have identical architecture. For more information, see [“DIMM Population Rules” on page 84](#).

---

#### Related Information

- [“DIMM Population Rules” on page 84](#)
- [“DIMM FRU Names” on page 85](#)
- [“Supported DIMM Configurations” on page 86](#)
- [“Increase System Memory With Additional DIMMs” on page 94](#)
- [“Verify DIMM Functionality” on page 96](#)
- [“DIMM Configuration Error Messages” on page 99](#)

---

## ▼ Locate a Faulty DIMM (DIMM Fault Remind Button)

This is cold-service procedure that can be performed by a customer.

Use the DIMM Fault Remind button to identify faulty DIMMs.

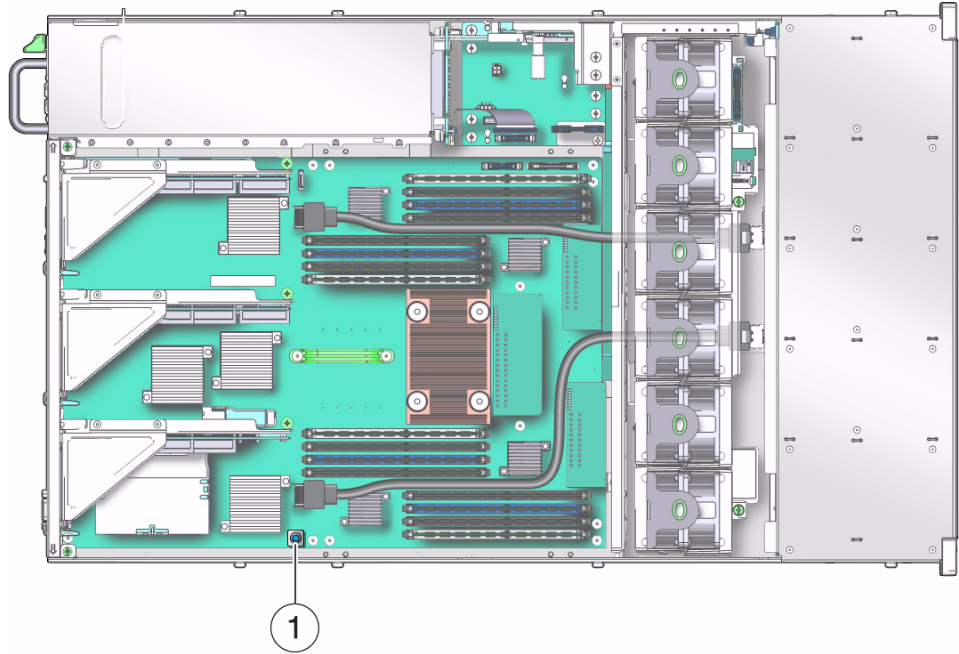
#### 1. Consider your first steps:

- Familiarize yourself with DIMM population rules.  
See [“About DIMMs” on page 83](#).
- Prepare the server for service.



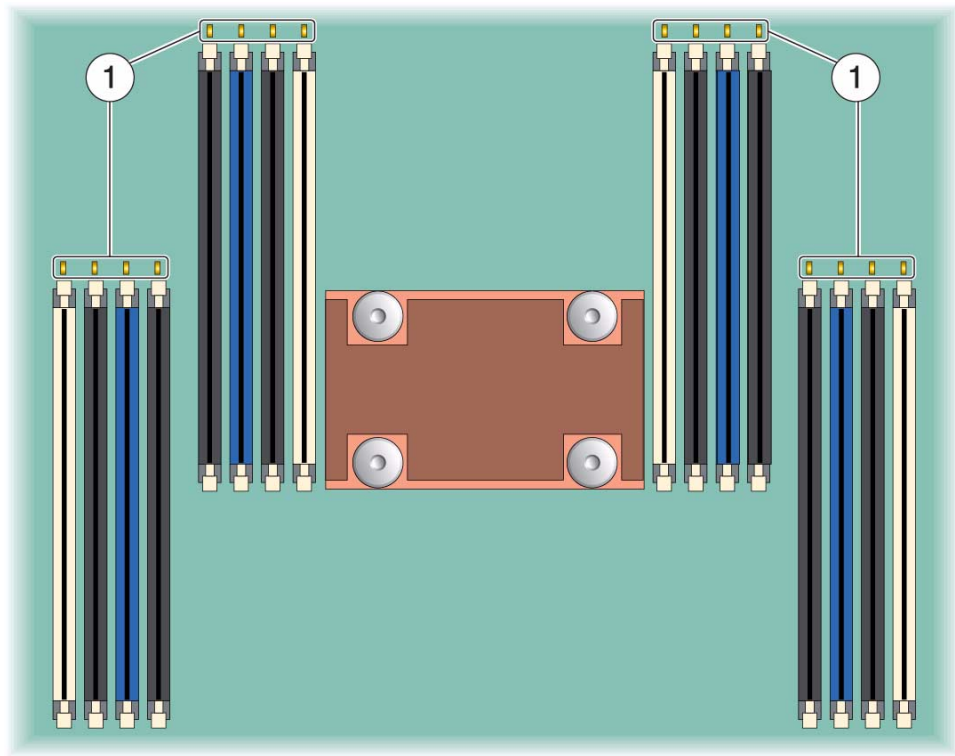
See “Preparing for Service” on page 65.

2. Swing the air duct up and forward to the fully open position.
3. Press the DIMM Remind button on the motherboard (callout 1 in the figure).  
This will cause an amber LED associated with the faulty DIMM to light for a few minutes.



4. Note the DIMM next to the illuminated LED.

**FIGURE:** DIMM Fault LED locations



**Figure Legend**

---

1	Individual DIMM Fault LEDs
---	----------------------------

---

**5. Ensure that all other DIMMs are seated correctly in their slots.**

**Related Information**

- [“Locate a Faulty DIMM \(show faulty Command\)” on page 91](#)
- [“Remove a DIMM” on page 91](#)
- [“Install a DIMM” on page 92](#)
- [“Verify DIMM Functionality” on page 96](#)
- [“DIMM Configuration Error Messages” on page 99](#)

---

## ▼ Locate a Faulty DIMM (show faulty Command)

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

- Type `show faulty` at the Oracle ILOM prompt:

-> <b>show faulty</b>		
Target	Property	Value
-----+-----+-----		
/SP/faultmgmt/0	fru	/SYS/MB/CMP0/B0B0/CH0/D0
/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/CMP0/B0B0/CH0/D0
faults/0		Forced fail (POST)

### Related Information

- [“Locate a Faulty DIMM \(DIMM Fault Remind Button\)” on page 88](#)
- [“Remove a DIMM” on page 91](#)
- [“Install a DIMM” on page 92](#)
- [“Verify DIMM Functionality” on page 96](#)
- [“DIMM Configuration Errors—show faulty Command Output” on page 102](#)

---

## ▼ Remove a DIMM

This is a cold-service procedure that can be performed by a customer.



---

**Caution** – Do not leave DIMM slots empty. You must install filler panels in all empty DIMM slots.

---

### 1. Consider your first steps:

- Familiarize yourself with DIMM configuration rules.  
See [“DIMM Population Rules” on page 84](#)
- Prepare the server for service.

See [“Preparing for Service”](#) on page 65

- If you are removing a faulty DIMM, locate the faulty DIMM.

See [“Locate a Faulty DIMM \(DIMM Fault Remind Button\)”](#) on page 88.

2. Swing the air duct up and forward to the fully open position.
3. Push down on the ejector tabs on each side of the DIMM until the DIMM is released.

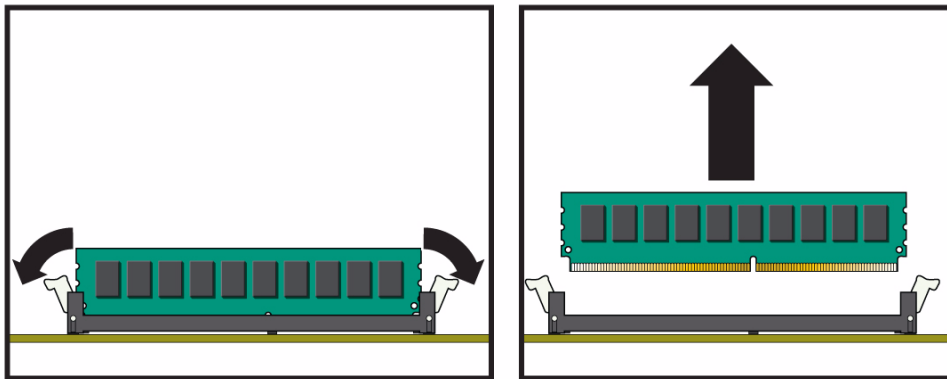
See panel 3 in the preceding figure.



---

**Caution** – DIMMs and heat sinks on the motherboard can be hot.

---



4. Grasp the top corners of the faulty DIMM and lift it out of its slot.
5. Place the DIMM on an antistatic mat.
6. Repeat [Step 3](#) through [Step 5](#) for any other DIMMs you intend to remove.
7. If you do not plan to install replacement DIMMs at this time, install filler panels in the empty slots.

#### Related Information

- [“Install a DIMM”](#) on page 92
- [“Verify DIMM Functionality”](#) on page 96

---

## ▼ Install a DIMM

This is a cold-service procedure that can be performed by customers.

---

**Note** – Dual-ranked x4 (2Rx4) DIMMs require System Firmware 8.2.1.b or later. See [“DIMM Rank Classification Labels”](#) on page 87.

---

**1. Consider your first steps:**

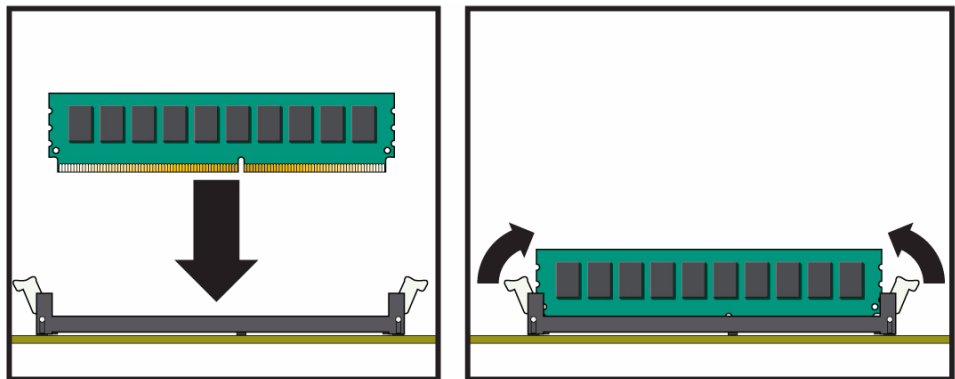
- Familiarize yourself with DIMM configuration rules.  
See [“DIMM Population Rules”](#) on page 84
- Prepare the server for service.  
See [“Preparing for Service”](#) on page 65
- If you are removing a faulty DIMM, locate the faulty DIMM.  
See [“Locate a Faulty DIMM \(DIMM Fault Remind Button\)”](#) on page 88.

**2. Swing the air duct up and forward to the fully open position.**

**3. Unpack the replacement DIMMs and place them on an antistatic mat.**

**4. Ensure that the ejector tabs on the connector that will receive the DIMM are in the open position.**

**FIGURE:** Installing DIMMs



**5. Align the DIMM notch with the key in the connector.**



---

**Caution** – Ensure that the orientation is correct. The DIMM might be damaged if the orientation is reversed.

---

**6. Push the DIMM into the connector until the ejector tabs lock the DIMM in place.**

If the DIMM does not easily seat into the connector, check the DIMM's orientation.

7. Repeat [Step 4](#) through [Step 6](#) until all new DIMMs are installed.



---

**Caution** – Do not leave DIMM slots empty. You must install filler panels in all empty DIMM slots.

---

8. Return the air duct to the closed position.

9. Finish the installation procedure:

- Return the server to operation.  
See [“Returning the Server to Operation”](#) on page 215.
- Verify DIMM functionality.  
See [“Verify DIMM Functionality”](#) on page 96.

#### Related Information

- [“About DIMMs”](#) on page 83
- [“Remove a DIMM”](#) on page 91
- [“Increase System Memory With Additional DIMMs”](#) on page 94
- [“Verify DIMM Functionality”](#) on page 96

---

## ▼ Increase System Memory With Additional DIMMs

This is a cold service procedure that can be performed by customers.

You should be familiar with the memory configuration guidelines described in [“DIMM Population Rules”](#) on page 84 before adding new DIMMs to increase a server’s memory capacity.



---

**Caution** – You must disconnect the power cables from the system before performing this procedure.

---

1. Consider your first steps:

- Familiarize yourself with DIMM configuration rules.  
See [“DIMM Population Rules”](#) on page 84.  
See [“Supported DIMM Configurations”](#) on page 86

See [“DIMM Rank Classification Labels”](#) on page 87.

- Prepare the server for service.

See [“Preparing for Service”](#) on page 65

2. Confirm that the DIMMs in the upgrade kit are compatible with the DIMMs already installed in the server.

---

**Note** – DIMM architectures must be identical (same capacity, same rank classification label). See [“DIMM Rank Classification Labels”](#) on page 87.

---

3. Unpack the new DIMMs and place them on an antistatic mat.
4. Swing the air duct up and forward to the fully open position.
5. At a DIMM slot that is to be upgraded, open the ejector tabs and remove the filler panel.  
Do not dispose of the filler panel. You may want to reuse it if any DIMMs are removed at another time.
6. Align the notch on the bottom edge of the DIMM with the key in the connector.



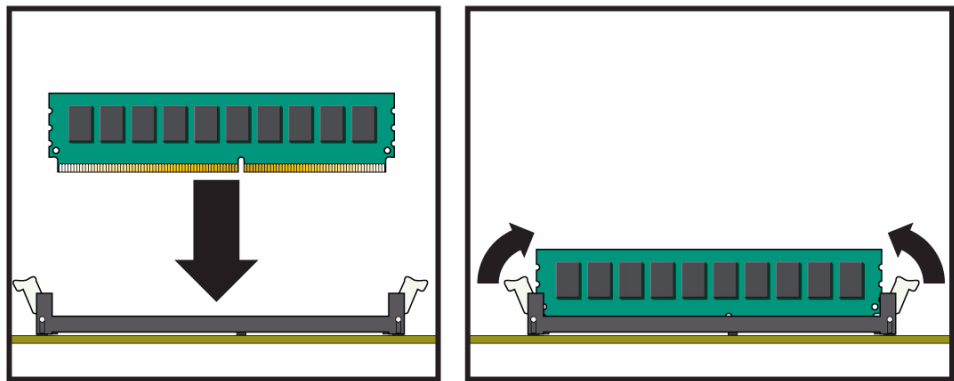
---

**Caution** – Ensure that the orientation is correct. The DIMM might be damaged if the orientation is reversed.

---

7. Press the DIMM into the connector until the ejector tabs lock the DIMM in place.

**FIGURE:** Installing DIMMs



---

**Note** – If the DIMM does not easily seat into the connector, do not try to force it into position. Instead, check its orientation. If the orientation is not correct, forcing the DIMM into the connector is likely to damage the DIMM, or the connector, or both.

---

8. Repeat [Step 5](#) through [Step 7](#) until all DIMMs are installed.

9. Finish the installation procedure:

- Return the server to operation.  
See [“Returning the Server to Operation”](#) on page 215.
- Verify DIMM functionality.  
See [“Verify DIMM Functionality”](#) on page 96.

#### Related Information

- [“DIMM Population Rules”](#) on page 84
- [“Remove a DIMM”](#) on page 91
- [“Install a DIMM”](#) on page 92
- [“Verify DIMM Functionality”](#) on page 96
- [“DIMM Rank Classification Labels”](#) on page 87

---

## ▼ Verify DIMM Functionality

1. Access the Oracle ILOM prompt.

Refer to the *SPARC T4 Series Servers Administration Guide* for instructions.

2. Use the `show faulty` command to determine how to clear the fault.

- If `show faulty` indicates a POST-detected fault, go to [Step 3](#).
- If `show faulty` 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 SP is power cycled. In those cases, the fault is automatically cleared from the system. If `show faulty` still displays the fault, the `set` command will clear it.

```
-> set /SYS/MB/CMP0/BR0/CH0/D0 component_state=enabled
Set 'component_state' to '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 will run in Service mode.

```
-> set /SYS/keyswitch_state=diag
Set 'keyswitch_state' to 'diag'
```

- b. Power cycle the system.

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

---

**Note** – Use the `show /HOST` command to determine when the host has been powered off. The console will display `status=Powered Off`. Allow approximately one minute before running this command.

---

- c. 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
.
.
.
0:7:2>INFO:
0:7:2>    POST Passed all devices.
0:7:2>POST:    Return to VBSC.
0:7:2>Master set ACK for vbsc runpost command and spin...
```

---

**Note** – The system might boot automatically at this point. If so, go directly to [Step e](#). If the system remains at the ok prompt, go to [Step d](#).

---

- d. If the system remains at the ok prompt, type **boot**.

- e. Return the virtual keyswitch to Normal mode.

```
-> set /SYS keyswitch_state=normal
Set 'keyswitch_state' to 'normal'
```

- f. Switch to the system console and type the Oracle Solaris OS `fmadm faulty` command.

```
# fmadm faulty
```

If any faults are reported, refer to the diagnostics instructions described in [“Oracle ILOM Troubleshooting Overview” on page 25](#).

5. Switch to the Oracle ILOM command shell.

6. Run the `show faulty` command.

-> <b>show faulty</b>		
Target	Property	Value
-----		
/SP/faultmgmt/0	fru	/SYS/MB/CMP0/B0B0/CH1/D0
/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-e487e520 7a8a
/SP/faultmgmt/0/ faults/0	timestamp	Dec 14 22:43:59

If the `show faulty` command reports a fault with a UUID go on to [Step 7](#). If `show faulty` 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 repaired` command with the UUID.

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

```
# fmadm repaired /SYS/MB/CMP0/B0B0/CH1/D0
```

### Related Information

- [“DIMM Population Rules” on page 84](#)
- [“DIMM FRU Names” on page 85](#)
- [“Supported DIMM Configurations” on page 86](#)
- [“Increase System Memory With Additional DIMMs” on page 94](#)
- [“DIMM Configuration Error Messages” on page 99](#)
- *Oracle Integrated Lights Out Manager (ILOM) 3.1 Document Collection*

---

# DIMM Configuration Error Messages

This topic includes the following:

- [“DIMM Configuration Errors—System Console” on page 99](#)
- [“DIMM Configuration Errors—show faulty Command Output” on page 102](#)
- [“DIMM Configuration Errors—fmadm faulty Output” on page 103](#)

## DIMM Configuration Errors—System Console

When the server boots, system firmware checks the memory configuration against the rules described in [“DIMM Population Rules” on page 84](#). If a memory configuration error is detected, a general error message is displayed:

Please refer to the service documentation for supported memory configurations.

In some cases, the server boots in a degraded state, and a message such as the following is displayed:

NOTICE: /SYS/MB/CMP0/CORE0/P0 is degraded

In other cases, the configuration error is fatal, and a message such as the following is displayed:

Fatal configuration error - forcing power-down

In addition, one or more rule-specific messages is displayed, indicating the type of configuration error detected.

The following table identifies and explains the various DIMM configuration error messages.

---

**Note** – The messages described in this table apply to SPARC T4-1 servers. The DIMM configuration requirements for other servers in the SPARC T4 series are different in some details, so some of their configuration error messages will also be different.

---

DIMM Configuration Error Messages	Notes
Fatal configuration error - forcing power-down.	<p>Ensure that DIMMs are installed in a supported configuration.</p> <p>See <a href="#">“DIMM Population Rules” on page 84.</a></p> <p>Ensure that DIMMs are identical (identical capacity, identical DIMM classification).</p> <p>See <a href="#">“DIMM Rank Classification Labels” on page 87</a></p> <p>See <a href="#">“Increase System Memory With Additional DIMMs” on page 94.</a></p>
Not all MCUs enabled. Unsupported Config.	<p>Ensure that DIMMs are installed in a supported configuration.</p> <p>See <a href="#">“DIMM Population Rules” on page 84.</a></p> <p>See <a href="#">“DIMM Rank Classification Labels” on page 87.</a></p>
Invalid DIMM population. No DIMM is present in MCUn/BOBn	<p>Install a DIMM with the appropriate characteristics in the slot specified in the message.</p>
Not all DIMMs have the same SDRAM capacity.	<p>All DIMM components must have the same storage capacity—all 4 GByte, all 8 GByte, all 16 GByte, or all 32 GByte.</p> <p>Replace any DIMMs that do not match the intended capacity.</p> <p>For more information, see <a href="#">“DIMM Rank Classification Labels” on page 87.</a></p>
Not all DIMMs have the same device width.	<p>All DIMM components must have the same device width.</p> <p>Replace any DIMMs that do not match the desired width.</p> <p>See <a href="#">“DIMM Rank Classification Labels” on page 87</a></p>
Not all DIMMs have the same number of ranks.	<p>All DIMM components must have the same number of ranks. The supported rank arrangements are:</p> <ul style="list-style-type: none"> <li>• 2 ranks—4 GByte, 8 GByte, 16 GByte DIMMs</li> <li>• 4 ranks—16 GByte, 32 GByte DIMMs</li> </ul> <p>Replace any DIMMs that do not match the intended rank number.</p> <p>For more information, see <a href="#">“DIMM Rank Classification Labels” on page 87.</a></p>
Invalid DIMM population. DIMMs in the same position must be all present or absent.	<p>Memory configurations must be populated in sets of 4, 8, or 16 DIMM components as as described in <a href="#">“DIMM Population Rules” on page 84.</a></p> <p>Either add DIMM components to fill a partially populated set, or remove DIMM components to empty a partial set.</p> <p><b>Note</b> - The DIMM slots labeled set 1 in the figure must always be fully populated.</p>

DIMM Configuration Error Messages	Notes
Invalid DIMM population. T4-1 only supports 1/4, 1/2 or full memory configs.	Add or remove DIMM components to achieve one of the supported memory configurations. See <a href="#">“DIMM Population Rules”</a> on page 84.
DIMM population across nodes is different.	This message does not apply to SPARC T4-1 servers.
DRAM capacity of DIMMs is different across nodes.	This message does not apply to SPARC T4-1 servers.
Device width of DIMM is different across nodes.	This message does not apply to SPARC T4-1 servers.
Number of ranks of DIMM is different across nodes.	This message does not apply to SPARC T4-1 servers.

