

**Netra Server X3-2
(formerly Sun Netra X4270 M3 Server)**

Service Manual



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Using This Documentation

This document explains how to diagnose problems with and service components in Oracle's Netra Server X3-2 (formerly Sun Netra X4270 M3 Server).

This document is written for technicians, system administrators, authorized service providers, and users who have advanced experience troubleshooting and replacing hardware.

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

Product Notes

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

<http://www.oracle.com/pls/topic/lookup?ctx=NetraServerX3-2>

Related Documentation

Documentation	Links
All Oracle products	http://www.oracle.com/documentation
Netra Server X3-2	http://www.oracle.com/pls/topic/lookup?ctx=NetraServerX3-2
Oracle Integrated Lights Out Manager (Oracle ILOM) 3.1 software library	http://www.oracle.com/pls/topic/lookup?ctx=ilom31
Oracle Solaris OS and systems software library	http://www.oracle.com/technetwork/indexes/documentation/#sys_sw

Feedback

Provide feedback about this documentation at:

<http://www.oracle.com/goto/docfeedback>

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

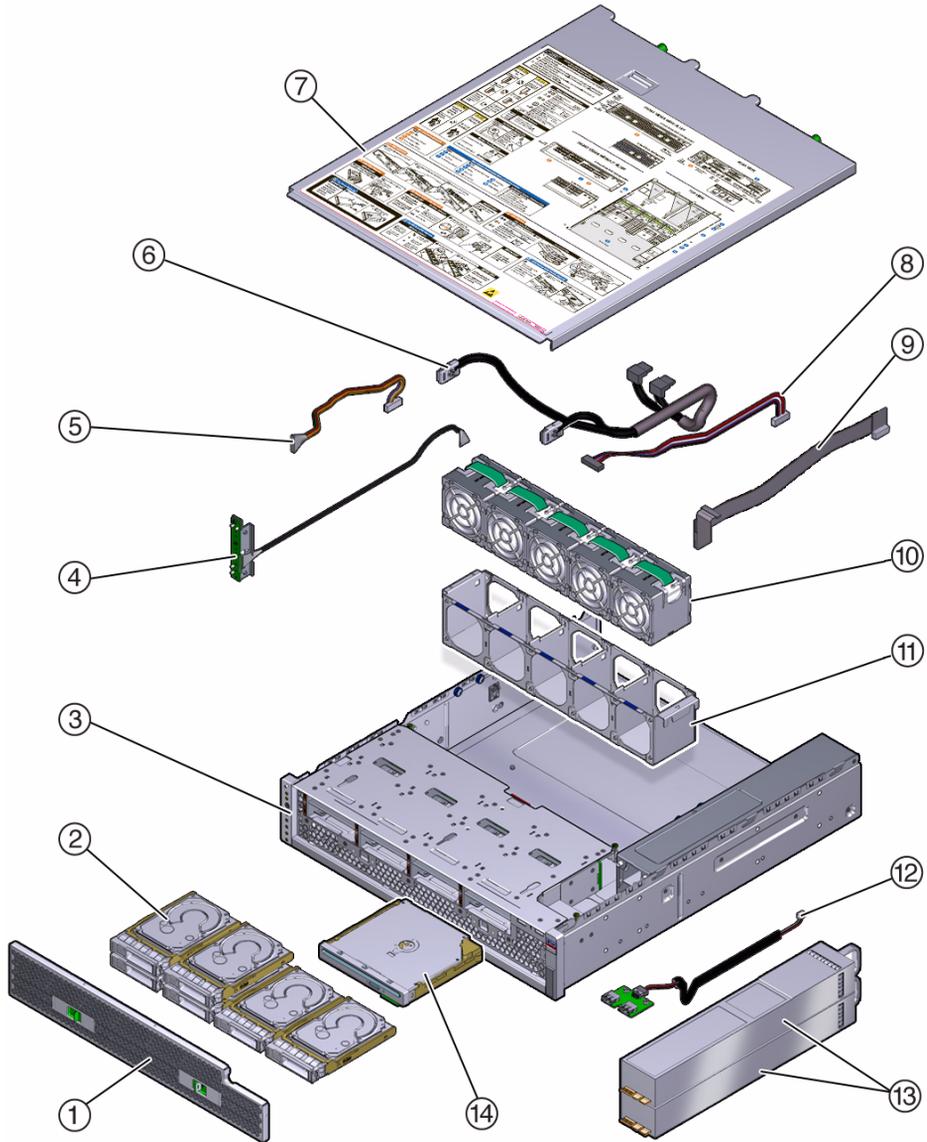
These topics identify key components of the server.

- [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2
- [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4
- [“Front Panel Components \(Service\)”](#) on page 6
- [“Rear Panel Components \(Service\)”](#) on page 7

Related Information

- [“Detecting and Managing Faults”](#) on page 9
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

Component Locations (Storage, Power, and Fans)

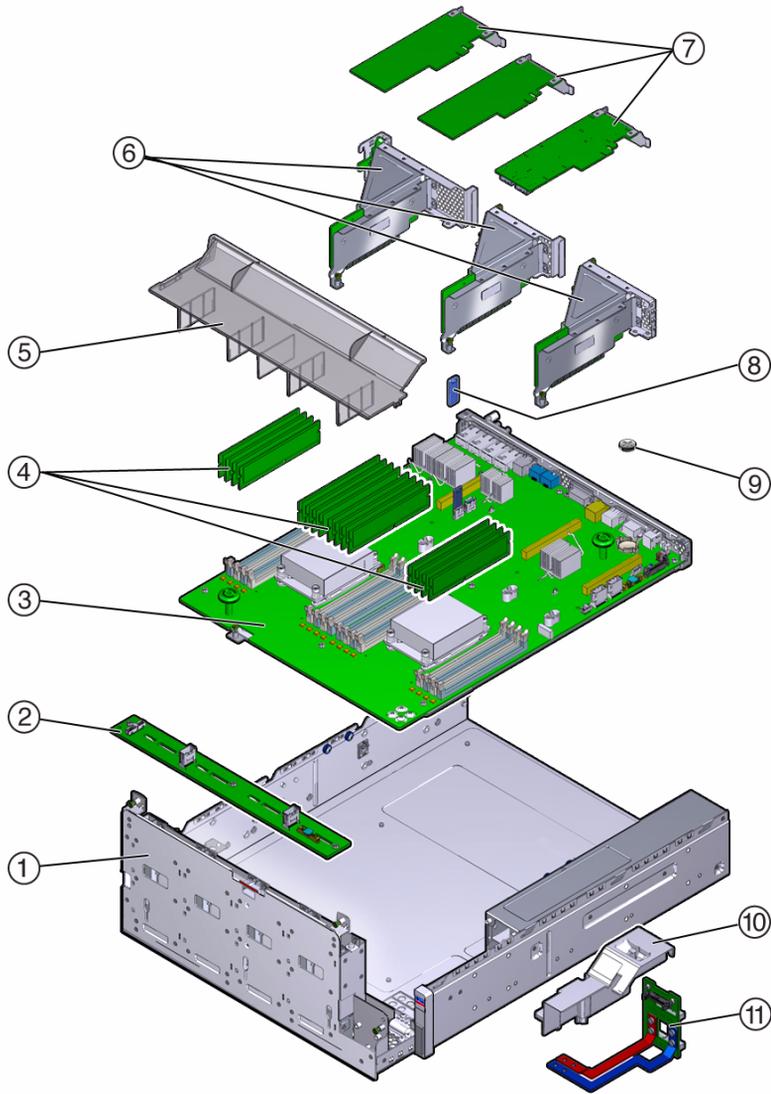


No.	Name	Service Links
1	Filter	“Servicing the Filter” on page 97
2	Drives	“Servicing Drives” on page 101
3	Chassis	“Accessing Internal Components” on page 74
4	LED board	“Servicing the LED Board” on page 219
5	Drive power cable	“Servicing Cables” on page 169
6	Drive signal cable	“Servicing Cables” on page 169
7	Top cover	“Remove the Top Cover” on page 87 “Install the Top Cover” on page 263
8	DVD SATA cable	“Servicing Cables” on page 169
9	PDB signal cable	“Servicing Cables” on page 169
10	Fan modules	“Servicing Fan Modules” on page 125
11	Fan tray	“Remove the Fan Tray” on page 89 “Install the Fan Tray” on page 262
12	USB board	“Servicing the USB Board” on page 227
13	Power supplies	“Servicing Power Supplies” on page 117
14	DVD drive	“Servicing the DVD Drive” on page 111

Related Information

- [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)” on page 4](#)
- [“Front Panel Components \(Service\)” on page 6](#)
- [“Rear Panel Components \(Service\)” on page 7](#)
- [“Component Service Task Reference” on page 67](#)

Component Locations (Motherboard, Memory, and PCIe3 Cards)

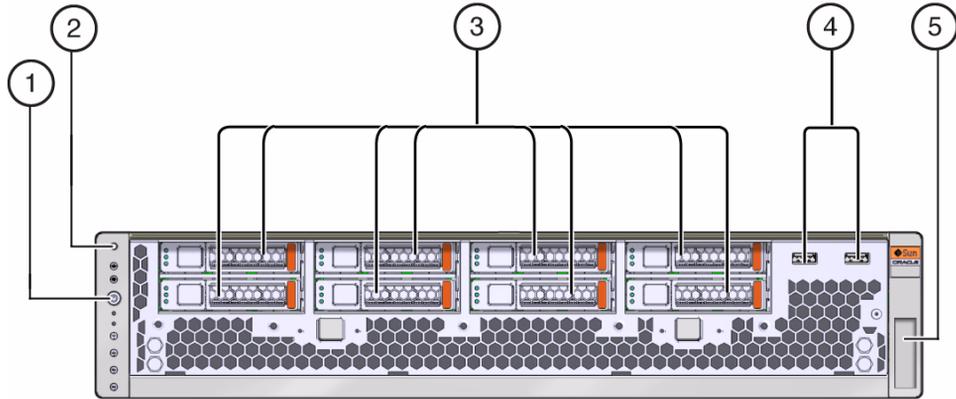


No.	Name	Service Links
1	Drive cage	“Raise the Drive Cage to the Service Position” on page 90 “Secure the Drive Cage” on page 260
2	Drive backplane	“Servicing the Drive Backplane” on page 183
3	Motherboard	“Servicing the Motherboard” on page 235
4	DIMMs	“Servicing DIMMs” on page 193
5	Air duct	“Remove the Air Duct” on page 92 “Install the Air Duct” on page 258
6	Risers	“Servicing Risers” on page 133
7	PCIe3 cards	“Servicing PCIe3 Cards” on page 143
8	USB drive	“Servicing the USB Drive” on page 163
9	Battery	“Servicing the Battery” on page 159
10	PDB duct	“Remove the PDB Duct” on page 94 “Install the PDB Duct” on page 256
11	PDB	“Servicing the PDB” on page 247

Related Information

- “Component Locations (Storage, Power, and Fans)” on page 2
- “Front Panel Components (Service)” on page 6
- “Rear Panel Components (Service)” on page 7
- “Component Service Task Reference” on page 67

Front Panel Components (Service)

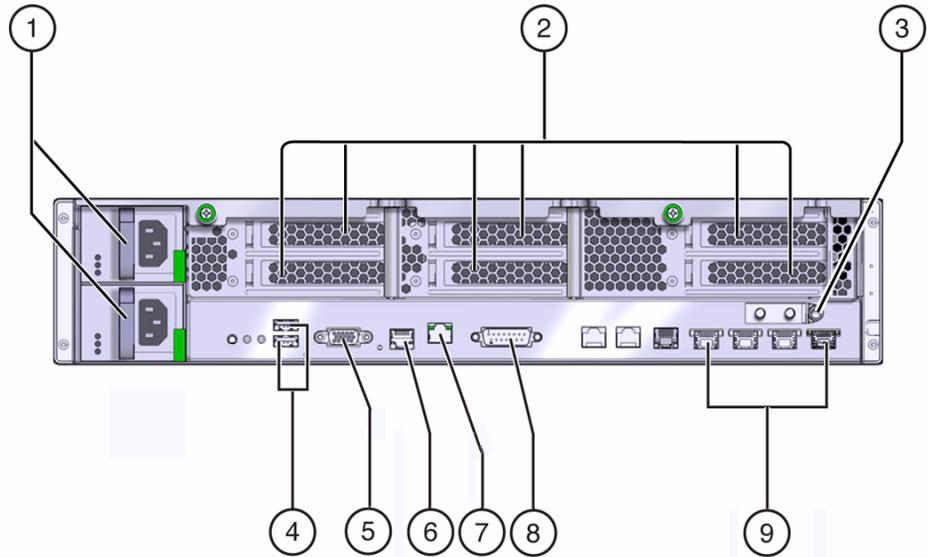


No.	Description	Links
1	Power button	“Power Off the Server (Power Button - Graceful)” on page 72 “Power On the Server (Power Button)” on page 267
2	Locator button	“Front Panel LEDs” on page 20
3	Drives (bottom row – HDD0 - HDD3, top row – HDD4, HDD5, and optionally, HDD6 and HDD7)	“Servicing Drives” on page 101
	DVD drive (substitutes for HDD6 and HDD7)	“Servicing the DVD Drive” on page 111
4	USB 2.0 ports	Server Installation , USB ports
5	RFID module	Server Installation , server serial number

Related Information

- [“Component Locations \(Storage, Power, and Fans\)” on page 2](#)
- [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)” on page 4](#)
- [“Rear Panel Components \(Service\)” on page 7](#)
- [“Front Panel LEDs” on page 20](#)

Rear Panel Components (Service)



No.	Description	Links
1	Power supplies (PS1 and PS0)(Note: AC supply shown)	“Servicing Power Supplies” on page 117
2	Expansion slots (PCIe3 cards 4 and 1 in riser 1 (left), cards 5 and 2 in riser 2 (middle), and cards 6 and 3 in riser 3 (right))	“Servicing PCIe3 Cards” on page 143 “Servicing Risers” on page 133
3	Grounding studs	<i>Server Installation</i> , grounding
4	USB 2.0 ports	<i>Server Installation</i> , USB ports
5	Video port (HD-15)	<i>Server Installation</i> , video port
6	SER MGT RJ-45 serial port for SP	“Access the SP (Oracle ILOM)” on page 17
7	NET MGT RJ-45 network port for SP	“Access the SP (Oracle ILOM)” on page 17
8	Alarm port (DB-15)	<i>Server Installation</i> , alarm port

No.	Description	Links
9	Network 10/100/1000 ports (NET0 to NET3) for host	<i>Server Installation</i> , Gigabit Ethernet ports

Related Information

- [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2
- [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4
- [“Front Panel Components \(Service\)”](#) on page 6
- [“Rear Panel LEDs”](#) on page 22

Detecting and Managing Faults

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

- [“Understanding Diagnostics” on page 9](#)
- [“Interpreting Diagnostic LEDs” on page 19](#)
- [“Troubleshooting \(Oracle ILOM /SP Targets\)” on page 23](#)
- [“BIOS POST Event Messages” on page 30](#)
- [“Troubleshooting \(Oracle ILOM /System Targets\)” on page 32](#)
- [“Displaying Faulty Components” on page 37](#)
- [“Troubleshooting \(Oracle ILOM Legacy Targets\)” on page 43](#)
- [“Troubleshooting \(Pc-Check\)” on page 51](#)

Related Information

- [“Identifying Components” on page 1](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

Understanding Diagnostics

When problems arise during day-to-day operations of the server, you can use these topics to determine the fault of the problem and a course of action.

- [“Diagnostic Process” on page 10](#)
- [“Understanding Diagnostic Tools Available During Server States” on page 12](#)
- [“Access the SP \(Oracle ILOM\)” on page 17](#)
- [“Network Management Troubleshooting Guidelines” on page 19](#)

Related Information

- “Interpreting Diagnostic LEDs” on page 19
- “Troubleshooting (Oracle ILOM /SP Targets)” on page 23
- “BIOS POST Event Messages” on page 30
- “Troubleshooting (Oracle ILOM /System Targets)” on page 32
- “Displaying Faulty Components” on page 37
- “Troubleshooting (Oracle ILOM Legacy Targets)” on page 43
- “Troubleshooting (Pc-Check)” on page 51

Diagnostic Process

This process table describes the diagnostic process, using different diagnostic tools through a troubleshooting sequence.

Step	Situation or Task	YES? Next Step	NO? Next Step
1.	Access Oracle ILOM. See “Access the SP (Oracle ILOM)” on page 17.		
2.	Can you access Oracle ILOM?	Step 28	Step 3
3.	Are the communication parameters configured correctly? See “Access the SP (Oracle ILOM)” on page 17.	Step 5	Step 4
4.	Correct the communication parameters. Then go to Step 1.		
5.	Is the cabling wired correctly? See “Network Management Troubleshooting Guidelines” on page 19.	Step 7	Step 6
6.	Correct the cabling. Then go to Step 1.		
7.	Is the supporting hardware functional?	Step 9	Step 8
8.	Fix the supporting hardware. Then go to Step 1.		
9.	Check the server.		
10.	Inspect the power supply LEDs. See “Rear Panel LEDs” on page 22 and “Power Supply LEDs” on page 118, or “Oracle ILOM Legacy Targets for LED States” on page 50.		
11.	Are any power supply LEDs lit?	Step 13	Step 12
12.	Check the power cords and supplied power. See <i>Server Installation</i> , cabling and specifications. Then go to Step 1.		
13.	Do the power supply LEDs indicate a fault?	Step 14	Step 17

Step	Situation or Task	YES? Next Step	NO? Next Step
14.	Remove and reinstall the faulty power supply. See “Servicing Power Supplies” on page 117 .		
15.	Does the power fault LED persist?	Step 16	Step 1
16.	Replace the faulty power supply with a new one. See “Servicing Power Supplies” on page 117 . Then go to Step 1.		
17.	Check the SP status LED. See “Front Panel LEDs” on page 20 or “Oracle ILOM Legacy Targets for LED States” on page 50 .		
18.	Does the SP status LED indicate a fault?	Step 19	Step 21
19.	Reset the SP. Insert the end of a paper clip into the pinhole between the video port and the SER MGT port, and press the switch within. See “Rear Panel Components (Service)” on page 7 .		
20.	Does the SP fault LED persist?	Step 40	Step 1
21.	Check the chassis status LEDs. See “Front Panel LEDs” on page 20 or “Oracle ILOM Legacy Targets for LED States” on page 50 .		
22.	Do the chassis status LEDs indicate a fault?	Step 1	Step 23
23.	Check the drive status LEDs. See “Front Panel LEDs” on page 20 and “Drive LEDs” on page 102 , or “Oracle ILOM Legacy Targets for LED States” on page 50 .		
24.	Do the drive LEDs indicate a fault?	Step 1	Step 25
25.	Check the network status LEDs. See “Rear Panel LEDs” on page 22 .		
26.	Do the network status LEDs indicate a fault?	Step 27	Step 1
27.	Inspect and replace cables as necessary. Then go to Step 1.		
28.	Check the logs for information. See “Display Oracle ILOM Log Entries” on page 25 .		
29.	Do the log entries identify the problem?	Step 30	Step 34
30.	Is the problem identified as a hardware problem?	Step 32	Step 31
31.	The problem is software related. See <i>Server Administration</i> .		
32.	Is sufficient information provided to justify a service operation?	Step 33	Step 34
33.	Perform the service operation on the identified component. See “Resettable Targets” on page 42 and “Identifying Components” on page 1 .		
34.	Is the server fully powered up?	Step 36	Step 35
35.	Fully power up the server. See “Power On the Server (Oracle ILOM)” on page 267 . Then go to Step 36.		
36.	Perform general diagnostics. See “Determining Component Health” on page 33 .		

Step	Situation or Task	YES? Next Step	NO? Next Step
37.	Do the general diagnostics identify any specific component as faulty?	Step 38	Step 31
38.	Perform tests on the specific component. See “Displaying Faulty Components” on page 37.		
39.	Does the component pass functional tests?	Step 31	Step 33
40.	Replace the motherboard. See “Servicing the Motherboard” on page 235. Then go to Step 1.		

Related Information

- [“Understanding Diagnostic Tools Available During Server States”](#) on page 12
- [“Access the SP \(Oracle ILOM\)”](#) on page 17
- [“Network Management Troubleshooting Guidelines”](#) on page 19

Understanding Diagnostic Tools Available During Server States

These tables describe the diagnostic tools that are available to you, according to the state of the server.

Note – You can also use these tables if your server has a problem and is not able to progress to a certain state. Use the tools available in the previously achieved state to determine the problem.

- [“Diagnostic Tools”](#) on page 13
- [“Tools Available When Power Cords Are Attached”](#) on page 14
- [“Tools Available On Initial Power Up”](#) on page 14
- [“Tools Available When the BIOS Menu Is Available”](#) on page 15
- [“Tools Available When the OS Boots”](#) on page 15
- [“Tools Available When the OS Is Running”](#) on page 16

Related Information

- [“Diagnostic Process”](#) on page 10
- [“Access the SP \(Oracle ILOM\)”](#) on page 17
- [“Network Management Troubleshooting Guidelines”](#) on page 19

Diagnostic Tools

These tools are available to perform diagnostics:

- **Status LEDs** – These LEDs indicate the condition or state of the chassis and components. See [“Interpreting Diagnostic LEDs” on page 19](#).
- **Oracle ILOM /SP targets** – These targets provide information about services, sessions, and configuration parameters for Oracle ILOM. See [“Troubleshooting \(Oracle ILOM /SP Targets\)” on page 23](#).
- **Oracle ILOM logs** – These files provide an accounting of events that happened with the server hardware. See [“Display Oracle ILOM Log Entries” on page 25](#).
- **BIOS messages** – These messages might be displayed. The messages describe events occurring during the BIOS power-on self-test. See [“BIOS POST Event Messages” on page 30](#).
- **Oracle ILOM /System targets** – These targets provide information about the hardware of the server. See [“Determining Component Health” on page 33](#).
- **Oracle ILOM show faulty command** – This command displays a table of components determined to be faulty. See [“Display Faults \(show faulty Command\)” on page 37](#).
- **Oracle ILOM faultmgt shell** – This shell diagnose hardware component failures. See [“Display Faults \(faultmgt Shell\)” on page 39](#).
- **Oracle ILOM legacy targets** – These targets provide detailed component and environmental information about the server. See [“Troubleshooting \(Oracle ILOM Legacy Targets\)” on page 43](#).
- **Pc-Check menu** – This menu provides a selection of hardware component tests. See [“Troubleshooting \(Pc-Check\)” on page 51](#).
- **OS boot diagnostics** – Specific to the OS installed, these tools determine the interaction between the OS and the hardware components.
- **Diagnostic applications** – These software programs perform tests on the hardware components.

Related Information

- [“Tools Available When Power Cords Are Attached” on page 14](#)
- [“Tools Available On Initial Power Up” on page 14](#)
- [“Tools Available When the BIOS Menu Is Available” on page 15](#)
- [“Tools Available When the OS Boots” on page 15](#)
- [“Tools Available When the OS Is Running” on page 16](#)
- [“Tools Available When Power Cords Are Attached” on page 14](#)

Tools Available When Power Cords Are Attached

In this server state, standby voltage is applied and constant throughout the chassis.

Tool	Links
Status LEDs	"Rear Panel LEDs" on page 22
• Power supply	"Front Panel LEDs" on page 20
• Chassis	
Oracle ILOM /SP targets	"Troubleshooting (Oracle ILOM /SP Targets)" on page 23
Oracle ILOM logs	"Display Oracle ILOM Log Entries" on page 25

Related Information

- ["Diagnostic Tools" on page 13](#)
- ["Tools Available On Initial Power Up" on page 14](#)
- ["Tools Available When the BIOS Menu Is Available" on page 15](#)
- ["Tools Available When the OS Boots" on page 15](#)
- ["Tools Available When the OS Is Running" on page 16](#)

Tools Available On Initial Power Up

The server is in a transition state from standby voltage to full power, and initiation of BIOS.

Tool	Links
Status LEDs	"Rear Panel LEDs" on page 22
• Power supply	"Front Panel LEDs" on page 20
• Chassis	
Oracle ILOM /SP targets	"Troubleshooting (Oracle ILOM /SP Targets)" on page 23
Oracle ILOM logs	"Display Oracle ILOM Log Entries" on page 25
BIOS messages	"BIOS POST Event Messages" on page 30

Related Information

- ["Diagnostic Tools" on page 13](#)
- ["Tools Available When Power Cords Are Attached" on page 14](#)
- ["Tools Available When the BIOS Menu Is Available" on page 15](#)

- [“Tools Available When the OS Boots”](#) on page 15
- [“Tools Available When the OS Is Running”](#) on page 16

Tools Available When the BIOS Menu Is Available

In this server state, the boot sequence has been suspended and the system is in a quiescent state at the BIOS menu. Full power is applied.

Tool	Links
Status LEDs	“Rear Panel LEDs” on page 22
<ul style="list-style-type: none"> • Power supply • Chassis • Hard drive • Fan 	“Front Panel LEDs” on page 20
Oracle ILOM /SP targets	“Troubleshooting (Oracle ILOM /SP Targets)” on page 23
Oracle ILOM logs	“Display Oracle ILOM Log Entries” on page 25
Oracle ILOM /System targets	“Determining Component Health” on page 33
Oracle ILOM <code>show faulty</code> command	“Display Faults (show faulty Command)” on page 37
Oracle ILOM <code>faultmgt</code> shell	“Display Faults (faultmgt Shell)” on page 39
Oracle ILOM legacy targets	“Troubleshooting (Oracle ILOM Legacy Targets)” on page 43
Pc-Check menu	“Troubleshooting (Pc-Check)” on page 51

Related Information

- [“Diagnostic Tools”](#) on page 13
- [“Tools Available When Power Cords Are Attached”](#) on page 14
- [“Tools Available On Initial Power Up”](#) on page 14
- [“Tools Available When the OS Boots”](#) on page 15
- [“Tools Available When the OS Is Running”](#) on page 16

Tools Available When the OS Boots

In this server state, the BIOS menu has been averted or exited, and the OS is booting. The kernel, libraries, and drivers are being loaded.

Tool	Links
Status LEDs	"Rear Panel LEDs" on page 22
<ul style="list-style-type: none"> • Power supply • Chassis • Hard drive • Fan • Network 	"Front Panel LEDs" on page 20
Oracle ILOM /SP targets	"Troubleshooting (Oracle ILOM /SP Targets)" on page 23
Oracle ILOM logs	"Display Oracle ILOM Log Entries" on page 25
Oracle ILOM /System targets	"Determining Component Health" on page 33
Oracle ILOM show faulty command	"Display Faults (show faulty Command)" on page 37
Oracle ILOM faultmgt shell	"Display Faults (faultmgt Shell)" on page 39
Oracle ILOM legacy targets	"Troubleshooting (Oracle ILOM Legacy Targets)" on page 43
OS Boot Diagnostics	See your OS documentation.

Related Information

- ["Diagnostic Tools" on page 13](#)
- ["Tools Available When Power Cords Are Attached" on page 14](#)
- ["Tools Available On Initial Power Up" on page 14](#)
- ["Tools Available When the BIOS Menu Is Available" on page 15](#)
- ["Tools Available When the OS Is Running" on page 16](#)

Tools Available When the OS Is Running

In this server state, the boot sequence is finished, the OS is running, and applications are available.

Tool	Links
Status LEDs	“Rear Panel LEDs” on page 22
<ul style="list-style-type: none"> • Power supply • Chassis • Hard drive • Fan • Network 	“Front Panel LEDs” on page 20
Oracle ILOM / SP targets	“Troubleshooting (Oracle ILOM /SP Targets)” on page 23
Oracle ILOM logs	“Display Oracle ILOM Log Entries” on page 25
Oracle ILOM /System targets	“Determining Component Health” on page 33
Oracle ILOM <code>show faulty</code> command	“Display Faults (show faulty Command)” on page 37
Oracle ILOM <code>faultmgt</code> shell	“Display Faults (faultmgt Shell)” on page 39
Oracle ILOM legacy targets	“Troubleshooting (Oracle ILOM Legacy Targets)” on page 43
Diagnostic applications	See your application documentation.

Related Information

- [“Diagnostic Tools” on page 13](#)
- [“Tools Available When Power Cords Are Attached” on page 14](#)
- [“Tools Available On Initial Power Up” on page 14](#)
- [“Tools Available When the BIOS Menu Is Available” on page 15](#)
- [“Tools Available When the OS Boots” on page 15](#)

▼ Access the SP (Oracle ILOM)

To run diagnostic and troubleshooting command outside of the OS and host console, you must first access the SP and log on as a user recognized by the SP.

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

1. **Establish connectivity to the SP using one of these methods:**

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

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

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

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

Note – Unless indicated otherwise, all examples of interaction with the SP are through the Oracle ILOM CLI. For more information about the Oracle ILOM web interface, see *Server Administration*, accessing the Oracle ILOM web interface.

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

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

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

Oracle(R) Integrated Lights Out Manager

Version 3.1.0.18 SW1.0 r72481

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reserved.

->
```

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

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

Related Information

- [“Diagnostic Process” on page 10](#)

- [“Understanding Diagnostic Tools Available During Server States”](#) on page 12
- [“Network Management Troubleshooting Guidelines”](#) on page 19

Network Management Troubleshooting Guidelines

Follow these guidelines when experiencing difficulty connecting to the server through its NET MGT port.

- Ensure that the `state` property of the `/SP/network` Oracle ILOM target is set to `enabled`. For example:

```
-> set /SP/network state=enabled
```

- Verify the integrity of the physical connection between the NET MGT port of the server, the network, and the management device.
- Ensure that at least one of the appropriate network services are enabled in Oracle ILOM:

Service	Command
SSH	<code>set /SP/services/ssh state=enabled</code>
HTTP	<code>set /SP/services/http secureredirect=disabled servicestate=enabled</code>
HTTPS	<code>set /SP/services/https servicestate=enabled</code>

- Use an industry-standard network diagnostic tool, like IPv4 Ping or Traceroute to test the network connections between the server and the management device.

Related Information

- [“Diagnostic Process”](#) on page 10
- [“Understanding Diagnostic Tools Available During Server States”](#) on page 12
- [“Access the SP \(Oracle ILOM\)”](#) on page 17

Interpreting Diagnostic LEDs

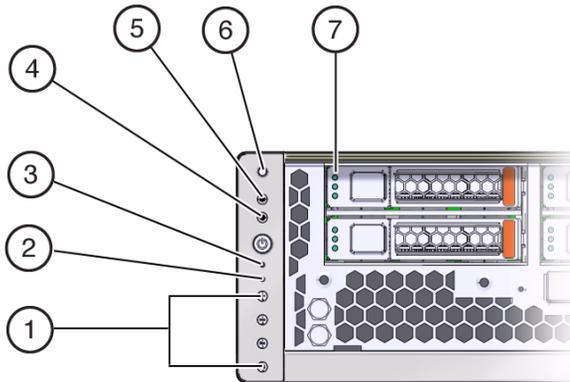
Use these diagnostic LEDs to determine if a component has failed in the server.

- “Front Panel LEDs” on page 20
- “Rear Panel LEDs” on page 22

Related Information

- “Understanding Diagnostics” on page 9
- “Troubleshooting (Oracle ILOM /SP Targets)” on page 23
- “BIOS POST Event Messages” on page 30
- “Troubleshooting (Oracle ILOM /System Targets)” on page 32
- “Displaying Faulty Components” on page 37
- “Troubleshooting (Oracle ILOM Legacy Targets)” on page 43
- “Troubleshooting (Pc-Check)” on page 51

Front Panel LEDs



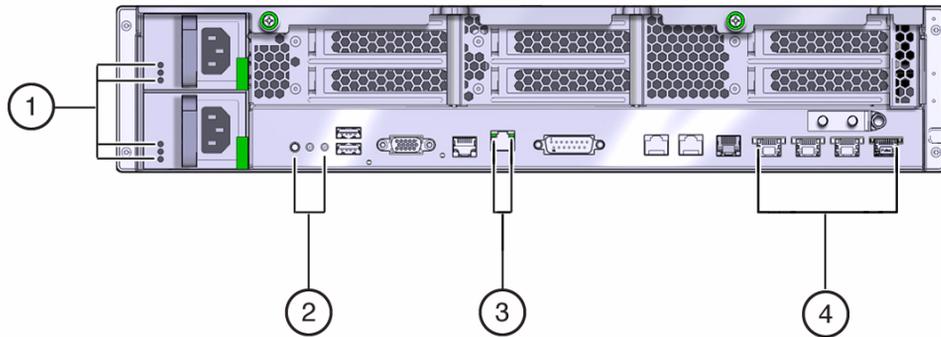
No.	LED	Description
1	Alarm LEDs:	
	• Critical Alarm LED (red)	Indicates a critical alarm condition.
	• Major Alarm LED (red)	Indicates a major alarm condition.
	• Minor Alarm LED (amber)	Indicates a minor alarm condition.
	• User Alarm LED (amber)	Indicates a user alarm condition.

No.	LED	Description
2	Rear Power Supply Status LED (amber)	Indicates the state of the power supplies: <ul style="list-style-type: none"> • Off – Indicates a steady state, no service action is required. • On – Indicates a fault with one of the power supplies.
3	SP Status LED	Indicates the state of the SP: <ul style="list-style-type: none"> • Green flashing – Indicates the SP is booting. • Green steady – Indicates a steady state, no service action is required.
4	OK LED (green)	Indicates these conditions: <ul style="list-style-type: none"> • Off – Indicates that the system is not running in its normal state. System power might be off. The SP might be running. • Steady on – Indicates that the system is powered on and is running in its normal operating state. No service actions are required. • Fast blink – Indicates that the system is running in standby mode and can be quickly returned to full function. • Slow blink – Indicates that a normal but transitory activity is taking place. Slow blinking might indicate that system diagnostics are running or that the system is booting.
5	Service Action Required LED (amber)	Indicates that service is required. The Oracle ILOM <code>show faulty</code> command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are turned on in addition to the Service Required LED.
6	Locator LED and button (white)	The Locator LED can be turned on to identify a particular system. When on, the LED blinks rapidly. Pressing and holding the Locator button for 5 seconds initiates a test of all LEDs in the LED assembly.
7	Hard Drive Status LEDs:	
	• Ready to Remove LED (top, blue)	Indicates that the drive can be removed during a hot-plug operation.
	• Service Required LED (middle, amber)	Indicates that the drive has experienced a fault condition.
	• OK/Activity LED (bottom, 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.

Related Information

- [“Rear Panel LEDs” on page 22](#)
- [“Front Panel Components \(Service\)” on page 6](#)

Rear Panel LEDs



No.	LED	Description
1	Power Supply Status LEDs:	
	<ul style="list-style-type: none"> Output Power OK LED (top, green) Service Action Required LED (middle, amber) AC or DC Input Power OK LED (bottom, green) 	<p>Indicates that output power is without fault.</p> <p>Indicates that service for the power supply is required. POST and Oracle ILOM are two diagnostic tools that can detect a fault or failure resulting in this indication. The Oracle ILOM <code>show faulty</code> command provides details about any faults that cause this indicator to light.</p> <p>Indicates that input power is without fault.</p>
2	Chassis Status LEDs:	
	<ul style="list-style-type: none"> Locator LED and button (left, white) Service Action Required LED (center, amber) 	<p>The Locator LED can be turned on to identify a particular system. When on, the LED blinks rapidly. There are two methods for turning a Locator LED on:</p> <ul style="list-style-type: none"> Typing the Oracle ILOM command <code>set /SYS/LOCATE value=Fast_Blink</code> Pressing the Locator button <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. The Oracle ILOM <code>show faulty</code> command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are turned on in addition to the Service Required LED.</p>

No.	LED	Description
	<ul style="list-style-type: none"> Main Power OK LED (right, green) 	<p>Indicates these conditions:</p> <ul style="list-style-type: none"> Off – System is not running in its normal state. System power might be off. The SP 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 that the system is booting.
3	Net Management LEDs:	
	<ul style="list-style-type: none"> Link and Activity LED (left, amber) 	<p>Indicates these conditions:</p> <ul style="list-style-type: none"> On or blinking – A link is established. Off – No link is established.
	<ul style="list-style-type: none"> Speed LED (right, green) 	<p>Indicates these conditions:</p> <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.
4	NET0 to NET3 Status LEDs:	
	<ul style="list-style-type: none"> Link and Activity LED (left, green) 	<p>Indicates these conditions:</p> <ul style="list-style-type: none"> On or blinking – A link is established. Off – No link is established.
	<ul style="list-style-type: none"> Speed LED (right, amber) 	<p>Indicates these conditions:</p> <ul style="list-style-type: none"> Amber – The link is operating as a Gigabit connection (1000-Mbps). Green – The link is operating as a 100-Mbps connection. Off – The link is operating as a 10-Mbps connection or there is no link.

Related Information

- [“Front Panel LEDs” on page 20](#)
- [“Rear Panel Components \(Service\)” on page 7](#)

Troubleshooting (Oracle ILOM / SP Targets)

The Oracle ILOM / SP targets enable you to perform these diagnostics:

- “Enable Oracle ILOM Legacy Targets” on page 24
- “Display Oracle ILOM Log Entries” on page 25
- “Oracle ILOM Log Entry Filters” on page 26
- “Display Active Power Consumption” on page 27
- “Display Information About User Sessions” on page 27
- “Display the NET MGT Configuration Properties” on page 28
- “Display the SP Firmware Version” on page 29

Related Information

- “Understanding Diagnostics” on page 9
- “Interpreting Diagnostic LEDs” on page 19
- “BIOS POST Event Messages” on page 30
- “Troubleshooting (Oracle ILOM /System Targets)” on page 32
- “Displaying Faulty Components” on page 37
- “Troubleshooting (Oracle ILOM Legacy Targets)” on page 43
- “Troubleshooting (Pc-Check)” on page 51

▼ Enable Oracle ILOM Legacy Targets

Oracle ILOM legacy targets are not available or functional until you perform this procedure.

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Enable the Oracle ILOM legacy targets.

```
-> set /SP/cli legacy_targets=enabled
Set 'legacy_targets' to 'enabled'
->
```

3. You can now perform diagnostics with Oracle ILOM legacy targets.

See “Troubleshooting (Oracle ILOM Legacy Targets)” on page 43.

Related Information

- “Display Oracle ILOM Log Entries” on page 25
- “Oracle ILOM Log Entry Filters” on page 26
- “Display Active Power Consumption” on page 27

- “Display Information About User Sessions” on page 27
- “Display the NET MGT Configuration Properties” on page 28
- “Display the SP Firmware Version” on page 29

▼ Display Oracle ILOM Log Entries

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Display the Oracle ILOM event log.

```
-> show /SP/logs/event/list Class==class Type==type
```

where *class* and *type* are chosen from the table in “Oracle ILOM Log Entry Filters” on page 26.

For example, to display log entries pertaining to faults:

```
-> show /SP/logs/event/list Class==Fault Type==Fault
Event
ID      Date/Time                Class      Type      Severity
-----
1741    Tue Mar  6 20:13:05 2012  Fault     Fault     critical
        Fault detected at time = Tue Mar  6 20:13:05 2012. The suspect component:
        /SYS/PS1 has fault.chassis.power.ext-fail with probability=100. Refer to
        http://www.sun.com/msg/SPX86-8003-73 for details.
->
```

For this example, power supply 1 has had a fault. A URL is provided for more information about the fault.

Related Information

- “Enable Oracle ILOM Legacy Targets” on page 24
- “Oracle ILOM Log Entry Filters” on page 26
- “Display Active Power Consumption” on page 27
- “Display Information About User Sessions” on page 27
- “Display the NET MGT Configuration Properties” on page 28
- “Display the SP Firmware Version” on page 29

Oracle ILOM Log Entry Filters

When you display the Oracle ILOM log, you can filter the output to specific classes and types of entries using combinations of the `Class` and `Type` parameters. See [“Display Oracle ILOM Log Entries” on page 25](#). This table describes the combinations and the entries that are displayed.

Parameters	Entries Displayed
<code>Class==Audit Type==Log</code>	Commands that result in a configuration change. Description includes user, command, command parameters, and success or failure.
<code>Class==IPMI Type==Log</code>	Any event that is place in the IPMI SEL is also put into the management log.
<code>Class==Chassis Type==State</code>	Changes to the component inventory and general system state.
<code>Class==Chassis Type==Action</code>	Shutdown events for server chassis, hot insert and removal of components, and Reset Parameters button when pressed.
<code>Class==Fault Type==Fault</code>	Fault management faults. Description gives the time fault was detected and the suspect component.
<code>Class==Fault Type==Repair</code>	Fault management repairs. Description gives the component name.

The output can be further filtered with the `Severity` parameter. The `Severity` parameter has one of five values:

- Debug
- Down
- Critical
- Major
- Minor

For example, to display only log entries indicating a minor change to the system inventory:

```
-> show /SP/logs/event/list Class==Chassis Type==State Severity==Minor
```

Note – The `Critical`, `Major`, and `Minor` values for the `Severity` parameter do not necessarily corollate to the `Critical`, `Major`, and `Minor` alarm states.

Related Information

- “Enable Oracle ILOM Legacy Targets” on page 24
- “Display Oracle ILOM Log Entries” on page 25
- “Oracle ILOM Log Entry Filters” on page 26
- “Display Active Power Consumption” on page 27
- “Display Information About User Sessions” on page 27
- “Display the NET MGT Configuration Properties” on page 28
- “Display the SP Firmware Version” on page 29

▼ Display Active Power Consumption

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Display the power consumed in real-time.

```
-> show /SP/powermgmt actual_power
/SP/powermgmt
Properties:
    actual_power = 180
->
```

The power is displayed in watts.

Related Information

- “Enable Oracle ILOM Legacy Targets” on page 24
- “Display Oracle ILOM Log Entries” on page 25
- “Oracle ILOM Log Entry Filters” on page 26
- “Display Information About User Sessions” on page 27
- “Display the NET MGT Configuration Properties” on page 28
- “Display the SP Firmware Version” on page 29

▼ Display Information About User Sessions

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Display the user session numbers.

```
-> show -d targets /SP/sessions
/SP/sessions
Targets:
    4 (current)
->
```

In this example, there is only one user session, number 4.

3. Display information about a particular session.

```
-> show -d properties /SP/sessions/x
```

where *x* is the session number. For example:

```
-> show -d properties /SP/sessions/4
/SP/sessions/4
Properties:
    username = root
    role = aucro
    starttime = Wed Mar 14 20:15:36 2012
    type = shell
    mode = normal
->
```

Related Information

- [“Enable Oracle ILOM Legacy Targets”](#) on page 24
- [“Display Oracle ILOM Log Entries”](#) on page 25
- [“Oracle ILOM Log Entry Filters”](#) on page 26
- [“Display Active Power Consumption”](#) on page 27
- [“Display the NET MGT Configuration Properties”](#) on page 28
- [“Display the SP Firmware Version”](#) on page 29

▼ Display the NET MGT Configuration Properties

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)”](#) on page 17.

2. Display the parameters configured for the SP to communicate over the network.

```
-> show -d properties /SP/network
/SP/network
Properties:
  commitpending = (Cannot show property)
  dhcp_clientid = none
  dhcp_server_ip = none
  ipaddress = 10.153.113.85
  ipdiscovery = static
  ipgateway = 10.153.113.1
  ipnetmask = 255.255.255.0
.
.
.
  state = enabled
->
```

Related Information

- [“Enable Oracle ILOM Legacy Targets” on page 24](#)
- [“Display Oracle ILOM Log Entries” on page 25](#)
- [“Oracle ILOM Log Entry Filters” on page 26](#)
- [“Display Active Power Consumption” on page 27](#)
- [“Display Information About User Sessions” on page 27](#)
- [“Display the SP Firmware Version” on page 29](#)
- [“Access the SP \(Oracle ILOM\)” on page 17](#)

▼ Display the SP Firmware Version

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)” on page 17](#).

2. Display the SP firmware version and build time.

