

# **Oracle ZFS Storage ZS3-ES**

## **Service Manual**



Part No.: E48559-02  
December 2014

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# Contents

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## **Using This Documentation ix**

## **About the Oracle ZFS Storage ZS3-ES 1**

Product Description 1

About Controls and Connectors 2

Front Panel Controls and Indicators 2

Server Back Panel View 3

About Server and Component Status Indicators 5

Server General Status Indicators 5

Server Fan Status Indicators 7

Storage Drive Status Indicators 8

Power Supply Status Indicators 8

Motherboard Status Indicators 9

DDR3 DIMM Fault Status Indicators 9

Processor Fault Status Indicators 10

Fault Remind Power Status Indicators 10

Standby Power Good Status Indicators 10

About System Components 11

Illustrated Parts Breakdown 11

Customer-Replaceable Units 13

Field-Replaceable Units 14

## **Troubleshooting the Server 15**

Service Troubleshooting Task List 15

Diagnostic Tools 16

▼ Gather Service Information 17

▼ Locate the Server Serial Number 18

Inspecting the System 19

▼ Troubleshoot Power Problems 19

▼ Inspect the Server Externally 20

▼ Inspect Internal Server Components 20

## **Preparing for Service 23**

Safety Precautions 23

Safety Symbols 24

Electrostatic Discharge Safety 24

Required Tools 25

Preparing the Server for Component Replacement 26

Powering Down the Server 26

▼ Graceful Server Power Down 27

▼ Emergency Server Power Down Using the Power Button 28

▼ Emergency Server Power Down Using the Oracle ILOM CLI 29

▼ Emergency Server Power Down Using the Oracle ILOM Web  
Interface 30

▼ Disconnect Cables From the Server 31

▼ Extend the Server to the Maintenance Position 31

▼ Remove the Server From the Rack 33

▼ Take Antistatic Measures 39

▼ Open the Server Fan Door 39

▼ Remove the Server Top Cover 40

## **Servicing CRUs That Do Not Require Server Power Off 43**

Servicing Storage Drives (CRU) 43



Storage Drives Hot-Plug Conditions	44
Storage Drive Status Indicators	44
▼ Remove a Storage Drive	45
▼ Install a Storage Drive	46
Servicing Fan Modules (CRU)	47
▼ Remove a Fan Module	48
▼ Install a Fan Module	51
Servicing Power Supplies (CRU)	52
Power Supply Status Indicators	52
▼ Remove a Power Supply	53
▼ Install a Power Supply	54
<b>Servicing CRUs That Require Server Power Off</b>	<b>57</b>
CRU Locations	57
Servicing the DIMMs (CRU)	58
DIMM and Processor Physical Layout	59
Inconsistencies Between DIMM Fault LEDs and the BIOS Isolation of Faulty DIMMs	60
Using the Fault Remind Button	61
▼ Identify and Remove Faulty DIMMs	62
▼ Install a DIMM	63
Servicing PCIe Risers (CRU)	64
PCIe Riser Location and Differences	65
▼ Remove a PCIe Riser From PCIe Slot 1 or 2	66
▼ Install a PCIe Riser Into PCIe Slot 1 or 2	68
▼ Remove a PCIe Riser From PCIe Slots 3 and 4	70
▼ Install a PCIe Riser Into PCIe Slots 3 and 4	71
Servicing PCIe Cards (CRU)	73
PCIe Slot Characteristics	74

- ▼ Identify a Faulty PCIe Card in the BUI 75
- ▼ Remove a PCIe Card From PCIe Slot 1 or 2 75
- ▼ Install a PCIe Card in PCIe Slot 1 or 2 76
- ▼ Remove a PCIe Card From PCIe Slot 3 77
- ▼ Install a PCIe Card in the PCIe Riser in Slot 3 78
- ▼ Remove the Internal HBA Card 79
- ▼ Install the Internal HBA Card in the PCIe Riser 80

#### Servicing the Internal USB Flash Drive (CRU) 81

- ▼ Remove an Internal USB Flash Drive 82
- ▼ Install an Internal USB Flash Drive 83

#### Servicing the Battery (CRU) 84

- ▼ Remove the Battery 84
- ▼ Install the Battery 85

### **Servicing FRUs 87**

#### FRU Locations 87

#### Servicing Processors (FRU) 88

- ▼ Remove a Processor 89
- ▼ Install a Processor 94

#### Servicing the Disk Backplane (FRU) 98

##### Disk Backplane Configuration 99

- ▼ Remove the Disk Backplane 100
- ▼ Install the Disk Backplane 102

#### Servicing the Front Indicator Module (FRU) 104

- ▼ Remove the Front Indicator Module 105
- ▼ Install the Front Indicator Module 106

#### Servicing the Motherboard (FRU) 107

- ▼ Remove the Motherboard 108
- ▼ Install the Motherboard 111

- Servicing the SAS Cables (FRUs) 114
  - ▼ Remove Storage Drive SAS Cables 115
  - ▼ Install Storage Drive SAS Cables 116

## **Returning the Server to Operation 119**

- Removing and Installing Server Filler Panels 119
  - ▼ Remove and Install Filler Panels 120
  - ▼ Install the Top Cover 120
  - ▼ Remove Antistatic Measures 122
  - ▼ Reinstall the Server Chassis Into the Rack 122
  - ▼ Return the Server to the Normal Rack Position 123
  - ▼ Install the Cable Management Arm 125
  - ▼ Reconnect Data Cables and Power Cords 133
  - ▼ Power On the Server 134

## **Identifying the Server Ports 137**

- Gigabit Ethernet Ports 137
- Network Management Port 138
- Serial Management Port 139
- Video Connector 141
- USB Ports 142

## **Getting Server Firmware and Software 145**

- Firmware and Software Updates 145
- Firmware and Software Access Options 146
  - ▼ Download Firmware and Software Using My Oracle Support 146

## **Index 149**



# Using This Documentation

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This service manual explains how to remove and replace parts in the Oracle ZFS Storage ZS3-ES, and how to troubleshoot and maintain the system.

This document is intended for system administrators, network administrators, and service technicians who have an understanding of server systems.

This section describes how to get the latest software and firmware, documentation and feedback, and support and accessibility information.

- [“About This Documentation” on page ix](#)
- [“Related Documentation” on page x](#)
- [“Feedback” on page x](#)
- [“Support and Accessibility” on page x](#)

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## About This Documentation

This documentation set is available in both PDF and HTML formats. The information is presented in topic-based organization (similar to online help) and therefore does not include chapters, appendices, or section numbering.

A PDF version that includes all information on a particular topic subject (such as hardware installation or product notes) can be generated by clicking the PDF button in the upper left corner of the HTML page.

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## Related Documentation

Documentation	Link
All Oracle documentation	<a href="http://www.oracle.com/documentation">http://www.oracle.com/documentation</a>
Oracle ZFS Storage ZS3-ES	<a href="http://www.oracle.com/goto/ZS3-ES/docs">http://www.oracle.com/goto/ZS3-ES/docs</a>
All Oracle Disk Storage Systems documentation	<a href="http://www.oracle.com/goto/ZFSStorage/docs">http://www.oracle.com/goto/ZFSStorage/docs</a>
Oracle Integrated Lights Out Manager (ILOM) 3.1	<a href="http://www.oracle.com/pls/topic/lookup?ctx=ilom31">http://www.oracle.com/pls/topic/lookup?ctx=ilom31</a>

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Learn about Oracle's commitment to accessibility	<a href="http://www.oracle.com/us/corporate/accessibility/index.html">http://www.oracle.com/us/corporate/accessibility/index.html</a>

# About the Oracle ZFS Storage ZS3-ES

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**Note** – For information about servicing Oracle disk shelves attached to the server, see the *Oracle ZFS Storage Appliance Customer Service Manual* for the appropriate software release. See the *Oracle ZFS Storage Appliance Cabling Guide* for information about connecting Oracle disk shelves to the server and to each other.

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These topics describe the controls, connectors, status indicators, system components, and replaceable components of the server.

Description	Links
Product Description	<a href="#">“Product Description” on page 1</a>
Learn about server controls and connectors.	<a href="#">“About Controls and Connectors” on page 2</a>
Learn about the server and component status indicators	<a href="#">“About Server and Component Status Indicators” on page 5</a>
Learn about system components.	<a href="#">“About System Components” on page 11</a>

---

## Product Description

The Oracle ZFS Storage ZS3-ES is an enterprise-class, one rack unit (1U) server. It supports the following components:

- Sixteen 16 GB DDR3 DIMMs occupying all DIMM slots. There are no empty DIMM slots and, therefore, no fillers.

**Note** – All DIMMs must be identical within each server and for both clustered servers.

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- Four PCIe Gen3 slots: three external slots and one internal.
  - Eight 2.5-inch SAS-2 hard disk drive (HDD)/solid state disk (SSD) slots, which are occupied as follows:
    - Two system disks in slots 0 and 1
    - Two SAS-2 Readzilla devices in slots 2 and 3
    - Four HDD/SSD fillers in slots 4 through 7
  - Two hot-pluggable, redundant power supplies.
  - An on-board Oracle Integrated Lights Out Manager (Oracle ILOM) service processor (SP) based on the AST2300 chip.
- 

## About Controls and Connectors

The following topics describe the controls and connectors located on the front and rear panels.

- [“Front Panel Controls and Indicators” on page 2](#)
- [“Server Back Panel View” on page 3](#)

### Related Information

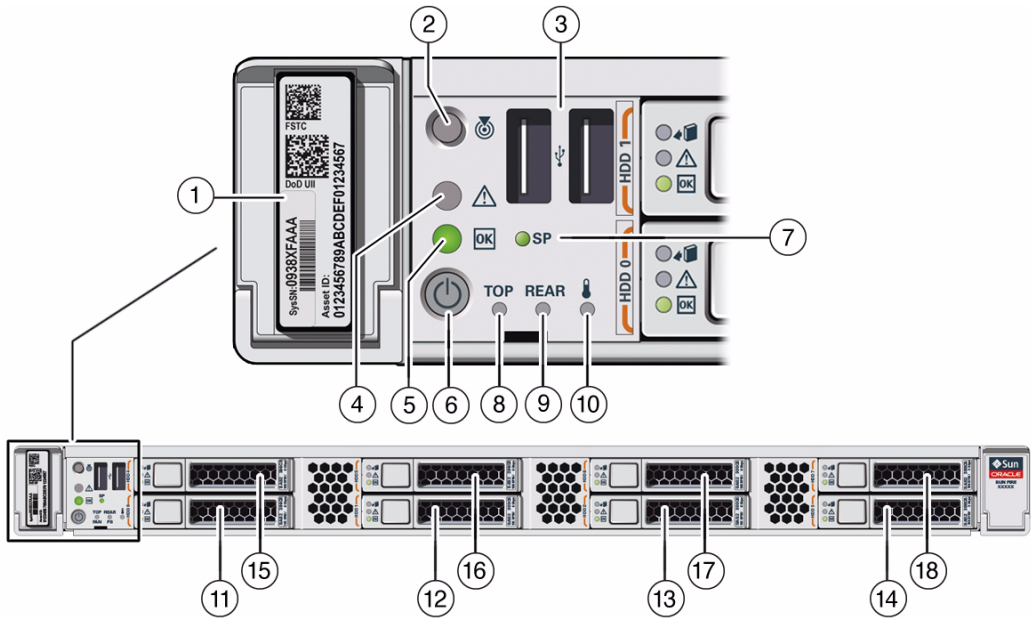
- [“About System Components” on page 11](#)
- [“About Server and Component Status Indicators” on page 5](#)
- [“Illustrated Parts Breakdown” on page 11](#)

## Front Panel Controls and Indicators

The following figure shows the status indicators (LEDs), connectors, and drives on the front panel of the Oracle ZFS Storage ZS3-ES.



**FIGURE:** Front Panel View



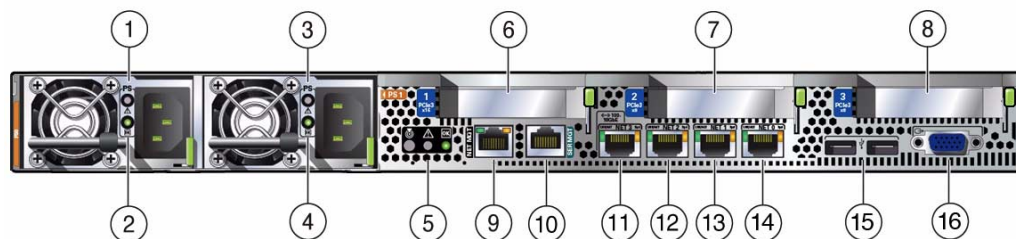
**Figure Legend**

1	Product Serial Number (PSN) label and Radio Frequency Identification (RFID) tag	10	System Over Temperature LED: amber
2	Locator LED/Locator button: white	11	System disk, slot 0
3	USB 2.0 connectors (2)	12	System disk, slot 1
4	Service Required LED: amber	13	Readzilla device, slot 2
5	Power/OK LED: green	14	Readzilla device, slot 3
6	Power button	15	Drive filler panel, slot 4
7	SP OK LED: green	16	Drive filler panel, slot 5
8	Fan Fault LED: amber	17	Drive filler panel, slot 6
9	Power Supply (PS) Fault LED: amber	18	Drive filler panel, slot 7

## Server Back Panel View

The following figure shows the Oracle ZFS Storage ZS3-ES back panel and the location of power supplies, status indicators (LEDs), connectors, and PCIe slots.

**FIGURE:** Server Back Panel View



**Figure Legend**

1	Power Supply (PS) 0	9	Integrated Lights Out Manager (ILOM) service processor (SP) network management 10/100BASE-T port (NET MGT)
2	Power Supply (PS) 0 status indicators: Service Required LED: amber AC OK LED: green	10	Serial management (SER MGT)/RJ-45 serial port
3	Power Supply (PS) 1	11	Network (NET) 100/1000/10000 port: NET 3
4	Power Supply (PS) 1 status indicators: Service Required LED: amber, AC OK LED: green	12	Network (NET) 100/1000/10000 port: NET 2
5	System status indicators: Locator LED: white, Service Required LED: amber, Power/OK LED: green	13	Network (NET) 100/1000/10000 port: NET 1
6	PCIe card slot 1 (InfiniBand card for connectivity to client servers)	14	Network (NET) 100/1000/10000 port: NET 0
7	PCIe card slot 2 (Clustron V2 PCIe card for connecting the Oracle ZFS Storage ZS3-ES servers together)	15	USB 2.0 connectors (2)
8	PCIe card slot 3 (SAS-2 host bus adapter (HBA) for disk shelf connectivity. Slot 4 is for an internal SAS-2 HBA and is not visible from the rear.)	16	DB-15 video connector

**Note** – All of the PCIe slots comply with the PCI Express 3.0 specification and can accommodate 25 watt PCIe3 cards.

### **Related Information**

- [“Front Panel Controls and Indicators” on page 2](#)
- [“About System Components” on page 11](#)

---

## About Server and Component Status Indicators

These topics describe the status indicators (LEDs) located on the front and rear of the server, including those found on components and ports.

- [“Server General Status Indicators” on page 5](#)
- [“Server Fan Status Indicators” on page 7](#)
- [“Storage Drive Status Indicators” on page 8](#)
- [“Power Supply Status Indicators” on page 8](#)
- [“Motherboard Status Indicators” on page 9](#)





### **Related Information**

- [“About Controls and Connectors” on page 2](#)
- [“Service Troubleshooting Task List” on page 15](#)


## Server General Status Indicators

There are six, system-level status indicators (LEDs), some of which are located on both the server front panel and the server back panel.

**TABLE:** Server General Status Indicators

LED Name	Icon	Color	State Meaning
Locator LED and button		White	<ul style="list-style-type: none"><li>• OFF – Server is operating normally</li><li>• FAST BLINK – Use Oracle ILOM to activate this LED to enable you to locate a particular system quickly and easily.</li><li>• Pressing the Locate button will toggle the LED fast blink on or off.</li></ul>
Service Required		Amber	<ul style="list-style-type: none"><li>• OFF – Normal operation</li><li>• STEADY ON – Fault present on server. This LED lights whenever a fault indicator lights for a server replaceable component.</li></ul> <p><b>Note</b> - The lighting of this indicator is always accompanied by the system console message that includes a recommended service action.</p>
Power/OK		Green	<p>Indicates the operational state of the chassis. This indicator can be in the following states:</p> <ul style="list-style-type: none"><li>• OFF – AC power is not present or the Oracle ILOM boot is not complete.</li><li>• STEADY BLINK – Standby power is on, but the chassis power is off and the Oracle ILOM SP is running.</li><li>• SLOW BLINK – Startup sequence has been initiated on the host. This pattern should begin soon after you power on the server. This status indicates either: (1) POST code checkpoint tests are running on the server host system, or (2) the host is transitioning from the powered-on state to the standby state on shutdown.</li><li>• STEADY ON – The server is powered on, and all host POST code checkpoint tests are complete. The server is in one of the following states: 1) the server host is booting the operating system (OS), 2) the server host is running the OS.</li></ul>
SP OK		Green	<ul style="list-style-type: none"><li>• OFF – Service processor (SP) is not running.</li><li>• SLOW BLINK – SP is booting.</li><li>• STEADY ON – SP is fully operational.</li></ul>

**TABLE:** Server General Status Indicators *(Continued)*

LED Name	Icon	Color	State Meaning
Top Fan, Processor, Memory Failure	TOP	Amber	Indicates that one or more of the internal fan modules, processors, or memory DIMMs have failed. <ul style="list-style-type: none"><li>• OFF – Indicates steady state; no service is required.</li><li>• STEADY ON – Indicates service required; service the fan modules, processor(s), or memory DIMMs.</li></ul>
Rear Power Supply Failure	REAR	Amber	Indicates that one of the server power supplies has failed. <ul style="list-style-type: none"><li>• OFF – Indicates steady state; no service is required.</li><li>• STEADY ON – Indicates service required; service the power supply.</li></ul>
Over Temperature Warning		Amber	<ul style="list-style-type: none"><li>• OFF – Normal operation; no service is required.</li><li>• STEADY ON – The system is experiencing an overtemperature warning condition.</li></ul> <p><b>Note</b> - This is a warning indication, not a fatal overtemperature. Failure to correct this might result in the system overheating and shutting down unexpectedly.</p>

**Related Information**

- [“Front Panel Controls and Indicators” on page 2](#)
- [“Server Back Panel View” on page 3](#)

# Server Fan Status Indicators

Each fan module has one bicolored status indicator (LED). These indicators are located on the server side wall adjacent to the fan modules and are visible when the top cover fan door is open.

**TABLE:** Server Fan Status Indicators

Indicator Name	Icon	Color	State Meaning
Fan Status	None	Bicolored: Amber/Green	<ul style="list-style-type: none"><li>• Amber – There is a fan fault.</li><li>• Green – Fan is properly installed and operating correctly. No fan errors detected.</li></ul>

**Related Information**




- [“Front Panel Controls and Indicators” on page 2](#)
- [“Server Back Panel View” on page 3](#)

- [“Servicing Fan Modules \(CRU\)” on page 47](#)

## Storage Drive Status Indicators

There are three status indicators (LEDs) on each drive.

**TABLE:** Server Front Storage Drive Indicators

LED Name	Icon	Color	State Meaning
OK to Remove		Blue	The storage drive can be removed safely during a hot-plug operation.
Service Required		Amber	<ul style="list-style-type: none"> <li>• OFF – Normal operation.</li> <li>• STEADY ON – The system has detected a fault with the storage drive.</li> </ul>
OK/Activity		Green	<ul style="list-style-type: none"> <li>• OFF – Power is off or installed drive is not recognized by the system.</li> <li>• STEADY ON – The drive is engaged and is receiving power.</li> <li>• STEADY BLINK – There is disk activity. Indicator blinks on and off to indicate activity.</li> </ul>



### Related Information

- [“Front Panel Controls and Indicators” on page 2](#)
- [“Server Back Panel View” on page 3](#)
- [“Servicing Storage Drives \(CRU\)” on page 43](#)

## Power Supply Status Indicators

There are two status indicators (LEDs) on each power supply. These indicators are visible from the rear of the server.