## Related Information

- [“Memory Fault Handling Overview”](#) on page 23
- [“DIMM Population Rules”](#) on page 84
- [“Locate a Faulty DIMM \(DIMM Fault Remind Button\)”](#) on page 88
- [“Locate a Faulty DIMM \(show faulty Command\)”](#) on page 91
- [“DIMM Rank Classification Labels”](#) on page 87
- [“DIMM Configuration Errors—show faulty Command Output”](#) on page 102
- [“DIMM Configuration Errors—fmadm faulty Output”](#) on page 103

# DIMM Configuration Errors—show faulty Command Output

In addition to general hardware errors, the `show faulty` command also detects DIMM configuration errors. For example:

-> <b>show faulty</b>		
Target	Property	Value
/SP/faultmgmt/0	fru	/SYS/MB/CMP0/BOB0/CH0/D0
/SP/faultmgmt/0/faults/0	class	<b>fault.component.misconfigured</b>
/SP/faultmgmt/0/faults/0	sunw-msg-id	SPT-8000-PX
/SP/faultmgmt/0/faults/0	component	/SYS/MB/CMP0/BOB0/CH0/D0
/SP/faultmgmt/0/faults/0	uuid	2caf416b-4fe0-6509-db02-aa719f5d d543
/SP/faultmgmt/0/faults/0	timestamp	2012-09-24/17:00:40
/SP/faultmgmt/0/faults/0	fru_part_number	000-0000
/SP/faultmgmt/0/faults/0	fru_serial_number	00CE011217213B151F
/SP/faultmgmt/0/faults/0	product_serial_number	1140BDY90A
/SP/faultmgmt/0/faults/0	chassis_serial_number	1140BDY90A

## Related Information

- [“DIMM Configuration Errors—System Console” on page 99](#)
- [“DIMM Configuration Errors—fmadm faulty Output” on page 103](#)

# DIMM Configuration Errors—fmadm faulty Output

The fault management tool (fmadm) captures DIMM configuration errors. For example:

faultmgmtsp> <b>fmadm faulty</b>			
-----			
Time	UUID	msgid	Severity
-----			
2012-09-24/17:00:40	2caf416b-4fe0-6509-db02-aa719f5dd543	SPT-8000-PX	Major
Fault class : <b>fault.component.misconfigured</b>			
FRU : /SYS/MB/CMP0/BOB0/CH0/D0			
(Part Number: 000-0000)			
(Serial Number: 00CE011217213B151F)			
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 will not be usable in its current location.			
Action : The administrator should review the ILOM event log for additional information pertaining to this diagnosis. Please refer to the Details section of the Knowledge Article for additional information.			

## Related Information

- [“DIMM Configuration Errors—System Console” on page 99](#)
- [“DIMM Configuration Errors—show faulty Command Output” on page 102](#)





# Servicing Hard Drives

---

These topics describe tasks you perform when replacing hard drives.

- [“Hard Drive Hot-Pluggable Capabilities” on page 105](#)
- [“Hard Drive Slot Configuration Reference” on page 106](#)
- [“Hard Drive LEDs” on page 107](#)
- [“Remove a Hard Drive” on page 108](#)
- [“Install a Hard Drive” on page 110](#)
- [“Verify the Functionality of a Hard Drive” on page 111](#)

---

## Hard Drive Hot-Pluggable Capabilities

The hard drives are hot-pluggable, meaning that the drives can be removed and inserted while the server is powered on.

---

**Note** – The term “hard drive” is used in this documentation to mean either disk-based hard drives or solid state drives (SSDs). The term “HDD” is also sometimes used and has the same meaning. Both disk drive and SSD technologies are supported.

---

Depending on the configuration of the data on a particular drive, the drive might also be removable while the server is online. However, to hot-plug a drive while the server is online you must take the drive offline before you can safely remove it. Taking a drive offline prevents any applications from accessing it, and removes the logical software links to it.

The following situations inhibit your ability to hot-plug a drive:

- If the drive contains the operating system, and the operating system is not mirrored on another drive.
- If the drive cannot be logically isolated from the online operations of the server.

If either of these conditions apply to the drive being serviced, you must take the server offline (shut down the operating system) before you replace the drive.

### Related Information

- [“Hard Drive Slot Configuration Reference” on page 106](#)
- [“Hard Drive LEDs” on page 107](#)
- [“Servicing the HDD Backplane” on page 193](#)
- [“Servicing the HDD Cage” on page 187](#)

---

## Hard Drive Slot Configuration Reference

This topic describes the server’s hard drive slot organization.

Address mapping between the Oracle Solaris OS device paths and physical hard drive slots is not fixed. For many storage administration tasks, the mapping of OS device names to physical hard drive slots must be determined before the task can be performed. See the SPARC T4 series servers administration guide for information on mapping SAS controller ports to physical drive slots.

---

**Note** – The server requires at least one hard drive to be installed and operational.

---

## Drive Backplane Slot Configuration Reference

The following table identifies the drive slot numbering in the SPARC T4-1 disk backplane.

**TABLE:** Physical Drive Locations in the SPARC T4-1 Disk Backplane

HDD1	HDD3	HDD5	DVD	
HDD0	HDD2	HDD4	HDD6	HDD7

### Related Information

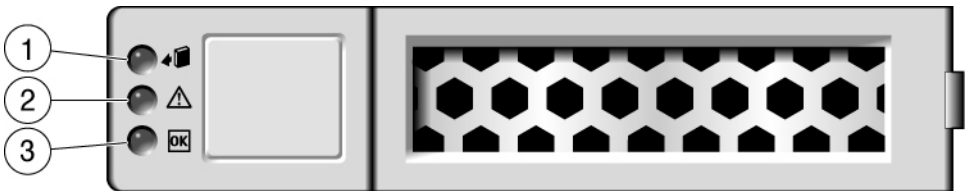
- [“Hard Drive LEDs” on page 107](#)
- [“Remove a Hard Drive” on page 108](#)

- “Install a Hard Drive” on page 110
- “Verify the Functionality of a Hard Drive” on page 111

# Hard Drive LEDs




The status of each hard drive is represented by the same three LEDs. These are shown in the following figure and described in the table that follows the figure.

**FIGURE:** Status LEDs for Hard Drives



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

**TABLE:** Hard Drive Status LEDs

LED	Description
1 Ready to Remove (blue)	 Indicates that a hard drive can be removed during a hot-plug operation.
2 Service Required (amber)	 Indicates that the hard drive is has experienced a fault condition.
3 OK/Activity (green)	 Indicates the HDD's availability for use. <ul style="list-style-type: none"><li>• On -- Read or write activity is in progress.</li><li>• Off -- Drive is idle and available for use.</li></ul>

**Note** – The front and rear panel Service Required LEDs are also lit when the system detects a hard drive fault.

### Related Information

- [“Remove a Hard Drive” on page 108](#)
- [“Install a Hard Drive” on page 110](#)
- [“Verify the Functionality of a Hard Drive” on page 111](#)

---

## ▼ Remove a Hard Drive

---

**Note** – This is a hot service procedure that can be performed by customers while the server is running. See [“Hot Service, Replaceable by Customer” on page 70](#) for more information about hot service procedures.

---



---

**Caution** – The drive must be taken offline before it is removed. If it cannot be taken offline, the OS must be shut down to prevent running programs from attempting to use it.

---

**1. Determine if you need to shut down the OS to replace the drive, and perform one of the following actions:**

- If the drive cannot be taken offline without shutting down the OS, follow instructions in [“Power Off the Server \(SP Command\)” on page 73](#). Then go to [Step 3](#).
- If the drive can be taken offline without shutting down the OS, go to [Step 2](#).

**2. Take the drive offline:**

- a. At the Oracle Solaris prompt, type the `cfgadm -al` command to 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 whose status is listed as configured, as described in [Step b](#).

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

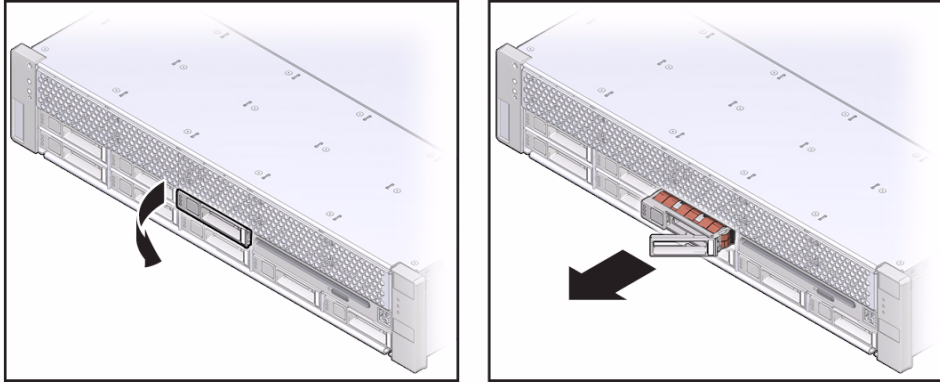
Example:

```
# 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.

3. Press the drive release button to unlock the drive and pull on the latch to remove the drive.



---

**Caution** – The latch is not an ejector. Do not force the latch too far to the right. Doing so can damage the latch.

---

**4. Install the replacement drive or a filler tray.**

See [“Install a Hard Drive” on page 110](#).

**Related Information**

- [“Install a Hard Drive” on page 110](#)
- [“Verify the Functionality of a Hard Drive” on page 111](#)

---

## ▼ Install a Hard Drive

---

**Note** – This is a hot service procedure that can be performed by customers while the server is running. See [“Hot Service, Replaceable by Customer” on page 70](#) for more information about hot service procedures.

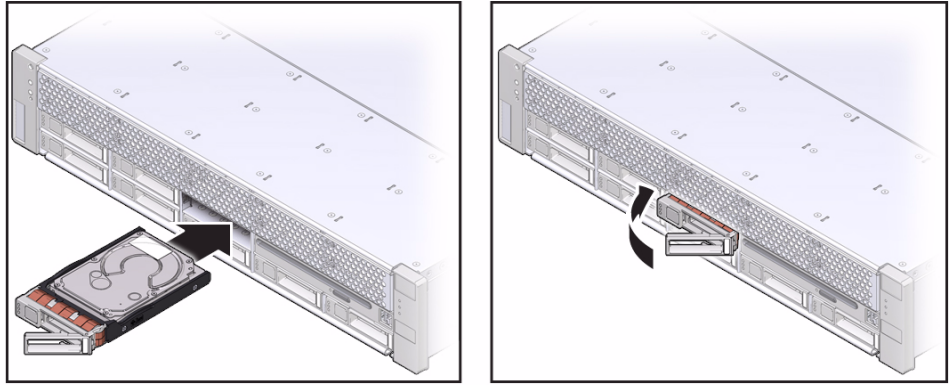
---

- 1. With the latch open on the replacement drive, insert the drive into the drive bay and slide it forward until it is seated.**

---

**Tip** – Drives are physically addressed according to the slot in which they are installed. If you are replacing a drive, install the replacement drive in the same slot as the drive that was removed.

---



2. Close the latch to lock the drive in place.

3. Bring the drive online.

Configure the drive using the `cfgadm -c configure` command. In the following example, the drive at `c0::dsk/c1t1d0` will be configured.

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

4. Verify the drive.

See [“Verify the Functionality of a Hard Drive” on page 111](#).

#### Related Information

- [“Remove a Hard Drive” on page 108](#)
- [“Verify the Functionality of a Hard Drive” on page 111](#)

---

## ▼ Verify the Functionality of a Hard 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, type the `cfgadm -al` command to list all drives in the device tree, including any drives that are not configured:

```
# cfgadm -al
```

This command helps you identify the drive you installed.

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

3. Configure the drive using the `cfgadm -c configure` command.

Example:

```
# 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 [“Hard Drive LEDs” on page 107](#).

5. At the Oracle Solaris prompt, type the `cfgadm -al` command to list all drives in the device tree, including any drives that are not configured:

```
# cfgadm -al
```

The replacement drive is now listed as configured. Example:

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



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

- If the previous steps did not verify the drive, see [“Diagnostics Process” on page 16](#).
- 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**

- [“Hard Drive Slot Configuration Reference” on page 106](#)
- [“Hard Drive Hot-Pluggable Capabilities” on page 105](#)
- [“Remove a Hard Drive” on page 108](#)
- [“Install a Hard Drive” on page 110](#)



# Servicing the DVD/USB Assembly

These topics explain how to remove and install DVD/USB modules.

- [“DVD/USB Assembly Overview” on page 115](#)
- [“Remove the DVD/USB Assembly” on page 116](#)
- [“Install the DVD/USB Assembly” on page 117](#)

---

## DVD/USB Assembly Overview

The DVD module and front USB board are mounted in a removable assembly that is accessed from the server’s front panel.

---

**Note** – The DVD interface on the hard drive backplane uses serial SATA technology.

---

**FIGURE:** DVD/USB Module



## ▼ Remove the DVD/USB Assembly

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---

**1. Perform the preliminary steps required for cold service procedures.**

See [“Cold Service, Replaceable by Customer” on page 70](#) for instructions.

**2. Remove any optical disks from the DVD module and unplug any USB cables from the USB port.**

**3. Bring the server to the standby mode.**

Momentarily press the recessed Power button on the server front panel. You may need to use a pointed object, such as a stylus or pen.

**4. Unplug the power cords.**

See [“Disconnect Power Cords” on page 74](#).

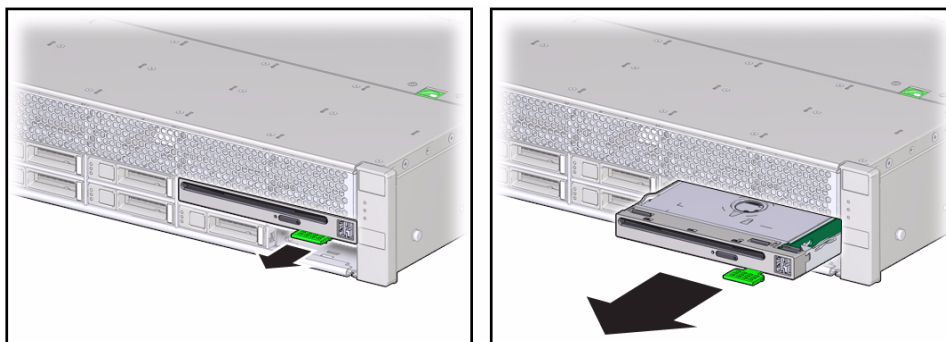
**5. Attach an antistatic wrist strap.**

**6. If the lower right hard drive bay contains an HDD or SDD module, remove it.**

This is the disk bay at location HDD7. See [“Hard Drive Slot Configuration Reference” on page 106](#).

**7. Reach in under the DVD/USB module and pull the release tab out.**

Use the finger indentation in the hard drive bay below the DVD/USB module to extend the release tab.



**8. Slide the DVD/USB module out of the hard drive cage.**

9. Place the module on an antistatic mat.

#### Related Information

- [“Install the DVD/USB Assembly” on page 117](#)
- [“DVD/USB Assembly Overview” on page 115](#)

---

## ▼ Install the DVD/USB Assembly

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---

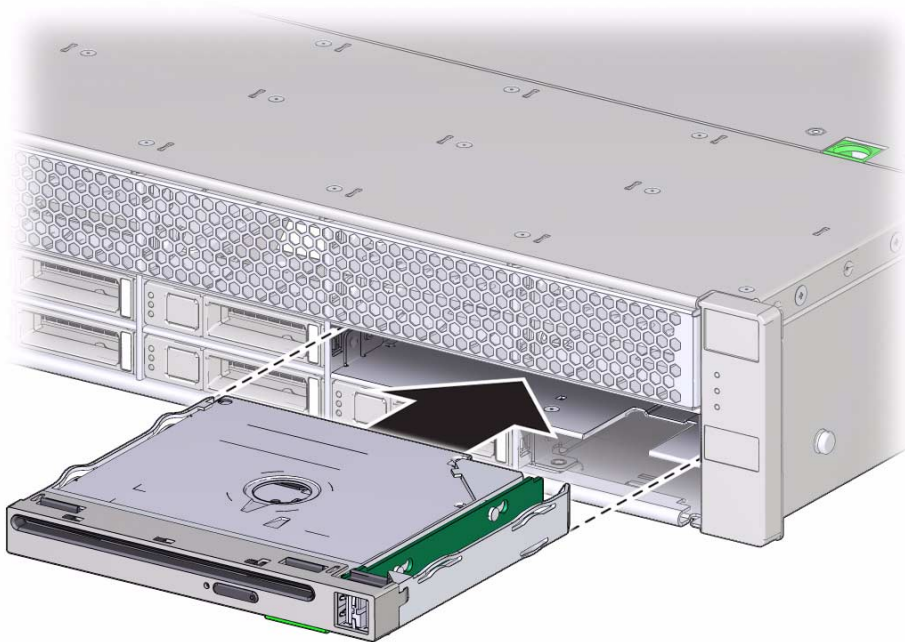


---

**Caution** – Be certain the DVD module you will install is of the serial ATA (SATA) type.

---

1. Perform the preliminary steps required for cold service procedures.  
See [“Cold Service, Replaceable by Customer” on page 70](#) for instructions.
2. Slide the DVD/USB module into the front of the chassis until it seats.



3. Slide the release tab back into the system.

4. If you removed a hard drive from the lower right drive bay, reinstall it.

5. Plug in the power cords.

See [“Reconnect the Power Cords”](#) on page 218.

6. Power on the system.

See [“Power On the Server \(start /SYS Command\)”](#) on page 218 or [“Power On the Server \(Power Button\)”](#) on page 218.

### Related Information

- [“Remove the DVD/USB Assembly”](#) on page 116
- [“DVD/USB Assembly Overview”](#) on page 115

# Servicing the Power Supplies

---

The following topics describe the tasks you perform to replace a power supply.

- [“Power Supply Hot-Swap Capabilities” on page 119](#)
- [“Locate a Faulty Power Supply” on page 121](#)
- [“Remove a Power Supply” on page 121](#)
- [“Install a Power Supply” on page 122](#)
- [“Verify the Functionality of a Power Supply” on page 124](#)
- [“Remove or Install a Power Supply Filler Panel” on page 124](#)

---

## Power Supply Hot-Swap Capabilities

The two power supply units in your server enable you to hot-swap a power supply when needed.

### **Related Information**

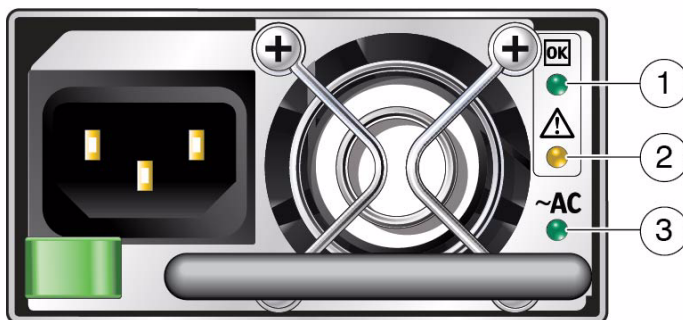
- [“Power Supply LEDs” on page 119](#)
- [“Remove a Power Supply” on page 121](#)
- [“Install a Power Supply” on page 122](#)
- [“Verify the Functionality of a Power Supply” on page 124](#)
- [“Remove or Install a Power Supply Filler Panel” on page 124](#)

---

## Power Supply LEDs



Each power supply is provided with a set of three LEDs, as shown in the figure.

**FIGURE:** Power Supply LEDs



The following table describes the three power supply LEDs

**TABLE:** Power Supply Status LEDs

Legend	LED	Icon	Color	
1	OK		Green	This LED lights when the power supply DC voltage from the PSU to the server is within tolerance.
2	Fault		Amber	This LED is lit when the power supply is faulty. <b>Note</b> - The front and rear panel Service Required LEDs are also lit if the system detects a power supply fault.
3	AC Present	~AC	Green	This LED turns on when AC voltage is applied to the power supply. Note - For DC models, this is the DC input OK LED. It turns on when the input DC power is present.

**Note** – If a power supply fails and you do not have a replacement available, leave the failed power supply installed to ensure proper airflow in the server.

### Related Information

- [“Locate a Faulty Power Supply” on page 121](#)
- [“Remove a Power Supply” on page 121](#)
- [“Install a Power Supply” on page 122](#)
- [“Verify the Functionality of a Power Supply” on page 124](#)



---

## ▼ Locate a Faulty Power Supply

A faulty power supply will cause the Service Required LEDs (front and rear panels) as well as the Fault LED located on the power supply to light.