```
-> version /SP
SP firmware 3.1.0.18
SP firmware build number: 71793
SP firmware date: Sat Feb 11 02:13:30 EST 2012
SP filesystem version: 0.1.23
->
```

Related Information

- “Enable Oracle ILOM Legacy Targets” on page 24
- “Display Oracle ILOM Log Entries” on page 25
- “Oracle ILOM Log Entry Filters” on page 26
- “Display Active Power Consumption” on page 27
- “Display Information About User Sessions” on page 27
- “Display the NET MGT Configuration Properties” on page 28

BIOS POST Event Messages

During BIOS power-on self-test, these event messages might be displayed:

BIOS POST Event Message	Cause
ACPI Power state	User has configured a soft power-off.
Boot media failure	No bootable media was found. BIOS was configured to boot off of removable media, yet none is available. Alternatively, bootable media is available, but lacking true boot capability.
Correctable ECC	A correctable ECC error was detected in memory. A memory cell has failed in a DIMM, but was corrected.
Embedded controller management	Hardware management controller was initialized.
Firmware (BIOS) ROM corruption	BIOS checksum fails although the boot block might not be corrupted. The boot process terminates.
Hard disk controller failure	No disk controller was found. If a disk controller is currently installed, it is either disabled or defective.
Initiated by hard reset	Boot process was started by a hard reset. This message might be seen at initial power on.
Initiated by warm reset	Boot process was started by a warm reset.
Keyboard controller initialization	Keyboard controller is being initialized.
Keyboard failure	Keyboard cannot be initialized. Alternatively, the keyboard is unplugged.
Memory initialization	Memory configuration is being sized.
No bootable media	There are no bootable media sources configured, enabled, or available. Alternatively, bootable media is available, but lacking true boot capability. The boot process terminates.

BIOS POST Event Message	Cause
No system memory	No physical memory was detected in the system. If DIMMS are currently installed, they are of an unsupported architecture or completely defective. The boot process terminates.
No usable system memory	All installed memory has experienced an unrecoverable failure. The failure of one or more DIMMs puts the remaining DIMMs into an unsupported configuration. The boot process terminates.
No video device	No video controller was found. If a video controller is currently installed, it is either disabled or defective. The boot process terminates.
Option ROM initialization	Option ROMs are being initialized.
Option ROM space exhausted	Memory space allocated for BIOS options is full and writes to the space cannot continue. The remaining options are not configured.
Primary processor initialization	Primary CPU is being initialized.
PXE server not found	BIOS was configured to boot from a PXE server, however the PXE server was not found, or the PXE server did not have the supported protocols or files available. The boot process terminates.
Secondary processor(s) initialization	Secondary CPUs are being initialized.
Setup password violation	An attempt to enter the setup password has failed three times in a row. The boot process terminates.
System restart	System boot was initiated.
Uncorrectable ECC	An uncorrectable ECC error was detected in memory. A memory cell has failed in a DIMM, and was not corrected.
User initiated boot to OS	User has initiated a boot to the operating system.
User initiated system set up	User has initiated access to the BIOS setup utility.
User password violation	An attempt to enter the user password has failed three times in a row. The boot process terminates.
Video initialization	Video controller is being initialized. This occurs during the keyboard controller initialization.

Related Information

- [“Understanding Diagnostics” on page 9](#)
- [“Interpreting Diagnostic LEDs” on page 19](#)
- [“Troubleshooting \(Oracle ILOM /SP Targets\)” on page 23](#)
- [“Troubleshooting \(Oracle ILOM /System Targets\)” on page 32](#)
- [“Displaying Faulty Components” on page 37](#)
- [“Troubleshooting \(Oracle ILOM Legacy Targets\)” on page 43](#)

- [“Troubleshooting \(Pc-Check\)” on page 51](#)

Troubleshooting (Oracle ILOM /System Targets)

The Oracle ILOM /System targets enable you to perform these diagnostics:

- [“Display Problematic Components” on page 32](#)
- [“Display PCIe3 Card Information” on page 33](#)
- [“Determining Component Health” on page 33](#)

Related Information

- [“Understanding Diagnostics” on page 9](#)
- [“Interpreting Diagnostic LEDs” on page 19](#)
- [“Troubleshooting \(Oracle ILOM /SP Targets\)” on page 23](#)
- [“BIOS POST Event Messages” on page 30](#)
- [“Displaying Faulty Components” on page 37](#)
- [“Troubleshooting \(Oracle ILOM Legacy Targets\)” on page 43](#)
- [“Troubleshooting \(Pc-Check\)” on page 51](#)

▼ Display Problematic Components

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)” on page 17](#).

2. Display a table of problematic components.

```
-> show /System/Open_Problems
Open Problems (0)
Date/Time           Subsystems           Component
-----
->
```

Related Information

- [“Display PCIe3 Card Information” on page 33](#)

- [“Determining Component Health” on page 33](#)

▼ Display PCIe3 Card Information

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)” on page 17](#).

2. Type.

```
-> show target
```

where this information have these *targets*:

Information	Target	Comment
Number of installed PCIe3 cards.	/System/PCI_Devices	
PCIe3 card installed in slot <i>x</i> .	/System/PCI_Devices/Add-on/Device_ <i>x</i>	Where <i>x</i> is 1 to 6.
PCIe3 card installed into Riser <i>x</i> .	/SYS/MB/RISER <i>x</i>	Where <i>x</i> is 1 to 3.

Related Information

- [“Display Problematic Components” on page 32](#)
- [“Determining Component Health” on page 33](#)

Determining Component Health

When a component or system of components experiences a fault, it becomes unhealthy. These topics enable you to display component health states.

- [“Display the General Health of Component Systems” on page 34](#)
- [“Display Health and Information About Specific Components” on page 34](#)
- [“Component Health Targets” on page 35](#)
- [“Oracle ILOM Target Health States” on page 36](#)

Related Information

- [“Display Problematic Components” on page 32](#)
- [“Display PCIe3 Card Information” on page 33](#)

▼ Display the General Health of Component Systems

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)”](#) on page 17.

2. Type.

```
-> show target
```

where these component systems have these *targets*:

Component	Target
Cooling system	/System/Cooling
CPUs	/System/Processors
DIMMs	/System/Memory
Ethernet interfaces	/System/Networking
Power system	/System/Power
Server	/System

Related Information

- [“Display Health and Information About Specific Components”](#) on page 34
- [“Component Health Targets”](#) on page 35
- [“Oracle ILOM Target Health States”](#) on page 36

▼ Display Health and Information About Specific Components

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)”](#) on page 17.

2. Type.

```
-> show target
```

where these components have these *targets*:

Component	Target	Comment
CPUs	/System/Processors/CPUs/CPU_x	Where <i>x</i> is either 0 or 1.
DIMMs	/System/Memory/DIMMs/DIMM_x	Where <i>x</i> is the number of the DIMM (0 to 15).
Fan elements	/System/Cooling/Fans/Fan_x	Where <i>x</i> is the number of the fan element (0 to 9)
NETx connections	/System/Networking/Ethernet_NICs/Ethernet_NIC_x	Where <i>x</i> is 0 to 3.
Power supplies	/System/Power/Power_Supplies/Power_Supply_x	Where <i>x</i> is either 0 or 1.

Related Information

- [“Display the General Health of Component Systems” on page 34](#)
- [“Component Health Targets” on page 35](#)
- [“Oracle ILOM Target Health States” on page 36](#)

Component Health Targets

This table lists Oracle ILOM targets that have a health property and the related component. This table is the reverse of those found in [“Display the General Health of Component Systems” on page 34](#) and [“Display Health and Information About Specific Components” on page 34](#).

Target	Component
/System	Server as a whole.
/System/Processors	Processor system.
/System/Processors/CPUs/CPU_x	Individual CPUs, where <i>x</i> is either 0 or 1.
/System/Memory	Memory system.
/System/Memory/DIMMs/DIMM_x	Individual DIMMs, where <i>x</i> is 0 to 15.
/System/Power	Power system.
/System/Power/Power_Supplies/Power_Supply_x	Individual power supplies, where <i>x</i> is either 0 or 1.
/System/Cooling	Cooling system.
/System/Cooling/Fans/Fan_x	Individual fans, where <i>x</i> is 0 to 9.
/System/Networking	Networking system.

Target	Component
/System/Networking/Ethernet_NICs/Ethernet_NIC_x	Individual network interfaces, where <i>x</i> is 0 to 3.
/System/Storage	Storage system. Requires HMP.
/System/Storage/Disks/Disk_x	Individual drives, where <i>x</i> is 0 to 7. Requires HMP.

Related Information

- [“Display the General Health of Component Systems” on page 34](#)
- [“Display Health and Information About Specific Components” on page 34](#)
- [“Oracle ILOM Target Health States” on page 36](#)

Oracle ILOM Target Health States

Use this table to clarify health states as seen in the `health` = parameter of Oracle ILOM `/System` targets.

Health state	Description
OK	Server or hardware component is fully functional.
Service Required	Oracle ILOM has detected a problem with the component that requires a service action to resolve the issue. If this health status appears at the server system level, view the <code>/System/Open_Problems</code> target. See “Display Problematic Components” on page 32 . If the health status appears in the Open Problems table, refer to the URL provided in the table for further details.
Not Available	Oracle ILOM is unable to provide health status for this hardware component. Oracle ILOM might require HMP to be installed. See the Oracle documentation library at: http://docs.oracle.com/cd/E20451_01/
Offline	Offline status applies to hardware components that can have a <code>Ready to Remove</code> condition. For example, drives. The offline health status appears when the action property is set to <code>Prepare to Remove</code> and the hardware component has not been removed from the chassis.

Related Information

- [“Display the General Health of Component Systems” on page 34](#)
- [“Display Health and Information About Specific Components” on page 34](#)
- [“Component Health Targets” on page 35](#)

Displaying Faulty Components

If Oracle ILOM has automatically determined a fault with a component, or if the host has reported a fault to ILOM, you can display that fault with these topics:

- “Display Faults (show faulty Command)” on page 37
- “Display Faults (faultmgt Shell)” on page 39
- “Clear a Fault Manually” on page 41
- “Resettable Targets” on page 42

Related Information

- “Understanding Diagnostics” on page 9
- “Interpreting Diagnostic LEDs” on page 19
- “Troubleshooting (Oracle ILOM /SP Targets)” on page 23
- “BIOS POST Event Messages” on page 30
- “Troubleshooting (Oracle ILOM /System Targets)” on page 32
- “Troubleshooting (Oracle ILOM Legacy Targets)” on page 43
- “Troubleshooting (Pc-Check)” on page 51

▼ Display Faults (show faulty Command)

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Display faulty components.

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

If a fault is found, information about the fault is displayed under three columns:

- Target – A numerical sub-target of the /SP/faultmgt fault management instance. For example, /SP/faultmgt/0/faults/0.

- **Property** – FRUID-type properties or parameters of the faulted component or the fault itself. For example, FRU, class, MSGID, UUID, timestamp, etc.
- **Value** – The value of the property. For example, the IPMI name, fault class categorization, message ID, etc.

This is an example of a faulty power supply:

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

Note – The `component` property provides the Oracle ILOM target of the component that faulted and might need to be replaced. You can use the information in the table of “[Resettable Targets](#)” on page 42 to further identify the component that faulted.

```
-> show faulty
```

Target	Property	Value
/SP/faultmgmt/0	fru	/SYS/PS0
/SP/faultmgmt/0/ faults/0	class	fault.chassis.power.fail
/SP/faultmgmt/0/ faults/0	sunw-msg-id	SPT-8000-MJ
/SP/faultmgmt/0/ faults/0	component	/SYS/PS0
/SP/faultmgmt/0/ faults/0	uuid	d7d67b9b-ba67-e257-8d8d-bcef2db2 971b
/SP/faultmgmt/0/ faults/0	timestamp	2011-09-13/15:47:41
/SP/faultmgmt/0/ faults/0	fru_part_number	300-2304
/SP/faultmgmt/0/ faults/0	fru_serial_number	C40003
/SP/faultmgmt/0/ faults/0	product_serial_number	1133BDN082
/SP/faultmgmt/0/ faults/0	chassis_serial_number	1133BDN082
/SP/faultmgmt/0/ faults/0	detector	/SYS/PS0/PWROK

Related Information

- “[Display Faults \(faultmgt Shell\)](#)” on page 39
- “[Clear a Fault Manually](#)” on page 41
- “[Resettable Targets](#)” on page 42

▼ Display Faults (faultmgt Shell)

Note – The Oracle ILOM CLI includes implementations of Oracle Solaris fault manager commands, such as `fmadm` and `fmdump`, within the Oracle ILOM CLI shell. This feature is referred to as the Oracle ILOM `faultmgt` shell. For more information about the Oracle Solaris fault manager commands, refer to *Server Administration* and the Oracle Solaris documentation.

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Access the `faultmgt` shell.

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

3. At the `faultmgtsp>` prompt, display any current faults.

```
faultmgtsp> fmadm faulty  
No faults found  
faultmgtsp>
```

If a fault is found, information about the fault is displayed in seven fields:

- **Heading** – The time, UUID, MSGID, and severity of the fault are displayed.
- **Fault class** – A categorization of the fault according to the component and type of fault.
- **FRU** – The Oracle ILOM target, part number, and serial number of the faulted component.
- **Description** – A succinct statement of the fault.
- **Response** – A description of how the system responded to the failure.
- **Impact** – A description of the consequences if no service action is taken.
- **Action** – Additional tasks the user can do to supplement troubleshooting the fault.

This is an example of a power supply fault:

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

```
-----  
-----  
Time                UUID                msgid                Severity  
-----  
-----  
2011-09-13/15:47:41 d7d67b9b-ba67-e257-8d8d-bcef2db2971b SPT-8000-MJ        Critical  
  
Fault class : fault.chassis.power.fail  
  
FRU          : /SYS/PS0  
              (Part Number: 300-2304)  
              (Serial Number: C40003)  
  
Description  : A Power Supply has failed and is not providing power to the  
              server.  
  
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  
              power supplies operational.  
  
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.
```

4. (Optional) Display the fault history.

```
faultmgmtsp> fmddump
TIMESTAMP                UUID                                MSGID
2011-12-20/06:00:14      52db4790-1d30-e1d5-b4e3-8bf677246bd2  ILOM-8000-30
2011-12-20/06:03:26      52db4790-1d30-e1d5-b4e3-8bf677246bd2  ILOM-8000-30 Repaired
2011-12-20/06:03:26      52db4790-1d30-e1d5-b4e3-8bf677246bd2  ILOM-8000-30 Resolved
2012-01-27/18:47:27      f69cca33-4759-4e16-9a06-9feaaa19a15c   SPX86-8003-K5
2012-02-16/16:54:08      f69cca33-4759-4e16-9a06-9feaaa19a15c   SPX86-8003-K5 Repaired
2012-02-16/16:54:08      f69cca33-4759-4e16-9a06-9feaaa19a15c   SPX86-8003-K5 Resolved
2012-03-06/20:13:05      63e1c3c7-910a-e825-83d5-d180378f54ae   SPX86-8003-73
2012-03-06/20:24:12      63e1c3c7-910a-e825-83d5-d180378f54ae   SPX86-8003-73 Repaired
2012-03-06/20:24:13      63e1c3c7-910a-e825-83d5-d180378f54ae   SPX86-8003-73 Resolved
faultmgmtsp>
```

The fault history provides the date and time (TIMESTAMP) of the fault, the UUID, and the MSGID of the fault.

In this example, three fault events occurred as indicated in the MSGID column. When the fault was Repaired satisfactorily, Oracle ILOM marked the fault as Resolved.

5. Exit the faultmgmt shell.

```
faultmgmtsp> exit
->
```

Related Information

- [“Display Faults \(show faulty Command\)” on page 37](#)
- [“Clear a Fault Manually” on page 41](#)
- [“Resettable Targets” on page 42](#)

▼ Clear a Fault Manually

If Oracle ILOM detects a fault and consequential component replacement, Oracle ILOM automatically clears the fault. However, if the host detects a fault, you must manually clear the fault from Oracle ILOM after resolution by resetting the component.

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)” on page 17](#).

2. Reset the component to clear the fault manually.

```
-> set target clear_fault_action=true
```

where *target* is the Oracle ILOM target of the faulted component.

See “Resettable Targets” on page 42 for a list of targets.

For example, to reset and clear a fault with power supply 0:

```
-> set /SYS/PS0 clear_fault_action=true
Are you sure you want to clear /SYS/PS0 (y/n)? y
Set 'clear_fault_action' to 'true'
->
```

Related Information

- “Display Faults (show faulty Command)” on page 37
- “Display Faults (faultmgt Shell)” on page 39
- “Resettable Targets” on page 42

Resettable Targets

This table lists Oracle ILOM targets that are resettable through their `clear_fault_action` property and the related components with manual reset capability. This table is the reverse of that found in “Oracle ILOM Legacy Targets for Component FRUID and Fault States” on page 44 and is used for the task “Clear a Fault Manually” on page 41.

Target	Component
/SYS	Server as a whole.
/SYS/MB	Motherboard.
/SYS/MB/NETx	Network interface <i>x</i> at the NETx port, where <i>x</i> is 0 to 3.
/SYS/MB/Px	CPU <i>x</i> , where <i>x</i> is either 0 or 1.
/SYS/MB/Px/Dy	DIMM <i>y</i> of CPU <i>x</i> , where <i>y</i> is 0 to 7 and <i>x</i> is either 0 or 1.
/SYS/MB/FMx	Fan module <i>x</i> , where <i>x</i> is 0 to 4.
/SYS/MB/RISERx/PCIEy	PCIe3 card <i>y</i> installed in riser <i>x</i> , where <i>y</i> is either 0 or 1 and <i>x</i> is 1 to 3.
/SYS/SP	SP.

Target	Component
/SYS/PSx	Power supply x, where x is either 0 or 1.
/SYS/PDB	PDB.
/SYS/DBP	Drive backplane.

Related Information

- [“Display Faults \(show faulty Command\)” on page 37](#)
- [“Display Faults \(faultmgt Shell\)” on page 39](#)
- [“Clear a Fault Manually” on page 41](#)

Troubleshooting (Oracle ILOM Legacy Targets)

Oracle ILOM legacy targets identify environmental conditions of hardware components. You must enable Oracle ILOM legacy targets before you can perform these diagnostics. See [“Enable Oracle ILOM Legacy Targets” on page 24](#).

Note – You need to enable Oracle ILOM legacy targets only once.

- [“Display FRUID and Fault State for Specific Components” on page 44](#)
- [“Oracle ILOM Legacy Targets for Component FRUID and Fault States” on page 44](#)
- [“Display Component Voltages” on page 45](#)
- [“Display Component Power Consumption” on page 46](#)
- [“Oracle ILOM Legacy Targets for Component Power Consumption” on page 47](#)
- [“Display Component Temperatures” on page 47](#)
- [“Display Component Fan Speeds” on page 48](#)
- [“Display Component LED State” on page 49](#)
- [“Oracle ILOM Legacy Targets for LED States” on page 50](#)

Related Information

- [“Understanding Diagnostics” on page 9](#)
- [“Interpreting Diagnostic LEDs” on page 19](#)

- “Troubleshooting (Oracle ILOM /SP Targets)” on page 23
- “BIOS POST Event Messages” on page 30
- “Troubleshooting (Oracle ILOM /System Targets)” on page 32
- “Displaying Faulty Components” on page 37
- “Troubleshooting (Pc-Check)” on page 51

▼ Display FRUID and Fault State for Specific Components

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. If not already done, enable Oracle ILOM legacy targets.

See “Enable Oracle ILOM Legacy Targets” on page 24.

3. Type.

```
-> show target
```

where *target* is from the table in “Oracle ILOM Legacy Targets for Component FRUID and Fault States” on page 44.

Related Information

- “Oracle ILOM Legacy Targets for Component FRUID and Fault States” on page 44
- “Display Component Voltages” on page 45
- “Display Component Power Consumption” on page 46
- “Display Component Temperatures” on page 47
- “Display Component Fan Speeds” on page 48
- “Display Component LED State” on page 49

Oracle ILOM Legacy Targets for Component FRUID and Fault States

Use the Oracle ILOM `show` command with these targets to display FRUID and faults states of hardware components. See “Display FRUID and Fault State for Specific Components” on page 44.

Component	Target	Comment
CPU P _x	/SYS/MB/P _x	Where <i>x</i> is either 0 or 1.
DIMM D _y	/SYS/MB/P _x /D _y	Where <i>y</i> is 0 to 7, for CPU P _x .
Drive backplane	/SYS/DBP	Where <i>x</i> is 0 to 5.
Fan module FM _x	/SYS/MB/FM _x	
Motherboard	/SYS/MB	
NET _x port	/SYS/MB/NET _x	Where <i>x</i> is 0 to 3.
NVRAM or IDPROM	/SYS/MB/CPLD	
PCIe3 card installed into slot PCIE _y of Riser <i>x</i>	/SYS/MB/RISER _x /PCIE _y	Where <i>y</i> is either 0 or 1.
PDB	/SYS/PDB	
Power supply PS _x	/SYS/PS _x	Where <i>x</i> is either 0 or 1.
SP	/SYS/SP	

Related Information

- [“Display FRUID and Fault State for Specific Components” on page 44](#)
- [“Oracle ILOM Legacy Targets for Component Power Consumption” on page 47](#)
- [“Oracle ILOM Legacy Targets for LED States” on page 50](#)

▼ Display Component Voltages

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)” on page 17](#).

2. If not already done, enable Oracle ILOM legacy targets.

See [“Enable Oracle ILOM Legacy Targets” on page 24](#).

3. Type.

```
-> show target value
```

where these component voltages have these *targets*:

Component voltage	Target	Comment
CPU Px DIMM voltage	/SYS/MB/Px/V_DIMM	Where <i>x</i> is either 0 or 1.
Power supply PSx input voltage	/SYS/PSx/V_IN	Where <i>x</i> is either 0 or 1.
Power supply PSx main voltage supplied	/SYS/PSx/V_12V	Where <i>x</i> is either 0 or 1.

Related Information

- [“Display FRUID and Fault State for Specific Components” on page 44](#)
- [“Display Component Power Consumption” on page 46](#)
- [“Display Component Temperatures” on page 47](#)
- [“Display Component Fan Speeds” on page 48](#)
- [“Display Component LED State” on page 49](#)

▼ Display Component Power Consumption

Note – For the chassis, CPUs, DIMMs, and fans, a summary of power consumed is displayed.

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)” on page 17](#).

2. If not already done, enable Oracle ILOM legacy targets.

See [“Enable Oracle ILOM Legacy Targets” on page 24](#).

3. Type.

```
-> show target
```

where *target* is from the table in [“Oracle ILOM Legacy Targets for Component Power Consumption” on page 47](#).

Related Information

- [“Display FRUID and Fault State for Specific Components” on page 44](#)
- [“Display Component Voltages” on page 45](#)
- [“Oracle ILOM Legacy Targets for Component Power Consumption” on page 47](#)
- [“Display Component Temperatures” on page 47](#)
- [“Display Component Fan Speeds” on page 48](#)

- [“Display Component LED State” on page 49](#)

Oracle ILOM Legacy Targets for Component Power Consumption

Use the Oracle ILOM `show` command with these targets to display component power consumed as a summary or a timeline, and the power going into and out of the power supplies. See [“Display Component Power Consumption” on page 46](#).

Component power	Target	Comment
Chassis power summary	<code>/SYS/VPS/history</code>	
Chassis power timeline	<code>/SYS/VPS/history/1/list</code>	14-day history
CPU power summary	<code>/SYS/VPS_CPUS/history</code>	
CPU power timeline	<code>/SYS/VPS_CPUS/history/1/list</code>	14-day history
DIMM power summary	<code>/SYS/VPS_MEMORY/history</code>	
DIMM power timeline	<code>/SYS/VPS_MEMORY/history/1/list</code>	14-day history
Fan power summary	<code>/SYS/VPS_FANS/history</code>	
Fan power timeline	<code>/SYS/VPS_FANS/history/1/list</code>	14-day history
Power supply PSx drawn	<code>/SYS/PSx/P_IN</code> value	Where x is either 0 or 1.
Power supply PSx supplied	<code>/SYS/PSx/P_OUT</code> value	Where x is either 0 or 1.

Related Information

- [“Oracle ILOM Legacy Targets for Component FRUID and Fault States” on page 44](#)
- [“Display Component Power Consumption” on page 46](#)
- [“Oracle ILOM Legacy Targets for LED States” on page 50](#)

▼ Display Component Temperatures

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)” on page 17](#).

2. If not already done, enable Oracle ILOM legacy targets.

See [“Enable Oracle ILOM Legacy Targets” on page 24](#).

3. Type.

```
-> show target value
```

where these component temperatures have these *targets*:

Component temperatures	Target	Comment
CPU P x air ambient	/SYS/MB/T_AMB x	Where x is either 0 or 1.
Ethernet interfaces NET0 and NET1 core	/SYS/MB/T_CORE_NET01	
Ethernet interfaces NET2 and NET3 core	/SYS/MB/T_CORE_NET23	
Power supply PS x air in	/SYS/PDB/T_IN_PS x	Where x is either 0 or 1.
Power supply PS x air out	/SYS/PS x /T_OUT	Where x is either 0 or 1.
Zone x air in	/SYS/MB/T_IN_ZONE x	Where x is 0 to 2.
Zone x air out	/SYS/MB/T_OUT_ZONE x	Where x is 0 to 2.

Related Information

- [“Display FRUID and Fault State for Specific Components” on page 44](#)
- [“Display Component Voltages” on page 45](#)
- [“Display Component Power Consumption” on page 46](#)
- [“Display Component Fan Speeds” on page 48](#)
- [“Display Component LED State” on page 49](#)

▼ Display Component Fan Speeds

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)” on page 17](#).

2. If not already done, enable Oracle ILOM legacy targets.

See [“Enable Oracle ILOM Legacy Targets” on page 24](#).

3. Type.

```
-> show target value
```

where these component fan speeds have these *targets*:

Component	Target	Comment
Fan module FMx with fan element Fy	/SYS/MB/FMx/Fy/TACH	Where x is from 0 to 4. Where y is either 0 or 1.
Power supply PSx	/SYS/PSx/F0/TACH	Where x is either 0 or 1.

Related Information

- [“Display FRUID and Fault State for Specific Components” on page 44](#)
- [“Display Component Voltages” on page 45](#)
- [“Display Component Power Consumption” on page 46](#)
- [“Display Component Temperatures” on page 47](#)
- [“Display Component LED State” on page 49](#)

▼ Display Component LED State

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)” on page 17](#).

2. If not already done, enable Oracle ILOM legacy targets.

See [“Enable Oracle ILOM Legacy Targets” on page 24](#).

3. Type.

```
-> show target value
```

where *target* is from the table in [“Oracle ILOM Legacy Targets for LED States” on page 50](#).

Related Information

- [“Display FRUID and Fault State for Specific Components” on page 44](#)
- [“Display Component Voltages” on page 45](#)
- [“Display Component Power Consumption” on page 46](#)
- [“Display Component Temperatures” on page 47](#)
- [“Display Component Fan Speeds” on page 48](#)
- [“Oracle ILOM Legacy Targets for LED States” on page 50](#)

Oracle ILOM Legacy Targets for LED States

Use the Oracle ILOM `show` command with these targets to display the states of status LEDs for hardware components. See [“Display Component LED State” on page 49](#).

Note – You can enable the Locator LED to blink with this command: `set /SYS/LOCATE value=Fast_Blink`

Component LED state	Target	Comment
Locator	<code>/SYS/LOCATE</code>	
Chassis Ok	<code>/SYS/OK</code>	
Chassis Service	<code>/SYS/SERVICE</code>	
CPU P x Service	<code>/SYS/MB/Px/SERVICE</code>	Where x is either 0 or 1.
Drive HDD x Ok to Remove	<code>/SYS/DBP/HDDx/OK2RM</code>	Where x is 0 to 7.
Drive HDD x Service	<code>/SYS/DBP/HDDx/SERVICE</code>	Where x is 0 to 7.
Fan module FM x Ok	<code>/SYS/MB/FMx/OK</code>	Where x is 0 to 5.
Fan module FM x Service	<code>/SYS/MB/FMx/SERVICE</code>	Where x is 0 to 5.
Power supply Fault	<code>/SYS/PS_FAULT</code>	
SP Ok	<code>/SYS/SP/OK</code>	
Critical alarm	<code>/SYS/CRITICAL_ALARM</code>	
Major alarm	<code>/SYS/MAJOR_ALARM</code>	
Minor alarm	<code>/SYS/MINOR_ALARM</code>	
User alarm	<code>/SYS/USER_ALARM</code>	

Related Information

- [“Oracle ILOM Legacy Targets for Component FRUID and Fault States” on page 44](#)
- [“Oracle ILOM Legacy Targets for Component Power Consumption” on page 47](#)
- [“Display Component LED State” on page 49](#)

Troubleshooting (Pc-Check)

Pc-Check is a third-party diagnostics program that enables you to perform checks of various components outside of Oracle ILOM and the host operating system. These topics describe how to enable, use, and disable Pc-Check:

- “Enable Pc-Check” on page 51
- “Pc-Check Navigation” on page 53
- “Pc-Check Diagnostic Tests” on page 54
- “Disable Pc-Check” on page 61

Related Information

- “Understanding Diagnostics” on page 9
- “Interpreting Diagnostic LEDs” on page 19
- “Troubleshooting (Oracle ILOM /SP Targets)” on page 23
- “BIOS POST Event Messages” on page 30
- “Troubleshooting (Oracle ILOM /System Targets)” on page 32
- “Displaying Faulty Components” on page 37
- “Troubleshooting (Oracle ILOM Legacy Targets)” on page 43

▼ Enable Pc-Check

You can enable Pc-Check through Oracle ILOM.

Note – You cannot run Pc-Check if BIOS is configured to UEFI mode. Pc-Check is only supported in BIOS legacy (default) mode.

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Enable Pc-Check

```
-> set /HOST/diag state=state
```

where *state* is the type of testing Pc-Check is to do:

- enabled – Pc-Check performs automated testing of the components, which lasts approximately 5 minutes. Test failures are displayed.
- extended – Pc-Check performs comprehensive automated testing of the components, which lasts over 40 minutes. Test failures are displayed.
- manual – The Pc-Check user interface is displayed and you select which components to test and the types of testing to be done.
- disabled – Pc-Check is disabled, and the boot of the system will occur without interruption.

3. Consider your next step.

- If you configured Pc-Check for manual testing, go to [Step 4](#).
- Otherwise, go to [Step 5](#).

4. Consider your next step.

- Attach a local keyboard and monitor to the server.
In this instance, you interact with Pc-Check directly at the server.
- Initiate a redirection through the Oracle ILOM web interface.
See *Server Administration*, keyboard and video redirection.

5. Start the boot sequence.

```
-> stop /System
Are you sure you want to stop /System (y/n)? y
stop: Target already stopped
-> start /System
Are you sure you want to start /System (y/n)? y
Starting /System
->
```

In a minute, the Pc-Check software begins to load.

6. Consider your next step.

- If you configured the enabled or extended state for Pc-Check, Pc-Check will perform the testing without any further interaction until the testing is completed.
When Pc-Check is finished testing, it requests a restart. Instead, disable Pc-Check. See [“Disable Pc-Check”](#) on page 61.
- If you configured the manual state for Pc-Check, Pc-Check displays a user license agreement.
Go to [Step 7](#).

7. Agree to the license.

In a moment, Pc-Check displays the Main Menu.

Note – If you do not agree to the license, Pc-Check quits and prompts you to restart or shut down the server. Disable Pc-Check. See “Disable Pc-Check” on page 61.

8. Highlight and select Advanced Diagnostic Tests.

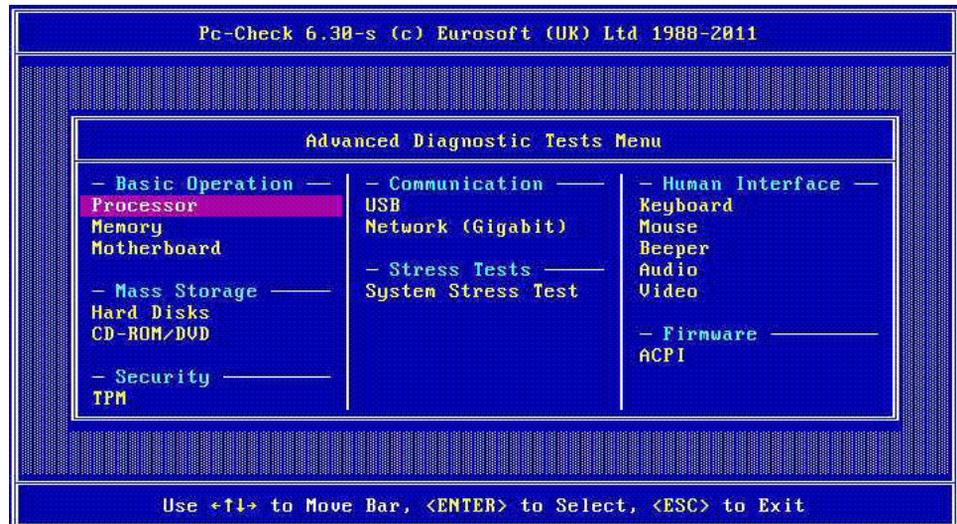
The Advanced Diagnostic Tests Menu is displayed. You can now conduct diagnostics on the hardware components. See “Pc-Check Diagnostic Tests” on page 54.

Related Information

- “Pc-Check Navigation” on page 53
- “Pc-Check Diagnostic Tests” on page 54
- “Disable Pc-Check” on page 61

Pc-Check Navigation

To perform advanced diagnostics with Pc-Check, the Advanced Diagnostics Tests Menu must be displayed. See “Enable Pc-Check” on page 51.



In this menu, and subsequent menus, these keys serve the following purposes:

- **Arrow keys** – Maneuvers the highlight over text to be selected.
- **Return or Enter keys** – Activates or selects the item highlighted.
- **Esc key** – Backs out of a test or menu.
- **Numeric keys** – Enters a testing value.

- **Space bar** – Advances a test if control keys are not displayed.

Related Information

- [“Enable Pc-Check” on page 51](#)
- [“Pc-Check Diagnostic Tests” on page 54](#)
- [“Disable Pc-Check” on page 61](#)

Pc-Check Diagnostic Tests

These topics help you perform diagnostics on components with Pc-Check.

- [“Diagnose the Beeper” on page 54](#)
- [“Diagnose the CPUs” on page 55](#)
- [“Diagnose the DIMMs” on page 56](#)
- [“Diagnose the Drives and USB Drive” on page 56](#)
- [“Diagnose the DVD Drive” on page 57](#)
- [“Diagnose the Keyboard” on page 58](#)
- [“Diagnose the Motherboard” on page 58](#)
- [“Diagnose the Mouse” on page 59](#)
- [“Diagnose the Net Interfaces” on page 59](#)
- [“Diagnose the USB Controllers” on page 60](#)

Related Information

- [“Enable Pc-Check” on page 51](#)
- [“Pc-Check Navigation” on page 53](#)
- [“Disable Pc-Check” on page 61](#)

▼ Diagnose the Beeper

1. Enable Pc-Check.

See [“Enable Pc-Check” on page 51](#).

2. From the Advanced Diagnostic Test Menu, select Beeper.

3. In Beeper Tests, select Beeper Test.

4. Run the test.

The test completes.

5. Consider your next step.

- If you want to perform more Pc-Check diagnostics, return to the Advanced Diagnostic Tests Menu.
See [“Pc-Check Diagnostic Tests” on page 54](#).
- If you are finished with Pc-Check diagnostics, disable Pc-Check.
See [“Disable Pc-Check” on page 61](#).

Related Information

- [“Enable Pc-Check” on page 51](#)
- [“Servicing the Motherboard” on page 235](#)
- [“Disable Pc-Check” on page 61](#)

▼ Diagnose the CPUs

1. Enable Pc-Check.

See [“Enable Pc-Check” on page 51](#).

2. From the Advanced Diagnostic Test Menu, select Processors.

3. In the Processor Tests Menu, select the processor core, the test, or Run All Tests on all processor cores.

4. Run the test.

The test completes.

5. Consider your next step.

- If you want to perform more Pc-Check diagnostics, return to the Advanced Diagnostic Tests Menu.
See [“Pc-Check Diagnostic Tests” on page 54](#).
- If you are finished with Pc-Check diagnostics, disable Pc-Check.
See [“Disable Pc-Check” on page 61](#).

Related Information

- [“Enable Pc-Check” on page 51](#)
- [“Servicing the Motherboard” on page 235](#)
- [“Disable Pc-Check” on page 61](#)

▼ Diagnose the DIMMs

1. **Enable Pc-Check.**

See [“Enable Pc-Check” on page 51.](#)

2. **From the Advanced Diagnostic Test Menu, select Memory.**

3. **Select Test Module.**

4. **Select the DIMM to test.**

Note – These test might take a long time.

5. **Run the test.**

The test completes.

6. **Consider your next step.**

- If you want to perform more Pc-Check diagnostics, return to the Advanced Diagnostic Tests Menu.

See [“Pc-Check Diagnostic Tests” on page 54.](#)

- If you are finished with Pc-Check diagnostics, disable Pc-Check.

See [“Disable Pc-Check” on page 61.](#)

Related Information

- [“Enable Pc-Check” on page 51](#)
- [“Servicing DIMMs” on page 193](#)
- [“Disable Pc-Check” on page 61](#)

▼ Diagnose the Drives and USB Drive

1. **Enable Pc-Check.**

See [“Enable Pc-Check” on page 51.](#)

2. **From the Advanced Diagnostic Test Menu, select Hard Disks.**

3. **In the Select Disk Menu, select the drive or USB drive to test.**

4. **In the Test Setting menu, configure testing.**

5. **In the Hard Disk Tests Menu, select a test.**

Note – These test might take a long time.

6. Run the test.

The test completes.

7. Consider your next step.

- If you want to perform more Pc-Check diagnostics, return to the Advanced Diagnostic Tests Menu.
See [“Pc-Check Diagnostic Tests” on page 54](#).
- If you are finished with Pc-Check diagnostics, disable Pc-Check.
See [“Disable Pc-Check” on page 61](#).

Related Information

- [“Enable Pc-Check” on page 51](#)
- [“Servicing Drives” on page 101](#)
- [“Servicing the USB Drive” on page 163](#)
- [“Disable Pc-Check” on page 61](#)

▼ Diagnose the DVD Drive

1. Enable Pc-Check.

See [“Enable Pc-Check” on page 51](#).

2. From the Advanced Diagnostic Test Menu, select CD-ROM/DVD.

3. Run the test.

The test completes.

4. Consider your next step.

- If you want to perform more Pc-Check diagnostics, return to the Advanced Diagnostic Tests Menu.
See [“Pc-Check Diagnostic Tests” on page 54](#).
- If you are finished with Pc-Check diagnostics, disable Pc-Check.
See [“Disable Pc-Check” on page 61](#).

Related Information

- [“Enable Pc-Check” on page 51](#)
- [“Servicing the DVD Drive” on page 111](#)
- [“Disable Pc-Check” on page 61](#)

▼ Diagnose the Keyboard

1. **Enable Pc-Check.**

See [“Enable Pc-Check” on page 51.](#)

2. **From the Advanced Diagnostic Test Menu, select Keyboard.**

3. **In the Keyboard Tests Menu, select a test.**

4. **Run the test.**

The test completes.

5. **Consider your next step.**

- If you want to perform more Pc-Check diagnostics, return to the Advanced Diagnostic Tests Menu.

See [“Pc-Check Diagnostic Tests” on page 54.](#)

- If you are finished with Pc-Check diagnostics, disable Pc-Check.

See [“Disable Pc-Check” on page 61.](#)

Related Information

- [“Enable Pc-Check” on page 51](#)
- [“Servicing the USB Board” on page 227](#)
- [“Servicing the Motherboard” on page 235](#)
- [“Disable Pc-Check” on page 61](#)

▼ Diagnose the Motherboard

1. **Enable Pc-Check.**

See [“Enable Pc-Check” on page 51.](#)

2. **From the Advanced Diagnostic Test Menu, select Motherboard.**

3. **In the Motherboard Tests Menu, select a test.**

4. **Run the test.**

The test completes.

5. **Consider your next step.**

- If you want to perform more Pc-Check diagnostics, return to the Advanced Diagnostic Tests Menu.

See [“Pc-Check Diagnostic Tests” on page 54.](#)

- If you are finished with Pc-Check diagnostics, disable Pc-Check.

See [“Disable Pc-Check” on page 61](#).

Related Information

- [“Enable Pc-Check” on page 51](#)
- [“Servicing the Motherboard” on page 235](#)
- [“Disable Pc-Check” on page 61](#)

▼ Diagnose the Mouse

1. Enable Pc-Check.

See [“Enable Pc-Check” on page 51](#).

2. From the Advanced Diagnostic Test Menu, select Mouse.

3. Read the note for further instructions.

4. Press any key.

5. Run the test.

The test completes.

6. Consider your next step.

- If you want to perform more Pc-Check diagnostics, return to the Advanced Diagnostic Tests Menu.
See [“Pc-Check Diagnostic Tests” on page 54](#).
- If you are finished with Pc-Check diagnostics, disable Pc-Check.
See [“Disable Pc-Check” on page 61](#).

Related Information

- [“Enable Pc-Check” on page 51](#)
- [“Servicing the USB Board” on page 227](#)
- [“Disable Pc-Check” on page 61](#)

▼ Diagnose the Net Interfaces

1. Enable Pc-Check.

See [“Enable Pc-Check” on page 51](#).

2. From the Advanced Diagnostic Test Menu, select Network (Gigabit).

3. In the Network Selection Menu, select the network interface Ethernet controller.

4. Select a test.

5. Run the test.

The test completes.

6. Consider your next step.

- If you want to perform more Pc-Check diagnostics, return to the Advanced Diagnostic Tests Menu.

See [“Pc-Check Diagnostic Tests”](#) on page 54.

- If you are finished with Pc-Check diagnostics, disable Pc-Check.

See [“Disable Pc-Check”](#) on page 61.

Related Information

- [“Enable Pc-Check”](#) on page 51
- [“Servicing the Motherboard”](#) on page 235
- [“Disable Pc-Check”](#) on page 61

▼ Diagnose the USB Controllers

1. Enable Pc-Check.

See [“Enable Pc-Check”](#) on page 51.

2. From the Advanced Diagnostic Test Menu, select USB.

3. In the USB Test Menu, select Test USB Controllers.

4. Run the test.

The test completes.

5. Consider your next step.

- If you want to perform more Pc-Check diagnostics, return to the Advanced Diagnostic Tests Menu.

See [“Pc-Check Diagnostic Tests”](#) on page 54.

- If you are finished with Pc-Check diagnostics, disable Pc-Check.

See [“Disable Pc-Check”](#) on page 61.

Related Information

- [“Enable Pc-Check”](#) on page 51
- [“Servicing the USB Board”](#) on page 227
- [“Servicing the Motherboard”](#) on page 235
- [“Disable Pc-Check”](#) on page 61

▼ Disable Pc-Check

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Disable Pc-Check.