**TABLE:** Server Power Supply Indicators

Indicator Name	Icon	Color	State Meaning
AC OK/DC OK		Green	<ul style="list-style-type: none"><li>• OFF – No AC power is present.</li><li>• SLOW BLINK – Normal operation. Input power is within specification. DC output voltage is not enabled.</li><li>• STEADY ON – Normal operation. Input AC power and DC output voltage are within specification.</li></ul>
Service Required		Amber	<ul style="list-style-type: none"><li>• OFF – Normal operation; no service required.</li><li>• STEADY ON – The power supply (PS) has detected a PS fan failure, PS overtemperature, PS over current, or PS over/under voltage.</li></ul>

### Related Information

- [“Front Panel Controls and Indicators” on page 2](#)
- [“Server Back Panel View” on page 3](#)
- [“Servicing Power Supplies \(CRU\)” on page 52](#)

## Motherboard Status Indicators

The motherboard and modules that are installed on the motherboard contain several status indicators (LEDs), which are described in the following sections:

- [“DDR3 DIMM Fault Status Indicators” on page 9](#)
- [“Processor Fault Status Indicators” on page 10](#)
- [“Fault Remind Power Status Indicators” on page 10](#)
- [“Standby Power Good Status Indicators” on page 10](#)

## DDR3 DIMM Fault Status Indicators

Each of the sixteen DDR3 DIMM slots on the motherboard has an amber fault status indicator (LED) associated with it. If Oracle ILOM determines that a DIMM is faulty, pressing the Fault Remind button on the motherboard signals the service processor to light the fault LEDs associated with the faulted DIMMs.

## Processor Fault Status Indicators

The motherboard includes a fault status indicator (LED) adjacent to each of the two processor sockets. These LEDs indicate when a processor is faulty. For example, if on reboot the BIOS detects that there are uncorrectable processor errors recorded in the machine check architecture (MCA) registers apparently left over from the previous boot, then the BIOS and Oracle ILOM work together to record and diagnose these errors. If it is determined that a processor is faulty, pressing the Fault Remind button on the motherboard signals the service processor to light the fault LED associated with the faulted processor.

## Fault Remind Power Status Indicators

This status indicator (LED) is located next to the Fault Remind button and is powered from the super capacitor that powers the fault LEDs on the motherboard. This LED lights to indicate that the fault remind circuitry is working properly in cases where no components have failed and, as a result, none of the component fault LEDs illuminate.

## Standby Power Good Status Indicators

The service instructions for all internal components require that all AC power be removed from the power supplies prior to the server's top cover being removed. This green status indicator (LED) is labeled STBY PWRGD and is located on the rear of the server near PCIe slot 2. The LED might be obscured by the PCIe card.

This LED lights to inform a service technician that the motherboard is receiving standby power from at least one of the power supplies. This indicator is provided to help prevent service actions on the server's internal components while the AC power cords are installed and power is being supplied to the server.

### Related Information

- [“Front Panel Controls and Indicators” on page 2](#)
- [“Server Back Panel View” on page 3](#)
- [“Illustrated Parts Breakdown” on page 11](#)



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# About System Components

These topics describe the components of the server:

- [“Illustrated Parts Breakdown” on page 11](#)
- [“Customer-Replaceable Units” on page 13](#)
- [“Field-Replaceable Units” on page 14](#)

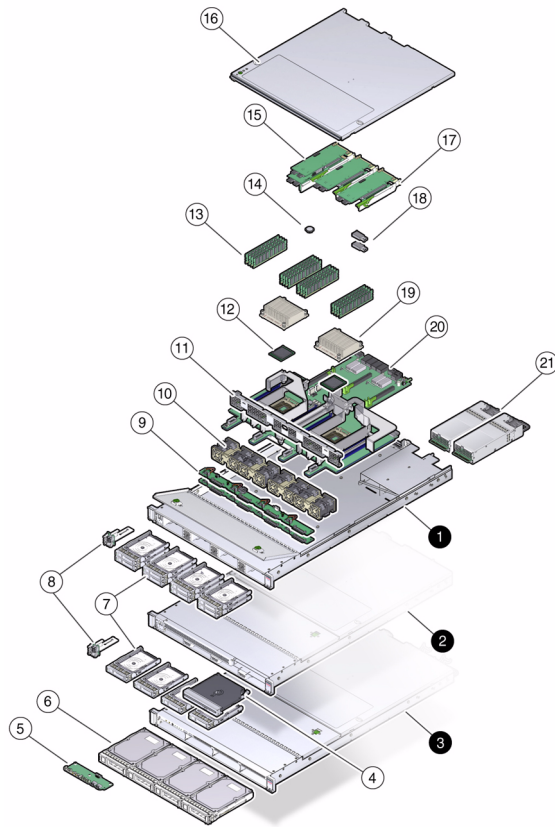
## **Related Information**

- [“Servicing CRUs That Do Not Require Server Power Off” on page 43](#)
- [“Servicing CRUs That Require Server Power Off” on page 57](#)
- [“Servicing FRUs” on page 87](#)

## Illustrated Parts Breakdown

The following figure identifies the major components of the server.

**FIGURE:** Server Illustrated Parts Breakdown



**Figure Legend**

1	Server chassis for eight 2.5-inch storage drives	12	Processors
2	Not applicable	13	DIMMs <b>Note:</b> All 16 DIMM slots must be filled with DIMMs. All DIMMs must be identical within each server and for both clustered servers.
3	Not applicable	14	Battery
4	Not applicable	15	PCIe cards and the internal HBA card
5	Not applicable	16	Top cover
6	Not applicable	17	PCIe riser
7	Eight 2.5-inch storage drives	18	USB flash drive
8	Front indicator module (FIM)	19	Processor heatsinks

**Figure Legend** *(Continued)*

<b>9</b>	Disk backplanes	<b>20</b>	Motherboard
<b>10</b>	Fan modules	<b>21</b>	Power supplies
<b>11</b>	Chassis mid-wall	<b>22</b>	Not applicable

## Customer-Replaceable Units

The table below lists the customer-replaceable units (CRUs) in the server and directs you to the replacement instructions.

CRU	Description	Replacement Instructions
Battery	Lithium coin-cell battery that powers the CMOS BIOS and real-time clock.	<a href="#">“Servicing the Battery (CRU)” on page 84</a>
DIMMs	Replace memory in the system.	<a href="#">“Servicing the DIMMs (CRU)” on page 58</a>
Storage drives	Supports SAS-2 solid-state or hard-disk drives.	<a href="#">“Servicing Storage Drives (CRU)” on page 43</a>
Fan Modules	Contains four fan modules for cooling the motherboard assembly and installed components.	<a href="#">“Servicing Fan Modules (CRU)” on page 47</a>
PCIe cards	Optional add-on cards that can expand the functionality of the server.	<a href="#">“Servicing PCIe Cards (CRU)” on page 73</a>
PCIe risers	Houses and connects the PCIe cards.	<a href="#">“Servicing PCIe Risers (CRU)” on page 64</a>
Power supplies (PSs)	Two fully redundant AC power supplies.	<a href="#">“Servicing Power Supplies (CRU)” on page 52</a>
USB flash drive (internal)	Replace internal flash drive.	<a href="#">“Servicing the Internal USB Flash Drive (CRU)” on page 81</a>

### Related Information

- [“Field-Replaceable Units” on page 14](#)
- [“Illustrated Parts Breakdown” on page 11](#)
- [“Servicing CRUs That Do Not Require Server Power Off” on page 43](#)
- [“Servicing CRUs That Require Server Power Off” on page 57](#)

# Field-Replaceable Units

The table below lists the field-replaceable units (FRUs) in the server and directs you to the replacement instructions.

FRU	Description	Replacement Instructions
Processor	Carries out the instructions of the system.	<a href="#">“Servicing Processors (FRU)” on page 88</a>
Disk backplane	Serves as the interface between storage drives and the host bus adapter (HBA) card.	<a href="#">“Servicing the Disk Backplane (FRU)” on page 98</a>
Front indicator module (FIM)	Contains the front panel controls, indicators, and USB ports.	<a href="#">“Servicing the Front Indicator Module (FRU)” on page 104</a>
Motherboard assembly	Provides connectors for the fans, DIMMs, processor(s), PCIe risers, and internal USB ports, and power supplies.	<a href="#">“Servicing the Motherboard (FRU)” on page 107</a>
Internal HBA SAS controller cables	Serve to connect the disk backplane to the the internal host bus adapter (HBA) card.	<a href="#">“Servicing the SAS Cables (FRUs)” on page 114</a>

## Related Information

- [“Customer-Replaceable Units” on page 13](#)
- [“Illustrated Parts Breakdown” on page 11](#)
- [“Servicing FRUs” on page 87](#)

# Troubleshooting the Server

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These topics introduce the diagnostic tools and strategies available to help you diagnose problems with the system.

Description	Links
Review the tasks used to locate the specific problem with the system.	<a href="#">“Service Troubleshooting Task List” on page 15</a>
Understand the diagnostic system indicators, utilities, and commands available.	<a href="#">“Diagnostic Tools” on page 16</a>
Gather information about the system to help a service engineer or technician work on your system.	<a href="#">“Gather Service Information” on page 17</a>
Locate the server’s serial number.	<a href="#">“Locate the Server Serial Number” on page 18</a>
Inspect the system methodically to locate the faulty component or components.	<a href="#">“Inspecting the System” on page 19</a>

## Related Information

- [“About the Oracle ZFS Storage ZS3-ES” on page 1](#)
- [“Preparing for Service” on page 23](#)
- [“Returning the Server to Operation” on page 119](#)

---

## Service Troubleshooting Task List

Use the following table as a sequence for troubleshooting the server.

**TABLE:** Troubleshooting Task List

No.	Description	Section or Document
1	Gather initial service information.	<a href="#">“Gather Service Information” on page 17</a>
2	Investigate any power-on problems.	<a href="#">“Troubleshoot Power Problems” on page 19</a>
3	Perform external visual inspection and internal visual inspection.	<a href="#">“Inspect the Server Externally” on page 20</a> <a href="#">“Inspect Internal Server Components” on page 20</a>
4	View service processor logs and sensor information.	Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: <a href="http://www.oracle.com/pls/topic/lookup?ctx=ilom31">http://www.oracle.com/pls/topic/lookup?ctx=ilom31</a>
5	Run Pc-Check diagnostics.	<i>Oracle x86 Servers Diagnostics, Applications, and Utilities Guide for Servers With Oracle ILOM 3.1</i> at: <a href="http://www.oracle.com/pls/topic/lookup?ctx=x86diag">http://www.oracle.com/pls/topic/lookup?ctx=x86diag</a>

### Related Information

- [“About the Oracle ZFS Storage ZS3-ES” on page 1](#)
- [“Diagnostic Tools” on page 16](#)

---

## Diagnostic Tools

There are a variety of diagnostic tools, commands, and indicators you can use to monitor and troubleshoot the server:

- **LEDs** – These indicators provide a quick visual notification of the status of the server and of some of the CRUs and FRUs.
- **Oracle ILOM firmware** – This firmware is located on the service processor and provides a comprehensive service portal using a command-line interface (CLI) and browser user interface (BUI) for lights-out management capabilities (such as remote power-on, power-off, etc.), monitoring the health of the environmental subsystem (such as power, fans, temperature, cover interlock, etc.), and provides fault management and automated diagnosis capabilities during server initialization (such as QuickPath Interconnect code and Memory Reference code) and server runtime.

- **Pc-Check** – Accessed through Oracle ILOM, the DOS-based Pc-Check utility tests all motherboard components (processor, memory, and I/O), ports, and slots. If enabled through Oracle ILOM, this utility will run each time the system powers on. For information about Pc-Check, refer to the *Oracle X86 Servers Diagnostics Guide for Servers With Oracle ILOM 3.1*.
- **SNMP**– Simple Network Management Protocol (SNMP) Traps are generated by the SNMP agents that are installed on the SNMP devices being managed by Oracle ILOM. Oracle ILOM receives the SNMP Traps and converts them into SNMP event messages that appear in the event log. For information about SNMP event messages that appear in the event log, refer to the *Oracle ZFS Storage Appliance Administration Guide*. See also Configuration:Services:SNMP in online help.
- **Hardware Error Detection Using the Software** - Hardware error detection is available through the system software. You can either use the browser user interface (BUI) Maintenance > Hardware screen or the CLI command `maintenance hardware show` to initiate locating the faulted hardware. For more information, see the *Oracle ZFS Storage Appliance Administration Guide*.

The LEDs, Oracle ILOM, system software, and many of the log files and console messages are integrated. For information about the log files, see the *Oracle ZFS Storage Appliance Administration Guide*.

## Related Information

- [“About the Oracle ZFS Storage ZS3-ES” on page 1](#)
- The system software is based on the Oracle Solaris OS. For Oracle Solaris OS documentation, see:
  - For Solaris 11: [http://docs.oracle.com/cd/E23824\\_01/index.html](http://docs.oracle.com/cd/E23824_01/index.html)
- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: <http://www.oracle.com/pls/topic/lookup?ctx=ilom31>
- *Oracle x86 Servers Diagnostics, Applications, and Utilities Guide for Servers With Oracle ILOM 3.1* at: <http://www.oracle.com/pls/topic/lookup?ctx=x86diag>

---

## ▼ Gather Service Information

The first step in determining the cause of a problem with the server is to gather information from the service call paperwork or the onsite personnel. Follow these general guidelines when you begin troubleshooting.

1. **Collect information about the following items:**

- Events that occurred prior to the failure
  - Whether any hardware or software was modified or installed
  - Whether the server was recently installed or moved
  - How long the server exhibited symptoms
  - The duration or frequency of the problem
2. **Document the server settings before you make any changes.**

If possible, make one change at a time in order to isolate potential problems. In this way, you can maintain a controlled environment and reduce the scope of troubleshooting.
  3. **Note the results of any change that you make. Include any errors or informational messages.**
  4. **Check for potential device conflicts before you add a new device.**
  5. **Check for version dependencies, especially with third-party software.**

#### **Related Information**

- [“Diagnostic Tools” on page 16](#)
- [“Locate the Server Serial Number” on page 18](#)

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## ▼ Locate the Server Serial Number

- **To locate the server’s serial number, do one of the following:**
  - From the front of the server, look at the left side of the front panel to locate the server’s serial number. The serial number is located on the Radio-Frequency Identification (RFID) label on the front panel, next to the general status indicators. For illustrations of the server front panel, see [“About Controls and Connectors” on page 2](#).
  - Refer to the service label that is attached to the top cover of the server. This label includes the serial number.
  - Locate the yellow Customer Information Sheet (CIS) attached to your server packaging. This sheet includes the serial number.
  - Click the Oracle logo in the BUI masthead for the chassis serial number.
  - Issue the CLI command `hostname: maintenance hardware show` for the chassis serial number.



- From the Oracle ILOM command-line interface (CLI), enter the `show /System` command or go to the System Information Summary page in the Oracle ILOM web browser interface.

#### **Related Information**

- [“Diagnostic Tools” on page 16](#)
- [“Gather Service Information” on page 17](#)

---

## Inspecting the System

Controls that have been improperly set and cables that are loose or improperly connected are common causes of problems with hardware components. Follow these tasks to locate common problems with the system.

- [“Troubleshoot Power Problems” on page 19](#)
- [“Inspect the Server Externally” on page 20](#)
- [“Inspect Internal Server Components” on page 20](#)

#### **Related Information**

- [“About the Oracle ZFS Storage ZS3-ES” on page 1](#)
- [“Preparing for Service” on page 23](#)

## ▼ Troubleshoot Power Problems

1. **If the system is powered off, power on the server.**  
See [“Power On the Server” on page 134](#).
  - If the server powers on, go to [“Inspect the Server Externally” on page 20](#).
  - If the server does not power on, go to [Step 2](#).
2. **Check that power cords are attached firmly to the server’s power supplies and to the power source.**

#### **Related Information**

- [“Power On the Server” on page 134](#)
- [“Inspect the Server Externally” on page 20](#)
- [“Servicing Power Supplies \(CRU\)” on page 52](#)

## ▼ Inspect the Server Externally

1. **Inspect the external status LED indicators, which can indicate component malfunction.**

For the LED locations and descriptions of their behavior, see [“About Controls and Connectors” on page 2](#).

2. **Verify that nothing in the server environment is blocking airflow or making a contact that could short out power.**
3. **If the problem is not evident, continue with the next section, [“Inspect Internal Server Components” on page 20](#).**

### **Related Information**

- [“About the Oracle ZFS Storage ZS3-ES” on page 1](#)
- [“Inspect the Server Externally” on page 20](#)
- [“Inspect Internal Server Components” on page 20](#)

## ▼ Inspect Internal Server Components

1. **Shut down the server from main power mode to standby power mode.**

Determine how you want to shut down the server:

- Graceful power down – Notify users and gracefully power down the system.
- Immediate power down – Power down the system quickly.

See [“Powering Down the Server” on page 26](#) for instructions.

2. **Disconnect the AC power cables from the server, extend the server to the maintenance position, and remove the server top cover**

See [“Preparing the Server for Component Replacement” on page 26](#).

3. **Inspect the internal status LED indicators, which can indicate component malfunction.**

For the LED locations and descriptions of their behavior, see the service procedures for the motherboard components.

To light these LEDs, press and hold down the Fault Remind button, which is located on the motherboard. For more information on the Fault Remind button, see [“Using the Fault Remind Button” on page 61](#).

4. **Verify that there are no loose or improperly seated components.**
5. **Verify that all cable connectors inside the system are firmly and correctly attached to their appropriate connectors.**

6. **Verify that any components that you ordered separately and were not installed at the factory are qualified and supported.**

Check with your customer representative for information about which PCIe cards and DIMMs are supported.

7. **Return the server to operation.**

See [“Returning the Server to Operation” on page 119](#).

8. **Press and release the Power button on the server front panel.**

When the main power is applied to the server, the Power/OK indicator next to the Power button blinks slowly until the OS is ready. When the OS is ready, the Power/OK indicator remains lit. For more information about the LED, see [“Server General Status Indicators” on page 5](#).

9. **If the problem with the server is not evident, then log in to either the Oracle ILOM service portal or Oracle Solaris service portal and use the fault management command `fmadm faulty` to list any faults that might be present on the server.**

For instructions, see the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at:

<http://www.oracle.com/pls/topic/lookup?ctx=ilom31>.

### **Related Information**

- [“Preparing for Service” on page 23](#)
- [“About Server and Component Status Indicators” on page 5](#)
- [“Returning the Server to Operation” on page 119](#)



# Preparing for Service

These topics describe safety considerations and provide prerequisite procedures and information to replace components within the server.

Description	Links
Understand the safety precautions, understand the safety symbols, and take ESD precautions prior to removing or installing parts in the server.	<a href="#">“Safety Precautions” on page 23</a> <a href="#">“Safety Symbols” on page 24</a> <a href="#">“Electrostatic Discharge Safety” on page 24</a>
Assemble the required tools.	<a href="#">“Required Tools” on page 25</a>
Before working with components within the server, power down the server, and prepare for servicing.	<a href="#">“Preparing the Server for Component Replacement” on page 26</a>

## Related Information

- [“Returning the Server to Operation” on page 119](#)

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## Safety Precautions

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

- Follow all standard cautions, warnings, and instructions marked on the equipment and described in *Important Safety Information for Oracle’s Hardware Systems*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment’s electrical rating label.
- Follow the electrostatic discharge safety practices as described in this section.
- Disconnect both power supply cords before servicing components.