- **From the rear of the server, check the power supply fault LEDs to identify which supply needs to be replaced.**

---

## ▼ Remove a Power Supply

---

**Note** – This *may* be a hot service procedure that can be performed by customers while the server is running. See [“Hot Service, Replaceable by Customer” on page 70](#) for more information about hot service procedures.

---

**1. Identify which power supply (0 or 1) requires replacement.**

See [“Locate a Faulty Power Supply” on page 121](#).

**2. Determine if you can hot-swap the power supply:**

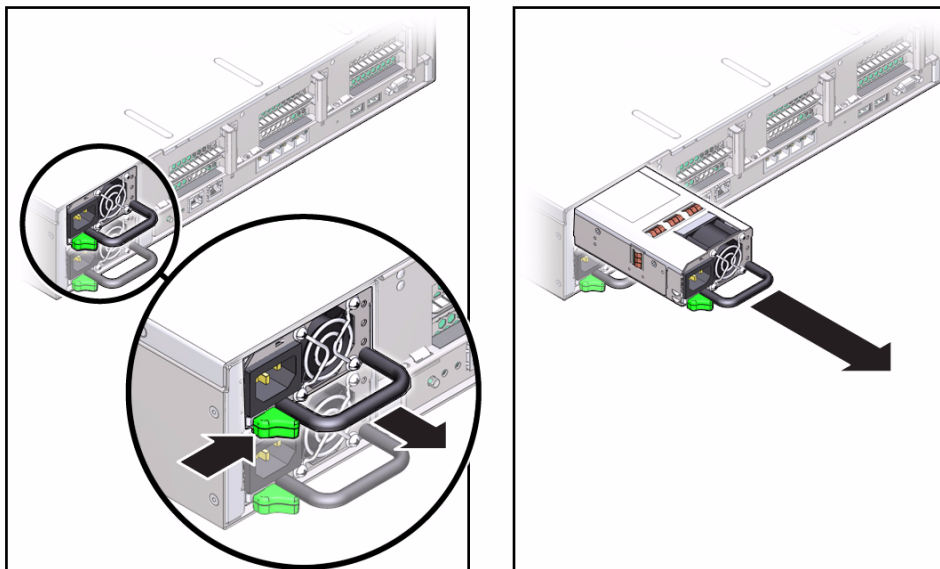
- If there are two power supplies, you can hot-swap the faulty power supply without shutting down the server. Go to [Step 4](#).
- If there is only one power supply, you must shut down the server before replacing the power supply. Go to [Step 3](#)

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

See [“Power Off the Server \(SP Command\)” on page 73](#)

**4. Disconnect the power cord from the faulty power supply.**

**5. Grasp the power supply handle, press the release latch and pull the power supply out of the server.**



---

**Caution** – If you will not be replacing the power supply immediately, install a power supply filler panel before returning power to the server. See [“Remove or Install a Power Supply Filler Panel”](#) on page 124.

---

#### Related Information

- [“Install a Power Supply”](#) on page 122
- [“Verify the Functionality of a Power Supply”](#) on page 124

---

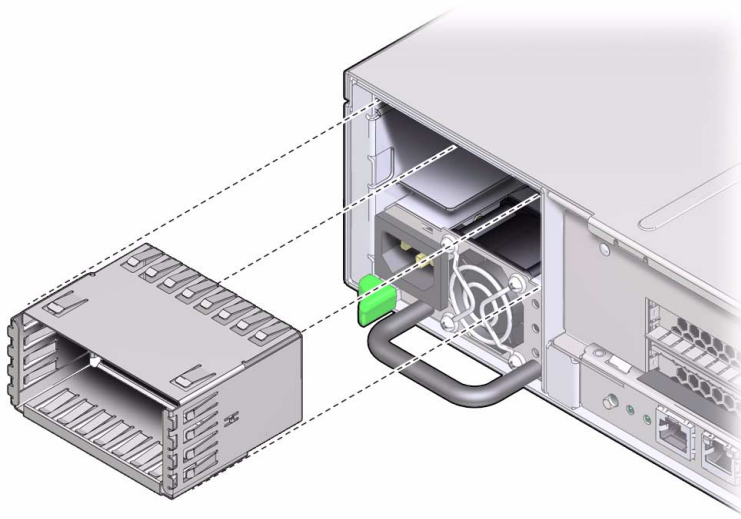
## ▼ Install a Power Supply

---

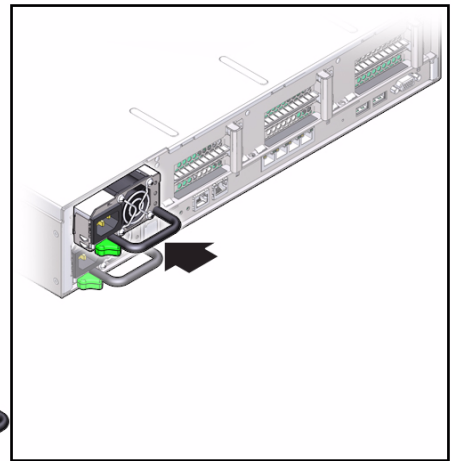
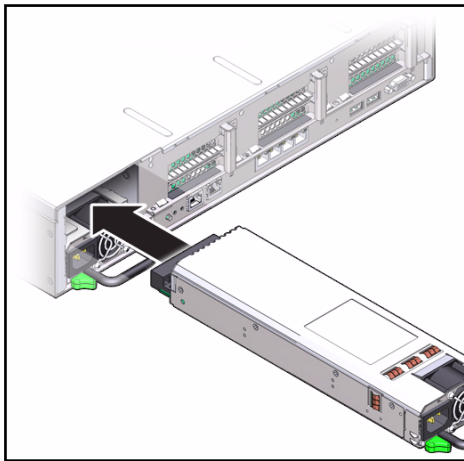
**Note** – This is a hot service procedure that can be performed by customers while the server is running. See [“Hot Service, Replaceable by Customer”](#) on page 70 for more information about hot service procedures.

---

1. If the power supply bay contains a power supply filler panel, remove it.



2. Align the replacement power supply with the empty power supply chassis bay.
3. Slide the power supply into the chassis until it locks into place.



4. Plug the power cord into the power supply.

---

**Note** – As soon as power is applied to the server, standby power initializes the SP. Depending on the server's OBP settings, the host server might automatically boot, or you might need to boot it manually.

---

5. **Verify the functionality of the power supply.**

See [“Verify the Functionality of a Power Supply”](#) on page 124.

**Related Information**

- [“Remove a Power Supply”](#) on page 121
- [“Verify the Functionality of a Power Supply”](#) on page 124

---

## ▼ Verify the Functionality of a Power Supply

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

See [“Power Supply LEDs”](#) on page 119.

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

See [“Front Panel System Controls and LEDs”](#) on page 20.

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

- If the previous steps did not clear the fault, see [“Diagnostics Process”](#) on page 16.
- If [Step 1](#) and [Step 2](#) indicate that no faults have been detected, return the server to operation:

See [“Returning the Server to Operation”](#) on page 215.

**Related Information**

- [“Remove a Power Supply”](#) on page 121
- [“Install a Power Supply”](#) on page 122

---

## ▼ Remove or Install a Power Supply Filler Panel

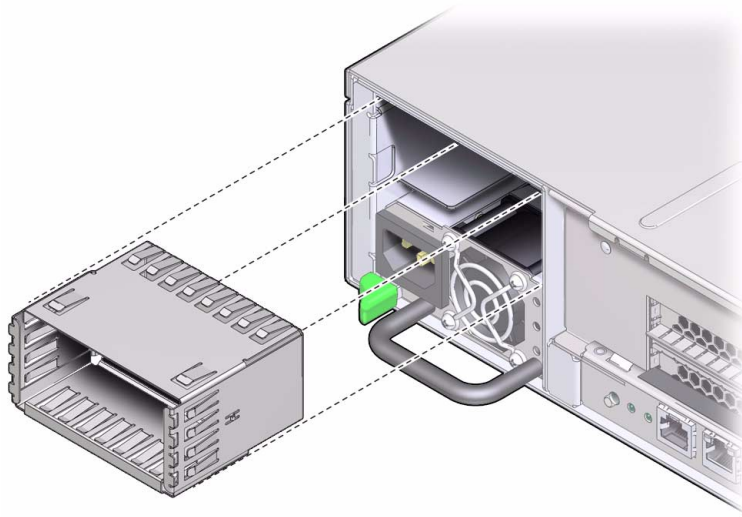
This procedure describes how to remove or install a power supply filler panel.

---

**Note** – During operation, an empty power supply bay must have a filler panel installed for proper environmental control.

---

- Depending on your desired task, perform one of the following tasks:
  - **Remove a filler panel** – Grasp an inside edge of the filler panel and pull out the filler panel.
  - **Install a filler panel** – Align the filler panel with the empty power supply bay and push it into the bay.





# Servicing the Power Distribution Board

---

The following topics explain how to remove and install power distribution boards. They also provide important safety information related to working with power distribution boards.

- [“Power Distribution Board Overview” on page 127](#)
- [“Remove the Power Distribution Board” on page 128](#)
- [“Install the Power Distribution Board” on page 129](#)

---

## Power Distribution Board Overview

The power distribution board distributes main 12V power from the power supplies to the rest of the system. It is directly connected to the connector card and to the motherboard by means of a bus bar and ribbon cable. This board also supports a top cover safety interlock (“kill”) switch.

It is easier to service the power distribution board with the bus bar assembly attached. If you are replacing a faulty power distribution board, you must remove the bus bar assembly from the old board and attach the assembly to the new power distribution board.

When a faulty power distribution board is replaced, the chassis serial number and part number must be programmed into the new power distribution board. This must be done in a special service mode by trained service personnel. These numbers are needed for obtaining product support.



---

**Caution** – The system supplies power to the power distribution board even when the server is powered off. To avoid personal injury or damage to the server, you must disconnect all power cords before servicing the power distribution board.

---

---

## ▼ Remove the Power Distribution Board

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

**1. Remove the system from the rack.**

See [“Remove the Server From the Rack” on page 77](#).

**2. Remove the motherboard assembly.**

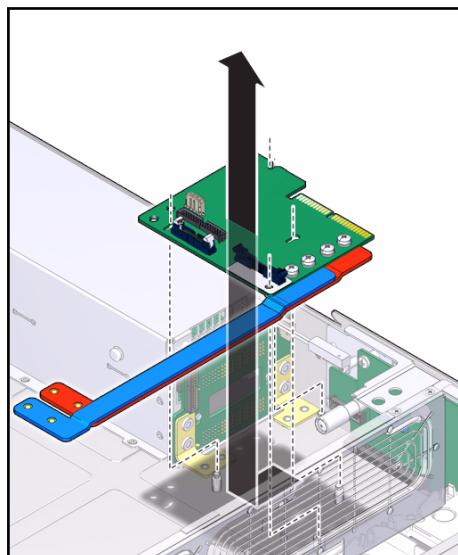
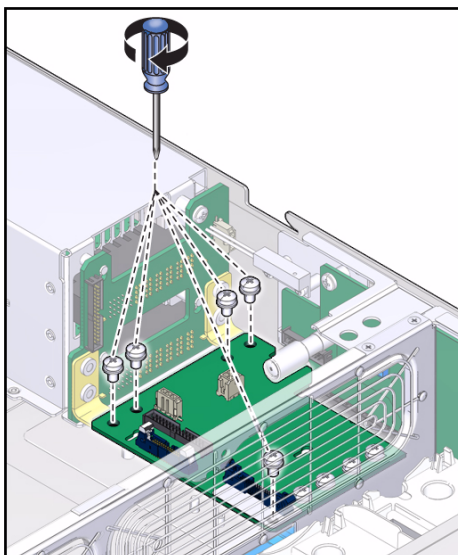
See [“Remove the Motherboard Assembly” on page 208](#).

**3. Disconnect the top cover interlock cable from the power distribution board.**

**4. Disconnect the two ribbon cables and the three-pin wire cable.**

**5. Remove the five screws that secure the power distribution board.**





6. Grasp the bus bar and move the bus bar/power distribution board assembly to the left, away from the connector board and then up off the three standoffs.
7. If the power distribution board will be replaced, remove the bus bar from the assembly so it can be attached to the replacement power distribution board.

#### Related Information

- [“Install the Power Distribution Board” on page 129](#)

---

## ▼ Install the Power Distribution Board

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---

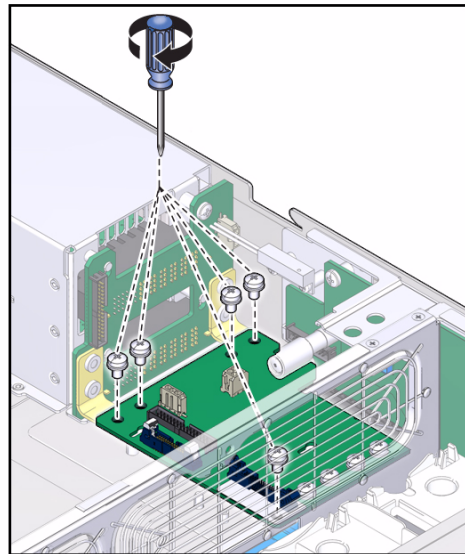
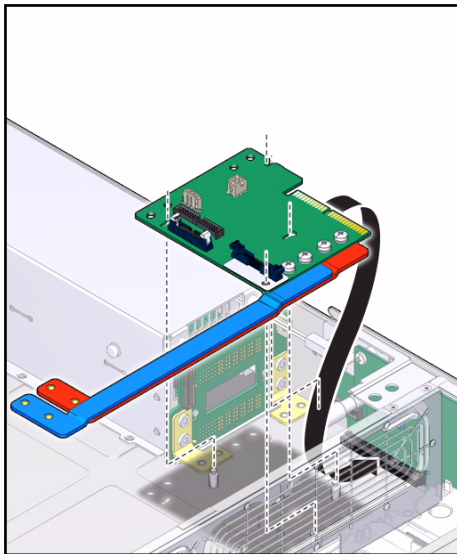


---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

1. If you have a bus bar from a previous bus bar/power distribution assembly, attach it to the new power distribution board.
2. Lower the bus bar/power distribution board assembly into the chassis.  
The power distribution board fits over a set of three mushroom standoffs in the floor of the chassis.
3. Slide the power distribution board/bus bar assembly to the right, until it plugs into the connector board.
4. Install one screw to secure the power distribution board to the chassis.
5. Attach the other four screws to secure the power distribution board to the power supply backplane bus bars.



6. Connect the power supply backplane ribbon cable to its plug on the power distribution board.
7. Reconnect the two ribbon cables.

8. Reconnect the three-pin wire cable from the power supply backplane to the power distribution board.
9. Reconnect the top cover interlock cable to the power distribution board.
10. Install the motherboard assembly.  
See [“Install the Motherboard Assembly” on page 211](#).

---

**Note** – After a new power distribution board is installed and the system is powered on, the chassis serial number and server part number must be programmed into the power distribution board. This operation is performed in a special service mode.

---

#### **Related Information**

- [“Remove the Power Distribution Board” on page 128](#)



# Servicing the Power Supply Backplane

---

The following topics explain how to remove and install the power supply backplane.

- [“Power Supply Backplane Overview” on page 133](#)
- [“Remove the Power Supply Backplane” on page 134](#)
- [“Install the Power Supply Backplane” on page 135](#)

---

## Power Supply Backplane Overview

The power supply backplane carries 12V power from the power supplies to the power distribution board over a pair of bus bars. It also delivers 3.3V standby power over a three-pin wire cable.



---

**Caution** – The system supplies standby power to the power distribution board even when the server is powered off. To avoid personal injury or damage to the server, you must disconnect the power cords before servicing the power supply backplane.

---

### Related Information

- [“Remove the Power Supply Backplane” on page 134](#)
- [“Install the Power Supply Backplane” on page 135](#)

---

## ▼ Remove the Power Supply Backplane

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

**1. Remove the system from the rack.**

See [“Remove the Server From the Rack” on page 77](#).

**2. Remove the motherboard assembly.**

See [“Remove the Motherboard Assembly” on page 208](#).

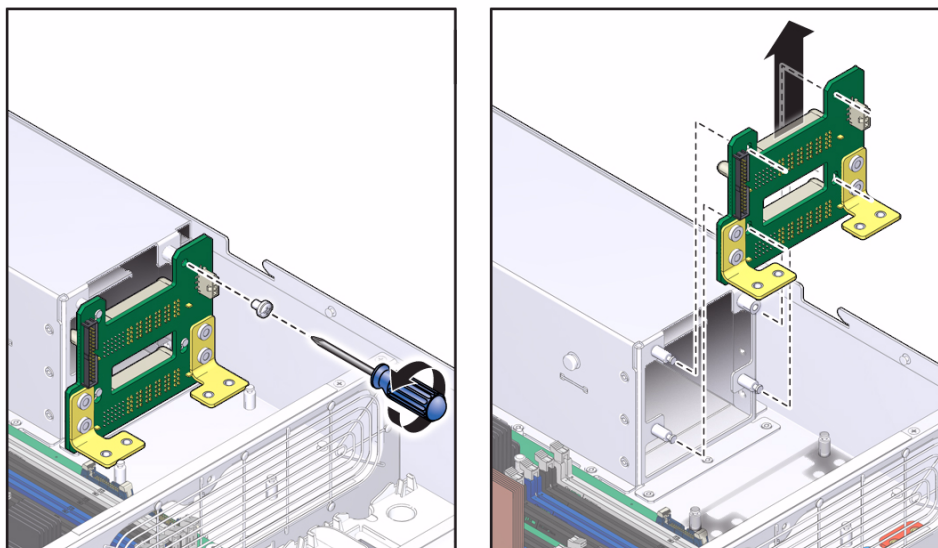
**3. Remove the power supplies.**

See [“Remove a Power Supply” on page 121](#)

**4. Remove the power distribution board.**

See [“Remove the Power Distribution Board” on page 128](#).

**5. Remove the screw securing the power supply backplane to the power supply bay.**



6. Lift the power supply backplane up and off its standoffs and out of the system.
7. Place the power supply backplane on an antistatic mat.

#### Related Information

- [“Install the Power Supply Backplane” on page 135](#)

---

## ▼ Install the Power Supply Backplane

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



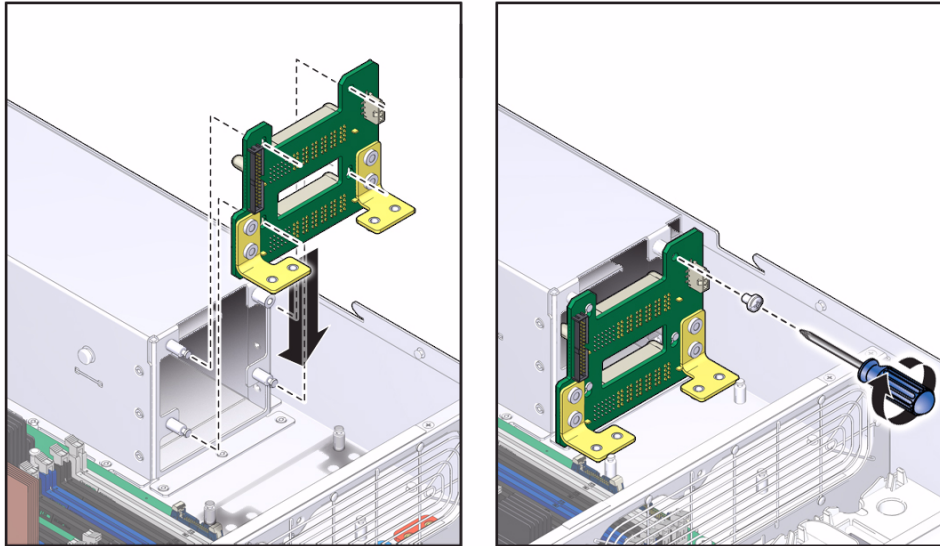
---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

**1. Mount the power supply backplane to the front of the power supply bay.**

Place the backplane over its standoffs.



**2. Secure the power supply backplane with a single screw.**

**3. Install the power distribution board.**

See [“Install the Power Distribution Board” on page 129](#).

**4. Install the power supplies.**

Slide each power supply into its bay until the power supply locks into place.

**5. Install the motherboard assembly.**

See [“Install the Motherboard Assembly” on page 211](#).

**Related Information**

- [“Remove the Power Supply Backplane” on page 134](#)



# Servicing the Connector Board

---

These topics explain how to remove and install the connector board.

- [“Connector Board Overview” on page 137](#)
- [“Remove the Connector Board” on page 137](#)
- [“Install the Connector Board” on page 139](#)

---

## Connector Board Overview

The connector board serves as the interconnect between the power distribution board and the fan power board, hard drive backplane, and front I/O board.