```
-> set /HOST/diag state=disabled
```

3. Stop the boot sequence.

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

Related Information

- “Enable Pc-Check” on page 51
- “Pc-Check Navigation” on page 53
- “Pc-Check Diagnostic Tests” on page 54

Preparing for Service

These topics describe how to prepare the server for servicing.

Step	Description	Link
1.	Review safety and handling information.	“Safety Information” on page 64
2.	Gather the tools for service.	“Tools Needed for Service” on page 66
3.	Consider filler panel options.	“Filler Panels” on page 66
4.	Find the server serial number.	“Find the Server Serial Number” on page 67
5.	Locate the component service information.	“Component Service Task Reference” on page 67
6.	Identify the server to be serviced.	“Locate the Server” on page 68
	You can now service the filter, the drives, the DVD drive, and the power supplies.	“Servicing the Filter” on page 97 “Servicing Drives” on page 101 “Servicing the DVD Drive” on page 111 “Servicing Power Supplies” on page 117
7.	Shut down the OS and power off the server.	“Removing Power From the Server” on page 69
8.	Move the server out of the rack and open the top cover.	“Accessing Internal Components” on page 74
	You can now service the fan modules, the risers, the PCIe3 cards, the battery, and the USB drive.	“Servicing Fan Modules” on page 125 “Servicing Risers” on page 133 “Servicing PCIe3 Cards” on page 143 “Servicing the Battery” on page 159 “Servicing the USB Drive” on page 163
9.	Remove the fan tray.	“Remove the Fan Tray” on page 89
	You can now service the cables.	“Servicing Cables” on page 169
10.	Bring the drive cage to service position.	“Raise the Drive Cage to the Service Position” on page 90
	You can now service the drive backplane.	“Servicing the Drive Backplane” on page 183
11.	Remove the air duct.	“Remove the Air Duct” on page 92

Step	Description	Link
	You can now service the DIMMs and the LED board.	“Servicing DIMMs” on page 193 “Servicing the LED Board” on page 219
12.	Remove the PDB duct.	“Remove the PDB Duct” on page 94
	You can now service the USB board, the motherboard, and the PDB.	“Servicing the USB Board” on page 227 “Servicing the Motherboard” on page 235 “Servicing the PDB” on page 247

Related Information

- [“Identifying Components” on page 1](#)
- [“Detecting and Managing Faults” on page 9](#)
- [“Returning the Server to Operation” on page 255](#)

Safety Information

For your protection, observe these 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 *Netra SPARC T4-2 Server Safety and Compliance Guide*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment’s electrical rating label.
- Follow the electrostatic discharge safety practices as described here.

Safety Symbols

Note the meanings of these 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 PCI cards, hard drives, and DIMMs require special handling.



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



Caution – You must disconnect 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 hard drive assemblies, circuit boards, or express modules. When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Following this practice equalizes the electrical potentials between you and the server.

Antistatic Mat

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

Related Information

- [“Tools Needed for Service” on page 66](#)
- [“Component Service Task Reference” on page 67](#)
- [“Removing Power From the Server” on page 69](#)

Tools Needed for Service

You need these tools for most service operations:

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

Related Information

- [“Safety Information” on page 64](#)
- [“Component Service Task Reference” on page 67](#)
- [“Accessing Internal Components” on page 74](#)

Filler Panels

Each server is shipped with replacement filler panels for hard drives and PCI 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 functional component to ensure proper airflow through the system. If you remove a filler panel and continue to operate your system with an

empty 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 topic in this document about servicing that component.

Related Information

- [“Component Service Task Reference” on page 67](#)
- [“Servicing Drives” on page 101](#)
- [“Servicing PCIe3 Cards” on page 143](#)

▼ Find the Server Serial Number

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

If it is not convenient to read either sticker, follow this procedure.

1. **Access Oracle ILOM.**

See [“Access the SP \(Oracle ILOM\)” on page 17](#).

2. **Display the serial number.**

```
-> show /System serial_number
/System
Properties:
  serial_number = 1150CN2022
->
```

Related Information

- [Server Administration, show command](#)
- [“Display FRUID and Fault State for Specific Components” on page 44](#)

Component Service Task Reference

This table identifies the server components that are FRUs or that you must remove as part of a service operation.

Name	FRU Name	Service Link
Battery		“Servicing the Battery” on page 159
Cables		“Servicing Cables” on page 169
CPUs	/SYS/MB/Px	“Servicing the Motherboard” on page 235
DIMMs	/SYS/MB/Px/Dy	“Servicing DIMMs” on page 193
Drives	/SYS/HDDx	“Servicing Drives” on page 101
Drive backplanes	/SYS/DBP	“Servicing the Drive Backplane” on page 183
DVD drive		“Servicing the DVD Drive” on page 111
Fan modules	/SYS/MB/FMx	“Servicing Fan Modules” on page 125
Filter		“Servicing the Filter” on page 97
LED board		“Servicing the LED Board” on page 219
Motherboard	/SYS/MB	“Servicing the Motherboard” on page 235
Network interfaces	/SYS/MB/NETx	“Servicing the Motherboard” on page 235
PCIe3 cards	/SYS/MB/RISERx/PCIEy	“Servicing PCIe3 Cards” on page 143
PDB	/SYS/PDB	“Servicing the PDB” on page 247
Power supplies	/SYS/PSx	“Servicing Power Supplies” on page 117
Risers	/SYS/MB/RISERx	“Servicing Risers” on page 133
SP	/SYS/SP	“Servicing the Motherboard” on page 235
USB board		“Servicing the USB Board” on page 227
USB drive		“Servicing the USB Drive” on page 163

Related Information

- [“Removing Power From the Server” on page 69](#)
- [“Accessing Internal Components” on page 74](#)

▼ Locate the Server

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

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. If not already done, enable Oracle ILOM legacy targets.

See “Enable Oracle ILOM Legacy Targets” on page 24.

3. Turn on the Locator LED.

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

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

4. After locating the server with the blinking Locator LED, turn the LED off by pressing the Locator button.

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

5. Consider your next step.

- Service these components:
 - “Servicing the Filter” on page 97
 - “Servicing Drives” on page 101
 - “Servicing the DVD Drive” on page 111
 - “Servicing Power Supplies” on page 117
- Or, remove power from the server.
 - See “Removing Power From the Server” on page 69.

Related Information

- *Server Administration*, `set` command
- “Component Service Task Reference” on page 67
- “Removing Power From the Server” on page 69

Removing Power From the Server

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

Step	Description	Link
1.	Prepare the server for powering off.	“Prepare to Power Off the Server” on page 70
2.	Power off the server by one of three methods.	“Power Off the Server (Oracle ILOM)” on page 71 “Power Off the Server (Power Button - Graceful)” on page 72 “Power Off the Server (Emergency Shutdown)” on page 72
3.	Disconnect the power cords.	“Disconnect Power Cords” on page 72

Related Information

- [“Accessing Internal Components” on page 74](#)
- [“Returning the Server to Operation” on page 255](#)

▼ Prepare to Power Off the Server

Perform this procedure before powering off the server.

1. Notify affected users that the server will be shut down.

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

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

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

3. Shut down all logical domains.

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

4. Shut down the Oracle Solaris OS.

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

5. Power off the server.

See:

- [“Power Off the Server \(Oracle ILOM\)” on page 71](#)
- [“Power Off the Server \(Power Button - Graceful\)” on page 72](#)
- [“Power Off the Server \(Emergency Shutdown\)” on page 72](#)

Related Information

- [“Power Off the Server \(Oracle ILOM\)”](#) on page 71
- [“Power Off the Server \(Power Button - Graceful\)”](#) on page 72
- [“Power Off the Server \(Emergency Shutdown\)”](#) on page 72

▼ Power Off the Server (Oracle ILOM)

You can use the SP to perform a graceful shutdown of the server. This type of shutdown ensures that all of your data is saved and that the server is ready for restart.

Note – Additional information about powering off the server is provided in *Server Administration*.

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)”](#) on page 17.

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. See [“Detecting and Managing Faults”](#) on page 9.

2. Power off the server.

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

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 72.) This button is recessed to prevent accidental server power off.

Related Information

- [“Prepare to Power Off the Server”](#) on page 70
- [“Disconnect Power Cords”](#) on page 72
- [“Power On the Server \(Oracle ILOM\)”](#) on page 267
- [“Power Off the Server \(Power Button - Graceful\)”](#) on page 72
- [“Power Off the Server \(Emergency Shutdown\)”](#) on page 72

▼ 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.**

See “Front Panel Components (Service)” on page 6.

Related Information

- “Prepare to Power Off the Server” on page 70
- “Disconnect Power Cords” on page 72
- “Power On the Server (Power Button)” on page 267
- “Front Panel Components (Service)” on page 6
- “Power Off the Server (Oracle ILOM)” on page 71
- “Power Off the Server (Emergency Shutdown)” on page 72

▼ Power Off the Server (Emergency Shutdown)



Caution – For this procedure, all applications and files are closed abruptly without saving changes. File system corruption might occur.

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

See “Front Panel Components (Service)” on page 6.

Related Information

- “Prepare to Power Off the Server” on page 70
- “Disconnect Power Cords” on page 72
- “Power On the Server (Power Button)” on page 267
- “Front Panel Components (Service)” on page 6
- “Power Off the Server (Oracle ILOM)” on page 71
- “Power Off the Server (Power Button - Graceful)” on page 72

▼ Disconnect Power Cords

1. **Power off the server.**

See:

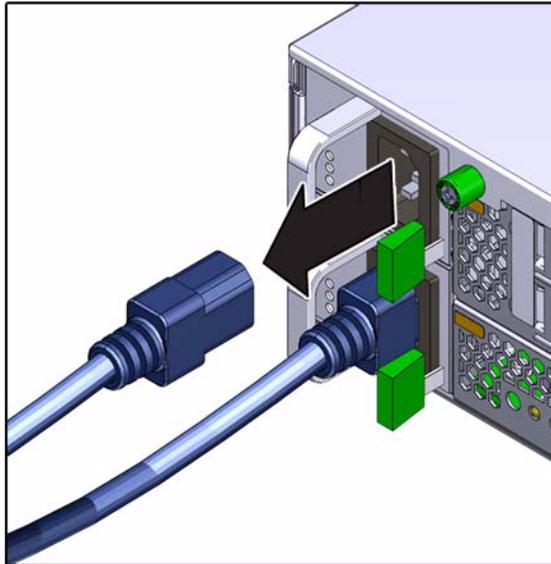
- “Power Off the Server (Oracle ILOM)” on page 71
- “Power Off the Server (Power Button - Graceful)” on page 72
- “Power Off the Server (Emergency Shutdown)” on page 72

2. Unplug all power cords from the server.

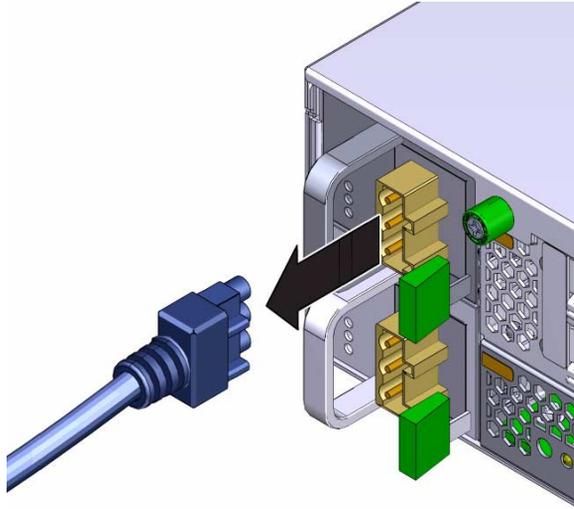


Caution – Because 3.3 VDC standby power is always present in the system, you must unplug the power cords before accessing any cold-serviceable components.

For AC power cords.



For DC power cords.



Related Information

- [“Power Off the Server \(Oracle ILOM\)” on page 71](#)
- [“Power Off the Server \(Power Button - Graceful\)” on page 72](#)
- [“Power Off the Server \(Emergency Shutdown\)” on page 72](#)
- [“Prevent ESD Damage” on page 75](#)
- [“Connect Power Cords” on page 265](#)

Accessing Internal Components

These topics provide procedures and guidelines when accessing internal components.

Step	Description	Link
1.	Take antistatic precautions now.	“Prevent ESD Damage” on page 75
2.	Move the server out of the rack	“Removing the Server From the Rack” on page 75
3.	Gain access to the internal components.	“Remove the Top Cover” on page 87

Related Information

- [“Safety Information” on page 64](#)

- [“Tools Needed for Service” on page 66](#)
- [“Component Service Task Reference” on page 67](#)
- [“Removing Power From the Server” on page 69](#)

▼ Prevent ESD Damage

Many components housed within the chassis can be damaged by electrostatic discharge. To protect these components from damage, perform these steps before opening the chassis for service. See [“Safety Information” on page 64](#).

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.

2. Attach an antistatic wrist strap.

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

Related Information

- [“Disconnect Power Cords” on page 72](#)
- [“Removing the Server From the Rack” on page 75](#)
- [“Remove the Top Cover” on page 87](#)
- [“Safety Information” on page 64](#)

Removing the Server From the Rack

Before you can remove the top cover to access components inside of the server chassis, you must remove the server from the rack. Six rack mounting configurations are supported:

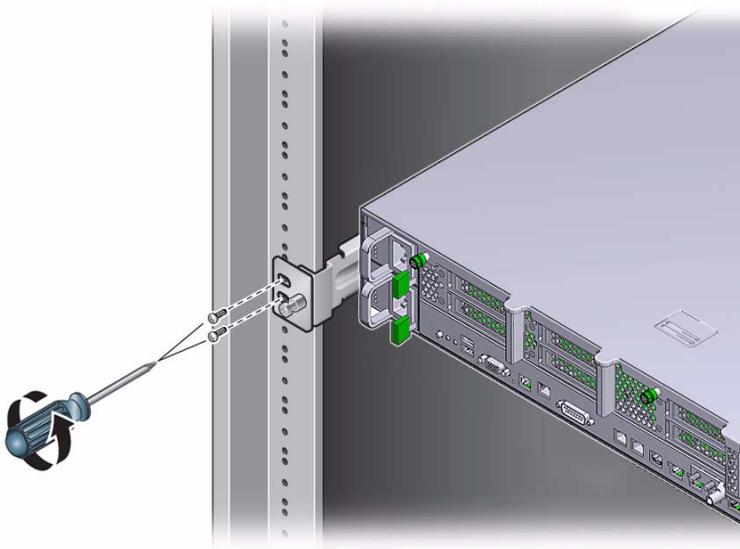
- [“Remove the Server From the 4-Post, 19-inch Hardmount Rack” on page 76](#)
- [“Remove the Server From the 4-Post, 19-inch Slidemount Rack” on page 77](#)
- [“Remove the Server From the 4-Post, 600-mm Hardmount Rack” on page 79](#)
- [“Remove the Server From the 2-Post, 19-inch Hardmount Rack” on page 81](#)
- [“Remove the Server From the 2-Post, 19-inch Slidemount Rack” on page 83](#)
- [“Remove the Server From the 2-Post, 23-inch Rack” on page 85](#)

Related Information

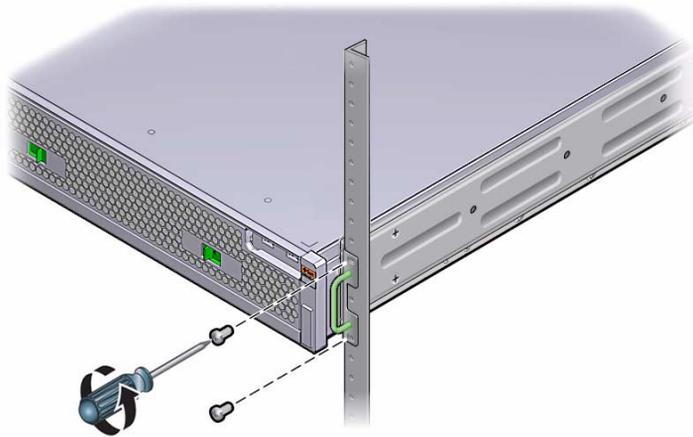
- “Disconnect Power Cords” on page 72
- “Prevent ESD Damage” on page 75
- “Remove the Top Cover” on page 87

▼ Remove the Server From the 4-Post, 19-inch Hardmount Rack

1. Support the weight of the server for removal.
2. Remove the two screws securing each rear mount support bracket.



3. Remove the two screws securing each hardmount bracket at the front of the rack.



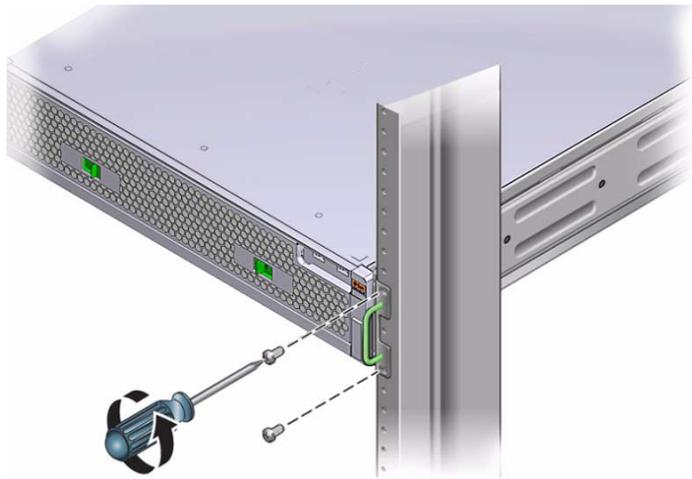
4. Lift the server from the rack and set it aside on an antistatic mat.
5. Remove the top cover.
See “Remove the Top Cover” on page 87.

Related Information

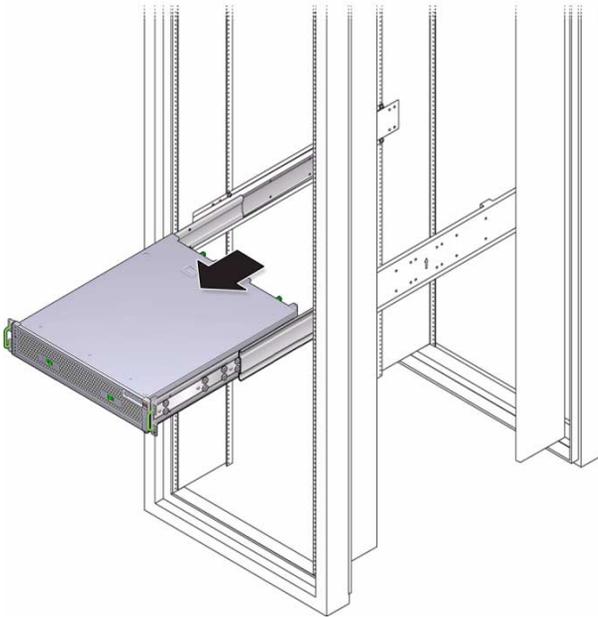
- “Prevent ESD Damage” on page 75
- “Remove the Top Cover” on page 87
- “Install the Top Cover” on page 263
- “Safety Information” on page 64

▼ Remove the Server From the 4-Post, 19-inch Slidemount Rack

1. Remove the two screws from each hardmount bracket at the front of the rack.



- 2. Push the slide buttons in and slide the server out of the rack until it stops in the service position.**



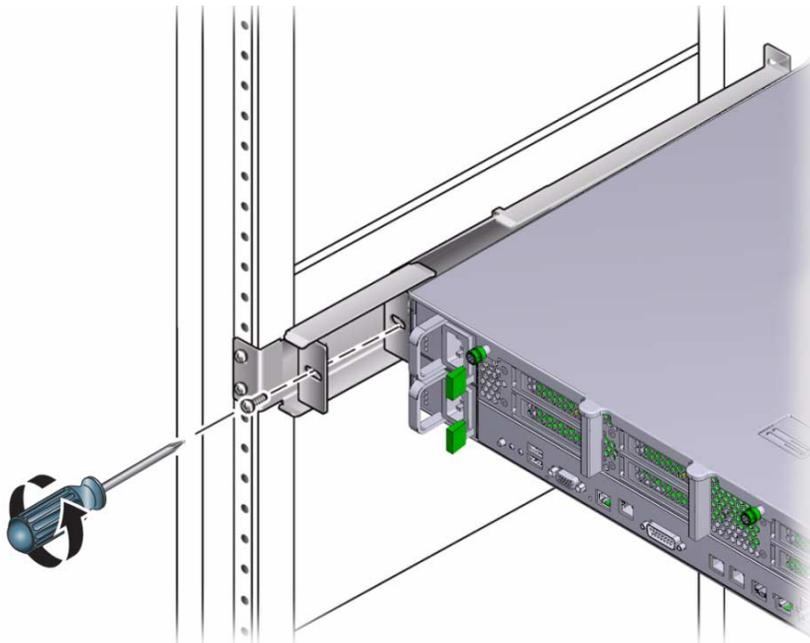
- 3. Remove the top cover.**
See ["Remove the Top Cover"](#) on page 87.

Related Information

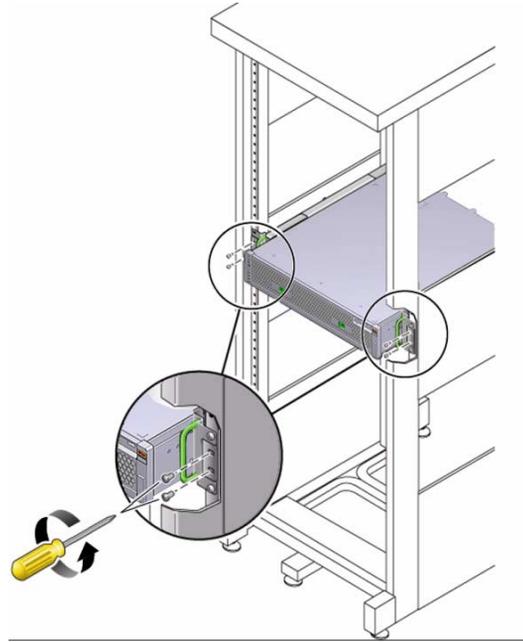
- “Prevent ESD Damage” on page 75
- “Remove the Top Cover” on page 87
- “Install the Top Cover” on page 263
- “Safety Information” on page 64

▼ Remove the Server From the 4-Post, 600-mm Hardmount Rack

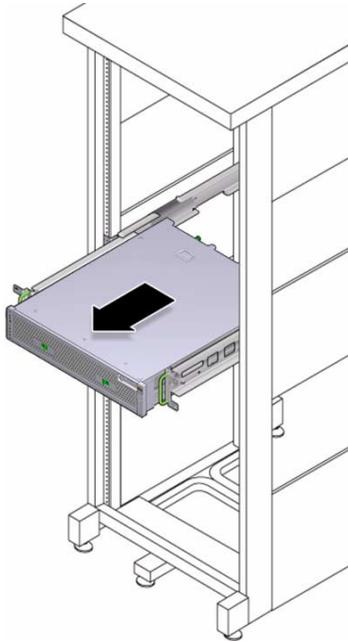
1. Remove the screw from each side flange at the rear of the rack.



2. Remove the two screws from each slide rail at the front of the rack.



3. Slide the server out of the rack and set it aside on an antistatic mat.



4. Remove the top cover.

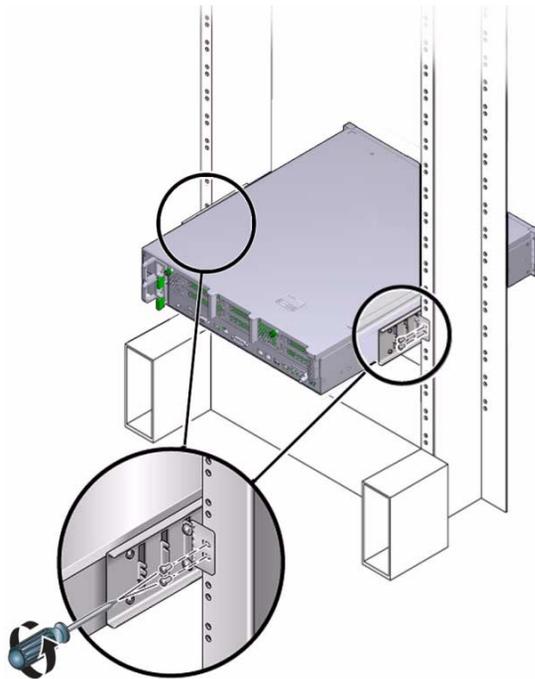
See “Remove the Top Cover” on page 87.

Related Information

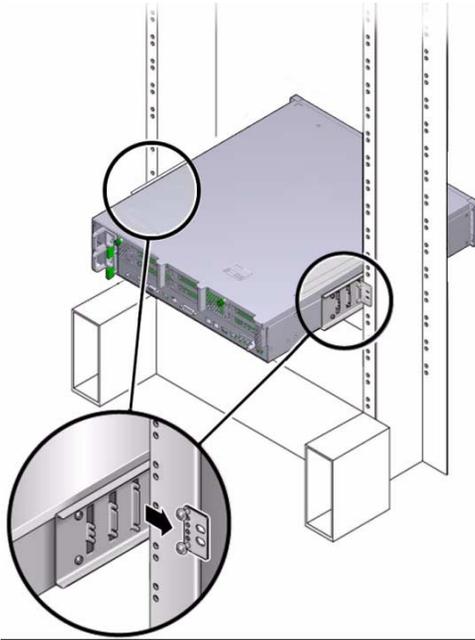
- “Prevent ESD Damage” on page 75
- “Remove the Top Cover” on page 87
- “Install the Top Cover” on page 263
- “Safety Information” on page 64

▼ **Remove the Server From the 2-Post, 19-inch Hardmount Rack**

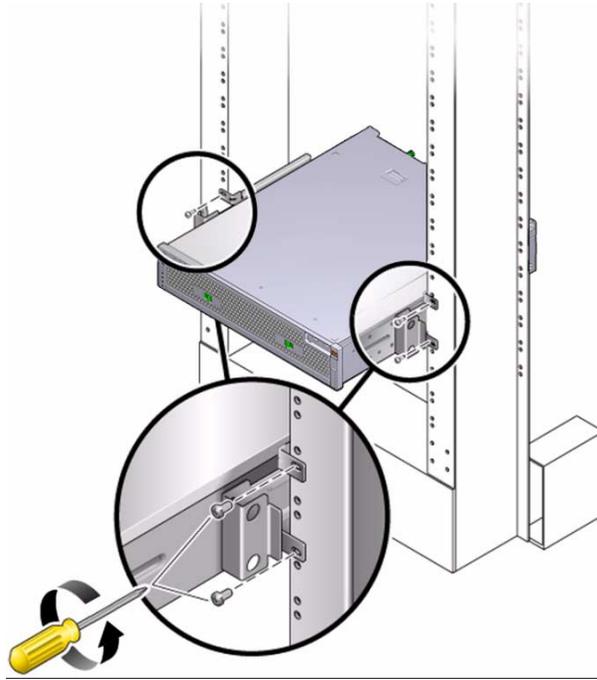
- 1. Support the weight of the server for removal.**
- 2. Remove the two screws that secure each rear plate to the back of the post.**



- 3. Loosen the two screws that secure each rear plate to the eyelets of the side bracket.**



4. Slide each rear plate out of the eyelets and set them aside.
5. Remove the two screws from each side bracket at the front of the posts.



6. Lift the server from the rack and set it aside on an antistatic mat.

7. Remove the top cover.

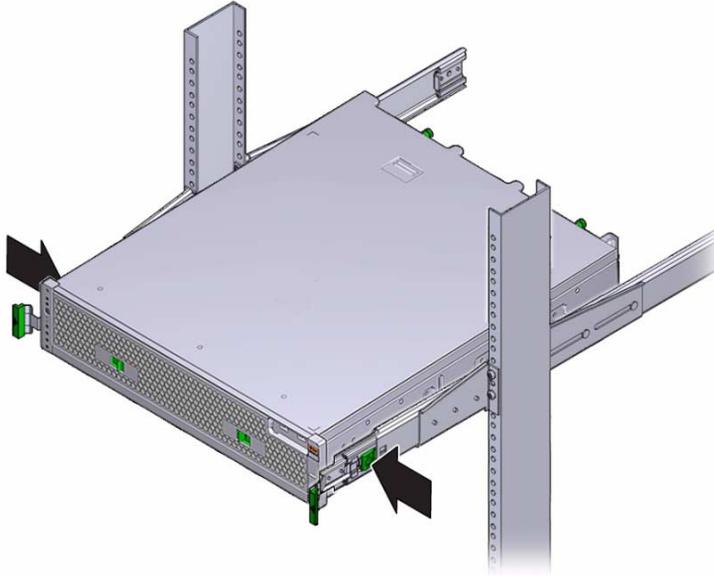
See “Remove the Top Cover” on page 87.

Related Information

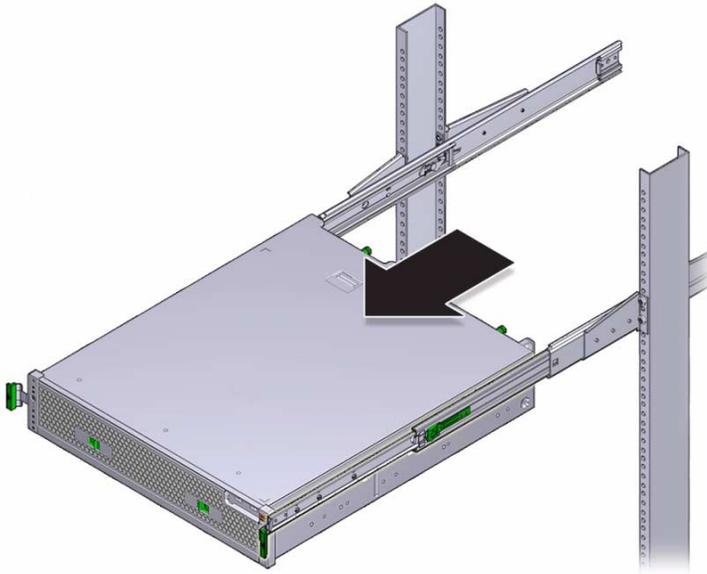
- “Prevent ESD Damage” on page 75
- “Remove the Top Cover” on page 87
- “Install the Top Cover” on page 263
- “Safety Information” on page 64

▼ Remove the Server From the 2-Post, 19-inch Slidemount Rack

1. Push the slide buttons in to release the server.



2. Slide the server out of the rack until it stops in the service position.



3. Remove the top cover.

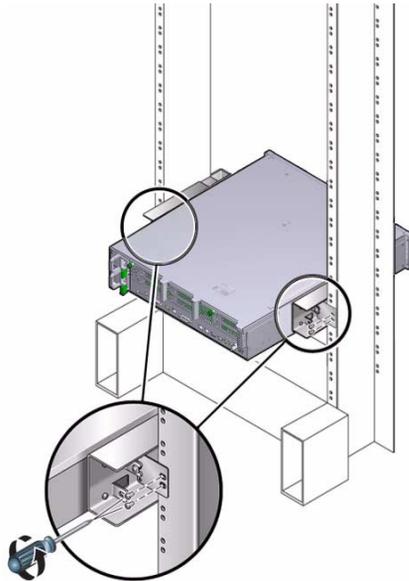
See [“Remove the Top Cover”](#) on page 87.

Related Information

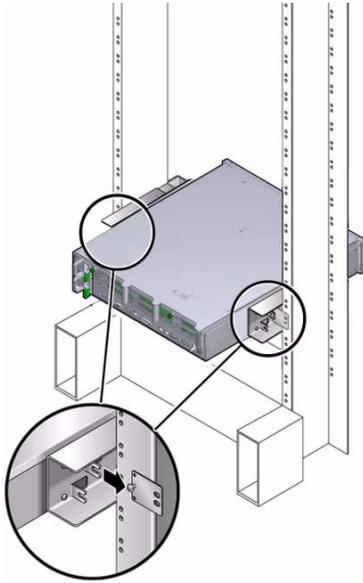
- “Prevent ESD Damage” on page 75
- “Remove the Top Cover” on page 87
- “Install the Top Cover” on page 263
- “Safety Information” on page 64

▼ Remove the Server From the 2-Post, 23-inch Rack

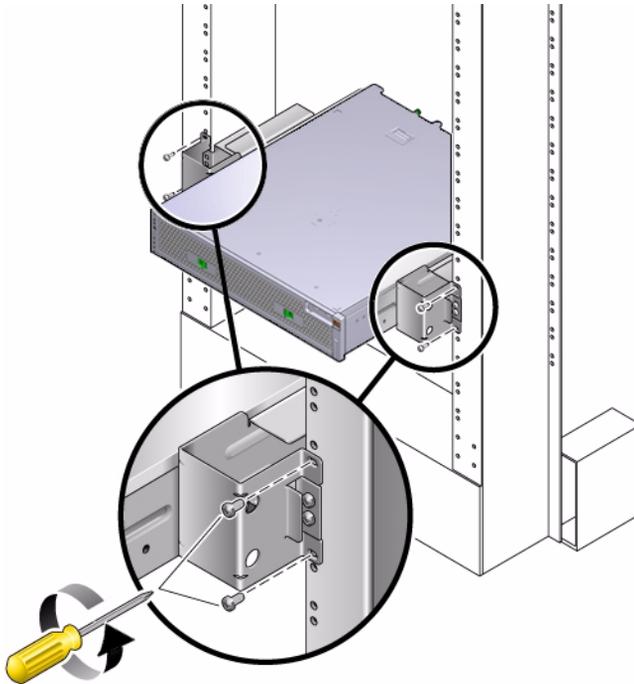
1. Remove the two screws that secure each rear plate to the back of the post.



2. Loosen the screws that secure each rear plate to the eyelets of the side bracket.



3. Slide each rear plate out of the eyelet and set them aside.
4. Remove the two screws from each side bracket at the front of the posts.



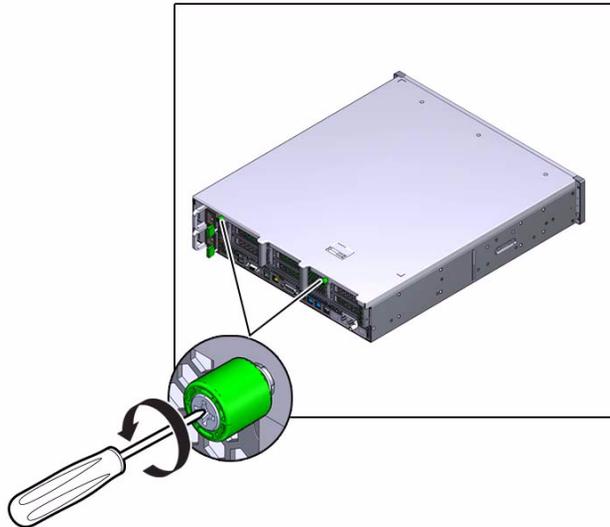
5. Lift the server from the rack and set it aside on an antistatic mat.
6. Remove the top cover.
See “Remove the Top Cover” on page 87.

Related Information

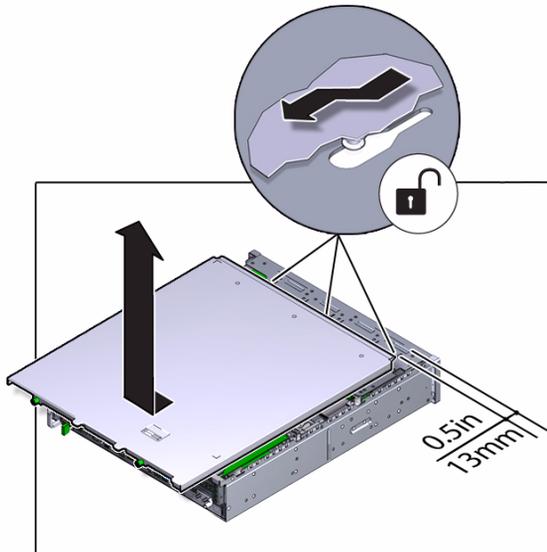
- “Prevent ESD Damage” on page 75
- “Remove the Top Cover” on page 87
- “Install the Top Cover” on page 263
- “Safety Information” on page 64

▼ Remove the Top Cover

1. Remove the server from the rack.
See “Removing the Server From the Rack” on page 75.
2. Fully loosen the two captive screws at the rear of the top cover.



3. Slide the top cover rearward 0.5 in (13 mm) and lift it straight up and off the chassis.



Set the top cover aside.

4. Consider your next step.

- Service these components:
 - “Servicing Fan Modules” on page 125
 - “Servicing Risers” on page 133
 - “Servicing PCIe3 Cards” on page 143
 - “Servicing the Battery” on page 159
 - “Servicing the USB Drive” on page 163
- Or, remove the fan tray.
 - See “Remove the Fan Tray” on page 89.

Related Information

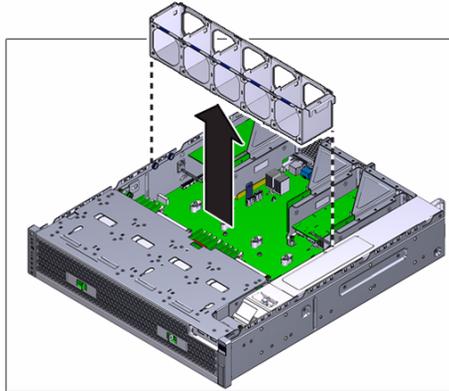
- “Prevent ESD Damage” on page 75
- “Removing the Server From the Rack” on page 75
- “Install the Top Cover” on page 263
- “Safety Information” on page 64

▼ Remove the Fan Tray

1. Complete these prerequisites in this order.

- [“Remove the Top Cover”](#) on page 87
 - [“Remove a Fan Module”](#) on page 128
- Remove all fan modules.

2. Lift the fan tray straight up and out of the chassis.



3. Consider your next step.

- Service the hard drive signal, hard drive power, or DVD SATA cables.
See [“Servicing Cables”](#) on page 169.
- Or, pivot the drive cage.
See [“Raise the Drive Cage to the Service Position”](#) on page 90.

Related Information

- [“Remove the Top Cover”](#) on page 87
- [“Install the Fan Tray”](#) on page 262
- [“Raise the Drive Cage to the Service Position”](#) on page 90

▼ Raise the Drive Cage to the Service Position

1. Complete these prerequisites in this order.

- “Remove the Top Cover” on page 87
- “Remove a Fan Module” on page 128
Remove all fan modules.
- “Remove the Fan Tray” on page 89

2. Remove the filter.

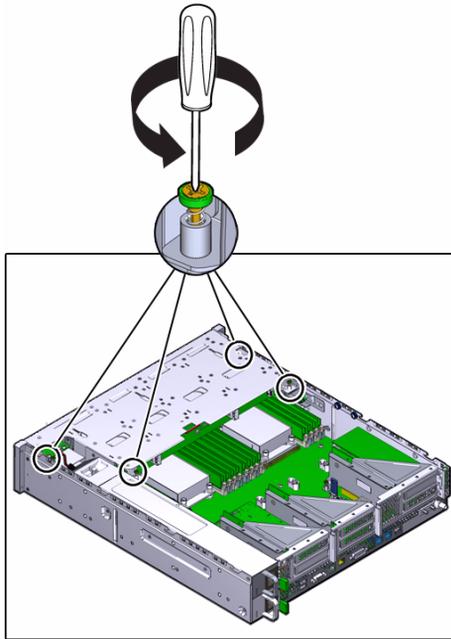
See “Remove the Filter” on page 97.

3. Disconnect the cables attached to the drive backplane, and the cable attached to the USB board.

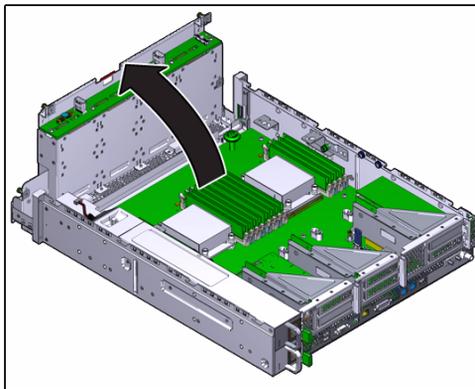
These cables (2), (3), (4), and (6) are visible in “Cable Configuration” on page 170.

Note – Depending on your server’s configuration, you might not have the DVD SATA cable (3) as seen in the illustration.

4. Fully loosen the four screws securing the drive cage to the chassis.



5. Raise the drive cage to the vertical position.



6. Consider your next step.

- Service the drive backplane.
See “[Servicing the Drive Backplane](#)” on page 183.
- Or, remove the air duct.
See “[Remove the Air Duct](#)” on page 92.

Related Information

- “Remove the Fan Tray” on page 89
- “Secure the Drive Cage” on page 260
- “Remove the Air Duct” on page 92

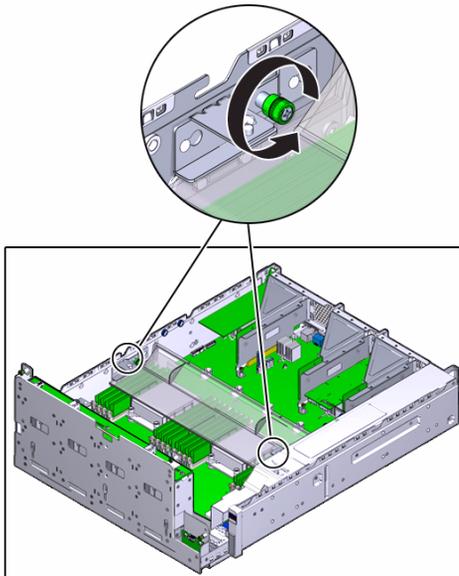
▼ Remove the Air Duct

1. Complete these prerequisites in this order.

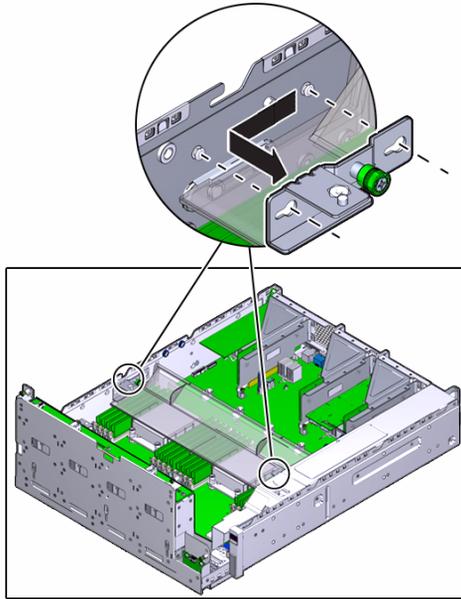
- “Remove the Top Cover” on page 87
- “Remove a Fan Module” on page 128
Remove all fan modules.
- “Remove the Fan Tray” on page 89
- “Raise the Drive Cage to the Service Position” on page 90

2. Disconnect or move the cables out of the way to gain access to the thumbscrew brackets.

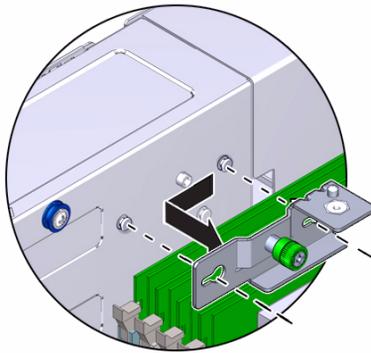
3. Fully loosen the thumbscrews.



4. Slide the left (L) thumbscrew bracket forward and off of the mounting pins.

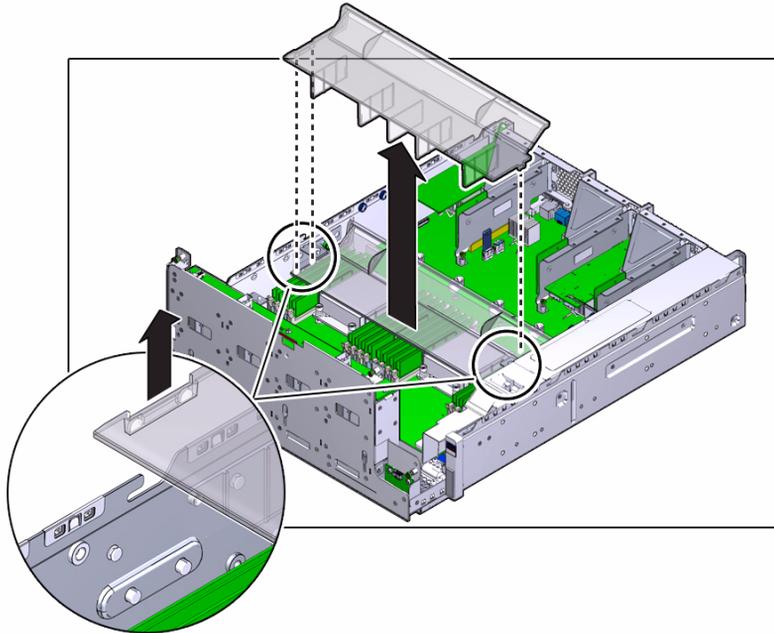


5. Slide the right (R) thumbscrew bracket rearward and off the mounting pins.



6. Set the thumbscrew brackets aside.

7. Lift the air duct straight up and off the alignment pins.



8. Set the air duct aside.

9. Consider your next step.

- Service these components:
 - “Servicing DIMMs” on page 193
 - “Servicing the LED Board” on page 219
- Or, remove the PDB duct.
See “Remove the PDB Duct” on page 94.

Related Information

- “Raise the Drive Cage to the Service Position” on page 90
- “Install the Air Duct” on page 258
- “Remove the PDB Duct” on page 94

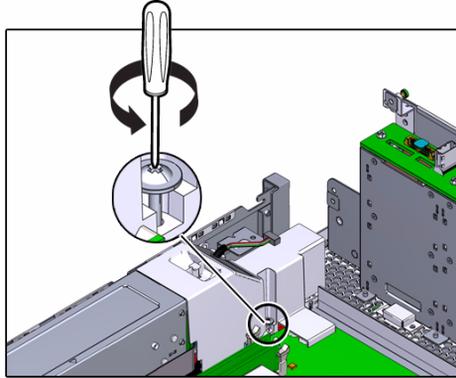
▼ Remove the PDB Duct

1. Complete these prerequisites in this order.

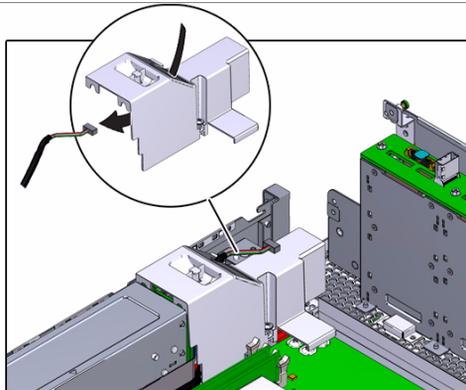
- “Remove the Top Cover” on page 87

- “Remove a Fan Module” on page 128
Remove all fan modules.
- “Remove the Fan Tray” on page 89
- “Raise the Drive Cage to the Service Position” on page 90
- “Remove the Air Duct” on page 92

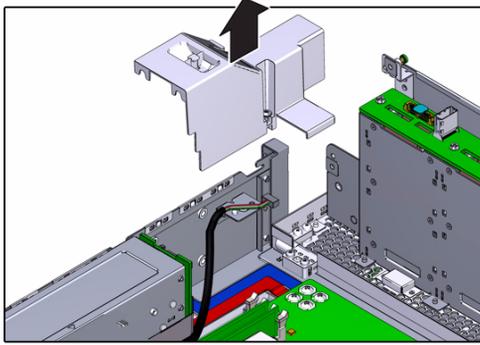
2. Fully loosen the captive screw.



3. Gently lift the PDB duct slightly, and pass the cables out of the slot of the duct.



4. Lift the PDB duct away from the chassis.



5. Set the PDB duct aside

6. Consider your next step.

- Continue servicing the USB board.
See “[Servicing the USB Board](#)” on page 227
- Service the motherboard.
See “[Servicing the Motherboard](#)” on page 235.
- Service the PDB.
See “[Servicing the PDB](#)” on page 247.
- Service the PDB signal cable.
See “[Servicing Cables](#)” on page 169.

Related Information

- “[Remove the Air Duct](#)” on page 92
- “[Install the PDB Duct](#)” on page 256

Servicing the Filter

The filter contains a foam rubber element and is used to trap larger particles from entering the server chassis. The filter is located at the air intake end of the server. See [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2.

Description	Links
Replace the faulty filter.	“Remove the Filter” on page 97 “Install the Filter” on page 99
Remove the filter as part of another component’s service operation.	“Remove the Filter” on page 97
Install the filter as part of another component’s service operation.	“Install the Filter” on page 99

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Remove the Filter

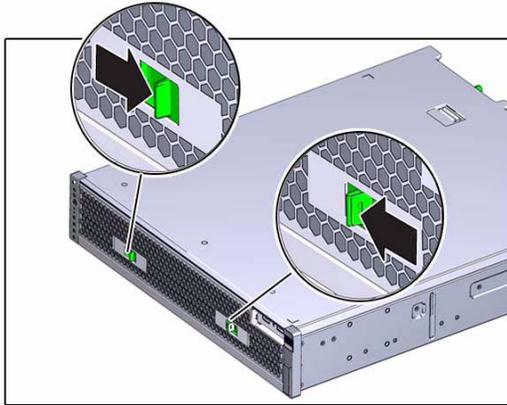
Removing the filter is a hot-swap operation. You do not need to power off the server before you remove the filter.

1. Consider your first step.

- If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.

- If you are removing the filter as part of another component's removal or installation procedure, go to [Step 2](#).

2. Pinch the left and right release levers inwards.



3. Pivot the filter forward and out of the chassis.



4. Lift the filter from the chassis.

5. Set the filter aside.

6. Consider your next step.

- If you removed the filter as part of a replacement operation, install a new filter. See [“Install the Filter” on page 99](#).
- If you removed the filter as part of another component's removal or installation procedure, return to that procedure. See [“Component Service Task Reference” on page 67](#) for assistance.

7. Finish the removal procedure.

See [“Returning the Server to Operation” on page 255](#).

Related Information

- “Install the Filter” on page 99
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

▼ Install the Filter

Installing the filter is a hot-swap operation. You do not need to power off the server before installing the filter.

1. Consider your first step.

- If you are replacing the filter, remove the faulty or obsolete filter first, then return to this procedure, [Step 2](#). See “[Remove the Filter](#)” on page 97.
- If you are installing the filter as part of another component’s removal or installation procedure, go to [Step 2](#).

2. Set the bottom edge of the filter into the lip at the front of the chassis.



The left and right release levers are facing forward.

3. Pivot the filter to vertical.

The release levers snap the filter into place.

4. Consider your next step.

- If you installed the filter as part of a replacement operation, you are finished.
- If you installed the filter as part of another component’s removal or installation procedure, return to that procedure. See “[Component Service Task Reference](#)” on page 67 for assistance.

Related Information

- [“Remove the Filter” on page 97](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

Servicing Drives

Drives are used for nonvolatile storage of information. The drives are located across the front of the chassis, behind the filter. See [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2.

Description	Links
Replace a faulty drive.	“Drive Configuration” on page 102 “Locate a Faulty Drive” on page 103 “Drive LEDs” on page 102 “Remove a Drive” on page 105 “Install a Drive” on page 107 “Verify a Drive” on page 109
Remove a drive as part of another component’s service operation.	“Remove a Drive” on page 105
Install a drive as part of another component’s service operation.	“Install a Drive” on page 107
Add additional drives.	“Drive Configuration” on page 102 “Install a Drive” on page 107 “Verify a Drive” on page 109
Decrease the number of existing drives.	“Remove a Drive” on page 105
Identify a faulty drive.	“Drive LEDs” on page 102 “Locate a Faulty Drive” on page 103 “Detecting and Managing Faults” on page 9

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

Drive Configuration

The server is shipped with one of two drive configurations. The server can have six drives and a DVD drive, or eight drives and no internal DVD drive. For both configurations, the locations and Oracle ILOM targets for drives 0 through 5 are identical. The DVD drive occupies the space where drives 6 and 7 would have installed. See [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2.

Note – It is not possible to swap drives 6 and 7 for a DVD drive. Nor is it possible to swap a DVD drive for drives 6 and 7. The drive cages are specific for the configurations and are not interchangeable.



Caution – Overheating hazard. There must be no empty drive slots.

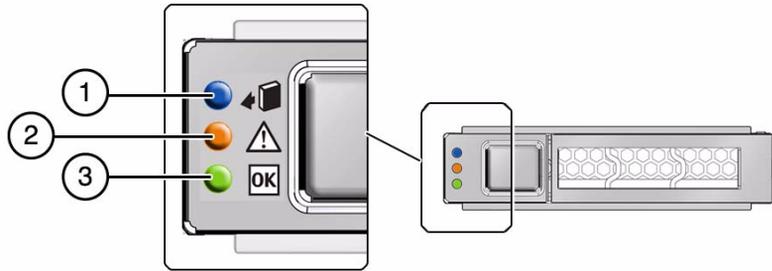
The filters for the two configurations are also configuration-specific.

Related Information

- [“Install a Drive”](#) on page 107
- [“Drive LEDs”](#) on page 102
- [“Locate a Faulty Drive”](#) on page 103

Drive LEDs

The status of each drive is represented by the same three LEDs. The LEDs are located above the release button of each hard drive. See [“Front Panel LEDs”](#) on page 20. This illustration and table describe the functionality of the drive LEDs.



No.	Icon	Location	Name	Color	State and Meaning
1		Top	Ready to Remove	Blue	On – Drive can be removed as a hot-plug operation. Off – Do not remove the drive. Flashing – Drive is initializing.
2		Middle	Attention Service Required	Amber	On – Normal fault detected. Off – No faults detected. Flashing – No function.
3		Bottom	OK/Activity	Green	On – Drive is functional without fault. Off – Drive is off or initializing. Flashing – Drive read and write activity.

Related Information

- [“Locate a Faulty Drive” on page 103](#)
- [“Drive Configuration” on page 102](#)
- [“Remove a Drive” on page 105](#)
- [“Front Panel LEDs” on page 20](#) [“Rear Panel LEDs” on page 22](#)

▼ Locate a Faulty Drive

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

1. **Check to see if any System Service Required LEDs are lit or flashing.**
See [“Interpreting Diagnostic LEDs” on page 19](#).

2. Visually inspect the drives to see if any of their status LEDs are lit or flashing.
See [“Drive LEDs” on page 102](#).
If a drive is faulty, replace it. See [“Remove a Drive” on page 105](#).
3. In Oracle ILOM, check the health of the storage system.

