

SPARC T4-2 Server

Service Manual



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Using This Documentation

This service manual is for experienced system engineers with experience servicing Oracle's SPARC T4-2 servers. The manual contains detailed instructions for troubleshooting, repairing, and upgrading server components. To use the information in this document, you must have experience working with advanced server technology.

- "Related Documentation" on page xi
- "Feedback" on page xii
- "Support and Accessibility" on page xii

Related Documentation

Documentation	Links
All Oracle products	http://www.oracle.com/documentation
SPARC T4-2 server	http://www.oracle.com/pls/topic/lookup?ctx=SPARCT4-2
Oracle ILOM 3.0	http://www.oracle.com/pls/topic/lookup?ctx=ilom30
Oracle Solaris OS and other systems software	http://www.oracle.com/technetwork/indexes/documentation/index.html#sys_sw
Oracle VTS 7.0	http://www.oracle.com/pls/topic/lookup?ctx=E19719-01

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Provide feedback on this documentation at:

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Support and Accessibility

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

Identifying Components

These topics identify key components of the 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 3](#)
- [“Infrastructure Boards in the Server” on page 4](#)
- [“Internal System Cables” on page 5](#)
- [“Internal Components” on page 6](#)
- [“Exploring Parts of the System” on page 7](#)
- [“System Schematic” on page 12](#)

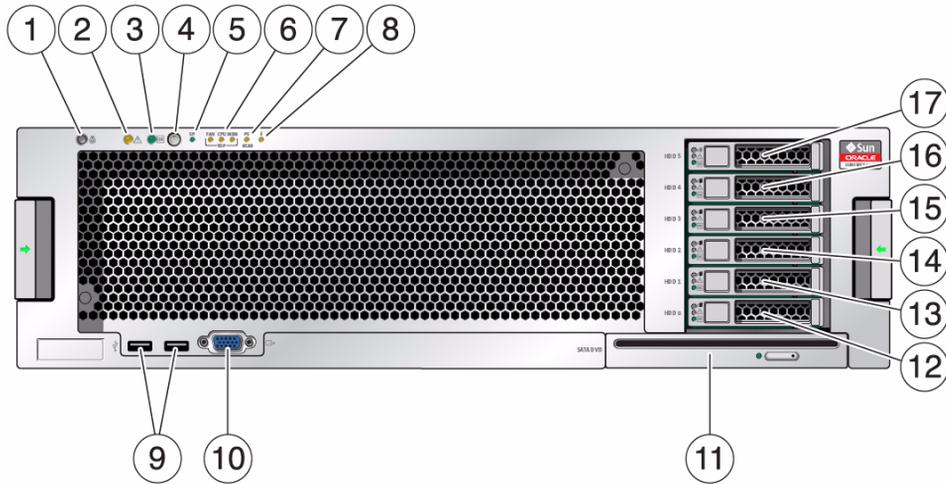
Related Information

- [“Detecting and Managing Faults” on page 15](#)
- [“Preparing for Service” on page 61](#)

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.

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



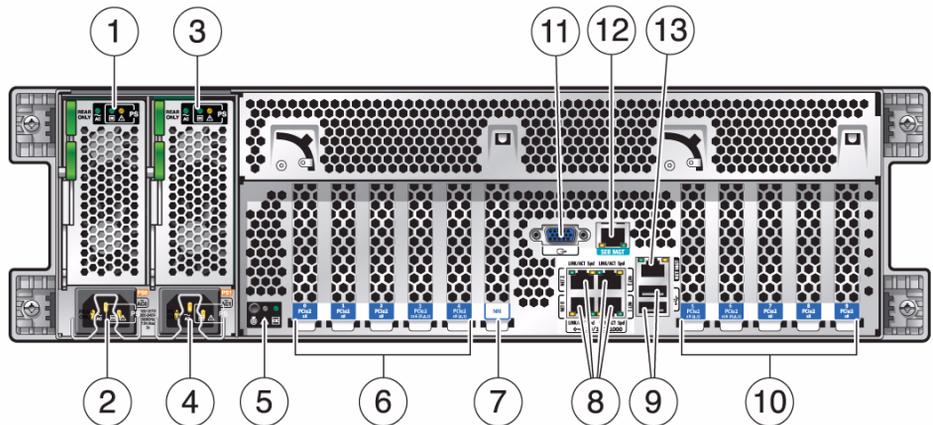
No.	Description
1	Locate LED/Locate button: white
2	Service Action Required LED: amber
3	Power/OK LED: green
4	Power button
5	SP OK/Fault LED: green/amber
6	Service Action Required LEDs (3) for Fan Module (FAN), Processor (CPU), and Memory: amber
7	Power Supply (PS) Fault (Service Action Required) LED: amber
8	Over Temperature Warning LED: amber
9	USB 2.0 connectors (2)
10	DB-15 video connector
11	SATA DVD drive
12	Drive 0 (optional)
13	Drive 1 (optional)
14	Drive 2 (optional)
15	Drive 3 (optional)
16	Drive 4 (optional)
17	Drive 5 (optional)

Related Information

- “Rear Components” on page 3
- “Internal Components” on page 6

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.



No.	Description
-----	-------------

- | | |
|---|---|
| 1 | Power supply unit 0 status indicator LEDs:
Service Action Required: amber
DC OK: green
AC OK: green or amber |
| 2 | Power supply unit 0 AC inlet |
| 3 | Power supply unit 1 status indicator LEDs:
Service Action Required: amber
DC OK: green
AC OK: green or amber |
| 4 | Power supply unit 1 AC inlet |
-

No.	Description
5	System status LEDs: Power/OK: green Attention: amber Locate: white
6	PCIe card slots 0-4
7	Network module (XAUI) card slot
8	Network (NET) 10/100/1000 ports: NET0-NET3
9	USB 2.0 connectors (2)
10	PCIe card slots 5-9
11	DB-15 video connector
12	Serial management (SER MGT)/RJ-45 serial port
13	SP network management (NET MGT) port

Related Information

- [“Front Components” on page 1](#)
- [“Internal Components” on page 6](#)

Infrastructure Boards in the Server

The following table provides an overview of the circuit boards used in the server.

Board	Description
Motherboard	<p>This board includes two CMP modules, memory control subsystems, and all service processor (Oracle ILOM) logic. It hosts a removable SCC module, which contains all MAC addresses, host ID, and Oracle ILOM configuration data. It also hosts the power distribution board, which distributes main 12V power from the power supplies to the rest of the system. The PDB is directly connected to the motherboard via a bus bar and ribbon cable and supports a top cover safety interlock (“kill”) switch.</p> <p>Note - When a PDB is replaced, the chassis serial number and part number must be programmed by trained service personnel.</p>
Power supply backplane	<p>This board carries 12V power from the power supplies to the PDB over a pair of bus bars. The power supplies connect directly to the PDB.</p>
Fan power board	<p>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.</p> <p>Note - When a fan board is replaced, the chassis serial number and part number might need to be programmed by trained service personnel.</p>
Drive backplane	<p>This board provides connectors for the drive signal cables. It also serves as the interconnect for the front I/O board, Power and Locator buttons, and system/component status LEDs.</p> <p>Note - When a drive backplane is replaced, the chassis serial number and part number might need to be programmed by trained service personnel.</p>

Related Information

- [“Internal Components” on page 6](#)
- [“Servicing the Motherboard” on page 159](#)
- [“Servicing the Fan Board” on page 155](#)
- [“Servicing the Drive Backplane” on page 175](#)

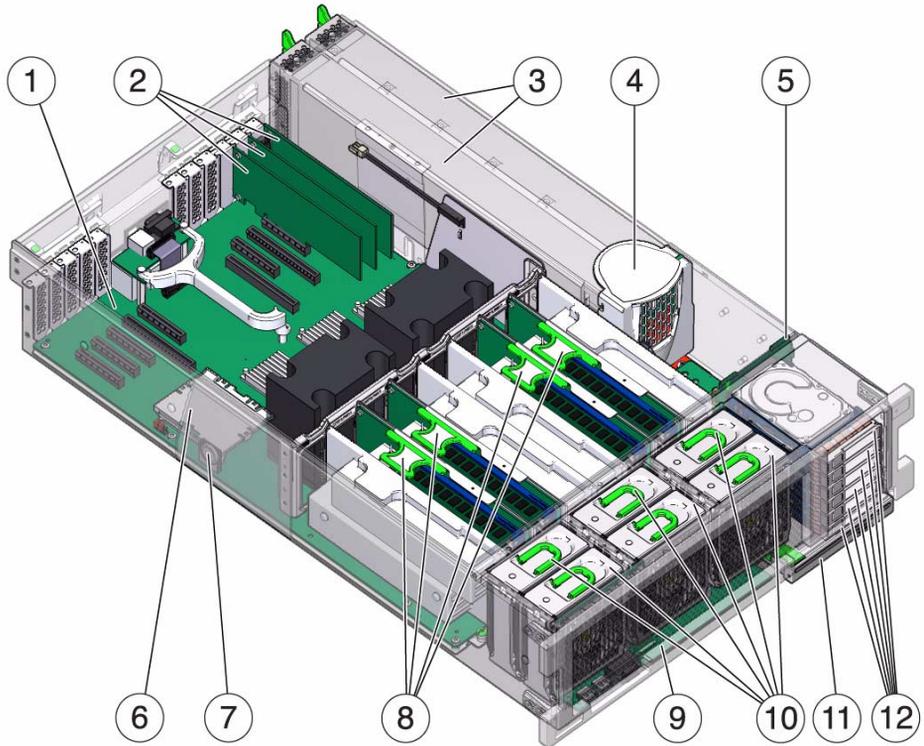
Internal System Cables

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

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

Internal Components

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



No.	Component	No.	Component
1	Motherboard	7	System lithium battery
2	Low-profile PCIe cards	8	Memory risers
3	Power supplies	9	Fan board
4	Power supply backplane (and cover)	10	Fan modules
5	Drive backplane	11	DVD drive
6	Service processor	12	Drives

Exploring Parts of the System

The following topics identify the components that can be individually replaced. These components are grouped into three functional categories:

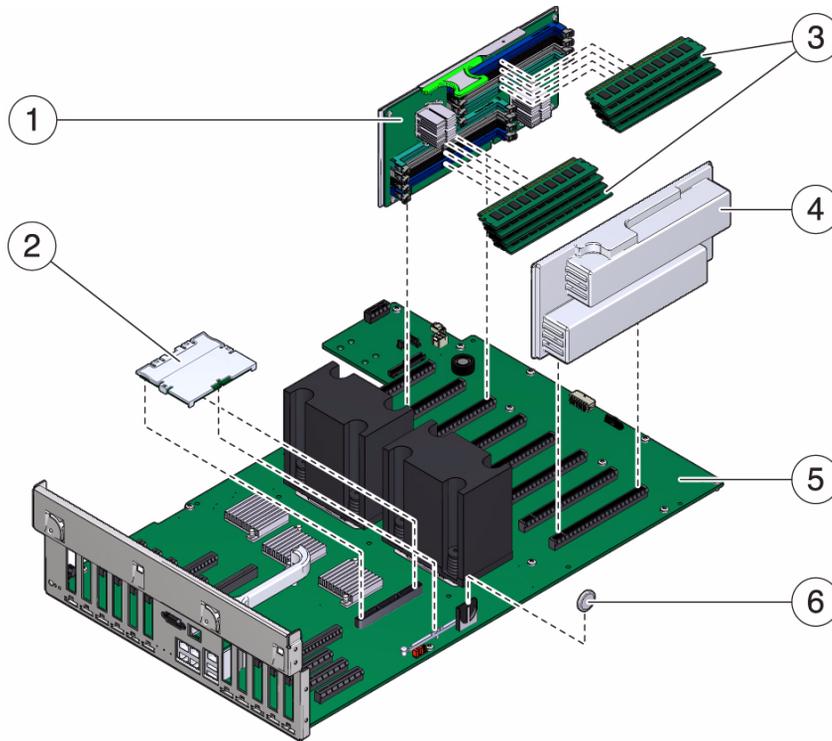
- “Motherboard Components” on page 8
- “I/O Components” on page 9
- “Power Distribution and Fan Module Components” on page 11

Related Information

- “Front Components” on page 1
- “Rear Components” on page 3

Motherboard Components

The following figure illustrates replaceable components related to the motherboard.



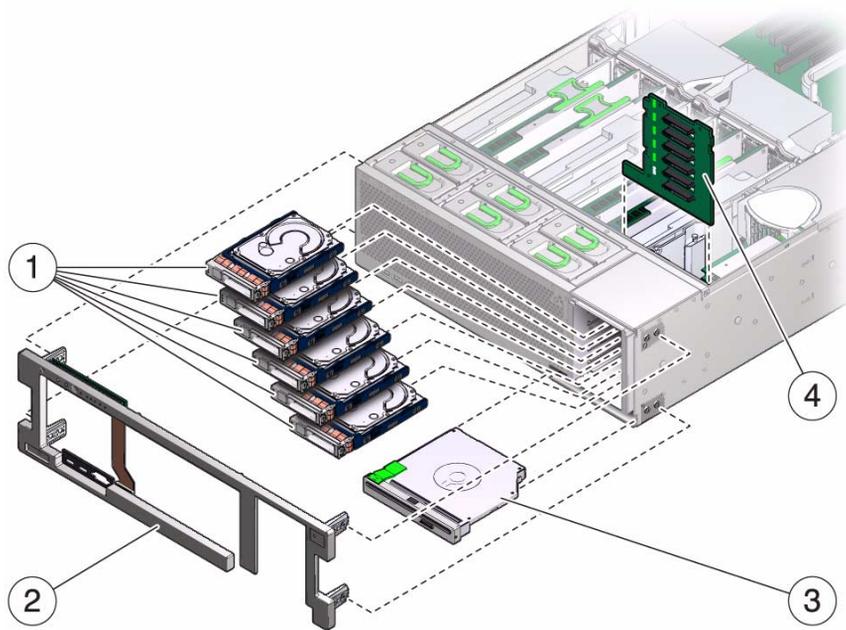
No.	FRU	Notes	FRU Name (If Applicable)
1	Memory riser	Four memory risers are shipped with the server. Two memory risers are associated with each CMP. Remove the memory risers to add or replace DIMMs.	/SYS/MB/CMP0/MR0 /SYS/MB/CMP0/MR1 /SYS/MB/CMP1/MR0 /SYS/MB/CMP1/MR1 .
2	Service processor	Rear panel PCI cross beam must be removed to access risers.	/SYS/MB/SP
3	DIMMs	See configuration rules before upgrading DIMMs.	See “About Memory Risers” on page 105.
4	Memory riser filler panel	Must be installed in blank memory riser slots.	N/A
5	Motherboard assembly	Contains two CMPs. Must be removed to access power distribution board, power supply backplane, and paddle card.	/SYS/MB
6	Battery	Necessary for system clock and other functions.	/SYS/MB/V_VBAT

Related Information

- [“Understanding Component Replacement Categories” on page 65](#)
- [“Servicing Memory Risers and DIMMs” on page 105](#)
- [“Servicing the Motherboard” on page 159](#)
- [“Servicing the System Lithium Battery” on page 141](#)

I/O Components

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



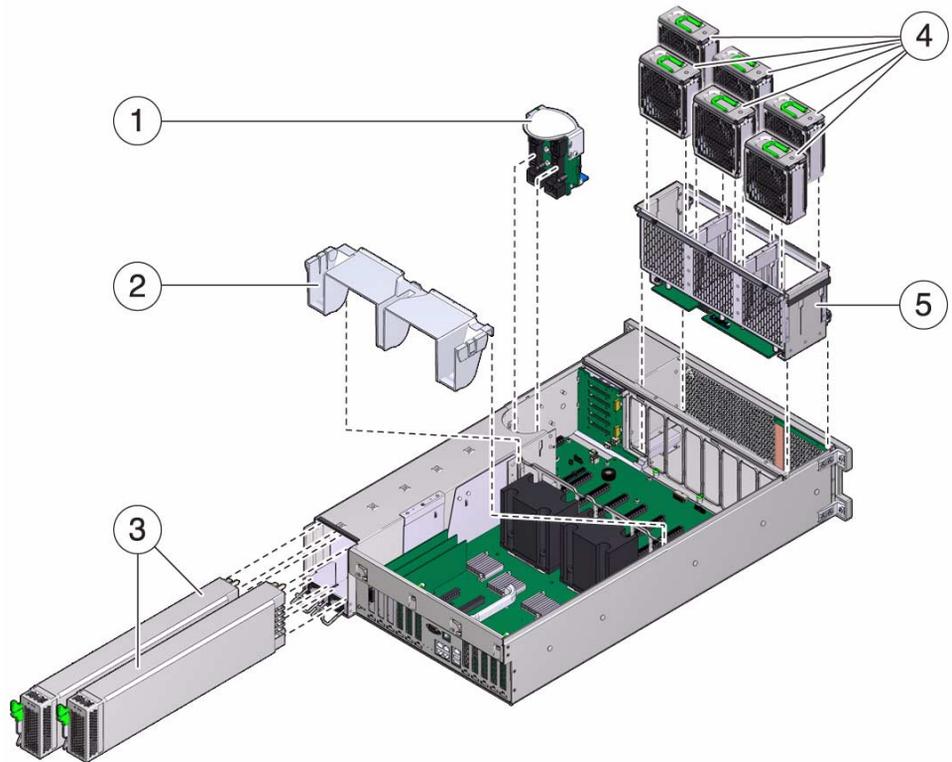
No.	FRU	Notes	FRU Name (if Applicable)
1	Drives	Must be removed to service the drive backplane.	N/A
2	Front control panel light pipe assembly	Metal light pipe bracket is not a FRU.	N/A
3	DVD module, USB module	Must be removed to service the drive backplane.	/SYS/DVD /SYS/USBBD
4	Drive backplane		/SYS/SASBP

Related Information

- [“Understanding Component Replacement Categories”](#) on page 65
- [“Servicing Drives”](#) on page 81
- [“Servicing DVD Drives”](#) on page 137
- [“Servicing the Drive Backplane”](#) on page 175

Power Distribution and Fan Module Components

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



No.	FRU	Notes	FRU Name (If Applicable)
1	Power supply backplane and cover	The power supplies must be partially removed from the chassis to remove this component.	N/A
2	Air duct	A plastic cover that rests on top of the CPUs.	N/A
3	Power supplies	Two power supplies provide N+1 redundancy.	/SYS/PS0 /SYS/PS1

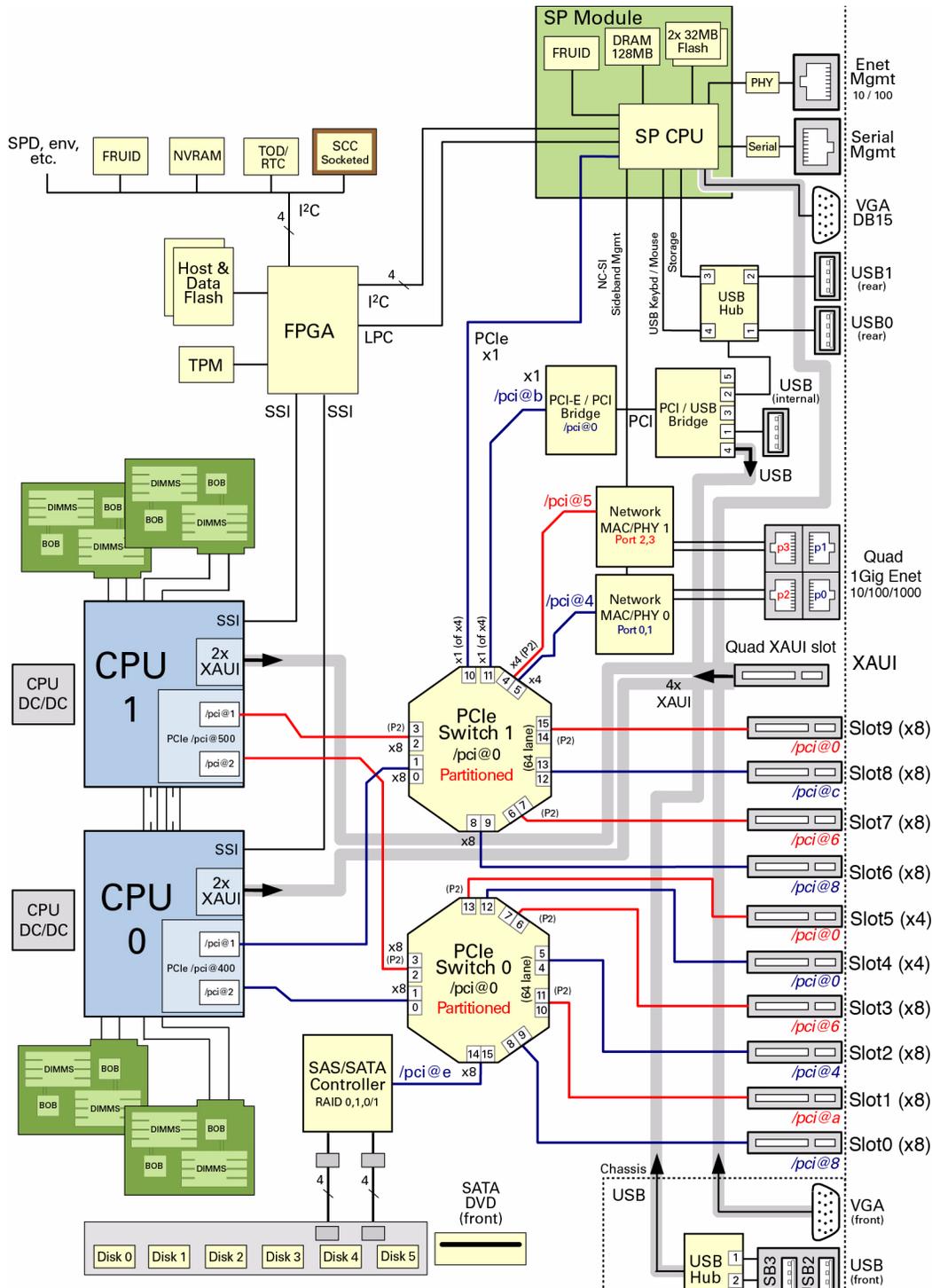
No.	FRU	Notes	FRU Name (If Applicable)
4	Fan modules	All six fan modules must be installed in the server.	/SYS/FANBD0/FAN0 /SYS/FANBD0/FAN1 /SYS/FANBD0/FAN2 /SYS/FANBD0/FAN3 /SYS/FANBD0/FAN4 /SYS/FANBD0/FAN5
5	Fan board unit	A single fan board attached to a fan board cage that holds the fan modules.	/SYS/FANBD0

Related Information

- [“Understanding Component Replacement Categories” on page 65](#)
- [“Servicing Power Supplies” on page 99](#)
- [“Servicing Fan Modules” on page 93](#)
- [“Servicing the Fan Board” on page 155](#)

System Schematic

This schematic shows the connections between and among specific components and device slots. You can use this schematic to determine optimum locations for any optional cards or other peripherals based on system configuration and intended use.



The following table illustrates how specific PCIe and XAUI slots are attached to CPUs.

Slot	Address	Bus CPU0	Bus CPU1
PCIe 0	/pci@400/pci@2/pci@0/pci@8	x	
PCIe 1	/pci@500/pci@2/pci@0/pci@a		x
PCIe 2	/pci@400/pci@2/pci@0/pci@4	x	
PCIe 3	/pci@500/pci@2/pci@0/pci@6		x
PCIe 4	/pci@400/pci@2/pci@0/pci@0	x	
PCIe 5	/pci@500/pci@2/pci@0/pci@0		x
PCIe 6	/pci@400/pci@1/pci@0/pci@8	x	
PCIe 7	/pci@500/pci@1/pci@0/pci@6		x
PCIe 8	/pci@400/pci@1/pci@0/pci@c	x	
PCIe 9	/pci@500/pci@1/pci@0/pci@0		x
QSFP P0, XAUI 0	/niu@480/network@0	x	
QSFP P1, XAUI 1	/niu@480/network@1	x	
QSFP P2, XAUI 0	/niu@580/network@0		x
QSFP P3, XAUI 1	/niu@580/network@1		x

Related Information

- [“Infrastructure Boards in the Server” on page 4](#)
- [“Internal System Cables” on page 5](#)
- [“Internal Components” on page 6](#)
- [“Motherboard Components” on page 8](#)
- [“I/O Components” on page 9](#)
- [“Detecting and Managing Faults” on page 15](#)
- [“Servicing Drives” on page 81](#)
- [“Servicing Memory Risers and DIMMs” on page 105](#)
- [“Servicing Expansion \(PCIe\) Cards” on page 145](#)
- [“Servicing the SP” on page 169](#)

Detecting and Managing Faults

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 19
- “Managing Faults (Oracle ILOM)” on page 23
- “Interpreting Log Files and System Messages” on page 37
- “Checking if Oracle VTS Is Installed” on page 38
- “Managing Faults (POST)” on page 40
- “Managing Faults (PSH)” on page 50
- “Managing Components (ASR)” on page 57

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 field-replaceable units (FRUs).
- **Oracle ILOM** – This firmware runs on the service processor. In addition to providing the interface between the hardware and OS, Oracle ILOM also tracks and reports the health of key server components. Oracle ILOM works closely with POST and Solaris Predictive Self-Healing technology to keep the system running even when there is a faulty component.
- **Power-on self-test (POST)** – 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.

- **Oracle Solaris OS Predictive Self-Healing (PSH)** - This technology 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 Predictive Self-Healing 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** – An application that exercises the system, provides hardware validation, and discloses possible faulty components with recommendations for repair.

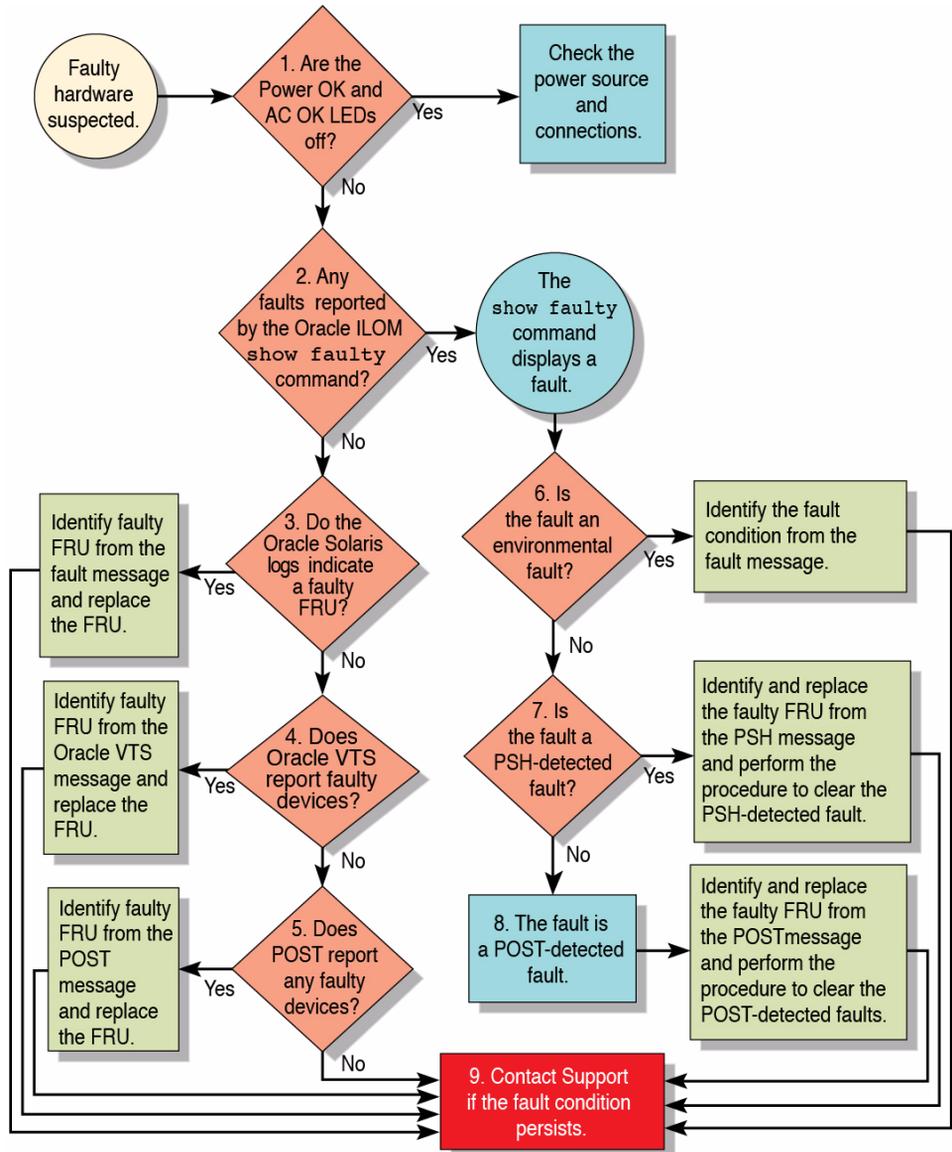
The LEDs, Oracle ILOM, PSH, and many of the log files and console messages are integrated. For example, when the Solaris software detects a fault, it displays the fault, logs it, and passes information to Oracle ILOM where it is logged. Depending on the fault, one or more LEDs might also be illuminated.

The diagnostic flow chart in “[Diagnostics Process](#)” on [page 16](#) describes an approach for using the server diagnostics to identify a faulty field-replaceable unit (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.

Diagnostics Process

The following flowchart illustrates the complementary relationship of the different diagnostic tools and indicates a default sequence of use.

FIGURE: Diagnostic Flowchart



The following table provides brief descriptions of the troubleshooting actions shown in the flowchart. It also provides links to topics with additional information on each diagnostic action.