### Related Information

- [“Remove the Connector Board” on page 137](#)
- [“Install the Connector Board” on page 139](#)

---

## ▼ Remove the Connector Board

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---

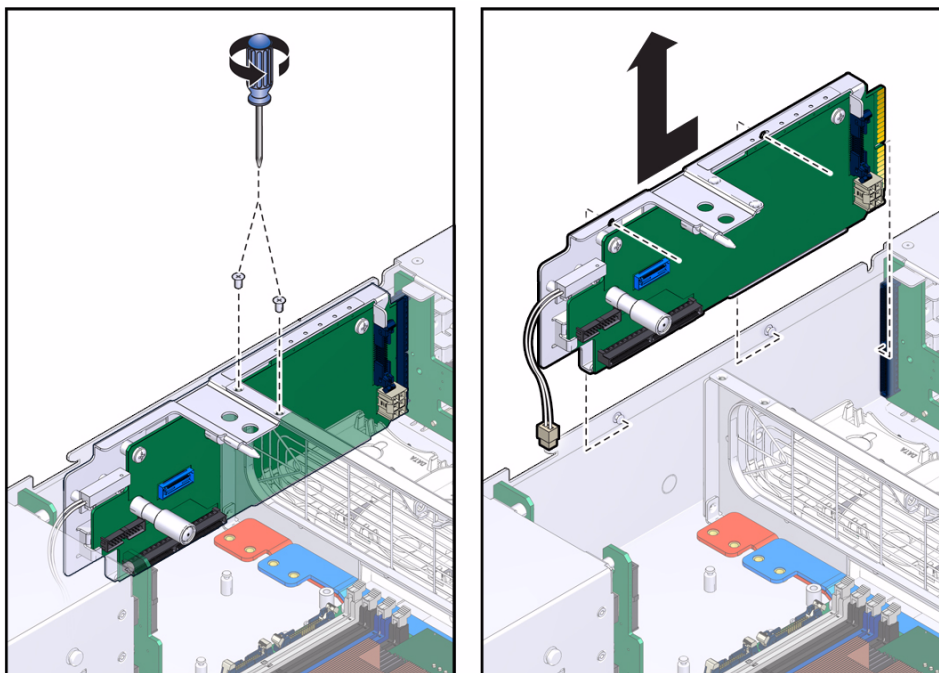


---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

1. **Perform the preliminary steps required for cold service procedures.**  
See [“Cold Service, Replaceable by Customer” on page 70](#) for instructions.
2. **Remove the system from the rack.**  
See [“Remove the Server From the Rack” on page 77](#).
3. **Remove the motherboard assembly.**  
See [“Remove the Motherboard Assembly” on page 208](#).
4. **Remove the power distribution board.**  
See [“Remove the Power Distribution Board” on page 128](#).
5. **Disconnect the connector board end of the power and data cables that lead to the fan power board.**
6. **Remove the two screws that secure the connector board to the midwall.**



7. Slide the connector board back to disengage it from the hard drive backplane.
8. Tilt the connector board away from the side of the chassis and lift it up and out of the system.
9. Place the connector board on an antistatic mat.

#### Related Information

- [“Install the Connector Board” on page 139](#)

## ▼ Install the Connector Board

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---

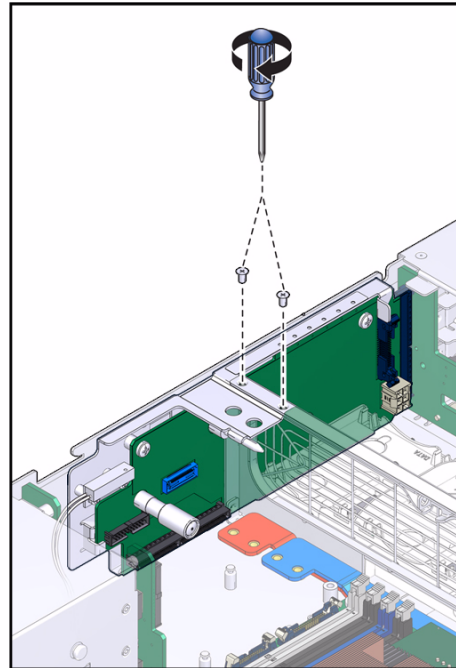
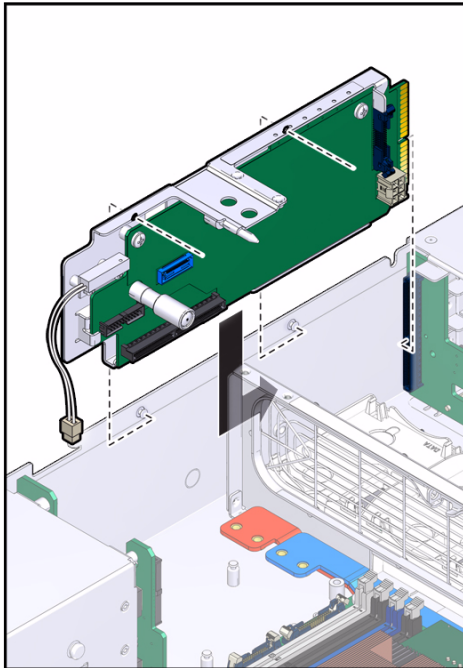


---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

1. Using the mushroom standoff as an alignment guide, lower the connector board into the chassis.



2. Slide the connector board forward to plug it into the hard drive backplane.
3. Secure the connector board with two screws.
4. Connect the power and data cables from the fan power board.
5. Install the power distribution board.

See [“Install the Power Distribution Board”](#) on page 129.

**6. Install the motherboard assembly.**

See [“Install the Motherboard Assembly”](#) on page 211.

**Related Information**

- [“Remove the Connector Board”](#) on page 137



# Servicing PCIe and PCIe/XAUI Risers

---

The following topics describe the procedures for replacing PCIe cards.

- [“Remove a PCIe or PCIe/XAUI Riser” on page 143](#)
- [“Install a PCIe or PCIe/XAUI Riser” on page 145](#)

---

## ▼ Remove a PCIe or PCIe/XAUI Riser

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

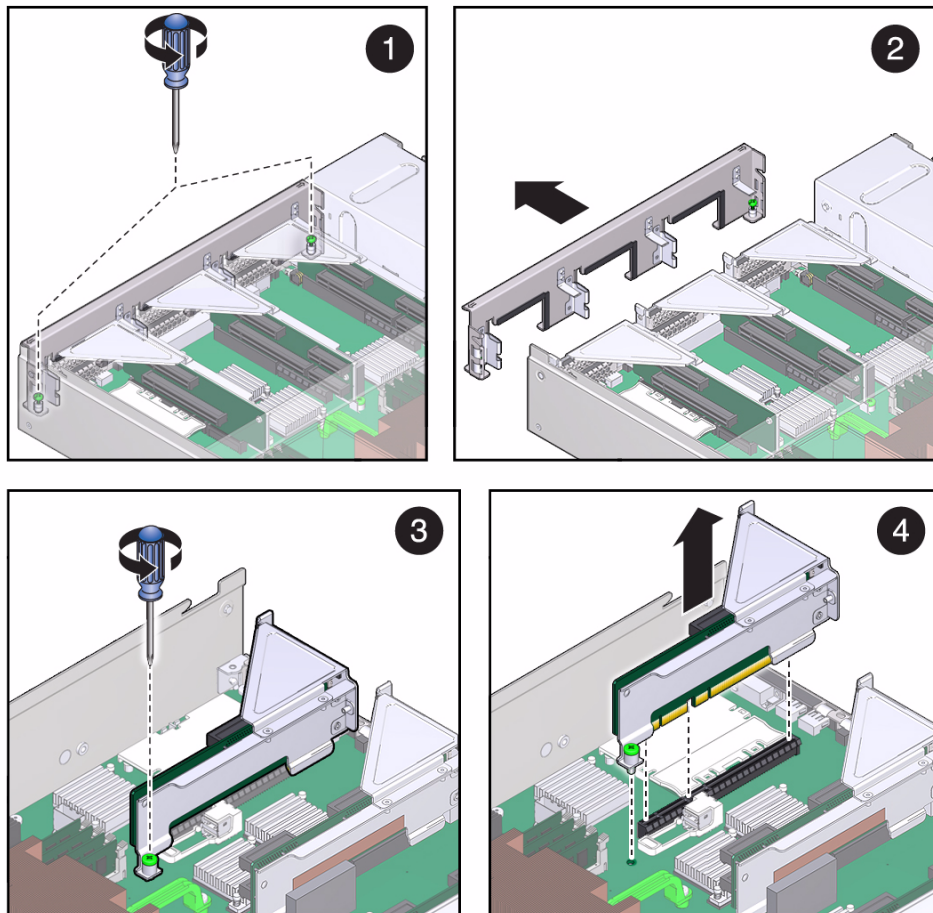
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1. **Perform the preliminary steps required for cold service procedures.**  
See [“Cold Service, Replaceable by Customer” on page 70](#) for instructions.
2. **Extend the server to the maintenance position.**  
See [“Extend the Server” on page 75](#).
3. **Remove the top cover.**  
See [“Remove the Top Cover” on page 80](#).

4. Attach an antistatic wrist strap.

5. Remove the PCIe2 cross beam.

Loosen the two green captive screws (panel 1).



6. Push the crossbeam to the rear and lift up (panel 2).

7. Loosen the screw that secures the riser to the motherboard (panel 3).

8. Lift the riser up to disengage the connector (panel 4).

### Related Information

- [“Install a PCIe or PCIe/XAUI Riser”](#) on page 145



---

## ▼ Install a PCIe or PCIe/XAUI Riser

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---

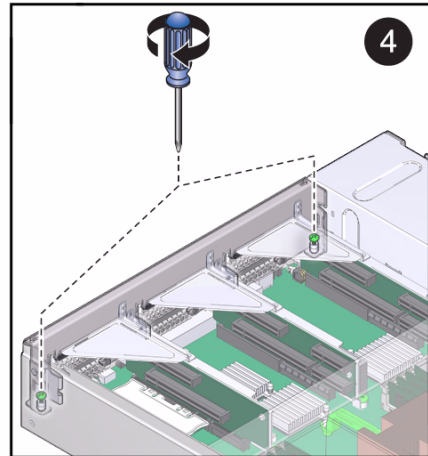
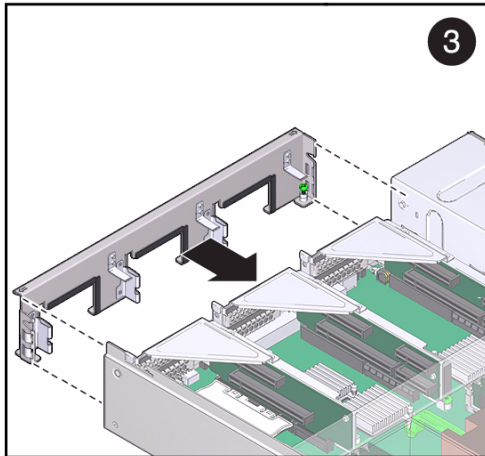
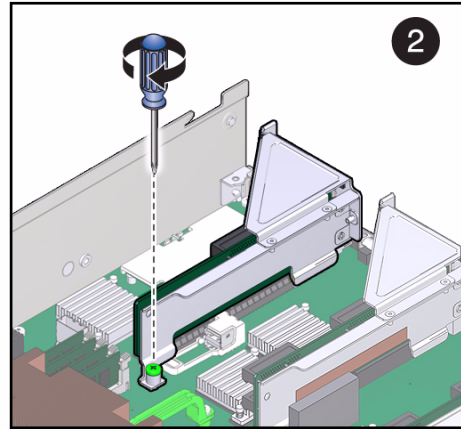
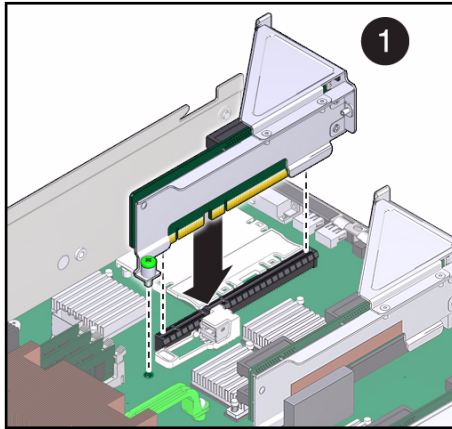


---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

1. **Perform the preliminary steps required for cold service procedures.**  
See [“Cold Service, Replaceable by Customer” on page 70](#) for instructions.
2. **Extend the server to the maintenance position.**  
See [“Extend the Server” on page 75](#).
3. **Remove the top cover.**  
See [“Remove the Top Cover” on page 80](#).
4. **Attach an antistatic wrist strap.**
5. **Align the riser board with the riser connector and press down to engage the connector (panel 1).**



6. Tighten the riser screw (panel 2).
7. Slide the crossbeam into position between the power supply bay and the side of the chassis (panel 3).
8. Tighten the two captive screws to secure the crossbeam (panel 4)

### Related Information

- [“Remove a PCIe or PCIe/XAUI Riser” on page 143](#)

# Servicing PCIe Cards

These topics describe service procedures for the PCIe cards in the server.

- [“PCIe Card Configuration Reference” on page 147](#)
- [“Remove a PCIe or XAUI Card” on page 148](#)
- [“Install a PCIe or XAUI Card” on page 150](#)

---

## PCIe Card Configuration Reference

Use the following table to plan your PCIe/XAUI card configuration on SPARC T4-1 server.

**TABLE:** PCIe and XAUI Support

Slot	PCIe Switch	Supported Device Types	FRU Name
PCIe 0 or XAUI 0*	0	PCIe (x16 physical, x8 electrical) XAUI expansion card	/SYS/MB/RISER0/PCIE0 /SYS/MB/RISER0/XAUI0
PCIe 1	1	PCIe (x16 physical, x8 electrical)	/SYS/MB/RISER1/PCIE1
PCIe 2	0	PCIe (x16 physical, x8 electrical)	/SYS/MB/RISER2/PCIE2
PCIe 3 or XAUI 1	1	PCIe (x8 physical, x8 electrical) XAUI expansion card	/SYS/MB/RISER0/PCIE3 /SYS/MB/RISER0/XAUI1
PCIe 4	0	PCIe (x8 physical, x8 electrical)	/SYS/MB/RISER1/PCIE4
PCIe 5	1	PCIe (x8 physical, x8 electrical)	/SYS/MB/RISER2/PCIE5

\* Slots 0 and 3 are capable of accepting either PCIe or XAUI cards. You can only install one type of card.

---

**Note** – As a general rule, the PCIe and PCIe/XAUI slots should be populated sequentially, beginning with slot 0 and progressing to slot 5. This general rule does not apply to I/O cards that have special slot restrictions. For guidance on these restrictions, see the table, PCIe Slot Usage Rules for Certain HBA Cards in the *SPARC T4-1 Server Product Notes*.

---

### Related Information

- [“Remove a PCIe or XAUI Card” on page 148](#)
- [“Install a PCIe or XAUI Card” on page 150](#)

---

## ▼ Remove a PCIe or XAUI Card

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

1. **Perform the preliminary steps required for cold service procedures.**  
See [“Cold Service, Replaceable by Customer” on page 70](#) for instructions.
2. **Extend the server to the maintenance position.**  
See [“Extend the Server” on page 75](#).
3. **Remove the top cover.**  
See [“Remove the Top Cover” on page 80](#).
4. **Attach an antistatic wrist strap.**
5. **Disconnect any cables connected to the card.**

---

**Note** – If the riser has cards installed in both slots, disconnect all cables connected to both cards.

---

---

**Tip** – Label the cables to ensure proper connection to the replacement card.

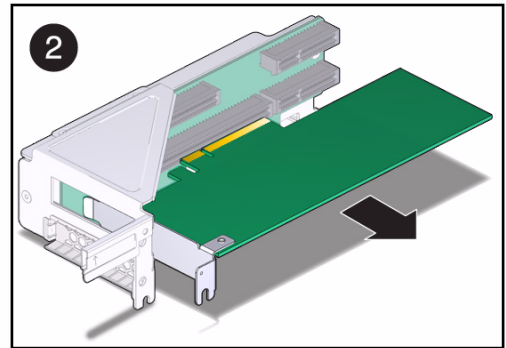
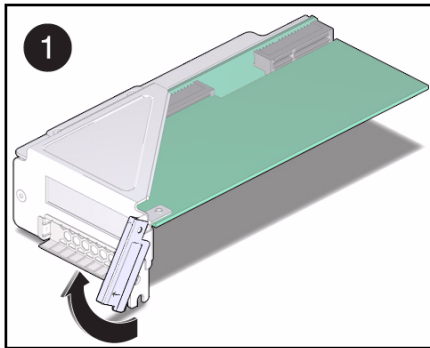
---

**6. Remove the riser that contains the card to be removed.**

See [“Remove a PCIe or PCIe/XAUI Riser” on page 143](#)

**7. With the riser placed on an antistatic surface, disengage the card from its connector and place it on an antistatic surface.**

The card is held in place by a retention clip, which you must rotate up before the card can be removed.



**8. If you are not replacing the PCIe or XAUI card, install a filler panel in the slot.**



---

**Caution** – To ensure proper system cooling and EMI shielding, you must use the appropriate PCIe filler panel for the server.

---

**Related Information**

- [“Install a PCIe or XAUI Card” on page 150](#)

## ▼ Install a PCIe or XAUI Card

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



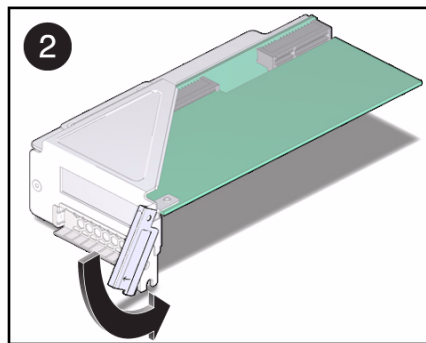
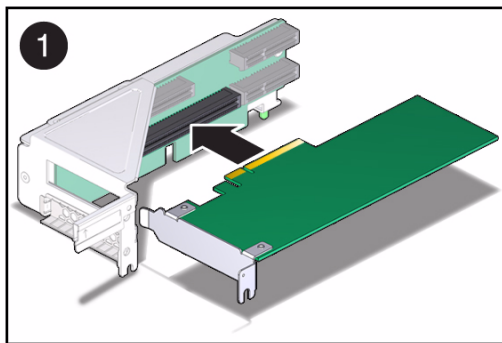
---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

1. Perform the preliminary steps required for cold service procedures.  
See [“Cold Service, Replaceable by Customer” on page 70](#) for instructions.
2. Locate the proper PCIe/XAUI slot for the card you are replacing.
3. Remove the PCIe/XAUI riser.  
See [“Remove a PCIe or PCIe/XAUI Riser” on page 143](#).
4. If a PCIe filler panel is installed, remove it.
5. Install the PCIe or XAUI card into the riser.

Before inserting the card, you must rotate the retention clip out of the way, as shown in panel 1.



6. Rotate the retention clip downward and press it until it is securely in place.

**7. Reinstall the PCIe/XAUI riser.**

See [“Install a PCIe or PCIe/XAUI Riser” on page 145.](#)

**8. Connect any data cables required to the PCIe/XAUI card.**

Route data cables through the cable management arm.

**Related Information**

- [“Remove a PCIe or XAUI Card” on page 148](#)





# Servicing SAS PCIe RAID HBA Cards

---

These topics describe service procedures for the RAID expansion modules in the server.

- [“Remove a SAS PCIe RAID HBA Card” on page 153](#)
- [“Install a SAS PCIe RAID HBA Card” on page 155](#)

---

## ▼ Remove a SAS PCIe RAID HBA Card

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

1. **Extend the server to the maintenance position.**  
See [“Extend the Server” on page 75](#).
2. **Remove the top cover.**  
See [“Remove the Top Cover” on page 80](#).
3. **Attach an antistatic wrist strap.**

4. Disconnect the data cables from the card.

---

**Note** – If the riser has cards installed in both slots, disconnect all cables connected to both cards.

---

---

**Tip** – Label the cables to ensure proper connection to the replacement card.

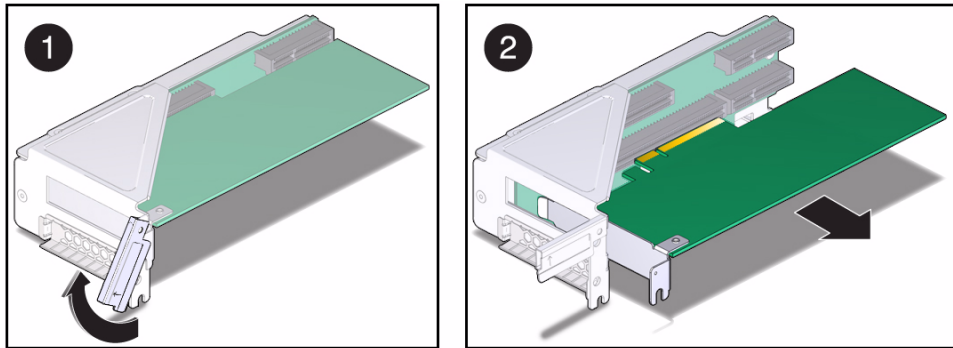
---

5. Remove the riser that contains the card.

See [“Remove a PCIe or PCIe/XAUI Riser”](#) on page 143

6. With the riser placed on an antistatic surface, disengage the card from its connector and place it on an antistatic surface.

The card is held in place by a retention clip, which you must rotate up before the card can be removed.



7. If you are not replacing the card, install a PCIe filler panel in the slot.



---

**Caution** – To ensure proper system cooling and EMI shielding, you must use the appropriate PCIe filler panel for the server.