### Related Information

- [“Safety Symbols” on page 24](#)
- [“Electrostatic Discharge Safety” on page 24](#)

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## Safety Symbols

The following symbols might appear in this book. Note their meanings.



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

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

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---

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

---

### Related Information

- [“Safety Precautions” on page 23](#)
- [“Electrostatic Discharge Safety” on page 24](#)

---

## Electrostatic Discharge Safety

Devices that are sensitive to electrostatic discharge (ESD), such as the motherboard, PCIe cards, drives, processors, and memory cards require special handling.



---

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

---

- Use an antistatic wrist strap

Wear an antistatic wrist strap and use an antistatic mat when handling components such as drive assemblies, boards, or cards. When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Then disconnect the power cords from the server. Following this practice equalizes the electrical potentials between you and the server.

---

**Note** – An antistatic wrist strap is not included in the Accessory Kit for the server. However, antistatic wrist straps are still included with options and components.

---

- Use an antistatic mat

Place ESD-sensitive components such as the motherboard, memory, and other PCB cards on an antistatic mat. The following items can be used as an antistatic mat:

- Antistatic bag used to wrap an Oracle replacement part
- An ESD mat (orderable from Oracle)
- A disposable ESD mat (shipped with some replacement parts or optional system components)

### Related Information

- [“Safety Precautions” on page 23](#)
- [“Safety Symbols” on page 24](#)
- [“Preparing the Server for Component Replacement” on page 26](#)
- [“Returning the Server to Operation” on page 119](#)

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## Required Tools

The server can be serviced with the following tools:

- Antistatic wrist strap
- Antistatic mat
- No. 2 Phillips screwdriver

### Related Information

- [“Preparing for Service” on page 23](#)
- [“Servicing CRUs That Do Not Require Server Power Off” on page 43](#)

- [“Servicing CRUs That Require Server Power Off” on page 57](#)
- [“Servicing FRUs” on page 87](#)

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## Preparing the Server for Component Replacement

Before you can remove and install components that are inside the server, you must perform the following tasks:

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**Note** – When replacing the storage drives or power supplies, not all of these tasks are necessary. See the replacement tasks for those components for more information.

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- [“Powering Down the Server” on page 26](#)
- [“Disconnect Cables From the Server” on page 31](#)
- [“Extend the Server to the Maintenance Position” on page 31](#)
- [“Remove the Server From the Rack” on page 33](#)
- [“Take Antistatic Measures” on page 39](#)
- [“Remove the Server Top Cover” on page 40](#)

### Related Information

- [“Returning the Server to Operation” on page 119](#)

## Powering Down the Server

Determine how you want to power off the server. A graceful power down is strongly recommended to avoid possible data loss or corruption. It also ensures that all resources are taken over by the server that is not being serviced.

Description	Link
Power down the server gracefully to move its resources to the other server, and to preserve data and its integrity.	<ul style="list-style-type: none"><li>• <a href="#">“Graceful Server Power Down” on page 27</a></li></ul>



Description	Link
If the server is not responding, or you must shut down the server quickly, perform an immediate power down. These procedures risk data loss and integrity, and possibly the configuration of the server.	<ul style="list-style-type: none"> <li>• <a href="#">“Emergency Server Power Down Using the Power Button” on page 28</a></li> <li>• <a href="#">“Emergency Server Power Down Using the Oracle ILOM CLI” on page 29</a></li> <li>• <a href="#">“Emergency Server Power Down Using the Oracle ILOM Web Interface” on page 30</a></li> </ul>

## Related Information

- [“Power On the Server” on page 134](#)

## ▼ Graceful Server Power Down

Performing a graceful shutdown ensures that data is saved and not corrupted, and that resources are assigned to the other server. This is the preferred method for powering down a server for component replacement.

1. **Ensure that Ethernet cables are connected from your network to the NET-0 port on the back of each server.**
2. **Direct your web browser to the server to be serviced by using either the IP address or host name assigned to the NET-0 port as follows:**  
**`https://ipaddress:215`**  
or  
**`https://hostname:215`**
3. **Log in with the Administrator account.**  
The username and password defaults are `root` and `changeme`. Contact your system administrator for the current password.
4. **Depending on the nature of the problem, you might want to view system status (Maintenance > System and Maintenance > Problems) or log files (Maintenance > Logs), or run diagnostics or view analytics before you shut down the server.**
5. **Go to Maintenance > Hardware.**
6. **Click the Show Details link for the server.**  
Before proceeding, you can view the status of server components by clicking the appropriate submenu, such as DIMM.
7. **Click the power icon for the server and select Power off from the pull-down list.**

## 8. Disconnect the power and cables from the server.

See [“Disconnect Cables From the Server”](#) on page 31.

### Related Information

- [“Emergency Server Power Down Using the Power Button”](#) on page 28
- [“Emergency Server Power Down Using the Oracle ILOM CLI”](#) on page 29
- [“Emergency Server Power Down Using the Oracle ILOM Web Interface”](#) on page 30
- [“Disconnect Cables From the Server”](#) on page 31
- [“Power On the Server”](#) on page 134

## ▼ Emergency Server Power Down Using the Power Button

This emergency power down task using the Power button is preferred to the other emergency tasks, which use the Oracle ILOM CLI or web interface, because it allows the operating system to gracefully shut down. However, because this task has risks, attempt the graceful power down first.



---

**Caution** – This task forces the main power off. You might corrupt or lose system data, or lose the server configuration (the resources assigned to it) during an immediate power down.

---

### 1. Press and quickly release the Power button on the front panel.

This action causes an orderly shutdown of the operating system, and the server enters the standby power mode.

If the server did not respond or you need a more immediate shutdown, press and hold the Power button for four seconds, which forces the main power off and enters the standby power mode immediately.

When the main power is off, the Power/OK LED on the front panel begins flashing, indicating that the server is in standby power mode. See [“About Controls and Connectors”](#) on page 2.



---

**Caution** – When you press the Power button to enter standby power mode, power is still directed to the service processor remote management subsystem and power supply fans. To completely power off the server, you must disconnect the power cords from the back of the power supplies.

---

2. **Disconnect the power and data cables from the server.**

See [“Disconnect Cables From the Server” on page 31.](#)

**Related Information**

- [“About Controls and Connectors” on page 2](#)
- [“Graceful Server Power Down” on page 27](#)
- [“Emergency Server Power Down Using the Oracle ILOM CLI” on page 29](#)
- [“Emergency Server Power Down Using the Oracle ILOM Web Interface” on page 30](#)
- [“Disconnect Cables From the Server” on page 31](#)
- [“Power On the Server” on page 134](#)

## ▼ Emergency Server Power Down Using the Oracle ILOM CLI

This emergency power down task using the Oracle ILOM CLI is not a preferred power down method. If possible, attempt the graceful power down task first. If that fails or a more immediate power down is needed, use the task [“Emergency Server Power Down Using the Power Button” on page 28](#) because it allows the operating system to gracefully shut down. If this is not possible because you are not physically located at the system, then use either this emergency task or [“Emergency Server Power Down Using the Oracle ILOM Web Interface” on page 30.](#)



---

**Caution** – This task forces the main power off. You might corrupt or lose system data, or lose the server configuration (the resources assigned to it) during an immediate power down.

---

1. **Log in to the Oracle ILOM command-line interface (CLI) using an Administrator account.**

Oracle ILOM displays the default command prompt (->), indicating that you have successfully logged in to Oracle ILOM.

2. **From the CLI prompt, type the following command:**

-> **stop -f /System**

The server powers down immediately.

3. **Disconnect the power and data cables from the server.**

See [“Disconnect Cables From the Server” on page 31.](#)

### Related Information

- [“Graceful Server Power Down” on page 27](#)
- [“Emergency Server Power Down Using the Power Button” on page 28](#)
- [“Emergency Server Power Down Using the Oracle ILOM Web Interface” on page 30](#)
- [“Disconnect Cables From the Server” on page 31](#)
- [“Power On the Server” on page 134](#)

## ▼ Emergency Server Power Down Using the Oracle ILOM Web Interface

This emergency power down task using the Oracle ILOM web interface is not a preferred power down method. If possible, attempt the graceful power down task first. If that fails or a more immediate power down is needed, use the task [“Emergency Server Power Down Using the Power Button” on page 28](#) because it allows the operating system to gracefully shut down. If this is not possible because you are not physically located at the system, then use either this emergency task or [“Emergency Server Power Down Using the Oracle ILOM CLI” on page 29](#).



---

**Caution** – This task forces the main power off. You might corrupt or lose system data, or lose the server configuration (the resources assigned to it) during an immediate power down.

---

### 1. Log in to the Oracle ILOM web interface using an Administrator account.

The Oracle ILOM web interface System Information page appears.

### 2. In the left pane, click Host Management > Power Control, and in the Actions list, click Immediate Power Off.

### 3. Click Save, and then click OK.

The server powers down immediately.

### 4. Disconnect the power and data cables from the server.

See [“Disconnect Cables From the Server” on page 31](#).

### Related Information

- [“Graceful Server Power Down” on page 27](#)
- [“Emergency Server Power Down Using the Power Button” on page 28](#)
- [“Emergency Server Power Down Using the Oracle ILOM CLI” on page 29](#)
- [“Disconnect Cables From the Server” on page 31](#)

- [“Power On the Server” on page 134](#)

## ▼ Disconnect Cables From the Server



---

**Caution** – The system supplies standby power to the circuit boards when the power cords are connected even when the system is powered off.

---

1. Label all cables connected to the server.
2. Disconnect the power cords from the rear of the server.
3. Disconnect all data cables from the rear of the server.
4. Note how the two servers are cabled together, and then label and disconnect the cables.

### Related Information

- [“Server Back Panel View” on page 3](#)
- [“Powering Down the Server” on page 26](#)
- [“Remove the Server From the Rack” on page 33](#)
- [“Reconnect Data Cables and Power Cords” on page 133](#)

## ▼ Extend the Server to the Maintenance Position

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

- Storage drives
- Fan modules
- Power supplies
- PCIe risers
- PCIe cards
- DDR3 DIMMs
- Internal USB flash drive
- Motherboard Battery
- Processors
- Disk backplane

- FIM (front indicator module)
- Motherboard

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

1. **To prevent the rack from tipping forward when the server is extended, extend all rack anti-tilt devices.**

Refer to your rack documentation for detailed instructions.



---

**Caution** – To reduce the risk of personal injury, stabilize the expansion rack cabinet and extend all anti-tilt devices before extending the server from the rack.

---

- a. **Open and remove the front and rear doors from the rack cabinet.**

---

**Note** – The front and rear doors need to be removed only if they impinge on the mounting bay.

---

- b. **To prevent the rack cabinet from tipping during the installation, fully extend the rack cabinet's anti-tilt legs or anti-tilt bar, which are located at the bottom front of the rack cabinet.**
    - c. **If there are leveling feet beneath the rack cabinet to prevent it from rolling, extend these leveling feet fully downward to the floor.**
  2. **Verify that no cables will be damaged or will interfere when the server is extended.**

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

3. **To release the rack rails, pull down on the flip-down handles, which are located on the sides of the server front panel, to release the slide-rail locks and slowly pull the server out of the rack until the slide-rails latch (see [FIGURE: Slide-Rail Release Latches on page 33](#) [callout 1]).**

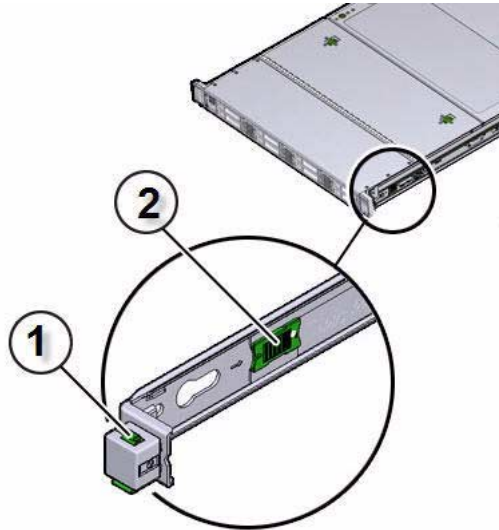
---

**Note** – The slide-rail locks are located behind the flip-down handles on the front of the server. The slide-rail locks are released when the flip-down handles are pulled down.

---

The server is now in the extended maintenance position.

**FIGURE:** Slide-Rail Release Latches



**Figure Legend**

- 
- |   |                        |
|---|------------------------|
| 1 | Slide-rail lock        |
| 2 | Slide-rail release tab |
- 

### Related Information

- [“Disconnect Cables From the Server” on page 31](#)
- [“Remove the Server From the Rack” on page 33](#)
- [“Reinstall the Server Chassis Into the Rack” on page 122](#)

## ▼ Remove the Server From the Rack



---

**Caution** – The server weighs approximately 18.1 kg (39.9 lb). Two people are required to dismount and carry the chassis.

To reduce the risk of personal injury, stabilize the expansion rack cabinet and extend all anti-tilt devices before extending the server from the rack.

---

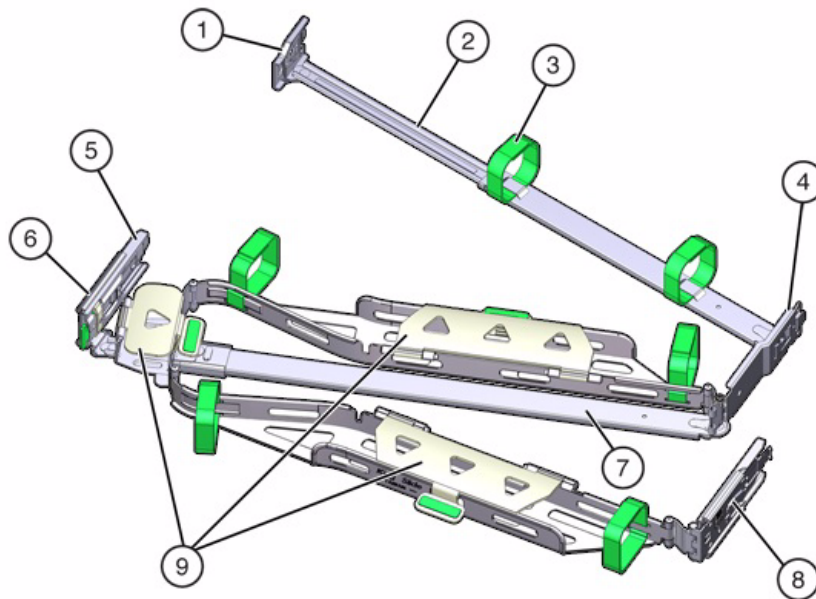
---

**Note** – References to “left” or “right” in this procedure assume that you are facing the back of the equipment rack. Throughout this procedure, after you disconnect any of the CMA’s four connectors, do not allow the CMA to hang under its own weight.

---

1. Ensure that you have disconnected all cables and power cords from the server, and have extended the server to the maintenance position.
2. Remove the cable management arm (CMA).
  - a. Refer to the following figure to identify CMA connectors A, B, C, and D. You will disconnect connector D first, then C, then B, and finally A.

**FIGURE:** Location of CMA Connectors and Components



**Figure Legend**

1	Connector A	6	Connector D
2	Front slide bar	7	Slide-rail latching bracket (used with connector D)
3	Velcro straps (6)	8	Rear slide bar
4	Connector B	9	Cable covers
5	Connector C	10	not applicable

- b. To remove the cables from the CMA, do the following:



- i. If applicable, remove any additional straps that were installed to bundle the cables.
  - ii. Unwrap the six straps that are securing the cables.
  - iii. Open the three cable covers to the fully opened position.
  - iv. Remove the cables from the CMA and set them aside.
- c. To disconnect connector D, perform the following steps:
  - i. Press the green release tab (callout 1) on the slide-rail latching bracket toward the left and slide connector D out of the left slide-rail [frames 1 and 2].

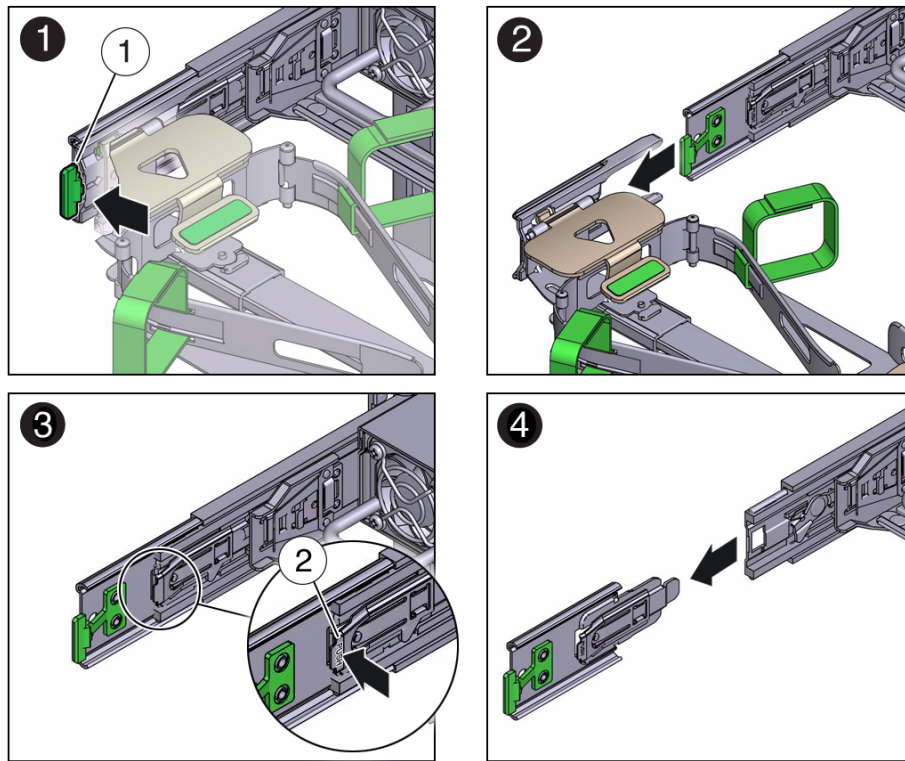
---

**Note –** When you slide connector D out of the left slide-rail, the slide-rail latching bracket portion of the connector remains in place. You will disconnect it in the next step.

After you have disconnected connector D, you must not allow the CMA to hang under its own weight. Throughout the remainder of this procedure, the CMA must be supported until all of the remaining connectors are disconnected and the CMA can be placed on a flat surface.

---

**FIGURE:** Disconnecting Connector D

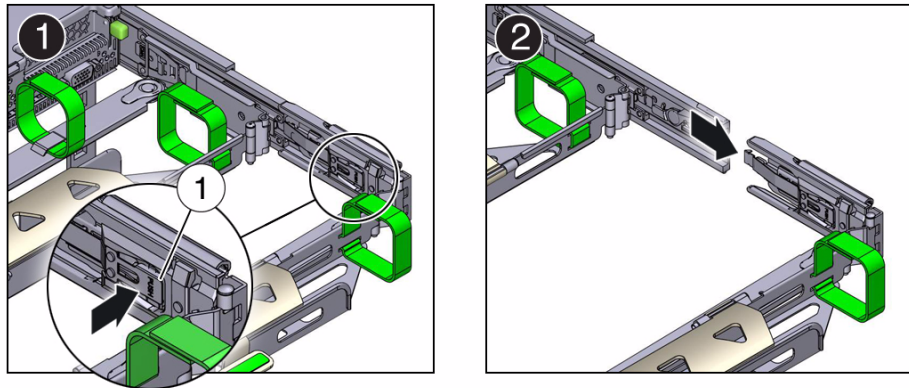


**Figure Legend**

- 
- |   |  |
|---|--|
| 1 | Connector D release tab (green)                        |
| 2 | Slide-rail latching bracket release tab (labeled PUSH) |
- 

- ii. Use your right hand to support the CMA and use your left thumb to push in (toward the left) on the connector D latching bracket release tab labeled PUSH (callout 2), and pull the latching bracket out of the left slide-rail and put it aside [frames 3 and 4].
- d. To disconnect connector C, perform the following steps:
- i. Place your left arm under the CMA to support it.
  - ii. Use your right thumb to push in (toward the right) on the connector C release tab labeled PUSH (callout 1), and pull connector C out of the right slide-rail [1, 2].