TABLE: Diagnostic Flowchart Reference Table

Flowchart No.	Diagnostic Action	Possible Outcome	Additional Information
1.	Check Power OK and AC Present LEDs on the server.	The Power OK LED is located on the front and rear of the chassis. The AC Present LED is located on the rear of the server on each power supply. If these LEDs are not on, check the power source and power connections to the server.	<ul style="list-style-type: none">• “Front Components” on page 1
2.	Run the Oracle ILOM <code>show faulty</code> command to check for faults.	The <code>show faulty</code> command displays the following kinds of faults: <ul style="list-style-type: none">• Environmental faults• Solaris Predictive Self-Healing (PSH) detected faults• POST detected faults Faulty FRUs are identified in fault messages using the FRU name.	<ul style="list-style-type: none">• Oracle ILOM Command on page 36• “Check for Faults (show faulty Command)” on page 28
3.	Check the Solaris log files for fault information.	The Oracle Solaris message buffer and log files record system events, and provide information about faults. <ul style="list-style-type: none">• If system messages indicate a faulty device, replace the FRU.• For more diagnostic information, review the Oracle VTS report. (Flowchart item 4)	<ul style="list-style-type: none">• “Interpreting Log Files and System Messages” on page 37
4.	Run Oracle VTS software.	Oracle VTS is an application you can run to exercise and diagnose FRUs. To run Oracle VTS, the server must be running the Solaris OS. <ul style="list-style-type: none">• If Oracle VTS reports a faulty device, replace the FRU.• If Oracle VTS does not report a faulty device, run POST. (Flowchart item 5)	<ul style="list-style-type: none">• “Oracle VTS Overview” on page 39
5.	Run POST.	POST performs basic tests of the server components and reports faulty FRUs.	<ul style="list-style-type: none">• “Managing Faults (POST)” on page 40• TABLE: Oracle ILOM Properties Used to Manage POST Operations on page 41

TABLE: Diagnostic Flowchart Reference Table (*Continued*)

Flowchart No.	Diagnostic Action	Possible Outcome	Additional Information
6.	Determine if the fault is an environmental fault.	<p>If the fault listed by the <code>show faulty</code> command displays a temperature or voltage fault, then the fault is an environmental fault. Environmental faults can be caused by faulty FRUs (power supply or fan) or by environmental conditions, such as ambient temperature that is too high or lack of sufficient airflow through the server. When the environmental condition is corrected, the fault automatically clears.</p> <p>If the fault indicates that a fan or power supply is bad, you can replace the FRU. You can also use the fault LEDs on the server to identify the faulty FRU.</p>	<ul style="list-style-type: none">• “Display FRU Information (show Command)” on page 27
7.	Determine if the fault was detected by PSH.	<p>If the fault message does <i>not</i> begin with the characters “SPT”, the fault was detected by the Oracle Solaris Predictive Self-Healing (PSH) software.</p> <p>For additional information on the reported fault, including possible corrective action, go to this web site: http://support.oracle.com</p> <p>Search for the message ID contained in the fault message.</p>	<ul style="list-style-type: none">• “Managing Faults (PSH)” on page 50• “Clear PSH-Detected Faults” on page 54
8.	Determine if the fault was detected by POST.	<p>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:</p> <p><code>Forced fail reason</code></p> <p>In a POST fault message, <i>reason</i> is the name of the power-on routine that detected the failure.</p>	<ul style="list-style-type: none">• “Managing Faults (POST)” on page 40• “Clear POST-Detected Faults” on page 47
9.	Contact technical support.	<p>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.</p>	

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"> • “Front and Rear Panel System Controls and LEDs” on page 20
Component-level LEDs	On or near the individual components	<ul style="list-style-type: none"> • “Servicing Drives” on page 81 • “Servicing Power Supplies” on page 99 • “Servicing Fan Modules” on page 93

Front and Rear Panel System Controls and LEDs

The following table identifies the various system-level LEDs and explains how to interpret their behavior.

TABLE: Front 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"> • Issuing the Oracle ILOM command <code>set /SYS/LOCATE value=Fast_Blink</code> • Pressing the Locator button.
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"> • Off – System is not running in its normal state. System power might be off. The service processor might be running. • Steady on – System is powered on and is running in its normal operating state. No service actions are required. • Fast blink – System is running in standby mode and can be quickly returned to full function. • Slow blink – A normal, but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running, or the system is booting.
Power button		<p>The recessed Power button toggles the system on or off.</p> <ul style="list-style-type: none"> • Press once to turn the system on. • Press once to shut the system down in a normal manner. • Press and hold for 4 seconds to perform an emergency shutdown.

TABLE: Front Panel Controls and Indicators (*Continued*)

LED or Button	Icon or Label	Description
Service processor OK/service LED	SP	Indicates the following conditions: <ul style="list-style-type: none"> • Off – Indicates the AC power might not have been connected to the power supplies. • Steady on, green – Service processor is running in its normal operating state. No service actions are required. • Blink, green – Service processor is initializing Oracle ILOM firmware. • Steady on, amber – An SP error has occurred and service is required.
Service action required LEDs (amber)	FAN, CPU, MEM	Provides the following operational indications for the fans, CPU, and memory: <ul style="list-style-type: none"> • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a component failure event has been acknowledged and a service action is required.
Power Supply Fault LED (amber)	REAR PS	Provides the following operational PSU indications: <ul style="list-style-type: none"> • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a power supply failure event has been acknowledged and a service action is required on at least one PSU.
Overtemp LED (amber)		Provides the following operational temperature indications: <ul style="list-style-type: none"> • Off – Indicates a steady state, no service action is required. • Steady on – Indicates that a temperature failure event has been acknowledged and a service action is required.

Ethernet and Network Management Port LEDs

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

The following table describes the status LEDs assigned to the Network Management port.

TABLE: Network Management Port LEDs (NET MGT)

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

Related Information

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

Memory Fault Handling

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 (CEs), POST forwards the error to the Oracle Solaris 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 an Oracle ILOM command:

```
-> set device component_state=enabled
```

where *device* is the name of the DIMM being enabled. For example:

```
-> set /SYS/MB/CMP1/MR0/BOB0/CH0/D0 component_state=enabled
```

- **Oracle Solaris PSH technology**—PSH uses the Fault Manager daemon (`fmd`) to watch for 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 that 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 faults.

Related Information

- [“POST Overview” on page 40](#)
- [“PSH Overview” on page 50](#)
- [“PSH-Detected Fault Example” on page 52](#)
- [“Locate a Faulty DIMM \(DIMM Fault Remind Button\)” on page 113](#)
- [“Locate a Faulty DIMM \(show faulty Command\)” on page 116](#)

Managing Faults (Oracle ILOM)

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

- [“Oracle ILOM Troubleshooting Overview” on page 24](#)
- [“Service-Related Oracle ILOM Commands” on page 36](#)
- [“Access the SP \(Oracle ILOM\)” on page 25](#)
- [“Display FRU Information \(show Command\)” on page 27](#)
- [“Check for Faults \(show faulty Command\)” on page 28](#)
- [“Clear Faults \(clear_fault_action Property\)” on page 30](#)

Related Information

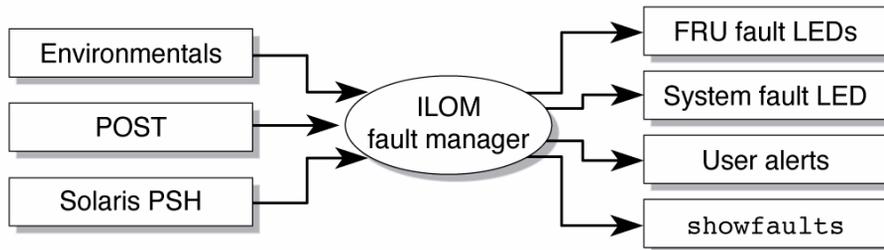
- [“POST Overview” on page 40](#)
- [“Oracle ILOM Properties that Affect POST Behavior” on page 41](#)

Oracle ILOM Troubleshooting Overview

The Integrated Lights Out Manager (Oracle ILOM) firmware enables you to remotely run diagnostics, such as power-on self-test (POST), that would otherwise require physical proximity to the server's serial port.

The service processor 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 the Oracle Solaris Predictive Self-Healing (PSH) technology are forwarded to Oracle ILOM for fault handling.



The Oracle ILOM fault manager evaluates error messages it 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, it classifies the error as an alert.

Alert conditions are often caused by environmental conditions, such as computer room temperature, which may improve over time. They may 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 will detect the change and will stop logging alerts for that condition.

- **Faults** -- When the fault manager determines that a particular FRU's has an error condition that is permanent, that error is classified as a fault. This 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 will also be turned on.

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

The service processor can automatically detect when a faulted FRU has been replaced by a good FRU. In many cases, it does this 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 drive replacement.

The Oracle Solaris Predictive Self-Healing technology does not monitor drives for faults. As a result, the service processor does not recognize drive faults and will not light the fault LEDs on either the chassis or the drive itself. Use the Oracle Solaris message files to view drive faults.

For general information about Oracle ILOM, see the *Oracle Integrated Lights Out Manager (ILOM) 3.0 Concepts Guide*.

For detailed information about Oracle ILOM features that are specific to this server, see the *SPARC T4 Series Servers Administration Guide*.

Related Information

- [“Access the SP \(Oracle ILOM\)” on page 25](#)
- [“Display FRU Information \(show Command\)” on page 27](#)
- [“Check for Faults \(show faulty Command\)” on page 28](#)
- [“Clear Faults \(clear_fault_action Property\)” on page 30](#)

▼ Access the SP (Oracle ILOM)

There are two approaches to interacting with the service processor:

- Oracle ILOM shell (default) -- The Oracle ILOM shell provides access to Oracle ILOM's features and functions through a command-line interface.
- Oracle ILOM browser interface -- The Oracle ILOM browser interface supports the same set of features and functions as the shell, but through windows on a browser interface.

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

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

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 Series Servers Administration Guide* and the Oracle Solaris documentation.

1. Establish connectivity to the service processor, using one of the following methods:

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

Set up your terminal device for 9600 baud, 8 bit, no parity, 1 stop bit and no handshaking, and 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.

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

2. Decide which interface to use:

- **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 service processor 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. Log in to Oracle ILOM.

The default Oracle ILOM login account is `root` with a default password `changeme`.

Example of logging in to the Oracle ILOM CLI:

```
ssh root@xxx.xxx.xxx.xxx
Password:

Oracle(R) Integrated Lights Out Manager

Version 3.0.12.2

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Warning: password is set to factory default.
->
```

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

4. Perform Oracle ILOM commands that provide 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 27.
- `show faulty command` – Displays environmental, POST-detected, and PSH-detected faults.
See [“Check for Faults \(show faulty Command\)”](#) on page 28.
- `clear_fault_action property of the set command` – Manually clears PSH-detected faults.
See [“Clear Faults \(clear_fault_action Property\)”](#) on page 30.

Note – You can use `fmadm faulty` in the `faultmgmt` shell as an alternative to `show faulty`.

▼ Display FRU Information (show Command)

Use the Oracle ILOM `show` command to display information about individual FRUs.

- **At the -> prompt, enter the show command.**

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

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

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

Properties:
  Type = DIMM
  ipmi_name = PO/MO/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

- [“System Schematic” on page 12](#)
- [“Diagnostics Process” on page 16](#)
- [“Clear Faults \(clear_fault_action Property\)” on page 30](#)

▼ **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 Command Examples” on page 32](#) for examples of the kind of information the command displays for different types of faults.

- At the `->` prompt, enter the `show faulty` command.

```

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

```

Related Information

- [“Diagnostics Process” on page 16](#)
- [“Clear Faults \(clear_fault_action Property\)” on page 30](#)
- [“Check for Faults \(fmadm faulty Command\)” on page 29](#)

▼ 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. Note that the two examples show the same UUID value.

The `fmadm faulty` command was invoked 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 `->` prompt, access the `faultmgmt` shell.

```
-> 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> exit
```

Related Information

- [“Diagnostics Process” on page 16](#)
- [“Check for Faults \(show faulty Command\)” on page 28](#)
- [“Clear Faults \(clear_fault_action Property\)” on page 30](#)

▼ 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 service processor.

If Oracle ILOM detects a FRU replacement, it will automatically clear the fault so that manual clearing of the fault is not necessary. For PSH diagnosed faults, if the replacement of the FRU is detected by the system or the fault is manually cleared on the host, the fault will also be cleared from Oracle ILOM. In such cases, manual fault clearing will typically not be required.

Note – For PSH-detected faults, this procedure clears the fault from the service processor but not from the host. If the fault persists in the host, clear it manually as described in [“Clear PSH-Detected Faults” on page 54](#).

- **At the -> 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 manually.

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 = PSO
fru_name = /SYS/PSO
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

- [“Diagnostics Process” on page 16](#)

Understanding Fault Management Command Examples

When no faults have been detected, the show fault output looks like this:

```
-> show faulty
Target          | Property          | Value
-----+-----+-----

```

Other examples are shown in the following sections.

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

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. Note that the two examples show the same UUID value.

The `fmadm faulty` command was invoked from within the 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

```

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/MB
/SP/faultmgmt/0       | class                   | fault.component.disabled
faults/0               |                          |
/SP/faultmgmt/0/      | sunw-msg-id             | SPT-8000-HR
faults/0               |                          |
/SP/faultmgmt/0/      | uuid                    | *****

```

faults/0		a262
/SP/faultmgmt/0/	timestamp	2010-09-03/11:21:17
faults/0		
/SP/faultmgmt/0/	detector	/SYS/MB/CMP0/NIU1
faults/0		
/SP/faultmgmt/0/	fru_part_number	541-3857-04
faults/0		
/SP/faultmgmt/0/	fru_serial_number	*****
faults/0		
/SP/faultmgmt/0/	product_serial_number	*****
faults/0		
/SP/faultmgmt/0/	chassis_serial_number	*****
faults/0		

PSH-Detected Fault Example (show faulty Command)

The following is an example of the `show faulty` command displaying a fault that was detected by the PSH technology. 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	7a8a
/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

faults/0 /SP/faultmgmt/0/ faults/0	severity	Major
--	----------	-------

Service-Related Oracle ILOM Commands

The following table describes the Oracle ILOM shell commands most frequently used when performing service related tasks.

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>break</code> menu, depending on the mode Solaris software was booted.
<code>set fru component clear_fault_action=true</code>	Clears the fault state for the FRU or the component.
<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 [where <i>property</i> is state, config, or script]</code>	Controls the host server OpenBoot PROM firmware method of booting.
<code>stop /SYS</code>	Powers off the host server.
<code>start /SYS</code>	Powers on the host server.
<code>reset /SYS</code>	Generates a hardware reset on the host server.
<code>reset /SP</code>	Reboots the service processor.
<code>set /SYS keyswitch_state=value normal standby diag locked</code>	Sets the virtual keyswitch.
<code>set /SYS/LOCATE value=value [Fast_blink Off]</code>	Turns the Locator LED on the server on or off.
<code>show faulty</code>	Displays current system faults. See “Check for Faults (show faulty Command)” on page 28.
<code>show /SYS keyswitch_state</code>	Displays the status of the virtual keyswitch.

Oracle ILOM Command	Description
<code>show /SYS/LOCATE</code>	Displays the current state of the Locator LED as either fast blink or off.
<code>show /SP/logs/event/list</code>	Displays the history of all events logged in the service processor event log.
<code>show /HOST</code>	Displays firmware versions and HOST status.
<code>show /SYS</code>	Displays product information, including the part number and serial number.

Related Information

- [“Managing Components \(ASR\)” on page 57](#)

Interpreting Log Files and System Messages

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

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

Use the `dmesg` command to view the most recent system message. To view the system messages log file, view the contents of the `/var/adm/messages` file.

- [“Check the Message Buffer” on page 37](#)
- [“View System Message Log Files” on page 38](#)

▼ 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 System Message Log Files” on page 38](#)

▼ View 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 37](#)

Checking if Oracle VTS Is Installed

Oracle VTS is a validation test suite that you can use to test this server. This section provides an overview and a way to check if Oracle VTS is installed. For comprehensive Oracle VTS information, refer to the Oracle VTS 7.0 documentation.

- [“Oracle VTS Overview” on page 39](#)

- [“Check if Oracle VTS Software Is Installed” on page 39](#)

Oracle VTS Overview

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

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

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

You can run Oracle VTS through a browser UI, terminal UI, or command UI.

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

Oracle VTS also provides a choice of security mechanisms.

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

Related Information

- Oracle VTS documentation
- [“Check if Oracle VTS Software Is Installed” on page 39](#)

▼ Check if Oracle VTS Software 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 Oracle VTS is not installed. You must take action to install the software before you can use it. You can obtain the Oracle VTS software from the following places:
 - Solaris OS media kit (DVDs)
 - As a download from the web

Related Information

- Oracle VTS documentation

Managing Faults (POST)

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

- [“POST Overview” on page 40](#)
- [“Oracle ILOM Properties that Affect POST Behavior” on page 41](#)
- [“Configure POST” on page 43](#)
- [“Run POST With Maximum Testing” on page 45](#)
- [“Interpret POST Fault Messages” on page 46](#)
- [“Clear POST-Detected Faults” on page 47](#)
- [“POST Output Reference” on page 48](#)

POST Overview

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

You can also run POST as system-level hardware diagnostic tool. To do this, 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 41.

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

Related Information

- [“Oracle ILOM Properties that Affect POST Behavior”](#) on page 41
- [“Run POST With Maximum Testing”](#) on page 45
- [“Interpret POST Fault Messages”](#) on page 46
- [“Clear POST-Detected Faults”](#) on page 47

Oracle ILOM Properties that Affect POST Behavior

The following table describes the Oracle ILOM properties that determine how POST performs its operations.

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

TABLE: Oracle ILOM Properties Used to Manage POST Operations

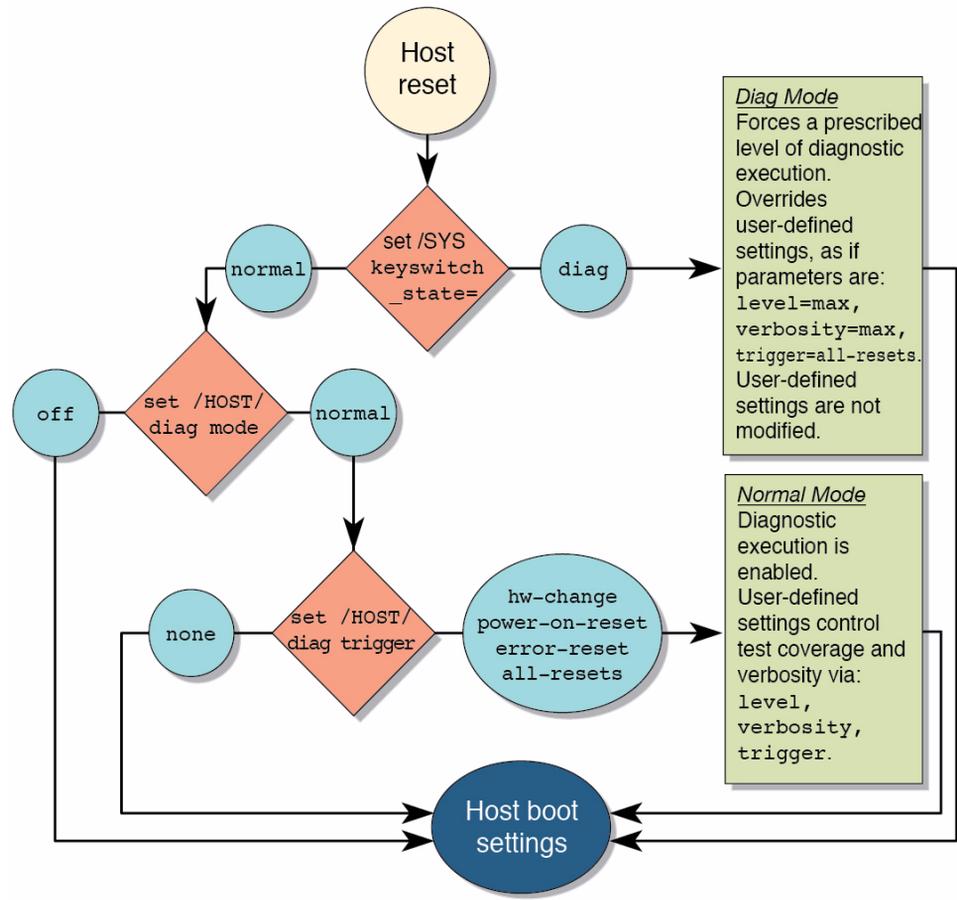
Parameter	Values	Description
/SYS keyswitch_state	normal	The system can power on and run POST (based on the other parameter settings). This parameter overrides all other commands.
	diag	The system runs POST based on predetermined settings.
	standby	The system cannot power on.
	locked	The system can power on and run POST, but no flash updates can be made.

TABLE: Oracle ILOM Properties Used to Manage POST Operations

Parameter	Values	Description
/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 HOST power on.
	error-reset	(Default) Runs POST if fatal errors are detected.
	all-resets	Equivalent to power-on-reset, hw-change, and error-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 displays all test and informational messages.
	debug	MAX POST plus debugging messages.
	none	No POST output is displayed.

The following flowchart is a graphic illustration of the same set of Oracle ILOM set command variables.

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



▼ Configure POST

1. Access the Oracle ILOM -> prompt.
 See "Access the SP (Oracle ILOM)" on page 25.

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 will configure 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 41.

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 41 for a list of parameters and values.

Examples:

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

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

Example:

```
-> show /HOST/diag

/HOST/diag
  Targets:

  Properties:
    error_reset_level = min
    error_reset_verbosity = min
    hw_change_level = min
    hw_change_verbosity = min
    level = min
    mode = off
    power_on_level = min
    power_on_verbosity = min
    trigger = none
    verbosity = min

  Commands:
    cd
```

```
set
show
->
```

Related Information

- “POST Overview” on page 40
- “Oracle ILOM Properties that Affect POST Behavior” on page 41
- “Run POST With Maximum Testing” on page 45
- “Interpret POST Fault Messages” on page 46
- “Clear POST-Detected Faults” on page 47

▼ Run POST With Maximum Testing

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

1. Access the Oracle ILOM -> prompt:

See “Access the SP (Oracle ILOM)” on page 25.

2. Set the virtual keyswitch to `diag` so that POST will run 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 issuing **commands** that will 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 will display `status=Powered Off`.

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

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

5. If you receive POST error messages, follow the guidelines provided in the topic “Interpret POST Fault Messages” on page 46.

Related Information

- “POST Overview” on page 40
- FIGURE: Flowchart of Oracle ILOM Properties Used to Manage POST Operations on page 43
- “Configure POST” on page 43
- “Interpret POST Fault Messages” on page 46
- “Clear POST-Detected Faults” on page 47

▼ Interpret POST Fault Messages

1. Run POST.

See “Run POST With Maximum Testing” on page 45.

2. View the output and watch for messages that look similar to the following syntax descriptions and example:

- 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 and informational messages use the following syntax:

```
INFO or WARNING: message
```

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

See “Check for Faults (show faulty Command)” on page 28.

Related Information

- “Clear POST-Detected Faults” on page 47

- “POST Overview” on page 40
- FIGURE: Flowchart of Oracle ILOM Properties Used to Manage POST Operations on page 43
- “Oracle ILOM Properties that Affect POST Behavior” on page 41
- “Configure POST” on page 43
- “Run POST With Maximum Testing” on page 45

▼ 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 57).

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

1. **After replacing a faulty FRU, at the Oracle ILOM prompt use 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. Example:

```

-> show faulty
Target                | Property                | Value
-----+-----+-----
/SP/faultmgmt/0      | fru                     | /SYS/MB/CMP0/MR0/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/MR0/B0B0/CH0/D0
faults/0              |                          | Forced fail(POST)

```

2. **Take one of the following actions based on the `show faulty` 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 the next step in this procedure.

3. 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 1](#). Example:

```
-> set /SYS/MB/CMP0/MR0/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 on.

4. Reset the server.

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

5. At the Oracle ILOM prompt, use the `show faulty` command to verify that no faults are reported. For example:

```
-> show faulty
Target                | Property                | Value
-----+-----+-----
->
```

Related Information

- [“POST Overview” on page 40](#)
- [“Oracle ILOM Properties that Affect POST Behavior” on page 41](#)
- [“Configure POST” on page 43](#)
- [“Run POST With Maximum Testing” on page 45](#)

POST Output Reference

POST error messages use the following syntax where n = the node number, c = the core number, s = the strand number:

```
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
```

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/MR0/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/MR0/BOB0/CH1/D0 (J1001)
2010-07-03 18:44:17.145 0:7:2>          /SYS/MB/CMP0/MR0/BOB1/CH1/D0 (J3001)
2010-07-03 18:44:17.241 0:7:2>END_ERROR

```

Related Information

- [“Oracle ILOM Properties that Affect POST Behavior” on page 41](#)
- [“Run POST With Maximum Testing” on page 45](#)
- [“Clear POST-Detected Faults” on page 47](#)

Managing Faults (PSH)

The following topics describe the Solaris Predictive Self-Healing feature:

- [“PSH Overview” on page 50](#)
- [“PSH-Detected Fault Example” on page 52](#)
- [“Check for PSH-Detected Faults” on page 52](#)
- [“Clear PSH-Detected Faults” on page 54](#)

PSH Overview

PSH technology 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, `fm̄(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 take the component offline. The daemon also logs the fault to the `syslogd` daemon and provides a fault notification with a message ID (MSGID). You can use the message 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 system administrator

If the PSH facility detects a faulty component, use the `fm̄adm 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 52](#)
- [“Check for PSH-Detected Faults” on page 52](#)
- [“Clear PSH-Detected Faults” on page 54](#)

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 50
- “Check for PSH-Detected Faults” on page 52
- “Clear PSH-Detected Faults” on page 54

▼ Check for PSH-Detected Faults

Use the `fmadm faulty` command to display the list of faults detected by the Oracle Solaris PSH facility. You can run this command either from the host or through the Oracle ILOM `fmadm` shell.

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

1. Check the event log using `fmadm faulty`:

```
# fmadm faulty
TIME                EVENT-ID                MSG-ID                SEVERITY
Aug 13 11:48:33    *****_*****_*****_*****_*****
                                     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)
- Universal Unique Identifier (UUID). The UUID is unique for every fault (21a8b59e-89ff-692a-c4bc-f4c5cccca8c8)
- Message identifier, 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 message ID to obtain more information about this type of fault:

- a. Obtain the message 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 message ID in the Search Knowledge Base search window.

The following example shows the knowledge article information provided for message 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.
```

Note – The information provided in a knowledge articles might be updated. If you are experiencing the message ID used in this example, be sure to refer to the latest information at <http://support.oracle.com>.

3. Follow the suggested actions to repair the fault.

Related Information

- [“Clear PSH-Detected Faults” on page 54](#)
- [“PSH-Detected Fault Example” on page 52](#)

▼ Clear PSH-Detected Faults

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

3. Clear the fault from all persistent fault records.

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

```
# fmadm replaced /SYS/MB
```

For the component referenced in the example in [Step 2](#) (the motherboard) enter the following command:

```
# fmadm replaced *****_****_****_****_*****
```

Note that you should use one of the following `fmadm` commands released with the Oracle Solaris 10 05/09 OS based on whether you are replacing a component or whether you have repaired the component in some way:

- Use `fmadm repaired` when a physical repair is performed to resolve a problem with a faulted component. For example, use this command if you have reinstalled a card after straightening a bent pin and reseating the card.
- Use `fmadm replaced` when you install a new component to replace a faulted component and the new component is not automatically discovered by the system.

Note – The system generally detects new components when a new serial number is introduced into the system, but in cases where fault information remains, the `fmadm replaced` command will clear any faults that persist in the system after discovery.

Refer to the `fmadm` man page for more information about these commands.

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 50](#)
- [“PSH-Detected Fault Example” on page 52](#)

Managing Components (ASR)

The following topics explain the role played by the ASR feature and how to manage the components it controls.

- “ASR Overview” on page 57
- “Display System Components” on page 58
- “Disable System Components” on page 59
- “Enable System Components” on page 59

ASR Overview

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

- CPU strands
- Memory DIMMs
- I/O subsystem

The database that contains the list of disabled components is referred to as 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 and 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 <code>asr-db</code> blacklist, where <i>asrkey</i> is the component to enable.
<code>set <i>asrkey</i> component_state=Disabled</code>	Adds a component to the <code>asr-db</code> 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 58](#)
- [“Disable System Components” on page 59](#)
- [“Enable System Components” on page 59](#)

▼ Display System Components

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

- **At the `->` prompt, enter the `show components` command.**

In the following example, `PCIE3` is shown as disabled.

```
-> show components
```

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

- “View System Message Log Files” on page 38
- “Disable System Components” on page 59
- “Enable System Components” on page 59

▼ Disable System Components

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

1. At the `->` prompt, set the `component_state` property to `Disabled`.

```
-> set /SYS/MB/CMP0/BR1/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 actually powered off. Powering off takes about a minute. Use the `show /HOST` command to determine if the host has powered off.

Related Information

- “View System Message Log Files” on page 38
- “Display System Components” on page 58
- “Enable System Components” on page 59

▼ Enable System Components

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

1. At the `->` prompt, set the `component_state` property to `Enabled`.

```
-> set /SYS/MB/CMP0/BR1/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 actually powered off. Powering off takes about a minute. Use the `show /HOST` command to determine if the host has powered off.

Related Information

- “View System Message Log Files” on page 38
- “Display System Components” on page 58
- “Disable System Components” on page 59

Preparing for Service

These topics describe how to prepare the server for servicing.

- “Safety Information” on page 61
- “Tools Needed For Service” on page 63
- “Find the Server Serial Number” on page 63
- “Locate the Server” on page 65
- “Understanding Component Replacement Categories” on page 65
- “Shut Down the Server” on page 67
- “Removing Power From the Server” on page 68
- “Positioning the System for Servicing” on page 71
- “Accessing Internal Components” on page 74
- “Filler Panels” on page 76
- “Attaching Devices to the Server” on page 77

Related Information

- “Identifying Components” on page 1

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 T4-2 Safety and Compliance Guide*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment’s electrical rating label.

- Follow the ESD safety practices as described in this section.

Safety Symbols

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



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



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



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

ESD Measures

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



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



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

Antistatic Wrist Strap Use

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

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

Antistatic Mat

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

Tools Needed For Service

You will need the following tools for most service operations:

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

Related Information

- [“Safety Information” on page 61](#)

▼ Find the Server Serial Number

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

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

```
-> show /SYS

/SYS
  Targets:
    MB
    MB_ENV
    USBBD
    RIO
    PDB
    FANBD
  ...
  Properties:
    type = Host System
    keyswitch_state = Normal
    product_name = SPARC T4-2
    product_part_number = 602-4954-02
    product_serial_number = BDL1026F8F
    product_manufacturer = Oracle Corporation
    fault_state = OK
    clear_fault_action = (none)
    power_state = On

  Commands:
    cd
    reset
    set
    show
    start
    stop
```

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

Related Information

- [“Front Components” on page 1](#)

▼ Locate the Server

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

1. **At the Oracle ILOM prompt, 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 with the blinking Locator LED, turn it 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.