---

**Related Information**

- [“Install a SAS PCIe RAID HBA Card”](#) on page 155

## ▼ Install a SAS PCIe RAID HBA Card

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---

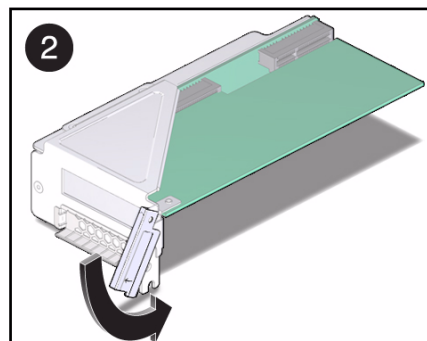
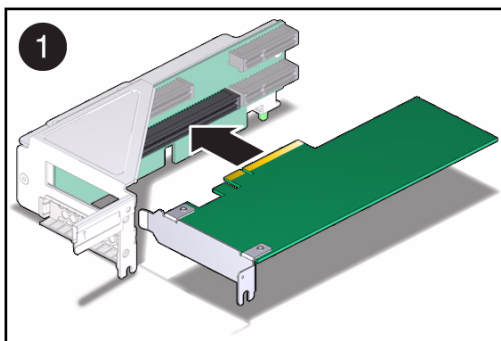


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**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

1. Unpack the SAS PCIe RAID HBA card and place it on an antistatic mat.
2. Remove the PCIe/XAUI riser that is closest to the power supplies.  
See [“Remove a PCIe or PCIe/XAUI Riser” on page 143](#).
3. If a PCIe filler panel is installed, remove it.
4. Install the SAS PCIe RAID HBA card into the upper slot in the riser.  
Before inserting the card, you must rotate the retention clip out of the way, as shown in panel 1.



5. Rotate the retention clip downward and press it until it is securely in place.
6. Connect the internal data cables to the card.

### **Related Information**

- [“Remove a SAS PCIe RAID HBA Card” on page 153](#)

# Servicing the Service Processor

---

The following topics describe how to remove, replace, and verify the service processor:

- [“Service Processor Overview” on page 157](#)
- [“Remove the Service Processor” on page 158](#)
- [“Install the Service Processor” on page 159](#)

---

## Service Processor Overview

The service processor plugs into a socket on the motherboard in the space between riser 2 and the right side of the chassis, as viewed from the rear. This is the riser that contains PCIe slots 2 and 5.

If the service processor is replaced, the configuration settings maintained in the service processor will need to be restored. Before replacing the service processor, you should save the configuration using the Oracle ILOM backup utility.

System firmware consists of both SP and host components. The SP component is located on the service processor and the host component is located on the CPU. These two components must be compatible. When the service processor is replaced, the SP firmware component on the new service processor may be incompatible with the existing host firmware component. In this case, the system firmware must be loaded as described in [“Install the Service Processor” on page 159](#).

### Related Information

- [“Remove the Service Processor” on page 158](#)
- [“Install the Service Processor” on page 159](#)

---

## ▼ Remove the Service Processor

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

After you replace the service processor, restoring the SP configuration will be much simpler if the configuration has been saved using the Oracle ILOM backup utility. If the configuration has not been backed up, do so now, if possible.

If you want to retain the same version of the system firmware with the new service processor, note the current version before you remove the service processor.

**1. Perform the preliminary steps required for cold service procedures.**

See [“Cold Service, Replaceable by Customer” on page 70](#) for instructions.

**2. Extend the server out of the rack.**

See [“Extend the Server” on page 75](#).

**3. If you can access the rear area of the server without removing the server from the rack, go to [Step 4](#), otherwise remove the server from the rack:**

- Unplug all cables from the server.
- [“Remove the Server From the Rack” on page 77](#)

**4. Remove the top cover.**

See [“Remove the Top Cover” on page 80](#).

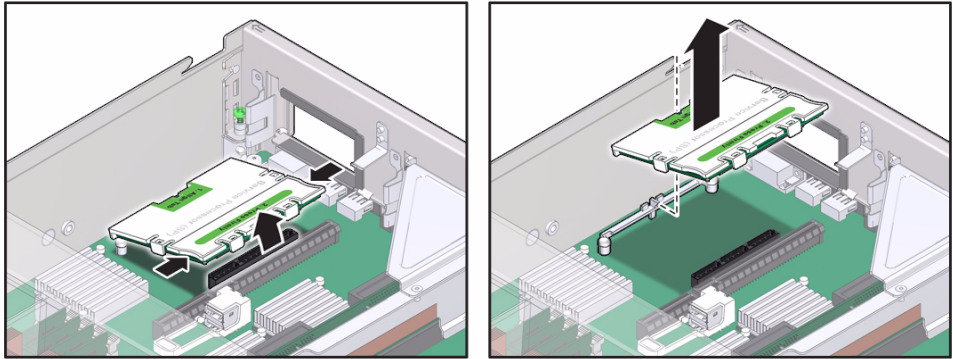
**5. Attach an antistatic wrist strap.**

6. If there are any PCIe cards installed in riser 2, remove them. This will require removing riser 2 first.

See [“Servicing PCIe and PCIe/XAUI Risers” on page 143](#) and [“Servicing PCIe Cards” on page 147](#).

7. Grasp the scalloped depressions along the short edges of the service processor module and pull up to disengage the socketed edge of the module.

The service processor’s connector is located next to the module’s edge that is closest to the riser.



8. Lift the module up and out of the chassis.

#### Related Information

- [“Install the Service Processor” on page 159](#)

---

## ▼ Install the Service Processor

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

1. If the server is connected to a power source, shut the server down fully and unplug any power cords.

See [“Removing Power From the System”](#) on page 72.

2. Extend the server out of the rack.

See [“Extend the Server”](#) on page 75.

3. If you can access the rear area of the server without removing the server from the rack, go to [Step 4](#), otherwise remove the server from the rack:

- Unplug all cables from the server.
- [“Remove the Server From the Rack”](#) on page 77

4. Remove the top cover.

See [“Remove the Top Cover”](#) on page 80.

5. Tilt the service processor module and align it with the tab on the motherboard service processor support.

6. Press the module straight down until it is fully seated in its socket.

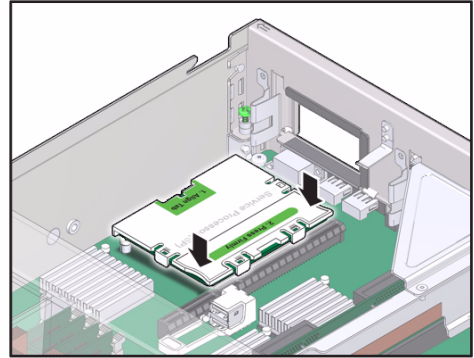
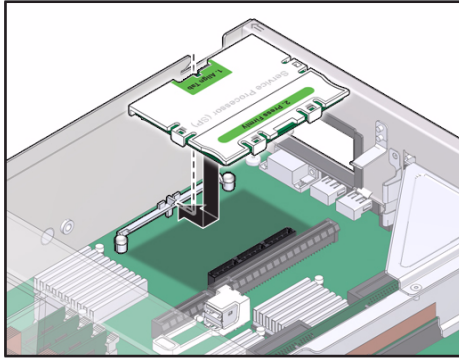


---

**Caution** – If the module does not slide into the socket with relative ease, do not force it. It may be that the module’s pins are not perfectly aligned with the socket. Excessive force could damage the pins, socket, or both.

---





**7. Return the server to an operational condition.**

Perform the following procedures before going on to [Step 8](#):

**a. Install the top cover.**

See “[Replace the Top Cover](#)” on page 215.

**b. Install the server in the rack.**

See “[Reinstall the Server in the Rack](#)” on page 216.

**c. Connect the power cords to the server.**

See “[Reconnect the Power Cords](#)” on page 218.

**8. Connect a terminal or a terminal emulator (PC or workstation) to the service processor SER MGT port.**

If the replacement service processor detects that the SP firmware is not compatible with the existing host firmware, further action will be suspended and the following message will be delivered over the SER MGT port.

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.

If you see this message, go on to [Step 9](#).

**9. Download the system firmware.**

**a. Configure the SP’s network port to enable the firmware image to be downloaded.**

Refer to the Oracle ILOM documentation for network configuration instructions.

**b. 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 revision that had been installed prior to the replacement of the service processor.

---

- c. If a backup file was created, use the Oracle ILOM restore utility to restore the configuration of the replacement service processor.

#### **Related Information**

- [“Remove the Service Processor” on page 158](#)

# Servicing the System Battery

---

The battery maintains system time when the server is powered off. If the server fails to maintain the proper time when it is powered off, replace the battery.

- [“Replace the System Battery” on page 163](#)
- [“Verify the System Battery” on page 165](#)

---

## ▼ Replace the System Battery

---

**Note** – This is a cold service procedure that can be performed by customers. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about cold service procedures.

---



---

**Caution** – This procedure exposes sensitive components to electrostatic discharge. Be certain to follow the ESD precautions described in [“Safety Information” on page 65](#).

---

The system battery is in a spring-loaded carrier that is located between riser 0 and the power supply housing.

1. **Shut down the system for service.**  
See [“Removing Power From the System” on page 72](#).
2. **Extend the server out of the rack.**  
See [“Extend the Server” on page 75](#).
3. **If you can access the rear area of the server without removing the server from the rack, go to [Step 4](#), otherwise remove the server from the rack:**
  - Unplug all cables from the server.
  - [“Remove the Server From the Rack” on page 77](#)

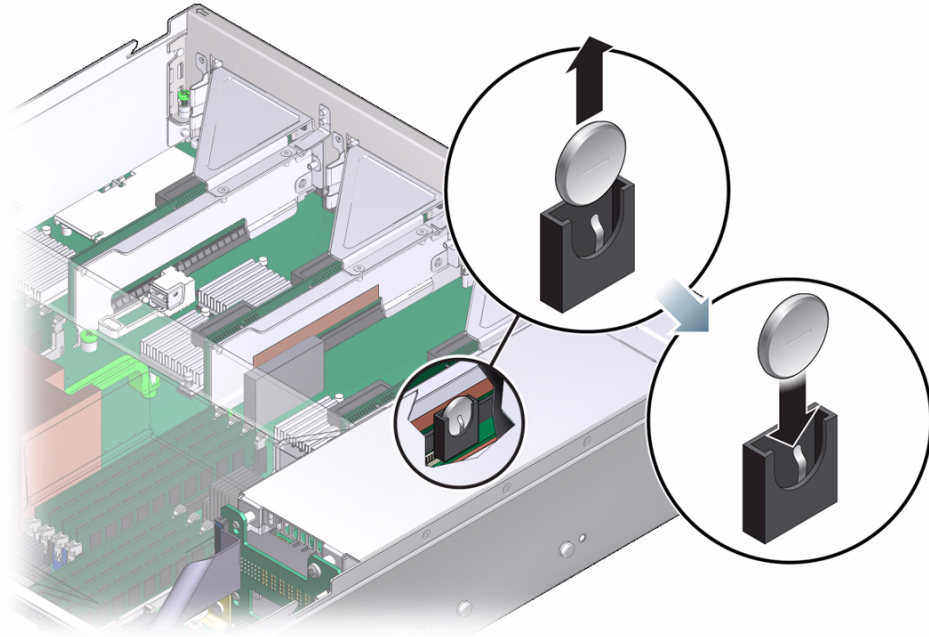
**4. Remove the top cover.**

See [“Remove the Top Cover”](#) on page 80.

**5. Remove riser 0 leftmost riser as viewed from the rear of the server).**

See [“Servicing PCIe and PCIe/XAUI Risers”](#) on page 143.

**6. Push the top edge of the battery against the spring and lift it out of the carrier.**



**7. Insert the new battery into the battery carrier with the negative side (-) facing out.**

**8. Replace the top cover.**

See [“Replace the Top Cover”](#) on page 215.

**9. Return the server to its operational position in the rack.**

See [“Return the Server to the Normal Rack Position”](#) on page 217.

**10. Restore power to the server.**

See [“Power On the Server \(start /SYS Command\)”](#) on page 218 or [“Power On the Server \(Power Button\)”](#) on page 218.

#### 11. Use the Oracle ILOM `clock` command to set the day and time.

The following example sets the date to June 17, 2010, the time to 16:19:56, and the timezone to GMT.

```
-> set /SP/clock datetime=061716192010

-> show /SP/clock

/SP/clock
  Targets:

  Properties:
    datetime = Wed JUN 17 16:19:56 2010
    timezone = GMT (GMT)
    usentpserver = disabled
  Commands:
    cd
    set
    show
```

---

**Note** – For additional details about setting the Oracle ILOM clock, refer to the CLI Procedures Guide for Oracle ILOM.

---

#### 12. Verify that the new system battery is functioning properly.

See [“Verify the System Battery” on page 165](#).

##### Related Information

- [“Verify the System Battery” on page 165](#)

---

## ▼ Verify the System Battery

- **Run `show /SYS/MB/BAT` to check the status of the system battery.**

In the output, the `/SYS/MB/BAT` status should be “OK”, as in the following example.

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

/SYS/MB/BAT

Targets:
```

```
Properties:
type = Battery
ipmi_name = MB/BAT
fault_state = OK
clear_fault_action = (none)
```

Commands:

```
cd
set
show
```

->

### **Related Information**

- [“Replace the System Battery” on page 163](#)

# Servicing Fan Modules

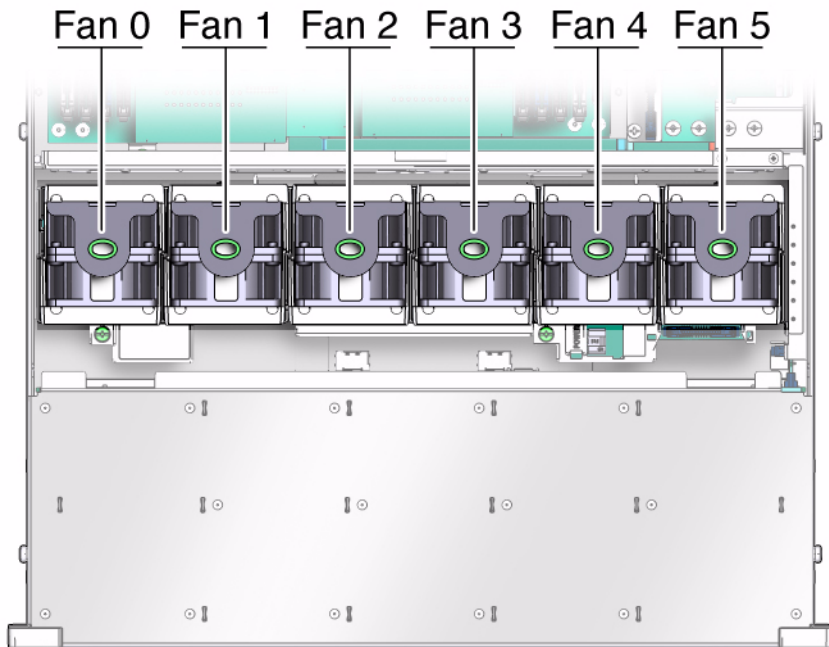
The following topics provide the procedures related to servicing fan modules.

- [“Locate a Faulty Fan Module” on page 170](#)
- [“Remove a Fan Module” on page 171](#)
- [“Fan Configuration Reference” on page 167](#)

---

## Fan Configuration Reference

The following figure shows the fan module slot assignments.



---

**Note** – All fan modules must be installed or the system will not be able to power up.

---

### **Related Information**

- [“Fan Module LEDs” on page 168](#)
- [“Locate a Faulty Fan Module” on page 170](#)
- [“Remove a Fan Module” on page 171](#)
- [“Install a Fan Module” on page 172](#)

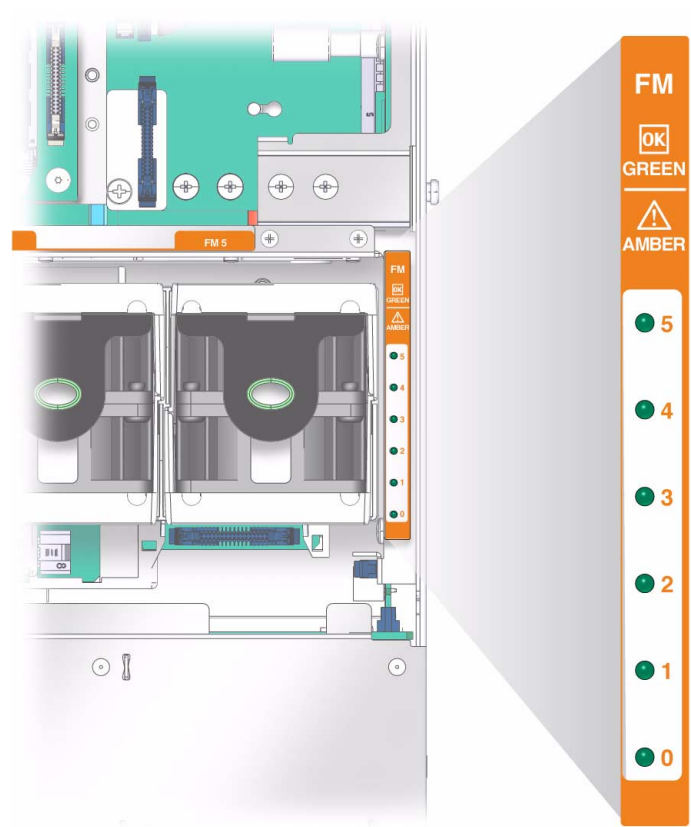
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## Fan Module LEDs



The status of each fan module is displayed by a bi-color LED. These six status LEDs are located on the chassis frame to the right of the fan module bay. The LEDs are labeled with numbers that correspond to fan module labels on the midwall. When the fault manager reports a failed fan module, use the status LEDs to learn the number of the faulty fan module and use the fan locating label on the midwall to identify the fan module.



**FIGURE:** Fan Module LEDs



**TABLE:** Fan Module Status LEDs

LED	Notes	
Fan OK Status (green)		The LED is green when the corresponding fan is operational.
Service Required Status (amber)		The LED is amber when the fan module is faulty. A faulty fan module will also cause the system Fan Fault LED to be lighted.

When a fan module fault is detected, the front and rear panel Service Required LEDs also turn on.

If the fan fault produces an over temperature condition, the system Overtemp LED will turn on and an error message will be logged and displayed on the system console.

### Related Information

- [“Fan Configuration Reference” on page 167](#)
- [“Locate a Faulty Fan Module” on page 170](#)
- [“Remove a Fan Module” on page 171](#)
- [“Install a Fan Module” on page 172](#)

---

## ▼ Locate a Faulty Fan Module

This procedure describes how to identify the faulty fan using the Fan Fault LEDs.



---

**Caution** – This procedure requires you to perform actions in an area that contains live voltages. Use caution to avoid contact with cable terminals or other electrified surfaces.

---

### 1. Check the front or rear panel System Fault LED.

A fan fault will cause the System Fault LED (on front and rear of server) as well as a Fan Fault LED in the array of fan status LEDs to be lighted.

### 2. Extend the server to the maintenance position.

See [“Extend the Server” on page 75](#).

### 3. Release the two fan compartment door latches and swing the door open.

### 4. If the color of a Fan Fault LED is amber, replace the corresponding fan module.

See [“Remove a Fan Module” on page 171](#).

### Related Information

- [“Fan Configuration Reference” on page 167](#)
- [“Fan Module LEDs” on page 168](#)
- [“Remove a Fan Module” on page 171](#)
- [“Install a Fan Module” on page 172](#)

---

## ▼ Remove a Fan Module

---

**Note** – This is a hot service procedure that can be performed by customers. See [“Hot Service, Replaceable by Customer” on page 70](#) for more information about hot service procedures.

---



---

**Caution** – Do not remove a fan module until you have a replacement unit ready for installation. The server may be run for the time it takes to remove and install a fan module, but the fan door must not be open for more than 60 seconds.

---

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

See [“Extend the Server” on page 75](#).

**2. Release the two fan compartment door latches and swing the door open.**

**3. Check the fan status LEDs to determine which fan module or modules need to be replaced.**

An amber LED identifies the faulty fan module.

**4. To remove a fan module, grasp the pull tab, pull the module toward the front of the system, and then lift it up and out of the fan module compartment.**

**5. Check to be certain adjacent fan modules are still fully seated.**

You can do this by pressing down on the top of the neighboring fan modules.



---

**Caution** – If you will not be able to install a new fan module within one minute, power down the system. See [“Removing Power From the System” on page 72](#).

---

### Related Information

- [“Fan Configuration Reference” on page 167](#)
- [“Fan Module LEDs” on page 168](#)
- [“Install a Fan Module” on page 172](#)

---

## ▼ Install a Fan Module

---

**Note** – This is a hot service procedure that can be performed by customers. See [“Hot Service, Replaceable by Customer” on page 70](#) for more information about hot service procedures.

---

The following procedure is based on the assumption that an empty slot exists for inserting the new fan module. If you need to remove a fan module before performing the installation procedure, see [“Remove a Fan Module” on page 171](#).

1. **Extend the server to the maintenance position.**  
See [“Extend the Server” on page 75](#).
2. **Release the two fan compartment door latches and swing the door open.**
3. **Align the connector pins on the base of the new fan module with the connector on the fan module board and lower the module straight down into the slot.**
4. **Press down on the top of the module until it is fully seated.**
5. **Check the following status LEDs to verify that the new fan is functioning.**
  - The fan module status LED associated with that fan module should be green.  
See [“Fan Module LEDs” on page 168](#).
  - Both Service Required LEDs should be off.
6. **Return the server to its operational position in the rack.**  
See [“Return the Server to the Normal Rack Position” on page 217](#).

### **Related Information**

- [“Fan Configuration Reference” on page 167](#)
- [“Fan Module LEDs” on page 168](#)
- [“Remove a Fan Module” on page 171](#)

# Servicing the Fan Power Board

---

The following topics describe the tasks you perform to replace a power supply.

- [“Fan Power Board Overview” on page 173](#)
- [“Remove the Fan Power Board” on page 173](#)
- [“Install the Fan Power Board” on page 176](#)

---

## Fan Power Board Overview

The fan power board carries power to the fan modules. It also carries status and control signals for the fan modules.

---

**Note** – The SAS and SATA data cables pass through a gutter in the center of the fan power board assembly on their way to their respective connectors on the disk backplane.

---

### Related Information

- [“Remove the Fan Power Board” on page 173](#)
- [“Install the Fan Power Board” on page 176](#)

---

## ▼ Remove the Fan Power Board

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

**1. Perform the preliminary steps required for cold service procedures.**

See [“Cold Service, Replaceable by Customer”](#) on page 70 for instructions.

**2. Disconnect the power cables.**

See [“Disconnect Power Cords”](#) on page 74.

**3. Extend the server into the maintenance position.**

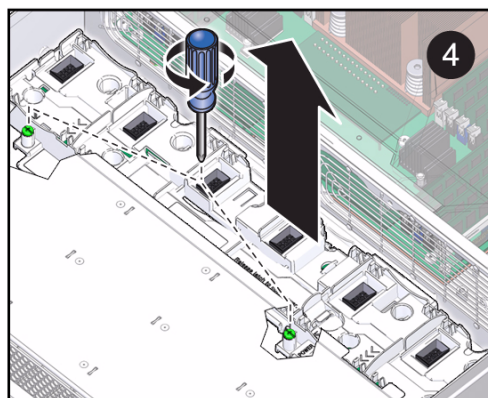
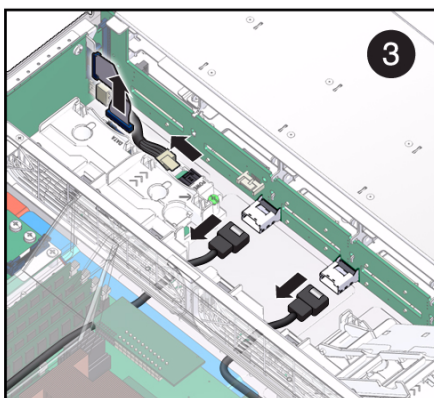
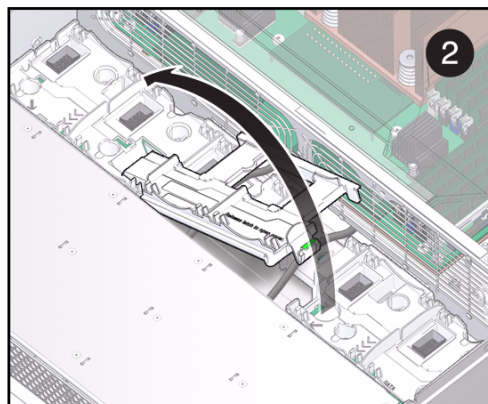
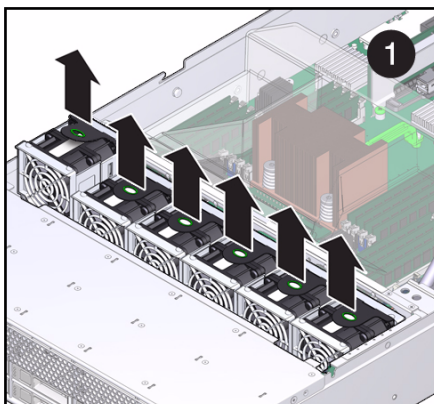
See [“Extend the Server”](#) on page 75.

**4. Attach an antistatic wrist strap.**

**5. Remove the top cover.**

See [“Remove the Top Cover”](#) on page 80.

**6. Remove all the fan modules as shown in panel 1.**



7. Release the latch that's in the middle of the fan power board assembly and swing open the access door, as shown in panel 2.
8. Disconnect the SAS and SATA data cables from their respective connectors on the disk backplane and move them out of the way, as shown in panel 3.

---

**Caution** – Carefully fold the cables back over the mid-wall so that they are as clear as possible of the fan power board area. It is important to minimize the risk of damaging them when you lift the fan power board assembly out of the fan compartment.

---

9. Disconnect the power and data cables from the fan power board, as shown in panel 3.
10. Loosen the two captive screws that secure the fan power board to the chassis, as shown in panel 4.

11. Slide the fan power board toward the front of the chassis and then lift it up and out.

### Related Information

- [“Install the Fan Power Board” on page 176](#)

---

## ▼ Install the Fan Power Board

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Customer” on page 70](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

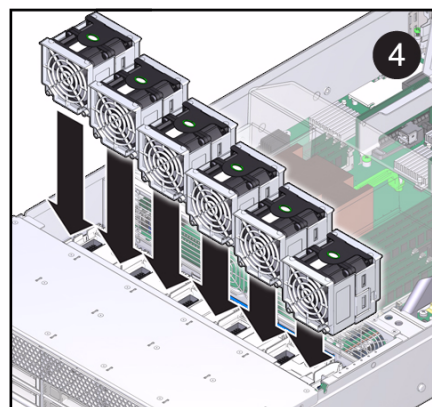
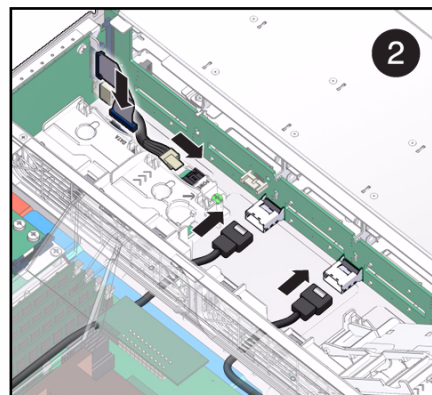
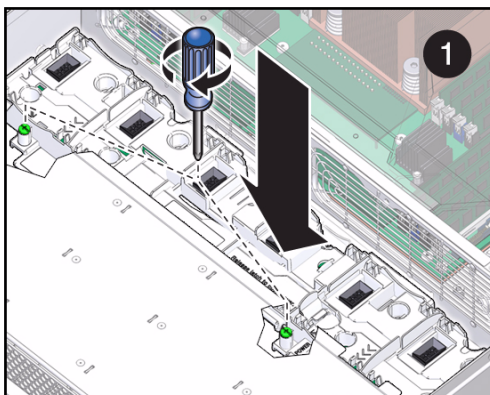
### 1. Clear all cables out of the fan module compartment.

These include the SAS and SATA cables that come in from the motherboard compartment and the power and signal cables that are connected to the connector board.

### 2. Lower the fan power board assembly into the fan compartment and slide it toward the rear of the server.

Keep the access door open during this step so the way is clear for laying the SAS and SATA data cables back across the fan power board's cable gutter.





3. Tighten the two captive screws to secure the board to the chassis, as shown in panel 1.
4. Connect the power and data cables that come from the connector board, as shown in panel 2.
5. Connect the SAS and SATA data cables to their respective connectors on the disk backplane, as shown in panel 2.
6. Close the fan power board access door, as shown in panel 3.
7. Install the fan modules as shown in panel 4.
8. Install the top cover.
9. Return the server to the rack.  
See [“Reinstall the Server in the Rack”](#) on page 216.
10. Slide the server into the rack.  
See [“Return the Server to the Normal Rack Position”](#) on page 217.

**11. Connect the power cords.**

See [“Reconnect the Power Cords”](#) on page 218.

**12. Power on the system.**

See [“Power On the Server \(start /SYS Command\)”](#) on page 218 or [“Power On the Server \(Power Button\)”](#) on page 218.

**Related Information**

- [“Remove the Fan Power Board”](#) on page 173

# Servicing the System Configuration PROM

---

The following topics describe how to remove, replace, and verify the System Configuration PROM:

- [“System Configuration PROM Overview” on page 179](#)
- [“Remove the System Configuration PROM” on page 180](#)
- [“Install the System Configuration PROM” on page 181](#)
- [“Verify the System Configuration PROM” on page 185](#)

---

## System Configuration PROM Overview

The System Configuration PROM stores the host ID and MAC address.

If you have to replace the motherboard, be sure to move the System Configuration PROM from the old motherboard to the new motherboard. This step will ensure that the server will retain its original host ID and MAC address.

### **Related Information**

- [“Remove the System Configuration PROM” on page 180](#)
- [“Install the System Configuration PROM” on page 181](#)
- [“Verify the System Configuration PROM” on page 185](#)

---

## ▼ Remove the System Configuration PROM

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

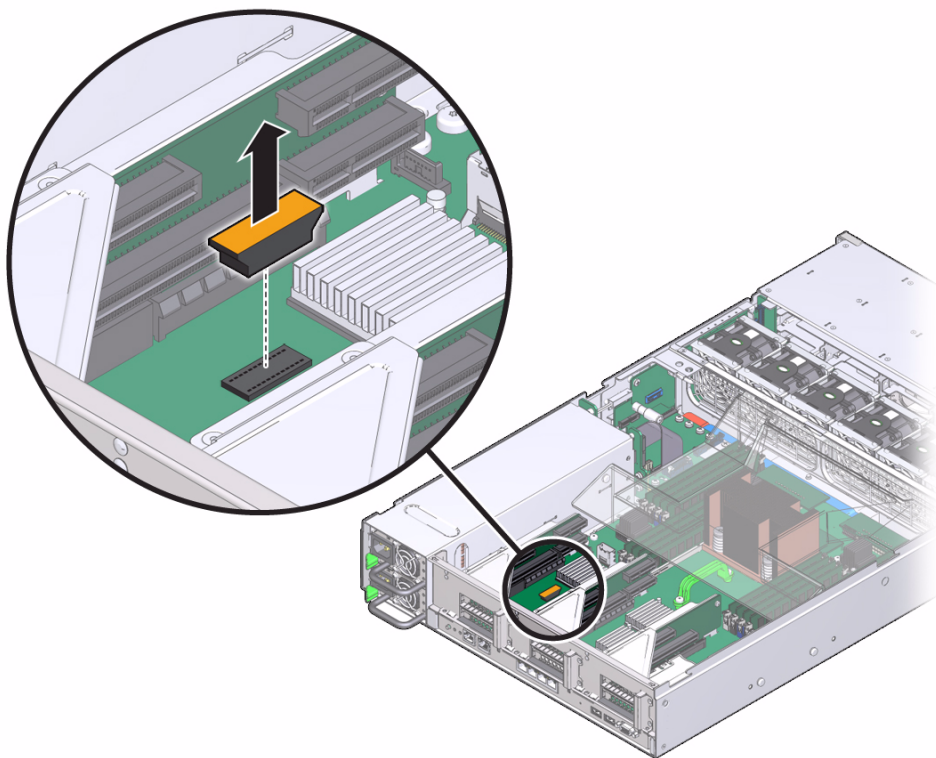
---

---

**Note** – The System Configuration PROM is plugged into a socket on the motherboard. It includes a yellow barcode label.

---

1. **Perform the preliminary steps required for cold service procedures.**  
See [“Cold Service, Replaceable by Customer” on page 70](#) for instructions.
2. **Extend the server out of the rack.**  
See [“Extend the Server” on page 75](#).
3. **If you can access the rear area of the server without removing the server from the rack, go to Step 4, otherwise remove the server from the rack:**
  - Unplug all cables from the server.
  - [“Remove the Server From the Rack” on page 77](#)
4. **Remove the top cover.**  
See [“Remove the Top Cover” on page 80](#).
5. **Pull up on the System Configuration PROM to remove it from its socket.**  
The System Configuration PROM has a yellow barcode label on it.



#### Related Information

- [“Install the System Configuration PROM” on page 181](#)
- [“Verify the System Configuration PROM” on page 185](#)

---

## ▼ Install the System Configuration PROM

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

**1. Perform the preliminary steps required for cold service procedures.**

See [“Cold Service, Replaceable by Customer”](#) on page 70 for instructions.

**2. Extend the server out of the rack.**

See [“Extend the Server”](#) on page 75.

**3. If you can access the rear area of the server without removing the server from the rack, go to [Step 5](#), otherwise remove the server from the rack.**

See [“Remove the Server From the Rack”](#) on page 77.

**4. Unplug all cables from the server.**

**5. Remove the top cover.**

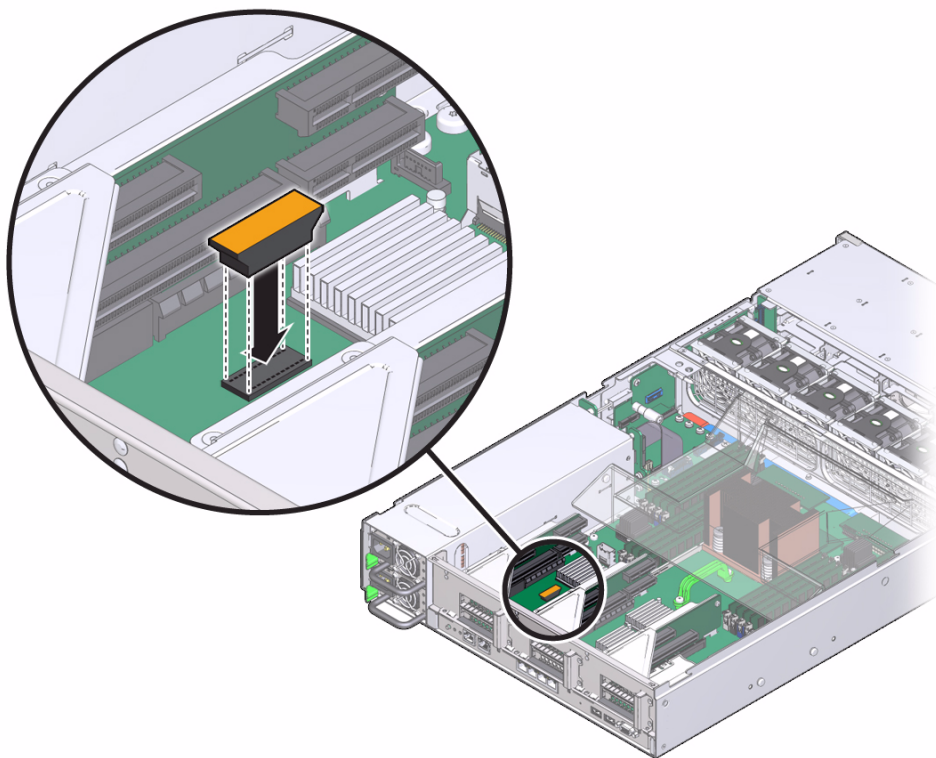
See [“Remove the Top Cover”](#) on page 80.

**6. Align the System Configuration PROM with the socket on the motherboard.**

The notch on the underside of the System Configuration PROM faces the rear of the server.

**7. Plug the System Configuration PROM into the socket.**

Gently press down on the center of the System Configuration PROM to ensure that it is fully seated.



**8. Install the top cover.**

See “Replace the Top Cover” on page 215.

**9. Return the server to its operational position in the rack.**

See “Return the Server to the Normal Rack Position” on page 217.

**10. Restore power to the server.**

See “Power On the Server (start /SYS Command)” on page 218 or “Power On the Server (Power Button)” on page 218.

---

**Note** – As the system boots up, watch for the banner display in the console output.

---

**11. Verify that the banner display includes an Ethernet address, and Host ID value.**

The Ethernet address and Host ID values are read from the System Configuration PROM. Their presence in the banner verifies that the SP and the host can read the System Configuration PROM.

```
.  
.   
.   
SPARC T4-1, No Keyboard  
.   
OpenBoot X.XX, 16256 MB memory available, Serial  
#87304604.Ethernet address *:**:**:**:**:**, Host ID: *****  
.   
.   
.
```

**12. For additional verification, run specific commands to display data stored in the System Configuration PROM.**

- Use the Oracle ILOM show command to display the MAC address:

```
-> show /HOST macaddress  
/HOST  
Properties:  
macaddress = *:**:**:**:**:**
```

- Use Oracle Solaris OS commands to display the hostid and Ethernet address:

```
# hostid  
8534299c  
  
# ifconfig -a  
lo0: flags=2001000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4,VIRTUAL> mtu 8232  
index 1  
    inet 127.0.0.1 netmask ff000000  
igb0: flags=201004843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 2  
    inet 10.6.88.150 netmask fffffe00 broadcast 10.6.89.255  
    ether *:**:**:**:**:**
```

**Related Information**

- [“Remove the System Configuration PROM” on page 180](#)
- [“Verify the System Configuration PROM” on page 185](#)



---

## ▼ Verify the System Configuration PROM

The steps described below can be performed whenever you want to verify that the System Configuration PROM can be read by the SP and by the host.

### 1. Power cycle the host and, it boots up, watch for the banner display.

The Ethernet address and Host ID values are read from the System Configuration PROM. This verifies that the Oracle ILOM and the host can read the System Configuration PROM.

```
.  
.   
.   
SPARC T4-1, No Keyboard  
.   
OpenBoot X.XX, 16256 MB memory available, Serial  
#*****.Ethernet address *:*:*:*:*:*:*, Host ID: *****  
.   
.   
.
```

### 2. For additional verification, run specific commands to display data stored in the System Configuration PROM.

- Use the Oracle ILOM `show` command to display the MAC address:

```
-> show /HOST macaddress  
/HOST  
Properties:  
macaddress = *:*:*:*:*:*:*
```

- Use Oracle Solaris OS commands to display the `hostid` and Ethernet address:

```
# hostid  
8534299c  
  
# ifconfig -a  
lo0: flags=2001000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4,VIRTUAL>  
mtu 8232 index 1  
inet 127.0.0.1 netmask ff000000
```