**FIGURE:** Disconnecting Connector C



**Figure Legend**

---

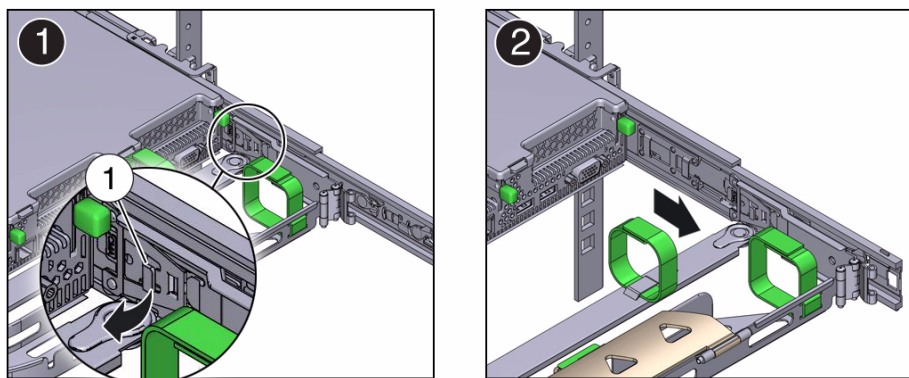
1 Connector C release tab (labeled PUSH)

---

e. To disconnect connector B, perform the following steps:

- i. Place your right arm under the CMA to support it and grasp the rear end of connector B with your right hand.
- ii. Use your left thumb to pull the connector B release lever to the left, away from the right slide-rail (callout 1), and use your right hand to pull the connector out of the slide-rail [1, 2].

**FIGURE:** Disconnecting Connector B



**Figure Legend**

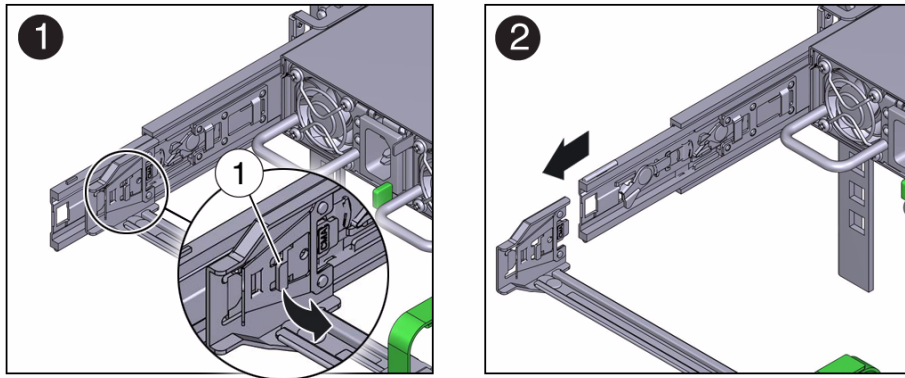
---

1 Connector B release lever

---

- f. To disconnect connector A, perform the following steps:
  - i. Place your left arm under the CMA to support it and grasp the rear end of connector A with your left hand.
  - ii. Use your right thumb to pull the connector A release lever to the right, away from the left slide-rail (callout 1), and use your left hand to pull the connector out of the slide-rail [1, 2].

**FIGURE:** Disconnecting Connector A



**Figure Legend**

- 
- |   |                           |
|---|---------------------------|
| 1 | Connector A release lever |
|---|---------------------------|
- 

- g. Remove the CMA from the rack and place it on a flat surface.
3. Extend the server to the maintenance position.

For instructions, see [“Extend the Server to the Maintenance Position”](#) on page 31.
4. From the front of the server, pull the green slide-rail release tabs toward the front of the server and pull the server out of the rack until it is free of the rack rails.

A slide-rail release tab is located on each slide-rail (see [FIGURE: Slide-Rail Release Latches](#) on page 33 [callout 2]).

---

**Note** – To pull the green slide-rail release tab, place your finger in the center of the tab, not on the end, and apply pressure as you pull the tab toward the front of the server.

---

5. Set the server on a sturdy work surface.

### Related Information

- [“Disconnect Cables From the Server” on page 31](#)
- [“Take Antistatic Measures” on page 39](#)
- [“Extend the Server to the Maintenance Position” on page 31](#)
- [“Reinstall the Server Chassis Into the Rack” on page 122](#)

## ▼ Take Antistatic Measures

### 1. Prepare an antistatic surface on which to set parts during removal and installation.

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

- Antistatic bag used to wrap a replacement part
- An ESD mat, orderable from Oracle
- Disposable ESD mat (shipped with some replacement parts or optional system components)

### 2. Attach an antistatic wrist strap.

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

---

**Note** – An antistatic wrist strap is not included in the Accessory Kit for the server. However, antistatic wrist straps are still included with options and components.

---

### Related Information

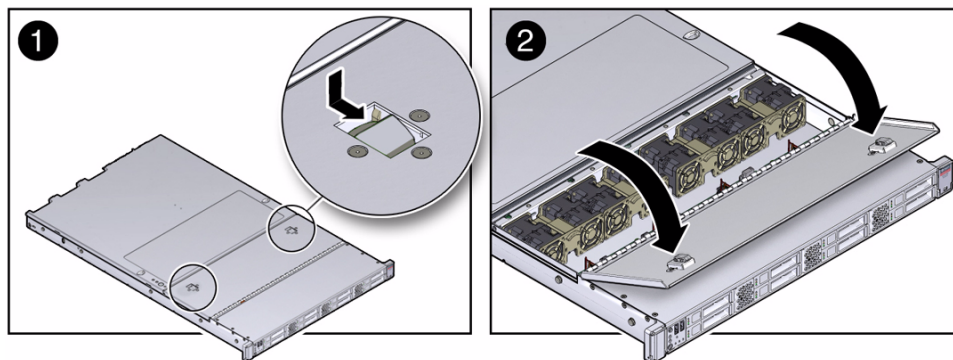
- [“Remove Antistatic Measures” on page 122](#)

## ▼ Open the Server Fan Door

Servicing the server fan modules and other components located in the front of the server, such as the front indication module, the DVD drive, and disk backplanes, requires that the fan door be opened. It is also easier to remove the server top cover if you open the fan door first.

- **To open the server fan door, slide the fan door latches forward and swing the door up to the open position.**

**FIGURE:** Opening the Server Fan Door



#### Related Information

- [“Take Antistatic Measures” on page 39](#)
- [“Remove the Server Top Cover” on page 40](#)

## ▼ Remove the Server Top Cover

Servicing most of the server components requires that the top cover be removed.



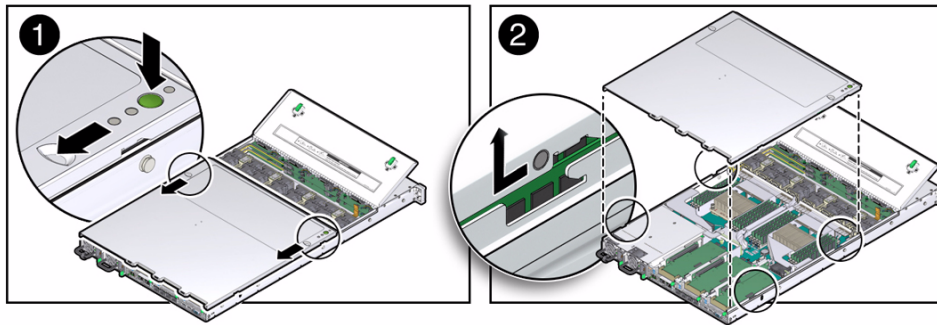
---

**Caution** – If the top cover is removed without first removing the AC power cords, the server host shuts down immediately and an event is logged to indicate that the chassis top cover has been removed.

---

1. Ensure that the AC power cords are disconnected from the server power supplies.
2. To open the server fan door, slide the latches toward the front of the server and swing up to the open position.
3. To open the top cover, press the top cover release buttons and use the recessed areas to slide the top cover toward the rear of the server about 0.5 inches (12.7 mm) [1].

**FIGURE:** Removing the Server Top Cover



4. Lift the cover off the chassis and set it aside [2].

#### **Related Information**

- [“Take Antistatic Measures” on page 39](#)
- [“Install the Top Cover” on page 120](#)





# Servicing CRUs That Do Not Require Server Power Off

The following topics describe how to service customer-replaceable units (CRUs) that do not require you to power off the server.

Description	Links
Servicing the storage drives.	<a href="#">“Servicing Storage Drives (CRU)” on page 43</a>
Servicing the fan modules.	<a href="#">“Servicing Fan Modules (CRU)” on page 47</a>
Servicing the power supplies.	<a href="#">“Servicing Power Supplies (CRU)” on page 52</a>

## Related Information

- [“Servicing CRUs That Require Server Power Off” on page 57](#)
- [“Servicing FRUs” on page 87](#)

---

## Servicing Storage Drives (CRU)

These sections describe how to remove and install storage drives:

- [“Storage Drives Hot-Plug Conditions” on page 44](#)
- [“Storage Drive Status Indicators” on page 44](#)
- [“Remove a Storage Drive” on page 45](#)
- [“Install a Storage Drive” on page 46](#)

## Related Information

- [“Removing and Installing Server Filler Panels” on page 119](#)

# Storage Drives Hot-Plug Conditions

The solid-state drives (SSDs) or hard-disk drives (HDDs) in the server are hot-pluggable, but this capability depends on how the drives are configured.

The following situations inhibit the ability to perform hot-plugging of a drive:

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

If your drive falls into one of these conditions, you must shut down the system before you replace the drive. See [“Powering Down the Server” on page 26](#).

---

**Note** – Replacing a drive does not require removing the server from a rack.

---

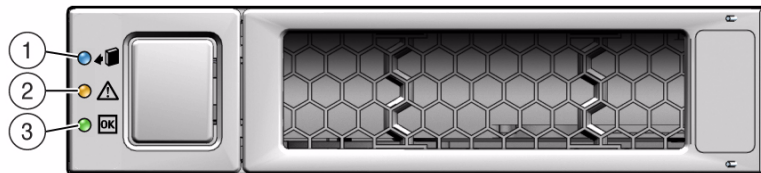
## Related Information

- [“Remove a Storage Drive” on page 45](#)
- [“Install a Storage Drive” on page 46](#)

# Storage Drive Status Indicators

The following figure and table describe the storage drive status indicators (LEDs).

**FIGURE:** Storage Drive Status Indicators



**TABLE:** Storage Drive LED Indicators

Legend	LED	Color	Lights When...
1	OK to Remove	Blue	The storage drive can be removed safely during a hot-plug operation.
2	Service Required	Amber	The system is running and the storage drive is faulty. The front and rear panel Service Required LEDs are also lit if the system detects a storage drive fault.
3	OK/Activity	Green	<ul style="list-style-type: none"><li>• OFF – Power is off or installed drive is not recognized by the system.</li><li>• STEADY ON – The drive is engaged and is receiving power.</li><li>• STEADY BLINK – There is disk activity. Indicator blinks on and off to indicate activity.</li></ul>

## ▼ Remove a Storage Drive

**1. Prepare the system for the drive removal.**

- See [“Take Antistatic Measures” on page 39](#).

**2. Identify the location of the drive that you want to remove.**

To locate a failed drive in the BUI, go to Maintenance > Hardware, click the Show Details link for the server, and look for a drive with an amber icon to the left of its ID. Click on the row with the failed drive to physically locate it in the server image.

The following illustration shows the location of the drives and the internal system software designations for the drives.

**FIGURE:** Drive Location and Numbering

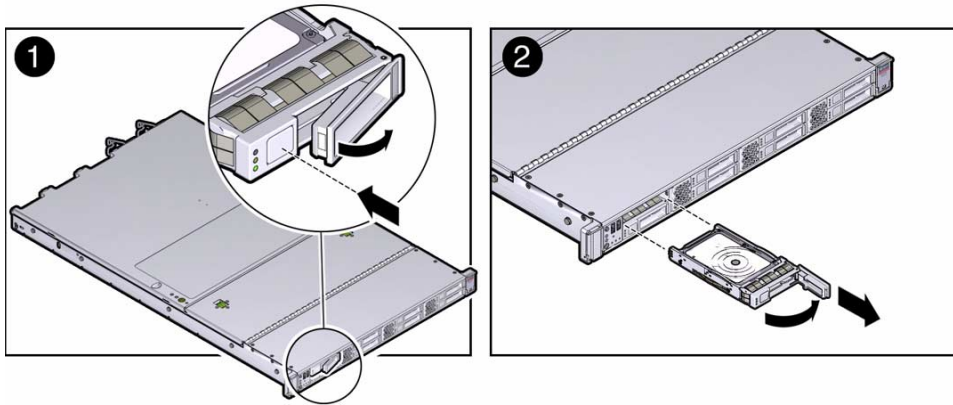


HDD4	HDD5	HDD6	HDD7
HDD0	HDD1	HDD2	HDD3

**Note** – The blue OK to Remove LED on the storage drive might not light.

3. On the drive you plan to remove, push the latch release button to open the latch.

**FIGURE:** Locating the Hard Drive Release Button and Latch



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

4. Grasp the latch and pull the drive out of the drive slot.
5. Consider your next steps:
  - If you are replacing the drive, continue to [“Install a Storage Drive”](#) on page 46.
  - If you are not replacing the drive, install a filler panel in the empty drive slot to maintain proper air flow and perform administrative tasks to configure the server to operate without the drive.

#### Related Information

- [“Storage Drive Status Indicators”](#) on page 44
- [“Storage Drives Hot-Plug Conditions”](#) on page 44
- [“Install a Storage Drive”](#) on page 46

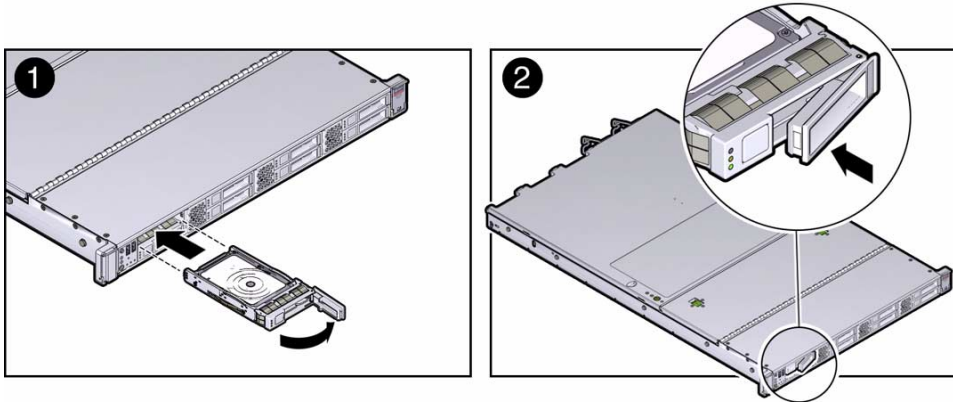
## ▼ Install a Storage Drive

1. Remove the replacement drive from its packaging and place the drive on an antistatic mat.
2. If necessary, remove the blank drive filler panel.

**3. Align the replacement drive to the drive slot.**

The drive is physically addressed according to the slot in which it is installed. It is important to install a replacement drive in the same slot as the drive that was removed.

**4. Slide the drive into the bay until the drive is fully seated [1].**



**5. Close the drive latch to lock the drive in place [2].**

**6. The system software automatically detects and configures the new drive.**

To confirm the status, go to the BUI Maintenance > Hardware screen, click the `Show Details` link for the server, and confirm that the drive status icon is green.

**Related Information**

- [“Storage Drive Status Indicators” on page 44](#)
- [“Storage Drives Hot-Plug Conditions” on page 44](#)
- [“Remove a Storage Drive” on page 45](#)

---

## Servicing Fan Modules (CRU)

The fan modules are located in the front of the server.

- [“Remove a Fan Module” on page 48](#)
- [“Install a Fan Module” on page 51](#)

## Related Information

- [“Open the Server Fan Door” on page 39](#)

## ▼ Remove a Fan Module

You do not have to power off the server to service the fan modules.

You should not begin this procedure unless you have a replacement fan and you are ready to install it right away.

### 1. In the BUI, identify the faulty fan module.

Go to Maintenance > Hardware, click the [Show Details](#) link for the server, click the [Fan](#) submenu, and look for the fan module with an amber icon to the left of its ID. Click on the row with the failed fan module to physically locate it in the server image.

### 2. Extend the server to the maintenance position.

See [“Extend the Server to the Maintenance Position” on page 31](#).

### 3. To access the fan modules, open the server fan door.

[“Open the Server Fan Door” on page 39](#)

---

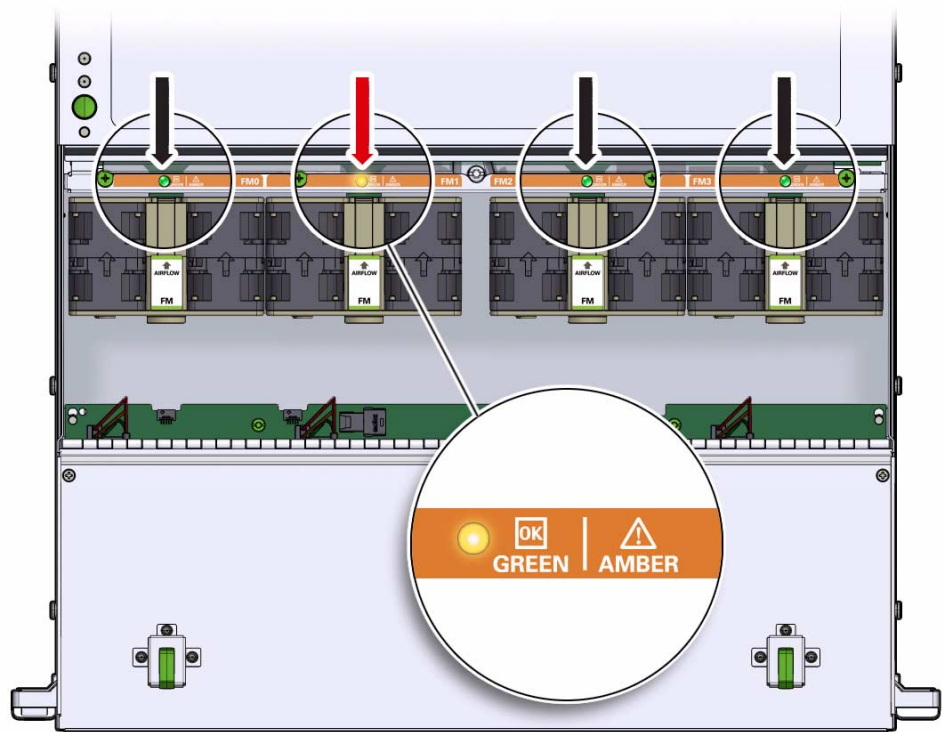
**Note** – Close the server fan door within 60 seconds to maintain adequate airflow to properly cool the server. Leaving the door open for more than 60 seconds, while the server is running, might cause the server to overheat and shut down.

---

### 4. Physically identify the faulty fan module.

Each fan module has a status indicator (LED). If the LED is lit amber, the fan has failed. The status LEDs are located on the chassis mid-wall adjacent to and aligned with the fan module, as shown in the following figure.