Related Information

- [“Front Components” on page 1](#)

Understanding Component Replacement Categories

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

- [“Hot Service, Replaceable by Customer” on page 66](#)
- [“Cold Service, Replaceable by Customer” on page 66](#)
- [“Cold Service, Replaceable by Authorized Service Personnel” on page 67](#)

Related Information

- [“Exploring Parts of the System” on page 7](#)

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.

Component	Service information	Notes
Drive	“Servicing Drives” on page 81	Drive must be offline
Drive filler	“Servicing Drives” on page 81	Needed to preserve proper interior air flow
Power supply	“Servicing Power Supplies” on page 99	If two power supplies are in use; otherwise, cold service
Fan module	“Servicing Fan Modules” on page 93	Removal of fan in rear row requires replacement within 30 seconds to avoid overheating

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 70](#) 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.

Component	Service information	Notes
DIMMs	“Servicing Memory Risers and DIMMs” on page 105	
DVD drive/filler	“Servicing DVD Drives” on page 137	Remove any media prior to replacement Must be installed to preserve proper interior air flow
System battery	“Servicing the System Lithium Battery” on page 141	
I/O cards (PCIe2/XAUI)/filler	“Servicing Expansion (PCIe) Cards” on page 145	

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

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.

Component	Service information	Notes
Fan board	“Servicing the Fan Board” on page 155	
Motherboard	“Servicing the Motherboard” on page 159	Transfer system configuration PROM to new motherboard.
Drive backplane	“Servicing the Drive Backplane” on page 175	
Power supply backplane	“Servicing the Power Supply Backplane” on page 179	

See [“Cold Service, Replaceable by Customer” on page 66](#) for the steps involved in shutting down the server.

▼ Shut Down the Server

To shut the server down, perform the following steps:

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

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

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

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

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

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

4. Shut down all logical domains.

Refer to 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 70.) This button is recessed to prevent accidental server power-off.

Removing Power From the Server

Description	Links
Power off the server in one of three ways, depending on your circumstances.	<ul style="list-style-type: none">• “Power Off the Server (SP Command)” on page 69• “Power Off the Server (Power Button - Graceful)” on page 70• “Power Off the Server (Emergency Shutdown)” on page 70
Disconnect the power cords from the server.	“Disconnect Power Cords” on page 70

Related Information

- [“Front Components”](#) on page 1

▼ Power Off the Server (SP Command)

You can use the service processor 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 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 Solaris system administration documentation for additional information.

5. Shut down the Solaris OS.

Refer to the 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 70](#).) 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 70](#)
- [“Power Off the Server \(Emergency Shutdown\)” on page 70](#)
- [“Front Components” on page 1](#)

▼ 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.**

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

Related Information

- [“Power Off the Server \(SP Command\)” on page 69](#)
- [“Power Off the Server \(Emergency Shutdown\)” on page 70](#)
- [“Front Components” on page 1](#)

▼ 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 five seconds.**

Related Information

- [“Power Off the Server \(SP Command\)” on page 69](#)
- [“Power Off the Server \(Power Button - Graceful\)” on page 70](#)
- [“Front Components” on page 1](#)

▼ Disconnect Power Cords

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

- **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.

Related Information

- [“Power Off the Server \(SP Command\)” on page 69](#)
- [“Power Off the Server \(Power Button - Graceful\)” on page 70](#)

- “Power Off the Server (Emergency Shutdown)” on page 70
- “Rear Components” on page 3

Related Information

- “Safety Information” on page 61

Positioning the System for Servicing

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

- “Extend the Server to the Maintenance Position” on page 71
- “Release the CMA” on page 72
- “Remove the Server From the Rack” on page 73

Related Information

- “Safety Information” on page 61

▼ Extend the Server to the Maintenance Position

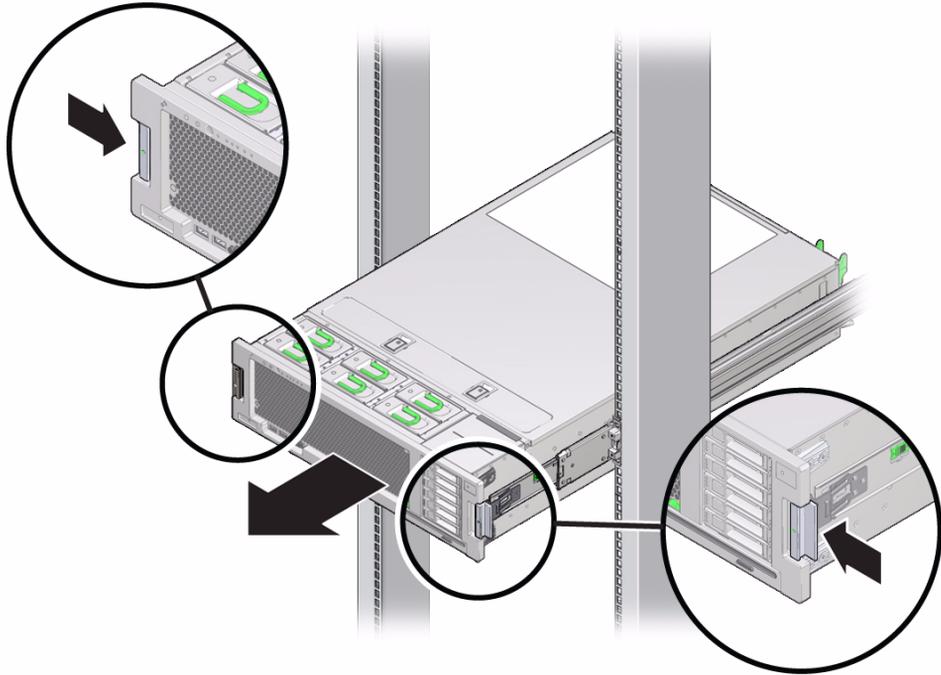
The following components can be serviced with the server in the maintenance position:

- Drives
- Fan modules
- Power supplies
- DVD module
- Fan boards
- DIMMs
- PCIe/XAUI cards
- System battery

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

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

2. From the front of the server, release the two slide release latches.
Squeeze the green slide release latches to release the slide rails.



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

Related Information

- “Release the CMA” on page 72
- “Remove the Server From the Rack” on page 73

▼ Release the CMA

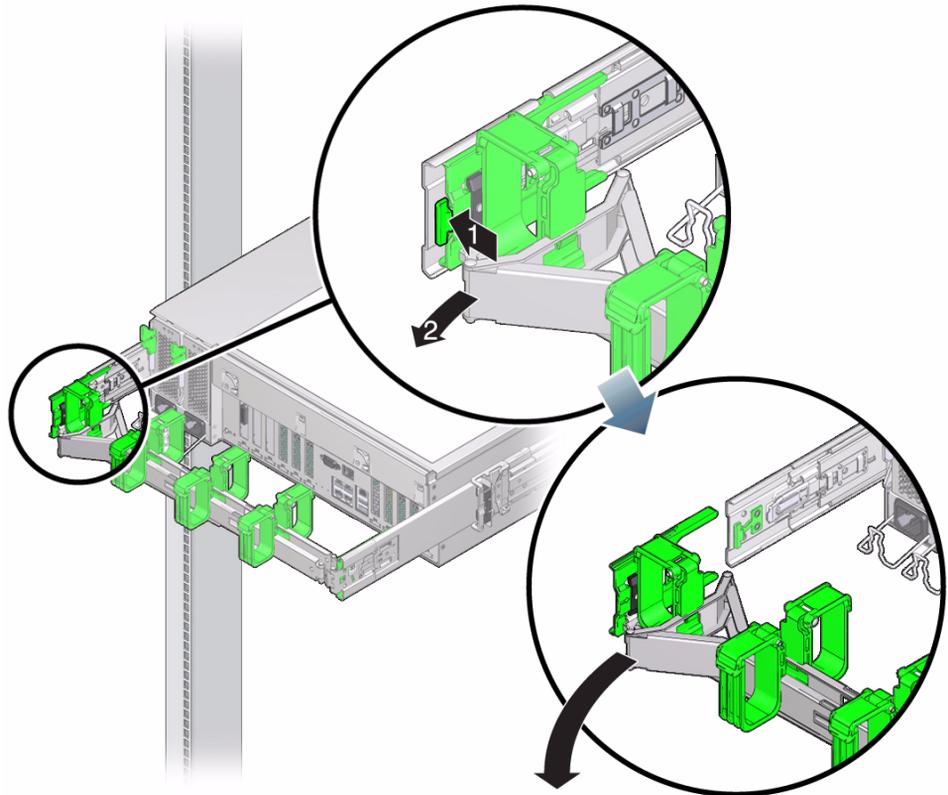
For some service procedures, if you are using a cable management arm (CMA), you might need to release the CMA to gain access to the rear of the chassis.

Note – For instructions on how to install the CMA for the first time, refer to *SPARC T4-2 Installation Guide*.

1. Press and hold the tab.

2. Swing the CMA out of the way.

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



Related Information

- “Extend the Server to the Maintenance Position” on page 71
- “Remove the Server From the Rack” on page 73

▼ Remove the Server From the Rack

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

- Motherboard
- Power supply backplane
- Drive backplane



Caution – The server requires two people to safely remove and carry it.

1. **Shut down the host.**
2. **Remove power from the system.**
See “[Removing Power From the Server](#)” on page 68.
3. **Disconnect all the cables and power cords from the server.**
4. **Extend the server to the maintenance position.**
See “[Extend the Server to the Maintenance Position](#)” on page 71.
5. **Release the CMA from the rail assembly.**
The CMA is still attached to the cabinet, but the server chassis is now disconnected from the CMA. See “[Release the CMA](#)” on page 72.
6. **From the front of the server, pull the release tabs forward and pull the server forward until it is free of the rack rails.**
A release tab is located on each rail.
7. **Set the server on a sturdy work surface.**

Related Information

- “[Extend the Server to the Maintenance Position](#)” on page 71
- “[Release the CMA](#)” on page 72

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 ESD.

- “[Prevent ESD Damage](#)” on page 74
- “[Remove the Top Cover](#)” on page 75

▼ Prevent ESD Damage

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

1. Prepare an antistatic surface to set parts on during the removal, 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.

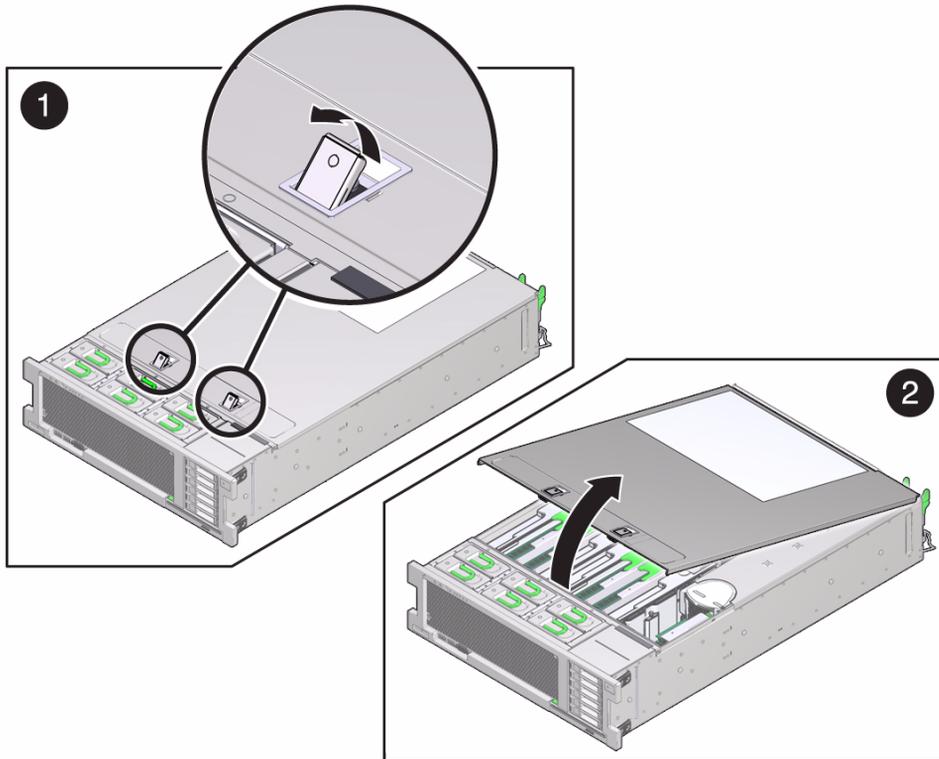
When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis.

▼ Remove the Top Cover



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

- 1. Ensure that the AC power cords are disconnected from the server power supplies.**
- 2. To unlatch the server top cover, insert your fingers under the two cover latches and simultaneously lift both latches in an upward motion as shown in panel 1 of the following figure.**



3. Lift the cover slightly and slide it toward the front of the server chassis about 0.5 inch (12 mm).
4. Lift up and remove the top cover as shown in panel 2 of the preceding figure.

Related Information

- [“Replace the Top Cover” on page 185](#)

Filler Panels

Each server is shipped with module-replacement filler panels for drives, memory modules (DIMMs), the DVD drive, and the PCIe cards. A filler panel is an empty metal or plastic enclosure that does not contain any functioning system hardware or cable connectors.

The filler panels are installed at the factory and must remain in the server until you replace them with a purchased module to ensure proper airflow through the system. If you remove a filler panel and continue to operate your system with an empty module slot, the server might overheat due to improper airflow. For instructions on removing or installing a filler panel for a server component, refer to the section in this guide about servicing that component.

Attaching Devices to the Server

During service procedures, you might have to connect devices to the server. The following sections describe the locations of connectors on the server and the order in which you should attach cables and devices to the server.

- [“Rear Panel Connectors” on page 77](#)
- [“Cable the Server” on page 78](#)

Rear Panel Connectors

The following figure shows and describes the locations of the rear panel connectors and rear LEDs on the server.

FIGURE: Server Rear Panel Connectors

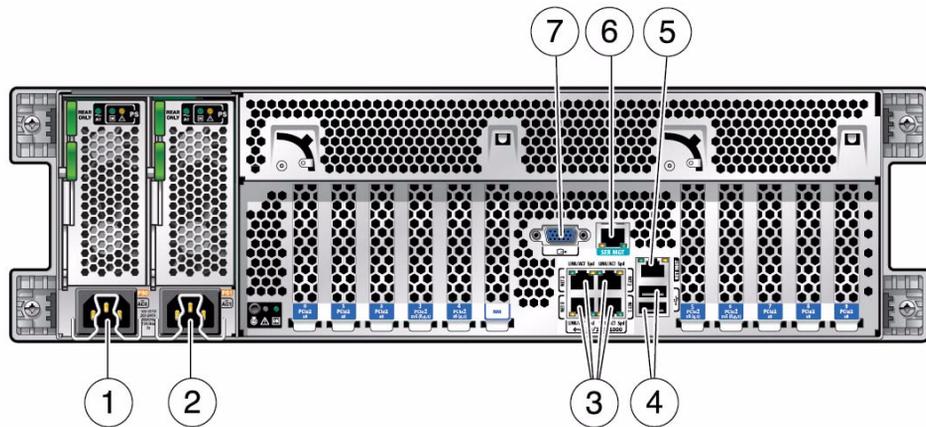


Figure Legend

1 Power supply unit 0 AC inlet	5 Service processor (SP) network management (NET MGT) Ethernet port
2 Power supply unit 1 AC inlet	6 Serial management (SER MGT)/RJ-45 serial port
3 Gigabit Ethernet ports NET-0, 1, 2, 3	7 DB-15 video connector
4 USB 2.0 ports	

▼ Cable the Server

Connect external cables to the server in the following order. Refer to “[Rear Panel Connectors](#)” on page 77 for the location of connectors on the rear of the server.

1. **Connect an Ethernet cable to the Gigabit Ethernet (NET) connectors as needed for OS support.**
2. **(Optional) If you plan to interact with the system console directly, connect any additional external devices, such as a mouse and keyboard, to the server’s USB connectors and/or a monitor to the DB-15 video connector.**
3. **If you plan to connect to the Oracle ILOM software over the network, connect an Ethernet cable to the Ethernet port labeled NET MGT.**

Note – The service processor (SP) uses the NET MGT (out-of-band) port by default. You can configure the SP to share one of the sever’s four 10/100/1000 Ethernet ports instead. The SP uses only the configured Ethernet port.

4. If you plan to access the Oracle ILOM command-line interface (CLI) using the management port, connect a serial null modem cable to the RJ-45 serial port labeled SER MGT.

Servicing Drives

These topics explain how to remove and install drives.

- “Drive Overview” on page 81
- “Locate a Faulty Drive” on page 82
- “Remove a Drive Filler Panel” on page 83
- “Remove a Drive” on page 85
- “Install a Drive” on page 87
- “Install a Drive Filler Panel” on page 89
- “Verify Drive Functionality” on page 90

Drive Overview

The server provides six 2.5-inch drive bays, accessible through the front panel. Drives can be removed and installed while the server is running. This feature, referred to as being *hot-swappable*, depends on how the drives are configured.

Note – Both traditional, disk-based storage devices, and Flash SSDs, which are diskless storage devices based on solid-state memory, are supported. The terms “drive” and “HDD” are used in a generic sense to refer to both types of internal storage devices.

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

A drive should not be hot-swapped when either of the following conditions exist:

- The drive contains the sole image of the operating system—that is, the operating system is not mirrored on another drive.
- The drive cannot be logically isolated from the server’s online operations.

If either condition exists, you must power off the server before replacing the drive.

Related Information

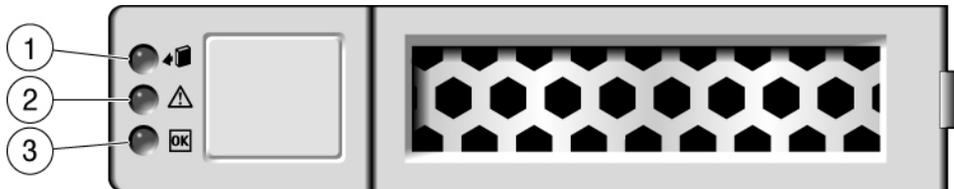
- “System Schematic” on page 12
- “Understanding Component Replacement Categories” on page 65
- “Remove a Drive Filler Panel” on page 83
- “Remove a Drive” on page 85
- “Install a Drive” on page 87
- “Install a Drive Filler Panel” on page 89
- “Verify Drive Functionality” on page 90

▼ Locate a Faulty Drive

This procedure describes how to identify a faulty drive using the fault LEDs on the drive.

- **View the drive LEDs to determine the status of the drive.**

When the amber Service Required LED on the front of a drive is lit, a fault has occurred on that drive.



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

LED	Color	Description
1 Ready to Remove	Blue	Indicates that a drive can be removed during a hot-swap operation.
2 Service Required	Amber	Indicates that the drive has experienced a fault condition.

LED	Color	Description
3 OK/Activity (HDDs)		Green Indicates the drive's availability for use. <ul style="list-style-type: none"> • On -- Read or write activity is in progress. • Off -- Drive is idle and available for use.
OK/Activity (SSDs)		Green Indicates the drive's availability for use. <ul style="list-style-type: none"> • On -- Read or write activity is in progress. • Off -- Drive is idle and available for use. • Flashes on and off -- This occurs during hot-plug operations. It can be ignored.

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

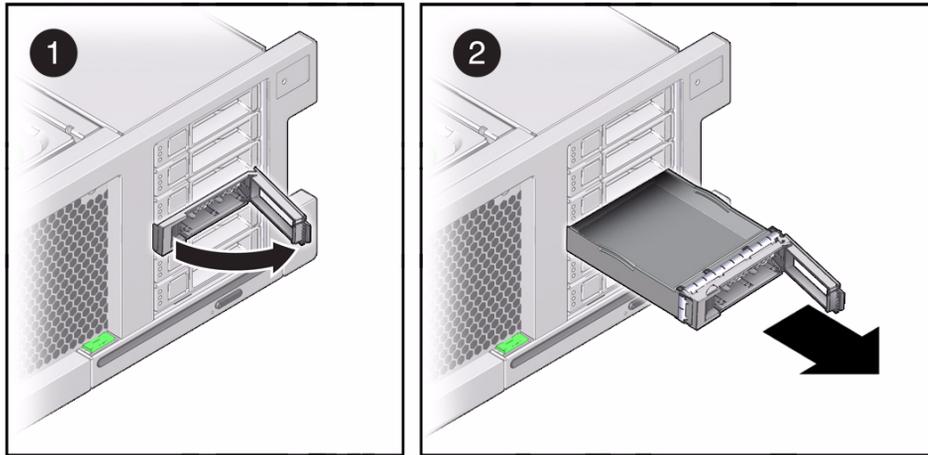
Related Information

- [“Front Components” on page 1](#)
- [“Rear Components” on page 3](#)
- [“Remove a Drive” on page 85](#)
- [“Install a Drive” on page 87](#)
- [“Remove a Drive Filler Panel” on page 83](#)
- [“Install a Drive Filler Panel” on page 89](#)
- [“Verify Drive Functionality” on page 90](#)

▼ Remove a Drive Filler Panel

This procedure can be performed by customers while the server is running. See [“Hot Service, Replaceable by Customer” on page 66](#) for more information about hot service procedures.

1. **Attach an antistatic wrist strap.**
2. **On the drive filler panel you want to remove, complete the following tasks.**



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

- a. Push the release button to open the latch and unlock the drive filler panel by moving the latch to the right.
- b. Grasp the latch and pull the filler panel out of the drive slot.



Caution – When you remove a drive filler panel, replace it with another filler panel or a drive; otherwise, the server might overheat due to improper airflow.

Related Information

- [“Locate a Faulty Drive”](#) on page 82
- [“Remove a Drive”](#) on page 85
- [“Install a Drive”](#) on page 87
- [“Install a Drive Filler Panel”](#) on page 89
- [“Verify Drive Functionality”](#) on page 90

▼ Remove a Drive

This procedure can be performed by customers while the server is running. See [“Hot Service, Replaceable by Customer” on page 66](#) for more information about hot service procedures.

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

- If the drive contains the sole image of the OS or cannot be logically isolated from the server’s online operations, shut down the OS as described in [“Power Off the Server \(SP Command\)” on page 69](#). 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 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](#).

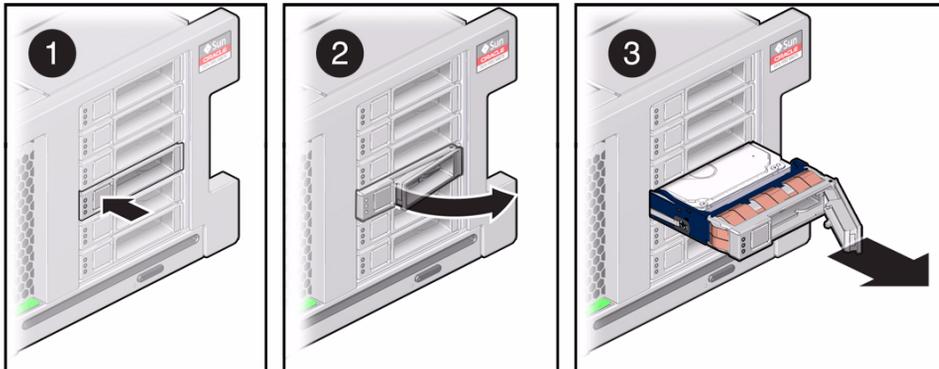
b. Unconfigure the drive using the `cfgadm -c unconfigure` command.

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. Determine whether you can replace the drive using the hot-swap procedure or whether you need to power off the server using the cold-swap procedure.
A cold-swap is required if the drive:
 - Contains the operating system, and the operating system is not mirrored on another drive.
 - Cannot be logically isolated from the online operations of the server.
4. Do one of the following:
 - To cold-swap the drive, power off the server. Complete one of the procedures described in [“Removing Power From the Server”](#) on page 68.
 - To hot-swap the drive, take the drive offline using one of the procedures in [“Power Off the Server \(Power Button - Graceful\)”](#) on page 70. This removes the logical software links to the drive and prevents any applications from accessing it.
5. If you are hot-swapping the drive, locate the drive that displays the amber Fault LED and ensure that the blue Ready-to-Remove LED is lit.
6. On the drive you want to remove, complete the following tasks.



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

- a. Push the release button to open the latch.
- b. Unlock the drive by moving the latch to the right.
- c. Grasp the latch and pull the drive out of the slot.



Caution – When you remove a drive, replace it with a filler panel or another drive; otherwise, the server might overheat due to improper airflow.

Related Information

- [“Install a Drive” on page 87](#)
- [“Remove a Drive Filler Panel” on page 83](#)
- [“Install a Drive Filler Panel” on page 89](#)
- [“Verify Drive Functionality” on page 90](#)

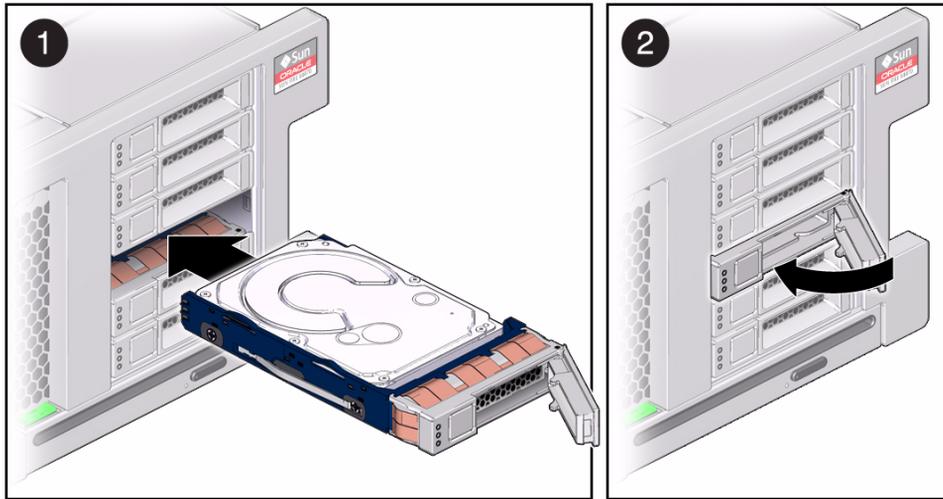
▼ Install a Drive

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

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

1. **Unpack the drive and place it on an antistatic mat.**
2. **Verify that the release lever on the drive is fully opened.**
3. **Install the drive by completing the following tasks.**

Note – 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.



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

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

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

- If you cold-swapped the drive, restore power to the server. Complete the procedure described in “Power On the Server (Oracle ILOM)” on page 188 or “Power On the Server (Power Button)” on page 188.
- If you hot-swapped the drive, configure it using the `cfgadm -c configure` command. The following example shows the drive at `c0::dsk/c1t1d0` being configured.

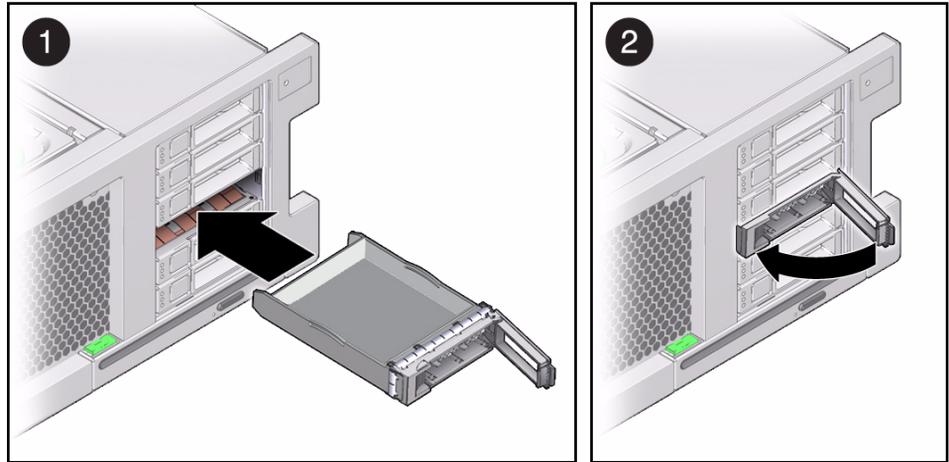
```
# cfgadm -c configure c0::dsk/c1t1d0
```

Related Information

- “Locate a Faulty Drive” on page 82
- “Remove a Drive” on page 85
- “Remove a Drive Filler Panel” on page 83
- “Install a Drive Filler Panel” on page 89
- “Verify Drive Functionality” on page 90

▼ Install a Drive Filler Panel

1. Verify that the release lever on the drive filler panel is fully opened.
2. Install the drive by completing the following tasks.



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

Related Information

- [“Locate a Faulty Drive”](#) on page 82
- [“Remove a Drive”](#) on page 85
- [“Install a Drive”](#) on page 87
- [“Remove a Drive Filler Panel”](#) on page 83
- [“Verify Drive Functionality”](#) on page 90

▼ Verify Drive Functionality

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 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 [“Locate a Faulty Drive”](#) on page 82.

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, as shown in the following example:

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

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

- If the previous steps did not verify the drive, see [“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 Solaris OS administration documentation.

For additional drive verification, you can run Oracle VTS. Refer to the Oracle VTS documentation for details.

Servicing Fan Modules

These topics explain how to service faulty fan modules.

- [“Fan Module Overview”](#) on page 93
- [“Locate a Faulty Fan Module”](#) on page 94
- [“Remove a Fan Module”](#) on page 95
- [“Install a Fan Module”](#) on page 97
- [“Verify Fan Module Functionality”](#) on page 98

Fan Module Overview

The six fan modules in the server are located at the front of the chassis; you can access them without removing the server cover. Each fan module contains a single fan that is mounted in an integrated, hot-swappable CRU.