```
-> show /System/Storage
/System/Power
Targets:
  Disks
  Controllers
  Volumes
  Expanders
Properties:
  health = OK
  health_details = -
.
.
.
->
```

If the `health_details` property identifies a faulty drive, replace it. See [“Remove a Drive” on page 105](#).

4. Check the health of the individual drives.

```
-> show /System/Storage/Disks/Disk_x
/System/Storage/Disks/Disk_0
Targets:
Properties:
  health = OK
  health_details = -
.
.
.
->
```

where `x` is the number of the drive, from 0 to 7.

If the `health_details` property identifies the drive as faulty, replace it. See [“Remove a Drive” on page 105](#).

5. Verify that a drive is faulty.

If a drive is faulty, you will see `/SYS/HDDx` under the Value heading, where `x` is 0 to 7.

For example:

```
-> show faulty
Target          | Property          | Value
-----+-----+-----
/SP/faultmgmt/0 | fru               | /SYS/HDD0
.
.
.
->
```

If a drive is faulty, replace it. See [“Remove a Drive” on page 105](#).

If a FRU value different from `/SYS/HDDx` is displayed, see [“Component Service Task Reference” on page 67](#) to identify which component is faulty.

6. Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.

See [“Display Faults \(faultmgmt Shell\)” on page 39](#).

Check the `Fault class` and `Description` fields for more information.

If a drive is faulty, replace it. See [“Remove a Drive” on page 105](#).

7. If you are unable to determine if a drive is faulty, seek further information.

See [“Detecting and Managing Faults” on page 9](#).

Related Information

- [“Remove a Drive” on page 105](#)
- [“Drive Configuration” on page 102](#)
- [“Drive LEDs” on page 102](#)
- [“Verify a Drive” on page 109](#)
- [“Detecting and Managing Faults” on page 9](#)

▼ Remove a Drive

Removing a drive is a hot-swap operation. You must run commands on the server before you remove the drive.

1. Determine which drive to remove.

See [“Locate a Faulty Drive”](#) on page 103.

2. Consider your next step.

- If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.
- If you are removing a drive as part of another component’s removal or installation procedure, go to [Step 3](#).

3. Remove the filter.

See [“Remove the Filter”](#) on page 97.

4. Determine if you need to shut down the OS to remove the drive, and perform one of these actions:

- If the drive cannot be taken offline without shutting down the OS, follow instructions in [“Power Off the Server \(Power Button - Graceful\)”](#) on page 72 then go to [Step 7](#).
- If the drive can be taken offline without shutting down the OS, go to [Step 5](#).

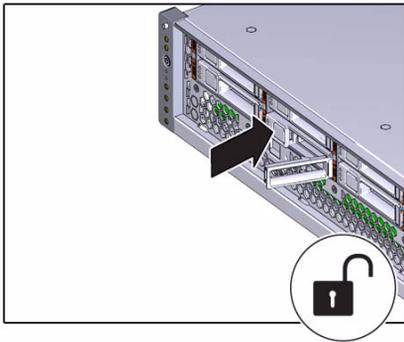
5. Take the drive offline according to your OS.

See your OS documentation.

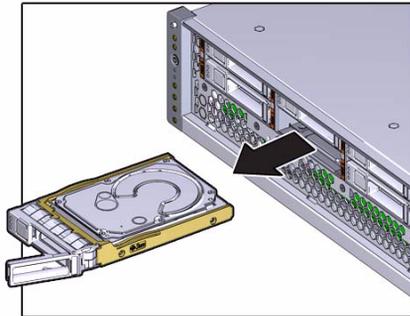
6. Verify that the drive’s blue Ready-to-Remove LED is lit.

See [“Drive LEDs”](#) on page 102.

7. Press the release button and pivot the release lever open to the right.



8. Grasp the release lever and pull the drive out of the chassis.



9. Set the drive aside.
10. Repeat from [Step 5](#) for any additional drives to be removed.
11. Consider your next step.
 - If you removed a drive as part of a replacement operation, install a new drive. See [“Install a Drive”](#) on page 107.
 - If you removed a drive as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.
 - If you are not replacing the drive, install a drive filler panel in its place. See [“Install a Drive”](#) on page 107.



Caution – Overheating hazard. There must be no empty drive slots.

Related Information

- [“Locate a Faulty Drive”](#) on page 103
- [“Install a Drive”](#) on page 107
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

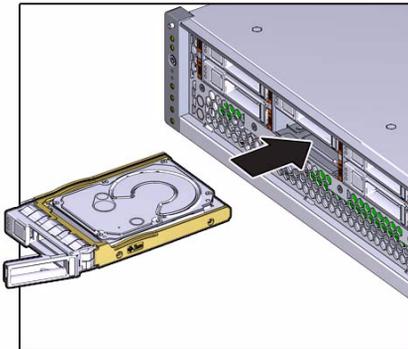
▼ Install a Drive

Installing a drive is a hot-plug operation. You do not need to power off the server before installing the drive. This procedure is the same for installing a drive filler panel.

1. Consider your first step.

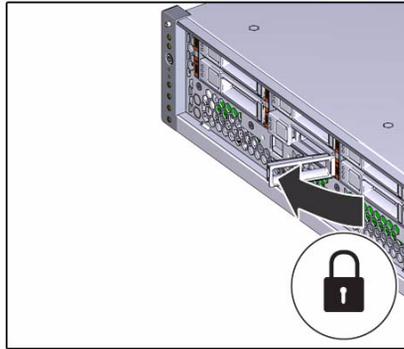
- If you are replacing a drive, remove the faulty or obsolete drive first, then return to this procedure, [Step 3](#). See [“Remove a Drive”](#) on page 105.
 - If you are installing a new or an additional drive, go to [Step 2](#).
 - If you are installing a drive as part of another component’s removal or installation procedure, go to [Step 3](#).
2. **Review this information and complete these prerequisites in this order.**
 - [“Preparing for Service”](#) on page 63
 - [“Drive Configuration”](#) on page 102
 - [“Remove the Filter”](#) on page 97
 3. **Push the release button of the drive.**

The release lever pops out.
 4. **Align the drive with the slot where it installs into the chassis.**



The connector is at the rear of the drive and the release button is on the left.

5. **Press on the release button to slide the drive into the chassis until the release lever moves slightly inward.**
6. **Press the release lever fully closed with a click, securing the drive into the chassis.**



7. Repeat from [Step 3](#) through [Step 6](#) for any additional drives that you are installing.
8. Consider your next step.
 - If you installed a drive as part of a replacement operation, go to [Step 9](#).
 - If you installed a drive as part of another component's removal or installation procedure, return to that procedure. See ["Component Service Task Reference" on page 67](#) for assistance.
 - If you have installed a new drive, go to [Step 9](#).
9. Install the filter.

See ["Install the Filter" on page 99](#).
10. Complete these prerequisites in this order to finish the installation procedure.
 - ["Returning the Server to Operation" on page 255](#)
 - ["Verify a Drive" on page 109](#)

Related Information

- ["Remove a Drive" on page 105](#)
- ["Verify a Drive" on page 109](#)
- ["Drive Configuration" on page 102](#)
- ["Preparing for Service" on page 63](#)
- ["Returning the Server to Operation" on page 255](#)

▼ Verify a Drive

After you install a drive, you can verify its functionality.

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Reset the drive.

```
-> set /SYS/HDDx clear_fault_action=true
Are you sure you want to clear /SYS/HDD0 (y/n)? y
Set 'clear_fault_action' to 'true'
->
```

where x is 0 to 7.

3. Consider your next step.

- If you installed a new drive as part of a replacement operation, verify that the drive is no longer considered faulty, then return to this procedure. See “Locate a Faulty Drive” on page 103.
- If you installed a new drive to increase functionality, go to [Step 4](#).

4. 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 OS documentation for more information.

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

See “Drive LEDs” on page 102.

6. If the previous steps indicate that the drive is functioning properly, perform the tasks required to configure the drive.

See the OS documentation.

Related Information

- “Install a Drive” on page 107
- “Drive Configuration” on page 102
- “Drive LEDs” on page 102
- “Locate a Faulty Drive” on page 103

Servicing the DVD Drive

The DVD drive is a SATA optical storage device with DVD DL-RW capabilities. The DVD drive is located above the hard drives at the front left of the chassis. See [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2.

Description	Links
Replace the faulty DVD drive.	“Remove the DVD Drive” on page 111 “Install the DVD Drive” on page 113
Remove the DVD drive as part of another component’s service operation.	“Remove the DVD Drive” on page 111
Install the DVD drive as part of another component’s service operation.	“Install the DVD Drive” on page 113

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Remove the DVD Drive

Removing the DVD drive is a hot-plug operation. You do not need to power off the server before you remove the DVD drive.



Caution – Overheating hazard. A DVD drive, even if it does not function, must be present in the DVD drive slot. Do not perform this procedure until you have a replacement DVD drive available.

1. Consider your first step.

- If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.
- If you are removing the DVD drive as part of another component’s removal or installation procedure, go to [Step 2](#).

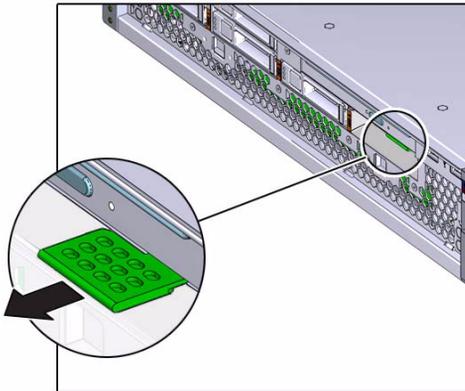
2. Remove the filter.

See [“Remove the Filter”](#) on page 97.

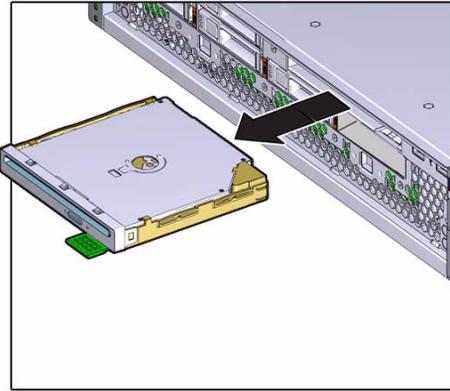
3. Remove the far right drive located beneath the DVD drive.

See [“Remove a Drive”](#) on page 105.

4. Grasp the tab under the right side of the DVD drive and pull the tab out.



5. Continue to pull the tab, so that the DVD drive slides out of the chassis.



6. Set the DVD drive aside.

7. Consider your next step.

- If you removed the DVD drive as part of a replacement operation, install a new DVD drive. See [“Install the DVD Drive”](#) on page 113.
- If you removed the DVD drive as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.

Related Information

- [“Install the DVD Drive”](#) on page 113
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Install the DVD Drive

Installing the DVD drive is a hot-plug operation. You do not need to power off the server before installing the DVD drive.

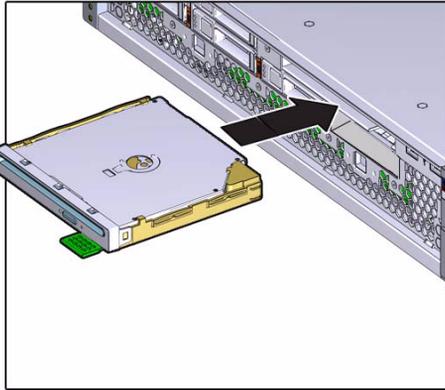
1. Consider your first step.

- If you are replacing the DVD drive, remove the faulty or obsolete DVD drive first, then return to this procedure, [Step 2](#). See [“Remove the DVD Drive”](#) on page 111.
- If you are installing the DVD drive as part of another component’s removal or installation procedure, go to [Step 2](#).

2. Extend the tab out from the underside of the DVD drive.

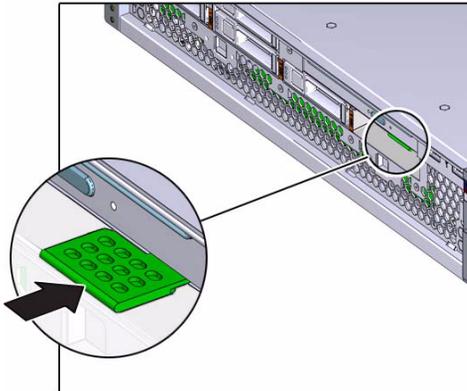
3. Align the DVD drive to the location where it installs into the chassis.
The DVD drive is oriented with the tab at the right front.

4. Slide the DVD drive into the chassis.



5. Press on the right side of the DVD drive to firmly seat it into the slot.

6. Push the tab in under the DVD drive.



7. Consider your next step.

- If you installed the DVD drive as part of a replacement operation, go to [Step 8](#).
- If you installed the DVD drive as part of another component's removal or installation procedure, return to that procedure. See "[Component Service Task Reference](#)" on page 67 for assistance.

8. Install the drive that you removed previously.

See "[Install a Drive](#)" on page 107.

9. Install the filter.

See “Install the Filter” on page 99.

10. Finish the installation procedure.

See “Returning the Server to Operation” on page 255.

Related Information

- “Remove the DVD Drive” on page 111
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

Servicing Power Supplies

The power supplies convert AC or DC facility power to 3.3 VDC and 12 VDC for use in the server chassis. The power supplies are configured for redundancy and are stacked at the rear left of the chassis. See [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2.

Description	Links
Replace a faulty power supply.	“Locate a Faulty Power Supply” on page 118 “Power Supply LEDs” on page 118 “Remove a Power Supply” on page 121 “Install a Power Supply” on page 122 “Verify a Power Supply” on page 124
Remove a power supply as part of another component’s service operation.	“Remove a Power Supply” on page 121
Install a power supply as part of another component’s service operation.	“Install a Power Supply” on page 122
Add additional power supplies.	“Install a Power Supply” on page 122 “Verify a Power Supply” on page 124
Decrease the number of existing power supplies.	“Remove a Power Supply” on page 121
Identify a faulty power supply.	“Power Supply LEDs” on page 118 “Locate a Faulty Power Supply” on page 118 “Detecting and Managing Faults” on page 9

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63

- [“Returning the Server to Operation” on page 255](#)

Power Supply LEDs

The status of each power supply is represented by the same three LEDs. The LEDs are located to the left of the fan of each power supply. See [“Rear Panel LEDs” on page 22](#). This table describes the functionality of the power supply LEDs.

Icon	Location	Name	Color	State and Meaning
	Top	OK	Green	On – Power supply is functional without fault. Off – Power supply is off or initializing. Flashing – No function.
	Middle	Attention Service Required	Amber	On – Normal fault detected. Off – No faults detected. Flashing – No function.
	Bottom	AC or DC	Green	On – Input power present and good. Off – Input power not present. Flashing – No function.

Related Information

- [“Locate a Faulty Power Supply” on page 118](#)
- [“Remove a Power Supply” on page 121](#)
- [“Front Panel LEDs” on page 20](#) [“Rear Panel LEDs” on page 22](#)

▼ Locate a Faulty Power Supply

You must determine which power supply is faulty before you replace it.

1. **Check to see if any System Service Required LEDs are lit or flashing.**
See [“Interpreting Diagnostic LEDs” on page 19](#).

2. Visually inspect the power supplies to see if any of their status LEDs are lit or flashing.
See [“Power Supply LEDs”](#) on page 118.
If a power supply is faulty, replace it. See [“Remove a Power Supply”](#) on page 121.
3. In Oracle ILOM, check the health of the power system.

```
-> show /System/Power  
/System/Power  
Targets:  
Properties:  
    health = OK  
    health_details = -  
.br/>.br/>.br/>->
```

If the `health_details` property identifies a faulty power supply, replace it. See [“Remove a Power Supply”](#) on page 121.

4. Check the health of the individual power supplies.

```
-> show /System/Power/Power_Supplies/Power_Supply_x  
//System/Power/Power_Supplies/Power_Supply_0  
Targets:  
Properties:  
    health = OK  
    health_details = -  
.br/>.br/>.br/>->
```

where `x` is the number of the power supply, either 0 (lower power supply) or 1 (upper power supply).

If the `health_details` property identifies the power supply as faulty, replace it. See [“Remove a Power Supply”](#) on page 121.

5. Verify that a power supply is faulty.

If a power supply is faulty, you will see /SYS/PSx under the Value heading, where x is 0 (lower power supply) or 1 (upper power supply).

For example:

```
-> show faulty
Target          | Property          | Value
-----+-----+-----
/SP/faultmgmt/0 | fru              | /SYS/PS0
.
.
.
->
```

If a power supply is faulty, replace it. See [“Remove a Power Supply” on page 121](#).

If a FRU value different from /SYS/PSx is displayed, see [“Component Service Task Reference” on page 67](#) to identify which component is faulty.

6. Use the Oracle ILOM faultmgmt shell to identify the faulty component.

See [“Display Faults \(faultmgmt Shell\)” on page 39](#).

Check the Fault class and Description fields for more information.

If a power supply is faulty, replace it. See [“Remove a Power Supply” on page 121](#).

7. Within the Oracle ILOM interface, verify the voltage output.

```
-> show /SYS/PSx/V_12V value
/SYS/PS0/V_12V
  Properties:
    value = 12.027 Volts
->
```

where x is 0 (lower power supply) or 1 (upper power supply).

If the power supply is faulty, replace it. See [“Remove a Power Supply” on page 121](#).

8. If you are unable to determine if a power supply is faulty, seek further information.

See [“Detecting and Managing Faults” on page 9](#).

Related Information

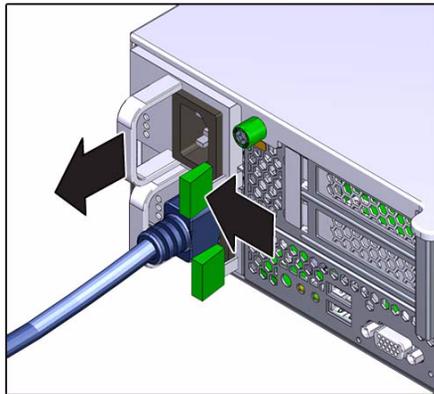
- [“Remove a Power Supply” on page 121](#)
- [“Power Supply LEDs” on page 118](#)
- [“Verify a Power Supply” on page 124](#)

- [“Detecting and Managing Faults” on page 9](#)

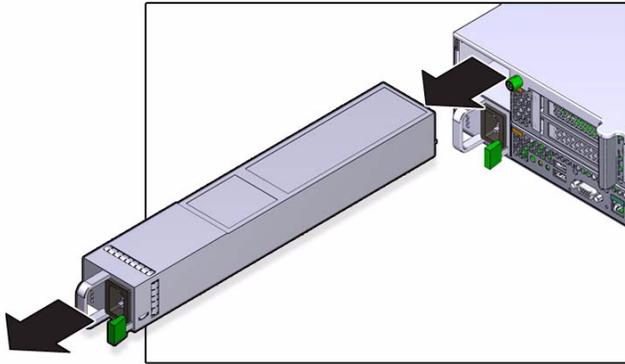
▼ Remove a Power Supply

Removing a power supply is a hot-swap operation. You do not need to power off the server before you remove the power supply.

1. **Determine which power supply to remove.**
See [“Locate a Faulty Power Supply” on page 118](#).
2. **Consider your next step.**
 - If you have not prepared for service, do so now. See [“Preparing for Service” on page 63](#).
 - If you are removing a power supply as part of another component’s removal or installation procedure, go to [Step 3](#).
3. **Disconnect the power cord from the power supply.**
See [“Disconnect Power Cords” on page 72](#).
4. **Press the release tab to the left and pull on the handle.**



5. **Continue to pull on the handle to slide the power supply out of the chassis.**



6. Set the power supply aside.

7. Consider your next step.

- If you removed a power supply as part of a replacement operation, install a new power supply. See [“Install a Power Supply” on page 122](#).
- If you removed a power supply as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference” on page 67](#) for assistance.

Related Information

- [“Locate a Faulty Power Supply” on page 118](#)
- [“Install a Power Supply” on page 122](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

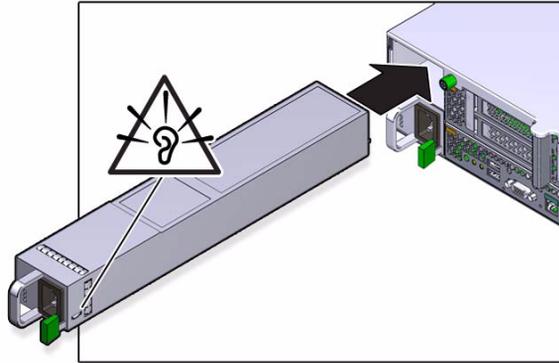
▼ Install a Power Supply

Installing a power supply is a hot-swap operation. You do not need to power off the server before installing the power supply.

1. Consider your first step.

- If you are replacing a power supply, remove the faulty or obsolete power supply first, then return to this procedure, [Step 2](#). See [“Remove a Power Supply” on page 121](#).
- If you are installing a power supply as part of another component’s removal or installation procedure, go to [Step 2](#).

2. **Align the power supply to the location where it installs into the chassis.**
The PDB connector is toward the chassis, and the release tab is on the right.
3. **Slide the power supply into the chassis until the power supply seats and the release tab clicks.**



4. **Attach the power cord.**
See [“Connect Power Cords”](#) on page 265.
5. **Consider your next step.**
 - If you installed a power supply as part of a replacement operation, go to [Step 6](#).
 - If you installed a power supply as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.
 - If you have installed a new power supply, go to [Step 6](#).
6. **Complete these postrequisites in this order to finish the installation procedure.**
 - [“Returning the Server to Operation”](#) on page 255
 - [“Verify a Power Supply”](#) on page 124

Related Information

- [“Remove a Power Supply”](#) on page 121
- [“Verify a Power Supply”](#) on page 124
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Verify a Power Supply

After you install a power supply, you can verify its functionality.

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)”](#) on page 17.

2. Reset the power supply.

```
-> set /SYS/PSx clear_fault_action=true
Are you sure you want to clear /SYS/PS0 (y/n)? y
Set 'clear_fault_action' to 'true'

->
```

where x is 0 (lower power supply) or 1 (upper power supply).

3. Verify that the power supply is no longer considered faulty, then return to this procedure.

See [“Locate a Faulty Power Supply”](#) on page 118.

4. Verify the voltage output.

```
-> show /SYS/PSx/V_12V value
/SYS/PS0/V_12V
Properties:
  value = 12.027 Volts

->
```

where x is 0 (lower power supply) or 1 (upper power supply).

Related Information

- [“Install a Power Supply”](#) on page 122
- [“Power Supply LEDs”](#) on page 118
- [“Locate a Faulty Power Supply”](#) on page 118

Servicing Fan Modules

Fan modules are composed of redundant fan elements. This redundancy enables the fan module to continuously supply air flow, even if one fan element fails. The five fan modules are located at the midsection of the chassis, behind the air duct. See [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2.

Description	Links
Replace a faulty fan module.	“Locate a Faulty Fan Module” on page 126 “Fan Module LEDs” on page 126 “Remove a Fan Module” on page 128 “Install a Fan Module” on page 129 “Verify a Fan Module” on page 131
Remove a fan module as part of another component’s service operation.	“Remove a Fan Module” on page 128
Install a fan module as part of another component’s service operation.	“Install a Fan Module” on page 129
Add additional fan modules.	“Install a Fan Module” on page 129 “Verify a Fan Module” on page 131
Decrease the number of existing fan modules.	“Remove a Fan Module” on page 128
Identify a faulty fan module.	“Fan Module LEDs” on page 126 “Locate a Faulty Fan Module” on page 126 “Detecting and Managing Faults” on page 9

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63

- [“Returning the Server to Operation” on page 255](#)

Fan Module LEDs

The status of each fan module is represented by a single bi-color LED. The LEDs are located on the motherboard near each fan module, and are visible from the rear panel, by looking through the grille below the risers. See [“Rear Panel Components \(Service\)” on page 7](#).

The color of the status LED indicates:

- **Green** – The fan module is functional without fault.
- **Amber** – The fan module has experienced a fault.

Note – There are two LEDs near the status LED for fan module 3. Do not confuse the FPGA Good and FPGA Diagnostic LEDs with the status LED for fan module 3.

Related Information

- [“Locate a Faulty Fan Module” on page 126](#)
- [“Remove a Fan Module” on page 128](#)
- [“Front Panel LEDs” on page 20](#) [“Rear Panel LEDs” on page 22](#)

▼ Locate a Faulty Fan Module

You must determine which fan module is faulty before you replace it.

1. **Check to see if any System Service Required LEDs are lit or flashing.**
See [“Interpreting Diagnostic LEDs” on page 19](#).

2. In Oracle ILOM, check the health of the cooling system.

```
-> show /System/Cooling
/System/Cooling
Targets:
Properties:
    health = OK
    health_details = -
.
.
.
->
```

If the `health_details` property identifies a faulty fan module, replace it. See [“Remove a Fan Module” on page 128](#).

3. Verify that a fan module is faulty.

If a fan module is faulty, you will see `/SYS/MB/FMx` under the `Value` heading where `x` is 0 to 4.

For example:

```
-> show faulty
Target          | Property          | Value
-----+-----+-----
/SP/faultmgmt/0 | fru              | /SYS/MB/FM0
.
.
.
->
```

If a fan module is faulty, replace it. See [“Remove a Fan Module” on page 128](#).

If a FRU value different from `/SYS/MB/FMx` is displayed, see [“Component Service Task Reference” on page 67](#) to identify which component is faulty.

4. Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.

See [“Display Faults \(faultmgmt Shell\)” on page 39](#).

Check the `Fault class` and `Description` fields for more information.

If a fan module is faulty, replace it. See [“Remove a Fan Module” on page 128](#).

5. Within the Oracle ILOM interface, verify the fan module speeds.

```
-> show /SYS/MB/FMx/Fy/TACH value
/SYS/MB/FM0/F0/TACH
Properties:
value = 3100.000 RPM
->
```

where:

- x is the fan module, 0 (left fan module) to 4 (right fan module).
- y is the fan element, 0 (primary) or 1 (secondary).

If a fan module is faulty, replace it. See [“Remove a Fan Module”](#) on page 128.

6. If you are unable to determine if a fan module is faulty, seek further information.

See [“Detecting and Managing Faults”](#) on page 9.

Related Information

- [“Remove a Fan Module”](#) on page 128
- [“Fan Module LEDs”](#) on page 126
- [“Verify a Fan Module”](#) on page 131
- [“Detecting and Managing Faults”](#) on page 9

▼ Remove a Fan Module

Removing a fan module is a cold-service operation. You must power off the server before you remove the fan module.

1. Determine which fan module to remove.

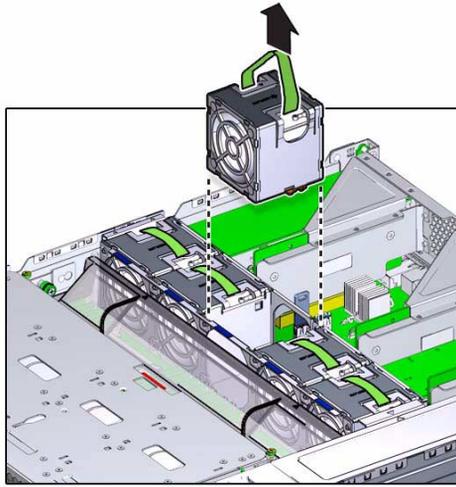
See [“Locate a Faulty Fan Module”](#) on page 126.

2. Consider your next step.

- If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.
- If you are removing a fan module as part of another component’s removal or installation procedure, go to [Step 3](#).

3. Grasp the green band of the fan module to be removed with your forefinger and press down on the fan module with your thumb.

4. Pull the band straight up and lift the fan module out of the chassis.



5. Set the fan module aside.
6. Repeat from [Step 3](#) for any additional fan modules to be removed.
7. Consider your next step.
 - If you removed a fan module as part of a replacement operation, install a new fan module. See [“Install a Fan Module”](#) on page 129.
 - If you removed a fan module as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.

Related Information

- [“Locate a Faulty Fan Module”](#) on page 126
- [“Install a Fan Module”](#) on page 129
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Install a Fan Module

Installing a fan module is a cold-service operation. You must power off the server before installing the fan module.

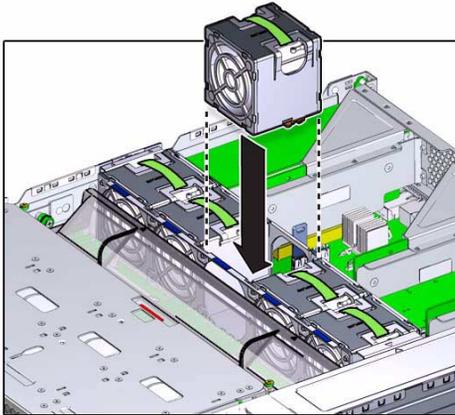
1. Consider your first step.

- If you are replacing a fan module, remove the faulty or obsolete fan module first, then return to this procedure, [Step 2](#). See [“Remove a Fan Module” on page 128](#).
- If you are installing a fan module as part of another component’s removal or installation procedure, go to [Step 2](#).

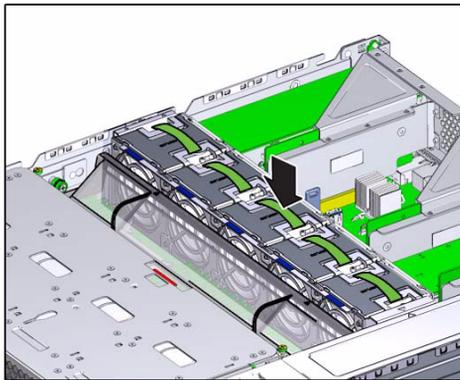
2. Align the fan module to the location where it installs into the fan tray.

The green band is on the top of the fan module and the arrow points to the rear of the chassis.

3. Lower the fan module into the fan tray.



4. Press the fan module down until it clicks securely in the fan tray.



5. Repeat from [Step 2](#) through [Step 4](#) for any additional fan modules that you are installing.

6. Consider your next step.

- If you installed a fan module as part of a replacement operation, go to [Step 7](#).

- If you installed a fan module as part of another component's removal or installation procedure, return to that procedure. See ["Component Service Task Reference"](#) on page 67 for assistance.
7. **Complete these prerequisites in this order to finish the installation procedure.**
- ["Returning the Server to Operation"](#) on page 255
 - ["Verify a Fan Module"](#) on page 131

Related Information

- ["Remove a Fan Module"](#) on page 128
- ["Verify a Fan Module"](#) on page 131
- ["Preparing for Service"](#) on page 63
- ["Returning the Server to Operation"](#) on page 255

▼ Verify a Fan Module

After you install a fan module, you can verify its functionality.

1. Access Oracle ILOM.

See ["Access the SP \(Oracle ILOM\)"](#) on page 17.

2. Reset the fan module.

```
-> set /SYS/MB/FM $x$  clear_fault_action=true
Are you sure you want to clear /SYS/MB/FM0 (y/n)? y
Set 'clear_fault_action' to 'true'

->
```

where x is the fan module, 0 (left fan module) to 4 (right fan module).

3. Verify that the fan module is no longer considered faulty, then return to this procedure.

See ["Locate a Faulty Fan Module"](#) on page 126.

4. Verify the fan module speeds.