**FIGURE:** Fan Module LEDs

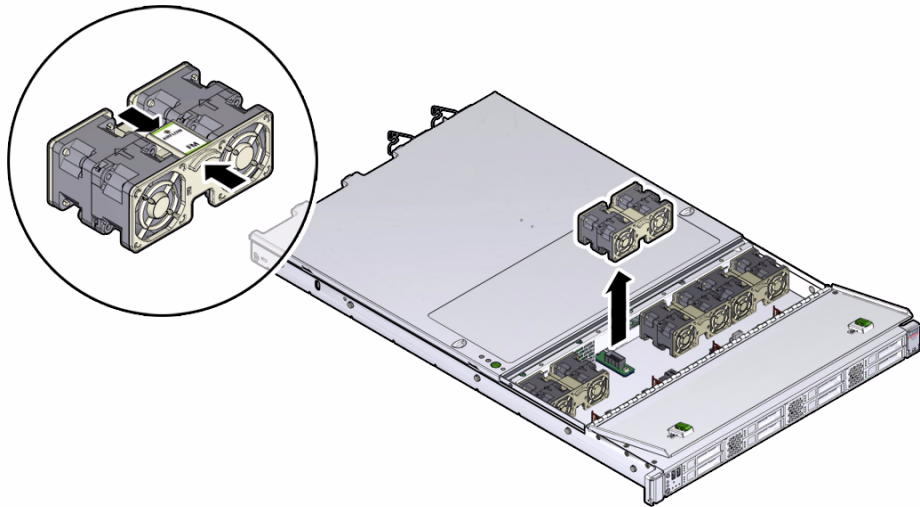


LED	Color	State Meaning
Fan Status	Bicolored: Amber/Green	<ul style="list-style-type: none"><li>• Amber - The fan module is faulty. The front TOP FAN LED and the front and rear panel Service Required LEDs are also lit if the system detects a fan module fault.</li><li>• Green - Indicates that the fan module is correctly installed and operating within specification.</li></ul>

**5. Remove the faulty fan module.**

- a. Using your thumb and forefinger, grasp the fan module in the finger recesses located in the plastic between the fans.**
- b. Lift the fan module straight up and out of the chassis.**

**FIGURE:** Removing a Fan Module



**6. Set fan module aside.**



---

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

---



---

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

---

**7. Consider your next step:**

- If you removed the fan assembly as part of another procedure, return to that procedure.
- Otherwise, continue to [“Install a Fan Module” on page 51.](#)

**Related Information**

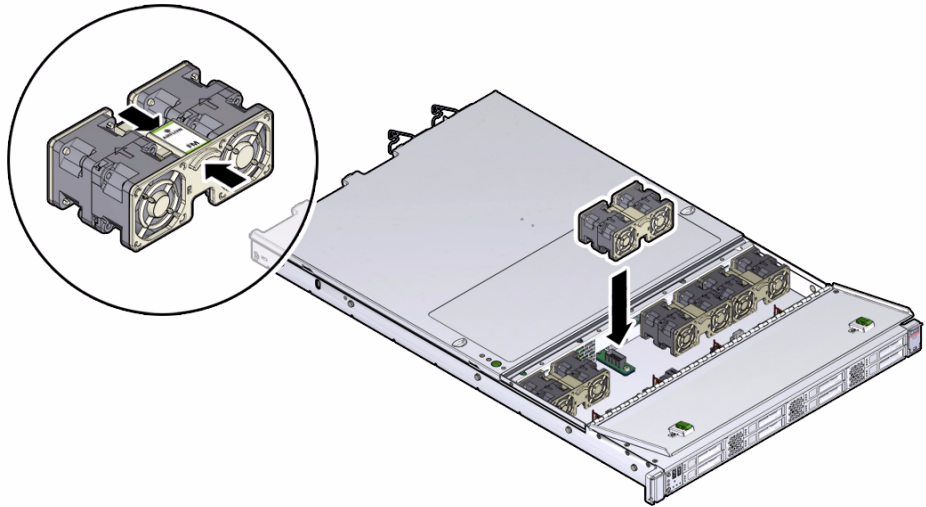
- [“Install a Fan Module” on page 51](#)



## ▼ Install a Fan Module

1. Remove the replacement fan module from its packaging and place it on an antistatic mat.
2. With the fan door open, install the replacement fan module into the server.  
The fan modules are keyed to ensure that they are installed in the correct orientation.

**FIGURE:** Installing a Fan Module



3. Press down on the fan module and apply firm pressure to fully seat the fan module.
4. Verify that the Fan status LED that aligns with the replaced fan module is lit green.
5. Close the fan door.
6. Verify that the Top Fan LED on the front of the server and the Service Required LEDs on the front and rear of the server are not lit.  
See [“About Controls and Connectors” on page 2](#) for more information about identifying and interpreting system LEDs.
7. Consider your next step:
  - If you installed the fan module as part of another procedure, return to that procedure.

- Otherwise, return the server to operation.  
See [“Returning the Server to Operation” on page 119](#).

#### **Related Information**

- [“Remove a Fan Module” on page 48](#)

---

## **Servicing Power Supplies (CRU)**

The server’s redundant power supplies support concurrent maintenance, which enables you to remove and replace a power supply without shutting down the server, provided that the other power supply is online and working.

The following LEDs are lit when a power supply fault is detected:

- Front and rear Service Required LEDs
- Amber Fault LED on the faulty power supply
- Rear LED located on the server front panel

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

See the following topics for more information.

- [“Power Supply Status Indicators” on page 52](#)
- [“Remove a Power Supply” on page 53](#)
- [“Install a Power Supply” on page 54](#)

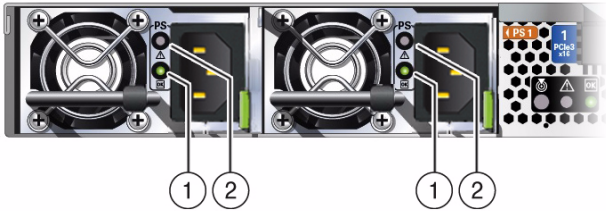
#### **Related Information**

- [“Powering Down the Server” on page 26](#)

## **Power Supply Status Indicators**

Each power supply contains two status indicators (LEDs) on the back panel. The following figure and table provide a description of the power supply status indicators.

**FIGURE:** Power Supply Status Indicators



**TABLE:** Server Power Supply Indicators

Legend	LED Name	Icon	Color	State Meaning
1	AC OK/DC OK		Green	<ul style="list-style-type: none"><li>• OFF – No AC power is present.</li><li>• SLOW BLINK – Normal operating. Input power is within specification. DC output voltage is not enabled.</li><li>• STEADY ON – Normal operation. Input AC power and DC output voltage are within specification.</li></ul>
2	Service Required		Amber	<ul style="list-style-type: none"><li>• OFF – Normal operation; no service required.</li><li>• STEADY ON – The power supply (PS) has detected a PS fan failure, PS overtemperature, PS over current, or PS over/under voltage.</li></ul>

## ▼ Remove a Power Supply

**1. In the BUI, identify which power supply requires replacement.**

Go to Maintenance > Hardware, click the [Show Details](#) link for the server, click the PSU submenu, and look for the power supply with an amber icon to the left of its ID. Click on the row with the failed power supply to physically locate it in the server image.

**2. Physically identify which power supply requires replacement.**

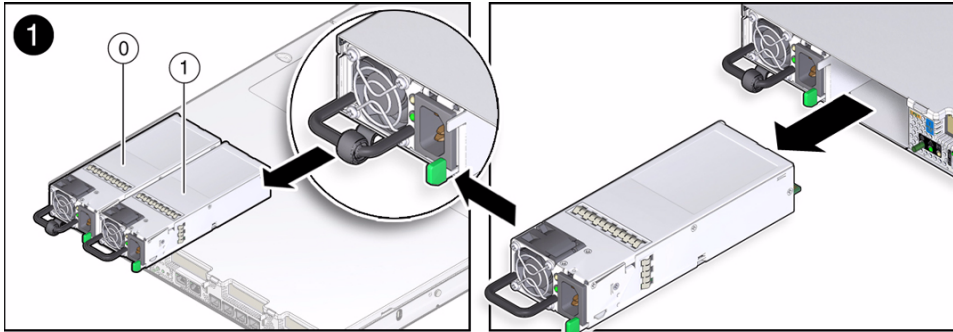
A lit amber LED on a power supply indicates that a failure was detected.

**Note –** The fans of a failed power supply may still be spinning when the system is powered on. You can remove a power supply while the fans are still spinning.

**3. Gain access to the rear of the server where the faulty power supply is located.**

4. If the cable management arm (CMA) is in the way, extend the server approximately 20 cm (8 inches) out of the front of the rack.
5. Disconnect the power cord from the faulty power supply.
6. Grasp the power supply handle and push the power supply latch to the left.

**FIGURE:** Removing a Power Supply



**Figure Legend**

- |   |                      |
|---|----------------------|
| 1 | Power Supply 0 (PS0) |
| 2 | Power Supply 1 (PS1) |

7. Pull the power supply out of the chassis.



**Caution** – Whenever you remove a power supply, you should replace it with another power supply; otherwise, the server might overheat due to improper airflow.

8. Continue to [“Install a Power Supply” on page 54.](#)

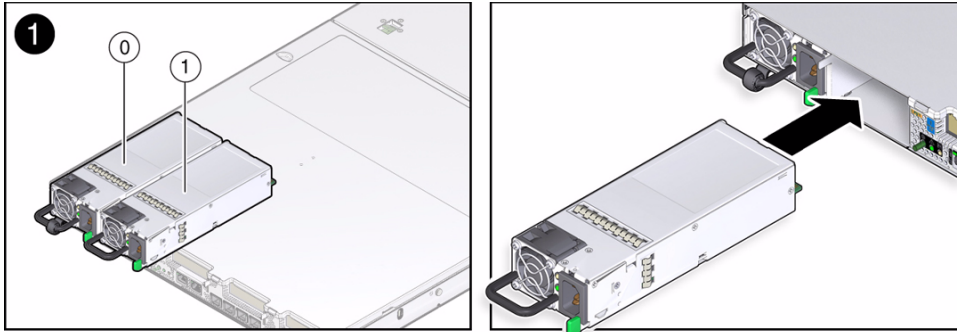
#### Related Information

- [“Server Back Panel View” on page 3](#)
- [“Power Supply Status Indicators” on page 52](#)
- [“Install a Power Supply” on page 54](#)

## ▼ Install a Power Supply

1. Remove the replacement power supply from its packaging and place it on an antistatic mat.
2. Align the replacement power supply with the empty power supply bay.

3. Slide the power supply into the bay until it is fully seated.  
Listen for the audible click when the power supply fully seats.



4. Reconnect the power cord to the power supply.
5. Verify that the amber LED on the replaced power supply and the Service Required LEDs on the chassis are not lit.
6. If you pulled the server out of the rack to make it easier to remove the power supply, push the server into the rack until the slide-rail locks (on the front of the server) engage the slide-rail assemblies.  
You will hear an audible click when the server is in the normal rack position.
7. To confirm the status, go to the BUI Maintenance > Hardware screen, click the [Show Details](#) link for the server, click the PSU submenu, and confirm that the power supply status icon is green.

#### Related Information

- [“Server Back Panel View”](#) on page 3
- [“Power Supply Status Indicators”](#) on page 52
- [“Remove a Power Supply”](#) on page 53



# Servicing CRUs That Require Server Power Off

These sections describe how to service customer-replaceable units (CRUs) that require you to power off the server.

Tasks	Description
Learn about the locations of the CRUs.	<a href="#">“CRU Locations” on page 57</a>
Service the DIMMs.	<a href="#">“Servicing the DIMMs (CRU)” on page 58</a>
Service the PCIe Risers.	<a href="#">“Servicing PCIe Risers (CRU)” on page 64</a>
Service the PCIe cards.	<a href="#">“Servicing PCIe Cards (CRU)” on page 73</a>
Service the internal USB flash drive.	<a href="#">“Servicing the Internal USB Flash Drive (CRU)” on page 81</a>
Service the battery.	<a href="#">“Servicing the Battery (CRU)” on page 84</a>

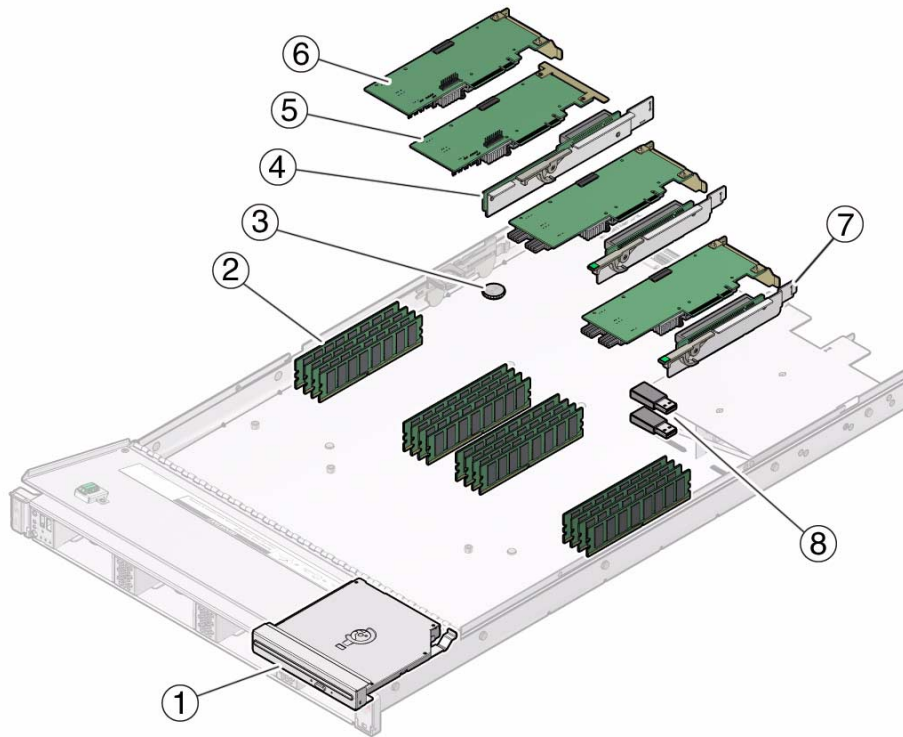
## Related Information

- [“Servicing CRUs That Do Not Require Server Power Off” on page 43](#)
- [“Servicing FRUs” on page 87](#)

## CRU Locations

The CRU locations are shown in the following figure.

**FIGURE:** CRU Locations



**Figure Legend**

1	Not applicable	5	Internal HBA card (installs in slot 4 on PCIe riser for slots 3 and 4)
2	DIMMs (CRUs)	6	PCIe card (installs in slot 3 on PCIe riser for slots 3 and 4)
3	Battery (CRU)	7	PCIe riser for slot 1
4	PCIe riser for slots 3 and 4	8	USB flash drive (1) [not (2) as shown]

## Servicing the DIMMs (CRU)

The Oracle ZFS Storage ZS3-ES is configured with 16 DDR3 DIMMs in 16 DIMM slots. All DIMMs must be of the same type in each server and in both clustered servers.





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**Caution** – These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Take Antistatic Measures” on page 39](#).

---



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**Caution** – Ensure that all power is removed from the server before removing or installing DDR3 DIMMs, or damage to the DDR3 DIMMs might occur. You must disconnect all power cables from the system before performing these procedures.

---

The following topics provide information to assist you when replacing or upgrading a DIMM:

- [“DIMM and Processor Physical Layout” on page 59](#)
- [“Inconsistencies Between DIMM Fault LEDs and the BIOS Isolation of Faulty DIMMs” on page 60](#)
- [“Using the Fault Remind Button” on page 61](#)
- [“Identify and Remove Faulty DIMMs” on page 62](#)
- [“Install a DIMM” on page 63](#)

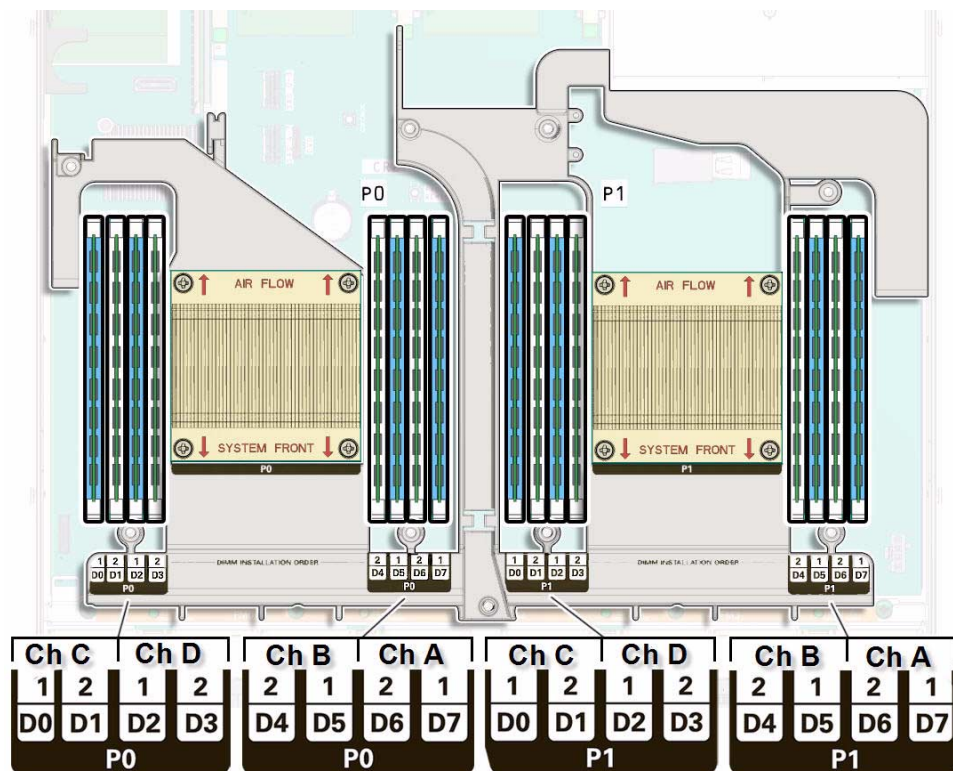
#### **Related Information**

- [“Servicing CRUs That Require Server Power Off” on page 57](#)
- [“Servicing FRUs” on page 87](#)

## **DIMM and Processor Physical Layout**

The physical layout of the DIMMs and processor(s) is shown in the following figure. When viewing the server from the front, processor 0 (P0) is on the left.

**FIGURE:** DIMM and Processor Physical Layout



## Inconsistencies Between DIMM Fault LEDs and the BIOS Isolation of Faulty DIMMs

When a single DIMM is marked as faulty by Oracle ILOM (for example, `fault.memory.intel.dimm.training-failed` is listed in the SP Event Log), BIOS might disable the entire memory channel that contains the faulty DIMM as failing, that is, up to two DIMMs. As a result, the memory available to the operating system is reduced.

However, when the Fault Remind button is pressed, only the fault LED associated with the faulty DIMM lights. The fault LED for the other DIMM in the memory channel remains off. Therefore, you can correctly identify the faulty DIMM.