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

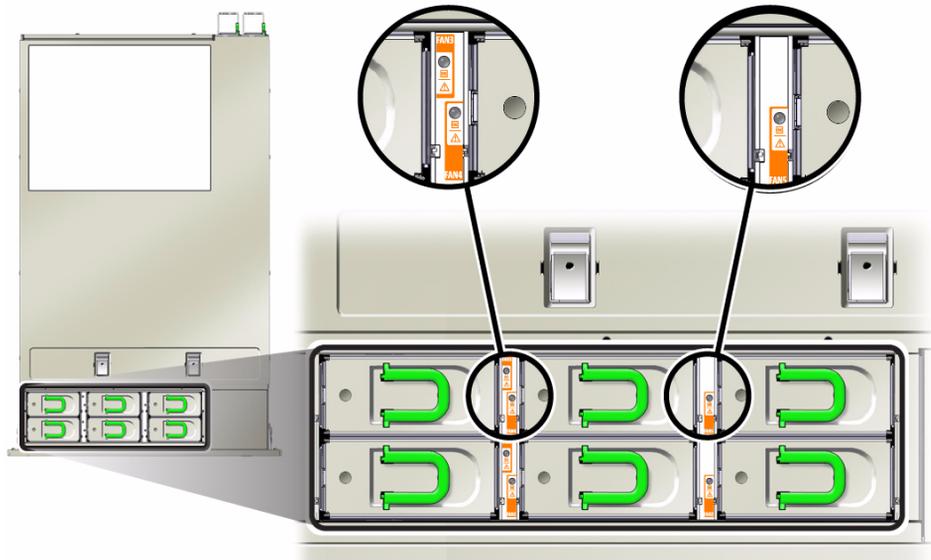
Related Information

- [“Understanding Component Replacement Categories”](#) on page 65
- [“Remove a Fan Module”](#) on page 95
- [“Install a Fan Module”](#) on page 97
- [“Verify Fan Module Functionality”](#) on page 98

▼ Locate a Faulty Fan Module

This procedure describes how to identify a faulty fan module.

- **View the following LEDs, which are lit when a fan module fault is detected.**
 - Fan Module (FAN) Fault LED on the front of the server (refer to “[Front Components](#)” on page 1).
 - Fan Fault LED on or adjacent to the faulty fan module (refer to the following illustration). Each fan module contains an LED. When the amber Service Required LED is lit, a fault has occurred on that fan module.



The following table describes the status LEDs located on the fan modules.

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

Note – The front and rear panel Service Action Required LEDs are also lit when the system detects a fan module fault. The system Overtemp LED might also light if a fan fault causes an increase in system operating temperature.

Related Information

- [“Front Components” on page 1](#)
- [“Rear Components” on page 3](#)
- [“Extend the Server to the Maintenance Position” on page 71](#)
- [“Remove a Fan Module” on page 95](#)

▼ Remove a Fan Module



Caution – If you remove one of the fans in the rear row (fans 3, 4, or 5), replace it within 30 seconds to prevent overheating of the server.



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

This procedure can be performed by customers while the server is running. See [“Hot Service, Replaceable by Customer” on page 66](#) for more information about hot service procedures.

1. **Prepare for servicing:**
 - a. **Attach an antistatic wrist strap.**
 - b. **Extend the server to the maintenance position.**
2. **Identify the faulty fan module with a corresponding Service Required LED.**

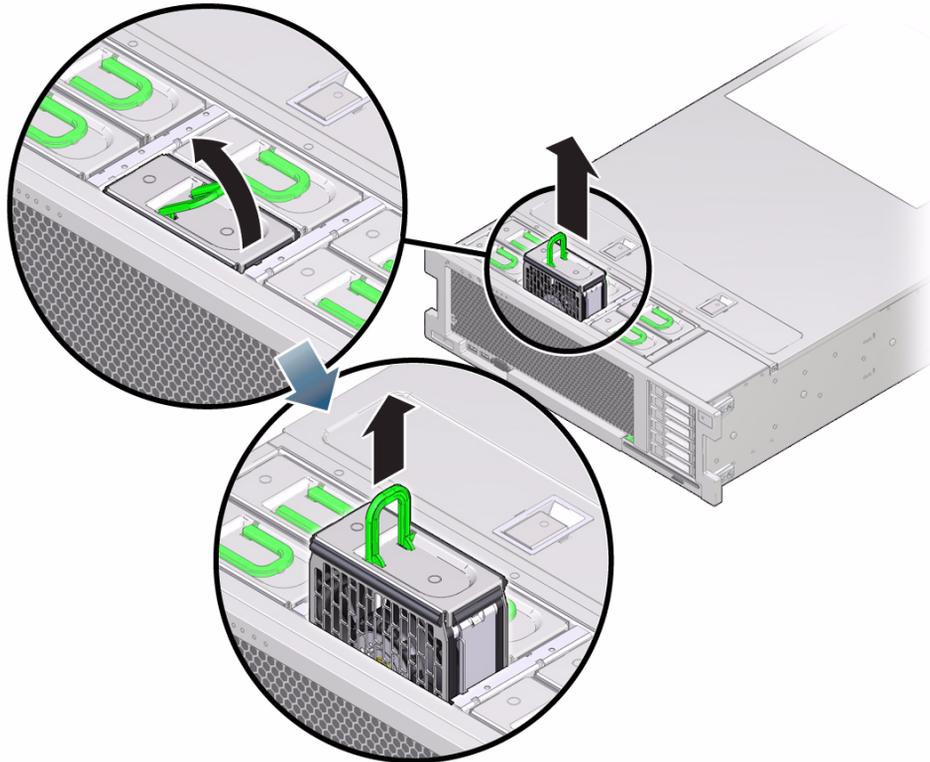
The Service Action Required LEDs are located on the fan module as shown in [“Locate a Faulty Fan Module” on page 94](#).
3. **Using your thumb and forefinger, grasp the handle on the fan module and lift it out of the server.**



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



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



Related Information

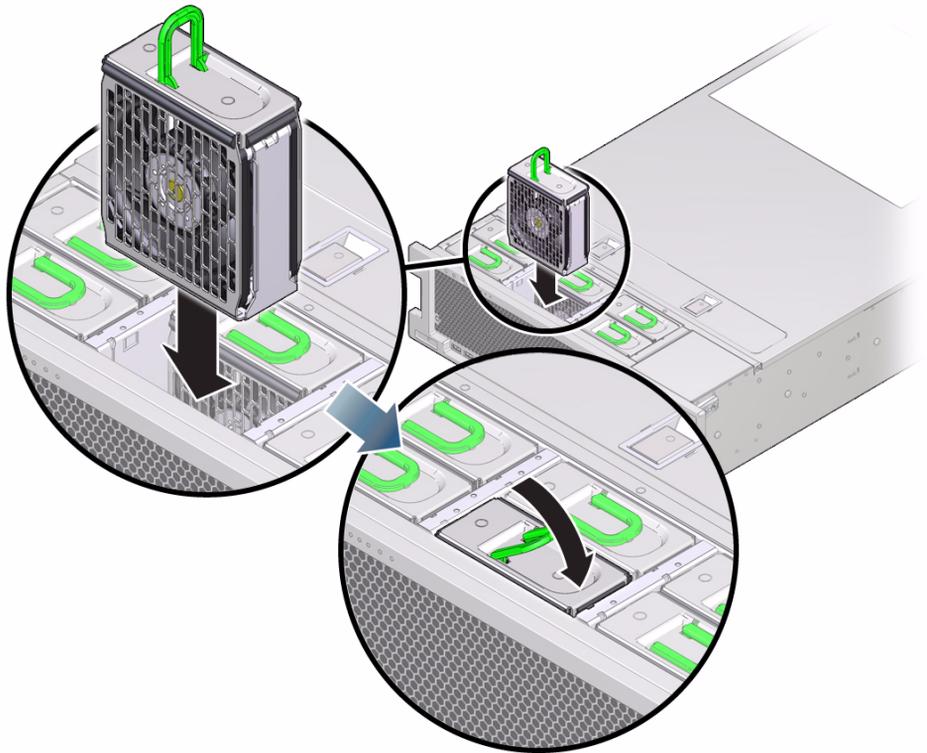
- [“Extend the Server to the Maintenance Position”](#) on page 71
- [“Install a Fan Module”](#) on page 97

▼ Install a Fan Module



Caution – To ensure proper system cooling, be certain to install the replacement fan module in the same slot from which the faulty fan was removed.

1. **Unpack the replacement fan module and place it on an antistatic mat.**
2. **Install the replacement fan module into the server by completing the following tasks.**



- a. **Align the fan module and slide it into the fan slot.**

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

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

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

3. **Return the server to the normal rack position.**

Related Information

- [“Return the Server to the Normal Rack Position” on page 186](#)
- [“Remove a Fan Module” on page 95](#)
- [“Verify Fan Module Functionality” on page 98](#)

▼ Verify Fan Module Functionality

1. **Verify that the Service Required LED on the replaced fan module is not lit.**
2. **Verify that the Top Fan LED and the Service Required LED on the front of the server are not lit.**

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

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

See [“Managing Faults \(Oracle ILOM\)” on page 23](#) for more information on using the `show faulty` command.

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

- If the previous steps did not clear the fault, see [“Detecting and Managing Faults” on page 15](#) for information about the tools and methods you can use to diagnose component faults.
- If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

Related Information

- [“Locate a Faulty Fan Module” on page 94](#)
- [“Front Components” on page 1](#)
- [“Rear Components” on page 3](#)

Servicing Power Supplies

These topics explain how to remove and replace power supply modules.

- [“Power Supply Overview” on page 99](#)
- [“Locate a Faulty Power Supply” on page 100](#)
- [“Remove a Power Supply” on page 101](#)
- [“Install a Power Supply” on page 103](#)

Power Supply Overview

These servers are equipped with redundant hot-swappable power supplies. With redundant power supplies, you can remove and replace a power supply without shutting the server down, provided that the other power supply is online and working.

The server offers two redundancy modes for the power supplies. Light load efficiency mode (LLEM) places PS1 in a warm standby condition while PS0 carries the entire load more efficiently by itself. If PS0 loses AC power or is extracted for replacement, PS1 takes over the load automatically. Some rare internal failures of PS0 could cause the server to lose power faster than PS1 can take over.

Disabling the LLEM Policy causes the power supplies to share the load at all times, at the expense of efficiency during light loads. For information about configuration policies, refer to the *SPARC T4 Series Servers Administration Guide* and the Oracle ILOM documentation.



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

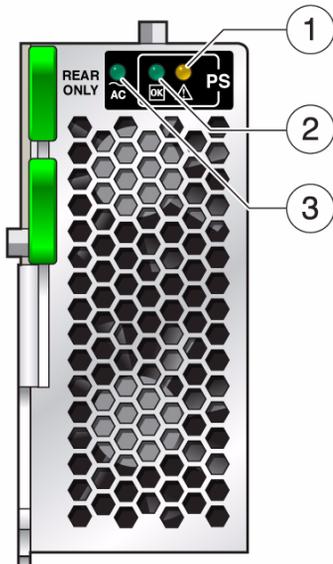
Related Information

- “Understanding Component Replacement Categories” on page 65
- “Locate a Faulty Power Supply” on page 100
- “Remove a Power Supply” on page 101
- “Install a Power Supply” on page 103
- “Verify Power Supply Functionality” on page 104

▼ Locate a Faulty Power Supply

This procedure describes how to identify a faulty power supply.

- **View the following LEDs, which are lit when a power supply fault is detected.**
 - Rear PS Fault LED on the front bezel of the server (refer to “Front Components” on page 1).
 - Service Action Required LED on the faulted power supply.



Legend	LED	Symbol	Color	Lights When...
1	Service Action Required		Amber	The power supply is faulty. Service action is required.
2	OK		Green	Both DC outputs (3.3V standby and 12V main) are active and within regulation.
3	AC Present		Green	This LED turns on when AC voltage is applied to the power supply.

Note – The front and rear panel Service Action Required LEDs are also lit when the system detects a power supply fault.

Related Information

- [“Front Components” on page 1](#)
- [“Rear Components” on page 3](#)
- [“Remove a Power Supply” on page 101](#)

▼ Remove a Power Supply



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

This procedure can be performed by customers while the server is running. See [“Hot Service, Replaceable by Customer” on page 66](#) for more information about hot service procedures.

1. Prepare for servicing:

- a. Attach an antistatic wrist strap.
- b. If necessary, release the cable management arm to access the power supplies.
See [“Release the CMA” on page 72](#).

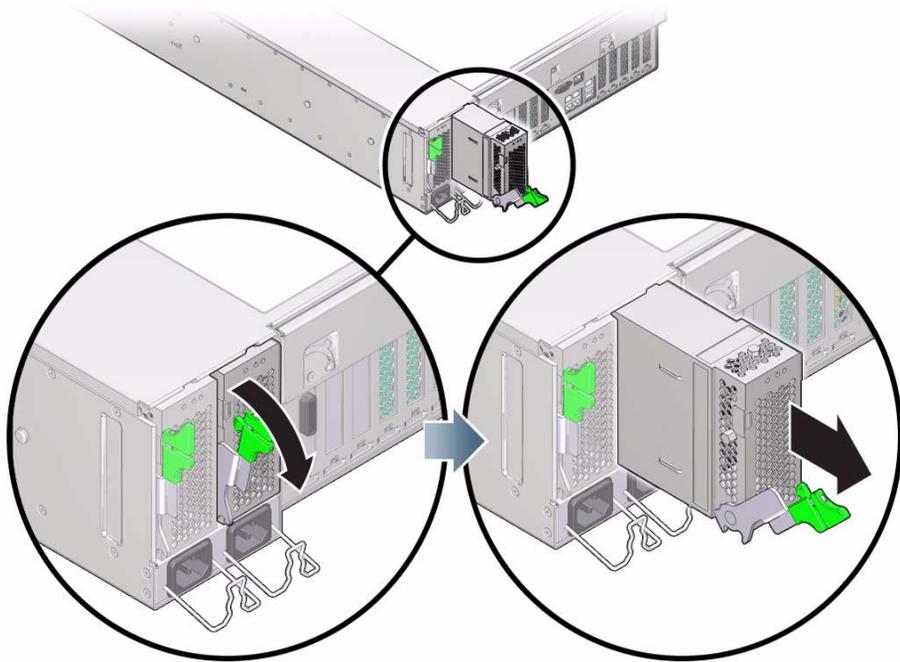
2. Disconnect the power cord from the power supply that displays an amber lit Service Action Required LED.
3. Press down on the release latch to open the ejector arm.
4. Slide the power supply out of the chassis.



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



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



Related Information

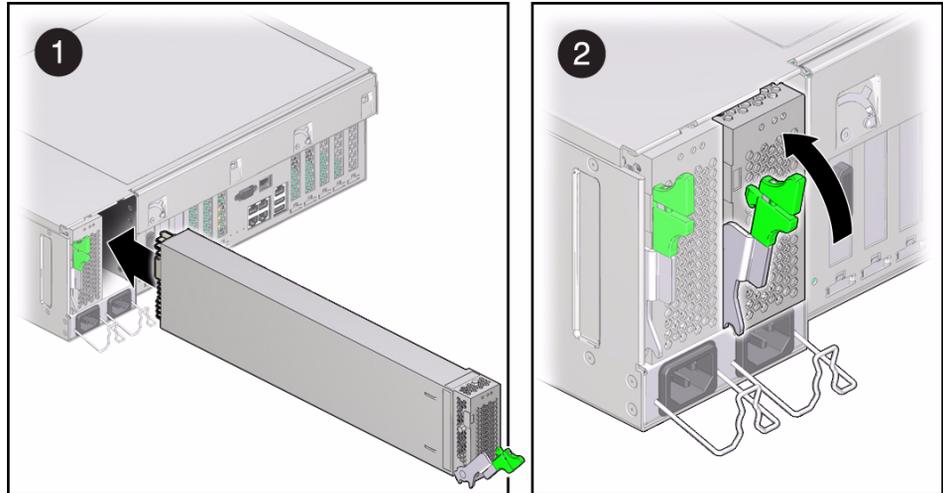
- “Locate a Faulty Power Supply” on page 100
- “Install a Power Supply” on page 103

▼ Install a Power Supply



Caution – Install an A239A power supply, labeled for upright installation, in the server. The A239A power supply correctly exhausts air from the rear of the server. Do not install an A239 power supply, which might cause the system to overheat and shut down.

1. Align the power supply with the empty power supply chassis bay.
2. Slide the power supply into the bay until it is fully seated.
3. Move the release latch up to secure the power supply in place.



4. Reconnect the power cord to the power supply.
5. Verify that the AC OK LED is lit.
See [“Locate a Faulty Power Supply”](#) on page 100.
6. Verify that the following LEDs are not lit:
 - Service Action Required LED on the power supply
 - Front and rear Service Action Required LEDs
 - Rear PS Failure LED on the bezel of the server

Related Information

- [“Remove a Power Supply”](#) on page 101

- [“Verify Power Supply Functionality” on page 104](#)

▼ Verify Power Supply Functionality

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

See [“Managing Faults \(Oracle ILOM\)” on page 23](#) for more information on using the `show faulty` command.

4. Perform one of the following tasks based on your verification results:
 - If the previous steps did not clear the fault, see [“Detecting and Managing Faults” on page 15](#) for information about the tools and methods you can use to diagnose component faults.
 - If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

Related Information

- [“Locate a Faulty Power Supply” on page 100](#)
- [“Front Components” on page 1](#)
- [“Rear Components” on page 3](#)

Servicing Memory Risers and DIMMs

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

- [“About Memory Risers” on page 105](#)
- [“About DIMMs” on page 108](#)
- [“Locate a Faulty DIMM \(DIMM Fault Remind Button\)” on page 113](#)
- [“Locate a Faulty DIMM \(show faulty Command\)” on page 116](#)
- [“Remove a Memory Riser” on page 116](#)
- [“Install a Memory Riser” on page 117](#)
- [“Remove a DIMM” on page 118](#)
- [“Install a DIMM” on page 120](#)
- [“Increase Server Memory With Additional DIMMs” on page 122](#)
- [“Increase Server Memory with Additional DIMMs \(16 Gbyte Configurations\)” on page 124](#)
- [“Remove a Memory Riser Filler Panel” on page 127](#)
- [“Install a Memory Riser Filler Panel” on page 128](#)
- [“Verify DIMM Functionality” on page 129](#)
- [“DIMM Configuration Error Messages” on page 132](#)

About Memory Risers

This section includes the following topics:

- [“Memory Risers Overview” on page 106](#)
- [“Memory Riser Population Rules” on page 106](#)
- [“Memory Riser FRU Names” on page 107](#)

Memory Risers Overview

There are four memory risers in the server, arranged in two pairs. One pair of memory risers is associated with CMP0; the other pair of memory risers is associated with CMP1. Each memory riser has slots for eight DDR3 DIMMs.

In addition, there are four memory riser filler panels in the server. These memory riser filler panels must be installed to ensure proper system airflow.

Note – The server fails to boot unless all eight memory riser slots are populated. For more information about memory riser configuration, see [“Memory Riser Population Rules”](#) on page 106.

Related Information

- [“Memory Riser Population Rules”](#) on page 106
- [“Memory Riser FRU Names”](#) on page 107
- [“About DIMMs”](#) on page 108

Memory Riser Population Rules

The memory riser population rules for the server are as follows:

- Each memory riser slot in the server chassis must be filled with either a memory riser or memory riser filler panel, arranged as illustrated in [“Memory Riser FRU Names”](#) on page 107.
- Each memory riser must be filled with DIMMs and/or DIMM filler panels, in one of the configurations described in [“Supported Memory Configurations”](#) on page 109.
- All DIMMs installed in each memory riser must be identical (identical capacity, identical rank classification).

Note – Misconfigured memory risers, such as DIMMs of mixed capacities and/or rank classifications installed on the same memory riser, might result in boot failure. See [“DIMM Configuration Error Messages”](#) on page 132.

Related Information

- [“Memory Risers Overview”](#) on page 106
- [“Memory Riser FRU Names”](#) on page 107

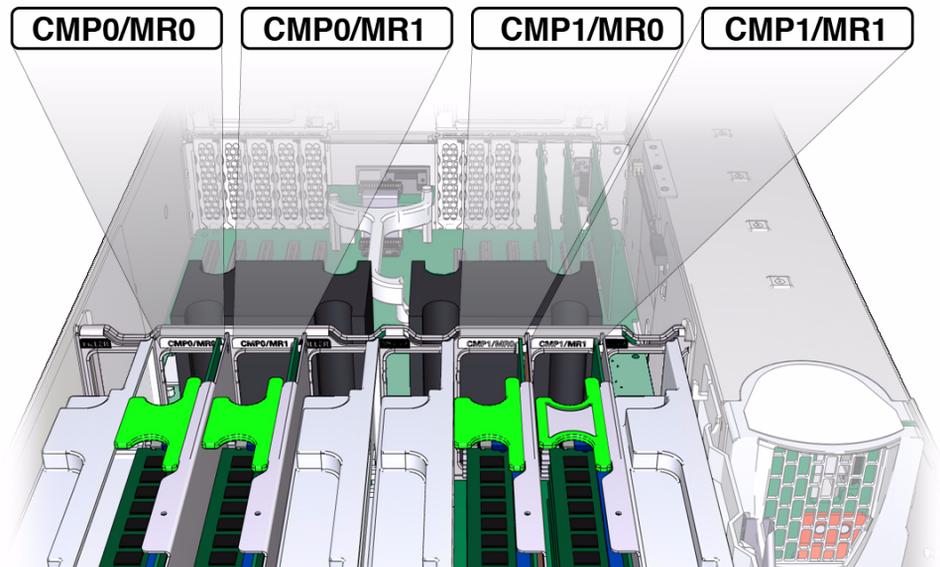
- [“About DIMMs” on page 108](#)
- [“Verify DIMM Functionality” on page 129](#)
- [“DIMM Configuration Error Messages” on page 132](#)

Memory Riser FRU Names

Two memory risers are supported per CMP:

- Memory risers associated with CMP0:
 - `/SYS/MB/CMP0/MR0`
 - `/SYS/MB/CMP0/MR1`
- Memory risers associated with CMP1:
 - `/SYS/MB/CMP1/MR0`
 - `/SYS/MB/CMP1/MR1`

Labels on the memory riser cage indicate the corresponding memory riser FRU name.



Related Information

- [“Memory Risers Overview” on page 106](#)
- [“Memory Riser Population Rules” on page 106](#)
- [“About DIMMs” on page 108](#)

About DIMMs

This section includes the following topics.

- [“DIMM Population Rules” on page 108](#)
- [“Supported Memory Configurations” on page 109](#)
- [“DIMM FRU Names” on page 110](#)
- [“DIMM Rank Classification Labels” on page 111](#)

DIMM Population Rules

Up to 32 DDR3 DIMMs can be installed in the server, with up to eight DIMMs installed in each memory riser.

When installing, upgrading, or replacing DIMMs, note the following:

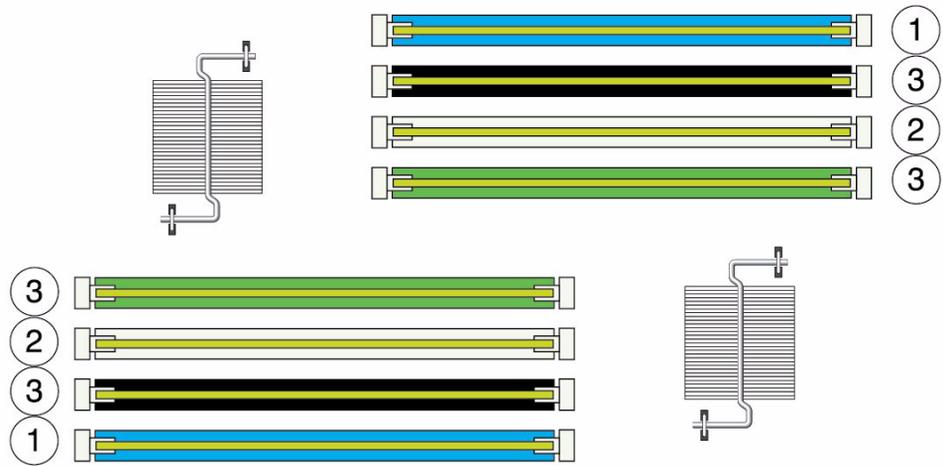
- Four DIMM capacities are supported: 4 Gbyte, 8 Gbyte, 16 Gbyte, and 32 Gbyte.

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 111](#).

- All DIMMs installed in the server must have identical capacities (all 4 Gbyte, all 8 Gbyte, all 16 Gbyte, or all 32 Gbyte).
- All DIMMs associated with each CMP must be identical (identical capacity and identical rank classification). For example, install identical DIMMs in all slots of CMP0/MR0 and CMP0/MR1, and identical DIMMs in all slots of CMP1/MR0 and CMP1/MR1.

To identify DIMM rank classification, see [“DIMM Rank Classification Labels” on page 111](#).

- The DIMM slots may be populated as 1/2 full or full.
 - 1/2 Full—In all memory risers, install DIMMs in the slots labeled 1 and 2 in the illustration, for a total of 16 DIMMs installed in the server. Install DIMM filler panels in the remaining slots.
 - Full—In all memory risers, install DIMMs in all slots (labeled 1, 2, and 3 in the illustration), for a total of 32 DIMMs installed in the server.



- Any slot without a DIMM must have a DIMM filler installed.

Related Information

- [“Memory Riser Population Rules”](#) on page 106
- [“Supported Memory Configurations”](#) on page 109
- [“DIMM FRU Names”](#) on page 110
- [“DIMM Rank Classification Labels”](#) on page 111
- [“Increase Server Memory With Additional DIMMs”](#) on page 122
- [“DIMM Configuration Error Messages”](#) on page 132

Supported Memory Configurations

The following table describes supported memory configurations.

Note – In half-populated configurations, DIMM filler panels must be installed in all unoccupied slots.

TABLE: Supported DIMM Configurations

DIMM Capacity	Number of DIMMs Installed	Total Memory Capacity
4 GB	16 (half population)	64 GB
	32 (full population)	128 GB
8 GB	16 (half population)	128 GB
	32 (full population)	256 GB
16 GB	16 (half population)	256 GB
	32 (full population)	512 GB
32 GB	16 (half population)	512 GB
	32 (full population)	1024 GB

Related Information

- [“DIMM Population Rules” on page 108](#)
- [“DIMM FRU Names” on page 110](#)
- [“DIMM Rank Classification Labels” on page 111](#)
- [“Increase Server Memory With Additional DIMMs” on page 122](#)
- [“Increase Server Memory with Additional DIMMs \(16 Gbyte Configurations\)” on page 124](#)
- [“DIMM Configuration Error Messages” on page 132](#)

DIMM FRU Names

DIMM FRU IDs are based on the location of the memory riser in the server and the DIMM slot on the memory riser. For example, the full FRU ID for the top-most DIMM slot (BOB1/CH1/D0) on the first memory riser (CMP0/MR0) is:

```
/SYS/MB/CMP0/MR0/BOB1/CH1/D0
```

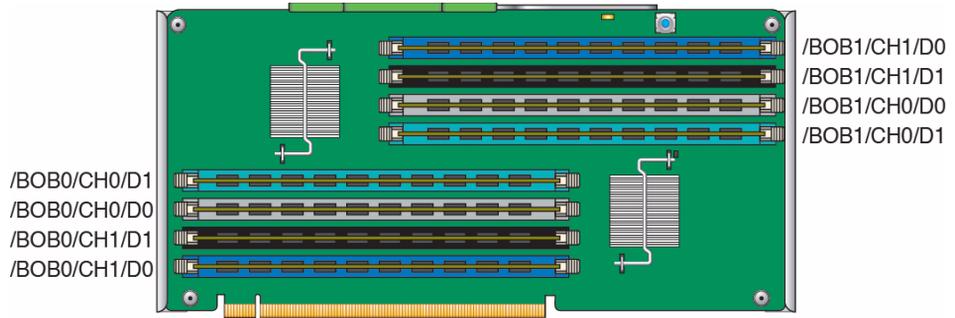


TABLE: DIMM FRU Identifiers

DIMM FRU Identifier (From Top to Bottom on Memory Riser)

/SYS/MB/CMPx/MRx/BOB1/CH1/D0
 /SYS/MB/CMPx/MRx/BOB1/CH1/D1
 /SYS/MB/CMPx/MRx/BOB1/CH0/D0
 /SYS/MB/CMPx/MRx/BOB1/CH0/D1
 /SYS/MB/CMPx/MRx/BOB0/CH0/D0
 /SYS/MB/CMPx/MRx/BOB0/CH0/D1
 /SYS/MB/CMPx/MRx/BOB0/CH1/D0
 /SYS/MB/CMPx/MRx/BOB0/CH1/D1

Related Information

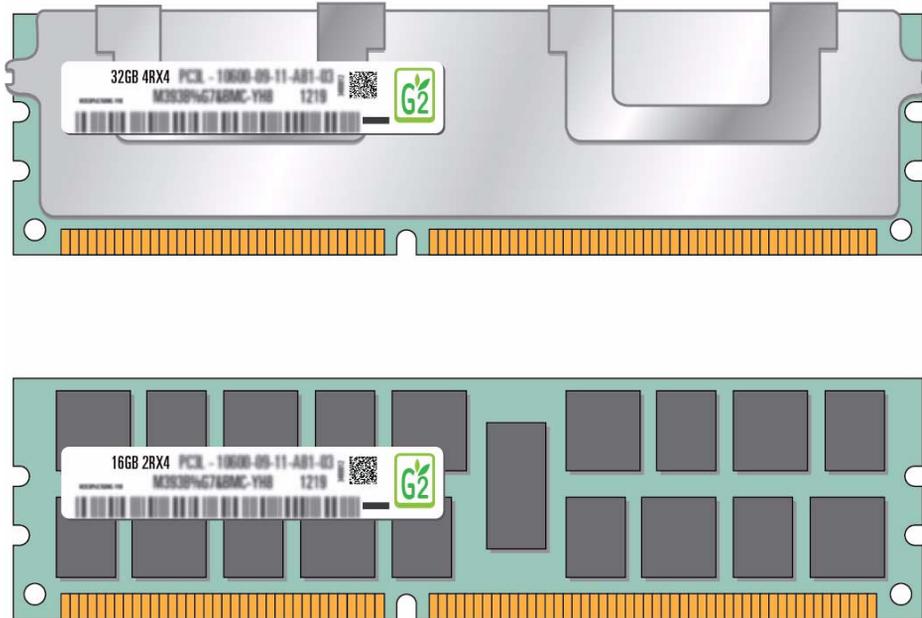
- “Memory Riser Population Rules” on page 106
- “Memory Riser FRU Names” on page 107
- “DIMM Population Rules” on page 108
- “Supported Memory Configurations” on page 109
- “DIMM Rank Classification Labels” on page 111
- “DIMM Configuration Error Messages” on page 132

DIMM Rank Classification Labels

All DIMMs installed in the server must have identical capacities. In addition, all DIMMs associated with each CMP must have identical rank classifications.