```
e1000g0: flags=
201004843<UP,BROADCAST,RUNNING,MULTICAST,DHCP,IPv4,CoS> mtu 1500
index 2
    inet 10.6.88.150 netmask fffffffe00 broadcast 10.6.89.255
    ether *:**:**:**:**:**
```

### **Related Information**

- [“Remove the System Configuration PROM” on page 180](#)
- [“Install the System Configuration PROM” on page 181](#)

# Servicing the HDD Cage

---

These topics explain how to remove and install the hard drive cage.

- [“Hard Drive Cage Overview” on page 187](#)
- [“Remove the Hard Drive Cage” on page 187](#)
- [“Install the Hard Drive Cage” on page 190](#)

---

## Hard Drive Cage Overview

The hard drive cage is not a field-replaceable unit (FRU). However, the hard drive cage must be removed when servicing either of the following components:

- Disk backplane
- Right and left light pipe assemblies

### Related Information

- [“Remove the Hard Drive Cage” on page 187](#)
- [“Install the Hard Drive Cage” on page 190](#)

---

## ▼ Remove the Hard Drive Cage

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

---

**Note** – You must remove the hard drive cage in order to remove the disk backplane or the front panel light pipe assemblies.

---

**1. Perform the preliminary steps required for cold service procedures.**

See [“Cold Service, Replaceable by Customer”](#) on page 70 for instructions.

**2. Disconnect all external cables.**

**3. Remove the server from the rack. Place the server on a hard, flat surface.**

See [“Remove the Server From the Rack”](#) on page 77.

**4. Attach an antistatic wrist strap.**

**5. Remove the top cover.**

See [“Remove the Top Cover”](#) on page 80.

**6. Remove all hard drives and the DVD/USB.**

See [“Remove a Hard Drive”](#) on page 108 and [“Remove the DVD/USB Assembly”](#) on page 116.

---

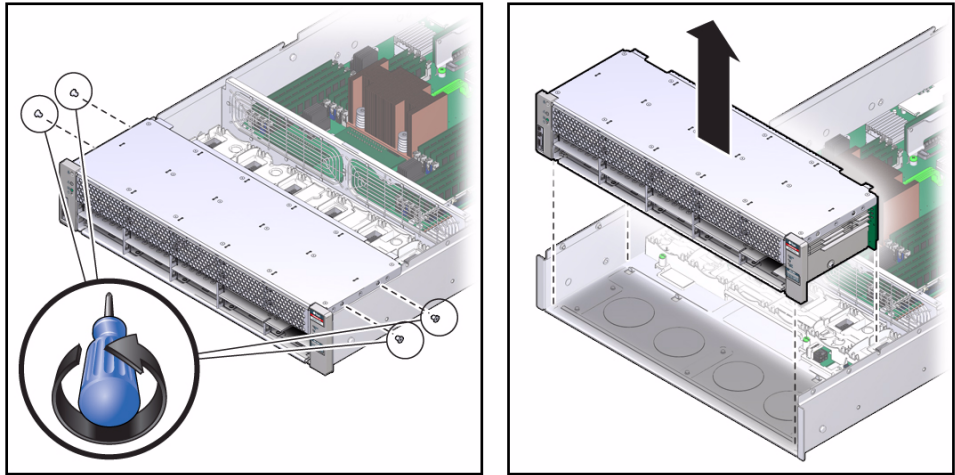
**Note** – Make a note of the drive locations before removing them. You will need to install the hard drives in the same locations when reassembling the system.

---

**7. Remove the No. 2 Phillips screws that secure the hard drive cage to the chassis.**

Two screws secure the disk cage to each side of the chassis. See panels 1 and 2 in the following figure.

**FIGURE:** Removing a Hard Drive Cage



8. Remove the four center fan modules to provide easier access to the three backplane connectors.
9. Disconnect the three cables from the backplane.
  - a. Deflect the release tab on the fan deck to expose the data cables.
  - b. Make a note of the cable/connector configuration to ensure that the cables will be reconnected to the right connectors.



---

**Caution** – The data cables are delicate. Use great care when sliding the disk cage in or out of the chassis that it does not rub against the cables.

---

10. Slide the hard drive cage forward to disengage the backplane from the connector board.
11. Lift the hard drive cage up and out of the chassis.
12. Set the hard drive cage on an antistatic mat.

#### **Related Information**

- [“Install the Hard Drive Cage” on page 190](#)

## ▼ Install the Hard Drive Cage

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel”](#) on [page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

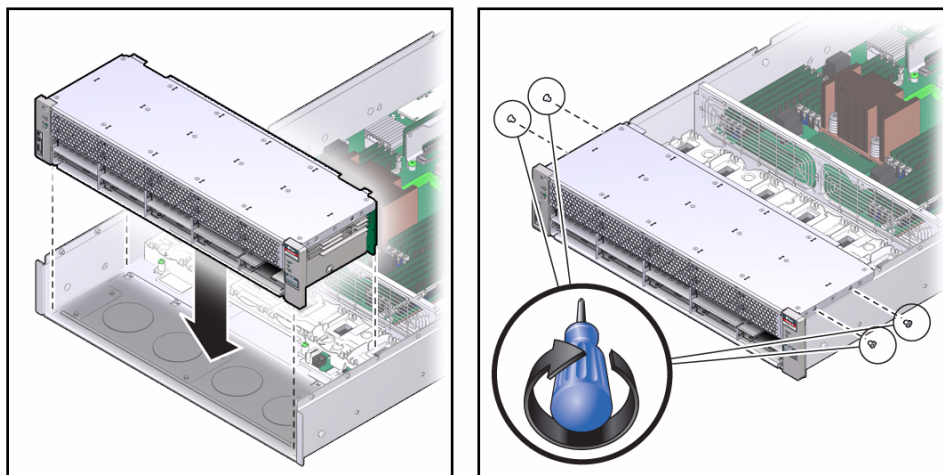
**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

### 1. Position the hard drive cage in the chassis, over the chassis standoffs.

This is shown in the following figure.

**FIGURE:** Installing a Hard Drive Cage





---

**Caution** – The data cables are delicate. Use great care when sliding the disk cage in or out of the chassis that it does not rub against the cables.

---

2. **Slide the hard drive cage back until the hard drive backplane engages with the connector board.**



---

**Caution** – Use care when installing the hard drive cage. Be certain that the hard drive cage is aligned with the base of the chassis before sliding the cage back.

---

3. **Connect the backplane data cables.**

Refer to the note you made when disconnecting the data cables to verify the correct mating of cables to connectors.

4. **Reinstall the No. 2 Phillips screws that secure the hard drive cage to the chassis.**

Two screws secure the disk cage to each side of the chassis.

5. **Install the top cover.**

See [“Replace the Top Cover” on page 215.](#)

6. **Install the server into the rack.**

See [“Reinstall the Server in the Rack” on page 216.](#)

7. **Install the hard drives in the same locations as they occupied before the replacement.**

See [“Install a Hard Drive” on page 110.](#)

8. **Install the DVD/USB module.**

See [“Install the DVD/USB Assembly” on page 117.](#)

9. **Connect the power cords.**

---

**Note** – As soon as the power cords are connected, standby power is applied. Depending on how the firmware is configured, the system might boot at this time.

---

10. **Power on the system.**

See [“Power On the Server \(start /SYS Command\)” on page 218.](#)

### **Related Information**

- [“Remove the Hard Drive Cage” on page 187](#)





# Servicing the HDD Backplane

---

These topics explain how to remove and install the disk backplane.

- [“Hard Drive Backplane Overview” on page 193](#)
- [“Remove the Hard Drive Backplane” on page 193](#)
- [“Install the Hard Drive Backplane” on page 196](#)

---

## Hard Drive Backplane Overview

The hard drive backplane is housed in the hard drive cage. It provides data and control signal connectors for the hard drives. It also provides the interconnect for the front I/O board, power and locator buttons, and system/component status LEDs.

---

**Note** – Each drive has its own Power/Activity, Fault, and Ready-to-Remove LEDs.

---

### Related Information

- [“Remove the Hard Drive Backplane” on page 193](#)
- [“Install the Hard Drive Backplane” on page 196](#)

---

## ▼ Remove the Hard Drive Backplane

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

---

**Note** – You must remove the hard drive cage in order to remove the disk backplane. See [“Remove the Hard Drive Cage”](#) on page 187.

---

**1. Perform the preliminary steps required for cold service procedures.**

See [“Cold Service, Replaceable by Customer”](#) on page 70 for instructions.

**2. Remove the server from the rack.**

See [“Remove the Server From the Rack”](#) on page 77.

**3. Remove the top cover.**

See [“Remove the Top Cover”](#) on page 80.

**4. Remove the hard drive cage.**

See [“Remove the Hard Drive Cage”](#) on page 187.

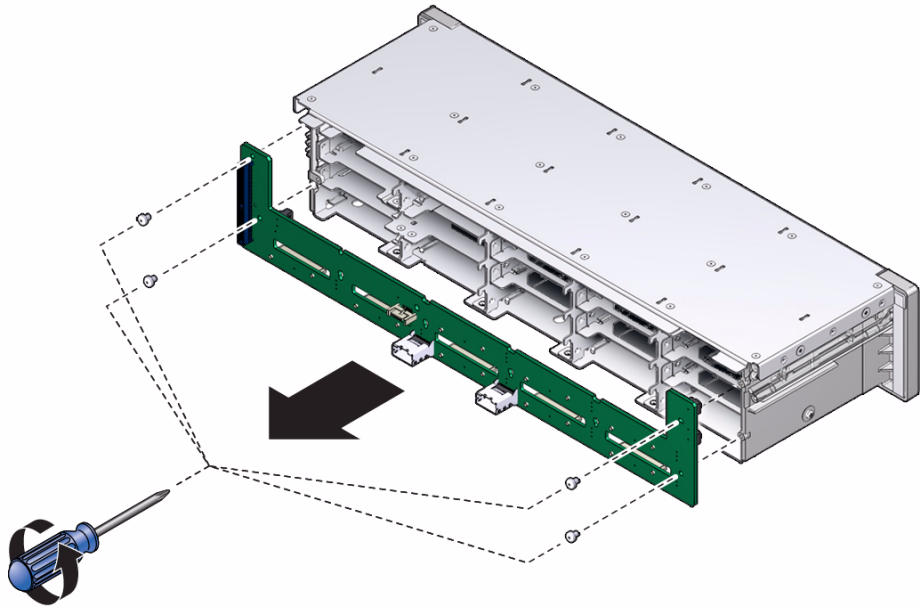
**5. Remove the four No. 2 Phillips screws securing the backplane to the hard drive cage.**

---

**Tip** – Place the hard drive cage upright on its front face for easier access to the backplane screws.

---

**FIGURE:** Removing a Hard Drive Backplane

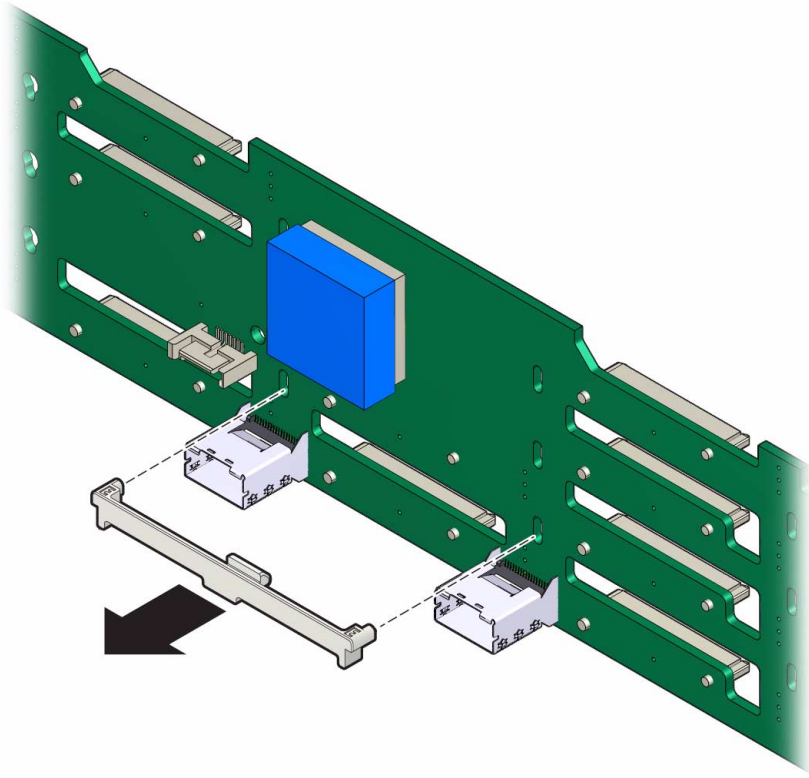


6. Remove the plastic backplane retention bracket from the backplane and set it aside for use when installing the backplane.

---

**Tip** – Make note of how the alignment clip is installed so you can position it properly when installing the backplane.

---



7. Slide the backplane down and off the hard drive cage retention hooks.
8. Place the hard drive backplane on an antistatic mat.

#### Related Information

- [“Install the Hard Drive Backplane” on page 196](#)

---

## ▼ Install the Hard Drive Backplane

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

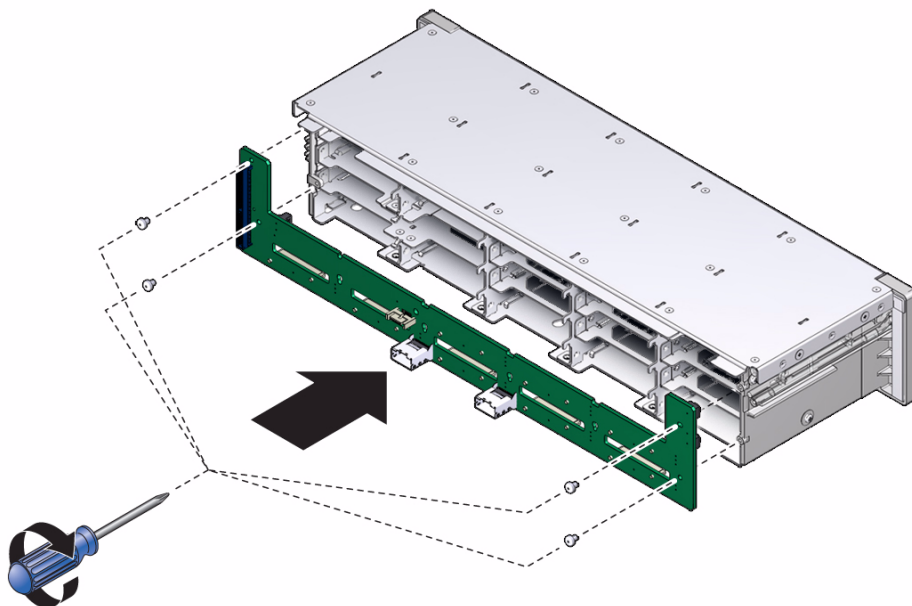
1. Slide the backplane under the retention hooks on the hard drive cage.
2. Install the four No. 2 Phillips screws and tighten just enough to hold the backplane against the hard drive cage.

---

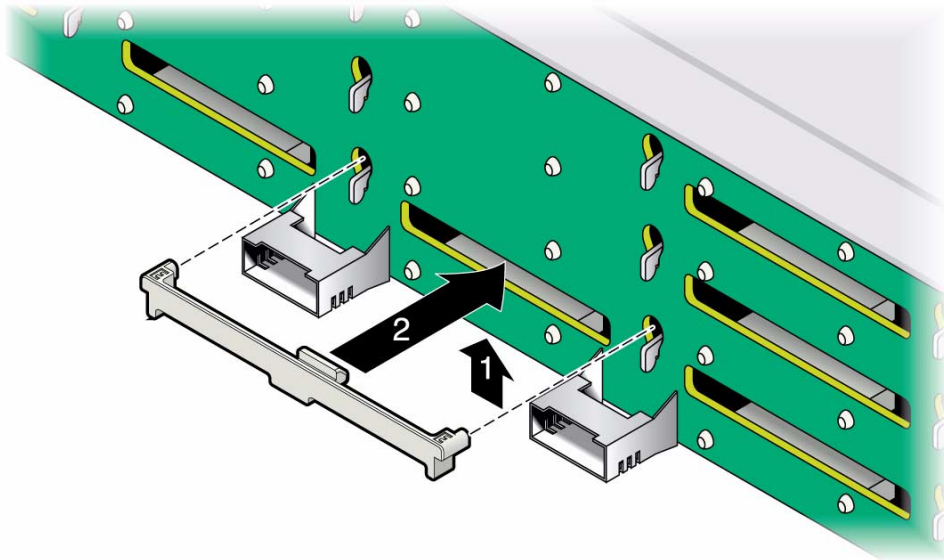
**Tip** – You will complete the alignment of the backplane in the next step, so the screws cannot be too tight during that step.

---

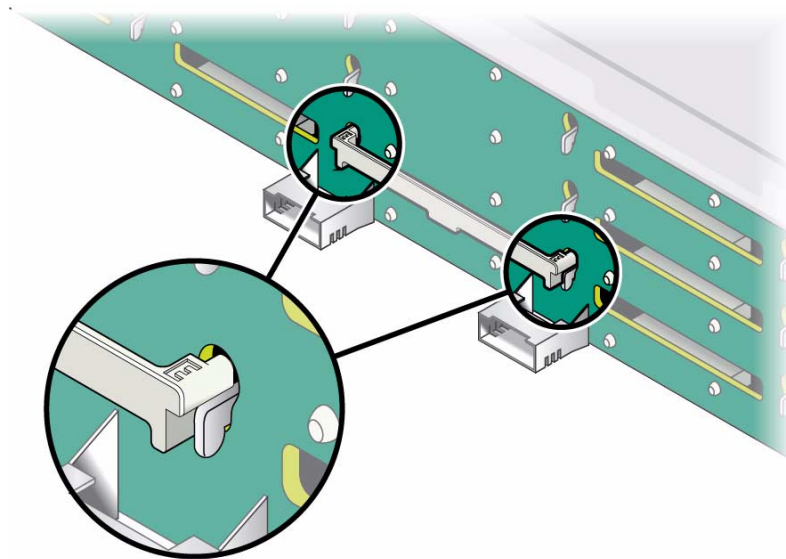
**FIGURE:** Installing a Hard Drive Backplane



3. With the backplane attached to the disk cage, push up against the bottom edge of the backplane and insert the retention bracket.



4. While keeping upward pressure on the backplane, press the retention bracket against the backplane, with the pins in line with the slots just above the hooks.



5. Complete tightening the four screws that secure the backplane to the disk cage.

**6. Install the hard drive cage.**

See [“Install the Hard Drive Cage”](#) on page 190.

**Related Information**

- [“Remove the Hard Drive Backplane”](#) on page 193





# Servicing the Front Panel Light Pipe Assemblies

---

These topics explain how to remove and install front control panel light pipe assemblies.

- [“Front Panel Light Pipe Assemblies Overview” on page 201](#)
- [“Remove the Front Panel Light Pipe Assembly \(Right or Left\)” on page 202](#)
- [“Install the Front Panel Light Pipe Assembly \(Right or Left\)” on page 204](#)

---

## Front Panel Light Pipe Assemblies Overview

The front control panel light pipe assemblies are mounted on each side of the hard drive cage. You must remove the hard drive cage to access the screws that attach the light pipe assemblies to the hard drive cage.

### **Related Information**

- [“Remove the Front Panel Light Pipe Assembly \(Right or Left\)” on page 202](#)
- [“Install the Front Panel Light Pipe Assembly \(Right or Left\)” on page 204](#)

---

## ▼ Remove the Front Panel Light Pipe Assembly (Right or Left)

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

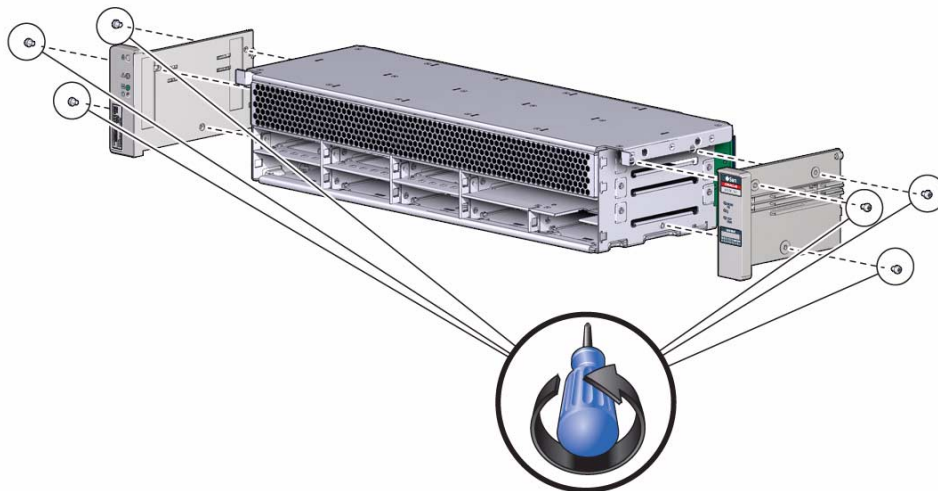
---

### 1. Remove the hard drive cage.

See [“Remove the Hard Drive Cage” on page 187](#).

### 2. Remove the three screws that secure the left or right light pipe assembly mounting plate to the hard drive cage.

This step is identical for both left and right assemblies.



The next steps depend on whether you are removing the right or left light pipe assembly.

- For the right light pipe assembly, go to [Step 3](#).
- For the left light pipe assembly, go to [Step 4](#)

**3. Remove the *right* light pipe assembly from its metal plate.**

This light pipe assembly is secured by two small hook-shaped clips that fit through holes in the metal plate and grip the other side of the plate. Two locator pins close to the front of the light pipe assembly help align the light pipes with the holes in the front panel flange.

- a. Use your thumb and index finger to grasp the light pipes near the two locator pins and gently bend the light pipes away from the mounting plate. Pull them just far enough to disengage the two hook-shaped clips from the slots.
- b. When the clips release their hold on the plate, remove the light pipe assembly from the metal plate.

**4. Remove the *left* light pipe assembly from its metal plate.**

This light pipe assembly is secured by two small hook-shaped clips that fit through a pair of rectangular holes in the metal plate. These holes are to the left of a curved plastic spring. The hooks grip the plate through a corresponding pair of smaller holes to the right.

---

**Note** – The curved plastic spring partially covers the hole used by the hook on the upper clip. This reduces access to the upper hook.

---

- a. Using the tip of a pointed object, such as the end of a paper clip or a stylus, push the hook end of the lower clip out of its hole. This is the hole that is *not* covered by the curved plastic spring.

---

**Tip** – If possible, leave this pointed object in the lower hole to prevent the hook from sliding back in and use a different tool for the upper hook.

---

- b. Repeat [Step a](#) for the upper hook.
- c. When both clip hooks are out of their holes, slide the light pipe assembly toward the rear of the metal plate and remove it.

#### Related Information

- [“Install the Front Panel Light Pipe Assembly \(Right or Left\)” on page 204](#)

---

## ▼ Install the Front Panel Light Pipe Assembly (Right or Left)

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

---

**Note** – The following steps apply to both right and left light pipe assemblies.

---

1. Align the individual light pipes with the corresponding holes in the front panel flange.
2. Lay the light pipe assembly on the metal mounting plate with its attachment hooks inserted into the corresponding holes in the plate.

---

**Note** – The two locator pins will not line up with their holes until the next step.

---

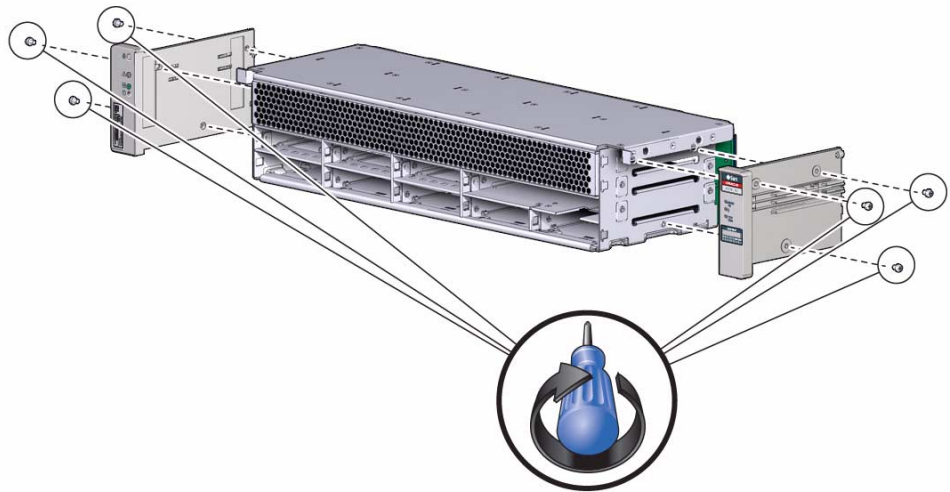
3. Slide the assembly forward until the attachment hooks and locator pins are fully engaged.

---

**Tip** – Verify that the tip of each light pipe is flush with the front surface of the flange. This is a sign that the assembly is properly installed on the mounting plate.

---

4. Align the screw holes in the metal mounting plate with the holes on the side of the hard drive cage.



5. Secure the light pipe assembly with the three screws.
6. Install the hard drive cage.

See “Install the Hard Drive Cage” on page 190.

### Related Information

- “Remove the Front Panel Light Pipe Assembly (Right or Left)” on page 202



# Servicing the Motherboard Assembly

---

These topics explain how to remove and install the motherboard assembly.

- [“Motherboard Servicing Overview” on page 207](#)
- [“Remove the Motherboard Assembly” on page 208](#)
- [“Install the Motherboard Assembly” on page 211](#)

---

## Motherboard Servicing Overview

The motherboard assembly must be removed in order to access the following components:

- Power supply backplane
- Power distribution board
- Connector board

---

**Note** – The server must be removed from the rack for this procedure.

---



---

**Caution** – The server is heavy. Two people are required to remove it from the rack.

---

If you replace the motherboard, remove and transfer the service processor and System Configuration PROM from the old board to the new. This will preserve system-specific information that is stored on these modules. The SP contains system configuration data used by Oracle ILOM and the System Configuration PROM contains the system host ID and MAC address.

System firmware consists of both service processor and host components. The service processor component is located on the SP and the host component is located on the CPU. These two components must be compatible. When the motherboard is replaced, the host firmware component on the new motherboard may be incompatible with the

SP firmware component on the service processor that was transferred to the new motherboard. In this case, the system firmware must be loaded as described in [“Install the Motherboard Assembly” on page 211](#).

### Related Information

- [“Remove the Motherboard Assembly” on page 208](#)
- [“Install the Motherboard Assembly” on page 211](#)

---

## ▼ Remove the Motherboard Assembly

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

---

1. **Stop the Oracle Solaris OS to get the OBP prompt.**
2. **Run the `printenv` command and make a note of any OBP variables that have been modified.**
3. **Power off the server.**  
[See “Removing Power From the System” on page 72.](#)
4. **Remove the server from the rack.**  
[See “Remove the Server From the Rack” on page 77.](#)
5. **Attach an antistatic wrist strap.**



**6. Remove the top cover.**

See [“Remove the Top Cover”](#) on page 80.

**7. Swing the air duct up and forward to the fully open position.**

**8. Remove all PCIe/XAUI riser assemblies.**

See [“Remove a PCIe or PCIe/XAUI Riser”](#) on page 143.

---

**Note** – Note which PCIe/XAUI slots the cards occupy.

---

---

**Note** – If riser 0 contains a SAS PCIe RAID HBA card, disconnect the data cables from the card.

---

**9. Disconnect the motherboard end of the two ribbon cables and move them out of the way of the motherboard removal.**

**10. Disconnect the motherboard end of the three backplane cables and move them out of the way of the motherboard removal.**

---

**Note** – If riser 0 contains a SAS PCIe RAID HBA card, there will only be the SATA DVD data cable connected to the motherboard.

---



---

**Caution** – The hard drive data cables are delicate. Ensure they are safely out of the way when servicing the motherboard.

---

**11. If you are replacing the motherboard, remove the following components:**

- All DIMMs. Record the memory configuration so that you can recreate it on the new motherboard.
- System configuration PROM.
- Service processor.

**12. Using a No. 2 Phillips screwdriver, remove the four screws that secure the motherboard assembly to the bus bar.**



---

**Caution** – Use care when removing the bus bar screws to avoid touching a heat sink, which can be dangerously hot.

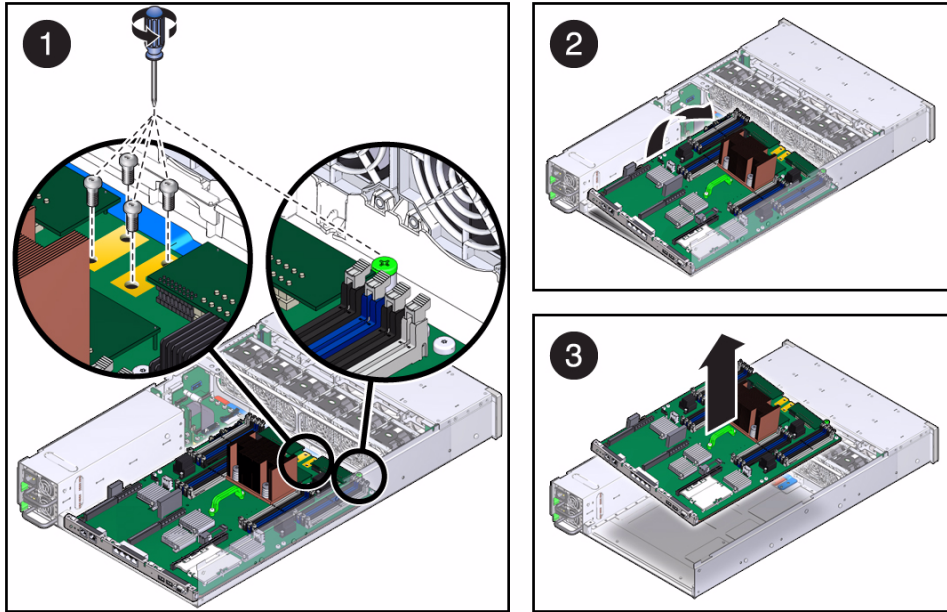
---

---

**Note** – Set the four screws aside. You must use these screws to attach the motherboard to the bus bar during installation.

---

**13. Loosen the captive screw securing the motherboard to the chassis.**



**14. Using the green handle, slide the motherboard toward the rear of the system approximately 1 cm (less than 1/2 inch).**

---

**Tip** – Note the metal tab projecting into the motherboard compartment from the rear, right corner of the chassis. In the next step, use care to avoid having this tab interfere with the removal of the motherboard.

---

**15. Angle the motherboard up and lift out of the chassis (as shown in the figure).**

**16. Place the motherboard assembly on an antistatic mat.**

**Related Information**

- [“Install the Motherboard Assembly” on page 211](#)

---

## ▼ Install the Motherboard Assembly

---

**Note** – This is a cold service procedure that must be performed by qualified service personnel. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 72](#) for more information about this category of service procedures.

---



---

**Caution** – The server must be fully shut down and the power cords disconnected.

---



---

**Caution** – This procedure involves handling circuit boards that are extremely sensitive to static electricity. Ensure that you follow ESD preventative practices to avoid damaging the circuit boards.

---



---

**Caution** – Components inside the chassis might be hot. Use caution when servicing components inside the chassis.

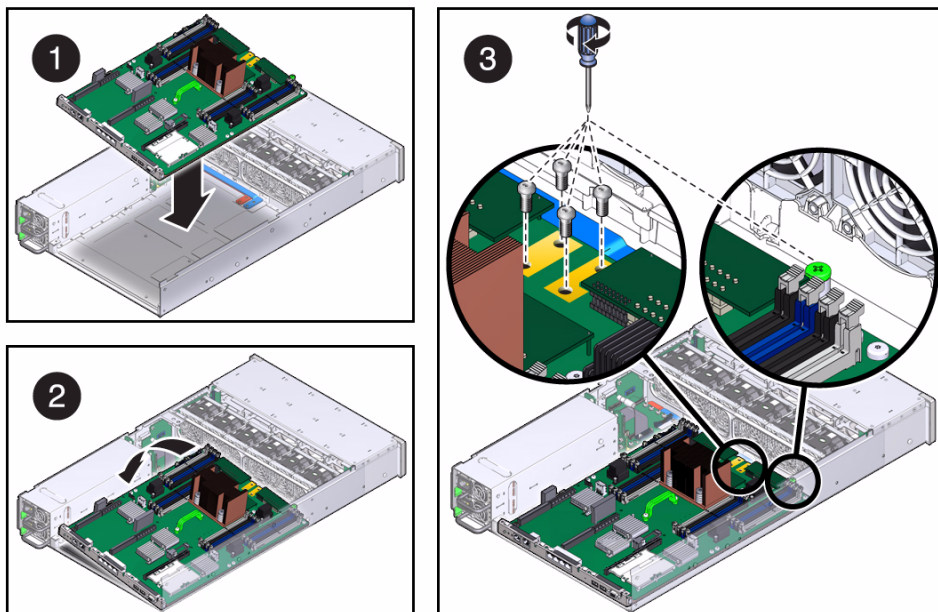
---

1. Tilt the motherboard assembly to position it into the chassis.

---

**Tip** – Note the metal tab projecting into the motherboard compartment from the rear, right corner of the chassis. In the next step, use care to avoid having this tab interfere with the installation of the motherboard.

---



2. Hold the green handle and the back edge of the motherboard and lower it down into the chassis.
3. Slide the motherboard forward until it is aligned with the bus bar screw holes and the captive screw.
4. Tighten the captive screw that secures the motherboard.
5. Using a No. 2 Phillips screwdriver, install the four bus bar screws and tighten them until the motherboard is securely fastened to the bus bar.

---

**Note** – Be certain to use the correct screws to attach the motherboard to the bus bar. Ordinarily, these would be the bus bar screws that were removed as part of the motherboard removal procedure.

---

6. If you are installing a new motherboard, install the following components:
  - All DIMMs removed from the previous motherboard. Ensure that the DIMM modules are installed in the same memory configuration as they were in previously.  
See “DIMM Population Rules” on page 84.
  - System configuration PROM.
  - Service processor.
  - Internal USB drive (if used).

7. Connect the three backplane cables that were disconnected earlier.
8. Connect the two ribbon cables that were disconnected earlier.
9. Reinstall the PCIe and PCIe/XUAI risers.  
See [“Install a PCIe or PCIe/XAUI Riser” on page 145.](#)

---

**Note** – If any internal HBA card is present, reconnect all internal cables that were disconnected earlier.

---

10. Install the top cover.  
See [“Replace the Top Cover” on page 215.](#)
11. Install the server into the rack.  
See [“Reinstall the Server in the Rack” on page 216.](#)
12. Attach the power cables.  
See [“Reconnect the Power Cords” on page 218.](#)
13. Connect a terminal or a terminal emulator (PC or workstation) to the SP SER MGT port.  
If the SP detects that the new host firmware component is incompatible with SP firmware component, further action will be suspended and the following message will be delivered over the SER MGT port.

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.

If you see this message, go on to [Step 14.](#)

14. Download the system firmware.
  - a. If needed, configure the SP's network port to enable the firmware image to be downloaded.  
Refer to the Oracle ILOM documentation for network configuration instructions.
  - b. 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 revision that had been installed prior to the replacement of the motherboard.

---

#### **15. Power on the server.**

See “Power On the Server (start /SYS Command)” on page 218 or “Power On the Server (Power Button)” on page 218.

#### **Related Information**

- “Remove the Motherboard Assembly” on page 208

# Returning the Server to Operation

These topics explain how to return the server to operation after you have performed service procedures.

- “Replace the Top Cover” on page 215
- “Reinstall the Server in the Rack” on page 216
- “Return the Server to the Normal Rack Position” on page 217
- “Reconnect the Power Cords” on page 218
- “Power On the Server (start /SYS Command)” on page 218
- “Power On the Server (Power Button)” on page 218

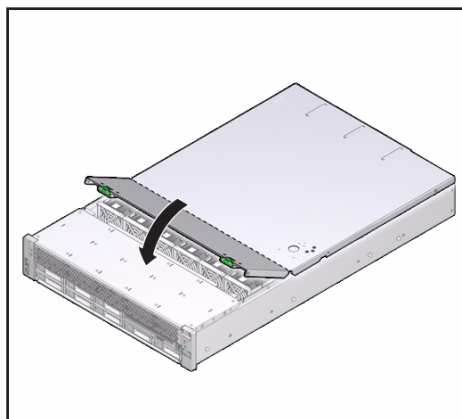
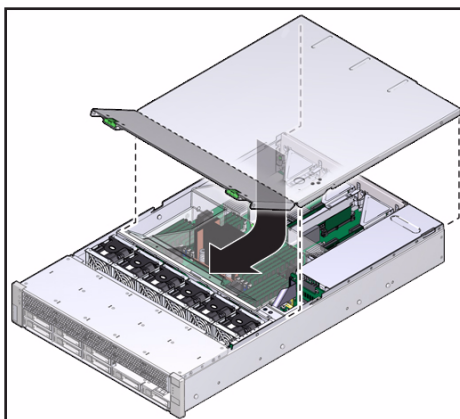
---

## ▼ Replace the Top Cover

### 1. Place the top cover on the chassis.

Set the cover down so that it hangs over the rear of the server by about an inch (25.4 mm).

### 2. Slide the top cover forward until it seats.



---

**Note** – If an emergency shutdown occurred when the top cover was removed, you must install the top cover and use the `poweron` command to restart the system. See [“Power On the Server \(start /SYS Command\)” on page 218](#) for more information about the `poweron` command.

---

#### Related Information

- [“Power On the Server \(start /SYS Command\)” on page 218](#)

---

## ▼ Reinstall the Server in the Rack

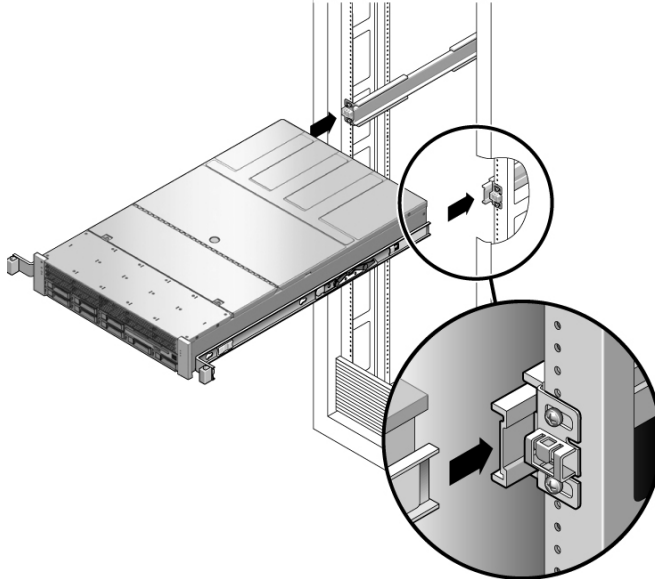


---

**Caution** – The chassis is heavy. To avoid personal injury, use two people to lift it and set it in the rack.

---

1. Place the ends of the chassis mounting brackets into the slide rails.



2. Slide the server into the rack until the brackets lock into place.

The server is now in the extended maintenance position.



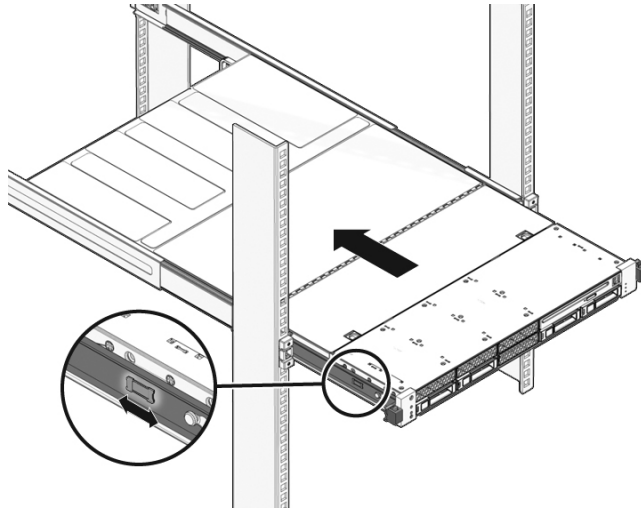
### Related Information

- [“Return the Server to the Normal Rack Position” on page 217](#)

---

## ▼ Return the Server to the Normal Rack Position

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 back of the server.  
If the CMA is in the way, disconnect the left CMA release and swing the CMA open.
4. Reconnect the CMA.  
Swing the CMA closed and latch it to the left rack rail.

### Related Information

- [“Reinstall the Server in the Rack” on page 216](#)

---

## ▼ Reconnect the Power Cords

- Reconnect the power cords to the power supplies.

---

**Note** – As soon as the power cords are connected, standby power is applied. Depending on how the firmware is configured, the system might boot at this time.

---

### Related Information

- [“Power On the Server \(start /SYS Command\)” on page 218](#)
- [“Power On the Server \(Power Button\)” on page 218](#)

---

## ▼ Power On the Server (start /SYS Command)

---

**Note** – If you are powering on the server following an emergency shutdown that was triggered by the top cover interlock switch, you must use `start /SYS`.

---

- Type `start /SYS` at the SP prompt:

```
-> start /SYS
```

### Related Information

- [“Power On the Server \(Power Button\)” on page 218](#)

---

## ▼ Power On the Server (Power Button)

- Momentarily press and release Power button on the front panel.  
Use a pointed object, such as a pen or stylus, to reach the recessed button.

### **Related Information**

- [“Power On the Server \(start /SYS Command\)” on page 218](#)



# Glossary

---

---

## A

<b>ANSI SIS</b>	American National Standards Institute Status Indicator Standard.
<b>ASF</b>	Alert standard format (Netra products only).
<b>ASR</b>	Automatic system recovery.
<b>AWG</b>	American wire gauge.

---

## B

<b>blade</b>	Generic term for server modules and storage modules. See <i>server module</i> and <i>storage module</i> .
<b>blade server</b>	Server module. See <i>server module</i> .
<b>BMC</b>	Baseboard management controller.
<b>BOB</b>	Memory buffer on board.

---

## C

<b>chassis</b>	For servers, refers to the server enclosure. For server modules, refers to the modular system enclosure.
<b>CMA</b>	Cable management arm.

<b>CMM</b>	Chassis monitoring module. The CMM is the service processor in the modular system. Oracle ILOM runs on the CMM, providing lights out management of the components in the modular system chassis. <i>See <a href="#">Modular system</a> and <a href="#">Oracle ILOM</a>.</i>
<b>CMM Oracle ILOM</b>	Oracle ILOM that runs on the CMM. <i>See <a href="#">Oracle ILOM</a>.</i>
<b>CMP</b>	Chip multiprocessor.

---

## D

<b>DHCP</b>	Dynamic Host Configuration Protocol.
<b>disk module or disk blade</b>	Interchangeable terms for storage module. <i>See <a href="#">storage module</a>.</i>
<b>DTE</b>	Data terminal equipment.

---

## E

<b>EIA</b>	Electronics Industries Alliance.
<b>ESD</b>	Electrostatic discharge.

---

## F

<b>FEM</b>	Fabric expansion module. FEMs enable server modules to use the 10GbE connections provided by certain NEMs. <i>See <a href="#">NEM</a>.</i>
<b>FRU</b>	Field-replaceable unit.

---

## H

<b>HBA</b>	Host bus adapter.
------------	-------------------

**host** The part of the server or server module with the CPU and other hardware that runs the Oracle Solaris OS and other applications. The term *host* is used to distinguish the primary computer from the SP. See [SP](#).

---

## I

**ID PROM** Chip that contains system information for the server or server module.

**IP** Internet Protocol.

---

## K

**KVM** Keyboard, video, mouse. Refers to using a switch to enable sharing of one keyboard, one display, and one mouse with more than one computer.

---

## L

**LwA** Sound power level.

---

## M

**MAC** Machine access code.

**MAC address** Media access controller address.

**Modular system** The rackmountable chassis that holds server modules, storage modules, NEMs, and PCI EMs. The modular system provides Oracle ILOM through its CMM.

**MSGID** Message identifier.

---

## N

<b>name space</b>	Top-level Oracle ILOM CMM target.
<b>NEBS</b>	Network Equipment-Building System (Netra products only).
<b>NEM</b>	Network express module. NEMs provide 10/100/1000 Mbps Ethernet, 10GbE Ethernet ports, and SAS connectivity to storage modules.
<b>NET MGT</b>	Network management port. An Ethernet port on the server SP, the server module SP, and the CMM.
<b>NIC</b>	Network interface card or controller.
<b>NMI</b>	Nonmaskable interrupt.

---

## O

<b>OBP</b>	OpenBoot PROM.
<b>Oracle ILOM</b>	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.
<b>Oracle Solaris OS</b>	Oracle Solaris operating system.

---

## P

<b>PCI</b>	Peripheral component interconnect.
<b>PCI EM</b>	PCIe ExpressModule. Modular components that are based on the PCI Express industry-standard form factor and offer I/O features such as Gigabit Ethernet and Fibre Channel.
<b>POST</b>	Power-on self-test.
<b>PROM</b>	Programmable read-only memory.
<b>PSH</b>	Predictive self healing.



---

## Q

**QSFP** Quad small form-factor pluggable.

---

## R

**REM** RAID expansion module. Sometimes referred to as an HBA *See* [HBA](#). Supports the creation of RAID volumes on drives.

---

## S

**SAS** Serial attached SCSI.

**SCC** System configuration chip.

**SER MGT** Serial management port. A serial port on the server SP, the server module SP, and the CMM.

**server module** Modular component that provides the main compute resources (CPU and memory) in a modular system. Server modules might also have onboard storage and connectors that hold REMs and FEMs.

**SP** Service processor. In the server or server module, the SP is a card with its own OS. The SP processes Oracle ILOM commands providing lights out management control of the host. *See* [host](#).

**SSD** Solid-state drive.

**SSH** Secure shell.

**storage module** Modular component that provides computing storage to the server modules.

---

## T

**TIA** Telecommunications Industry Association (Netra products only).

**Tma** Maximum ambient temperature.

---

## U

<b>UCP</b>	Universal connector port.
<b>UI</b>	User interface.
<b>UL</b>	Underwriters Laboratory Inc.
<b>US. NEC</b>	United States National Electrical Code.
<b>UTC</b>	Coordinated Universal Time.
<b>UUID</b>	Universal unique identifier.

---

## W

<b>WWN</b>	World wide name. A unique number that identifies a SAS target.
------------	--

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