When the faulty DIMM is replaced, the memory available to the operating system returns to normal. If the DIMM fault message in Oracle ILOM is not cleared under Open Problems, you should use Oracle ILOM to clear the fault. For instructions for manually clearing a DIMM fault, see the procedure "Undetected Replaced or

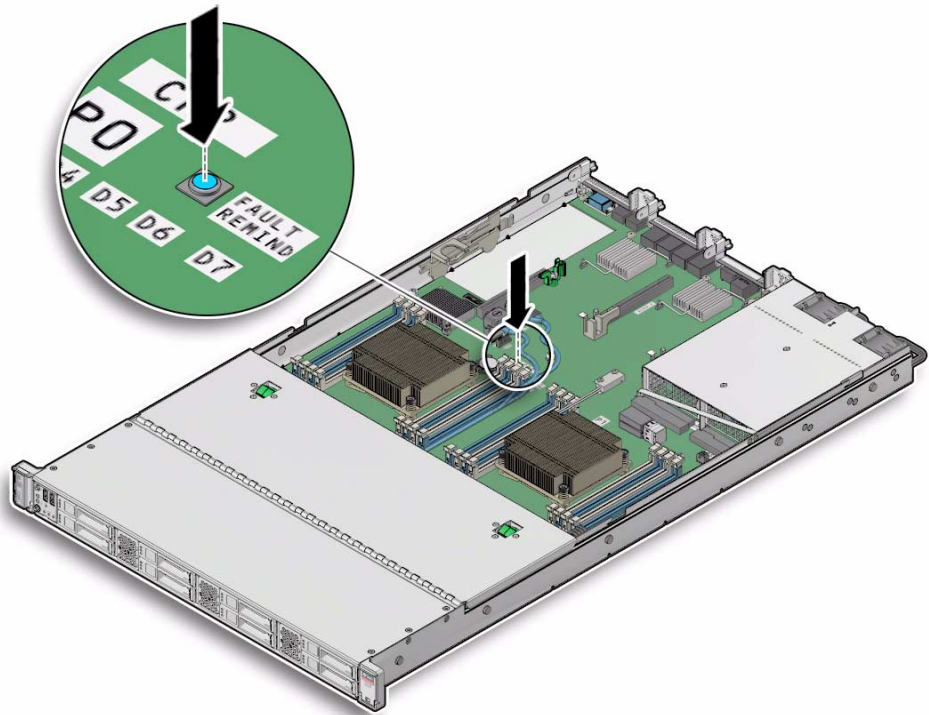
Repaired Hardware Components" in the *Oracle Integrated Lights Out Manager (ILOM) 3.1 User's Guide* in the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: <http://www.oracle.com/pls/topic/lookup?ctx=ilom31>.

## Using the Fault Remind Button

When the Fault Remind button is pressed, a LED located next to the Fault Remind button lights green to indicate that there is sufficient voltage present in the fault remind circuit to light any fault LEDs that were set due to a failure. If this LED fails to light when you press the Fault Remind button, it is likely that the capacitor powering the fault remind circuit has lost its charge. This can happen if the Fault Remind button is pressed for a long time with fault LEDs lit or if power has been removed from the server for more than 15 minutes.

The following figure shows the location of the Fault Remind button.

**FIGURE:** Fault Remind Button Location



## ▼ Identify and Remove Faulty DIMMs

### 1. Use the BUI to identify the faulty DIMM.

Go to Maintenance > Hardware, click the Show Details link for the server, click the DIMM submenu, and look for the DIMM with an amber icon to the left of its ID. Click on the row with the faulted DIMM to physically locate it in the server image.

### 2. Prepare the server for service.

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

See [“Powering Down the Server” on page 26](#)

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

See [“Extend the Server to the Maintenance Position” on page 31](#).

#### c. Attach an antistatic wrist strap.

See [“Take Antistatic Measures” on page 39](#).

#### d. Remove the top cover.

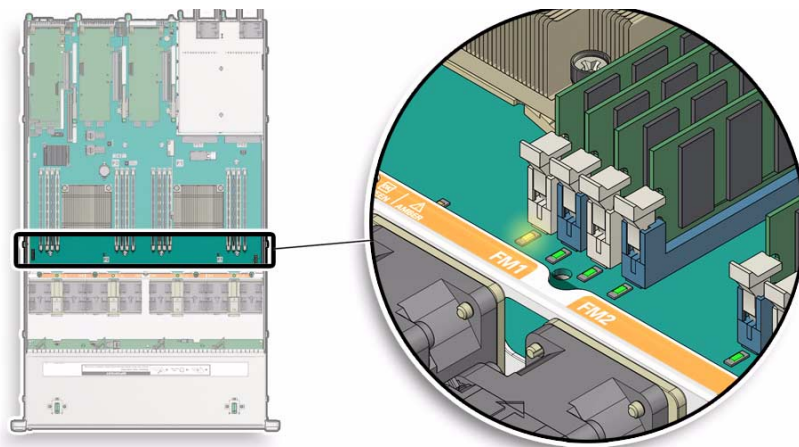
See [“Remove the Server Top Cover” on page 40](#).

### 3. Replace the faulty DIMM.

#### a. To identify the location of the faulty DDR3 DIMM, press the Fault Remind button on the motherboard (see [“Using the Fault Remind Button” on page 61](#)).

#### b. Note the location of faulty DDR3 DIMM.

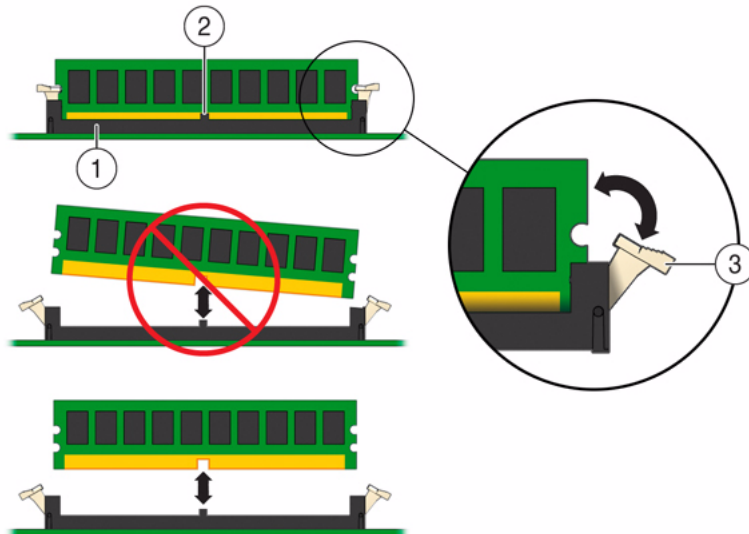
Faulty DDR3 DIMMs are identified with a corresponding amber LED on the motherboard.



- If DIMM fault LED is off: DIMM is operating properly.

- If DIMM fault LED is on (amber): DIMM is faulty and should be replaced.
- c. To remove the faulty DIMM do the following:
  - i. Rotate both DIMM socket ejectors outward as far as they will go.  
The DIMM is partially ejected from the socket (See [FIGURE: DIMM Socket Release and Alignment](#) on page 63).
  - ii. Carefully lift the DIMM straight up to remove it from the socket.
- d. Replace each faulty DIMM with another DIMM of the same rank size.  
For DIMM replacement instructions, see “[Install a DIMM](#)” on page 63.

**FIGURE:** DIMM Socket Release and Alignment



**Figure Legend**

- 
- |   |                       |
|---|-----------------------|
| 1 | DIMM connector socket |
| 2 | DIMM connector key    |
| 3 | DIMM ejector lever    |
- 

## ▼ Install a DIMM

1. Unpack the replacement DDR3 DIMM and place it on an antistatic mat.
2. Ensure that the replacement DDR3 DIMM matches the size it is replacing.

### 3. Install the DIMM.

- a. Ensure that the ejector tabs are in the open position.
- b. Align the notch in the replacement DIMM with the key in the connector.  
The notch ensures that the DIMM is oriented correctly.
- c. Push the DDR3 DIMM into the connector until the ejector tabs lock the DIMM in place.

If the DIMM does not easily seat into the connector, verify that the notch in the DIMM is aligned with the key in the connector. If the notch is not aligned, damage to the DIMM might occur.

### 4. Repeat [Step 3](#) until all replacement DDR3 DIMMs are installed.

### 5. Return the server to operation.

- a. Install the top cover.  
See ["Install the Top Cover"](#) on page 120.
- b. Close the fan door.
- c. Return the server to the normal rack position.  
See ["Return the Server to the Normal Rack Position"](#) on page 123.
- d. Reconnect the power cord to the server power supply and the data cables.  
See ["Reconnect Data Cables and Power Cords"](#) on page 133.
- e. Power on the server.  
See ["Power On the Server"](#) on page 134.  
Verify that the Power/OK indicator is steady on.

---

## Servicing PCIe Risers (CRU)

PCIe cards in all slots are installed on vertical risers. You must remove the relevant riser to remove and replace a PCIe card. You must remove all three PCIe risers when replacing the motherboard.



---

**Caution** – These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in ["Take Antistatic Measures"](#) on page 39.

---



---

**Caution** – Ensure that all power is removed from the server before removing or installing PCIe risers, or damage to the PCIe cards installed in the risers might occur. You must disconnect all power cables from the system before performing these procedures.

---

The following topics are covered:

- [“PCIe Riser Location and Differences” on page 65](#)
- [“Remove a PCIe Riser From PCIe Slot 1 or 2” on page 66](#)
- [“Install a PCIe Riser Into PCIe Slot 1 or 2” on page 68](#)
- [“Remove a PCIe Riser From PCIe Slots 3 and 4” on page 70](#)
- [“Install a PCIe Riser Into PCIe Slots 3 and 4” on page 71](#)

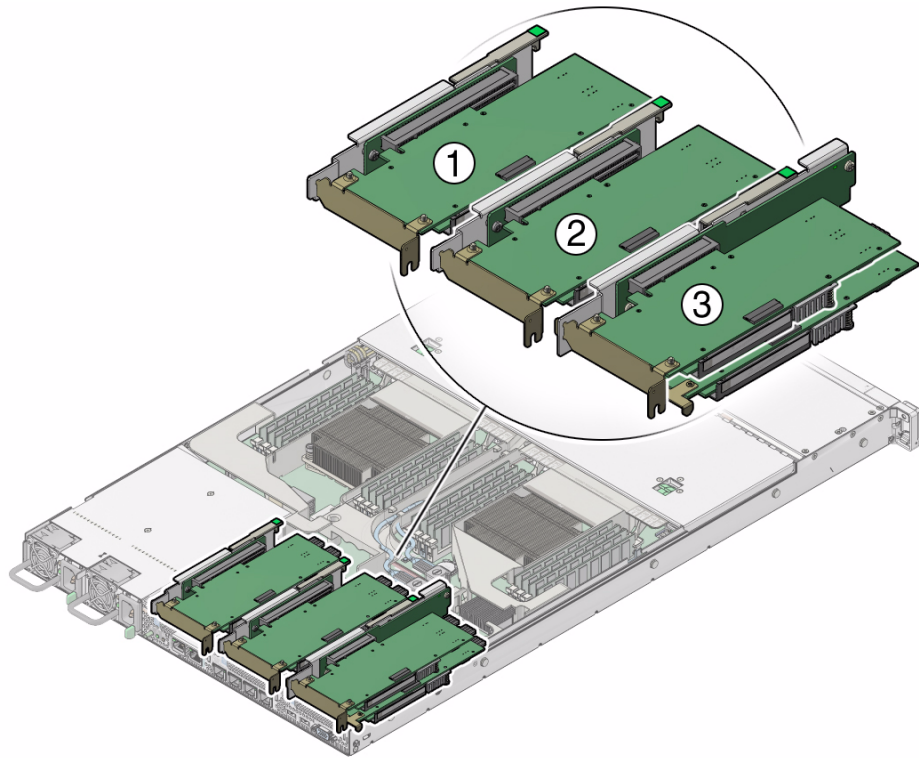
### **Related Information**

- [“Servicing PCIe Cards \(CRU\)” on page 73](#)

## **PCIe Riser Location and Differences**

The PCIe riser that installs in PCIe slots 3 and 4 is different than the risers in PCIe slots 1 and 2. The riser for slots 3 and 4 supports two cards, a standard PCIe card and an internal HBA card. Do not attempt to install the riser for PCIe slots 3 and 4 in slots 1 or 2, and vice versa.

**FIGURE:** PCIe Riser Locations



**Figure Legend**

- 
- |   |  |
|---|--|
| 1 | PCIe riser and installed PCIe card in slot 1 (This slot is nonfunctional in single-processor systems.) |
| 2 | PCIe riser and installed PCIe card in slot 2   |
| 3 | PCIe riser and installed cards (2) in slots 3 and 4 (this riser contains the internal HBA card.)       |
- Note:** This riser is different from the risers in slots 1 and 2.
- 

**Related Information**

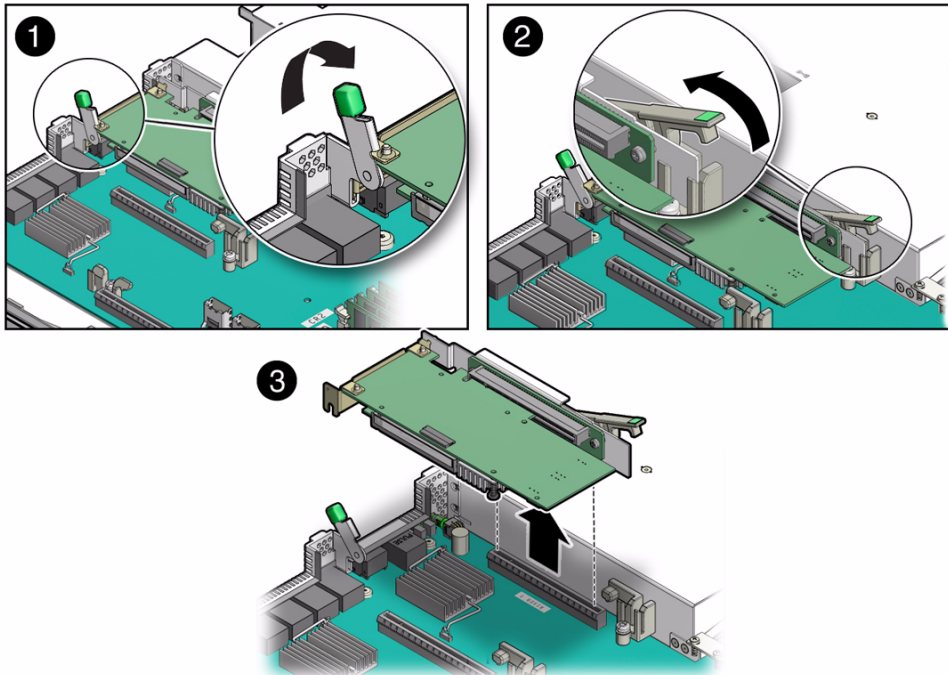
- [“PCIe Slot Characteristics” on page 74](#)

## ▼ Remove a PCIe Riser From PCIe Slot 1 or 2

1. Prepare the server for service.



- a. Power off the server and disconnect the power cords from the power supplies.  
See [“Powering Down the Server”](#) on page 26
  - b. Extend the server to the maintenance position.  
See [“Extend the Server to the Maintenance Position”](#) on page 31.
  - c. Attach an antistatic wrist strap.  
See [“Take Antistatic Measures”](#) on page 39.
  - d. Remove the top cover.  
See [“Remove the Server Top Cover”](#) on page 40.
2. Select the PCIe riser that you want to remove.  
See [“PCIe Slot Characteristics”](#) on page 74.
  3. If a PCIe card is installed in the riser, disconnect any external or internal cables from the card.
  4. Lift the green-tabbed latch on the rear of the server chassis next to the applicable PCIe slot to release the PCIe card’s rear bracket [1].



5. Lift the riser release lever with one hand and use your other hand to remove the riser from the motherboard [2, 3].

The release lever is marked with a green tab.

6. If there is a PCIe card installed in the riser, place the riser on an antistatic mat and make a note of the slot in which the PCIe riser was originally installed; otherwise, set the PCIe riser aside.

### Related Information

- [“Install a PCIe Riser Into PCIe Slot 1 or 2” on page 68](#)

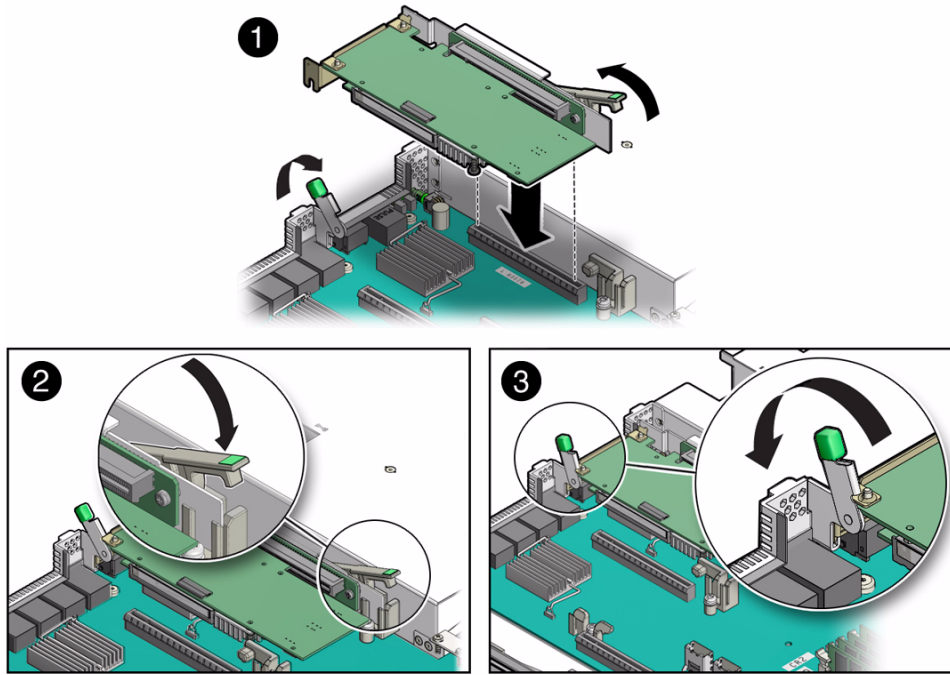
## ▼ Install a PCIe Riser Into PCIe Slot 1 or 2

---

**Note** – The PCIe riser in slots 3 and 4 is different than the PCIe risers in slots 1 and 2. Do not attempt to install a PCIe riser from slots 1 or 2 into PCIe slots 3 and 4 and vice versa.

---

1. Determine into which slot you will install the PCIe riser.
2. Retrieve the PCIe riser and any PCIe cards attached to it.
3. Raise the PCIe riser release lever (marked with a green tab) to the open (up) position [1].
4. Gently press the riser into the motherboard connector until it seats and press the green-tabbed, riser release lever to the close (down) position [2].



5. If there is a PCIe card installed in the riser, reconnect any external or internal cables to the card.
6. Close the green-tabbed latch on the rear of the server chassis next to the applicable PCIe slot to secure the PCIe card's rear bracket to the server chassis [3].
7. Return the server to operation.
  - a. Install the top cover.  
See ["Install the Top Cover"](#) on page 120.
  - b. Close the fan door.
  - c. Return the server to the normal rack position.  
See ["Return the Server to the Normal Rack Position"](#) on page 123.
  - d. Reconnect the power cord to the server power supply and the data cables.  
See ["Reconnect Data Cables and Power Cords"](#) on page 133.
  - e. Power on the server.  
See ["Power On the Server"](#) on page 134.  
Verify that the Power/OK indicator is steady on.

#### 8. Use Oracle ILOM to clear the server PCIe riser fault.

If the PCIe riser fault message in Oracle ILOM is not cleared under Open Problems, you should use Oracle ILOM to clear the fault. For instructions for manually clearing a PCIe riser fault, see the procedure "Undetected Replaced or Repaired Hardware Components" in the *Oracle Integrated Lights Out Manager (ILOM) 3.1 User's Guide* in the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at:

<http://www.oracle.com/pls/topic/lookup?ctx=ilom31>.