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.

FIGURE: Example DIMM Rank Classification Labels



Tip – Rank classification labels for installed DIMMs can be viewed with the memory risers installed in the server. 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 61](#).

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

Rank Type	Capacity	Rank Classification Label
Dual-rank x8 DIMMs (2Rx8)	4 Gbyte	2Rx8
Dual-rank x4 DIMMs (2Rx4)	8 Gbyte	2Rx4
	16 Gbyte	2Rx4*
Quad-rank x4 DIMMs (4Rx4)	16 Gbyte	4Rx4
	32 Gbyte	4Rx4*

* Require System Firmware 8.2.1.b or later.

Related Information

- “DIMM Population Rules” on page 108
- “Supported Memory Configurations” on page 109
- “DIMM FRU Names” on page 110
- “Increase Server Memory With Additional DIMMs” on page 122
- “Increase Server Memory with Additional DIMMs (16 Gbyte Configurations)” on page 124
- “DIMM Configuration Error Messages” on page 132

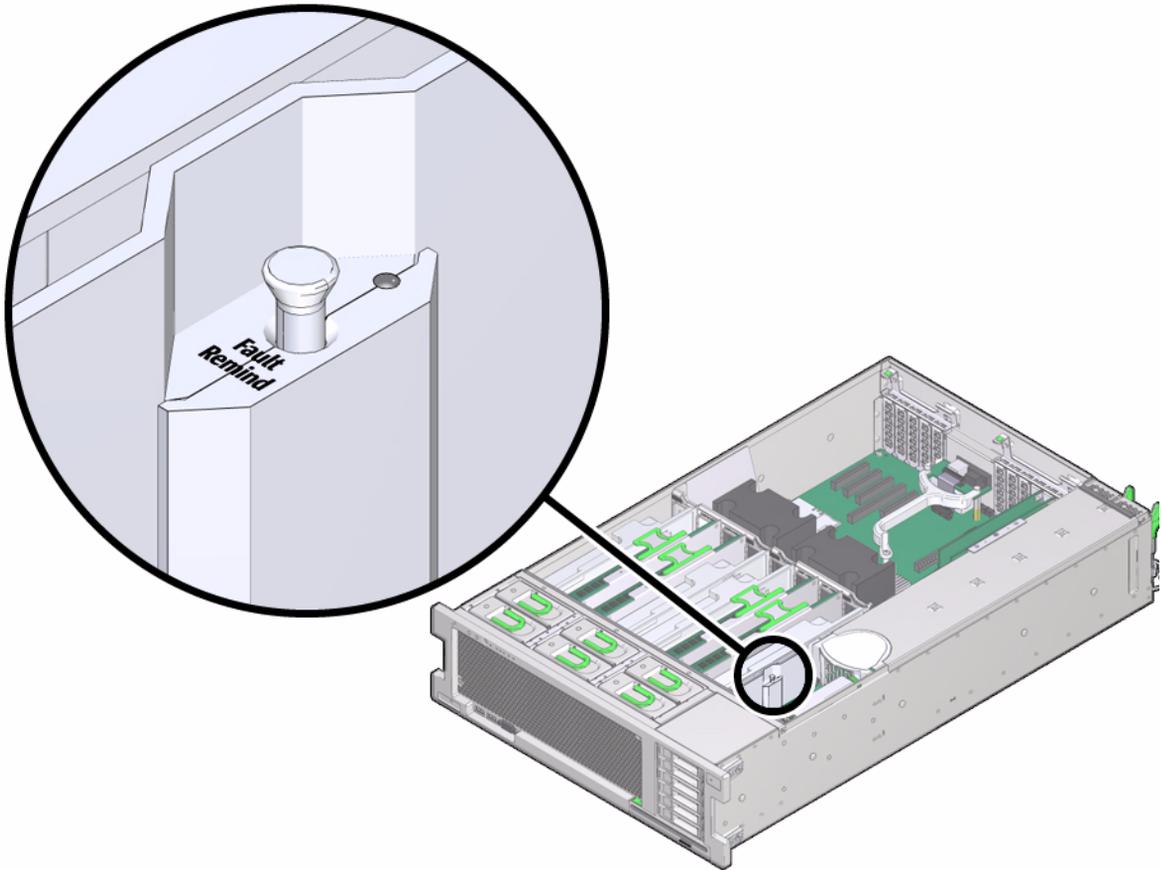
▼ Locate a Faulty DIMM (DIMM Fault Remind Button)

Each memory riser has a Remind button, a Power LED, and Fault LEDs adjacent to each DIMM. This procedure describes how to identify a faulty DIMM using these buttons and LEDs.

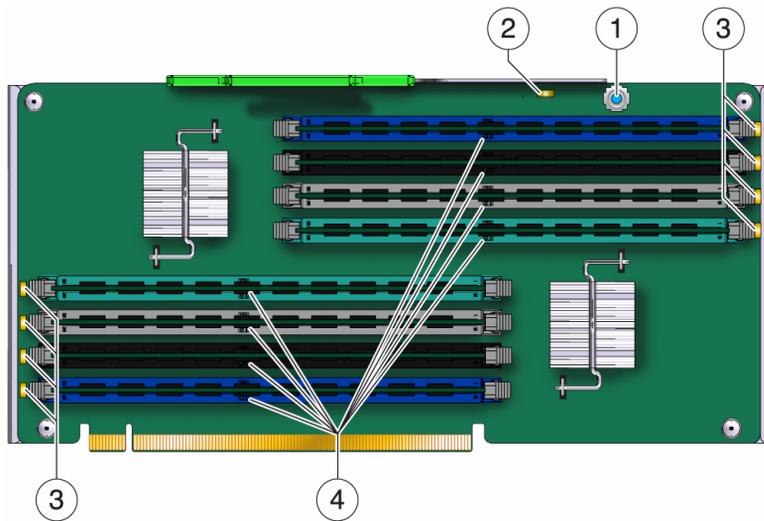
1. Consider your first steps:

- Familiarize yourself with DIMM configuration rules.
See “DIMM Population Rules” on page 108.
- Prepare the system for service.
See “Preparing for Service” on page 61.

2. Press the Fault Remind button on the air divider to identify the memory riser containing the faulty DIMM, as shown in the following figure.



- If the memory riser Service Action Required LED is off, all DIMMs on this riser are operating properly.
 - If the memory riser Service Action Required LED is on (amber), one or more of the DIMMs installed on this riser is faulty or misconfigured.
3. **Remove the memory riser containing the faulty DIMM. Place the memory riser on an ESD-protected work surface.**
See ["Remove a Memory Riser"](#) on page 116.
 4. **Press the Remind button on the memory riser to identify the faulty DIMM. An amber Fault LED will light next to the faulty DIMM.**



No.	LED	Color	Description
1	Memory riser remind button	Blue	Push this button to identify the faulty or misconfigured DIMM(s).
2	Memory riser power LED	Green Amber	Indicates that the riser is operating normally. Indicates that the riser has a fault.
3	DIMM Fault LED	Amber	Identifies a faulty or misconfigured DIMM.
4	DIMM keys		Notches that ensure the DIMMs are correctly oriented.

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

Related Information

- [“Front and Rear Panel System Controls and LEDs”](#) on page 20
- [“Locate a Faulty DIMM \(show faulty Command\)”](#) on page 116
- [“Remove a Memory Riser”](#) on page 116

▼ 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.

```
-> show faulty
```

Target	Property	Value
/SP/faultmgmt/0	fru	/SYS/MB/CMP0/MR1/BOB1/CH0/D0
/SP/faultmgmt/0	timestamp	Dec 21 16:40:56
/SP/faultmgmt/0/ faults/0	timestamp	Dec 21 16:40:56 faults/0
/SP/faultmgmt/0/ faults/0	sp_detected_fault	/SYS/MB/CMP0/MR1/BOB1/CH0/D0 Forced fail(POST)

Related Information

- [“Locate a Faulty DIMM \(DIMM Fault Remind Button\)” on page 113](#)
- [“Remove a Memory Riser” on page 116](#)
- [“DIMM Configuration Errors—show faulty Command Output” on page 135](#)

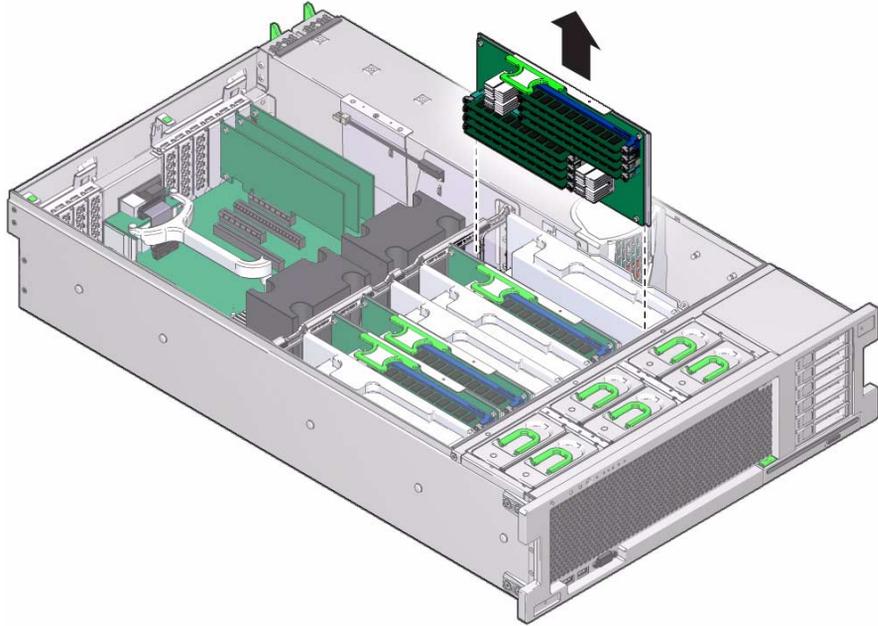
▼ Remove a Memory Riser

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

1. Consider your first steps:

- Familiarize yourself with DIMM configuration rules.
See [“DIMM Population Rules” on page 108](#).
- Prepare the system for service.
See [“Preparing for Service” on page 61](#).
- If you are replacing a faulty DIMM, identify the affected memory riser.
See [“Locate a Faulty DIMM \(DIMM Fault Remind Button\)” on page 113](#).

2. Lift the memory riser straight up to remove the memory riser from the memory module socket.



Caution – Whenever you remove a memory riser or DIMM, you must replace it with another memory riser or a DIMM or a filler panel; otherwise, the server might overheat due to improper airflow.

Related Information

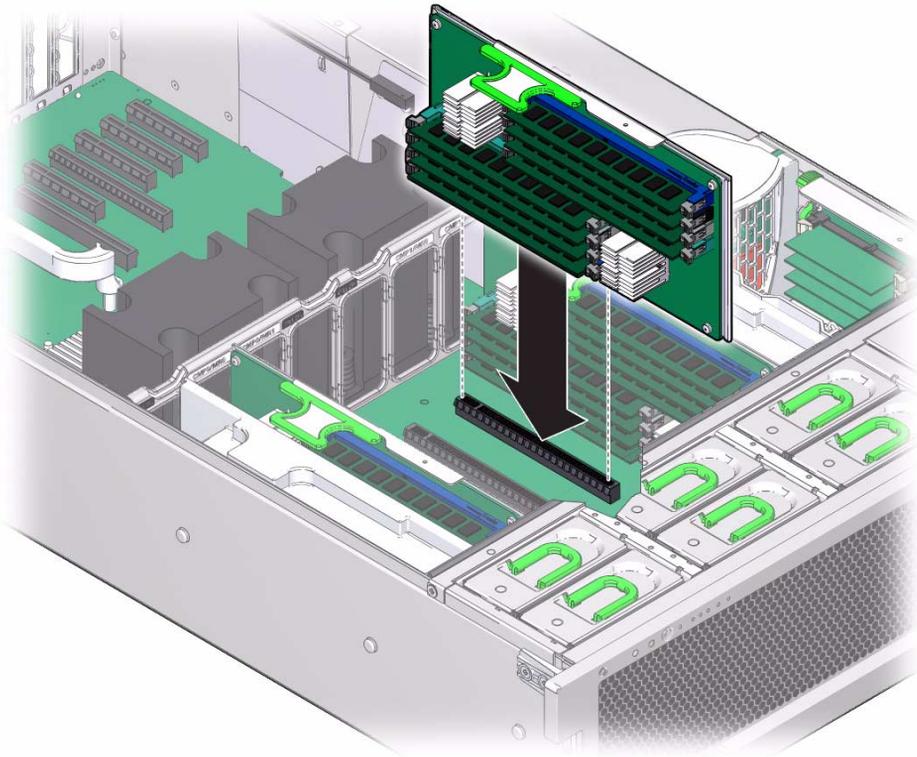
- [“About Memory Risers” on page 105](#)
- [“Install a Memory Riser” on page 117](#)

▼ Install a Memory Riser

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

If you are upgrading the server with additional memory, ensure that the memory risers are being installed in the correct slots. See [“Memory Riser FRU Names” on page 107](#).

1. Push the memory riser into the associated memory riser slot until the riser module locks in place.



2. Finish the installation procedure:

- Return the server to operation.
See [“Returning the Server to Operation”](#) on page 185.
- Verify DIMM functionality.
See [“Verify DIMM Functionality”](#) on page 129.

Related Information

- [“About Memory Risers”](#) on page 105
- [“Remove a Memory Riser”](#) on page 116
- [“Verify DIMM Functionality”](#) on page 129

▼ Remove a DIMM

A DIMM is a cold-service component that can be replaced by a customer.



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

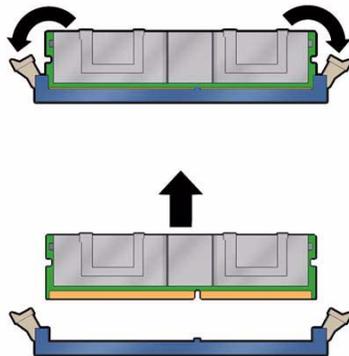
1. Consider your first steps:

- Familiarize yourself with DIMM configuration rules.
See “DIMM Population Rules” on page 108.
- Prepare the system for service.
See “Preparing for Service” on page 61.
- If you are replacing a faulty DIMM, locate the memory riser containing the faulty DIMM(s).
See “Locate a Faulty DIMM (DIMM Fault Remind Button)” on page 113.
- Remove the memory riser(s).
See “Remove a Memory Riser” on page 116.

2. Push down on the ejector tabs on each side of the DIMM until the DIMM is released.



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



- 3. Grasp the top corners of the DIMM and lift it out of its slot.**
- 4. Place the DIMM on an antistatic mat.**
- 5. Repeat Step 2 through Step 4 for any other DIMMs you intend to remove.**
- 6. Determine if you are installing replacement DIMMs at this time.**

- If you are installing replacement DIMMs at this time, go to [“Install a DIMM”](#) on page 120.
- If you are not installing replacement DIMMs at this time, follow these procedures to reinsert the processor module back into the server:
 - a. **Install filler panels in the empty DIMM slots.**



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

- b. **Insert the memory riser back into its slot in the server.**

See [“Install a Memory Riser”](#) on page 117.

Related Information

- [“About DIMMs”](#) on page 108
- [“Locate a Faulty DIMM \(DIMM Fault Remind Button\)”](#) on page 113
- [“Locate a Faulty DIMM \(show faulty Command\)”](#) on page 116
- [“Install a DIMM”](#) on page 120
- [“Verify DIMM Functionality”](#) on page 129
- [“DIMM Configuration Error Messages”](#) on page 132

▼ Install a DIMM

A DIMM is a cold-service component that can be replaced by a customer.



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

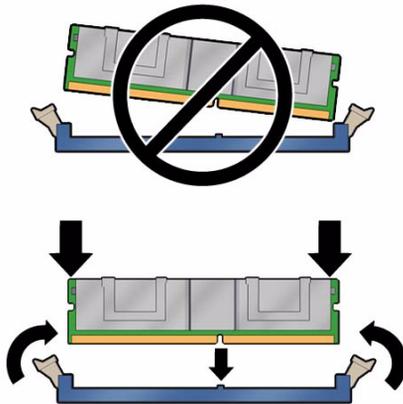
1. Consider your first steps:

- Familiarize yourself with DIMM population rules.
See [“DIMM Population Rules”](#) on page 108.
- Prepare the system for service.
See [“Preparing for Service”](#) on page 61.
- Remove the memory riser(s).
See [“Remove a Memory Riser”](#) on page 116.

2. Unpack the replacement DIMMs and place them on an antistatic mat.
3. Ensure that the ejector tabs on the connector that will receive the DIMM are in the open position.
4. 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.



5. 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.
6. Repeat [Step 3](#) through [Step 5](#) until all new DIMMs are installed.
7. Finish the installation procedure:
 - Install the memory riser(s).
See [“Install a Memory Riser”](#) on page 117.
 - Return the server to operation.
See [“Returning the Server to Operation”](#) on page 185
 - Verify DIMM functionality.
See [“Verify DIMM Functionality”](#) on page 129

Related Information

- [“Memory Fault Handling”](#) on page 22
- [“About DIMMs”](#) on page 108
- [“Remove a DIMM”](#) on page 118

- “Verify DIMM Functionality” on page 129
- “DIMM Configuration Error Messages” on page 132

▼ Increase Server Memory With Additional DIMMs

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

Note – If you are adding memory to a server equipped with 16 Gbyte DIMMs, see “Increase Server Memory with Additional DIMMs (16 Gbyte Configurations)” on page 124.

1. Consider your first steps:

- Familiarize yourself with DIMM configuration rules.
See “DIMM Population Rules” on page 108.
See “DIMM Rank Classification Labels” on page 111.
- Prepare the system for service.
See “Preparing for Service” on page 61.
- Remove the memory risers.
See “Remove a Memory Riser” on page 116.

2. Unpack the new DIMMs and place them on an antistatic mat.

3. At a DIMM slot that is to be upgraded, open the ejector tabs and remove the filler panel.

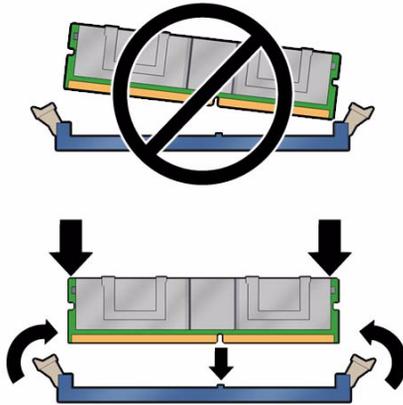
Do not dispose of the filler panel. You may want to reuse it if any DIMMs are removed at another time.

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

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 2 through Step 5](#) until all DIMMs are installed.
8. Finish the installation procedure:
 - Install the memory risers.
See ["Install a Memory Riser"](#) on page 117.
 - Return the server to operation.
See ["Returning the Server to Operation"](#) on page 185
 - Verify DIMM functionality.
See ["Verify DIMM Functionality"](#) on page 129

Related Information

- ["Memory Fault Handling"](#) on page 22
- ["About DIMMs"](#) on page 108
- ["Remove a DIMM"](#) on page 118
- ["Install a DIMM"](#) on page 120
- ["Increase Server Memory with Additional DIMMs \(16 Gbyte Configurations\)"](#) on page 124
- ["Verify DIMM Functionality"](#) on page 129
- ["DIMM Configuration Error Messages"](#) on page 132

▼ Increase Server Memory with Additional DIMMs (16 Gbyte Configurations)

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

The following 16 Gbyte configurations are supported:

DIMM Rank Classification	Half-populated Configuration (256 GB)	Fully-populated Configuration (512 GB)
All 4Rx4 DIMMs	four 4Rx4 DIMMs in CMP0/MR0 four 4Rx4 DIMMs in CMP0/MR1 four 4Rx4 DIMMs in CMP1/MR0 four 4Rx4 DIMMs in CMP1/MR1	eight 4Rx4 DIMMs in CMP0/MR0 eight 4Rx4 DIMMs in CMP0/MR1 eight 4Rx4 DIMMs in CMP1/MR0 eight 4Rx4 DIMMs in CMP1/MR1
All 2Rx4 DIMMs*	four 2Rx4 DIMMs in CMP0/MR0 four 2Rx4 DIMMs in CMP0/MR1 four 2Rx4 DIMMs in CMP1/MR0 four 2Rx4 DIMMs in CMP1/MR1	eight 2Rx4 DIMMs in CMP0/MR0 eight 2Rx4 DIMMs in CMP0/MR1 eight 2Rx4 DIMMs in CMP1/MR0 eight 2Rx4 DIMMs in CMP1/MR1
4Rx4 DIMMs and 2Rx4 DIMMs (hybrid configurations)*	Not supported.	eight 2Rx4 DIMMs in CMP0/MR0 eight 2Rx4 DIMMs in CMP0/MR1 eight 4Rx4 DIMMs in CMP1/MR0 eight 4Rx4 DIMMs in CMP1/MR1
	Not supported.	eight 4Rx4 DIMMs in CMP0/MR0 eight 4Rx4 DIMMs in CMP0/MR1 eight 2Rx4 DIMMs in CMP1/MR0 eight 2Rx4 DIMMs in CMP1/MR1

* Requires System Firmware 8.2.1.b or later.

Note – All DIMMs associated with each CMP must be identical. See [“DIMM Population Rules” on page 108](#) and [“DIMM Rank Classification Labels” on page 111](#).

Note – Dual-ranked x4 (2Rx4) DIMMs require System Firmware 8.2.1.b or later. See [“DIMM Rank Classification Labels” on page 111](#).

To install 16 Gbyte DIMMs, do the following:

1. **Consider your first steps:**
 - Familiarize yourself with DIMM configuration rules.
See “DIMM Population Rules” on page 108.
 - Prepare the system for service.
See “Preparing for Service” on page 61.
2. **Note the DIMM classification labels on the DIMMs currently installed in the server.**
See “DIMM Rank Classification Labels” on page 111.

Note – The DIMM classification labels are visible with the DIMMs installed in the memory risers.

3. **Note the DIMM classification labels provided in the upgrade kit.**
See “DIMM Rank Classification Labels” on page 111.
4. **Remove all memory risers from the server. Arrange the memory risers in order on an ESD-protected work surface.**
See “Remove a Memory Riser” on page 116.
5. **Remove all DIMM filler panels from all memory risers:**
 - a. **At a DIMM slot that is to be upgraded, open the ejector tabs and remove the filler panel.**
 - b. **Repeat Step a until all DIMM filler panels are removed.**

Note – Do not dispose of the filler panels. You may want to reuse them if any DIMMs are removed at another time.

6. **Do one of the following:**
 - If your upgrade DIMMs have the same rank classification as the installed DIMMs, install the upgrade DIMMs in all empty slots on all memory risers.
See “Install a DIMM” on page 120.
 - If your upgrade DIMMs have a different rank classification from the installed DIMMs:
 - a. **Remove all DIMMs currently installed on the memory risers associated with CMP0.**
See “Remove a DIMM” on page 118.
 - b. **Install the DIMMs you removed in Step a into the empty slots on the memory risers associated with CMP1.**

See “Install a DIMM” on page 120.

- c. Install all of the DIMMs in the upgrade kit into all slots on the memory risers associated with CMP0.

See “Install a DIMM” on page 120.

FIGURE: Upgrading 16 Gbyte DIMMs (Hybrid Configuration)

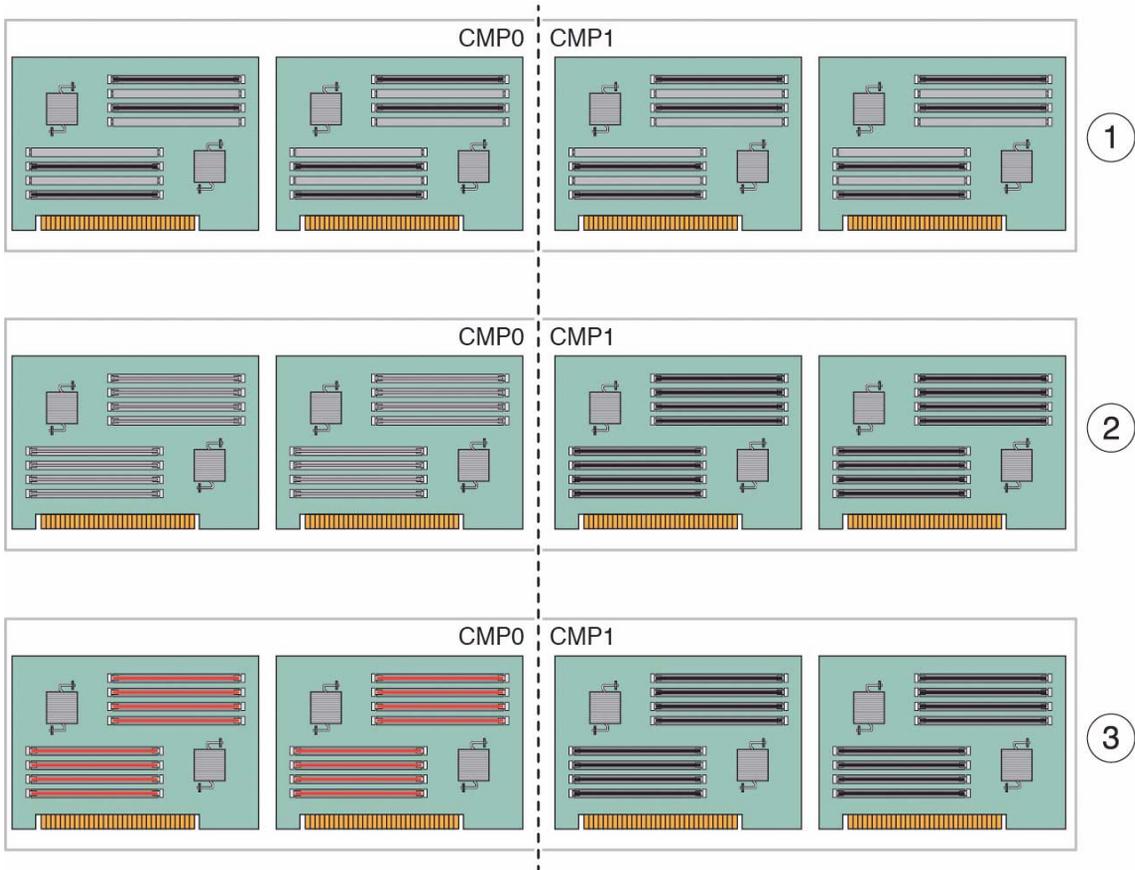


Figure Legend

- 1 Remove all DIMM fillers.
- 2 Move existing DIMMs from risers associated with CMP0 to risers associated with CMP1.
- 3 Install new DIMMs on risers associated with CMP0.

7. Insert the memory risers back into memory riser slots in the server.

See “Install a Memory Riser” on page 117

Note – Ensure that each riser is installed in the same slot from which it was removed. Installing the memory risers in the wrong slots might result in the server booting in a degraded state, with some or most of the memory disabled. See [“DIMM Configuration Error Messages” on page 132](#).

8. Finish the installation procedure:

- Return the server to operation.
See [“Returning the Server to Operation” on page 185](#)
- Verify DIMM functionality.
See [“Verify DIMM Functionality” on page 129](#)

Related Information

- [“Memory Fault Handling” on page 22](#)
- [“About DIMMs” on page 108](#)
- [“Remove a DIMM” on page 118](#)
- [“Install a DIMM” on page 120](#)
- [“Increase Server Memory With Additional DIMMs” on page 122](#)
- [“Verify DIMM Functionality” on page 129](#)
- [“DIMM Configuration Error Messages” on page 132](#)

▼ Remove a Memory Riser Filler Panel

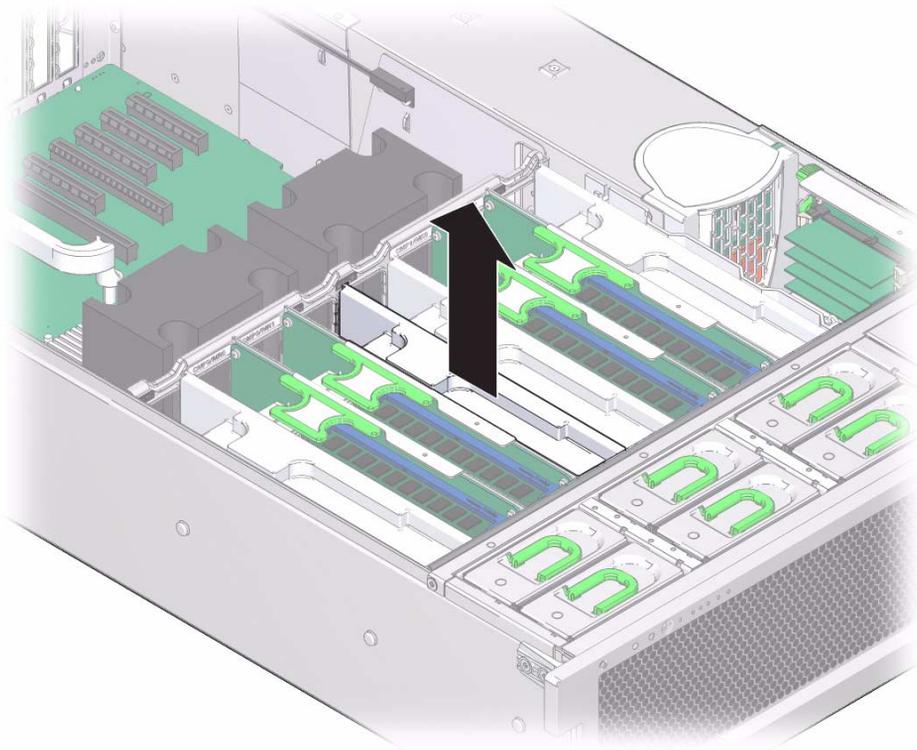
Removing all memory riser filler panels is necessary to service the motherboard. See [“Servicing the Motherboard” on page 159](#).