```
-> show /SYS/MB/FMx/Fy/TACH value  
/SYS/MB/FM0/F0/TACH  
Properties:  
value = 3100.000 RPM  
->
```

where:

- x is the fan module, 0 (left fan module) to 4 (right fan module).
- y is the fan element, 0 (primary) or 1 (secondary).

Related Information

- [“Install a Fan Module” on page 129](#)
- [“Fan Module LEDs” on page 126](#)
- [“Locate a Faulty Fan Module” on page 126](#)

Servicing Risers

Three risers each host two PCIe3 slots. The risers are located at the rear of the chassis. See [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4.

Description	Links
Replace a faulty riser.	“Riser Configuration” on page 134 “Locate a Faulty Riser” on page 134 “Remove a Riser” on page 136 “Install a Riser” on page 138 “Verify a Riser” on page 141
Remove a riser as part of another component’s service operation.	“Remove a Riser” on page 136
Install a riser as part of another component’s service operation.	“Install a Riser” on page 138
Add additional risers.	“Riser Configuration” on page 134 “Install a Riser” on page 138 “Verify a Riser” on page 141
Decrease the number of existing risers.	“Remove a Riser” on page 136
Identify a faulty riser.	“Locate a Faulty Riser” on page 134 “Detecting and Managing Faults” on page 9

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

Riser Configuration

The three risers are labeled Riser 1, Riser 2 and Riser 3. Though similar, the risers are not interchangeable. Riser 1 installs at the left rear of the chassis, Riser 2 at the center rear, and Riser 3 at the right rear of the chassis. See [“Rear Panel Components \(Service\)”](#) on page 7 and [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4.

Each riser can accommodate two PCIe3 x8 cards:

- Riser 1 contains slots 1 and 4.
- Riser 2 contains slots 2 and 5.
- Riser 3 contains slots 3 and 6.

By design, the risers are mechanically dependent upon each other. Even if there are no PCIe3 cards installed, all risers must be installed.

Related Information

- [“Install a Riser”](#) on page 138
- [“Locate a Faulty Riser”](#) on page 134

▼ Locate a Faulty Riser

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

1. **Check to see if any System Service Required LEDs are lit or flashing.**

See [“Interpreting Diagnostic LEDs”](#) on page 19.

2. In Oracle ILOM, verify that a riser is faulty.

If a riser is faulty, you will see `/SYS/MB/RISERx` under the `Value` heading, where `x` is 1 to 3.

For example:

```
-> show faulty
Target          | Property          | Value
-----+-----+-----
/SP/faultmgmt/0 | fru               | /SYS/MB/RISER1
.
.
.
->
```

If a riser is faulty, replace it. See [“Remove a Riser” on page 136](#).

If a FRU value different from `/SYS/MB/RISERx` is displayed, see [“Component Service Task Reference” on page 67](#) to identify which component is faulty.

3. Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.

See [“Display Faults \(faultmgmt Shell\)” on page 39](#).

Check the `Fault class` and `Description` fields for more information.

If a riser is faulty, replace it. See [“Remove a Riser” on page 136](#).

4. If you are unable to determine if a riser is faulty, seek further information.

See [“Detecting and Managing Faults” on page 9](#).

Related Information

- [“Remove a Riser” on page 136](#)
- [“Riser Configuration” on page 134](#)
- [“Verify a Riser” on page 141](#)
- [“Detecting and Managing Faults” on page 9](#)

▼ Remove a Riser

Removing a riser is a cold-service operation. You must power off the server before you remove the riser.

1. Determine which riser to remove.

See [“Locate a Faulty Riser”](#) on page 134.

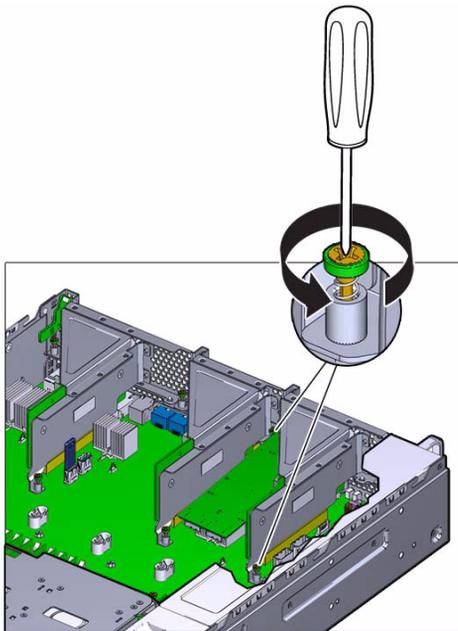
2. Consider your next step.

- If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.
- If you are removing a riser as part of another component’s removal or installation procedure, go to [Step 3](#).

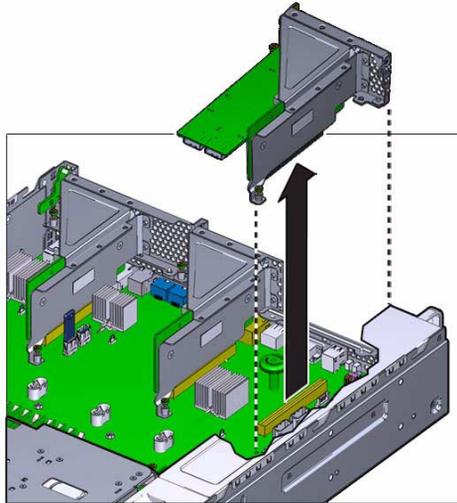
3. Disconnect any external cables attached to any PCIe3 cards installed in the riser.

Note – Also disconnect any internal cables attached to the PCIe3 cards, if that will ease removing the PCIe3 card.

4. Fully loosen the two captive screws securing the riser to the motherboard.



5. Lift the riser straight up and out of its socket on the motherboard.



6. If you have not already done so, disconnect any internal cables attached to the PCIe3 cards installed in the riser.

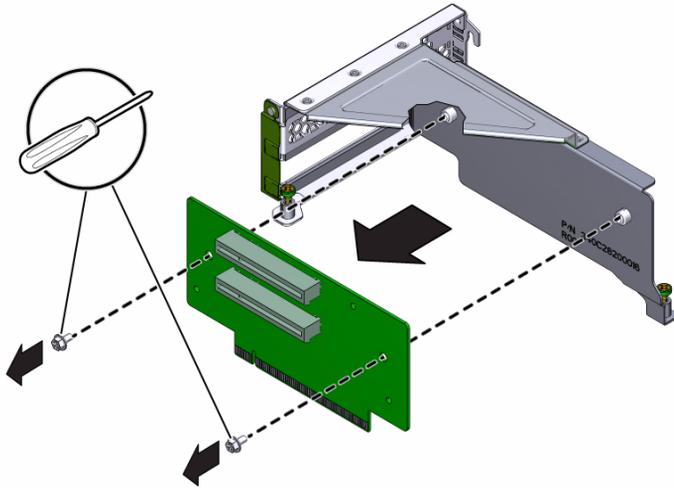
7. Consider your next step.

- If you removed a riser as part of a riser printed circuit board replacement operation, continue to [Step 8](#).
- If you removed a riser as part of another component's removal or installation procedure, return to that procedure. See "[Component Service Task Reference](#)" on [page 67](#) for assistance.

8. Remove any installed PCIe3 cards from the riser.

See "[Remove a PCIe3 Card \(Risers 1 and 2\)](#)" on [page 146](#) or "[Remove a PCIe3 Card \(Riser 3\)](#)" on [page 148](#).

9. Remove the two screws securing the printed circuit board to the riser bracket.



10. Lift the printed circuit board out of the riser bracket and set the board aside.

11. Repeat from [Step 3](#) for any additional risers to be removed.

12. Install the new riser.

See “[Install a Riser](#)” on page 138.

Related Information

- “[Locate a Faulty Riser](#)” on page 134
- “[Install a Riser](#)” on page 138
- “[Preparing for Service](#)” on page 63
- “[Returning the Server to Operation](#)” on page 255

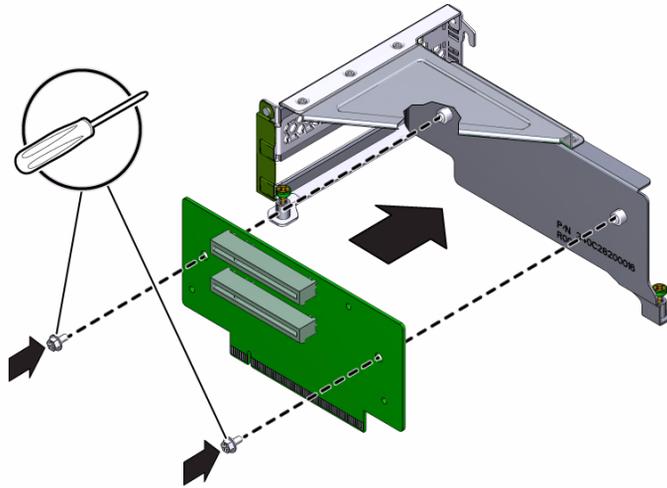
▼ Install a Riser

Installing a riser is a cold-service operation. You must power off the server before installing the riser.

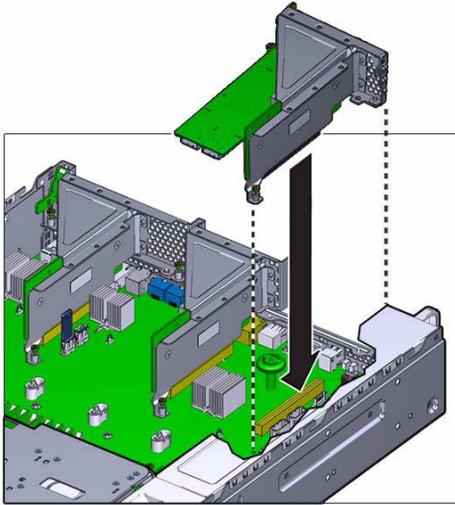
1. Consider your first step.

- If you are replacing a riser, remove the faulty or obsolete riser first, then return to this procedure, [Step 4](#). See “[Remove a Riser](#)” on page 136.
- If you are installing a riser as part of another component’s removal or installation procedure, go to [Step 5](#).

2. Position the printed circuit board to the location where it installs into the riser bracket.

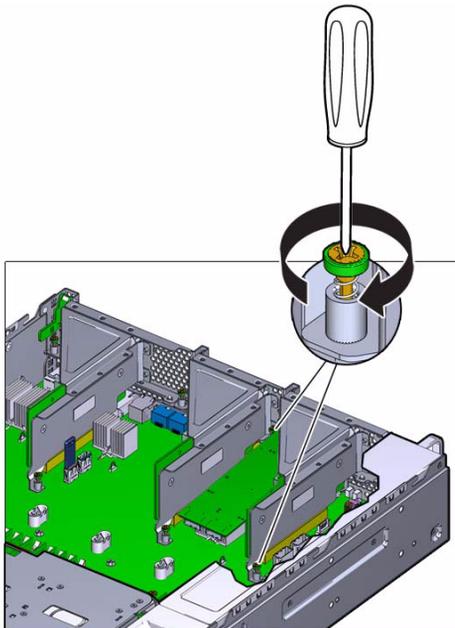


3. Install and tighten the two screws securing the board to the riser bracket.
4. If any PCIe3 card was previously removed from the riser, install it.
See "Install a PCIe3 Card (Risers 1 and 2)" on page 151 or "Install a PCIe3 Card (Riser 3)" on page 153.
5. Align the riser to the location where it installs into the chassis.
6. Reconnect any previously removed internal cables to any PCIe3 cards installed in the riser, if doing so will ease installation of the riser.
7. Lower the riser card onto the motherboard and press the card edge connector securely into the socket.



The bracket of the riser overlaps the bracket of the adjacent riser.

8. Tighten the two captive screws.



9. Reconnect any previously removed internal or external cables to any PCIe3 cards installed in the riser.

10. Repeat from [Step 2](#) through [Step 9](#) for any additional risers that you are installing.

11. Consider your next step.

- If you installed a riser as part of a replacement operation, go to [Step 12](#).
- If you installed a riser as part of another component's removal or installation procedure, return to that procedure. See ["Component Service Task Reference" on page 67](#) for assistance.

12. Complete these prerequisites in this order to finish the installation procedure.

- ["Returning the Server to Operation" on page 255](#)
- ["Verify a Riser" on page 141](#)

Related Information

- ["Remove a Riser" on page 136](#)
- ["Verify a Riser" on page 141](#)
- ["Riser Configuration" on page 134](#)
- ["Preparing for Service" on page 63](#)
- ["Returning the Server to Operation" on page 255](#)

▼ Verify a Riser

After you install a riser, you can verify its functionality.

1. Access Oracle ILOM.

See ["Access the SP \(Oracle ILOM\)" on page 17](#).

2. Reset the riser.

```
-> set /SYS/MB/RISERx clear_fault_action=true
Are you sure you want to clear /SYS/MB/RISER1 (y/n)? y
Set 'clear_fault_action' to 'true'

->
```

where *x* is 1 to 3.

3. Verify that the riser is no longer considered faulty, then return to this procedure.

See ["Locate a Faulty Riser" on page 134](#).

4. Verify that the riser is recognized.

```
-> show /SYS/MB
/SYS/MB
Targets:
  BIOS
  NET0
  NET1
.
.
.
  T_OUT_ZONE2
  RISER1
  RISER2
  RISER3
.
.
.
->
```

Related Information

- [“Install a Riser” on page 138](#)
- [“Riser Configuration” on page 134](#)
- [“Locate a Faulty Riser” on page 134](#)

Servicing PCIe3 Cards

PCIe3 cards provide additional I/O or other functionality. The Sun Storage 6 Gb SAS PCIe RAID HBA, Internal card installed in slot PCIE1 provides HBAs for the drives. The PCIe3 cards install into the risers and are located across the rear of the chassis. See [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4.

Description	Links
Replace a faulty PCIe3 card.	“PCIe3 Card Configuration” on page 144 “Locate a Faulty PCIe3 Card” on page 144 “Remove a PCIe3 Card (Risers 1 and 2)” on page 146 “Install a PCIe3 Card (Riser 3)” on page 153 “Verify a PCIe3 Card” on page 156
Remove a PCIe3 card as part of another component’s service operation.	“Remove a PCIe3 Card (Risers 1 and 2)” on page 146
Install a PCIe3 card as part of another component’s service operation.	“Install a PCIe3 Card (Riser 3)” on page 153
Add additional PCIe3 cards.	“PCIe3 Card Configuration” on page 144 “Install a PCIe3 Card (Riser 3)” on page 153 “Verify a PCIe3 Card” on page 156
Decrease the number of existing PCIe3 cards.	“Remove a PCIe3 Card (Risers 1 and 2)” on page 146
Identify a faulty PCIe3 card.	“Locate a Faulty PCIe3 Card” on page 144 “Detecting and Managing Faults” on page 9

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63

- [“Returning the Server to Operation” on page 255](#)

PCIe3 Card Configuration

You can install a maximum of six PCIe3 cards into the server. See [“Rear Panel Components \(Service\)” on page 7](#) and [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)” on page 4](#).

These are some guidelines to follow when configuring PCIe3 cards:

- Slot 1, the lower slot of Riser 1 is reserved for the Sun Storage 6 Gb SAS PCIe RAID HBA, Internal card. This is a configuration requirement.
- Riser 2 can accommodate taller PCIe3 cards, but the cards must not interfere with the USB flash drive.
- Use only the PCIe3 filler panels provided with the server to maintain proper airflow and EMI conformance for empty slots.

Related Information

- [“Install a PCIe3 Card \(Riser 3\)” on page 153](#)
- [“Locate a Faulty PCIe3 Card” on page 144](#)

▼ Locate a Faulty PCIe3 Card

You must determine which PCIe3 card is faulty before you replace it.

1. **Check to see if any System Service Required LEDs are lit or flashing.**
See [“Interpreting Diagnostic LEDs” on page 19](#).

2. In Oracle ILOM, verify that a PCIe3 card is recognized.

```
-> show /System/PCI_Devices/Add-on  
/System/PCI_Devices/Add-on  
Targets:  
    Device_x  
    Device_y  
.  
.  
.  
->
```

where *x*, *y*, etc, are the slot numbers where PCIe3 cards are installed.

If a PCIe3 card is not recognized, check its installation. See [“Remove a PCIe3 Card \(Risers 1 and 2\)”](#) on page 146 or [“Remove a PCIe3 Card \(Riser 3\)”](#) on page 148.

3. Verify that a PCIe3 card is identified.

```
-> show /System/PCI_Devices/Add-on/Device_x
```

where *x* is the slot number where the PCIe3 card is installed.

If a PCIe3 card cannot be identified, replace it. See [“Remove a PCIe3 Card \(Risers 1 and 2\)”](#) on page 146 or [“Remove a PCIe3 Card \(Riser 3\)”](#) on page 148

4. Verify that a PCIe3 card is faulty.

If a PCIe3 card is faulty, you will see `/SYS/MB/RISERx/PCIEy` under the `Value` heading where:

- *x* is 1 to 3.

- y is 0 to 1.

For example:

```
-> show faulty
-----+-----+-----
Target          | Property          | Value
-----+-----+-----
/SP/faultmgmt/0 | fru               | /SYS/MB/RISER1/PCIE1
.
.
.
->
```

If a PCIe3 card is faulty, replace it. See “Remove a PCIe3 Card (Risers 1 and 2)” on page 146 or “Remove a PCIe3 Card (Riser 3)” on page 148.

If a FRU value different from `/SYS/MB/RISERx/PCIEy` is displayed, see “Component Service Task Reference” on page 67 to identify which component is faulty.

5. Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.

See “Display Faults (faultmgt Shell)” on page 39.

Check the `Fault class` and `Description` fields for more information.

If a PCIe3 card is faulty, replace it. See “Remove a PCIe3 Card (Risers 1 and 2)” on page 146 or “Remove a PCIe3 Card (Riser 3)” on page 148.

6. If you are unable to determine if a PCIe3 card is faulty, seek further information.

See “Detecting and Managing Faults” on page 9.

Related Information

- “Remove a PCIe3 Card (Risers 1 and 2)” on page 146
- “PCIe3 Card Configuration” on page 144
- “Verify a PCIe3 Card” on page 156
- “Detecting and Managing Faults” on page 9

▼ Remove a PCIe3 Card (Risers 1 and 2)

Removing a PCIe3 card is a cold-service operation. You must power off the server before you remove the PCIe3 card.

Note – This procedure is the same for removing a filler panel.

1. Determine which PCIe3 card to remove.

See “Locate a Faulty PCIe3 Card” on page 144.

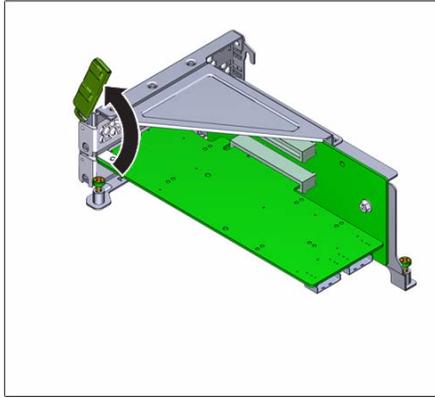
2. Consider your next step.

- If you have not prepared for service, do so now. See “Preparing for Service” on page 63.
- If you are removing a PCIe3 card as part of another component’s removal or installation procedure, go to [Step 3](#).

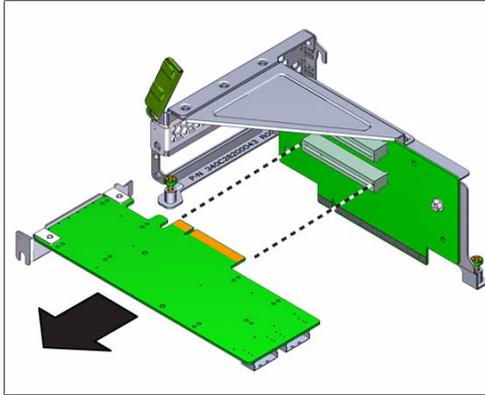
3. Remove the riser which has the PCIe3 card to be removed.

See “Remove a Riser” on page 136.

4. Swing the retainer to its fully open (120 degrees) position.



5. Lift the PCIe3 card off of the bracket alignment pin and out of the socket.



6. Set the PCIe3 card aside.
7. Repeat from [Step 5](#) to [Step 6](#) for any additional PCIe3 card to be removed from this riser.
8. Repeat from [Step 3](#) to [Step 7](#) for any additional PCIe3 cards to be removed.
9. Consider your next step.
 - If you removed a PCIe3 card as part of a replacement operation, install a new PCIe3 card. See [“Install a PCIe3 Card \(Risiers 1 and 2\)”](#) on page 151.
 - If you removed a PCIe3 card as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.
 - If you are not replacing the PCIe3 card, install a filler panel. See [“Install a PCIe3 Card \(Risiers 1 and 2\)”](#) on page 151.

Related Information

- [“Locate a Faulty PCIe3 Card”](#) on page 144
- [“Install a PCIe3 Card \(Riser 3\)”](#) on page 153
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Remove a PCIe3 Card (Riser 3)

Removing a PCIe3 card is a cold-service operation. You must power off the server before you remove the PCIe3 card.

Note – This procedure is the same for removing a filler panel.

1. Determine which PCIe3 card to remove.

See “Locate a Faulty PCIe3 Card” on page 144.

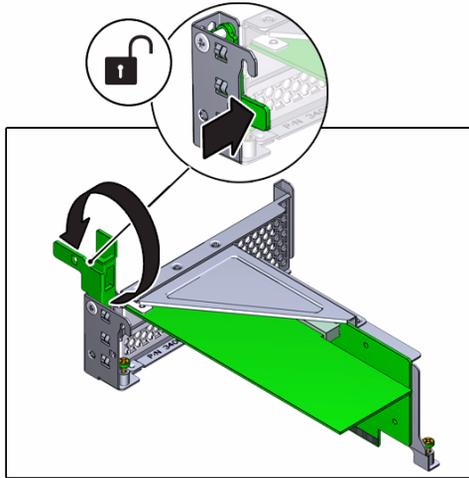
2. Consider your next step.

- If you have not prepared for service, do so now. See “Preparing for Service” on page 63.
- If you are removing a PCIe3 card as part of another component’s removal or installation procedure, go to [Step 3](#).

3. Remove Riser 3.

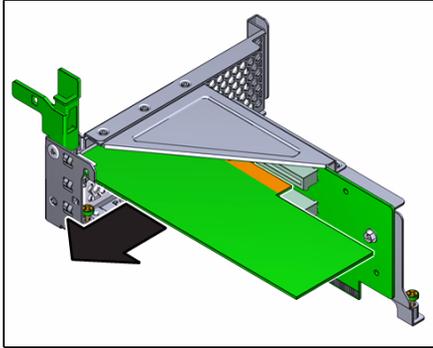
See “Remove a Riser” on page 136.

4. Press the green tab and rotate the tab up and out of the riser bracket.

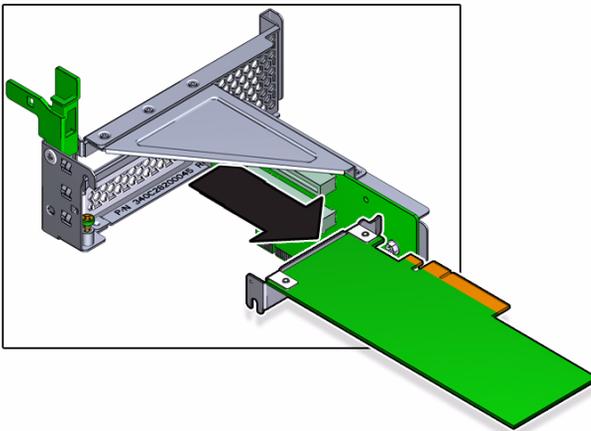


5. Continue to rotate the tab a full 180 degrees.

6. Lift the PCIe3 card off of the bracket alignment pin and out of the socket.



7. Move the PCIe3 card sideways out of the riser and lift the PCIe3 card away from the riser.



8. Set the PCIe3 card aside.
9. Repeat from [Step 5](#) for any additional PCIe3 card to be removed.
10. Consider your next step.
 - If you removed a PCIe3 card as part of a replacement operation, install a new PCIe3 card. See [“Install a PCIe3 Card \(Riser 3\)”](#) on page 153.
 - If you removed a PCIe3 card as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.
 - If you are not replacing the PCIe3 card, install a filler panel. See [“Install a PCIe3 Card \(Riser 3\)”](#) on page 153.
11. Install Riser 3.
See [“Install a Riser”](#) on page 138.

12. Finish the removal procedure.

See “Returning the Server to Operation” on page 255.

Related Information

- “Locate a Faulty PCIe3 Card” on page 144
- “Install a PCIe3 Card (Riser 3)” on page 153
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

▼ Install a PCIe3 Card (Risiers 1 and 2)

Installing a PCIe3 card is a cold-service operation. You must power off the server before installing the PCIe3 card.

Note – This procedure is the same for installing a filler panel.

1. Consider your first step.

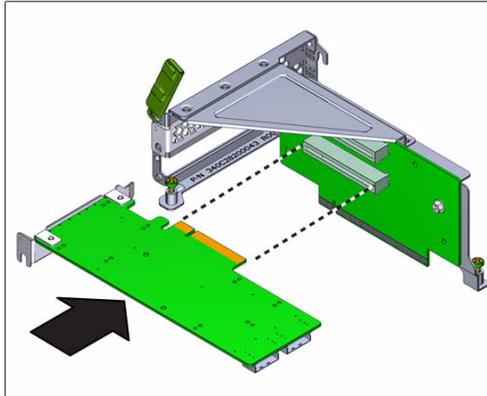
- If you are replacing a PCIe3 card, remove the faulty or obsolete PCIe3 card first, then return to this procedure, [Step 3](#). See “Remove a PCIe3 Card (Risiers 1 and 2)” on page 146.
- If you are installing a new or an additional PCIe3 card, go to [Step 2](#).
- If you are installing a PCIe3 card as part of another component’s removal or installation procedure, go to [Step 3](#).

2. Review this information and complete these prerequisites in this order.

- “PCIe3 Card Configuration” on page 144
 - “Preparing for Service” on page 63
 - “Remove a Riser” on page 136
 - “Remove a PCIe3 Card (Risiers 1 and 2)” on page 146
- Remove filler panel.

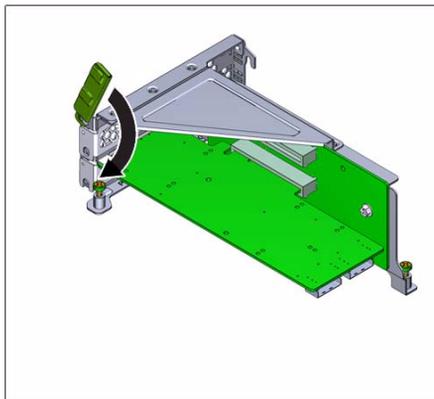
3. Swing the retainer to its fully open (120 degrees) position.

4. Position the PCIe3 card with where it will install into the riser.



The PCIe3 card bracket mates with the alignment pin and the socket of the riser.

5. Press the PCIe3 card into the socket.
6. Repeat [Step 4](#) and [Step 5](#) for any additional PCIe3 card for this riser.
7. Swing the retainer to its fully closed position.



If there is resistance, check the alignment of the PCIe3 card bracket and try again.

8. Repeat from [Step 3](#) through [Step 7](#) for any additional PCIe3 cards that you are installing in the other riser.
9. Consider your next step.
 - If you installed a PCIe3 card as part of a replacement operation, go to [Step 10](#).
 - If you installed a PCIe3 card as part of another component's removal or installation procedure, return to that procedure. See "[Component Service Task Reference](#)" on page 67 for assistance.
 - If you installed a new PCIe3 card or filler panel, go to [Step 10](#).

10. Install the riser.

See “Install a Riser” on page 138.

11. Complete these prerequisites in this order to finish the installation procedure.

- “Returning the Server to Operation” on page 255
- “Verify a PCIe3 Card” on page 156

Related Information

- “Remove a PCIe3 Card (Risiers 1 and 2)” on page 146
- “Verify a PCIe3 Card” on page 156
- “PCIe3 Card Configuration” on page 144
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

▼ Install a PCIe3 Card (Riser 3)

Installing a PCIe3 card is a cold-service operation. You must power off the server before installing the PCIe3 card.

Note – This procedure is the same for installing a filler panel.

1. Consider your first step.

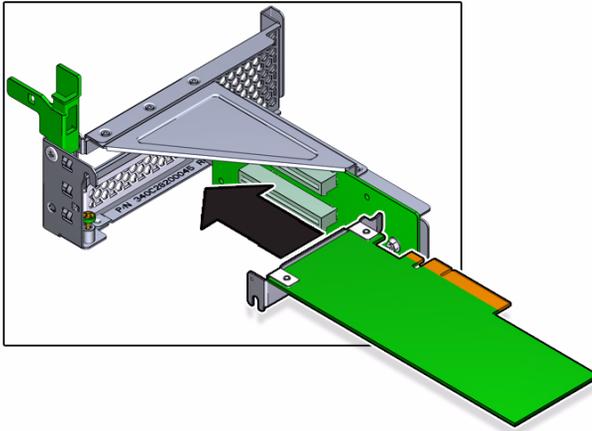
- If you are replacing a PCIe3 card, remove the faulty or obsolete PCIe3 card first, then return to this procedure, [Step 3](#). See “Remove a PCIe3 Card (Risiers 1 and 2)” on page 146.
- If you are installing a new or an additional PCIe3 card, go to [Step 2](#).
- If you are installing a PCIe3 card as part of another component’s removal or installation procedure, go to [Step 3](#).

2. Review this information and complete these prerequisites in this order.

- “PCIe3 Card Configuration” on page 144
 - “Preparing for Service” on page 63
 - “Remove a Riser” on page 136
 - “Remove a PCIe3 Card (Riser 3)” on page 148
- Remove filler panel.

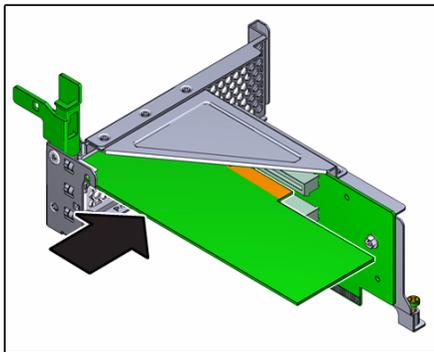
3. Press the green tab and rotate the tab up and out of the riser bracket.

4. Continue to rotate the tab a full 180 degrees.
5. Move the PCIe3 card sideways into the riser, positioning the card to where it will install into the riser.

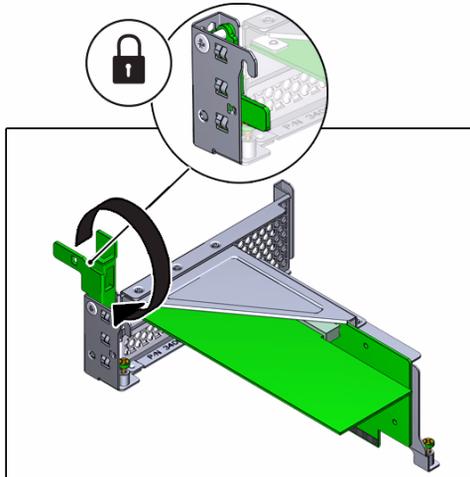


The PCIe3 card bracket mates with the alignment pin and the socket of the riser.

6. Press the PCIe3 card into the socket.



7. Swing the retainer to its fully closed position.



If there is resistance, check the alignment of the PCIe3 card bracket and try again.

8. Repeat from [Step 5](#) through [Step 7](#) for any additional PCIe3 card that you are installing.
9. Consider your next step.
 - If you installed a PCIe3 card as part of a replacement operation, go to [Step 10](#).
 - If you installed a PCIe3 card as part of another component's removal or installation procedure, return to that procedure. See "[Component Service Task Reference](#)" on page 67 for assistance.
 - If you have installed a new PCIe3 card or filler panel, go to [Step 10](#).
10. Install Riser 3.

See "[Install a Riser](#)" on page 138.
11. Complete these prerequisites in this order to finish the installation procedure.
 - "[Returning the Server to Operation](#)" on page 255
 - "[Verify a PCIe3 Card](#)" on page 156

Related Information

- "[Remove a PCIe3 Card \(Risiers 1 and 2\)](#)" on page 146
- "[Verify a PCIe3 Card](#)" on page 156
- "[PCIe3 Card Configuration](#)" on page 144
- "[Preparing for Service](#)" on page 63
- "[Returning the Server to Operation](#)" on page 255

▼ Verify a PCIe3 Card

After you install a PCIe3 card, you can verify its functionality.

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)”](#) on page 17.

2. Reset the PCIe3 card.

```
-> set /SYS/MB/RISERx/PCIEy clear_fault_action=true
Are you sure you want to clear /SYS/MB/RISER1/PCIE1 (y/n)? y
Set 'clear_fault_action' to 'true'

->
```

where:

- x is 1 to 3.
- y is 0 to 1.

3. Consider your next step.

- If you installed a new PCIe3 card as part of a replacement operation, verify that the PCIe3 card is no longer considered faulty, then return to this procedure. See [“Locate a Faulty PCIe3 Card”](#) on page 144.
- If you installed a new PCIe3 card to increase functionality, go to [Step 4](#).

4. Verify that the PCIe3 card is recognized.

```
-> show /System/PCI_Devices/Add-on
/System/PCI_Devices/Add-on
Targets:
  Device_x
  Device_y
.
.
.
->
```

where x , y , etc, are the slot numbers where PCIe3 cards are installed.

If the PCIe3 card is not recognized, check its installation.

5. Verify that the PCIe3 card is identified.