#### Related Information

- "Remove a PCIe Riser From PCIe Slot 1 or 2" on page 66

## ▼ Remove a PCIe Riser From PCIe Slots 3 and 4

### 1. Prepare the server for service.

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

See "Powering Down the Server" on page 26

- b. Extend the server to the maintenance position.

See "Extend the Server to the Maintenance Position" on page 31.

- c. Attach an antistatic wrist strap.

See "Take Antistatic Measures" on page 39.

- d. Remove the top cover.

See "Remove the Server Top Cover" on page 40.

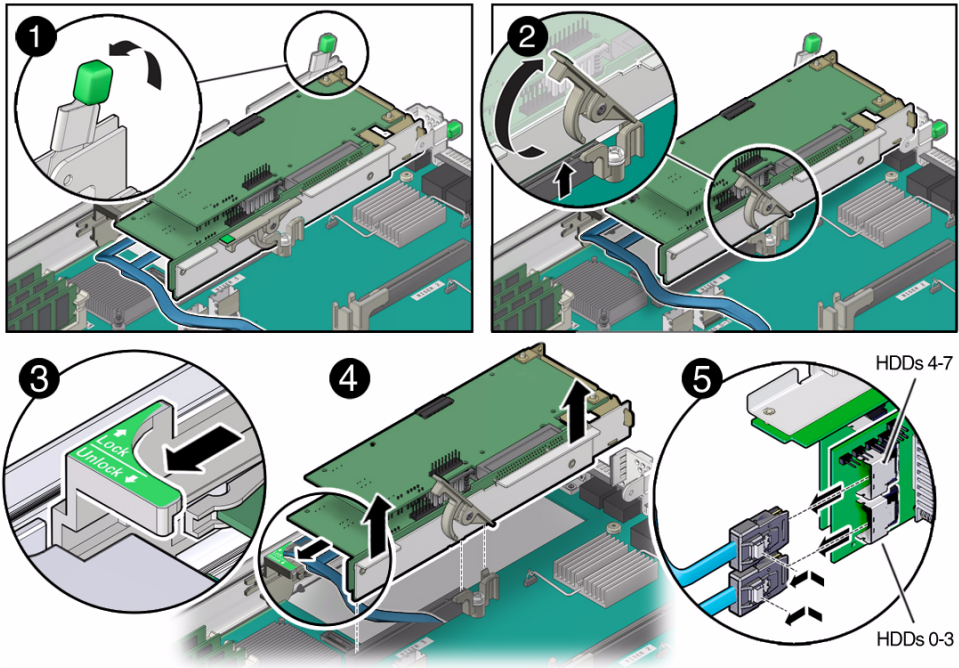
### 2. If there is a PCIe card installed in the riser, disconnect any external or internal cables.

---

**Note** – Do not disconnect the SAS cable from the internal HBA card until after you have removed the riser from the server.

---

### 3. Open the green-tabbed latch located on the rear of the server chassis next to the PCIe slot 3 to release the PCIe card holding bracket [1].



4. To release the riser from the motherboard connector, lift the riser's green-tabbed release lever to the open position [2].
5. Slide the plastic PCIe card retainer, which is mounted on the side of the chassis, forward to release the card(s) installed in the riser [3].
6. Grasp the riser with both hands and remove it from the server [4].
7. Disconnect the SAS storage drive (HDD) cables from the internal HBA card installed in PCIe slot 4 [5].
8. Place the riser on an antistatic mat.

#### Related Information

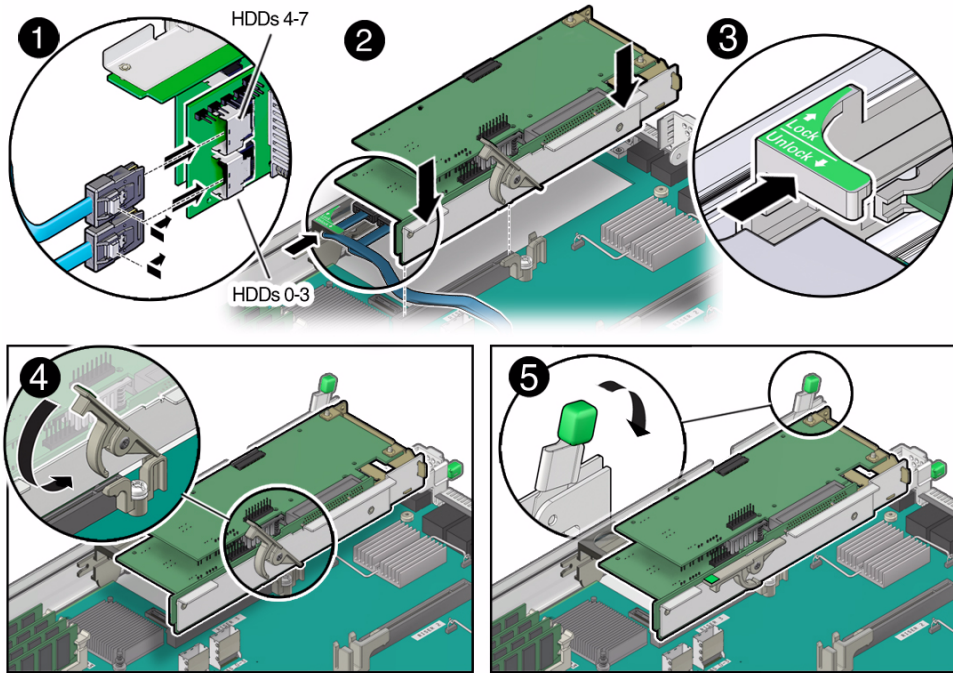
- [“Install a PCIe Riser Into PCIe Slots 3 and 4” on page 71](#)

## ▼ Install a PCIe Riser Into PCIe Slots 3 and 4

**Note** – The PCIe riser in slots 3 and 4 is different than the PCIe risers in slots 1 and 2. Do not attempt to install a PCIe riser from slots 1 or 2 into PCIe slots 3 and 4 and vice versa.

1. Retrieve the PCIe riser and any PCIe cards attached to it.
2. Reconnect the SAS cable(s) to the internal HBA card [1].

Be sure to connect the SAS cable for storage drives 4 through 7 (HDDs 4-7) to the connector that is closest to the riser; otherwise, the server will incorrectly identify the storage drives when it is powered on.



3. Raise the PCIe riser green-tabbed release lever to the open (up) position and gently press the riser into the motherboard connector until it seats [2].
4. Ensure that the rear bracket on the internal HBA card in PCIe slot 4 is connected to the slot in the server chassis side wall. If the bracket is not connected, remove the riser and reposition it so that the rear bracket connects to the side wall, then gently press the riser into the motherboard connector.
5. Slide the plastic PCIe card retainer that is mounted on the side of the chassis toward the back of the server to secure the card(s) installed in the riser [3].
6. Press the green-tabbed release lever on the PCIe riser to the close (down) position [4].
7. To secure the PCIe card's rear bracket to the server, close the green-tabbed latch on the rear of the server chassis [5].

8. If there is a PCIe card installed in slot 3 of the riser, reconnect any external or internal cables to the card.
9. Return the server to operation.
  - a. Install the top cover.  
See [“Install the Top Cover”](#) on page 120.
  - b. Close the fan door.
  - c. Return the server to the normal rack position.  
See [“Return the Server to the Normal Rack Position”](#) on page 123.
  - d. Reconnect the power cord to the server power supply and the data cables.  
See [“Reconnect Data Cables and Power Cords”](#) on page 133.
  - e. Power on the server.  
See [“Power On the Server”](#) on page 134.  
Verify that the Power/OK indicator is steady on.
10. Use Oracle ILOM to clear the server PCIe riser fault.

If the PCIe riser fault message in Oracle ILOM is not cleared under Open Problems, you should use Oracle ILOM to clear the fault. For instructions for manually clearing a PCIe riser fault, see the procedure "Undetected Replaced or Repaired Hardware Components" in the *Oracle Integrated Lights Out Manager (ILOM) 3.1 User's Guide* in the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at:  
<http://www.oracle.com/pls/topic/lookup?ctx=ilom31>.

#### Related Information

- [“Remove a PCIe Riser From PCIe Slot 1 or 2”](#) on page 66

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## Servicing PCIe Cards (CRU)

These topics describe how to service PCIe cards. Refer to your PCIe card documentation for complete software and cabling information about your card.



---

**Caution** – These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Take Antistatic Measures”](#) on page 39.

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---

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

---

The following topics are covered:

- [“PCIe Slot Characteristics” on page 74](#)
- [“Identify a Faulty PCIe Card in the BUI” on page 75](#)
- [“Remove a PCIe Card From PCIe Slot 1 or 2” on page 75](#)
- [“Install a PCIe Card in PCIe Slot 1 or 2” on page 76](#)
- [“Remove a PCIe Card From PCIe Slot 3” on page 77](#)
- [“Install a PCIe Card in the PCIe Riser in Slot 3” on page 78](#)
- [“Remove the Internal HBA Card” on page 79](#)
- [“Install the Internal HBA Card in the PCIe Riser” on page 80](#)

### Related Information

- [“Servicing PCIe Risers \(CRU\)” on page 64](#)

## PCIe Slot Characteristics

There are three external and one internal PCIe slots available. The external slots support optional, standard PCIe cards and are numbered 1, 2, and 3 from left to right when you view the server from the rear. The internal slot, which installs on the riser in PCIe slot 3 and 4, supports a required internal SAS controller HBA card. For a view of the rear panel that shows PCIe slot numbering, see [“Server Back Panel View” on page 3](#).

---

**Note** – All of the PCIe slots comply with the PCI Express 3.0 specification and can accommodate 25 watt PCIe cards.

---

The following table lists the characteristics and requirements of the PCIe slots.

Slot Number	Supported PCIe Card Types	Supported PCIe Specifications	Slot Connector Width/PCI Express Lanes
1	Low-profile cards only	PCIe 1.0, PCIe 2.0, PCIe 3.0	x16 mechanical/x16 electrical



Slot Number	Supported PCIe Card Types	Supported PCIe Specifications	Slot Connector Width/PCI Express Lanes
2	Low-profile cards only	PCIe 1.0, PCIe 2.0, PCIe 3.0	x16 mechanical/x8 electrical
3 and 4	Low-profile cards only	PCIe 1.0, PCIe 2.0, PCIe 3.0	x8 mechanical/x8 electrical

### Related Information

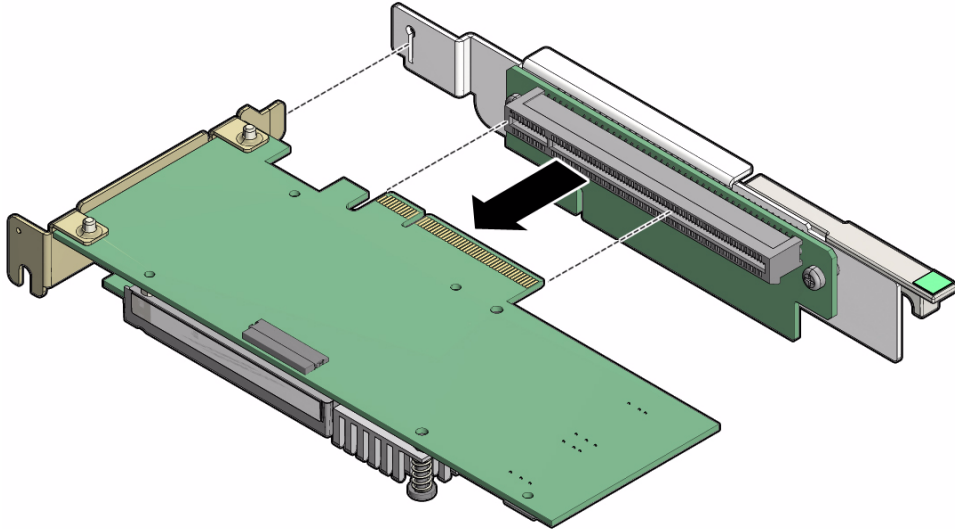
- [“Server Back Panel View” on page 3](#)

## ▼ Identify a Faulty PCIe Card in the BUI

1. Go to **Maintenance > Hardware**.
2. Click the **Show Details** link for the server, click the **Slot** submenu, and look for a PCIe card with an amber icon to the left of its ID.
3. Click on the row with the faulty PCIe card to physically locate it in the server image.

## ▼ Remove a PCIe Card From PCIe Slot 1 or 2

1. Remove the PCIe riser from the server.  
For instructions, see [“Remove a PCIe Riser From PCIe Slot 1 or 2” on page 66](#)
2. Remove the PCIe card from the PCIe riser.
  - a. Hold the riser in one hand and use your other hand to carefully pull the PCIe card connector out of the riser.
  - b. Disconnect the rear bracket that is attached to the PCIe card from the rear of the PCIe riser.



3. Place the PCIe card on an antistatic mat.



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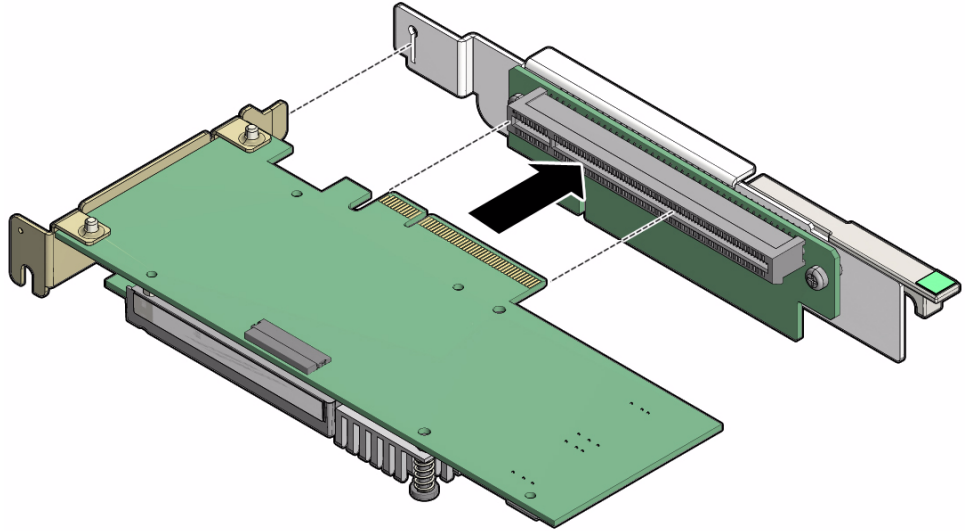
**Caution** – Whenever you remove a PCIe card, you should replace it with another PCIe card or a filler panel. Installing filler panels in vacant PCIe slots helps reduce the level of electromagnetic interference (EMI) emitted by the server. For instructions for installing a filler panel, see [“Removing and Installing Server Filler Panels”](#) on [page 119](#).

---

## ▼ Install a PCIe Card in PCIe Slot 1 or 2

1. Install the PCIe card.

- a. Insert the rear bracket that is attached to the PCIe card into the PCIe riser.
- b. Hold the riser in one hand and use your other hand to carefully insert the PCIe card connector into the Riser.



**2. Install the PCIe riser into the server.**

For instructions, see [“Install a PCIe Riser Into PCIe Slot 1 or 2”](#) on page 68.

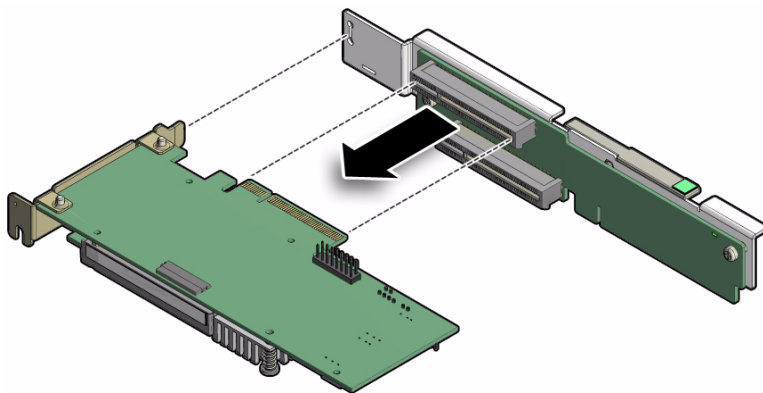
## ▼ Remove a PCIe Card From PCIe Slot 3

**1. Remove the PCIe riser from the server.**

For instructions, see [“Remove a PCIe Riser From PCIe Slots 3 and 4”](#) on page 70

**2. Remove the PCIe card from the riser.**

- a. Hold the riser in one hand and use your other hand to carefully remove the PCIe card connector from the riser.
- b. Disconnect the rear bracket attached to the PCIe card from the rear of the PCIe riser.



3. Place the PCIe card on an antistatic mat.



---

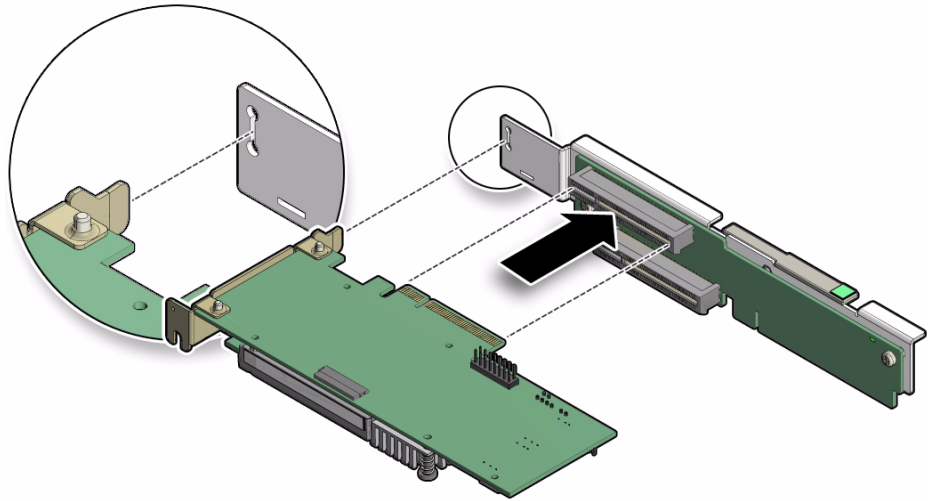
**Caution** – Whenever you remove a PCIe card, you should replace it with another PCIe card or a filler panel. Installing filler panels in vacant PCIe slots helps reduce the level of electromagnetic interference (EMI) emitted by the server.

---

## ▼ Install a PCIe Card in the PCIe Riser in Slot 3

1. Install the PCIe card in the riser.

- a. Insert the rear bracket that is attached to the PCIe card into the PCIe riser.
- b. Insert the PCIe card connector into the riser.



**2. Install the PCIe riser.**

For instructions, see [“Install a PCIe Riser Into PCIe Slots 3 and 4”](#) on page 71.

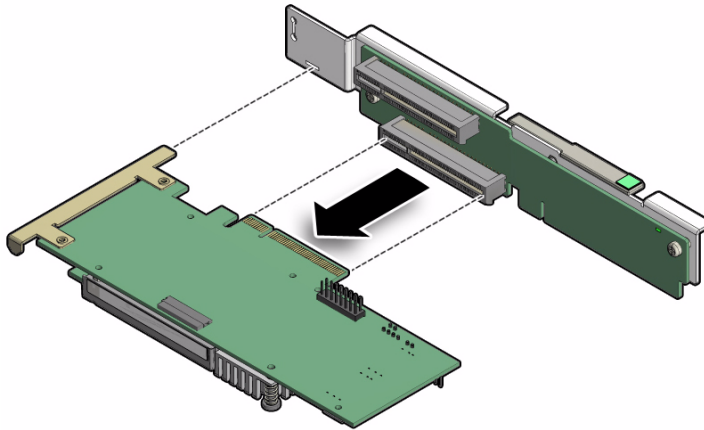
## ▼ Remove the Internal HBA Card

**1. Remove the PCIe riser from slot 3.**

For instructions, see [“Remove a PCIe Riser From PCIe Slots 3 and 4”](#) on page 70.