Caution – All memory risers and memory riser filler panels must be installed in order to ensure proper server airflow.

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

- 1. Prepare the system for service.**
See [“Preparing for Service” on page 61](#).
- 2. Locate the memory riser filler panel you want to remove.**
- 3. Lift the filler panel straight up to remove it from the memory module socket.**



Related Information

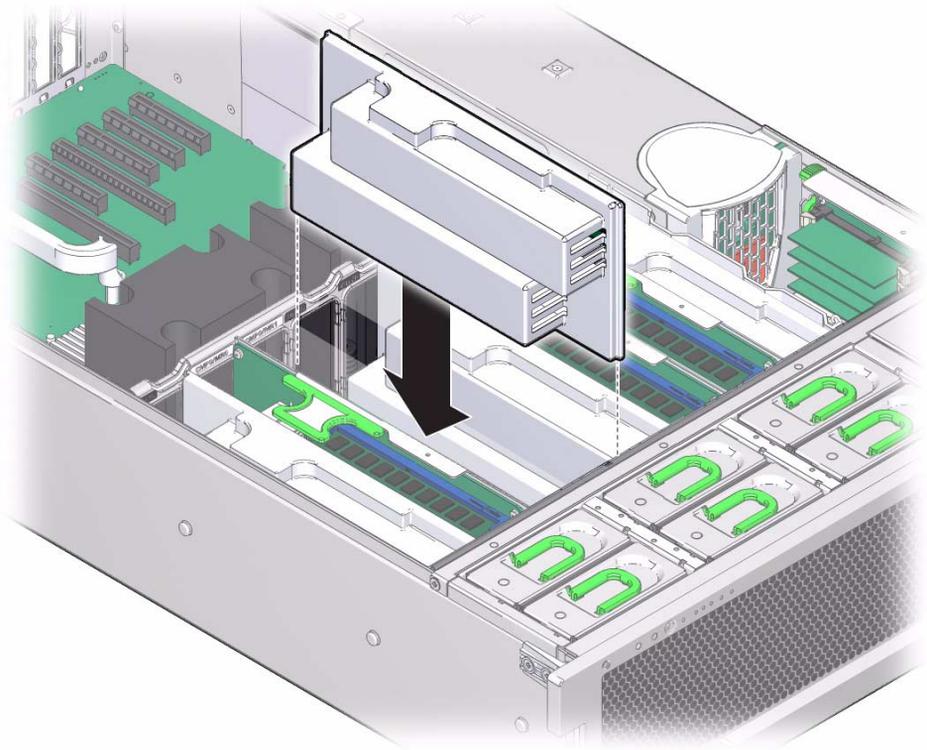
- “About Memory Risers” on page 105
- “Install a Memory Riser Filler Panel” on page 128

▼ Install a Memory Riser Filler Panel



Caution – All memory risers and memory riser filler panels must be installed in order to ensure proper server airflow.

1. Align the memory riser filler panel with the empty slot.
2. Gently press the memory riser filler panel into the slot.



3. Return the server to operation.

See “Returning the Server to Operation” on page 185.

Related Information

- “Remove a Memory Riser Filler Panel” on page 127
- “Remove a Memory Riser” on page 116

▼ 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 the 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 service processor 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 server.

```
-> 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 /SYS/console
.
.
.
0:0:0>INFO:
0:0:0> POST Passed all devices.
0:0:0>POST: Return to VBSC.
0:0:0>Master set ACK for vbsc runpost command and spin...
```

Note – The server might boot automatically at this point. If so, go directly to [Step e](#). If it 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 24.

- 5. Switch to the Oracle ILOM command shell.
- 6. Run the `show faulty` command.

```
-> show faulty
Target                | Property                | Value
-----+-----+-----
/SP/faultmgmt/0      | fru                     | /SYS/MB/CMP0/MR1/BOB1/CH0/D0
/SP/faultmgmt/0      | timestamp               | Dec 14 22:43:59
/SP/faultmgmt/0/     | sunw-msg-id             | SUN4V-8000-DX
faults/0              |                          |
/SP/faultmgmt/0/     | uuid                    | 3aa7c854-9667-e176-efe5-e487e520
faults/0              |                          | 7a8a
/SP/faultmgmt/0/     | timestamp               | Dec 14 22:43:59
faults/0              |                          |
```

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, using the same FRU ID that was displayed from the output of the Oracle ILOM `show faulty` command.

```
# fmadm repaired /SYS/MB/CMP0/MR1/BOB1/CM0/D0
```

Related Information

- [“DIMM Population Rules” on page 108](#)
- [“Supported Memory Configurations” on page 109](#)
- [“DIMM FRU Names” on page 110](#)
- [“DIMM Configuration Error Messages” on page 132](#)
- *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 132](#)
- [“DIMM Configuration Errors—show faulty Command Output” on page 135](#)
- [“DIMM Configuration Errors—fmadm faulty Output” on page 135](#)

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 108](#). If any violations of these rules are detected, the following 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/CMP1/CORE0/P0 is degraded
```

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

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

In addition to these general memory configuration errors, one or more rule-specific messages is displayed, indicating the type of configuration error detected. The following table identifies and explains the various DIMM configuration error messages.

Note – The messages described in this table apply to SPARC T4-2 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 “DIMM Population Rules” on page 108.</p> <p>Ensure that DIMMs on each memory riser are identical (identical capacity, identical DIMM classification).</p> <p>See “DIMM Rank Classification Labels” on page 111</p> <p>See “Increase Server Memory With Additional DIMMs” on page 122.</p> <p>See “Increase Server Memory with Additional DIMMs (16 Gbyte Configurations)” on page 124.</p>
Not all MCUs enabled. Unsupported Config.	<p>Ensure that DIMMs are installed in a supported configuration.</p> <p>See “DIMM Population Rules” on page 108.</p> <p>Ensure that all memory risers and all DIMMs are installed and seated correctly.</p> <p>See “Install a Memory Riser” on page 117.</p> <p>See “Install a DIMM” on page 120.</p>
Invalid DIMM configuration. 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>See “DIMM Population Rules” on page 108.</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 intended width.</p> <p>See “DIMM Rank Classification Labels” on page 111</p>

DIMM Configuration Error Messages	Notes
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"> • 2 ranks—4 Gbyte, 8 Gbyte, 16 Gbyte DIMMs • 4 ranks—16 Gbyte and 32 Gbyte DIMMs <p>Replace any DIMMs that do not match the intended rank number.</p> <p>See “DIMM Rank Classification Labels” on page 111.</p>
Invalid DIMM population. DIMMs in the same position must be all present or absent.	<p>Memory configurations must be populated in sets of 8 or 16 DIMM components for each CMP as shown in “DIMM Population Rules” on page 108.</p> <p>Either add DIMM components to fill a partially populated set or remove DIMM components to empty a partial set.</p> <p>Note - The DIMM slots labeled set 1 in the figure must always be fully populated.</p>
Invalid DIMM population. T4-2 only supports 1/2 or full memory configs.	<p>Add or remove DIMM components to achieve one of the supported memory configurations.</p> <p>See “DIMM Population Rules” on page 108.</p>
DIMM population across nodes is different.	<p>If the CMPs in a server have different DIMM populations, add or remove DIMM components until they are equal.</p> <p>See “DIMM Population Rules” on page 108.</p>
DRAM capacity of DIMMs is different across nodes.	<p>If the CMPs in a server have different DRAM capacities, replace some DIMM components until all DRAM capacities are the same.</p> <p>See “DIMM Population Rules” on page 108</p>
Device width of DIMM is different across nodes.	<p>If the CMPs in a server have DIMMs with different device widths, replace some DIMM components until all DIMMs have the same device width.</p> <p>See “DIMM Rank Classification Labels” on page 111.</p>
Number of ranks of DIMM is different across nodes.	<p>If the CMPs in a server have DIMMs with different rank arrangements, replace some DIMM components until all rank number are the same.</p> <p>“DIMM Rank Classification Labels” on page 111.</p>

Related Information

- [“Memory Fault Handling” on page 22](#)
- [“DIMM Population Rules” on page 108](#)
- [“DIMM Rank Classification Labels” on page 111](#)

DIMM Configuration Errors—show faulty Command Output

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

```
-> show faulty
```

Target	Property	Value
/SP/faultmgmt/0	fru	/SYS/MB/CMP0/MR0/BOB0/CH0/D0
/SP/faultmgmt/0/ faults/0	class	fault.component.misconfigured
/SP/faultmgmt/0/ faults/0	sunw-msg-id	SPT-8000-PX
/SP/faultmgmt/0/ faults/0	component	/SYS/MB/CMP0/MR0/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 132](#)
- [“DIMM Configuration Errors—fmadm faulty Output” on page 135](#)

DIMM Configuration Errors—fmadm faulty Output

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