```
-> show /System/PCI_Devices/Add-on/Device_x
```

where x is the slot number where the PCIe3 card is installed.

Related Information

- [“Install a PCIe3 Card \(Riser 3\)” on page 153](#)
- [“PCIe3 Card Configuration” on page 144](#)
- [“Locate a Faulty PCIe3 Card” on page 144](#)

Servicing the Battery

The battery provides continuous backup power for the SP, BIOS, and time-of-day circuits. The battery is located at the rear of the motherboard, under the Sun Storage 6 Gb SAS PCIe RAID HBA, Internal card installed in Riser 1. See [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4.

Description	Links
Replace the faulty battery.	“Remove the Battery” on page 159 “Install the Battery” on page 161
Remove the battery as part of another component’s service operation.	“Remove the Battery” on page 159
Install the battery as part of another component’s service operation.	“Install the Battery” on page 161

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Remove the Battery

Removing the battery is a cold-service operation. You must power off the server before you remove the battery.

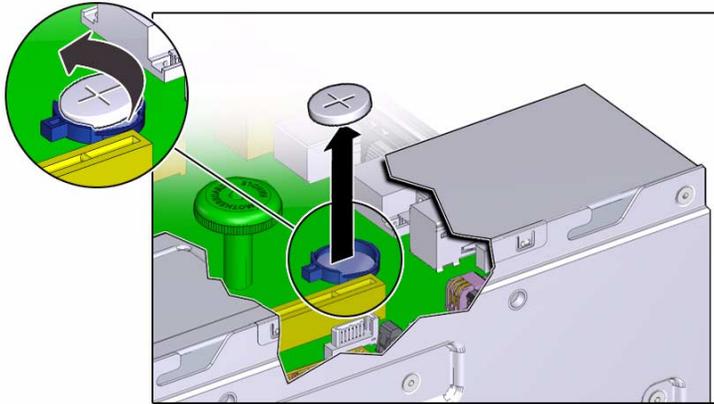
1. **Consider your first step.**

- If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.
- If you are removing the battery as part of another component’s removal or installation procedure, go to [Step 2](#).

2. Remove Riser 1.

See [“Remove a Riser”](#) on page 136.

3. Press the tab of the battery receptacle forward to release the battery.



The battery pops up.

4. Lift the battery out of the receptacle.

5. Set the battery aside.

6. Consider your next step.

- If you removed the battery as part of a replacement operation, install a new battery. See [“Install the Battery”](#) on page 161.
- If you removed the battery as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.

Related Information

- [“Install the Battery”](#) on page 161
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Install the Battery

Installing the battery is a cold-service operation. You must power off the server before installing the battery.

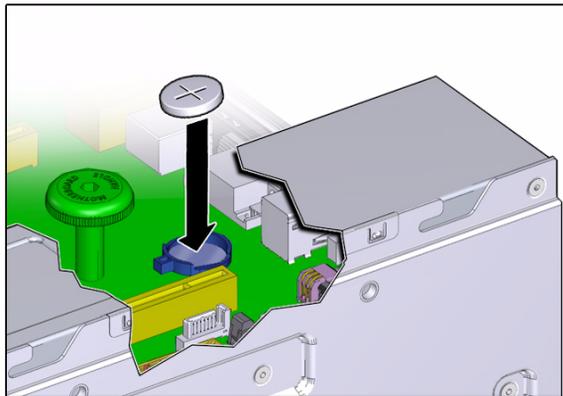
1. Consider your first step.

- If you are replacing the battery, remove the faulty or obsolete battery first, then return to this procedure, [Step 2](#). See [“Remove the Battery”](#) on page 159.
- If you are installing the battery as part of another component’s removal or installation procedure, go to [Step 2](#).

2. Position the battery where it will install into the receptacle.

The positive (+) side of the battery faces up.

3. Press the battery into the receptacle until you hear a click.



4. Consider your next step.

- If you installed the battery as part of a replacement operation, go to [Step 5](#).
- If you installed the battery as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.

5. Install Riser 1.

See [“Install a Riser”](#) on page 138.

6. Finish the installation procedure.

See [“Returning the Server to Operation”](#) on page 255.

Related Information

- [“Remove the Battery” on page 159](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

Servicing the USB Drive

The USB flash drive is a 4GB flash technology device that provides nonvolatile storage of the OSA software application.

The USB flash drive is located in the rear-most USB socket at the center rear of the motherboard, labeled USB 0.

Note – Do not use the USB drive for any purpose other than to support the OSA software application.

Description	Links
Replace the faulty USB flash drive.	“USB Drive LED” on page 164 “Remove the USB Drive” on page 164 “Install the USB Drive” on page 165
Remove the USB flash drive as part of another component’s service operation.	“Remove the USB Drive” on page 164
Install the USB flash drive as part of another component’s service operation.	“Install the USB Drive” on page 165

Related Information

- [“Identifying Components” on page 1](#)
- [“Detecting and Managing Faults” on page 9](#)
- [“Component Service Task Reference” on page 67](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

USB Drive LED

The status of the USB flash drive is represented by an LED located within the construction of the USB drive, and might not have any distinct features. The light emitted by the LED might be visible through the grille of the back panel of the chassis, at the location of Riser 3. See [“Rear Panel Components \(Service\)”](#) on page 7.

The LED of the USB drive flashes to represent read/write activity:

- Rapid flashing identifies read activity.
- Slower, rhythmic flashing identifies write activity.

Related Information

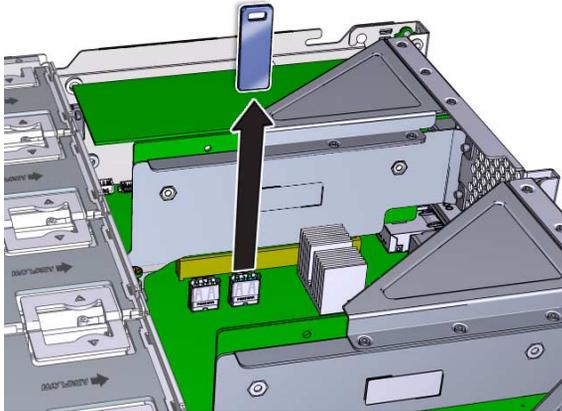
- [“Remove the USB Drive”](#) on page 164
- [“Front Panel LEDs”](#) on page 20
- [“Rear Panel LEDs”](#) on page 22

▼ Remove the USB Drive

Removing the USB flash drive is a cold-service operation. You must power off the server before you remove the USB flash drive.

- 1. Consider your first step.**
 - If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.
 - If you are removing the USB flash drive as part of another component’s removal or installation procedure, go to [Step 2](#).
- 2. If a PCIe3 card installed in Riser 2 prevents you from accessing the USB drive, remove Riser 2.**

See [“Remove a Riser”](#) on page 136.
- 3. Grasp the USB drive and pull it straight up and out of the chassis.**



4. Set the USB drive aside.

5. Consider your next step.

- If you removed the USB drive as part of a replacement operation, install a new USB drive. See [“Install the USB Drive” on page 165](#).
- If you removed the USB drive as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference” on page 67](#) for assistance.
- Otherwise, go to [Step 6](#).

6. If you removed Riser 2 to access the USB drive, install Riser 2.

See [“Install a Riser” on page 138](#).

7. Finish the removal procedure.

See [“Returning the Server to Operation” on page 255](#).

Related Information

- [“Install the USB Drive” on page 165](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

▼ Install the USB Drive

Installing the USB flash drive is a cold-service operation. You must power off the server before installing the USB flash drive.

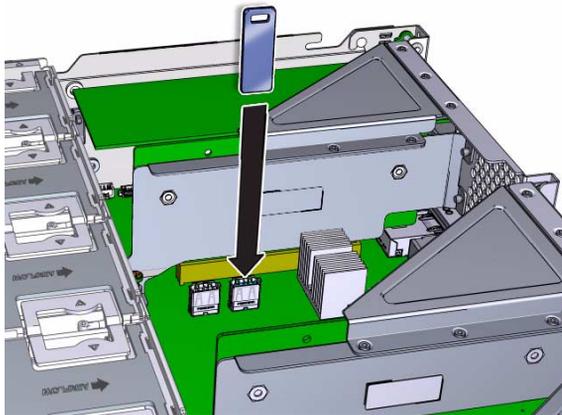
1. Consider your first step.

- If you are replacing the USB flash drive, remove the faulty or obsolete USB flash drive first, then return to this procedure, [Step 2](#). See [“Remove the USB Drive”](#) on page 164.
- If you are installing the USB flash drive as part of another component’s removal or installation procedure, go to [Step 2](#).
- If you are installing a new USB drive, perform these tasks in order to remove components:
 - If a PCIe3 card installed in Riser 2 prevents you from accessing the USB port, remove Riser 2. See [“Remove a Riser”](#) on page 136.
 - Go to [Step 2](#).

2. Position the USB drive to where it installs onto the motherboard.

The USB drive installs into the USB socket that is toward the rear. The socket is labeled USB 0. See [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4.

3. Gently insert the USB drive into the USB socket.



4. Consider your next step.

- If you installed the USB drive as part of a replacement operation, go to [Step 5](#).
- If you installed the USB drive as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.
- If you installed a new USB drive, go to [Step 5](#).

5. If you removed Riser 2 to access the USB drive, install Riser 2.

See [“Install a Riser”](#) on page 138.

6. Finish the installation procedure.

See “Returning the Server to Operation” on page 255.

Related Information

- “Remove the USB Drive” on page 164
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

Servicing Cables

The cables provide a means of delivering power to or conducting signals between hardware components. The cables are routed throughout the chassis. See [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2.

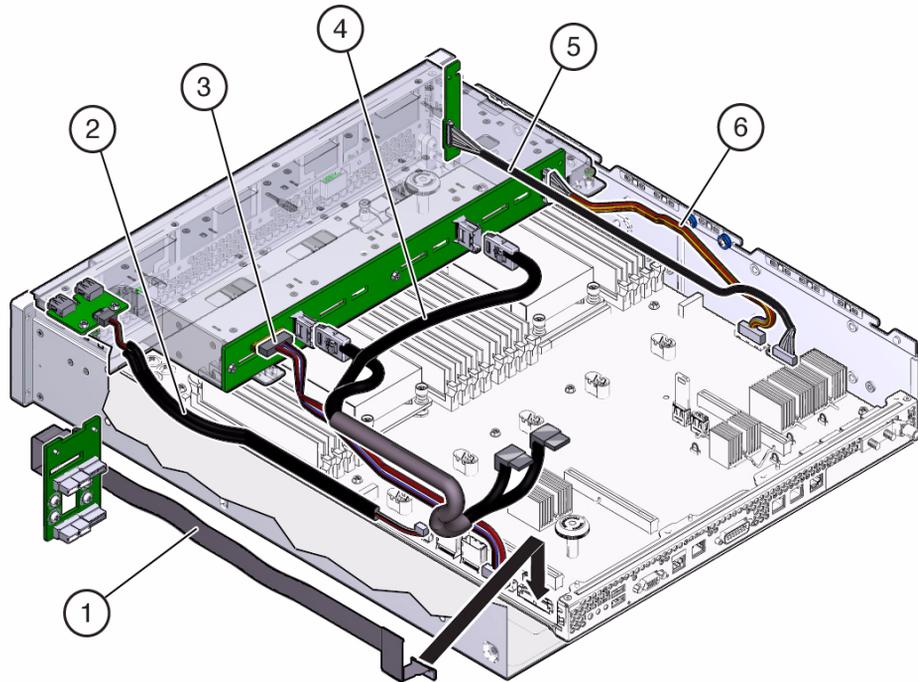
Description	Links
Replace a faulty cable.	“Remove the Drive Signal Cable” on page 171 “Install the Drive Signal Cable” on page 172 “Remove the Drive Power Cable” on page 173 “Install the Drive Power Cable” on page 174 “Remove the DVD SATA Cable” on page 176 “Install the DVD SATA Cable” on page 177 “Remove the PDB Signal Cable” on page 179 “Install the PDB Signal Cable” on page 181
Remove a cable as part of another component’s service operation.	“Remove the Drive Signal Cable” on page 171 “Remove the Drive Power Cable” on page 173 “Remove the DVD SATA Cable” on page 176 “Remove the PDB Signal Cable” on page 179
Install a cable as part of another component’s service operation.	“Install the Drive Signal Cable” on page 172 “Install the Drive Power Cable” on page 174 “Install the DVD SATA Cable” on page 177 “Install the PDB Signal Cable” on page 181

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

Cable Configuration

This illustration identifies cables routed throughout the chassis interior.



No.	Description	Links
1	PDB signal cable	“Remove the PDB Signal Cable” on page 179 “Install the PDB Signal Cable” on page 181
2	USB board cable	“Remove the USB Board” on page 227 “Install the USB Board” on page 231
3	DVD SATA cable	“Remove the DVD SATA Cable” on page 176 “Install the DVD SATA Cable” on page 177
4	Drive signal cable	“Remove the Drive Signal Cable” on page 171 “Install the Drive Signal Cable” on page 172
5	LED board cable	“Remove the LED Board” on page 220 “Install the LED Board” on page 223

No.	Description	Links
6	Drive power cable	“Remove the Drive Power Cable” on page 173 “Install the Drive Power Cable” on page 174

Related Information

- [“Component Locations \(Storage, Power, and Fans\)” on page 2](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

▼ Remove the Drive Signal Cable

Removing a cable is a cold-service operation. You must power off the server before you remove the cable.

1. Determine which cable to remove.

See [“Cable Configuration” on page 170](#).

2. Consider your next step.

- If you have not prepared for service, do so now. See [“Preparing for Service” on page 63](#).
- If you are removing a cable as part of another component’s removal or installation procedure, go to [Step 3](#).

3. Review this information and complete these prerequisites in this order.

- [“Remove a Fan Module” on page 128](#)
- [“Remove the Fan Tray” on page 89](#)
- [“Remove a Riser” on page 136](#)

Remove Riser 1.

4. Disconnect the two drive signal cable connectors from the drive backplane.

See [“Cable Configuration” on page 170](#).

5. Disconnect the cable connectors from the Sun Storage 6 Gb SAS PCIe RAID HBA, Internal card in Riser 1.

6. Set the cable aside.

7. Consider your next step.

- If you removed a cable as part of a replacement operation, install a new cable. See [“Install the Drive Signal Cable”](#) on page 172.
- If you removed a cable as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.

Related Information

- [“Install the Drive Signal Cable”](#) on page 172
- [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Install the Drive Signal Cable

Installing a cable is a cold-service operation. You must power off the server before installing the cable.

1. Consider your first step.

- If you are replacing a cable, remove the faulty or obsolete cable first, then return to this procedure, [Step 2](#). See [“Remove the Drive Signal Cable”](#) on page 171.
- If you are installing a cable as part of another component’s removal or installation procedure, go to [Step 2](#).

2. Connect the cable to the Sun Storage 6 Gb SAS PCIe RAID HBA, Internal card in Riser 1.

3. Install Riser 1.

See [“Install a Riser”](#) on page 138.

4. Route the cable against the chassis wall.

5. Review this information and complete these prerequisites in this order.

- [“Install the Fan Tray”](#) on page 262
 - [“Install a Fan Module”](#) on page 129
- Install all fan modules.

6. Connect the drive signal cable connectors to the drive backplane.

See [“Cable Configuration”](#) on page 170.

7. Consider your next step.

- If you installed a cable as part of a replacement operation, go to [Step 8](#).
 - If you installed a cable as part of another component's removal or installation procedure, return to that procedure. See ["Component Service Task Reference" on page 67](#) for assistance.
- 8. Finish the installation procedure.**
See ["Returning the Server to Operation" on page 255](#).

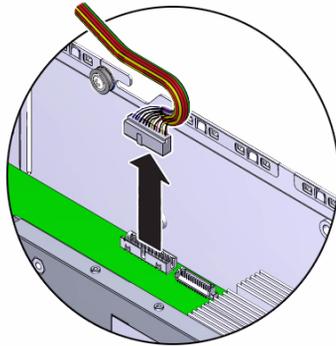
Related Information

- ["Remove the Drive Signal Cable" on page 171](#)
- ["Component Locations \(Storage, Power, and Fans\)" on page 2](#)
- ["Preparing for Service" on page 63](#)
- ["Returning the Server to Operation" on page 255](#)

▼ Remove the Drive Power Cable

Removing a cable is a cold-service operation. You must power off the server before you remove the cable.

- 1. Determine which cable to remove.**
See ["Cable Configuration" on page 170](#).
- 2. Consider your next step.**
 - If you have not prepared for service, do so now. See ["Preparing for Service" on page 63](#).
 - If you are removing a cable as part of another component's removal or installation procedure, go to [Step 3](#).
- 3. Review this information and complete these prerequisites in this order.**
 - ["Remove a Fan Module" on page 128](#)
Remove all fan modules.
 - ["Remove the Fan Tray" on page 89](#)
- 4. Disconnect the drive power cable from the drive backplane.**
See ["Cable Configuration" on page 170](#).
- 5. Release the cable from the cable clamp on the chassis wall.**
- 6. Disconnect the cable from the motherboard.**



7. Set the cable aside.

8. Consider your next step.

- If you removed a cable as part of a replacement operation, install a new cable. See [“Install the Drive Power Cable”](#) on page 174.
- If you removed a cable as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.

Related Information

- [“Install the Drive Power Cable”](#) on page 174
- [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

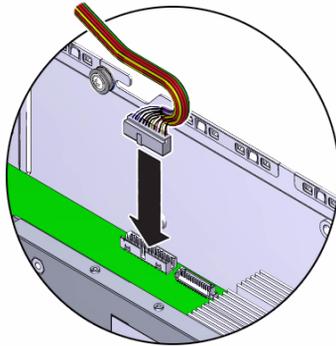
▼ Install the Drive Power Cable

Installing a cable is a cold-service operation. You must power off the server before installing the cable.

1. Consider your first step.

- If you are replacing a cable, remove the faulty or obsolete cable first, then return to this procedure, [Step 2](#). See [“Remove the Drive Power Cable”](#) on page 173.
- If you are installing a cable as part of another component’s removal or installation procedure, go to [Step 2](#).

2. Connect the cable to the motherboard.



3. **Route the cable into the cable clamp and against the chassis wall.**
4. **Review this information and complete these prerequisites in this order.**
 - “Install the Fan Tray” on page 262
 - “Install a Fan Module” on page 129Install all fan modules.
5. **Connect the drive power cable to the drive backplane.**
See “Cable Configuration” on page 170.
6. **Consider your next step.**
 - If you installed a cable as part of a replacement operation, go to [Step 7](#).
 - If you installed a cable as part of another component’s removal or installation procedure, return to that procedure. See “[Component Service Task Reference](#)” on page 67 for assistance.
7. **Finish the installation procedure.**
See “[Returning the Server to Operation](#)” on page 255.

Related Information

- “[Remove the Drive Power Cable](#)” on page 173
- “[Component Locations \(Storage, Power, and Fans\)](#)” on page 2
- “[Preparing for Service](#)” on page 63
- “[Returning the Server to Operation](#)” on page 255

▼ Remove the DVD SATA Cable

Removing a cable is a cold-service operation. You must power off the server before you remove the cable.

1. Determine which cable to remove.

See [“Cable Configuration”](#) on page 170.

2. Consider your next step.

- If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.
- If you are removing a cable as part of another component’s removal or installation procedure, go to [Step 3](#).

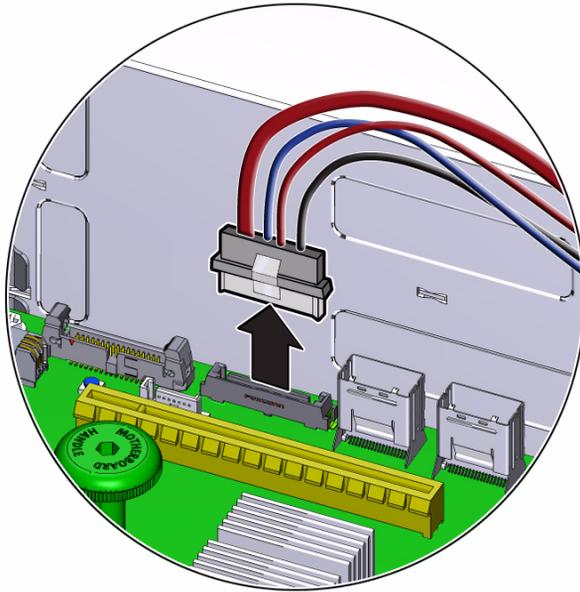
3. Review this information and complete these prerequisites in this order.

- [“Remove a Fan Module”](#) on page 128
Remove all fan modules.
- [“Remove the Fan Tray”](#) on page 89
- [“Remove a Riser”](#) on page 136
Remove Riser 1 from socket.

4. Disconnect the DVD SATA cable from the drive backplane.

See [“Cable Configuration”](#) on page 170.

5. Disconnect the cable from the motherboard.



6. Set the cable aside.

7. Consider your next step.

- If you removed a cable as part of a replacement operation, install a new cable. See [“Install the DVD SATA Cable” on page 177](#).
- If you removed a cable as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference” on page 67](#) for assistance.

Related Information

- [“Install the DVD SATA Cable” on page 177](#)
- [“Component Locations \(Storage, Power, and Fans\)” on page 2](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

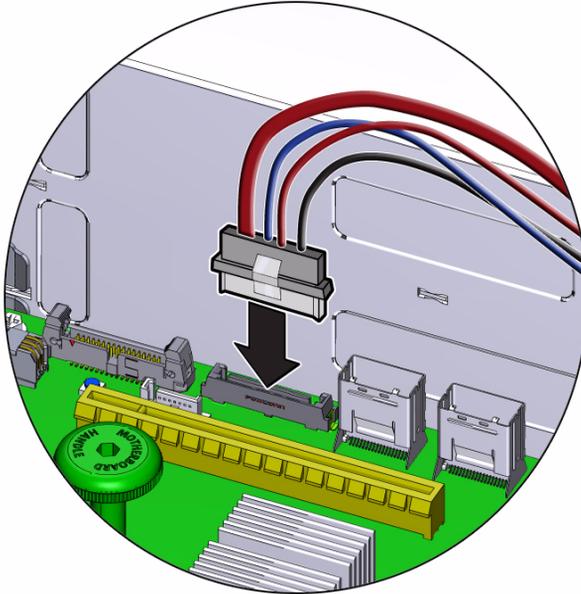
▼ Install the DVD SATA Cable

Installing a cable is a cold-service operation. You must power off the server before installing the cable.

1. Consider your first step.

- If you are replacing a cable, remove the faulty or obsolete cable first, then return to this procedure, [Step 2](#). See [“Remove the DVD SATA Cable”](#) on [page 176](#).
- If you are installing a cable as part of another component’s removal or installation procedure, go to [Step 2](#).

2. Connect the cable to the motherboard.



3. Route the cable against the chassis wall.

4. Review this information and complete these prerequisites in this order.

- [“Install a Riser”](#) on [page 138](#)
Install Riser 1.
- [“Install the Fan Tray”](#) on [page 262](#)
- [“Install a Fan Module”](#) on [page 129](#)
Install all fan modules.

5. Connect the DVD SATA cable to the drive backplane.

See [“Cable Configuration”](#) on [page 170](#).

6. Consider your next step.

- If you installed a cable as part of a replacement operation, go to [Step 7](#).

- If you installed a cable as part of another component's removal or installation procedure, return to that procedure. See ["Component Service Task Reference" on page 67](#) for assistance.

7. Finish the installation procedure.

See ["Returning the Server to Operation" on page 255](#).

Related Information

- ["Remove the DVD SATA Cable" on page 176](#)
- ["Component Locations \(Storage, Power, and Fans\)" on page 2](#)
- ["Preparing for Service" on page 63](#)
- ["Returning the Server to Operation" on page 255](#)

▼ Remove the PDB Signal Cable

Removing a cable is a cold-service operation. You must power off the server before you remove the cable.

1. Determine which cable to remove.

See ["Cable Configuration" on page 170](#).

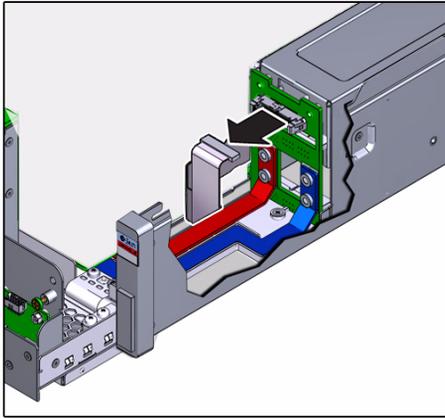
2. Consider your next step.

- If you have not prepared for service, do so now. See ["Preparing for Service" on page 63](#).
- If you are removing a cable as part of another component's removal or installation procedure, go to [Step 3](#).

3. Review this information and complete these prerequisites in this order.

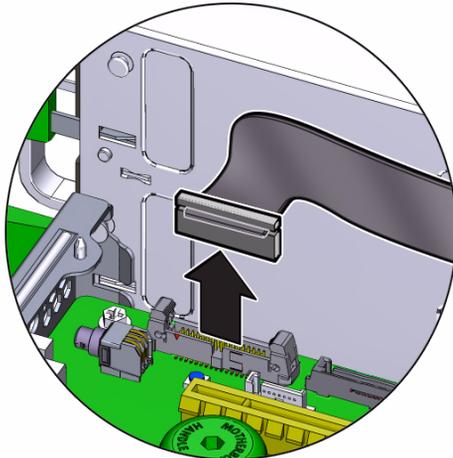
- ["Remove the Filter" on page 97](#)
- ["Remove a Riser" on page 136](#)
Remove Riser 1 from socket.
- ["Remove a Fan Module" on page 128](#)
Remove all fan modules.
- ["Remove the Fan Tray" on page 89](#)
- ["Raise the Drive Cage to the Service Position" on page 90](#)
- ["Remove the Air Duct" on page 92](#)
- ["Remove the PDB Duct" on page 94](#)

4. Disconnect the cable from the PDB.



5. Release the cable from the cable clamp on the chassis wall.

6. Disconnect the cable from the motherboard.



7. Set the cable aside.

8. Consider your next step.

- If you removed a cable as part of a replacement operation, install a new cable. See [“Install the PDB Signal Cable” on page 181](#).
- If you removed a cable as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference” on page 67](#) for assistance.

Related Information

- “Install the PDB Signal Cable” on page 181
- “Component Locations (Storage, Power, and Fans)” on page 2
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

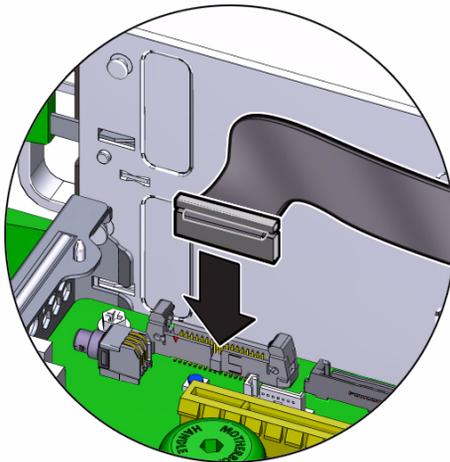
▼ Install the PDB Signal Cable

Installing a cable is a cold-service operation. You must power off the server before installing the cable.

1. Consider your first step.

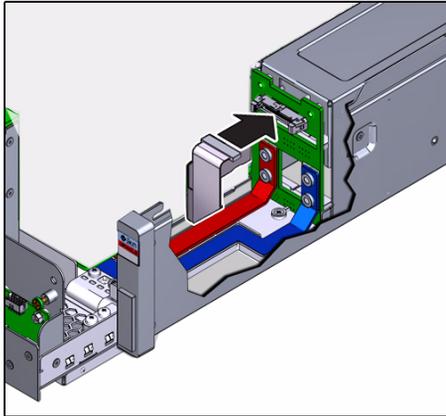
- If you are replacing a cable, remove the faulty or obsolete cable first, then return to this procedure, [Step 2](#). See “[Remove the PDB Signal Cable](#)” on [page 179](#).
- If you are installing a cable as part of another component’s removal or installation procedure, go to [Step 2](#).

2. Connect the cable to the motherboard.



3. Route the cable into the cable clamp and against the chassis wall.

4. Connect the cable to the PDB.



5. Review this information and complete these prerequisites in this order.

- “Install the PDB Duct” on page 256
 - “Install the Air Duct” on page 258
 - “Secure the Drive Cage” on page 260
 - “Install the Fan Tray” on page 262
 - “Install a Fan Module” on page 129
- Install all fan modules.
- “Install a Riser” on page 138
 - “Install the Filter” on page 99

6. Consider your next step.

- If you installed a cable as part of a replacement operation, go to [Step 7](#).
- If you installed a cable as part of another component’s removal or installation procedure, return to that procedure. See “[Component Service Task Reference](#)” on [page 67](#) for assistance.

7. Finish the installation procedure.

See “[Returning the Server to Operation](#)” on [page 255](#).

Related Information

- “[Remove the PDB Signal Cable](#)” on [page 179](#)
- “[Component Locations \(Storage, Power, and Fans\)](#)” on [page 2](#)
- “[Preparing for Service](#)” on [page 63](#)
- “[Returning the Server to Operation](#)” on [page 255](#)

Servicing the Drive Backplane

The drive backplane provides a physical interconnect for the drives and their controllers. The drive backplane is located at the rear of the drive cage. See [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4.

Description	Links
Replace the faulty drive backplane.	“Drive Backplane Configuration” on page 184 “Determine if the Drive Backplane Is Faulty” on page 184 “Remove the Drive Backplane” on page 186 “Install the Drive Backplane” on page 188 “Verify the Drive Backplane” on page 190
Remove the drive backplane as part of another component’s service operation.	“Remove the Drive Backplane” on page 186
Install the drive backplane as part of another component’s service operation.	“Install the Drive Backplane” on page 188
Determine if the drive backplane is faulty.	“Determine if the Drive Backplane Is Faulty” on page 184 “Detecting and Managing Faults” on page 9

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

Drive Backplane Configuration

The server ships with one of two drive configurations. The server can have six drives and a DVD drive, or eight drives and no internal DVD drive. For each configuration, the drive backplane is unique. The drive backplanes are distinguished by the inclusion or lack of an SATA connector, which supports the DVD drive. See [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4.

Note – It is not possible to swap backplanes to gain added functionality because the drive cages are specific for the configurations and are not interchangeable.

Related Information

- [“Install the Drive Backplane”](#) on page 188
- [“Determine if the Drive Backplane Is Faulty”](#) on page 184

▼ Determine if the Drive Backplane Is Faulty

You must determine if the drive backplane is faulty before you replace it.

1. **Check to see if any System Service Required LEDs are lit or flashing.**
See [“Interpreting Diagnostic LEDs”](#) on page 19.

2. In Oracle ILOM, check the health of the storage system.

```
-> show /System/Storage
/System/Power
Targets:
  Disks
  Controllers
  Volumes
  Expanders
Properties:
  health = OK
  health_details = -
.
.
.
->
```

If the `health_details` property identifies a faulty drive backplane, replace it. See [“Remove the Drive Backplane”](#) on page 186.

3. Verify that the drive backplane is faulty.

If the drive backplane is faulty, you will see `/SYS/DBP` under the `Value` heading. For example:

```
-> show faulty
Target          | Property          | Value
-----+-----+-----
/SP/faultmgmt/0 | fru               | /SYS/DBP
.
.
.
->
```

If the drive backplane is faulty, replace it. See [“Remove the Drive Backplane”](#) on page 186.

If a FRU value different from `/SYS/DBP` is displayed, see [“Component Service Task Reference”](#) on page 67 to identify which component is faulty.

4. Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.

See [“Display Faults \(faultmgmt Shell\)”](#) on page 39.

Check the `Fault` class and `Description` fields for more information.

If the drive backplane is faulty, replace it. See [“Remove the Drive Backplane”](#) on page 186.

5. **If you are unable to determine if the drive backplane is faulty, seek further information.**

See “Detecting and Managing Faults” on page 9.

Related Information

- “Remove the Drive Backplane” on page 186
- “Drive Backplane Configuration” on page 184
- “Verify the Drive Backplane” on page 190
- “Detecting and Managing Faults” on page 9

▼ Remove the Drive Backplane

Removing the drive backplane is a cold-service operation. You must power off the server before you remove the drive backplane.

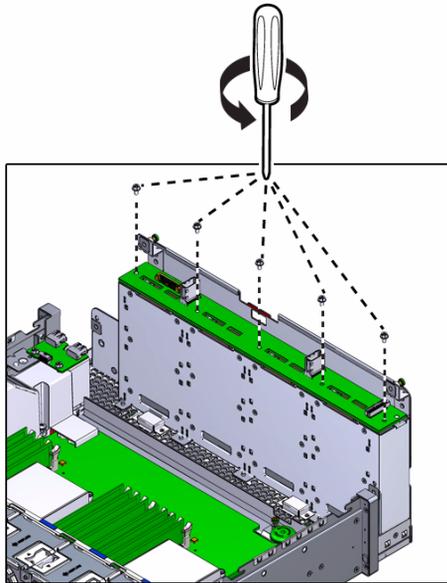
1. Consider your first step.

- If you have not prepared for service, do so now. See “Preparing for Service” on page 63.
- If you are removing the drive backplane as part of another component’s removal or installation procedure, go to [Step 2](#).

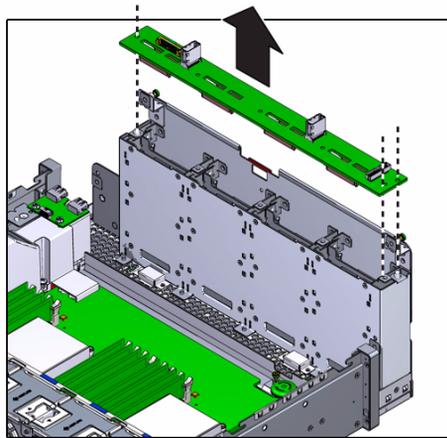
2. Review this information and complete these prerequisites in this order.

- “Remove the Filter” on page 97
- “Remove a Drive” on page 105
Remove all drives.
- “Remove the DVD Drive” on page 111
- “Remove a Fan Module” on page 128
Remove all fan modules.
- “Remove the Fan Tray” on page 89
- “Raise the Drive Cage to the Service Position” on page 90

3. Remove the five screws from the drive backplane.



4. Lift the drive backplane off of the alignment pins and out of the chassis.



5. Set the drive backplane aside.

6. Consider your next step.

- If you removed the drive backplane as part of a replacement operation, install a new drive backplane. See [“Install the Drive Backplane” on page 188](#).
- If you removed the drive backplane as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference” on page 67](#) for assistance.

Related Information

- “Determine if the Drive Backplane Is Faulty” on page 184
- “Install the Drive Backplane” on page 188
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

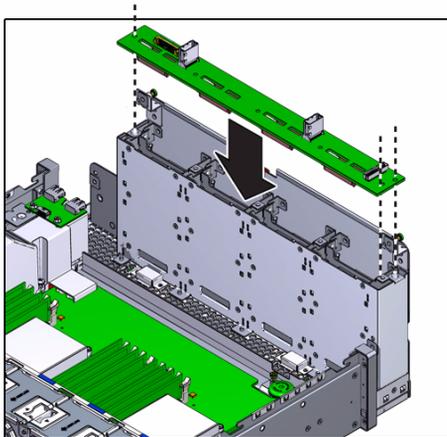
▼ Install the Drive Backplane

Installing the drive backplane is a cold-service operation. You must power off the server before installing the drive backplane.

1. Consider your first step.

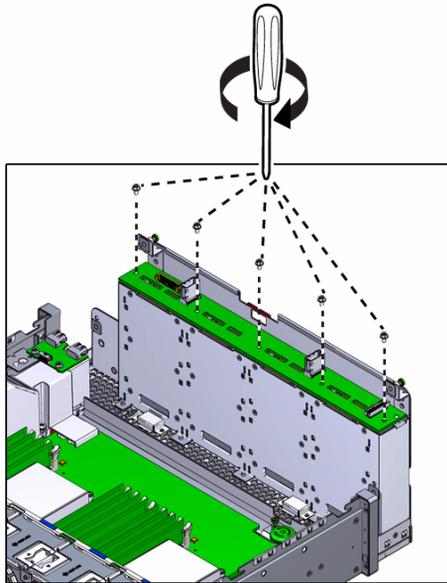
- If you are replacing the drive backplane, remove the faulty or obsolete drive backplane first, then return to this procedure, [Step 2](#). See “[Remove the Drive Backplane](#)” on page 186.
- If you are installing the drive backplane as part of another component’s removal or installation procedure, go to [Step 2](#).

2. Position the drive backplane to where it will install into the chassis.



The drive backplane aligns with the drive connectors down. The two alignment holes are on the left and the single alignment hole is on the right.

3. Install and tighten the five screws.



4. Consider your next step.

- If you installed the drive backplane as part of a replacement operation, go to [Step 5](#).
- If you installed the drive backplane as part of another component's removal or installation procedure, return to that procedure. See ["Component Service Task Reference"](#) on page 67 for assistance.

5. Review this information and complete these prerequisites in this order.

- ["Secure the Drive Cage"](#) on page 260
- ["Install the Fan Tray"](#) on page 262
- ["Install a Fan Module"](#) on page 129
Install all fan modules.
- ["Install the DVD Drive"](#) on page 113
- ["Install a Drive"](#) on page 107
Install all drives.
- ["Install the Filter"](#) on page 99

6. Complete these postrequisites in this order to finish the installation procedure.

- ["Returning the Server to Operation"](#) on page 255
- ["Verify the Drive Backplane"](#) on page 190

Related Information

- “Remove the Drive Backplane” on page 186
- “Verify the Drive Backplane” on page 190
- “Drive Backplane Configuration” on page 184
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

▼ Verify the Drive Backplane

After you install the drive backplane, you can verify its functionality.

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Reset the drive backplane.

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

->
```

3. Verify that the drive backplane is no longer considered faulty, then return to this procedure.

See “Determine if the Drive Backplane Is Faulty” on page 184.

4. Verify that the installed drives are recognized.

```
-> show /SYS/DBP
/SYS/DBP
Targets:
  HDD0
  HDD1
  HDD2
.
.
.
->
```

Related Information

- “Install the Drive Backplane” on page 188
- “Drive Backplane Configuration” on page 184
- “Determine if the Drive Backplane Is Faulty” on page 184

Servicing DIMMs

DIMMs provide RAM for the CPUs configured in the server. The DIMMs are located in slots on either side of the CPUs at the center of the motherboard. See [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4.

Description	Links
Replace a faulty DIMM.	“DIMM Configuration” on page 194 “Locate a Faulty DIMM” on page 195 “Remove a DIMM” on page 198 “Install a DIMM” on page 200 “Verify a DIMM” on page 202
Remove a DIMM as part of another component’s service operation.	“Remove a DIMM” on page 198
Install a DIMM as part of another component’s service operation.	“Install a DIMM” on page 200
Add additional DIMMs.	“DIMM Configuration” on page 194 “Install a DIMM” on page 200 “Verify a DIMM” on page 202
Decrease the number of existing DIMMs.	“Remove a DIMM” on page 198
Identify a faulty DIMM.	“Locate a Faulty DIMM” on page 195 “Detecting and Managing Faults” on page 9

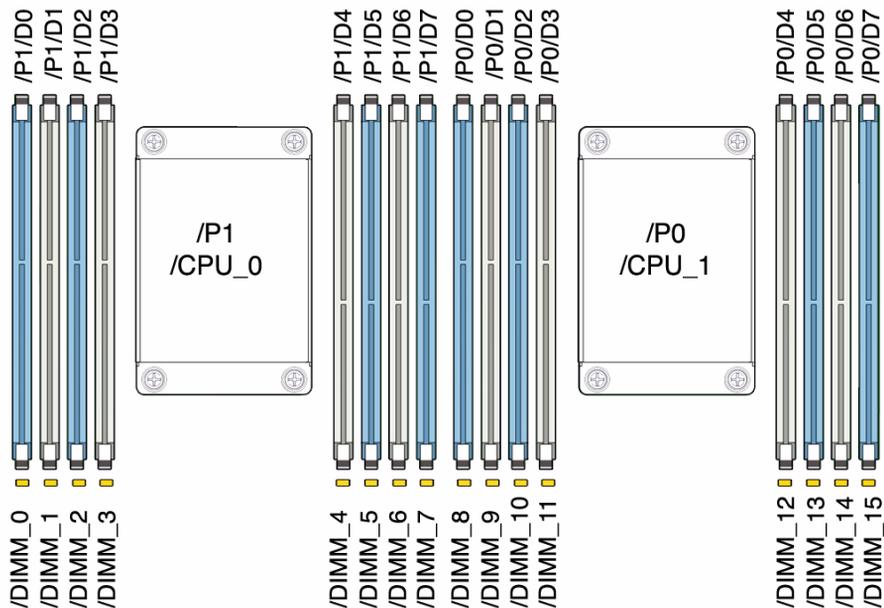
Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

DIMM Configuration

In this illustration of the DIMM slots, the Oracle ILOM legacy targets for the DIMMs are provided across the top and the Oracle ILOM /System targets for the DIMMs are provided across the bottom.

For example, the blue slot on the far left has the Oracle ILOM legacy target of /SYS/MB/P1/D0. This same slot has the Oracle ILOM /System target of /System/Memory/DIMMs/DIMM_0.



See “Component Locations (Motherboard, Memory, and PCIe3 Cards)” on page 4.

When you add or remove DIMMs to the motherboard, there are guidelines to follow:

- You can configure an odd number of DIMMs, however an equally-balanced even number of DIMMs provides better performance.
- When you add DIMMs in pairs, the pair should be of the same part number.
- Fill all of the blue slots first, and then add DIMMs to the white slots
- If you will mix DIMM capacities, install the largest capacities first, then consecutively smaller capacities.
- If a slot is empty, install a DIMM filler.



Caution – Overheating hazard. There must be no empty DIMM slots.

This table lists the order that the DIMMs should be installed, either singly, or in pairs, and the total memory of the configuration, according to the DIMMs installed.

DIMM pair order	Single DIMM order	Oracle ILOM Legacy target	Oracle ILOM /System target	Total memory 8 GB DIMMs	Total memory 16 GB DIMMs
First	1	/P0/D0	/DIMM_8	8	16
	2	/P1/D0	/DIMM_0	16	32
Second	3	/P0/D2	/DIMM_10	24	48
	4	/P1/D2	/DIMM_2	32	64
Third	5	/P0/D5	/DIMM_13	40	80
	6	/P1/D5	/DIMM_5	48	96
Fourth	7	/P0/D7	/DIMM_15	56	112
	8	/P1/D7	/DIMM_7	64	128
Fifth	9	/P0/D1	/DIMM_9	72	144
	10	/P1/D1	/DIMM_1	80	160
Sixth	11	/P0/D3	/DIMM_11	88	176
	12	/P1/D3	/DIMM_3	96	192
Seventh	13	/P0/D4	/DIMM_12	104	208
	14	/P1/D4	/DIMM_4	112	224
Eighth	15	/P0/D6	/DIMM_14	120	240
	16	/P1/D6	/DIMM_6	128	256

Related Information

- [“Install a DIMM” on page 200](#)
- [“Locate a Faulty DIMM” on page 195](#)

▼ Locate a Faulty DIMM

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

1. Check to see if any System Service Required LEDs are lit or flashing.
See [“Interpreting Diagnostic LEDs”](#) on page 19.
2. In Oracle ILOM, check the health of the memory system.

```
-> show /System/Memory
/System/Memory
Targets:
Properties:
    health = OK
    health_details = -
.
.
.
->
```

If the `health_details` property identifies a faulty DIMM, replace it. See [“Remove a DIMM”](#) on page 198.

3. Verify a DIMM is recognized.

```
-> show /System/Memory/DIMMs
/System/Memory/DIMMs
Targets:
    DIMM_x
    DIMM_y
.
.
.
->
```

where *x*, *y*, etc, are the slot numbers where DIMMs are installed.

If a DIMM is not recognized, check its installation. See [“Remove a DIMM”](#) on page 198.

4. Check the health of the individual DIMMs and verify their identity.

```
-> show /System/Memory/DIMMs/DIMM_x
/System/Memory/DIMMs/DIMM_7
Targets:
Properties:
    health = OK
    health_details = -
.
.
.
->
```

where x is the number of the DIMM, from 0 to 15.

If the `health_details` property identifies the DIMM as faulty, or the DIMM cannot be identified, replace it. See [“Remove a DIMM” on page 198](#).

5. Verify that a DIMM is faulty.

If a DIMM is faulty, you will see `/SYS/MB/Px/Dy` under the Value heading where:

- x is 0 or 1.
- y is 0 to 7.

For example:

```
-> show faulty
Target          | Property          | Value
-----+-----+-----
/SPP/faultmgmt/0 | fru              | /SYS/MB/P0/D7
.
.
.
->
```

If a DIMM is faulty, replace it. See [“Remove a DIMM” on page 198](#).

If a FRU value different from `/SYS/MB/Px/Dy` is displayed, see [“Component Service Task Reference” on page 67](#) to identify which component is faulty.

6. Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.

See [“Display Faults \(faultmgmt Shell\)” on page 39](#).

Check the `Fault class` and `Description` fields for more information.

If a DIMM is faulty, replace it. See [“Remove a DIMM” on page 198](#).

7. If you are unable to determine if a DIMM is faulty, seek further information.

See [“Detecting and Managing Faults” on page 9](#).

Related Information

- [“Remove a DIMM” on page 198](#)
- [“DIMM Configuration” on page 194](#)
- [“Verify a DIMM” on page 202](#)
- [“Detecting and Managing Faults” on page 9](#)

▼ Remove a DIMM

Removing a DIMM is a cold-service operation. You must power off the server before you remove the DIMM.

1. Determine which DIMM to remove.

See [“Locate a Faulty DIMM” on page 195](#).

2. Consider your next step.

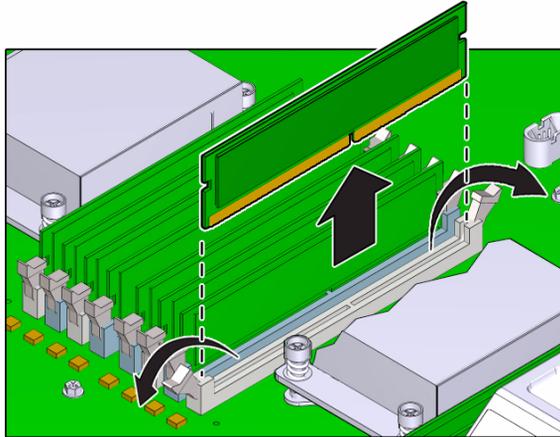
- If you have not prepared for service, do so now. See [“Preparing for Service” on page 63](#).
- If you are removing a DIMM as part of another component’s removal or installation procedure, go to [Step 3](#).

3. Review this information and complete these prerequisites in this order.

- [“Remove the Filter” on page 97](#)
- [“Remove a Fan Module” on page 128](#)
Remove all fan modules.
- [“Remove the Fan Tray” on page 89](#)
- [“Raise the Drive Cage to the Service Position” on page 90](#)
- [“Remove the Air Duct” on page 92](#)

4. Locate the DIMM to remove.

5. Press down and out on the release levers at both ends of the DIMM slot.



6. Lift the DIMM up and out the slot.
7. Set the DIMM aside.
8. Repeat from [Step 4](#) for any additional DIMMs to be removed.
9. Consider your next step.
 - If you removed a DIMM as part of a replacement operation, install a new DIMM. See [“Install a DIMM” on page 200](#).
 - If you removed a DIMM as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference” on page 67](#) for assistance.
 - If you are not replacing the DIMM, install a DIMM filler in its place. See [“Install a DIMM” on page 200](#).



Caution – Overheating hazard. There must be no empty DIMM slots.

Related Information

- [“Locate a Faulty DIMM” on page 195](#)
- [“Install a DIMM” on page 200](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

▼ Install a DIMM

Installing a DIMM is a cold-service operation. You must power off the server before installing the DIMM. This procedure is the same for installing a DIMM filler.

1. Consider your first step.

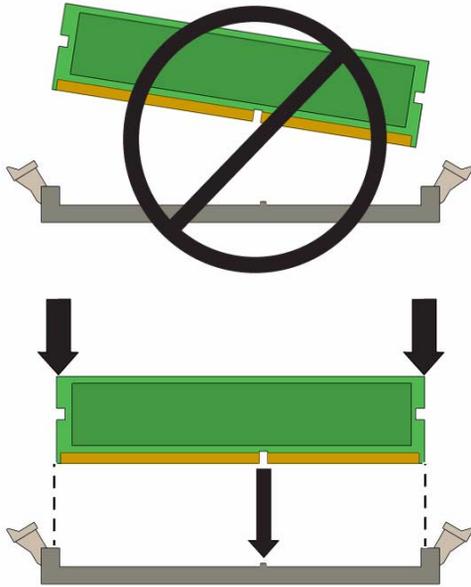
- If you are replacing a DIMM, remove the faulty or obsolete DIMM first, then return to this procedure, [Step 3](#). See [“Remove a DIMM” on page 198](#).
- If you are installing a new or an additional DIMM, go to [Step 2](#).
- If you are installing a DIMM as part of another component’s removal or installation procedure, go to [Step 3](#).

2. Review this information and complete these prerequisites in this order.

- [“DIMM Configuration” on page 194](#)
- [“Preparing for Service” on page 63](#)
- [“Remove the Filter” on page 97](#)
- [“Remove a Fan Module” on page 128](#)
Remove all fan modules.
- [“Remove the Fan Tray” on page 89](#)
- [“Raise the Drive Cage to the Service Position” on page 90](#)
- [“Remove the Air Duct” on page 92](#)

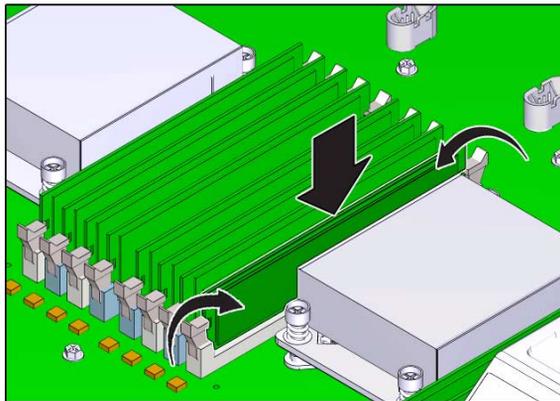
3. Open the release levers of the slot where you are installing the DIMM.

4. Align the DIMM to the location where it installs into the slot.



Ensure that the notch in the DIMM lines up with the key in the slot.

5. Insert the DIMM into the slot, pressing firmly so that both release levers click closed.



6. Repeat from [Step 3](#) through [Step 5](#) for any additional DIMMs that you are installing.
7. Consider your next step.
 - If you installed a DIMM as part of a replacement operation, go to [Step 8](#).

- If you installed a DIMM as part of another component's removal or installation procedure, return to that procedure. See "Component Service Task Reference" on page 67 for assistance.
 - If you have installed a new DIMM, go to [Step 8](#).
- 8. Review this information and complete these prerequisites in this order.**
- "Install the Air Duct" on page 258
 - "Secure the Drive Cage" on page 260
 - "Install the Fan Tray" on page 262
 - "Install a Fan Module" on page 129
Install all fan modules.
 - "Install the Filter" on page 99
- 9. Complete these postrequisites in this order to finish the installation procedure.**
- "Returning the Server to Operation" on page 255
 - "Verify a DIMM" on page 202

Related Information

- "Remove a DIMM" on page 198
- "Verify a DIMM" on page 202
- "DIMM Configuration" on page 194
- "Preparing for Service" on page 63
- "Returning the Server to Operation" on page 255

▼ Verify a DIMM

After you install a DIMM, you can verify its functionality.

1. Access Oracle ILOM.

See "Access the SP (Oracle ILOM)" on page 17.

2. Reset the DIMM.

```
-> set /SYS/MB/PC/D7 clear_fault_action=true
Are you sure you want to clear /SYS/MB/P0/D7 (y/n)? y
Set 'clear_fault_action' to 'true'

->
```

3. Consider your next step.

- If you installed a new DIMM as part of a replacement operation, verify that the DIMM is no longer considered faulty, then return to this procedure. See [“Locate a Faulty DIMM” on page 195](#).
- If you installed a new DIMM to increase functionality, go to [Step 4](#).

4. Verify that the DIMM is recognized.

```
-> show /System/Memory/DIMMs
/System/Memory/DIMMs
Targets:
    DIMM_x
    DIMM_y
.
.
.
->
```

where *x*, *y*, or etc, is the slot number where the DIMM is installed.

5. Verify that the DIMM is identified.

```
-> show /System/Memory/DIMMs/DIMM_x
```

where *x* is the slot number where the DIMM is installed.

Related Information

- [“Install a DIMM” on page 200](#)
- [“DIMM Configuration” on page 194](#)
- [“Locate a Faulty DIMM” on page 195](#)

Servicing CPUs

Use these procedures to service the CPUs.

- [“CPU Configuration” on page 206](#)
- [“Locate a Faulty CPU” on page 206](#)
- [“Remove a CPU” on page 208](#)
- [“Install a CPU” on page 213](#)

Related Information

- [“Identifying Components” on page 1](#)
- [“Detecting and Managing Faults” on page 9](#)
- [“Component Service Task Reference” on page 67](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

2. In Oracle ILOM, check the health of the CPUs.

Replace *x* with 0 or 1.

```
-> show /System/Processors/CPUs/CPU_x  
/System/Processors/CPUs/CPU_0  
Targets:  
Properties:  
    health = Service Required
```

3. Run the show faulty command.

See “Display Faults (show faulty Command)” on page 37.

4. Use the Oracle ILOM faultmgmt shell to identify the faulty component.

See “Display Faults (faultmgmt Shell)” on page 39.

5. Run Pc-Check CPU diagnostics.

See “Pc-Check Diagnostic Tests” on page 54.