```
faultmgmtsp> fmadm faulty
```

Time	UUID	msgid	Severity
------	------	-------	----------

FRU : /SYS/MB/CMP0/MR0/BOB0/CH0/D0

(Part Number: 000-0000)

2012-09-24/17:00:40 2caf416b-4fe0-6509-db02-aa719f5dd543 SPT-8000-PX Major

(Serial Number: 00CE011217213B151F)

Fault class : **fault.component.misconfigured**

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 132](#)
- [“DIMM Configuration Errors—show faulty Command Output” on page 135](#)

Servicing DVD Drives

These topics explain how to remove and install a DVD drive in the server.

- [“DVD Drive Overview” on page 137](#)
- [“Remove a DVD Drive or Filler Panel” on page 137](#)
- [“Install a DVD Drive or Filler Panel” on page 138](#)

DVD Drive Overview

The SATA DVD drive is mounted in a removable module that is accessed from the system’s front panel. The DVD module must be removed from the drive cage in order to service the drive backplane.

The DVD drive is automatically disabled if you install a SAS PCIe RAID HBA, as described in [“PCIe Card Configuration Rules” on page 145](#). Use of this card precludes using the DVD drive. You do not need to physically remove the disabled DVD drive from the server to use the SAS PCIe RAID HBA.

Related Information

- [“Remove a DVD Drive or Filler Panel” on page 137](#)
- [“Install a DVD Drive or Filler Panel” on page 138](#)

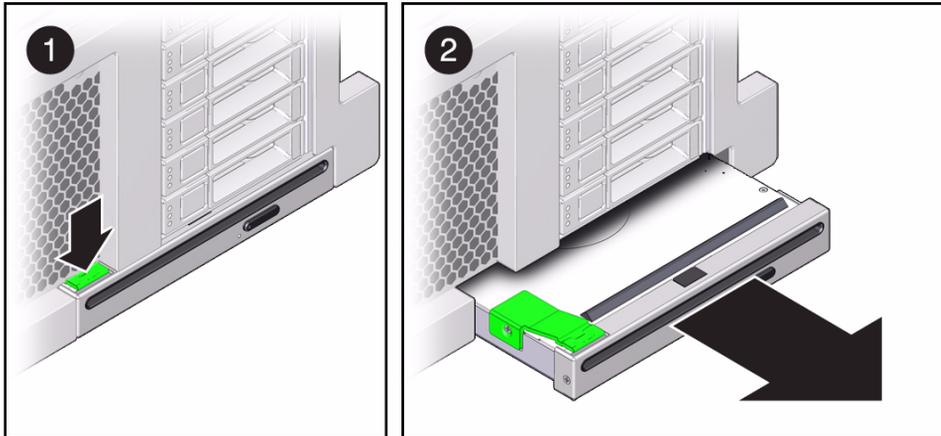
▼ Remove a DVD Drive or Filler Panel

This is a cold service procedure that can be performed by customers. The system must be completely powered down before performing this procedure. See [“Cold Service, Replaceable by Customer” on page 66](#) for more information about cold service procedures.

1. Prepare for servicing:
 - a. Attach an antistatic wrist strap.
 - b. Remove any media from the drive.
 - c. Power off the server and unplug power cords from the power supplies.
See [“Removing Power From the Server”](#) on page 68.
2. Push down on the latch on the top left corner of the DVD drive or filler panel.
3. Slide the DVD drive or filler panel out of the server.



Caution – Whenever you remove the DVD drive or filler panel, you should replace it with another DVD drive or a filler panel; otherwise the server might overheat due to improper airflow.



Related Information

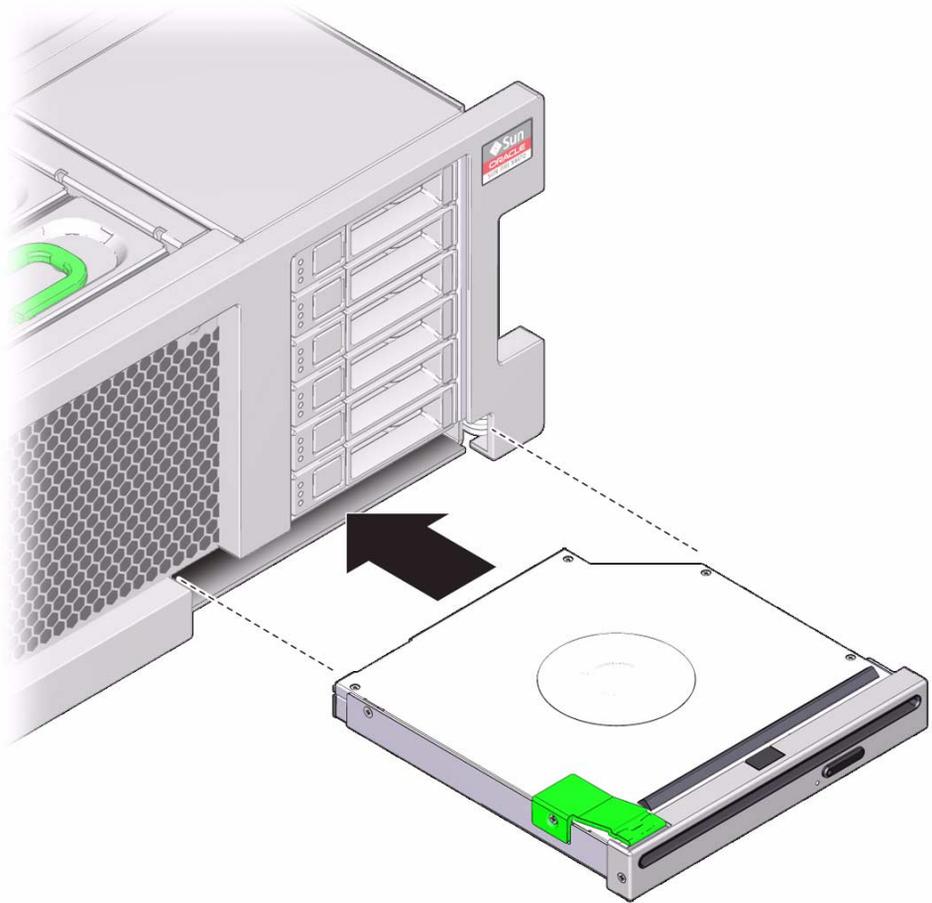
- [“Install a DVD Drive or Filler Panel”](#) on page 138

▼ Install a DVD Drive or Filler Panel

1. **Unpack the DVD drive or filler panel.**

If it is a DVD drive, attach an antistatic wrist wrap and place the drive on an antistatic mat.

2. Slide the DVD drive or filler panel into the front of the chassis until it seats.



3. Return the server to operation:
 - a. Return the server to the normal rack position.
See [“Return the Server to the Normal Rack Position”](#) on page 186.
 - b. Reinstall the power cords to the power supplies and power on the server.
See [“Returning the Server to Operation”](#) on page 185.

Related Information

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

Servicing the System Lithium Battery

These topics explain how to remove and install the system battery in the server.

- [“System Battery Overview”](#) on page 141
- [“Remove the System Battery”](#) on page 141
- [“Install the System Battery”](#) on page 143

System Battery Overview

The system battery maintains system time when the server is powered off and disconnected from AC power. If the IPMI logs indicate a battery failure, replace the system battery.

▼ Remove the System Battery

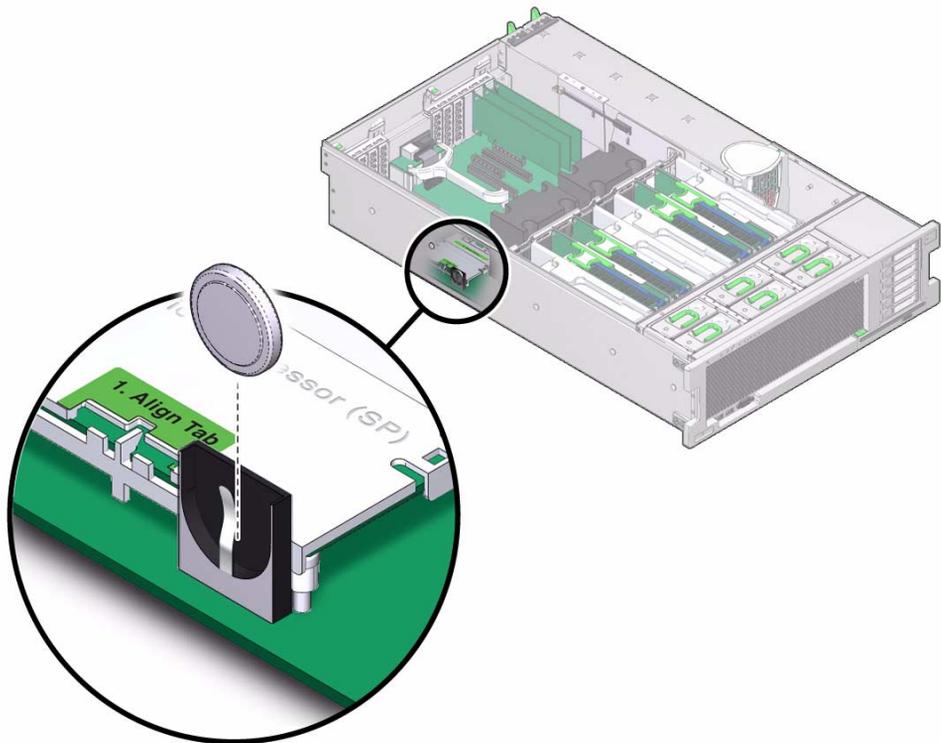


Caution – This procedure requires that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“ESD Measures”](#) on page 62.

This is a cold service procedure that can be performed by customers. The system must be completely powered down before performing this procedure. See [“Cold Service, Replaceable by Customer”](#) on page 66 for more information about cold service procedures.

1. **Prepare for servicing:**
 - a. **Attach an antistatic wrist strap.**

- b. **Power off the server and unplug power cords from the power supplies.**
See [“Removing Power From the Server”](#) on page 68.
 - c. **Extend the server to maintenance position.**
See [“Extend the Server to the Maintenance Position”](#) on page 71.
 - d. **Remove the top cover.**
See [“Remove the Top Cover”](#) on page 75.
2. **Remove the battery from the battery holder by pulling back on the metal tab holding it in place and sliding the battery up and out of the battery holder as shown in the following figure.**



Related Information

- [“Install the System Battery”](#) on page 143

▼ Install the System Battery

1. Attach an antistatic wrist wrap and unpack the replacement battery.
2. Press the new battery into the battery holder with the positive side (+) facing away from the metal tab that holds it in place.
3. If the service processor is configured to synchronize with a network time server using the Network Time Protocol (NTP), the Oracle ILOM clock will be reset as soon as the server is powered on and connected to the network. Otherwise, proceed to the next step.
4. If the service processor is not configured to use NTP, you must reset the Oracle ILOM clock using the Oracle ILOM CLI or the web interface. For instructions, see the Oracle Integrated Lights Out Manager (ILOM) 3.0 Documentation Collection.
5. Return the server to operation:
 - a. Return the server to the normal rack position.
See [“Return the Server to the Normal Rack Position”](#) on page 186.
 - b. Reinstall the power cords to the power supplies and power on the server.
See [“Returning the Server to Operation”](#) on page 185.

Related Information

- [“Remove the System Battery”](#) on page 141

Servicing Expansion (PCIe) Cards

These topics explain how to remove and install PCIe cards in the server.

- [“PCIe Card Configuration Rules”](#) on page 145
- [“Remove a PCIe Card Filler Panel”](#) on page 146
- [“Remove a PCIe Card”](#) on page 148
- [“Install a PCIe Card”](#) on page 149
- [“Cable an Internal SAS HBA PCIe Card”](#) on page 151
- [“Install a PCIe Card Filler Panel”](#) on page 153

PCIe Card Configuration Rules

Note – Refer to the Product Notes for detailed information about known issues and configuration limitations before installing PCIe cards.

This server has ten PCI Express 2.0 slots that accommodate low-profile PCIe cards. All slots support x8 PCIe cards. Two slots are also capable of supporting x16 PCIe cards.

- Slots 4 and 5: x4 electrical interface
- Slots 0, 1, 2, 7, 8, and 9: x8 electrical interface
- Slots 3 and 6: x8 electrical interface (x16 connector)

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

- First consider any cooling considerations that require a card to be installed in a certain slot. When possible, place cards that contain temperature-sensitive components (for example, batteries) in the outer slots (0, 1, 8, and 9). Slot 0 is a good choice when cabling or cooling concerns exist.
- If your configuration includes a SAS PCIe RAID HBA, install that HBA in slot 0.

Note – If you install a SAS PCIe RAID HBA, the server’s slimline DVD drive is disabled automatically. Use of this card precludes using the slimline DVD drive. You do not need to physically remove the disabled DVD drive from the server to use the SAS PCIe RAID HBA.

- For high bandwidth cards, install the cards so that the load on the server is balanced between the server’s two CPUs, each of which connects to five of the available PCIe slots. (CPU0 connects to slots 0, 2, 4, 6, and 8. CPU1 connects to slots 1, 3, 5, 7, and 9). Avoid slots 4 and 5 for high-bandwidth cards because they are x4 slots. To balance the loads, continue to alternate the high-bandwidth cards between even and odd numbered slots.
- Install lower-speed cards (for example, 1-Gbit/s Ethernet and 8-Gbit/s Fibre Channel adapters) in any remaining slots, since these cards perform well in any location, including the x4 slots, 4 and 5.

Related Information

- [“Rear Components” on page 3](#)
- [“System Schematic” on page 12](#)
- [“Remove a PCIe Card Filler Panel” on page 146](#)
- [“Remove a PCIe Card” on page 148](#)
- [“Install a PCIe Card” on page 149](#)
- [“Install a PCIe Card Filler Panel” on page 153](#)

▼ Remove a PCIe Card Filler Panel

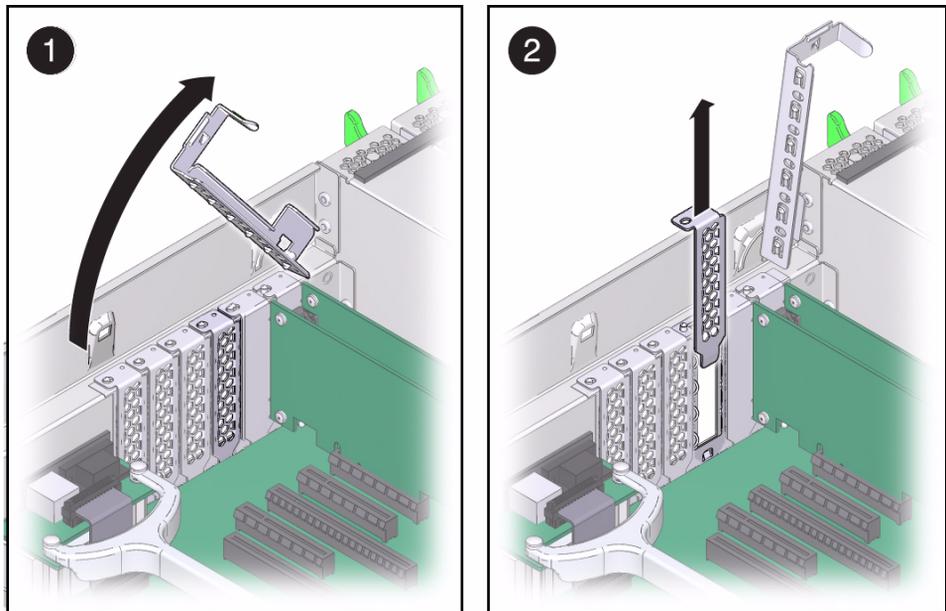


Caution – This procedure requires that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, follow antistatic practices as described in [“ESD Measures” on page 62](#).

This procedure can be performed by customers. The system must be completely powered down before performing this procedure. See [“Cold Service, Replaceable by Customer” on page 66](#) for more information about cold service procedures.

1. **Prepare for servicing:**
 - a. **Attach an antistatic wrist strap.**

- b. Power off the server and disconnect all power cords from the server power supplies.
See “Removing Power From the Server” on page 68.
 - c. Extend the server to the maintenance position.
See “Extend the Server to the Maintenance Position” on page 71.
 - d. Remove the top cover.
See “Remove the Top Cover” on page 75.
2. Locate the PCIe card filler panel that you want to remove.
See “Rear Components” on page 3 for information about PCIe slots and their locations.
 3. Remove the PCIe card filler panel by completing the following tasks.



- a. Disengage the PCIe card slot crossbar from its locked position and rotate the crossbar to an upright position.
- b. Carefully remove the PCIe card filler panel from the card slot.



Caution – Whenever you remove a PCIe card filler panel, replace it with another filler panel or a PCIe card; otherwise, the server might overheat due to improper airflow.

Related Information

- [“Remove a PCIe Card” on page 148](#)
- [“Install a PCIe Card” on page 149](#)
- [“Install a PCIe Card Filler Panel” on page 153](#)

▼ Remove a PCIe Card



Caution – This procedure requires that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“ESD Measures” on page 62](#).

This procedure can be performed by customers. The system must be completely powered down before performing this procedure. See [“Cold Service, Replaceable by Customer” on page 66](#) for more information about cold service procedures.

1. Prepare for servicing:

- Attach an antistatic wrist strap.**
- Power off the server and disconnect all power cords from the server power supplies.**
See [“Removing Power From the Server” on page 68](#).
- Extend the server to the maintenance position.**
See [“Extend the Server to the Maintenance Position” on page 71](#).
- Remove the top cover.**
See [“Remove the Top Cover” on page 75](#)

2. Locate the PCIe card that you want to remove.

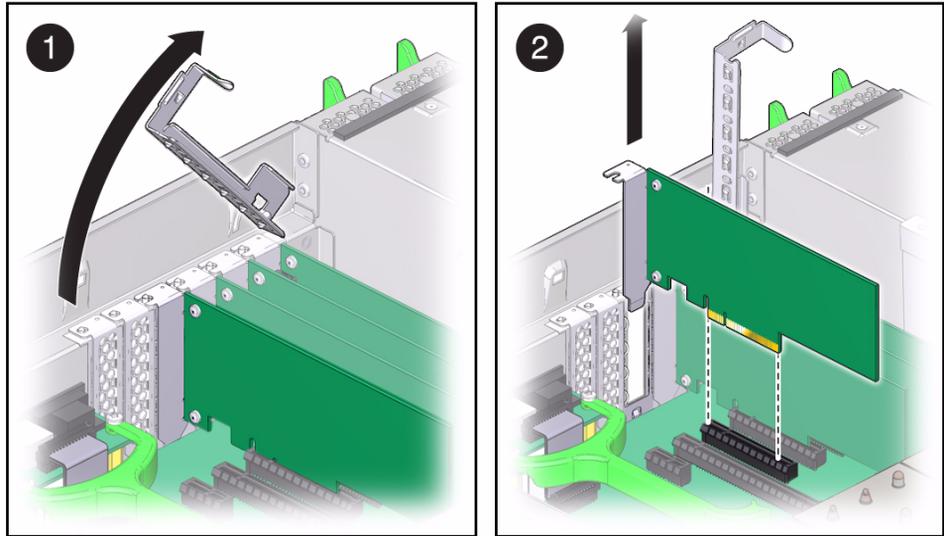
See [“Rear Components” on page 3](#) for information about PCIe slots and their locations.

3. If necessary, make a note of where the PCIe cards are installed.

4. Unplug all data cables from the PCIe card.

Note the location of all cables for reinstallation later.

5. Remove the PCIe card filler panel by completing the following tasks.



- a. Disengage the PCIe card slot crossbar from its locked position and rotate the crossbar to an upright position.
- b. Carefully remove the PCIe card from the card slot.

Related Information

- [“Remove a PCIe Card Filler Panel” on page 146](#)
- [“Install a PCIe Card” on page 149](#)
- [“Install a PCIe Card Filler Panel” on page 153](#)

▼ Install a PCIe Card

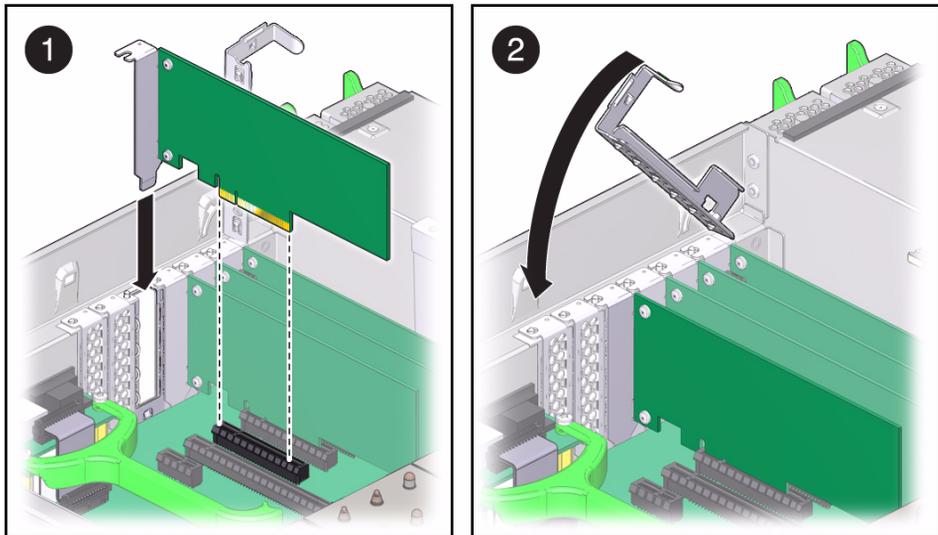


Caution – This procedure requires that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“ESD Measures” on page 62](#).

Note – If the server has PCIe cards installed that provide bootable devices, disable Option ROM on the PCIe slots that are not used for booting so that resources are available for the slots that are used for booting.

1. Attach an antistatic wrist strap, unpack the PCIe card, and place it on an antistatic mat.
2. Ensure that the server is powered off and all power cords are disconnected from the server power supplies.
See [“Removing Power From the Server”](#) on page 68.
3. Install the PCIe card into the card slot and return the crossbar to its closed and locked position.

Note – If you are not replacing an existing PCIe card and need information about deciding into which slot a the card should be installed, refer to [“PCIe Card Configuration Rules”](#) on page 145.



4. Return the server to operation:
 - a. Install the top cover.
See [“Replace the Top Cover”](#) on page 185.
 - b. Return the server to the normal rack position.
See [“Return the Server to the Normal Rack Position”](#) on page 186.
 - c. Reconnect all power cords to the server power supplies.
See [“Connect Power Cords”](#) on page 187.

d. Power on the server.

See “Power On the Server (Oracle ILOM)” on page 188 or “Power On the Server (Power Button)” on page 188.

5. If the PCIe card being installed is replacing a faulty PCIe card, manually clear the PCIe card fault using Oracle Integrated Lights Out Manager (ILOM).

For instructions on clearing server faults, refer to the *SPARC T4 Series Servers Administration Guide* and to the Oracle ILOM documentation.

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

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

<http://www.lsi.com/support/sun>

Related Information

- “Remove a PCIe Card Filler Panel” on page 146
- “Remove a PCIe Card” on page 148
- “Install a PCIe Card Filler Panel” on page 153

▼ Cable an Internal SAS HBA PCIe Card

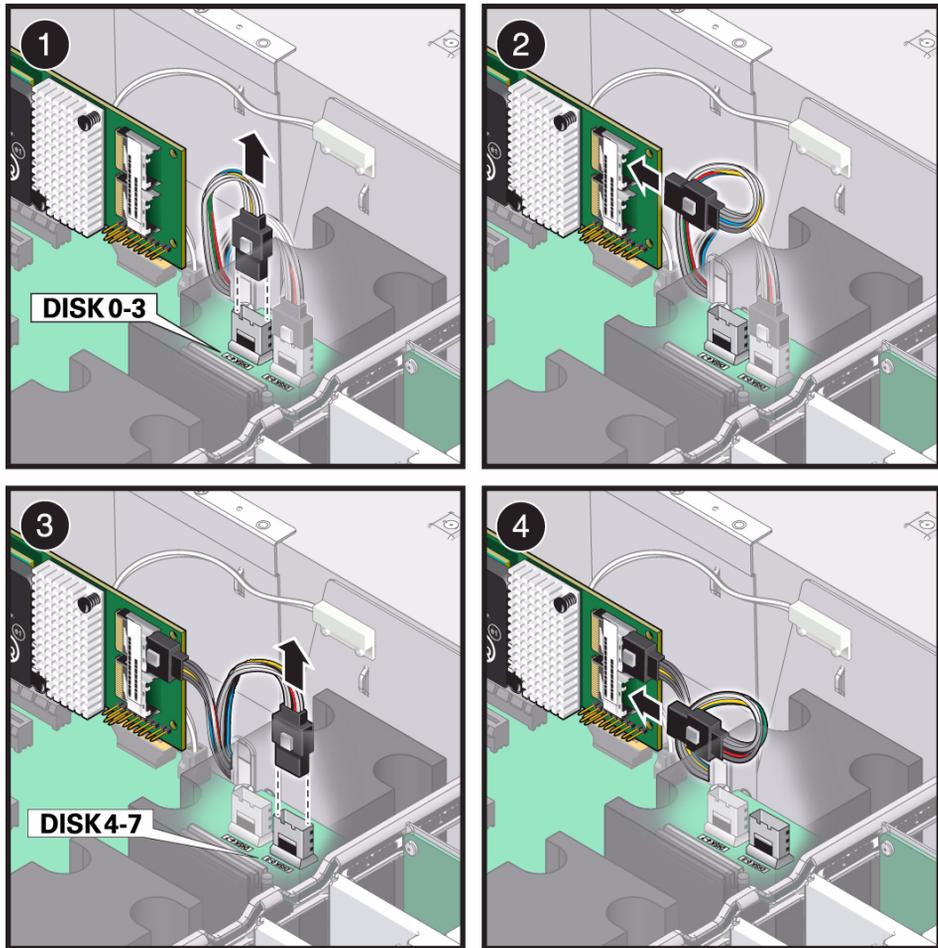
After installing an optional internal SAS HBA PCIe card into the server, connect the internal SAS cables attached to the hard disk drive backplane to the card.

Note – SAS HBA PCIe cards do not support SATA devices, so connecting these system cables will disable the front-panel SATA DVD drive.

1. Install the SAS HBA PCIe card in slot 0 of the server.

See “Install a PCIe Card” on page 149 and the PCIe card documentation for instructions.

2. Remove the SAS cable from the motherboard port labeled DISK0-3 and connect it to the top HBA port.



3. Remove the SAS cable from the motherboard port labeled DISK4-7 and connect it to the bottom HBA port.
4. Continue with the PCIe card installation and return the server to operation.
See Step 4 in “Install a PCIe Card” on page 149.

Related Information

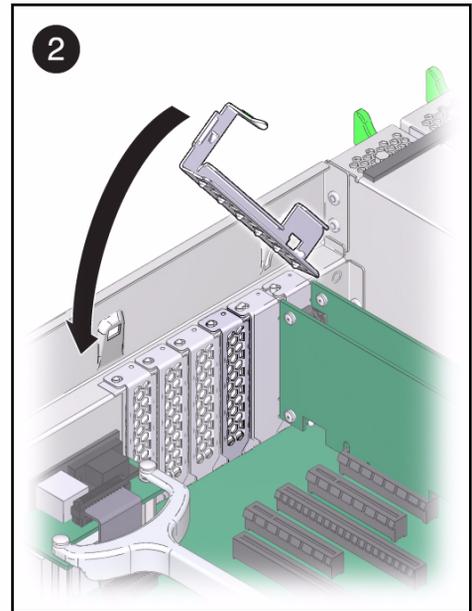
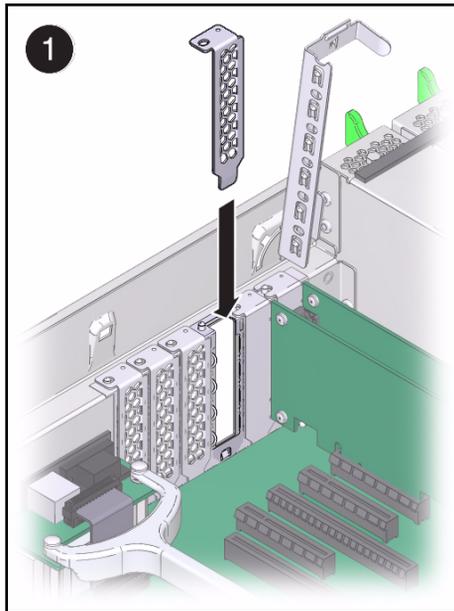
- “System Schematic” on page 12
- “PCIe Card Configuration Rules” on page 145
- “Install a PCIe Card” on page 149
- The SAS HBA PCIe card documentation

▼ Install a PCIe Card Filler Panel



Caution – This procedure requires that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in “ESD Measures” on page 62.

1. Ensure that the server is powered off and all power cords are disconnected from the server power supplies.
See “Removing Power From the Server” on page 68.
2. Attach an antistatic wrist strap, unpack the PCIe card, and place it on an antistatic mat.
3. Install the PCIe filler panel into the card slot opening and return the PCIe card slot crossbar to its closed and locked position.



4. Return the server to operation:
 - a. Install the top cover.
See “Replace the Top Cover” on page 185.

b. Return the server to the normal rack position.

See [“Return the Server to the Normal Rack Position”](#) on page 186.

c. Reconnect all power cords to the server power supplies.

See [“Connect Power Cords”](#) on page 187.

d. Power on the server.

See [“Power On the Server \(Oracle ILOM\)”](#) on page 188 or [“Power On the Server \(Power Button\)”](#) on page 188.

Related Information

- [“Remove a PCIe Card Filler Panel”](#) on page 146
- [“Remove a PCIe Card”](#) on page 148
- [“Install a PCIe Card”](#) on page 149

Servicing the Fan Board

These topics explain how to remove and install the server's fan board.

- ["Remove the Fan Board" on page 155](#)
- ["Install the Fan Board" on page 157](#)
- ["Verify Fan Board Functionality" on page 158](#)

▼ Remove the Fan Board



Caution – These procedures require that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in ["ESD Measures" on page 62](#).

This is a cold service procedure that must be performed by qualified service personnel. The system must be completely powered down before performing this procedure. See ["Cold Service, Replaceable by Authorized Service Personnel" on page 67](#) for more information about this category of service procedures.

1. Prepare for servicing:

- a. **Attach an antistatic wrist strap.**
- b. **Power off the server and unplug power cords from the power supplies.**
See ["Removing Power From the Server" on page 68](#).
- c. **Extend the server to the maintenance position.**
See ["Extend the Server to the Maintenance Position" on page 71](#).
- d. **Remove the top cover.**
See ["Remove the Top Cover" on page 75](#).

2. Remove all fan modules.

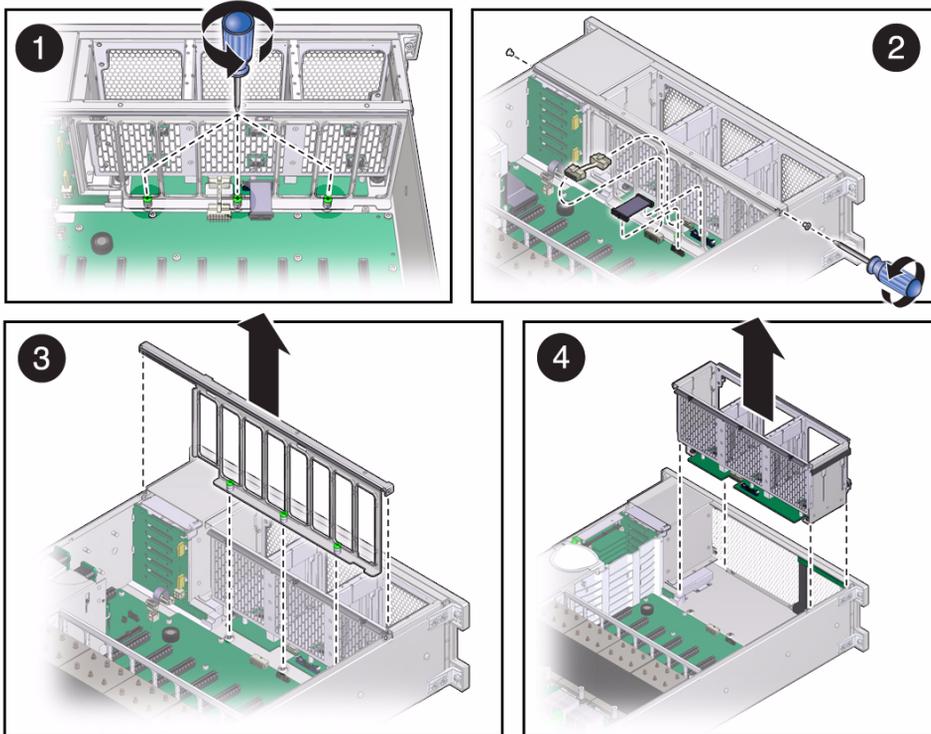
- See ["Remove a Fan Module" on page 95](#).

3. Remove all memory risers.

See “Remove a Memory Riser” on page 116.

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

5. Remove the fan board by completing the following tasks.



a. Loosen the three captive screws connecting the front memory riser guide to the motherboard.

b. Remove the two screws on each side of the outside of the chassis that hold the fan board in place and unplug the fan board and power cables from motherboard.

c. Remove the front memory riser guide by pulling it up and out of the chassis.

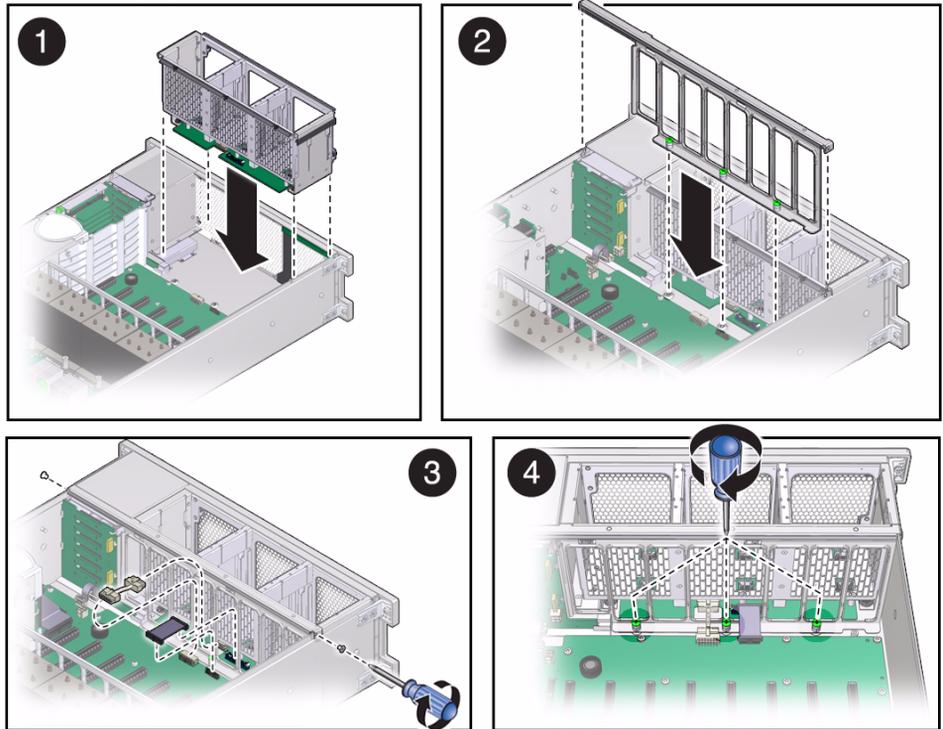
d. Pull the fan board back and out of chassis.

Related Information

- “Install the Fan Board” on page 157

▼ Install the Fan Board

1. Unpack the replacement fan board unit and place it on an antistatic mat.
2. Remove the fan board cable and power cables from the faulty fan board unit and plug them into the fan board on the replacement fan board unit.
3. Reinstall the fan board unit by completing the following tasks.



- a. Insert the fan board into the chassis, moving it down and toward the front.
- b. Reposition the front memory riser guide, routing the fan board and power cable through the riser guide.
- c. Plug the fan board cable and power cable into the connectors on the motherboard and secure the fan board by reinserting and tightening the two screws on each side of the outside of the chassis.
- d. Tighten the three captive screws to hold the front memory riser guide in place.

4. Reinstall all fan modules.

See [“Remove a Fan Module”](#) on page 95.

5. Reinstall all memory risers.

See [“Install a Memory Riser”](#) on page 117.

6. Return the server to operation:

a. Install the top cover.

See [“Replace the Top Cover”](#) on page 185.

b. Return the server to the normal rack position.

See [“Return the Server to the Normal Rack Position”](#) on page 186.

c. Reinstall the power cords to the power supplies and power on the server.

See [“Returning the Server to Operation”](#) on page 185.

Note – The product serial number used for service entitlement and warranty coverage might need to be reprogrammed on the fan board by authorized service personnel with the correct product serial number located on the chassis EZ label.

Related Information

- [“Remove the Fan Board”](#) on page 155
- [“Verify Fan Board Functionality”](#) on page 158

▼ Verify Fan Board Functionality

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

See [“Managing Faults \(Oracle ILOM\)”](#) on page 23 for more information on using the `show faulty` command.

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

- If the previous steps did not clear the fault, see [“Detecting and Managing Faults”](#) on page 15 for information about the tools and methods you can use to diagnose component faults.
- If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

Servicing the Motherboard

These topics explain how to remove and install the motherboard.

- [“Motherboard Overview”](#) on page 159
- [“Remove the Motherboard”](#) on page 160
- [“Install the Motherboard”](#) on page 162
- [“Reactivate RAID Volumes”](#) on page 165
- [“Verify Motherboard Functionality”](#) on page 168

Motherboard Overview

When replacing the motherboard, remove the service processor and System Configuration PROM from the old motherboard and install these components on the new motherboard. The service processor contains the Oracle ILOM system configuration data and the System Configuration PROM contains the system host ID and MAC address. Transferring these components will preserve the system-specific information stored on these modules.

System firmware consists of two components: a service processor component and a host component. The service processor component is located on the service processor and the host component is located on the motherboard. In order for the system to operate correctly, these two components must be compatible.

After replacing the motherboard, the host firmware on the motherboard might be incompatible with the service processor firmware on the service processor that you transferred to the new motherboard. In this case, the system firmware must be loaded as described in [“Install the Motherboard”](#) on page 162.

Related Information

- [“Understanding Component Replacement Categories”](#) on page 65
- [“Remove the Motherboard”](#) on page 160
- [“Install the Motherboard”](#) on page 162

- [“Verify Motherboard Functionality”](#) on page 168

▼ Remove the Motherboard



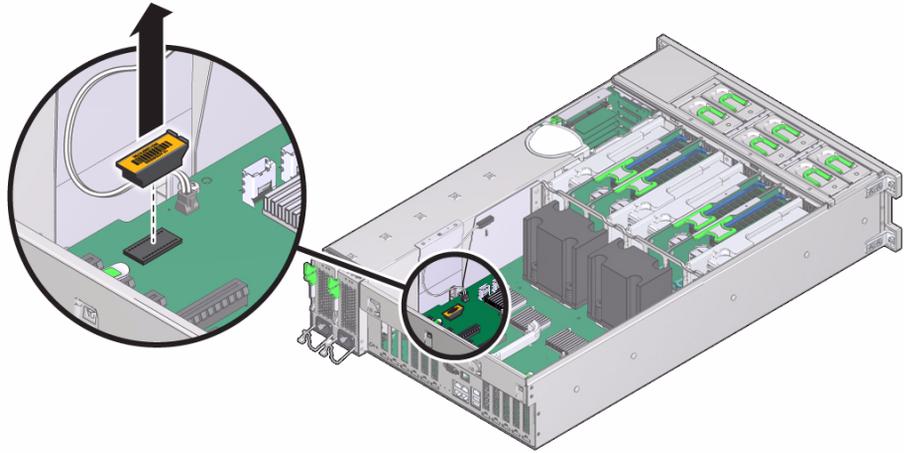
Caution – Ensure that all power is removed from the server before removing or installing the motherboard assembly. You must disconnect the power cables from the system before performing these procedures.



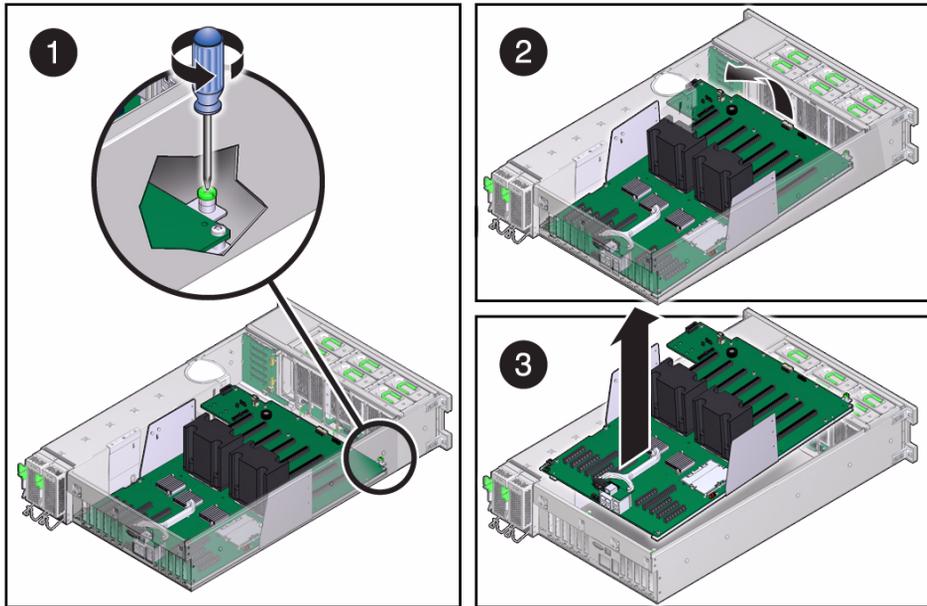
Caution – These procedures require that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“ESD Measures”](#) on page 62.

This is a cold service procedure that must be performed by qualified service personnel. The system must be completely powered down before performing this procedure. See [“Cold Service, Replaceable by Authorized Service Personnel”](#) on page 67 for more information about this category of service procedures.

1. **Prepare for servicing:**
 - a. **Attach an antistatic wrist strap.**
 - b. **Power off the server and unplug power cords from the power supplies.**
See [“Removing Power From the Server”](#) on page 68.
 - c. **Remove the server from the rack.**
See [“Remove the Server From the Rack”](#) on page 73.
 - d. **Remove the top cover.**
See [“Remove the Top Cover”](#) on page 75.
2. **Remove the System Configuration PROM from the motherboard so you can reinstall it on the new motherboard.**



3. **Remove all memory risers and filler panels.**
See [“Remove a Memory Riser”](#) on page 116.
See [“Remove a Memory Riser Filler Panel”](#) on page 127.
4. **Remove the System Remind button assembly (air divider) by lifting it up and away from the power supplies.**
5. **Disconnect all cables connected to the motherboard by completing the following tasks.**
 - a. **Disconnect two cables that connect the motherboard to the drive backplane.**
 - b. **Disconnect three cables from the motherboard.**
 - c. **Disconnect the fan board power cable and the ribbon cable from the motherboard.**
6. **Remove the Phillips screw on the cable cover, lift and remove the cover, and disconnect the two exposed cables from the motherboard.**
7. **Remove the four bus bar screws securing the motherboard to the power supply backplane.**
See [“Remove the Power Supply Backplane”](#) on page 179.
8. **Remove all PCIe cards from the server.**
See [“Remove a PCIe Card”](#) on page 148.
9. **Position the drive end of the cables off to the side using the tab on the top of the plastic power supply cover.**
10. **Remove the motherboard by completing the following tasks.**



- a. Loosen the captive screw in the corner near the fans that secures the motherboard to the chassis.
 - b. Grasp the handle on the motherboard and slide it toward the front of the chassis.
 - c. Lift the motherboard out of the chassis.
11. Remove the service processor from the motherboard so you can reinstall it on the new motherboard.
See “Remove the SP” on page 170.

Related Information

- “Motherboard Overview” on page 159
- “Install the Motherboard” on page 162
- “Verify Motherboard Functionality” on page 168

▼ Install the Motherboard

1. Unpack the replacement motherboard and place it on an antistatic mat.

2. On the replacement motherboard, install the service processor that you removed from the old motherboard.

See “Install the SP” on page 171.

3. Grasping the motherboard by the handle, place it into the chassis.
4. Hold the cables off to the side while grasping the handle on the motherboard and sliding it toward the rear of the chassis.
5. Reinsert and tighten the four bus bar screws that secure the motherboard to the power supply backplane.

See “Install the Power Supply Backplane” on page 181.

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

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



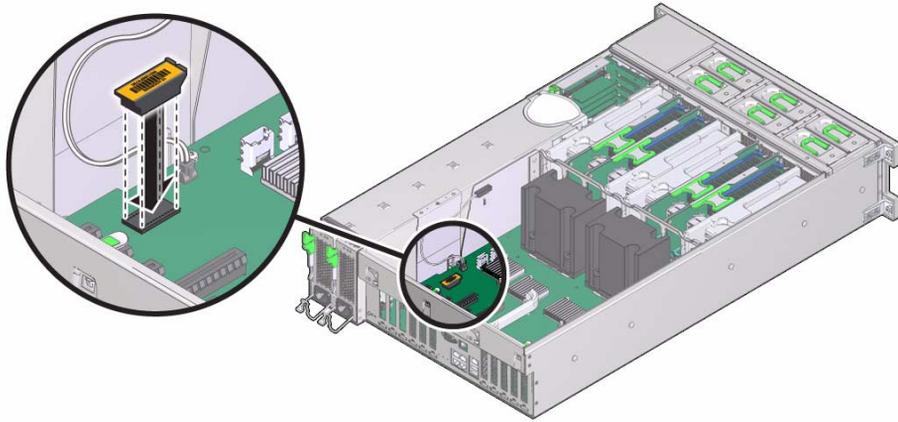
Caution – After replacing the motherboard, inspect the dividing wall gasket, and then install the plastic dividing wall securely. This dividing wall maintains a pressurized seal between the server cooling zones. Without this pressurized seal, the power supply fans will not be able to draw enough air to cool the drives properly.

7. Reinstall all memory risers and filler panels.

See “Install a Memory Riser” on page 117.

See “Install a Memory Riser Filler Panel” on page 128.

8. Reinstall the cable cover.
9. Reconnect all cables from the power supply backplane, drive backplane, and fan board to their original locations on the motherboard.
10. Reinstall all PCIe cards.
See “Install a PCIe Card” on page 149.
11. Tighten the captive screw in the corner near the fans that secures the motherboard to the chassis.
12. On the replacement motherboard, install the System Configuration PROM that you removed from the old motherboard.



13. Install the top cover.

See “Replace the Top Cover” on page 185.

14. Return the server to the normal rack position.

See “Return the Server to the Normal Rack Position” on page 186.

15. Reinstall the power cords to the power supplies.

See “Connect Power Cords” on page 187.

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

Refer to the *SPARC T4-2 Server Installation Guide* for instructions.

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

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

If you see the preceding message, continue to [Step 17](#). Otherwise, skip to [Step 19](#).

17. Download the system firmware.

a. If necessary, configure the service processor NET MGT port so that it can access the network.

Refer to the Oracle ILOM documentation for network configuration instructions.

b. Log in to the service processor through the NET MGT port.

c. Download the system firmware.

Follow the firmware download instructions in the Oracle ILOM documentation.

Note – You can load any supported system firmware version, including the firmware version that had been installed prior to replacing the motherboard.

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

If your system contained RAID volumes prior to replacing the motherboard, see [“Reactivate RAID Volumes”](#) on page 165 for instructions.

19. Power on the server.

See [“Power On the Server \(Oracle ILOM\)”](#) on page 188 or [“Power On the Server \(Power Button\)”](#) on page 188.

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

Do this if you need the replacement to have the same serial number as the unit before servicing. This must be done in a special service mode by trained service personnel.

Related Information

- Oracle ILOM documentation
- [“Motherboard Overview”](#) on page 159
- [“Remove the Motherboard”](#) on page 160
- [“Reactivate RAID Volumes”](#) on page 165
- [“Verify Motherboard Functionality”](#) on page 168

▼ Reactivate RAID Volumes

Only perform this task if your system had RAID volumes prior to replacing the motherboard.

1. Prior to powering on the server, log in to the service processor.

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

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

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

3. Power on the server.

See “Power On the Server (Oracle ILOM)” on page 188 or “Power On the Server (Power Button)” on page 188.

4. At the OpenBoot PROM prompt, use the `show-devs` command to list the device paths on the server:

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

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

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

5. Use the `select` command to choose the RAID module on the motherboard:

```
ok select scsi
```

Instead of using the alias name `scsi`, you could type the full device path name (such as `/pci@400/pci@2/pci@0/pci@e/scsi@0`).

6. List all connected logical RAID volumes to determine which volumes are in an inactive state:

```
ok show-volumes
```

For example, the following `show-volumes` output shows an inactive volume:

```
ok show-volumes
Volume 0 Target 389 Type RAID1 (Mirroring)
WWID 03b2999bca4dc677
Optimal Enabled Inactive
```

```

2 Members                               583983104 Blocks, 298 GB
Disk 1
  Primary Optimal
  Target 9      HITACHI  H103030SCSUN300G A2A8
Disk 0
  Secondary Optimal
  Target c      HITACHI  H103030SCSUN300G A2A8

```

7. For every RAID volume listed as inactive, type the following command to activate those volumes:

```
ok inactive_volume activate-volume
```

Where *inactive_volume* is the name of the RAID volume that you are activating. For example:

```
ok 0 activate-volume
Volume 0 is now activated
```

Note – For more information on configuring hardware RAID on the server, refer to the *SPARC T4 Series Servers Administration Guide*.

8. Use the `unselect-dev` command to unselect the `scsi` device.

```
ok unselect-dev
```

9. Use the `probe-scsi-all` command to confirm that you reactivated the volume.

```

ok probe-scsi-all
/pci@400/pci@2/pci@0/pci@e/scsi@0

FCode Version 1.00.54, MPT Version 2.00, Firmware Version 5.00.17.00

Target a
  Unit 0 Removable Read Only device  TEAC  DV-W28SS-R    1.0C
  SATA device  PhyNum 3
Target b
GB Unit 0  Disk  SEAGATE  ST914603SSUN146G 0868    286739329 Blocks, 146
  SASDeviceName 5000c50016f75e4f SASAddress 5000c50016f75e4d PhyNum 1
Target 389 Volume 0
  Unit 0  Disk  LSI      Logical Volume  3000    583983104 Blocks, 298 GB
  VolumeDeviceName 33b2999bca4dc677 VolumeWWID 03b2999bca4dc677

```

```
/pci@400/pci@1/pci@0/pci@b/pci@0/usb@0,2/hub@2/hub@3/storage@2
Unit 0 Removable Read Only device AMI Virtual CDROM 1.00
```

10. Set the `auto-boot?` OpenBoot PROM variable to `true` so the system will boot the OS when powered-on.

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

11. Reboot the server.

Related Information

- [“Install the Motherboard”](#) on page 162
- [“Reactivate RAID Volumes”](#) on page 165
- [“Verify Motherboard Functionality”](#) on page 168

▼ Verify Motherboard Functionality

1. Run the Oracle ILOM `show faulty` command to verify that the fault has been cleared.
See [“Managing Faults \(Oracle ILOM\)”](#) on page 23 for more information on using the `show faulty` command.
2. Perform one of the following tasks based on your verification results:
 - If the previous steps did not clear the fault, see [“Detecting and Managing Faults”](#) on page 15 for information about the tools and methods you can use to diagnose component faults.
 - If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

Servicing the SP

These topics describe service procedures for the SP in the server.

- [“SP Firmware and Configuration” on page 169](#)
- [“Remove the SP” on page 170](#)
- [“Install the SP” on page 171](#)
- [“Verify SP Functionality” on page 173](#)

SP Firmware and Configuration

System firmware consists of two components: a SP component and a host component. The SP firmware component is located on the SP and the host component is located on the motherboard. In order for the system to operate correctly, these two components must be compatible.

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

After replacing the SP, the new SP firmware component must be compatible with the existing host firmware component. If the firmware components are incompatible, load new system firmware as described in [“Install the SP” on page 171](#).

Related Information

- Oracle ILOM documentation
- [“PCIe Card Configuration Rules” on page 145](#)
- [“Servicing the Motherboard” on page 159](#)
- [“Remove the SP” on page 170](#)
- [“Install the SP” on page 171](#)

▼ Remove the SP



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



Caution – These procedures require that you handle components that are sensitive to ESD. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“ESD Measures” on page 62](#).

After you replace the SP, restoring the SP configuration will be easier if you had previously saved the configuration using the Oracle ILOM backup utility. If possible, back up the Oracle ILOM configuration before removing the SP. Refer to the Oracle ILOM documentation for instructions on backing up and restoring the Oracle ILOM configuration.

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

Replacing the SP is a cold service procedure that must be performed by qualified service personnel. The system must be completely powered down before performing this procedure. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 67](#) for more information about this category of service procedures.

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

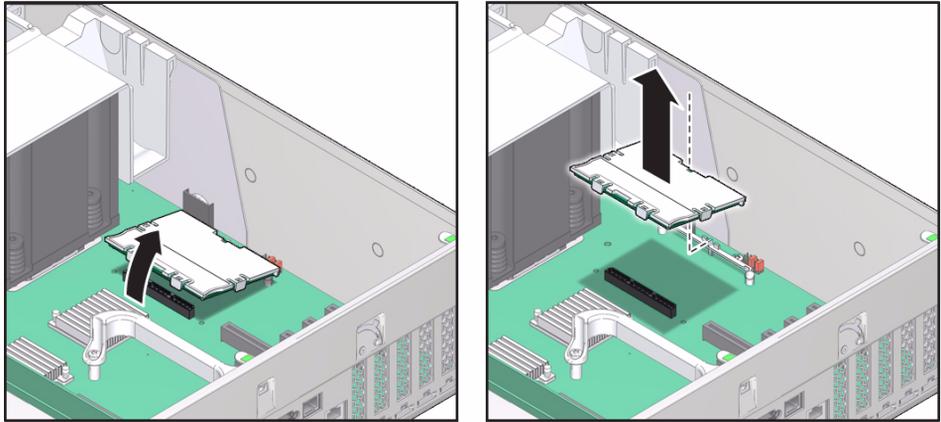
1. Prepare for servicing:

- a. **Attach an antistatic wrist strap.**
- b. **Power off the server and unplug power cords from the power supplies.**
See [“Removing Power From the Server” on page 68](#).
- c. **Remove the server from the rack.**
See [“Remove the Server From the Rack” on page 73](#).
- d. **Remove the top cover.**
See [“Remove the Top Cover” on page 75](#).

2. Locate the SP.

- See [“Internal Components” on page 6](#).

3. Remove the SP by completing the following tasks.



Note – If you are removing the SP because you are replacing the motherboard, set the SP aside as you will need to reinstall it on the new motherboard.

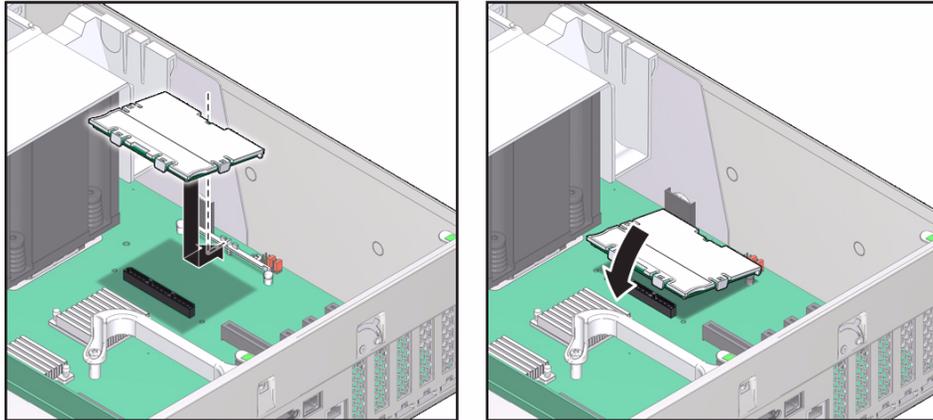
- a. Grasp the SP by the two grasp points and lift up to disengage the SP from the connectors on the motherboard.
- b. Lift the SP up and away from the motherboard.

Related Information

- [“SP Firmware and Configuration” on page 169](#)
- [“Install the SP” on page 171](#)

▼ Install the SP

1. Install the SP by completing the following tasks.



- a. Lower the side of the SP with the Align Tab sticker at an angle down on the SP tab on the motherboard.
 - b. Press the SP straight down until it is fully seated in its socket.
2. Return the server to an operational condition:
- a. Install the top cover.
See [“Replace the Top Cover”](#) on page 185.
 - b. Return the server to the normal rack position.
See [“Return the Server to the Normal Rack Position”](#) on page 186.
 - c. Reinstall the power cords to the power supplies.
See [“Connect Power Cords”](#) on page 187.
3. Prior to powering on the server, connect a terminal or a terminal emulator (PC or workstation) to the SP SER MGT port.

Refer to the *SPARC T4-2 Server Installation Guide* for instructions.

If the replacement SP detects that the SP firmware is not compatible with the existing host firmware, further action will be suspended and the following message will be displayed:

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

If you see the preceding message, continue to the next step. Otherwise, skip to [Step 5](#).

4. Download the system firmware.

- a. **Configure the SP NET MGT port so that it can access the network, and log in to the SP through the NET MGT port.**

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 version that was installed prior to replacing the SP.

- c. **If you created a backup of your Oracle ILOM configuration, use the Oracle ILOM restore utility to restore the configuration of the replacement SP.**

Refer to the Oracle ILOM documentation for instructions.

5. **Power on the server.**

See “Power On the Server (Oracle ILOM)” on page 188 or “Power On the Server (Power Button)” on page 188.

6. **Verify the SP.**

See “Verify SP Functionality” on page 173.

Related Information

- Oracle ILOM documentation
- “Remove the SP” on page 170
- “Verify SP Functionality” on page 173

▼ Verify SP Functionality

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

Note that the LED will flash green while the SP initializes the Oracle ILOM firmware. See “Front and Rear Panel System Controls and LEDs” on page 20 for information about the status of the SP LED.

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

See “Managing Faults (Oracle ILOM)” on page 23 for more information on using the `show faulty` command.

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

- If the previous steps did not clear the fault, see [“Detecting and Managing Faults” on page 15](#) for information about the tools and methods you can use to diagnose component faults.
- If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

Servicing the Drive Backplane

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

- [“Remove the Drive Backplane” on page 175](#)
- [“Install the Drive Backplane” on page 176](#)
- [“Verify Drive Backplane Functionality” on page 178](#)

▼ Remove the Drive Backplane

This is a cold service procedure that must be performed by qualified service personnel. The system must be completely powered down before performing this procedure. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 67](#) for more information about this category of service procedures.

1. Prepare for servicing:

- Attach an antistatic wrist strap.**
- Power off the server and unplug power cords from the power supplies.**
See [“Removing Power From the Server” on page 68](#).
- Remove the server from the rack.**
See [“Remove the Server From the Rack” on page 73](#).
- Remove the top cover.**
See [“Remove the Top Cover” on page 75](#).

2. Remove all drives and fillers.

- See [“Remove a Drive” on page 85](#).

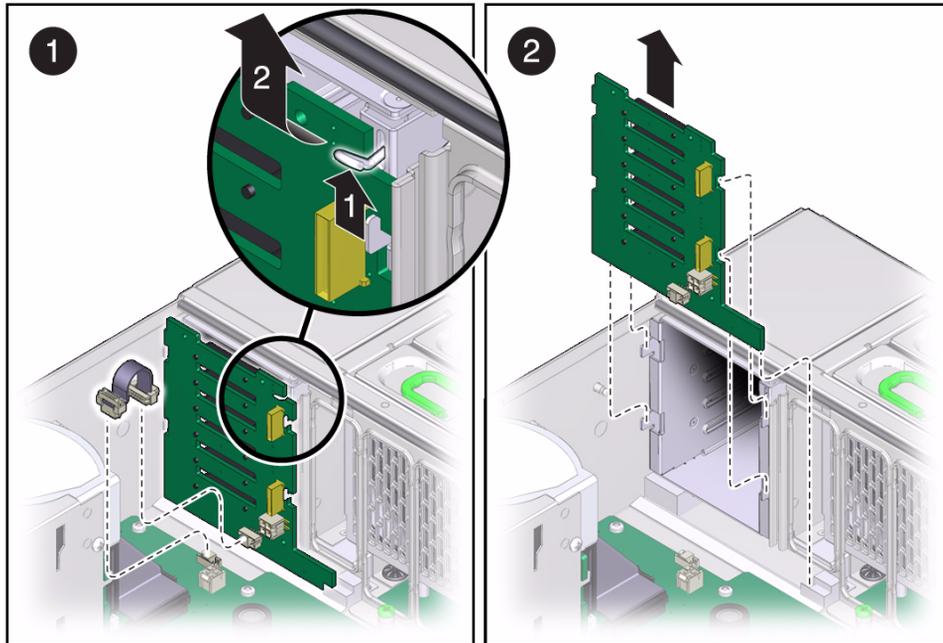
Note – Note the positions of the disks so you can return them to the correct slots.

3. Remove the DVD drive.

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

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

5. Remove the drive backplane by completing the following tasks.



a. Unplug the two SAS cables, power cables, and ribbon cable from the drive backplane and push up on the wire tab in the upper corner of the drive backplane.

b. Swing the drive backplane back and out of the chassis.

Related Information

- [“Install the Drive Backplane”](#) on page 176

▼ Install the Drive Backplane

1. Unpack the replacement power supply backplane and place it on an antistatic mat.

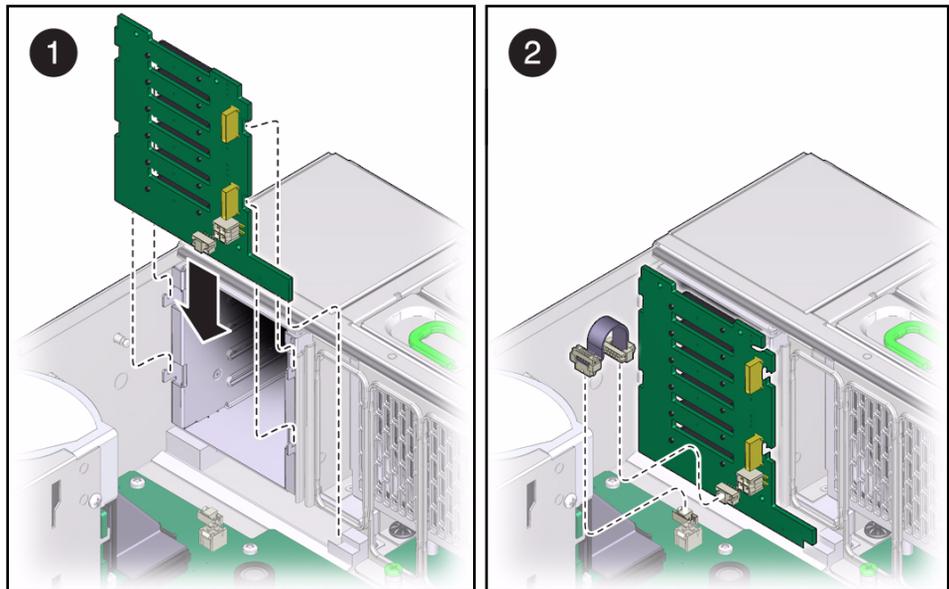
2. Insert the drive backplane into the chassis.

Verify that the drive backplane is seated properly at the bottom, in the small slot near the DVD drive.

3. Lift up the metal hook and press the drive backplane to the front until it snaps into place.

4. Replace the power cable, ribbon data cable, and SAS cables to their original locations.

Note – The mini-SAS plug must be inserted into the upper mini-SAS connector on the disk backplane. This short cable connects the DVD to its USB bridge on the motherboard. The longer SAS cable connects drive bays 4 and 5 to a storage device in the rear of the system. The lower mini-SAS connector on the disk backplane requires the standard, four-channel mini-SAS cable for drive bays 0 to 3.



5. Replace all drives and filler panels.

See “Install a Drive” on page 87.

6. Replace the System Remind button assembly (air divider).

7. Replace the DVD drive.

See “Install a DVD Drive or Filler Panel” on page 138.

8. Return the server to operation:

a. Install the top cover.

See [“Replace the Top Cover”](#) on page 185.

b. Return the server to the normal rack position.

See [“Return the Server to the Normal Rack Position”](#) on page 186.

c. Power on the server.

See [“Returning the Server to Operation”](#) on page 185.

Note – The product serial number used for service entitlement and warranty coverage might need to be reprogrammed on the disk backplane by authorized service personnel with the correct product serial number located on the chassis EZ label.

Related Information

- [“Remove the Drive Backplane”](#) on page 175
- [“Install the Drive Backplane”](#) on page 176
- [“Verify Drive Backplane Functionality”](#) on page 178

▼ Verify Drive Backplane Functionality

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

See [“Managing Faults \(Oracle ILOM\)”](#) on page 23 for more information on using the `show faulty` command.

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

- If the previous steps did not clear the fault, see [“Detecting and Managing Faults”](#) on page 15 for information about the tools and methods you can use to diagnose component faults.
- If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

Servicing the Power Supply Backplane

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

- [“Remove the Power Supply Backplane” on page 179](#)
- [“Install the Power Supply Backplane” on page 181](#)
- [“Verify Power Supply Backplane Functionality” on page 183](#)

▼ Remove the Power Supply Backplane



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

This is a cold service procedure that must be performed by qualified service personnel. The system must be completely powered down before performing this procedure. See [“Cold Service, Replaceable by Authorized Service Personnel” on page 67](#) for more information about this category of service procedures.

1. Prepare for servicing:

- Attach an antistatic wrist strap.**
- Power off the server and unplug power cords from the power supplies.**
See [“Removing Power From the Server” on page 68](#).
- Extend the server to the maintenance position.**
See [“Extend the Server to the Maintenance Position” on page 71](#).
- Remove the top cover.**
See [“Remove the Top Cover” on page 75](#).

2. Pull both power supplies at least part way out of the chassis, to disconnect them from the power supply backplane.

See “Remove a Power Supply” on page 101.

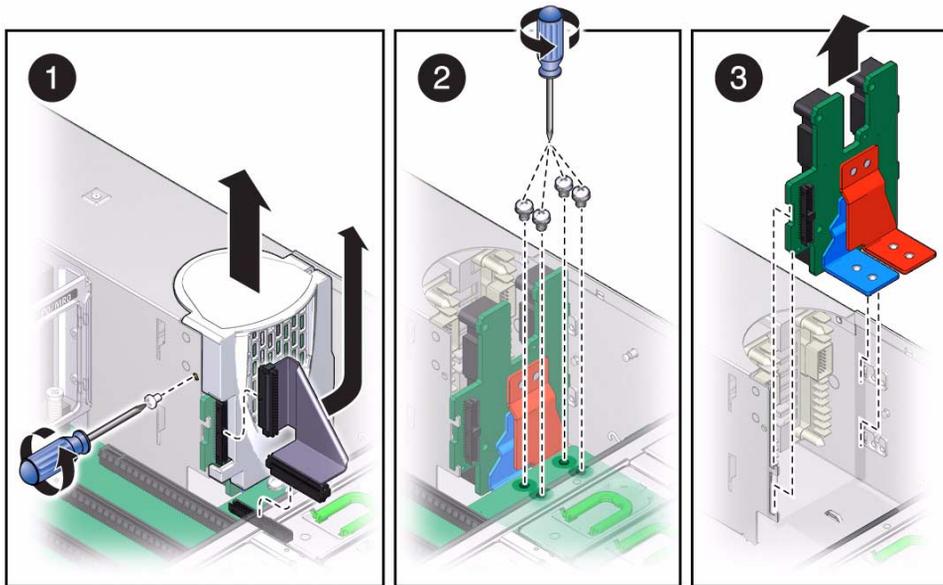
3. Remove all memory risers or filler panels.

See “Remove a Memory Riser” on page 116.

4. Remove the air divider by pulling it up and out of the chassis.

5. Remove the ribbon cable connecting the power supply backplane to the motherboard.

6. Remove the power supply backplane by completing the following tasks.



- a. Remove the screw that holds the power supply backplane cover in place and remove the power supply cover.

- b. Remove the four bus bar screws securing the motherboard to the power supply backplane and remove the motherboard to gain access to the bus bars.

This will also involve disconnecting all cables that connect the power supply backplane, drive backplane, and fan board to the motherboard.

See “Remove the Motherboard” on page 160.

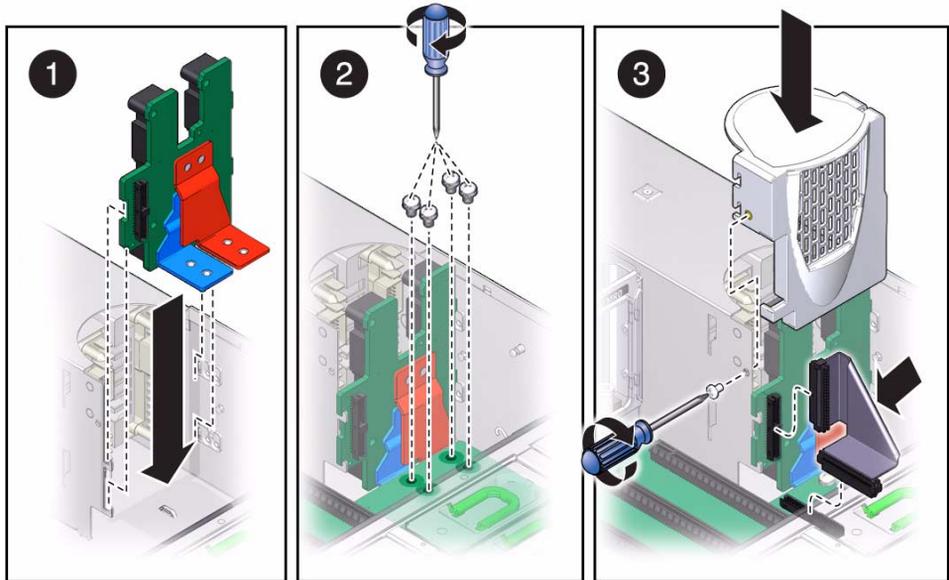
- c. Disconnect the AC cables from power supply backplane and lift the backplane out of the chassis.

Related Information

- “Install the Power Supply Backplane” on page 181

▼ Install the Power Supply Backplane

1. **Unpack the replacement power supply backplane and place it on an antistatic mat.**
2. **Hold the power supply backplane at the end of the power supply cage and connect the AC cables to the AC connectors on the power supply backplane.**
Ensure that each AC cable is connected to the appropriate connector. The AC cable on the right must be connected to the AC connector on the right and the AC cable on the left must be connected to the AC connector on the left.
3. **Insert the power supply backplane into position by completing the following tasks.**



- a. **Ensure that the tabs on the power board slide onto the hooks on the power supply cage.**

- b. Install the motherboard and the four bus bar screws that secure the motherboard to the power supply backplane.**

This will also involve reconnecting all cables that connect the power supply backplane, drive backplane, and fan board to the motherboard.

See [“Install the Motherboard”](#) on page 162.

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

- c. Replace the power supply backplane cover and fasten it in place with the screw.**
- 4. Reconnect the ribbon cable from the motherboard to the power supply backplane.**
- 5. Reinstall the air divider by sliding it into the chassis.**
- 6. Reinstall the memory risers or filler panels.**

See [“Install a Memory Riser”](#) on page 117.
- 7. Push the power supplies all the way back into the chassis.**

See [“Install a Power Supply”](#) on page 103.
- 8. Return the server to operation:**
 - a. Install the top cover.**

See [“Replace the Top Cover”](#) on page 185.
 - b. Return the server to the normal rack position.**

See [“Return the Server to the Normal Rack Position”](#) on page 186.
 - c. Reinstall the power cords to the power supplies and power on the server.**

See [“Returning the Server to Operation”](#) on page 185.

Related Information

- [“Remove the Power Supply Backplane”](#) on page 179
- [“Verify Power Supply Backplane Functionality”](#) on page 183

▼ Verify Power Supply Backplane Functionality

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

See [“Managing Faults \(Oracle ILOM\)” on page 23](#) for more information on using the `show faulty` command.

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

- If the previous steps did not clear the fault, see [“Detecting and Managing Faults” on page 15](#) for information about the tools and methods you can use to diagnose component faults.
- If the previous steps indicate that no faults have been detected, then the component has been replaced successfully. No further action is required.

Returning the Server to Operation

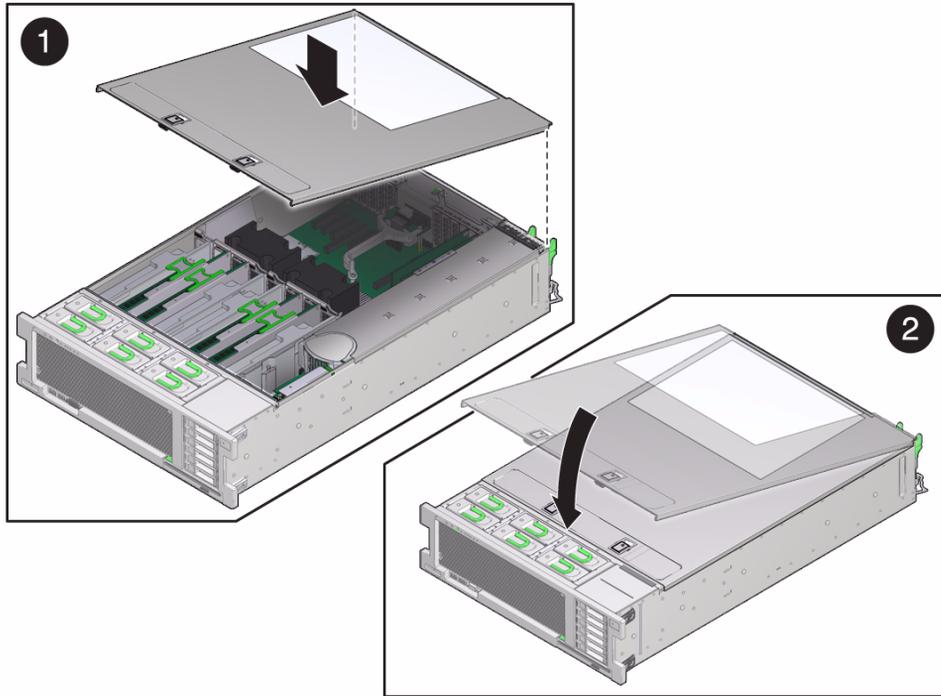
These topics explain how to return the server to operation after you have performed service procedures.

- [“Replace the Top Cover” on page 185](#)
- [“Return the Server to the Normal Rack Position” on page 186](#)
- [“Connect Power Cords” on page 187](#)
- [“Power On the Server \(Oracle ILOM\)” on page 188](#)
- [“Power On the Server \(Power Button\)” on page 188](#)

▼ Replace the Top Cover

- 1. Place the top cover on the chassis.**

Set the cover down so that it is slightly forward of the rear of the server by about 1 inch (25.4 mm).
- 2. Slide the top cover toward the rear of the chassis until the rear cover lip engages with the rear of the chassis.**
- 3. To close the top cover, press down on the cover with both hands until both latches engage.**

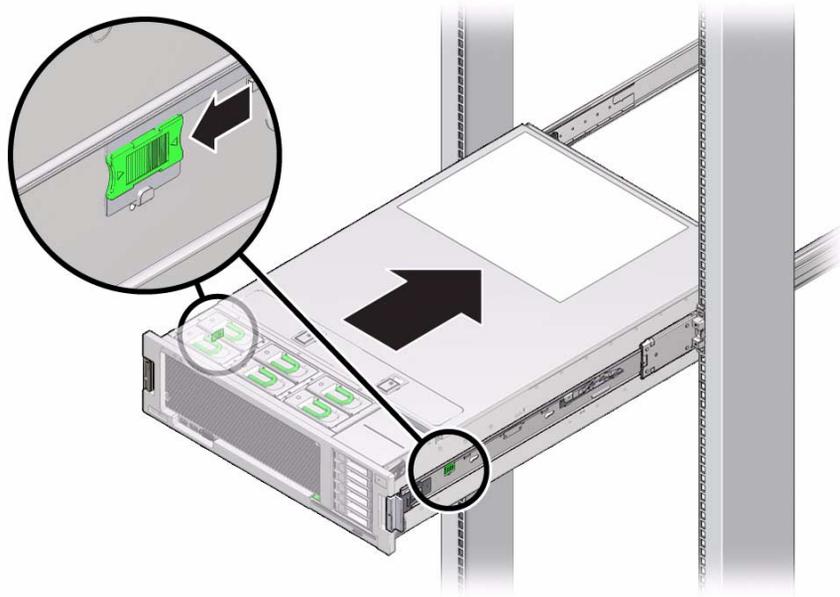


▼ Return the Server to the Normal Rack Position



Caution – The chassis is heavy. To avoid personal injury, use two people to lift it and set it in the rack.

1. Release the slide rails from the fully extended position by pushing the release tabs on the side of each rail.



2. **While pushing on the release tabs, slowly push the server into the rack.**
Ensure that the cables do not get in the way.
3. **Reconnect the cables to the rear of the server.**
If the cable management arm (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.

▼ Connect Power Cords

- **Reconnect both 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 \(Oracle ILOM\)” on page 188](#)

- [“Power On the Server \(Power Button\)” on page 188](#)

▼ Power On the Server (Oracle ILOM)

Note – If you are powering on the server following an emergency shutdown that was triggered by the top cover interlock switch, you must use the `poweron` command.

- Type `poweron` at the SP prompt.

```
-> poweron
```

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

```
-> start /SYS
```

Related Information

- [“Power On the Server \(Power Button\)” on page 188](#)

▼ Power On the Server (Power Button)

1. **Verify that the power cord has been connected and that standby power is on.**

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

2. Press and release the recessed Power button on the server front panel.

When main power is applied to the server, the main Power/OK LED begins to blink more quickly while the system boots and lights solidly once the operating system boots.

Each time the server powers on, the power-on self-test (POST) can take several minutes to complete.

FIGURE: Power Button, Power/OK LED, and SP Fault/OK LED

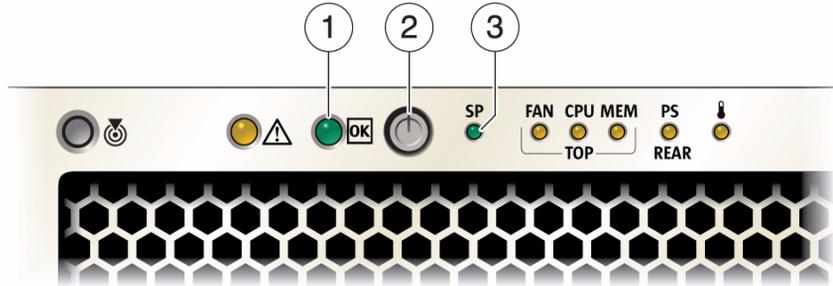


Figure Legend

-
- | | |
|---|-----------------|
| 1 | Power/OK LED |
| 2 | Power Button |
| 3 | SP OK/Fault LED |
-



Caution – Do not operate the server without all fans, component heatsinks, air baffles, and the cover installed. Severe damage to server components can occur if the server is operated without adequate cooling mechanisms.

Related Information

- “Power On the Server (Oracle ILOM)” on page 188

Glossary

A

- ANSI SIS** American National Standards Institute Status Indicator Standard.
- ASR** Automatic system recovery.

B

- blade** Generic term for server modules and storage modules. *See [server module](#) and [storage module](#).*
- blade server** Server module. *See [server module](#).*
- BMC** Baseboard management controller.
- BOB** Memory buffer on board.

C

- chassis** For servers, refers to the server enclosure. For server modules, refers to the modular system enclosure.
- CMA** Cable management arm.
- CMM** 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. *See [Modular system](#) and [Oracle ILOM](#).*

CMM Oracle ILOM Oracle ILOM that runs on the CMM. See [Oracle ILOM](#).

CMP Chip multiprocessor.

D

DHCP Dynamic Host Configuration Protocol.

**disk module or
disk blade** Interchangeable terms for storage module. See [storage module](#).

DTE Data terminal equipment.

E

ESD Electrostatic discharge.

F

FEM Fabric expansion module. FEMs enable server modules to use the 10GbE connections provided by certain NEMs. See [FEM](#).

FRU Field-replaceable unit.

H

HBA Host bus adapter.

host The part of the server or server module with the CPU and other hardware that runs the Oracle Solaris OS and other applications. The term *host* is used to distinguish the primary computer from the SP. See [SP](#).

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.

M

- 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

- name space** Top-level Oracle ILOM CMM target.
- NEM** Network express module. NEMs provide 10/100/1000 Ethernet, 10GbE Ethernet ports, and SAS connectivity to storage modules.
- NET MGT** Network management port. An Ethernet port on the server SP, the server module SP, and the CMM.
- NIC** Network interface card or controller.
- NMI** Nonmaskable interrupt.

O

- OBP** OpenBoot PROM.
- Oracle ILOM** Oracle Integrated Lights Out Manager. Oracle ILOM firmware is preinstalled on a variety of Oracle systems. Oracle ILOM enables you to remotely manage your Oracle servers regardless of the state of the host system.
- Oracle Solaris OS** Oracle Solaris operating system.

P

- PCI** Peripheral component interconnect.
- PCI EM** 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.
- POST** Power-on self-test.
- PROM** Programmable read-only memory.
- PSH** 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. <i>See host.</i>
SSD	Solid-state drive.
SSH	Secure shell.
storage module	Modular component that provides computing storage to the server modules.

U

UCP	Universal connector port.
UI	User interface.
UTC	Coordinated Universal Time.
UUID	Universal unique identifier.

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