6. If you are unable to determine if a CPU is faulty, seek further information.

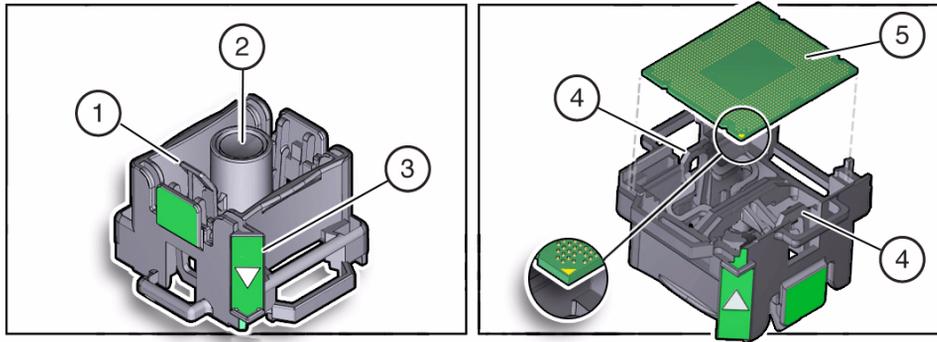
See “Detecting and Managing Faults” on page 9.

Related Information

- “Remove a CPU” on page 208
- “CPU Configuration” on page 206
- “Detecting and Managing Faults” on page 9

CPU Tool

When you remove and install a CPU, a special tool is required for safe handling of the CPU. The CPU tool is provided in the CPU shipping package. Familiarize yourself with these parts of the CPU tool.



No.	Description
1	Hold lever
2	Release button
3	CPU pin 1 alignment
4	Securing clip (one on each side)
5	CPU (upside down, a triangle indicates pin 1)

▼ Remove a CPU

Removing a CPU is a cold-service operation. You must power off the server before you remove the CPU.

1. Determine which CPU to remove.

See [“Locate a Faulty CPU”](#) on page 206.

2. Consider your next step.

- If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.
- If you are removing a CPU as part of another component’s removal or installation procedure, go to [Step 3](#).

3. Review this information and complete these prerequisites in this order.

- [“Remove the Filter”](#) on page 97
- [“Remove a Fan Module”](#) on page 128

Remove all fan modules.

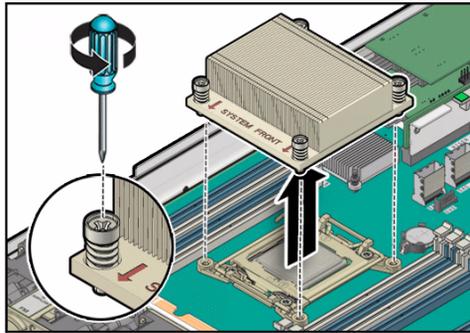
- “Remove the Fan Tray” on page 89
- “Raise the Drive Cage to the Service Position” on page 90
- “Remove the Air Duct” on page 92

4. Locate the CPU to remove.

See “CPU Configuration” on page 206.

5. Loosen the four captive screws of the CPU heat sink.

Alternate between the screws in an X pattern, turning each 1 revolution, until they are fully removed.



6. Grasp the heat sink and wiggle it clockwise and counterclockwise while pulling up.

This action breaks the adhesion of the heat sink to the CPU.

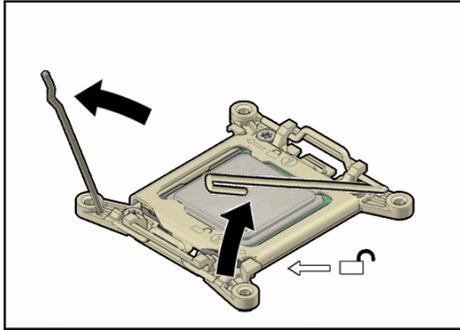


Caution – Do not pull forcibly as you might damage the heat sink or CPU socket.

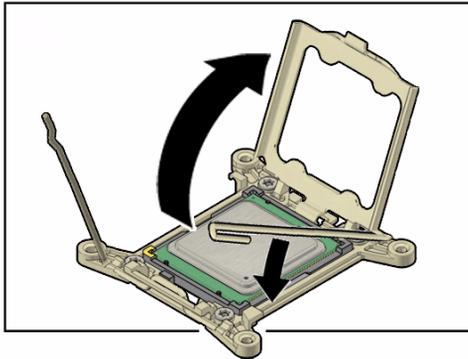
7. Use an alcohol pad to clean the thermal compound from the heat sink and CPU.

Note – Be careful not to get the thermal compound on your fingers because this could contaminate components.

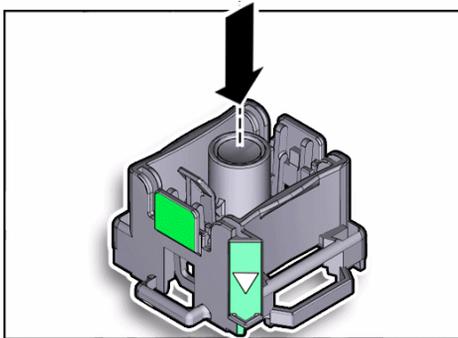
8. Unhook the pressure frame release levers from the catches of the CPU socket and raise them upward to approximately 35 degrees.



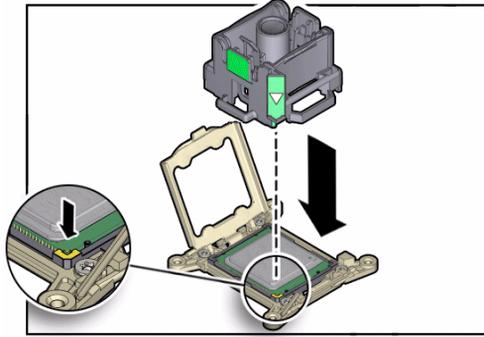
9. Release the pressure frame by slightly lowering the right release lever and lifting the pressure frame up to the fully open position.



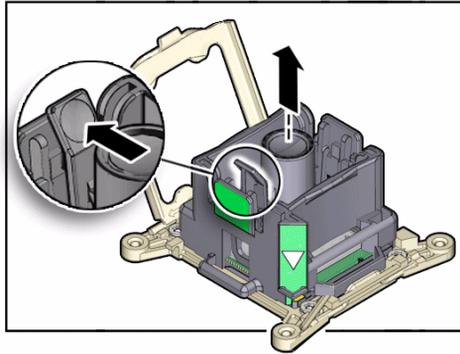
10. Press the release button on the CPU tool.



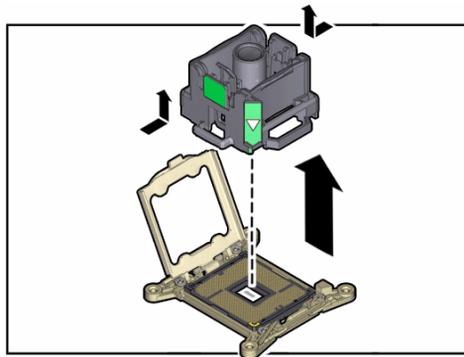
11. Position the tool over the CPU socket and lower it onto the CPU.
The triangle on the side of the tool aligns with pin 1 of the CPU.



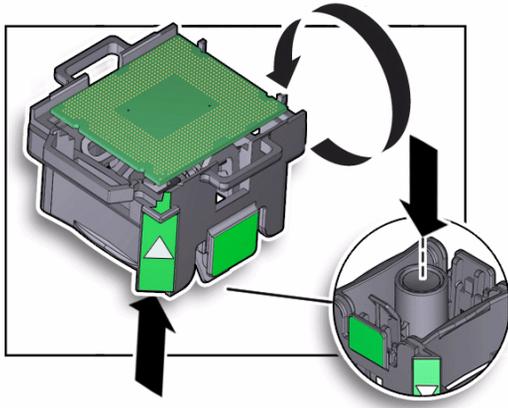
- 12. Push the hold lever outward to engage the CPU.**
You hear a click, and the release button retracts.



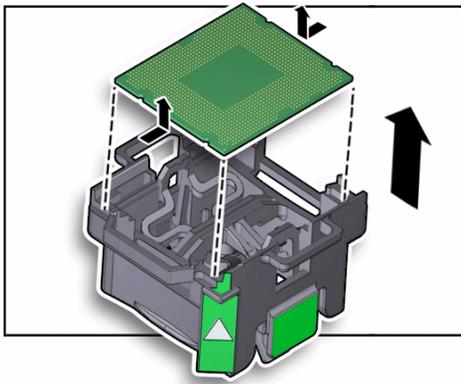
- 13. Grasp the tool by its sides and lift it from the CPU socket.**



- 14. While holding the tool upside down with one hand, and the CPU edges with the other hand, press the release button.**



15. Lift the CPU out of the tool and place it pin side down on an antistatic mat.



16. Repeat from [Step 4](#) for any additional CPU to be removed.

17. Install the replacement CPU.

See [“Install a CPU”](#) on page 213.

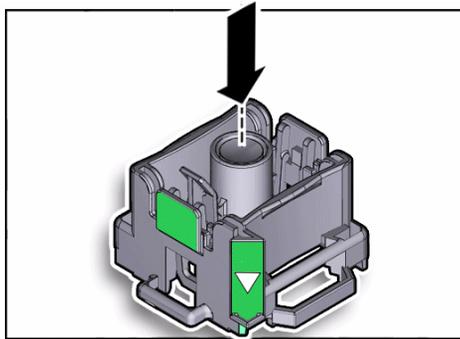
Related Information

- [“Locate a Faulty CPU”](#) on page 206
- [“Install a CPU”](#) on page 213
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

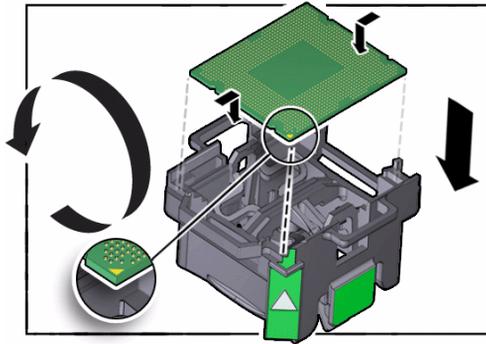
▼ Install a CPU

Installing a CPU is a cold-service operation. You must power off the server before installing the CPU.

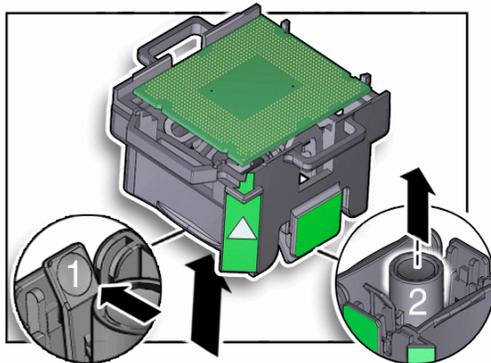
1. **Review this information and complete these prerequisites in this order, if you have not done so already.**
 - [“Remove the Filter” on page 97](#)
 - [“Remove a Fan Module” on page 128](#)
Remove all fan modules.
 - [“Remove the Fan Tray” on page 89](#)
 - [“Raise the Drive Cage to the Service Position” on page 90](#)
 - [“Remove the Air Duct” on page 92](#)
2. **Unpack the replacement processor and place it pin side down on an antistatic mat.**
3. **Press the release button on the CPU tool to open the securing clips.**
See [“CPU Tool” on page 207](#).



4. **Turn the tool upside down and lower the CPU into the tool, pin side up.**
The triangle on the side of the tool aligns with pin 1 of the CPU.

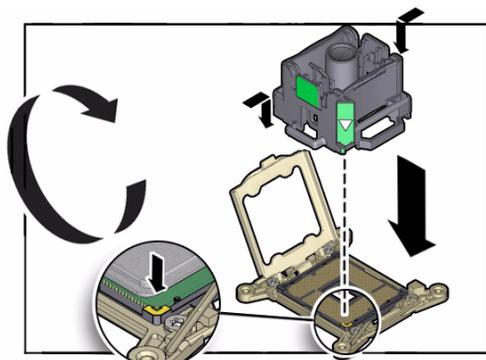


5. Press the hold lever outward to engage the CPU.
 You hear a click, and the release button retracts.



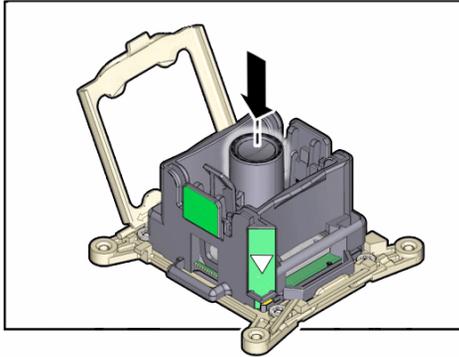
6. Position the tool over the CPU socket and lower it into place.
 The triangle on the side of the tool aligns with pin 1 of the CPU socket.

Caution – The tool must be level and flat onto the socket, not offset or angled.



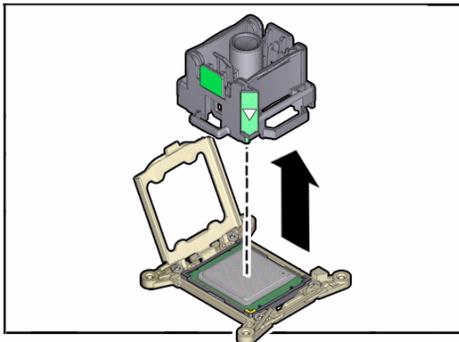
7. Press the release button on the tool to release the CPU into the socket.

Caution – Do not attempt to forcibly seat the CPU.



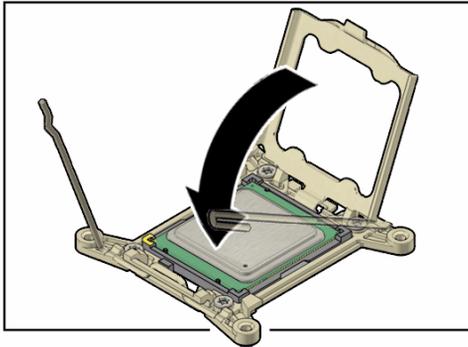
8. Remove the tool.

The processor should lie flat in the socket, and be properly aligned.

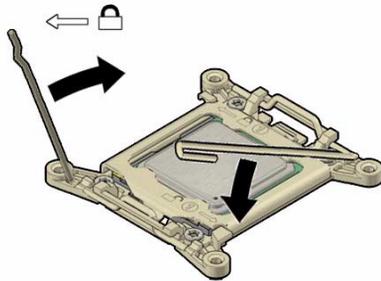


9. Lower the pressure frame to the closed position.

The pressure frame should sit flat over the processor.

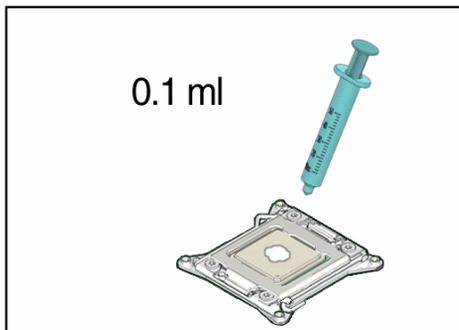


10. Lower the release levers and hook them under the catches of the CPU socket.



11. Use the syringe to apply approximately 0.1 ml of thermal compound to the top center of the CPU.

Note – Do not distribute the compound. The spring pressure of the heat sink will evenly distribute the compound.

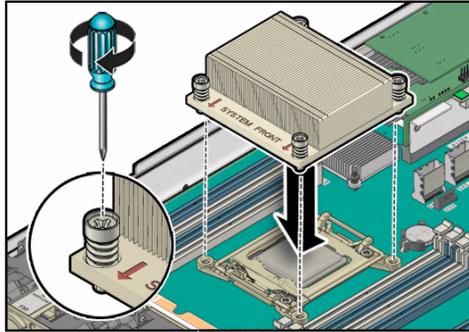


12. Carefully align the heat sink screws to the mounting posts.

The “System Front” label must face the front of the server.



Caution – Moving the heat sink too much unevenly distributes the thermal compound and can lead to CPU damage.



13. Tighten the four captive screws of the CPU heat sink.

Alternate between the screws in an X pattern, turning each one-half revolution, until they are fully seated.

14. Review this information and complete these prerequisites in this order.

- “Install the Air Duct” on page 258
- “Secure the Drive Cage” on page 260
- “Install the Fan Tray” on page 262
- “Install a Fan Module” on page 129
Install all fan modules.
- “Install the Filter” on page 99

15. Return the server to operation.

See “Returning the Server to Operation” on page 255

16. Verify the functionality of the CPUs by checking for faults.

See “Locate a Faulty CPU” on page 206.

Related Information

- “Remove a CPU” on page 208
- “CPU Configuration” on page 206
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

Servicing the LED Board

The LED board is the heart of the LED assembly and provides LED indicators of chassis and other components status. The LED board is located inside the LED assembly at the left front of the chassis. See [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2.

Description	Links
Replace the faulty LED board.	“Determine if the LED Board Is Faulty” on page 220 “Remove the LED Board” on page 220 “Install the LED Board” on page 223 “Verify the LED Board” on page 226
Remove the LED board as part of another component’s service operation.	“Remove the LED Board” on page 220
Install the LED board as part of another component’s service operation.	“Install the LED Board” on page 223
Determine if the LED board is faulty.	“Determine if the LED Board Is Faulty” on page 220 “Detecting and Managing Faults” on page 9

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Determine if the LED Board Is Faulty

You must determine if the LED board is faulty before you replace it.

1. Press and hold the Locator button for more than 5 seconds.

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

All of the LEDs in the LED assembly should light.

If the LED board is faulty, replace it. See [“Remove the LED Board”](#) on page 220.

2. If you are unable to determine if the LED board is faulty, seek further information.

See [“Detecting and Managing Faults”](#) on page 9.

Related Information

- [“Remove the LED Board”](#) on page 220
- [“Verify the LED Board”](#) on page 226
- [“Detecting and Managing Faults”](#) on page 9

▼ Remove the LED Board

Removing the LED board is a cold-service operation. You must power off the server before you remove the LED board.

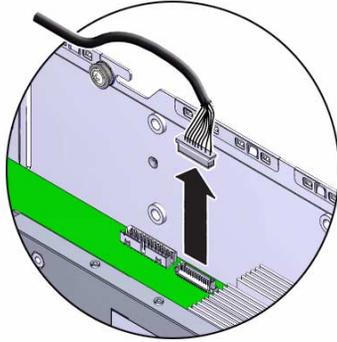
1. Consider your first step.

- If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.
- If you are removing the LED board as part of another component’s removal or installation procedure, go to [Step 2](#).

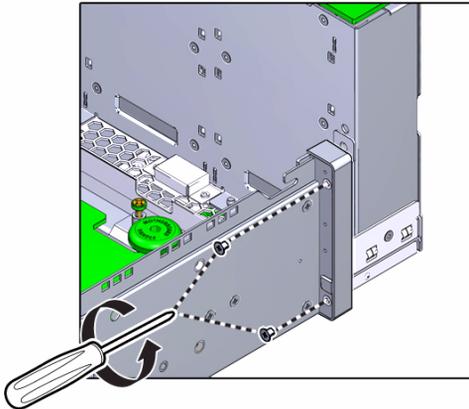
2. Review this information and complete these prerequisites in this order.

- [“Remove the Filter”](#) on page 97
- [“Remove a Fan Module”](#) on page 128
Remove all fan modules.
- [“Remove the Fan Tray”](#) on page 89
- [“Raise the Drive Cage to the Service Position”](#) on page 90
- [“Remove the Air Duct”](#) on page 92

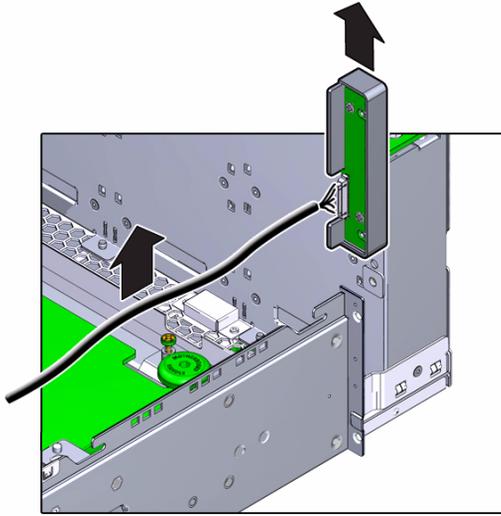
3. Release the cable from the cable clamp on the chassis wall.
4. Disconnect the cable from the motherboard.



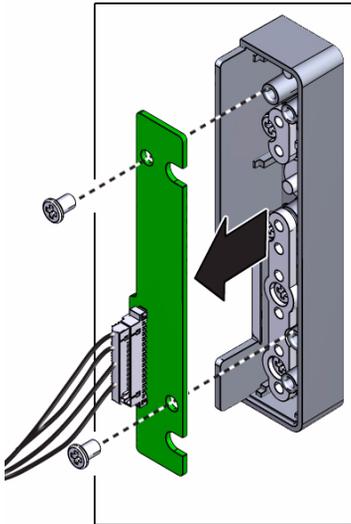
5. Remove the two screws securing the LED assembly to the chassis.



6. Lift the LED assembly from the chassis.



7. Remove the two screws securing the LED board to the LED assembly.



8. Lift the LED board from the LED assembly and set it aside.

9. Consider your next step.

- If you removed the LED board as part of a replacement operation, install a new LED board. See [“Install the LED Board”](#) on page 223.

- If you removed the LED board as part of another component's removal or installation procedure, return to that procedure. See ["Component Service Task Reference"](#) on page 67 for assistance.

Related Information

- ["Determine if the LED Board Is Faulty"](#) on page 220
- ["Install the LED Board"](#) on page 223
- ["Preparing for Service"](#) on page 63
- ["Returning the Server to Operation"](#) on page 255

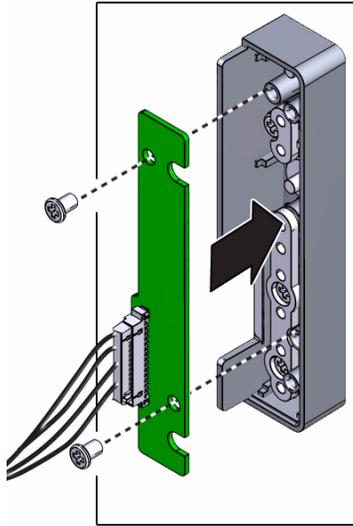
▼ Install the LED Board

Installing the LED board is a cold-service operation. You must power off the server before installing the LED board.

1. Consider your first step.

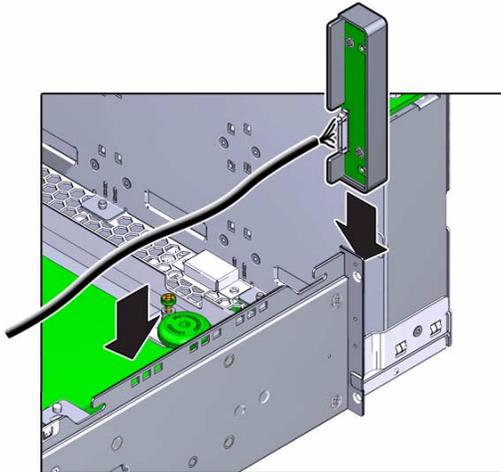
- If you are replacing the LED board, remove the faulty or obsolete LED board first, then return to this procedure, [Step 2](#). See ["Remove the LED Board"](#) on page 220.
- If you are installing the LED board as part of another component's removal or installation procedure, go to [Step 2](#).

2. Set the LED board into the LED assembly.

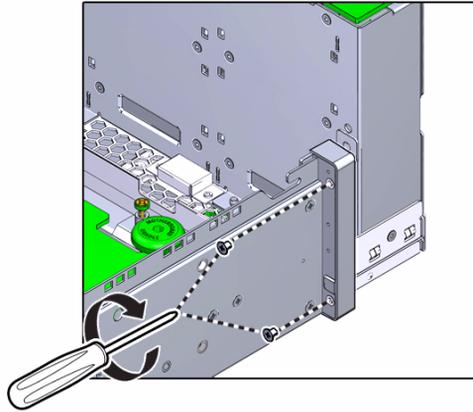


3. Install and tighten the two screws.

4. Position the LED assembly over the flange on the chassis left.

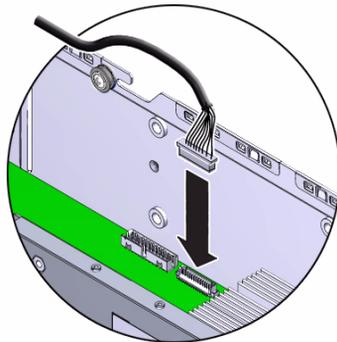


5. Install and tighten the two screws.



6. Route the cable into the cable clamp and against the chassis wall.

7. Connect the cable to the motherboard.



8. Consider your next step.

- If you installed the LED board as part of a replacement operation, go to [Step 9](#).
- If you installed the LED board as part of another component's removal or installation procedure, return to that procedure. See "[Component Service Task Reference](#)" on page 67 for assistance.

9. Review this information and complete these prerequisites in this order.

- "[Install the Air Duct](#)" on page 258
- "[Secure the Drive Cage](#)" on page 260
- "[Install the Fan Tray](#)" on page 262
- "[Install a Fan Module](#)" on page 129
Install all fan modules.
- "[Install the Filter](#)" on page 99

10. Complete these prerequisites in this order to finish the installation procedure.

- “Returning the Server to Operation” on page 255
- “Verify the LED Board” on page 226

Related Information

- “Remove the LED Board” on page 220
- “Verify the LED Board” on page 226
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

▼ Verify the LED Board

After you install the LED board, you can verify its functionality.

- **Press and hold the Locator button for more than 5 seconds.**
All of the LEDs in the LED assembly should light.

Related Information

- “Install the LED Board” on page 223
- “Determine if the LED Board Is Faulty” on page 220

Servicing the USB Board

The USB board provides USB 2.0 connectivity at the front of the chassis. See [“Component Locations \(Storage, Power, and Fans\)”](#) on page 2.

Description	Links
Replace the faulty USB board.	“Remove the USB Board” on page 227 “Install the USB Board” on page 231
Remove the USB board as part of another component’s service operation.	“Remove the USB Board” on page 227
Install the USB board as part of another component’s service operation.	“Install the USB Board” on page 231

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Remove the USB Board

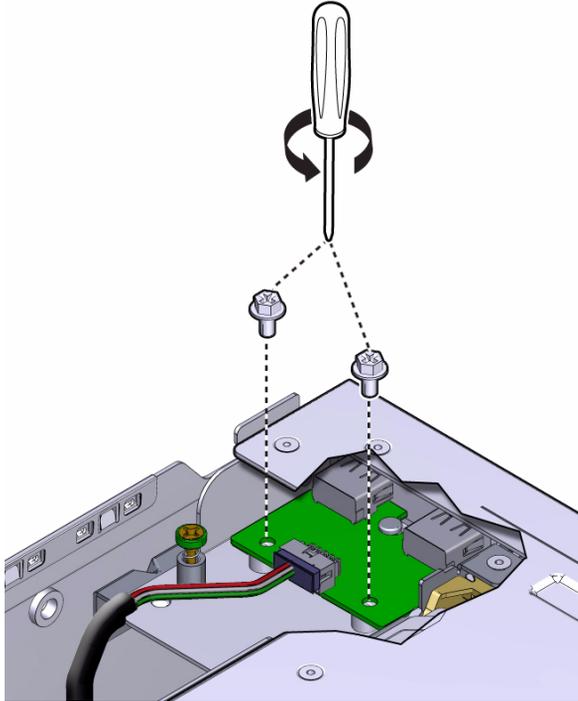
Removing the USB board is a cold-service operation. You must power off the server before you remove the USB board.

1. Consider your first step.

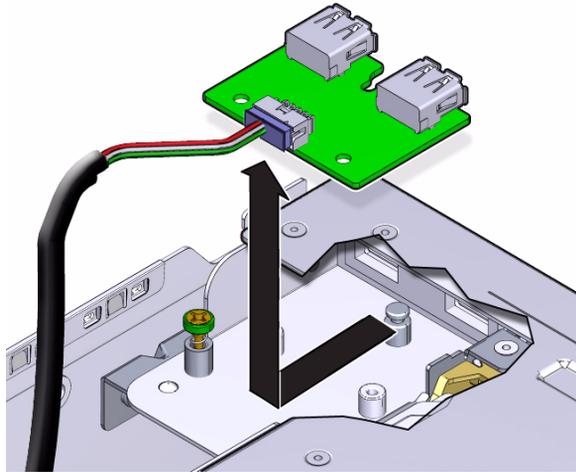
- If you have not prepared for service, do so now. See [“Preparing for Service”](#) on page 63.

- If you are removing the USB board as part of another component's removal or installation procedure, go to [Step 5](#).

2. Remove the two screws securing the USB board to the chassis.



3. Slide the USB board rearward off of the alignment pin and allow the USB board to float freely.

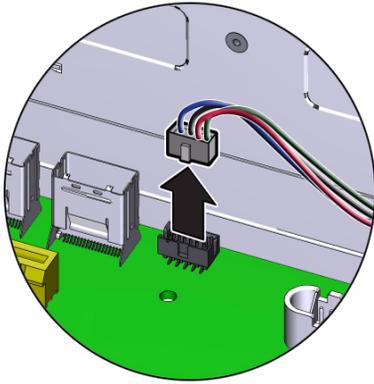


Note – Do not disconnect the cable from the USB board.

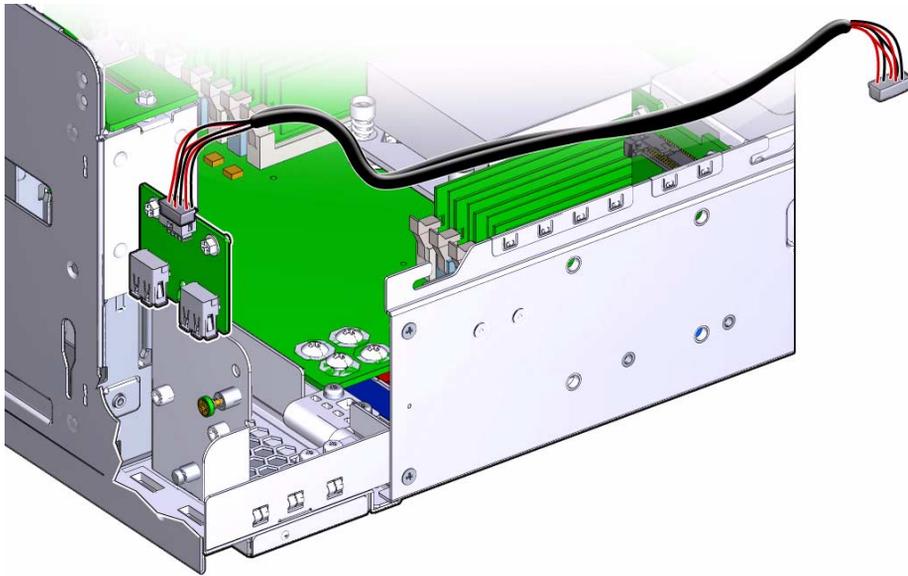
4. Review this information and complete these prerequisites in this order.

- “Remove the Filter” on page 97
- “Remove a Fan Module” on page 128
Remove all fan modules.
- “Remove the Fan Tray” on page 89
- “Remove a Riser” on page 136
Remove Riser 1.
- “Raise the Drive Cage to the Service Position” on page 90
- “Remove the Air Duct” on page 92
- “Remove the PDB Duct” on page 94

5. Disconnect the cable from the motherboard.



6. Gently lift the USB board and cable out of the chassis.



7. Set the USB board aside.

8. Consider your next step.

- If you removed the USB board as part of a replacement operation, install a new USB board. See [“Install the USB Board”](#) on page 231.
- If you removed the USB board as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.

Related Information

- [“Install the USB Board”](#) on page 231

- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

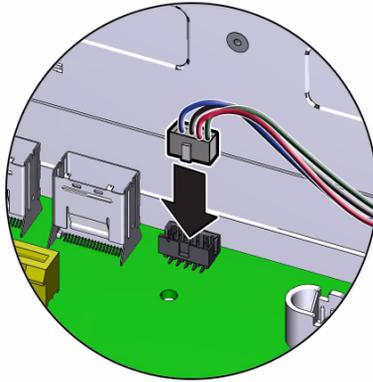
▼ Install the USB Board

Installing the USB board is a cold-service operation. You must power off the server before installing the USB board.

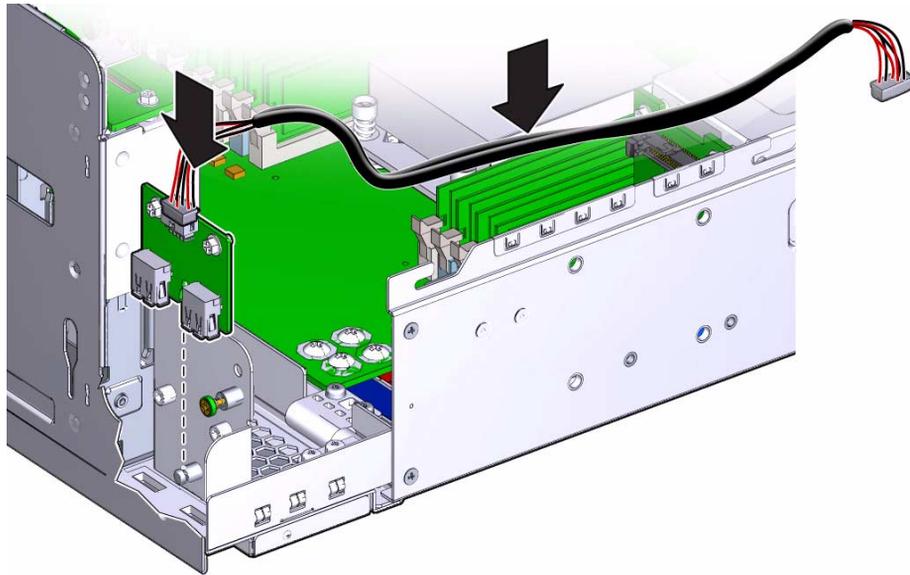
1. Consider your first step.

- If you are replacing the USB board, remove the faulty or obsolete USB board first, then return to this procedure, [Step 5](#). See “Remove the USB Board” on [page 227](#).
- If you are installing the USB board as part of another component’s removal or installation procedure, go to [Step 5](#).

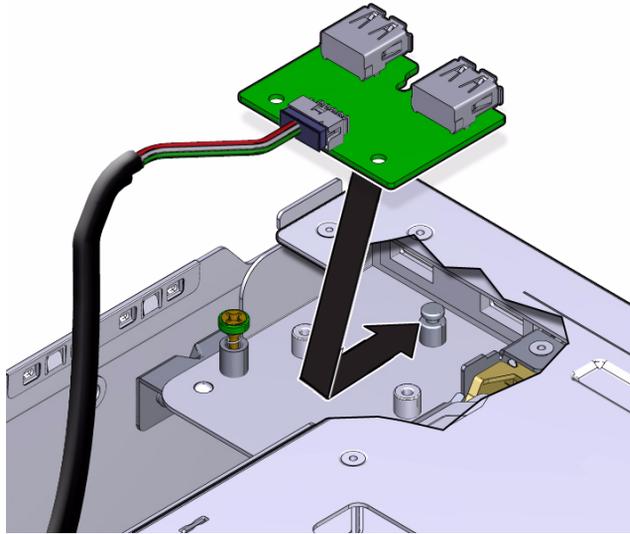
2. Connect the USB board cable to the motherboard.



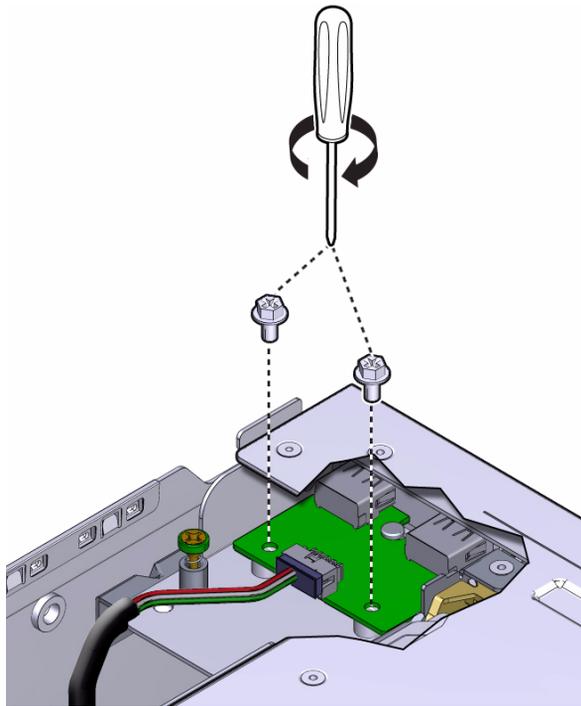
3. Gently lay the cable into the gap between the DIMMs and the chassis wall.



4. **Review this information and complete these prerequisites in this order.**
 - “Install the PDB Duct” on page 256
 - “Install the Air Duct” on page 258
 - “Secure the Drive Cage” on page 260
 - “Install the Fan Tray” on page 262
 - “Install a Fan Module” on page 129
Install all fan modules.
 - “Install the Filter” on page 99
5. **Position the USB board to the location where it installs into the chassis.**
The USB connectors are forward and upward.
6. **Lower the USB board to the chassis and slide it forward over the alignment pin.**



7. Compress the EMI shielding while you install and tighten the two screws.



8. Consider your next step.

- If you installed the USB board as part of a replacement operation, go to [Step 9](#).

- If you installed the USB board as part of another component's removal or installation procedure, return to that procedure. See ["Component Service Task Reference"](#) on page 67 for assistance.

9. Finish the installation procedure.

See ["Returning the Server to Operation"](#) on page 255.

Related Information

- ["Remove the USB Board"](#) on page 227
- ["Preparing for Service"](#) on page 63
- ["Returning the Server to Operation"](#) on page 255

Servicing the Motherboard

The motherboard is the primary component of the server. The motherboard is located on a tray at the bottom of the chassis. See [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4.

Description	Links
Replace the faulty motherboard.	“Determine if the Motherboard Is Faulty” on page 236 “Remove the Motherboard” on page 239 “Install the Motherboard” on page 241 “Verify the Motherboard” on page 245
Remove the motherboard as part of another component’s service operation.	“Remove the Motherboard” on page 239
Install the motherboard as part of another component’s service operation.	“Install the Motherboard” on page 241
Determine if the motherboard is faulty.	“Determine if the Motherboard Is Faulty” on page 236 “Detecting and Managing Faults” on page 9

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Determine if the Motherboard Is Faulty

You must determine if the motherboard is faulty before you replace it.

1. Check to see if any System Service Required LEDs are lit or flashing.

See [“Interpreting Diagnostic LEDs”](#) on page 19.

2. In Oracle ILOM, check the health of the processors system.

```
-> show /System/Processors
/System/Processors
Targets:
  CPUs
Properties:
  health = OK
  health_details = -
.
.
.
->
```

If the `health_details` property identifies a faulty CPU, replace the motherboard. See [“Remove the Motherboard”](#) on page 239.

3. Check the health of the individual CPUs.

```
-> show /System/Processors/CPUs/CPU_x
/System/Processor/CPUs/CPU_0
Targets:
Properties:
  health = OK
  health_details = -
.
.
.
->
```

where `x` is the number of the CPU, either 0 or 1.

If the `health_details` property identifies the CPU as faulty, replace the motherboard. See [“Remove the Motherboard”](#) on page 239.

4. Check the health of the networking system.

```
-> show /System/Networking
/System/Networking
Targets:
    Ethernet_NICs
Properties:
    health = OK
    health_details = -
.
.
.
->
```

If the `health_details` property identifies a faulty interface, consider replacing the motherboard. See [“Remove the Motherboard”](#) on page 239.

5. Check the health of the individual interfaces.

```
-> show /System/Networking/Ethernet_NICs/Ethernet_NIC_x
/System/Networking/Ethernet_NICs/Ethernet_NIC_0
Targets:
Properties:
    health = OK
    health_details = -
.
.
.
->
```

where x is the number of the interface, from 0 to 3.

If the `health_details` property identifies the interface as faulty, consider replacing the motherboard. See [“Remove the Motherboard”](#) on page 239.

6. Verify that the motherboard is faulty.

If the motherboard is faulty, you will see `/SYS/MB`, `/SYS/MB/P0`, or `/SYS/MB/P1` under the `Value` heading.

For example:

```
-> show faulty
Target                | Property                | Value
-----+-----+-----
/SP/faultmgmt/0      | fru                     | /SYS/MB
.
.
.
->
```

If the motherboard is faulty, replace it. See [“Remove the Motherboard” on page 239](#).

If a FRU value different from `/SYS/MB`, `/SYS/MB/P0`, or `/SYS/MB/P1` is displayed, see [“Component Service Task Reference” on page 67](#) to identify which component is faulty.

7. Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.

See [“Display Faults \(faultmgt Shell\)” on page 39](#).

Check the `Fault class` and `Description` fields for more information.

If the motherboard is faulty, replace it. See [“Remove the Motherboard” on page 239](#).

8. Within the Oracle ILOM interface, display the power currently consumed.

```
-> show /SYS/VPS value
/SYS/VPS
  Properties:
    value = 159.175 Watts
->
```

If the power displayed is unreasonable or none at all, replace the motherboard. See [“Remove the Motherboard” on page 239](#).

9. If you are unable to determine if the motherboard is faulty, seek further information.

See [“Detecting and Managing Faults” on page 9](#).

Related Information

- [“Remove the Motherboard” on page 239](#)
- [“Verify the Motherboard” on page 245](#)

- [“Detecting and Managing Faults” on page 9](#)

▼ Remove the Motherboard

Removing the motherboard is a cold-service operation. You must power off the server before you remove the motherboard.

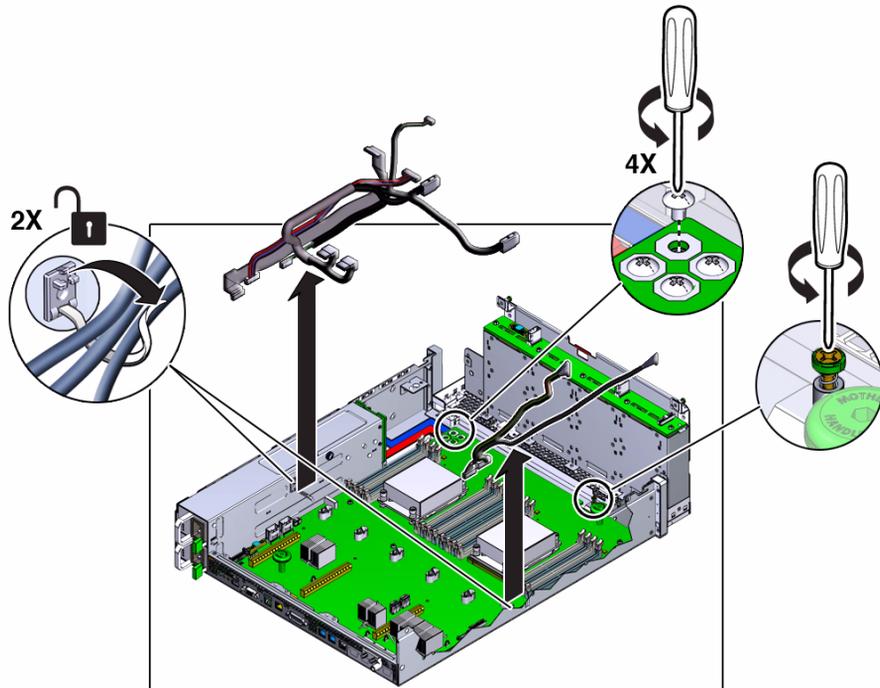
1. Consider your first step.

- If you have not prepared for service, do so now. See [“Preparing for Service” on page 63](#).
- If you are removing the motherboard as part of another component’s removal or installation procedure, go to [Step 2](#).

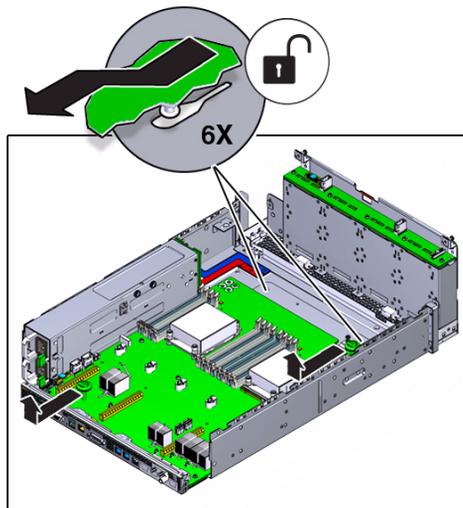
2. Review this information and complete these prerequisites in this order.

- [“Remove the Filter” on page 97](#)
- [“Remove a Fan Module” on page 128](#)
Remove all fan modules.
- [“Remove the Fan Tray” on page 89](#)
- [“Raise the Drive Cage to the Service Position” on page 90](#)
- [“Remove a Riser” on page 136](#)
Remove all risers.
- [“Remove the USB Drive” on page 164](#)
- [“Remove the Air Duct” on page 92](#)
- [“Remove a DIMM” on page 198](#)
Remove all DIMMs.
- [“Remove the PDB Duct” on page 94](#)

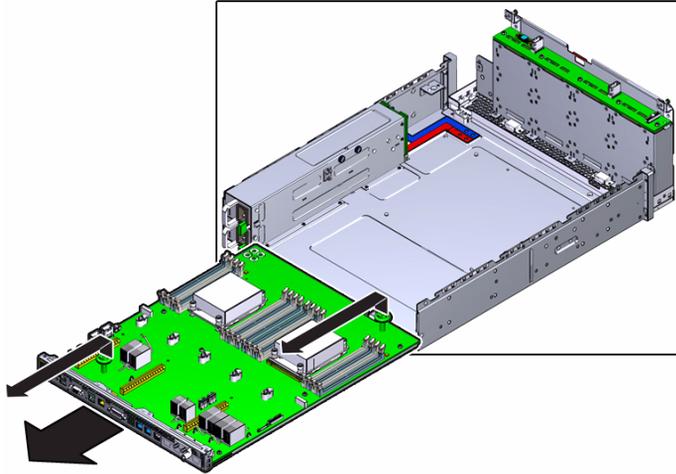
3. Disconnect all remaining cables from the motherboard and move them out of the way.



4. Remove the four bus bar screws.
5. Fully loosen the captive screw at the front of the motherboard.
6. Grasp the two motherboard handles and slide the motherboard rearward off of the alignment pins.



7. Lift the motherboard 0.5 in. (13 mm) to clear the bottom alignment pins and slowly move the motherboard out the rear of the chassis.



8. Set the motherboard aside.
9. Consider your next step.
 - If you removed the motherboard as part of a replacement operation, install a new motherboard. See [“Install the Motherboard”](#) on page 241.
 - If you removed the motherboard as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.

Related Information

- [“Determine if the Motherboard Is Faulty”](#) on page 236
- [“Install the Motherboard”](#) on page 241
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Install the Motherboard

Installing the motherboard is a cold-service operation. You must power off the server before installing the motherboard.

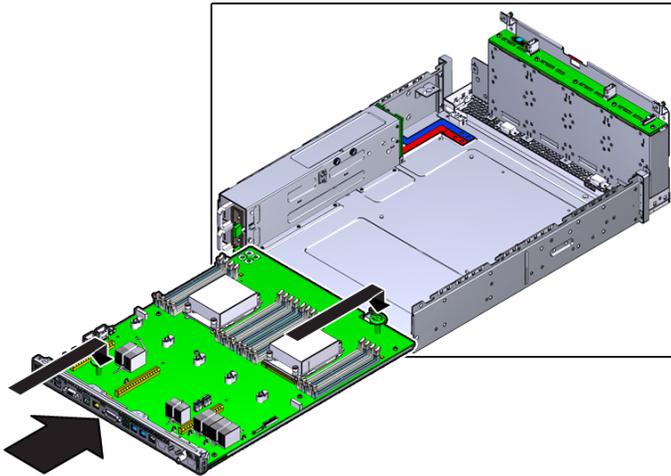
1. Consider your first step.

- If you are replacing the motherboard, remove the faulty or obsolete motherboard first, then return to this procedure, [Step 2](#).
See [“Remove the Motherboard”](#) on page 239.
- If you are installing the motherboard as part of another component’s removal or installation procedure, go to [Step 2](#).

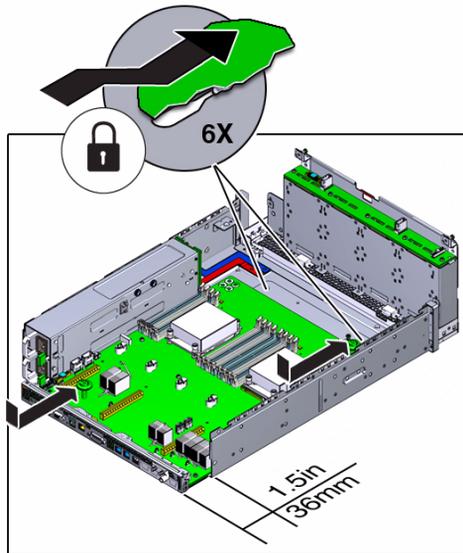
2. Position the motherboard for installation into the chassis.

The heatsinks are toward the front of the chassis, and the ports are at the rear.

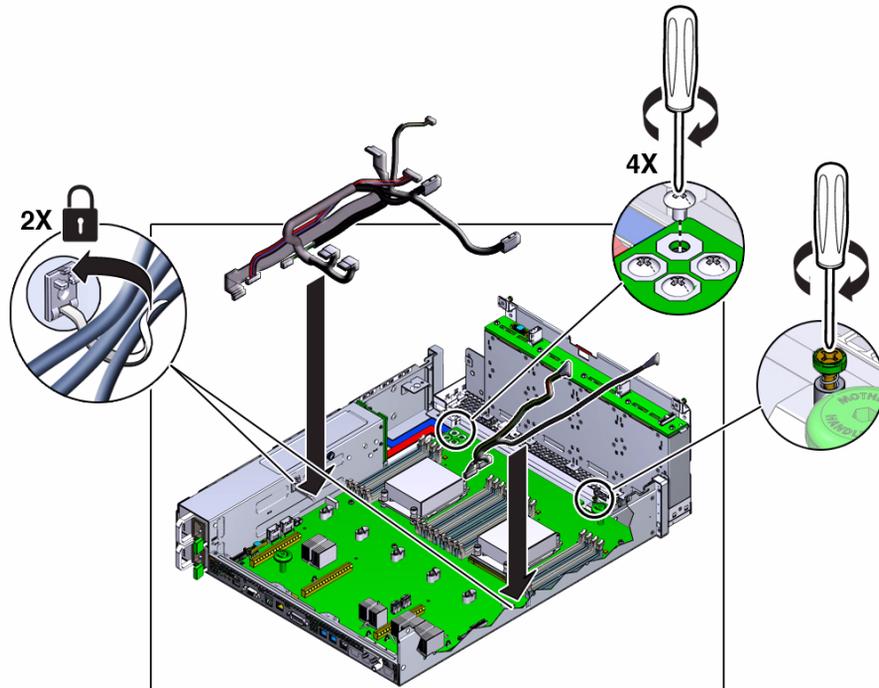
3. Lift the motherboard by the handles to a height of about 0.5 in. (13 mm) and slowly move the motherboard forward into the chassis from the rear.



4. When there is about 1.5 in. (36 mm) to go, lower the motherboard onto the bottom alignment pins.



5. **Slowly slide the motherboard forward until it drops, engaging the bottom alignment pins.**
6. **Continue to slide the motherboard forward until it seats.**
The rear of the motherboard must be flush with the rear of the chassis.
Additionally, the four holes in the motherboard must align with the four holes in the bus bars.
7. **Tighten the captive screw.**



8. Install and tighten the four bus bar screws.

9. Reconnect the cables you previously disconnected.

10. Consider your next step.

- If you installed the motherboard as part of a replacement operation, go to [Step 11](#).
- If you installed the motherboard as part of another component's removal or installation procedure, return to that procedure. See "[Component Service Task Reference](#)" on page 67 for assistance.

11. Review this information and complete these prerequisites in this order.

- "[Install the PDB Duct](#)" on page 256
- "[Install a DIMM](#)" on page 200
Install all DIMMs.
- "[Install the Air Duct](#)" on page 258
- "[Install the USB Drive](#)" on page 165
- "[Install a Riser](#)" on page 138
Install all risers.
- "[Secure the Drive Cage](#)" on page 260

- “Install the Fan Tray” on page 262
 - “Install a Fan Module” on page 129
Install all fan modules.
 - “Install the Filter” on page 99
12. Complete these prerequisites in this order to finish the installation procedure.
- “Returning the Server to Operation” on page 255
 - “Verify the Motherboard” on page 245

Related Information

- “Remove the Motherboard” on page 239
- “Verify the Motherboard” on page 245
- “Preparing for Service” on page 63
- “Returning the Server to Operation” on page 255

▼ Verify the Motherboard

After you install the motherboard, you can verify its functionality.

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Reset the motherboard.

```
-> 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'

->
```

3. Verify that the motherboard is no longer considered faulty, then return to this procedure.

See “Determine if the Motherboard Is Faulty” on page 236.

4. Display the power currently consumed.

```
-> show /SYS/VPS value
/SYS/VPS
```

```
Properties:  
  value = 159.175 Watts
```

->

Related Information

- [“Install the Motherboard” on page 241](#)
- [“Determine if the Motherboard Is Faulty” on page 236](#)

Servicing the PDB

The PDB is a interconnect between the power supplies and the motherboard. The PDB is located forward of the power supplies, under the PDB duct. See [“Component Locations \(Motherboard, Memory, and PCIe3 Cards\)”](#) on page 4.

Description	Links
Replace the faulty PDB.	“Determine if the PDB Is Faulty” on page 247 “Remove the PDB” on page 249 “Install the PDB” on page 251 “Verify the PDB” on page 253
Remove the PDB as part of another component’s service operation.	“Remove the PDB” on page 249
Install the PDB as part of another component’s service operation.	“Install the PDB” on page 251
Determine if the PDB is faulty.	“Determine if the PDB Is Faulty” on page 247 “Detecting and Managing Faults” on page 9

Related Information

- [“Identifying Components”](#) on page 1
- [“Detecting and Managing Faults”](#) on page 9
- [“Component Service Task Reference”](#) on page 67
- [“Preparing for Service”](#) on page 63
- [“Returning the Server to Operation”](#) on page 255

▼ Determine if the PDB Is Faulty

You must determine if the PDB is faulty before you replace it.

1. Check to see if any System Service Required LEDs are lit or flashing.
See [“Interpreting Diagnostic LEDs”](#) on page 19.
2. In Oracle ILOM, check the health of the power system.

```

-> show /System/Power
/System/Power
Targets:
Properties:
    health = OK
    health_details = -
.
.
.
->

```

If the `health_details` property identifies a faulty PDB, replace it. See [“Remove the PDB”](#) on page 249.

3. Verify that the PDB is faulty.

If the PDB is faulty, you will see `/SYS/PDB` under the Value heading.

For example:

```

-> show faulty
Target                | Property                | Value
-----+-----+-----
/SP/faultmgmt/0      | fru                     | /SYS/PDB
.
.
.
->

```

If the PDB is faulty, replace it. See [“Remove the PDB”](#) on page 249.

If a FRU value different from `/SYS/PDB` is displayed, see [“Component Service Task Reference”](#) on page 67 to identify which component is faulty.

4. Use the Oracle ILOM `faultmgmt` shell to identify the faulty component.

See [“Display Faults \(faultmgmt Shell\)”](#) on page 39.

Check the `Fault class` and `Description` fields for more information.

If the PDB is faulty, replace it. See [“Remove the PDB”](#) on page 249.

5. Within the Oracle ILOM interface, verify that the PDB is reporting temperatures.

```
-> show /SYS/PDB/T_IN_PSx value
/SYS/PDB/T_IN_PS0
Properties:
  value = 23.750 degree C
->
```

If an unreasonable temperature or no temperature is displayed, replace the PDB. See [“Remove the PDB” on page 249](#).

6. If you are unable to determine if the PDB is faulty, seek further information. See [“Detecting and Managing Faults” on page 9](#).

Related Information

- [“Remove the PDB” on page 249](#)
- [“Verify the PDB” on page 253](#)
- [“Detecting and Managing Faults” on page 9](#)

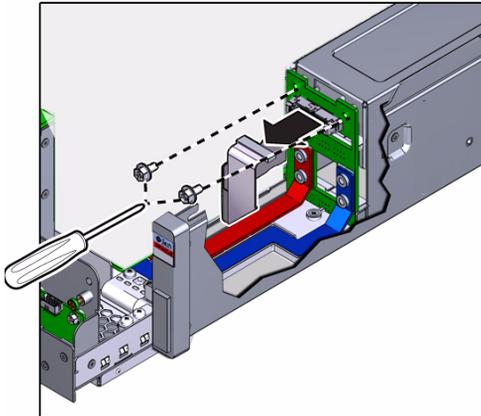
▼ Remove the PDB

Removing the PDB is a cold-service operation. You must power off the server before you remove the PDB.

1. Consider your first step.
 - If you have not prepared for service, do so now. See [“Preparing for Service” on page 63](#).
 - If you are removing the PDB as part of another component’s removal or installation procedure, go to [Step 2](#).
2. Review this information and complete these prerequisites in this order.
 - [“Remove a Power Supply” on page 121](#)
Remove both power supplies.
 - [“Remove the Filter” on page 97](#)
 - [“Remove a Fan Module” on page 128](#)
Remove all fan modules.
 - [“Remove the Fan Tray” on page 89](#)

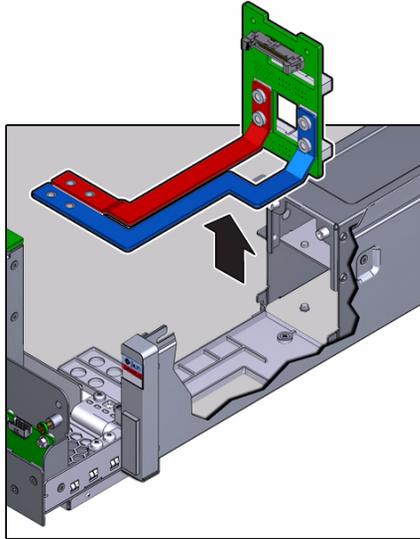
- “Raise the Drive Cage to the Service Position” on page 90
- “Remove a Riser” on page 136
Remove all risers.
- “Remove the USB Drive” on page 164
- “Remove the Air Duct” on page 92
- “Remove a DIMM” on page 198
Remove all DIMMs.
- “Remove the PDB Duct” on page 94
- “Remove the Motherboard” on page 239

3. Disconnect the cable from the PDB.



4. Remove the two screws securing the PDB to the chassis.

5. Lift the PDB up and forward off of the alignment pins.



6. Lift the PDB and attached bus bars out of the chassis.
7. Set the PDB aside.
8. Consider your next step.
 - If you removed the PDB as part of a replacement operation, install a new PDB. See [“Install the PDB” on page 251](#).
 - If you removed the PDB as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference” on page 67](#) for assistance.

Related Information

- [“Determine if the PDB Is Faulty” on page 247](#)
- [“Install the PDB” on page 251](#)
- [“Preparing for Service” on page 63](#)
- [“Returning the Server to Operation” on page 255](#)

▼ Install the PDB

Installing the PDB is a cold-service operation. You must power off the server before installing the PDB.

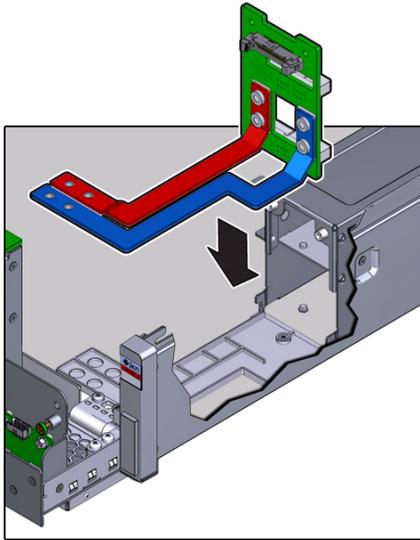
1. Consider your first step.

- If you are replacing the PDB, remove the faulty or obsolete PDB first, then return to this procedure, [Step 2](#). See “[Remove the PDB](#)” on page 249.
- If you are installing the PDB as part of another component’s removal or installation procedure, go to [Step 2](#).

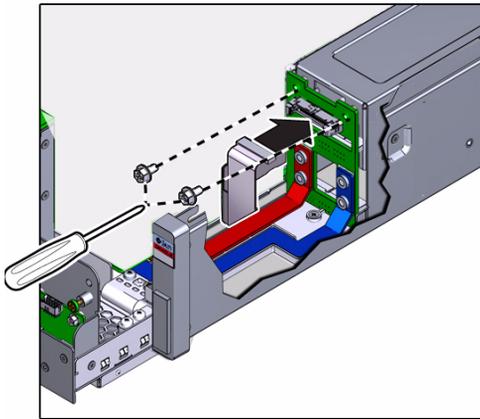
2. Position the PDB to where it installs into the chassis.

The bus bars are forward and down.

3. Place the bus bars into the channels, and move the PDB rearward and down onto the alignment pins.



4. Install and tighten the two screws.



5. Reconnect the cable to the PDB.

6. Consider your next step.

- If you installed the PDB as part of a replacement operation, go to [Step 7](#).
- If you installed the PDB as part of another component's removal or installation procedure, return to that procedure. See ["Component Service Task Reference"](#) on page 67 for assistance.

7. Review this information and complete these prerequisites in this order.

- ["Install the Motherboard"](#) on page 241
- ["Install the PDB Duct"](#) on page 256
- ["Install a DIMM"](#) on page 200
Install all DIMMs.
- ["Install the Air Duct"](#) on page 258
- ["Install the USB Drive"](#) on page 165
- ["Install a Riser"](#) on page 138
Install all risers.
- ["Secure the Drive Cage"](#) on page 260
- ["Install the Fan Tray"](#) on page 262
- ["Install a Fan Module"](#) on page 129
Install all fan modules.
- ["Install the Filter"](#) on page 99

8. Complete these postrequisites in this order to finish the installation procedure.

- ["Returning the Server to Operation"](#) on page 255
- ["Verify the PDB"](#) on page 253

Related Information

- ["Remove the PDB"](#) on page 249
- ["Verify the PDB"](#) on page 253
- ["Preparing for Service"](#) on page 63
- ["Returning the Server to Operation"](#) on page 255

▼ Verify the PDB

After you install the PDB, you can verify its functionality.

1. Access Oracle ILOM.

See “Access the SP (Oracle ILOM)” on page 17.

2. Reset the PDB.

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

3. Verify that the PDB is no longer considered faulty, then return to this procedure.

See “Determine if the PDB Is Faulty” on page 247.

4. Verify that the PDB is reporting temperatures.

```
-> show /SYS/PDB/T_IN_PSx value  
/SYS/PDB/T_IN_PS0  
Properties:  
value = 23.750 degree C  
  
->
```

Related Information

- “Install the PDB” on page 251
- “Determine if the PDB Is Faulty” on page 247

Returning the Server to Operation

These topics explain how to return the Netra Server X3-2 (formerly Sun Netra X4270 M3 Server) from Oracle to operation after you perform service procedures.

Step	Task	Link
1.	Install the PDB duct if you serviced these components: <ul style="list-style-type: none">• USB board• Motherboard• PDB• PDB signal cable	“Install the PDB Duct” on page 256
2.	Install the air duct if you serviced the components in Step 1 or these components: <ul style="list-style-type: none">• DIMMs• LED board	“Install the Air Duct” on page 258
3.	Secure the drive cage if you serviced the components in Step 1, Step 2, or this component: <ul style="list-style-type: none">• Drive backplane	“Secure the Drive Cage” on page 260
4.	Install the fan tray if you serviced the components in Step 1, Step 2, Step 3, or these components: <ul style="list-style-type: none">• Drive signal cable• Drive power cable• DVD SATA cable	“Install the Fan Tray” on page 262
5.	Install the top cover if you serviced the components in Step 1, Step 2, Step 3, Step 4 or these components: <ul style="list-style-type: none">• Fan modules• Risers• PCIe3 cards• Battery• USB drive	“Install the Top Cover” on page 263
6.	Install the server into the rack.	See <i>Server Installation</i> , install the server into the rack.

Step	Task	Link
7.	Connect power cords to the server.	“Connect Power Cords” on page 265
8.	Power on the server by one of two methods.	“Power On the Server (Oracle ILOM)” on page 267 “Power On the Server (Power Button)” on page 267
9.	Verify the installation of the component, if you serviced the components in Step 1, Step 2, Step 3, Step 5, or these components: <ul style="list-style-type: none"> • Drives • DVD drive • Power supplies 	“Verify the Motherboard” on page 245 “Verify the PDB” on page 253 “Verify a DIMM” on page 202 “Verify the LED Board” on page 226 “Verify the Drive Backplane” on page 190 “Verify a Fan Module” on page 131 “Verify a Riser” on page 141 “Verify a PCIe3 Card” on page 156 “Verify a Drive” on page 109 “Verify a Power Supply” on page 124

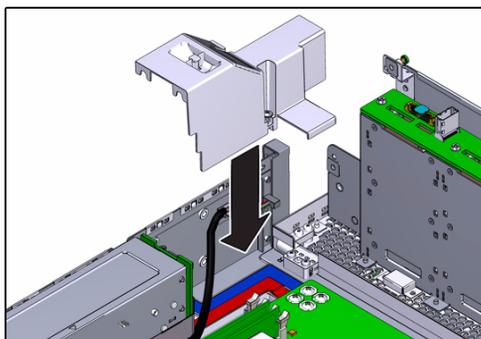
Related Information

- [“Identifying Components” on page 1](#)
- [“Detecting and Managing Faults” on page 9](#)
- [“Preparing for Service” on page 63](#)

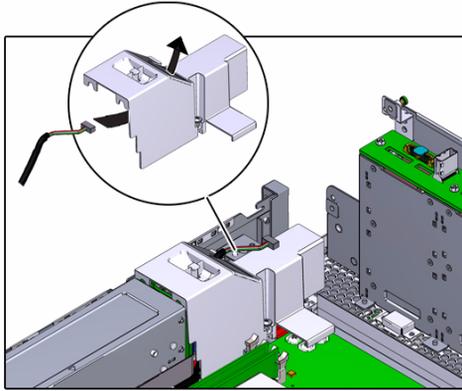
▼ Install the PDB Duct

Perform this task when you have previously removed the PDB duct.

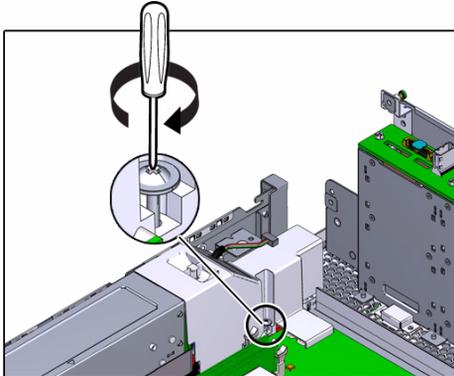
1. Lower the PDB duct down over the PDB and the bus bars.



2. Gently pass the USB cables into the slot of the duct.



3. Tighten the captive screw to secure the duct to the motherboard and chassis.



4. Consider your next step.

- If you installed the PDB duct as part of another component's installation procedure, return to that procedure. See ["Component Service Task Reference" on page 67](#) for assistance.
- Otherwise, install the air duct.
See ["Install the Air Duct" on page 258](#).

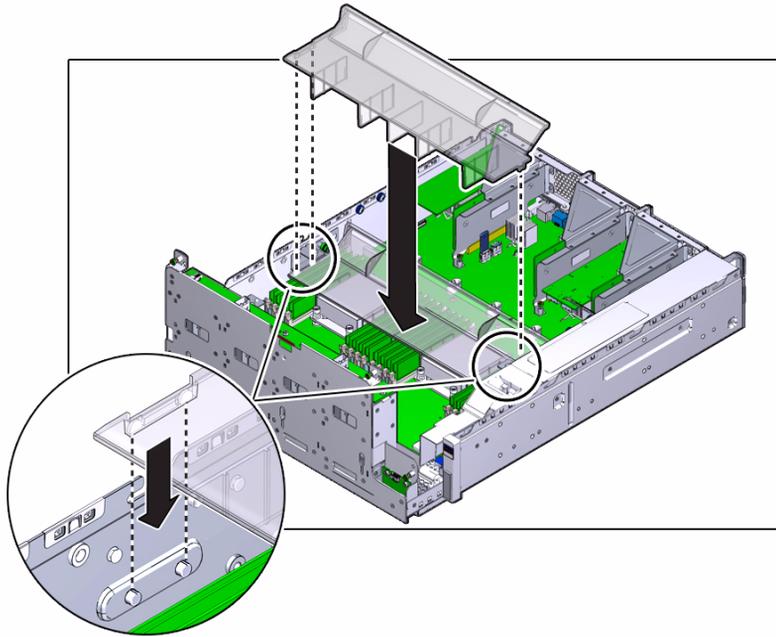
Related Information

- ["Remove the PDB Duct" on page 94](#)
- ["Install the Air Duct" on page 258](#)

▼ Install the Air Duct

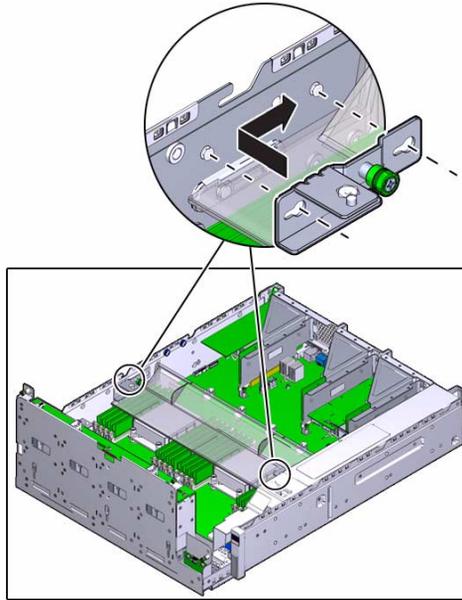
Perform this task when you have previously removed the air duct.

1. If you previously removed the PDB duct, install it.
See [“Install the PDB Duct”](#) on page 256.
2. Move any loose cables to the gap between the DIMMs and the chassis walls.
3. Align the air duct to where it installs into the chassis.

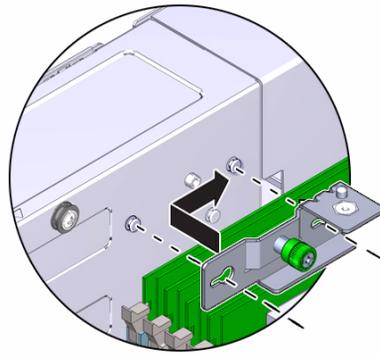


There are two alignment pins on the left and one on the right.

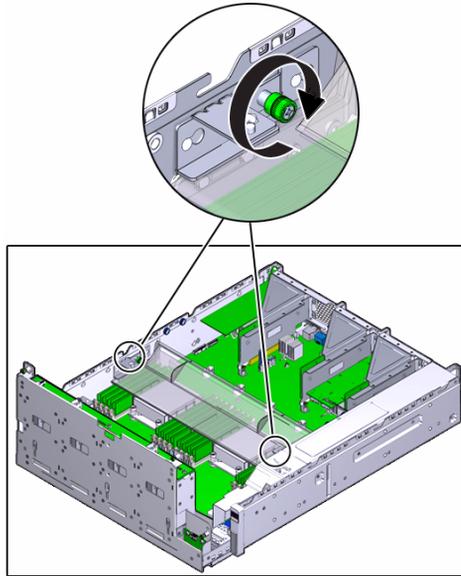
4. Lower the air duct onto the alignment pins.
5. Set the left (L) thumbscrew bracket over the alignment pins and slide it rearward.



6. Set the right (R) thumbscrew bracket over the alignment pins and slide it forward.



7. Tighten the thumbscrews.



8. Consider your next step.

- If you installed the air duct as part of another component's removal or installation procedure, return to that procedure. See ["Component Service Task Reference"](#) on page 67 for assistance.
- Otherwise, secure the drive cage.
See ["Secure the Drive Cage"](#) on page 260.

Related Information

- ["Install the PDB Duct"](#) on page 256
- ["Remove the Air Duct"](#) on page 92
- ["Secure the Drive Cage"](#) on page 260

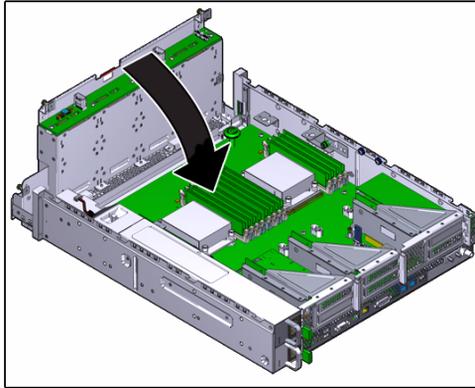
▼ Secure the Drive Cage

Perform this task when you have previously pivoted the drive cage to the service position.

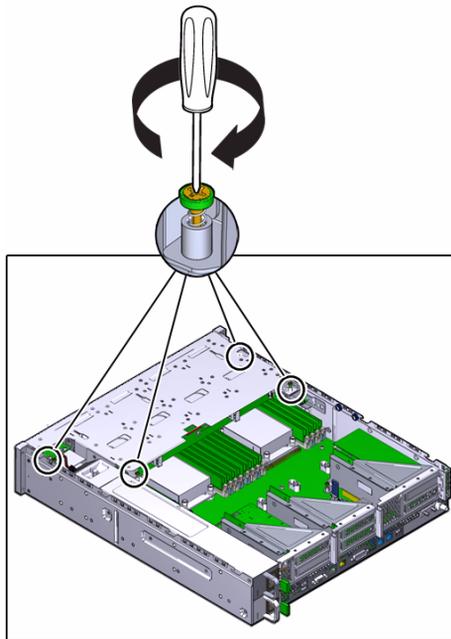
1. **If you previously removed the PDB duct or removed the air duct, complete these prerequisites, as necessary, in this order.**
 - ["Install the PDB Duct"](#) on page 256

- [“Install the Air Duct”](#) on page 258

2. Lower the drive cage to the horizontal position.



3. Tighten the four screws securing the drive cage to the chassis.



4. Connect the cables to the drive backplane, and the cable attached to the USB board.

These cables (2), (3), (4), and (6) are visible in [“Cable Configuration”](#) on page 170.

Note – Depending on your server’s configuration, you might not have the DVD SATA cable (3) as seen in the illustration.

5. Install the filter.

See “Install the Filter” on page 99.

6. Consider your next step.

- If you secured the drive cage as part of another component’s removal or installation procedure, return to that procedure. See “Component Service Task Reference” on page 67 for assistance.
- Otherwise, install the fan tray.
See “Install the Fan Tray” on page 262.

Related Information

- “Install the Air Duct” on page 258
- “Raise the Drive Cage to the Service Position” on page 90
- “Install the Fan Tray” on page 262

▼ Install the Fan Tray

Perform this task when you have previously removed the fan tray.

1. If you previously removed the PDB duct, removed the air duct, or raised the drive cage, complete these prerequisites, as necessary, in this order.

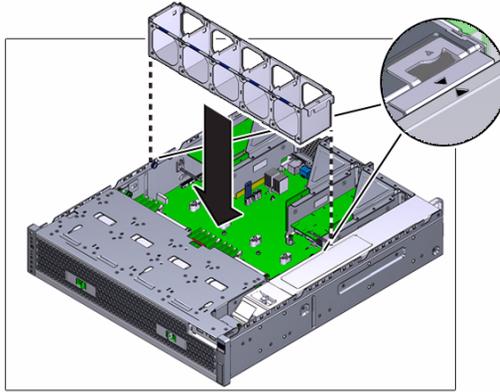
- “Install the PDB Duct” on page 256
- “Install the Air Duct” on page 258
- “Secure the Drive Cage” on page 260

2. Move any loose cables so that they are against the chassis walls.

3. Align the fan tray to where it installs into the chassis.

The single arrow on the right end of the fan tray aligns with the single arrow on the power supply bay.

4. Slowly lower the fan tray into the chassis, gently working the cables into the gaps between the fan tray and chassis walls.



5. Verify that the fan tray is properly seated, no cables are pinched, and the top surfaces of the fan tray are flush with the chassis.
6. Install the fan modules.
See [“Install a Fan Module”](#) on page 129.
7. Consider your next step.
 - If you installed the fan tray as part of another component’s removal or installation procedure, return to that procedure. See [“Component Service Task Reference”](#) on page 67 for assistance.
 - Otherwise, install the top cover.
See [“Install the Top Cover”](#) on page 263.

Related Information

- [“Secure the Drive Cage”](#) on page 260
- [“Remove the Fan Tray”](#) on page 89
- [“Install the Top Cover”](#) on page 263

▼ Install the Top Cover

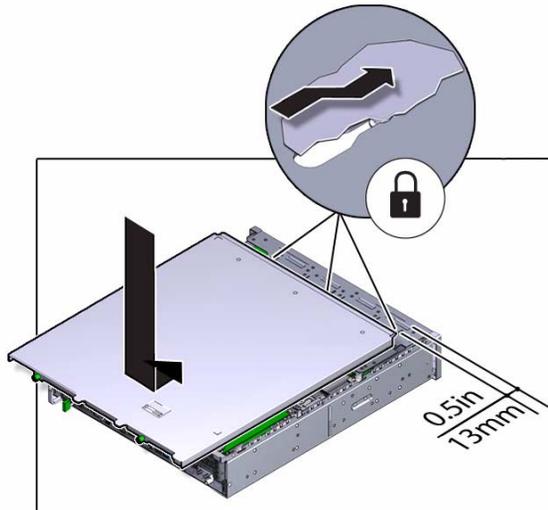
Perform this task when you have previously removed the top cover.

1. If you previously removed the PDB duct, removed the air duct, raised the drive cage, or removed the fan tray, complete these prerequisites, as necessary, in this order.
 - [“Install the PDB Duct”](#) on page 256

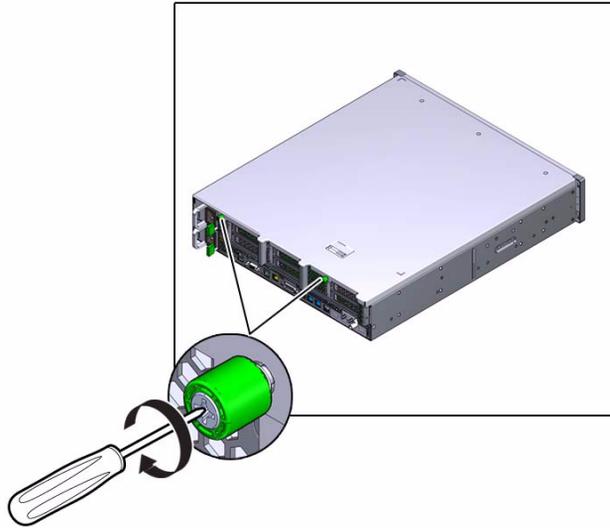
- “Install the Air Duct” on page 258
- “Secure the Drive Cage” on page 260
- “Install the Fan Tray” on page 262
- “Install a Fan Module” on page 129

Install all fan modules.

2. Position the top cover on the chassis, with the front edge of the top cover 0.5 in. (13 mm) rearward of the front edge of the chassis.



3. Slide the top cover forward into place.
4. Secure the top cover with the two captive screws at the rear.



5. Install the server into the rack.

Refer to *Server Installation*, installing the server into the rack.

6. Connect the power cords.

See “[Connect Power Cords](#)” on page 265.

Related Information

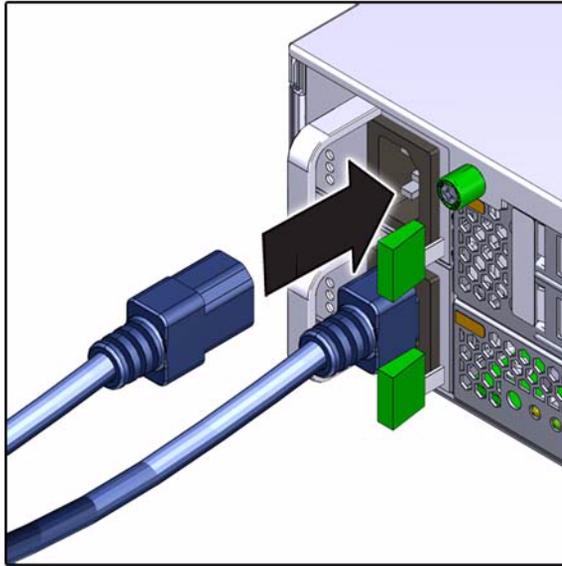
- “[Install the Fan Tray](#)” on page 262
- “[Remove the Top Cover](#)” on page 87
- “[Connect Power Cords](#)” on page 265

▼ Connect Power Cords

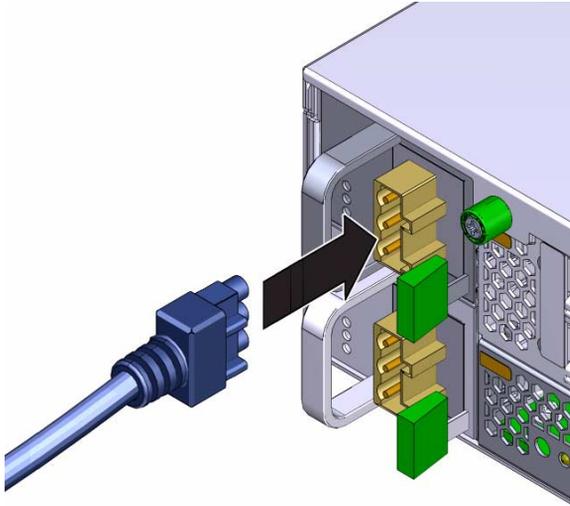
1. Reconnect the power cords to the power supplies.

Note – As soon as the power cords are connected, standby power is applied. Depending on how the firmware is configured, the system might boot at this time.

For AC power cords.



For DC power cords.



2. Power on the server.

See one of these topics:

- [“Power On the Server \(Oracle ILOM\)”](#) on page 267
- [“Power On the Server \(Power Button\)”](#) on page 267

Related Information

- [“Install the Top Cover”](#) on page 263
- [“Disconnect Power Cords”](#) on page 72
- [“Power On the Server \(Oracle ILOM\)”](#) on page 267
- [“Power On the Server \(Power Button\)”](#) on page 267

▼ Power On the Server (Oracle ILOM)

1. Access Oracle ILOM.

See [“Access the SP \(Oracle ILOM\)”](#) on page 17.

2. Power on the server.

```
-> start /System
```

The server powers on and boots.

3. If you want to verify an installed component, return to that component's verification procedure.

See [“Component Service Task Reference”](#) on page 67 for assistance.

Related Information

- [“Connect Power Cords”](#) on page 265
- [“Power Off the Server \(Oracle ILOM\)”](#) on page 71
- [“Power On the Server \(Power Button\)”](#) on page 267

▼ Power On the Server (Power Button)

1. Momentarily press and release the Power button on the front panel.

See [“Front Panel Components \(Service\)”](#) on page 6 for the location of the Power button.

The server powers on and boots.

2. If you want to verify an installed component, return to that component's verification procedure.

See "Component Service Task Reference" on page 67 for assistance.

Related Information

- "Connect Power Cords" on page 265
- "Power Off the Server (Power Button - Graceful)" on page 72
- "Power Off the Server (Emergency Shutdown)" on page 72
- "Front Panel Components (Service)" on page 6
- "Power On the Server (Oracle ILOM)" on page 267

Glossary

A

ACPI	Advanced Configuration and Power Interface.
ANSI SIS	American National Standards Institute Status Indicator Standard.
ASF	Alert standard format (Netra products only).
ASR	Automatic system recovery.
AWG	American wire gauge.

B

BAT	basic assurance test.
BIOS	Basic Input Output System.
blade	Generic term for server modules and storage modules. See <i>server module</i> and <i>storage module</i> .
blade server	Server module. See <i>server module</i> .
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. <i>See Modular system and Oracle ILOM.</i>
CMM Oracle ILOM	Oracle ILOM that runs on the CMM. <i>See Oracle ILOM.</i>

D

DHCP	Dynamic Host Configuration Protocol.
disk module or disk blade	Interchangeable terms for storage module. <i>See storage module.</i>
DTE	Data terminal equipment.

E

ECC	Error-correcting code.
EIA	Electronics Industries Alliance.
ESD	Electrostatic discharge.

F

FEM	Fabric expansion module. FEMs enable server modules to use the 10GbE connections provided by certain NEMs. <i>See NEM.</i>
FRU	Field-replaceable unit.

G

- GPT** GUID partition table.
- GRUB** GRand Unified Bootloader. A GNU implementation that supports booting multiple OSs on a computer.

H

- HBA** Host bus adapter.
- HMP** Hardware Management Pack.
- 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

- ICMP** Internet Control Message Protocol.
- IDE** Integrated Development Environment.
- ID PROM** Chip that contains system information for the server or server module.
- IP** Internet Protocol.

K

- KVM** Keyboard, video, mouse. Refers to using a switch to enable sharing of one keyboard, one display, and one mouse with more than one computer.

L

LwA Sound power level.

M

MAC Machine access code.

MAC address Media access controller address.

MBR Master boot record.

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.

NEBS Network Equipment-Building System (Netra products only).

NEM Network express module. NEMs provide 10/100/1000 Mbps 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.
OS	Operating system.
OSA	Oracle System Assistant.

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.
PDB	power distribution board.
PMR	Physical media request.
POST	Power-on self-test.
PROM	Programmable read-only memory.
PSH	Predictive self healing.
PXE	Pre-boot eXecution environment.

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.
- RHEL** Red Hat Enterprise Linux.

S

- SAN** Storage area network.
- SAS** Serial attached SCSI.
- SATA** Serial advanced technology attachment.
- 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.
- SLES** SUSE Linux Enterprise Server.
- SMART** Self-Monitoring, Analysis, and Reporting Technology.
- SNMP** Simple network management protocol.
- SP** Service processor. In the server or server module, the SP is a card with its own OS. The SP processes Oracle ILOM commands providing lights out management control of the host. See [host](#).
- SRU** Support Repository Update. Used to updated the Oracle Solaris OS.
- SSD** Solid-state drive.
- SSH** Secure shell.
- storage module** Modular component that provides computing storage to the server modules.

T

- TIA** Telecommunications Industry Association (Netra products only).
- Tma** Maximum ambient temperature.
- TPM** Trusted Platform Module (a Windows 2008 feature).

U

- UCP** Universal connector port.
- UEFI** Unified Extensible Firmware Interface.
- UI** User interface.
- UL** Underwriters Laboratory Inc.
- U.S. NEC** United States National Electrical Code.
- UTC** Coordinated Universal Time.
- UUID** Universal unique identifier.

V

- VM** Virtual machine.

W

- WDS** Windows Deployment Services.
- WIM** Windows Imaging Format.
- WWN** World wide name. A unique number that identifies a SAS target.

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