**2. Remove the internal HBA card from the riser.**

- a. Hold the riser in one hand and use your other hand to carefully remove the card from slot 4 of the riser.
- b. Disconnect the rear bracket attached to the PCIe card from the rear of the PCIe riser.



3. Place the PCIe card on an antistatic mat.



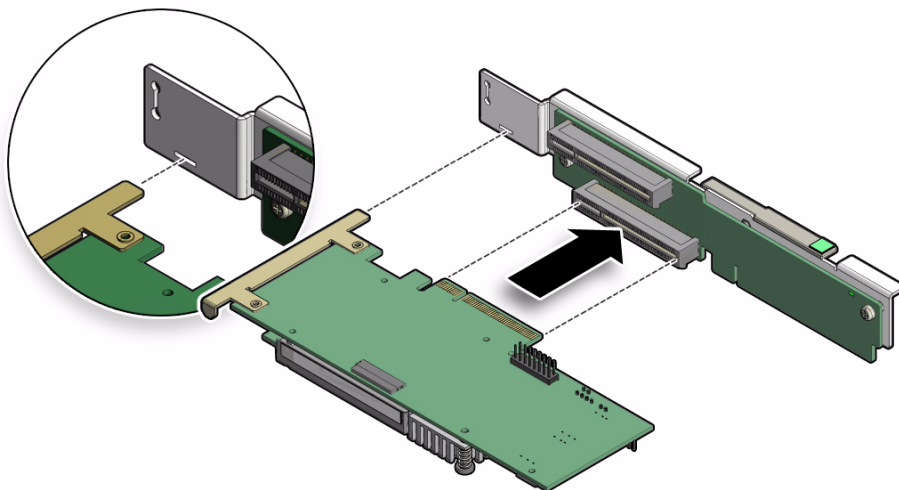
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**Caution** – Whenever you remove a PCIe card, you should replace it with another PCIe card or a filler panel. Installing filler panels in vacant PCIe slots helps reduce the level of electromagnetic interference (EMI) emitted by the server.

---

## ▼ Install the Internal HBA Card in the PCIe Riser

1. Install the internal HBA card into the riser in slot 3.
  - a. Insert the rear bracket that is attached to the internal HBA card into the rear connector on the PCIe riser.
  - b. Insert the internal HBA card connector into the riser bottom connector.



## 2. Install the PCIe riser.

For instructions, see [“Install a PCIe Riser Into PCIe Slots 3 and 4”](#) on page 71.

---

# Servicing the Internal USB Flash Drive (CRU)



---

**Caution** – These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Take Antistatic Measures”](#) on page 39.

---



---

**Caution** – Ensure that all power is removed from the server before removing or installing a flash drive or damage to the drive might occur. You must disconnect all power cables from the system before performing these procedures.

---

The following topics are covered:

- [“Remove an Internal USB Flash Drive”](#) on page 82
- [“Install an Internal USB Flash Drive”](#) on page 83

## Related Information

- “Extend the Server to the Maintenance Position” on page 31
- “Remove the Server Top Cover” on page 40

## ▼ Remove an Internal USB Flash Drive

The server is equipped with one internal USB flash drive.

### 1. Prepare the server for service.

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

See “Powering Down the Server” on page 26

- b. Extend the server to the maintenance position.

See “Extend the Server to the Maintenance Position” on page 31.

- c. Attach an antistatic wrist strap.

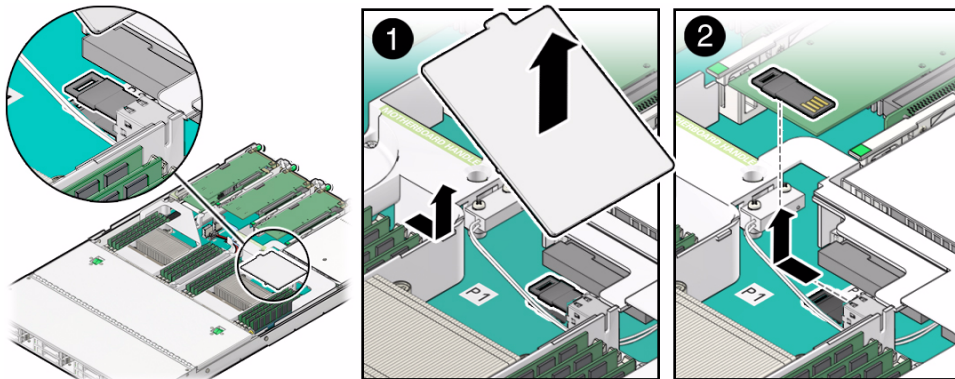
See “Take Antistatic Measures” on page 39.

- d. Remove the top cover.

See “Remove the Server Top Cover” on page 40.

### 2. To access the USB flash drives, remove the cover [1].

**FIGURE:** Removing an Internal USB Flash Drive



### 3. To remove a USB flash drive, grasp it and pull it out of the internal USB port [2].



## ▼ Install an Internal USB Flash Drive

1. **Unpack the replacement USB flash drive.**
2. **Insert the USB flash drive into the internal USB port** (see [FIGURE: Removing an Internal USB Flash Drive on page 82 \[2\]](#)).
3. **Install the USB flash drive cover [1].**
4. **Return the server to operation.**
  - a. **Install the top cover.**  
See [“Install the Top Cover” on page 120](#).
  - b. **Close the fan door.**
  - c. **Return the server to the normal rack position.**  
See [“Return the Server to the Normal Rack Position” on page 123](#).
  - d. **Reconnect the power cord to the server power supply and the data cables.**  
See [“Reconnect Data Cables and Power Cords” on page 133](#).
  - e. **Power on the server.**  
See [“Power On the Server” on page 134](#).  
Verify that the Power/OK indicator is steady on.

---

# Servicing the Battery (CRU)

The battery maintains system time when the server is powered off and a time server is unavailable. If the server fails to maintain the proper time when the server is powered off and not connected to a network, replace the battery.

The BIOS power-on self-test (POST) code checkpoint tests check the battery when the server is powered on. If the battery is low, the BIOS POST code checkpoint tests generates a Low battery error and logs it to the Oracle ILOM service processor (SP) event log.



---

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

---

The following topics are covered:

- [“Remove the Battery” on page 84](#)
- [“Install the Battery” on page 85](#)

## Related Information

- [“Extend the Server to the Maintenance Position” on page 31](#)
- [“Remove the Server Top Cover” on page 40](#)

## ▼ Remove the Battery

### 1. Prepare the server for service.

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

See [“Powering Down the Server” on page 26](#)

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

See [“Extend the Server to the Maintenance Position” on page 31](#).

- c. **Attach an antistatic wrist strap.**

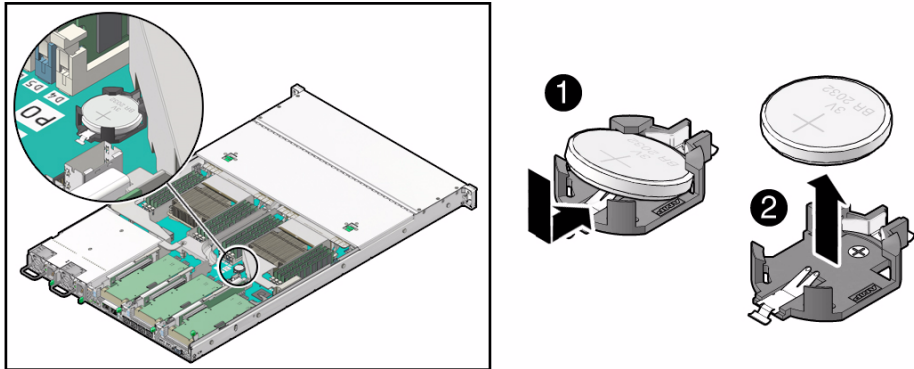
See [“Take Antistatic Measures” on page 39](#).

- d. **Remove the top cover.**

See [“Remove the Server Top Cover” on page 40](#).

2. To dislodge the battery from its retainer, place your finger under the rear of the battery (the side nearest the rear of the server) [1] and gently lift it up and out of its retainer [2].

**FIGURE:** Removing the Battery



## ▼ Install the Battery

1. Unpack the replacement battery.
2. Press the new battery into the battery retainer with the positive side (+) facing up (see [FIGURE: Removing the Battery on page 85](#)[1]).
3. If the service processor is configured to synchronize with a network time server using the Network Time Protocol (NTP), the Oracle ILOM clock will be reset as soon as the server is powered on and connected to the network; otherwise, proceed to the next step.
4. If the service processor is not configured to use NTP, you must do the following:
  - a. Reset the Oracle ILOM clock using the Oracle ILOM CLI or the web interface.  
For instructions, see the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at:  
<http://www.oracle.com/pls/topic/lookup?ctx=ilom31>.
  - b. Use the BIOS Setup Utility to reprogram the host clock.
5. Return the server to operation.
  - a. Install the top cover.  
See “[Install the Top Cover](#)” on page 120.

**b. Close the fan door.**

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

See [“Return the Server to the Normal Rack Position”](#) on page 123.

**d. Reconnect the power cord to the server power supply and the data cables.**

See [“Reconnect Data Cables and Power Cords”](#) on page 133.

**e. Power on the server.**

See [“Power On the Server”](#) on page 134.

Verify that the Power/OK indicator is steady on.

---

**Note** – On first boot, use the BIOS Setup utility to reset the server host time.

---

# Servicing FRUs

The following topics describe how to service field-replaceable units (FRUs). You must power down the system and disconnect the AC power cords from the server before servicing any of these components.

**Note** – Only Oracle authorized service personnel should service FRU components.

Description	Link
Identifying FRU locations.	<a href="#">“FRU Locations” on page 87</a>
Servicing the processor(s).	<a href="#">“Servicing Processors (FRU)” on page 88</a>
Servicing the disk backplane.	<a href="#">“Servicing the Disk Backplane (FRU)” on page 98</a>
Servicing the front indicator module.	<a href="#">“Servicing the Front Indicator Module (FRU)” on page 104</a>
Servicing the motherboard.	<a href="#">“Servicing the Motherboard (FRU)” on page 107</a>
Servicing the server SAS cables.	<a href="#">“Servicing the SAS Cables (FRUs)” on page 114</a>

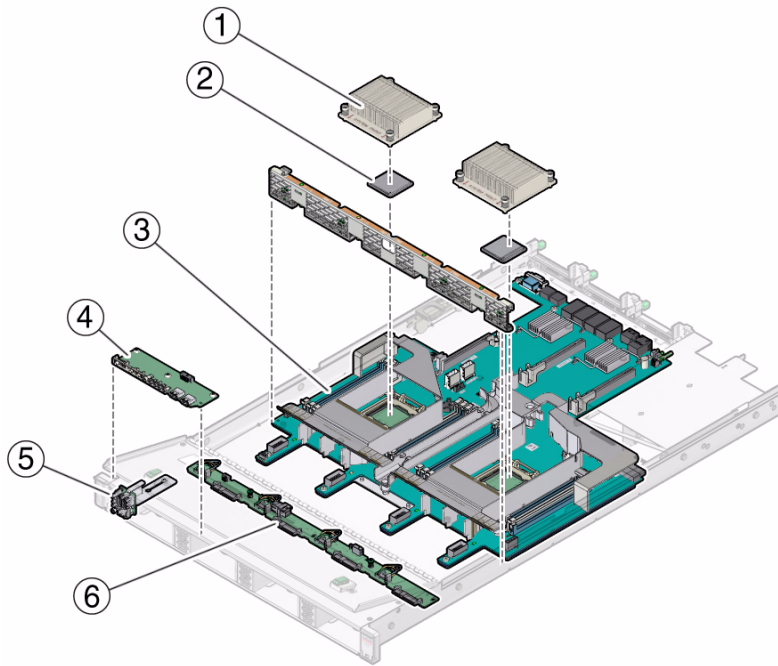
## Related Information

- [“Servicing CRUs That Do Not Require Server Power Off” on page 43](#)
- [“Servicing CRUs That Require Server Power Off” on page 57](#)

# FRU Locations

The locations of the FRUs are shown in the following figure.

**FIGURE:** FRU Locations



**Figure Legend**

1	Heatsink(s)	4	Not applicable
2	Processor(s) (FRU)	5	FIM (front indicator module) (FRU)
3	Motherboard (FRU)	6	Disk backplane (FRU)

## Servicing Processors (FRU)



**Caution** – Ensure that all power is removed from the server before removing or installing a processor. You must disconnect the power cables from the server before performing these procedures.



---

**Caution** – These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Take Antistatic Measures” on page 39](#).

---

These sections are covered:

- [“Remove a Processor” on page 89](#)
- [“Install a Processor” on page 94](#)

### Related Information

- [“Disconnect Cables From the Server” on page 31](#)
- [“Take Antistatic Measures” on page 39](#)
- [“Remove the Server From the Rack” on page 33](#)
- [“Remove the Server Top Cover” on page 40](#)

## ▼ Remove a Processor



---

**Caution** – Processor(s) should be removed only by an Oracle qualified service technician.

---



---

**Caution** – The processor socket used in the Oracle ZFS Storage ZS3-ES is the Intel LGA2011. Processor removal and replacement must be done using the green color-coded tool (see [FIGURE: Removing a Processor on page 93](#)). Using a tool with a different color code might result in damage to the processor and the socket. The supported replacement processor for the server includes the correct tool.

---

### 1. Use the BUI to identify the faulty processor.

Go to Maintenance > Hardware, click the `Show Details` link for the server, click the CPU submenu, and look for a processor with an amber icon to the left of its ID. Click on the row with the failed processor to physically locate it in the server image.

### 2. Prepare the server for service.

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

See [“Powering Down the Server” on page 26](#)

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

See “Extend the Server to the Maintenance Position” on page 31.

**c. Attach an antistatic wrist strap.**

See “Take Antistatic Measures” on page 39.

**d. Remove the server top cover.**

“Remove the Server Top Cover” on page 40.

**3. To identify the location of the faulty processor, press the Fault Remind button on the motherboard.**

---

**Note** – When the Fault Remind button is pressed, a LED located next to the Fault Remind button lights green to indicate that there is sufficient voltage present in the fault remind circuit to light any fault LEDs that were set due to a failure. If this LED fails to light when you press the Fault Remind button, it is likely that the capacitor powering the fault remind circuit has lost its charge. This can happen if the Fault Remind button is pressed for a long time with fault LEDs lit or if power has been removed from the server for more than 15 minutes.

---

**4. Identify the faulty processor using the fault LED.**

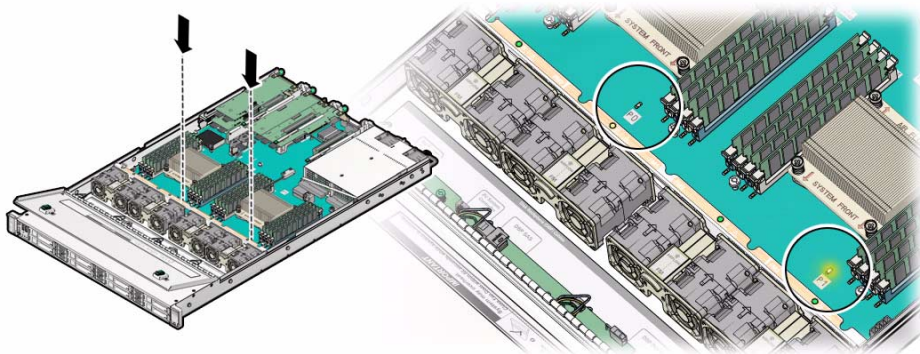
The processor fault LEDs are located next to the processor(s).

- If processor fault LED is off: processor is operating properly.
- If processor fault LED is on (amber): processor is faulty and should be replaced.

---

**Note** – Processor 0 (P0) is on the left side when viewing the server from the front.

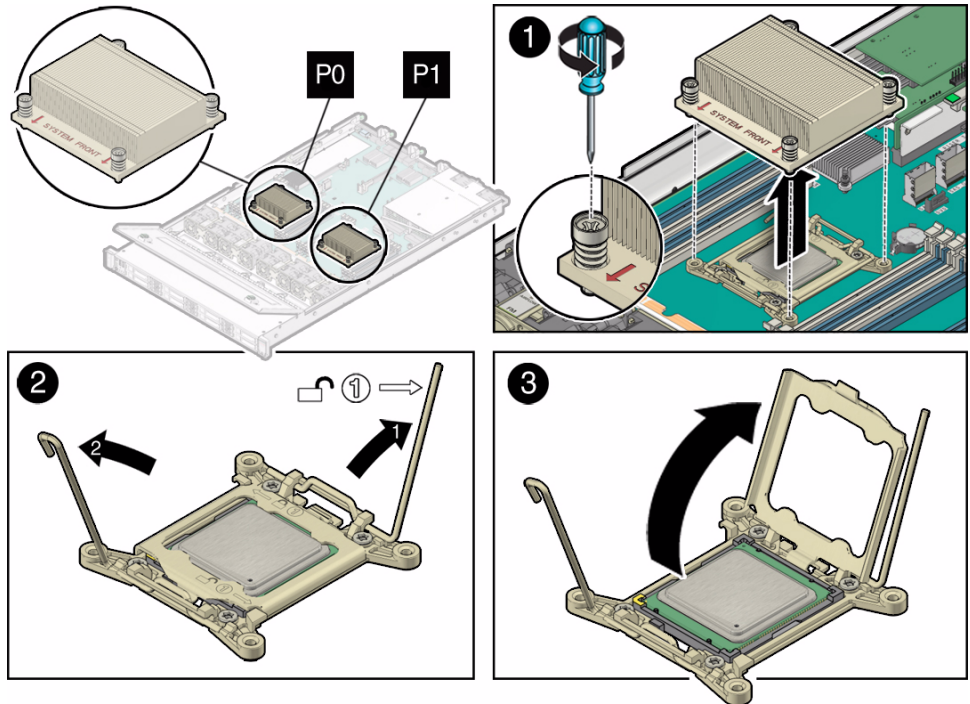
---





5. Gently press down on the top of the heat sink to counteract the pressure of the captive spring-loaded screws that secure the heat sink to the motherboard and loosen the four Phillips captive screws in the heatsink for the faulty processor [1].

Turn the screws counterclockwise alternately one and one half turns until they are fully removed.



6. To separate the heat sink from the top of the processor, gently twist the heat sink left and right, while pulling upward, then lift off the heatsink and place it upside down on a flat surface [1].

A thin layer of thermal grease separates the heat sink and the processor. This grease also acts as an adhesive.

---

**Note** – Do not allow the thermal grease to contaminate the work space or other components.

---

7. Use an alcohol pad to clean the thermal grease from the underside of the heatsink.

Be very careful not to get the thermal grease on your fingers.



---

**Caution** – Failure to clean the heatsink prior to removing the processor could result in the accidental contamination of the processor socket or other components. Also, be careful not to get the grease on your fingers as this could result in contamination of components.

---

8. Disengage the processor release lever on the right side of the processor socket (viewing the server from the front) by pushing down and moving it to the side away from the processor, and then rotating the lever upward [2].
9. Disengage the processor release lever on the left side of the processor socket (viewing the server from the front) by pushing down and moving it to the side away from the processor, and then rotating the lever upward [2].
10. To lift the pressure frame off of the socket, rotate the processor release lever on the right side of the processor toward the closed position (the pressure frame is lifted up as the release lever is lowered toward the closed position) and carefully swing the pressure frame to the fully open position [3].



---

**Caution** – Whenever you remove a processor, you should replace it with another processor and reinstall the processor heatsink; otherwise, the server might overheat due to improper airflow. For instructions for installing a processor, see [“Install a Processor” on page 94](#).

---

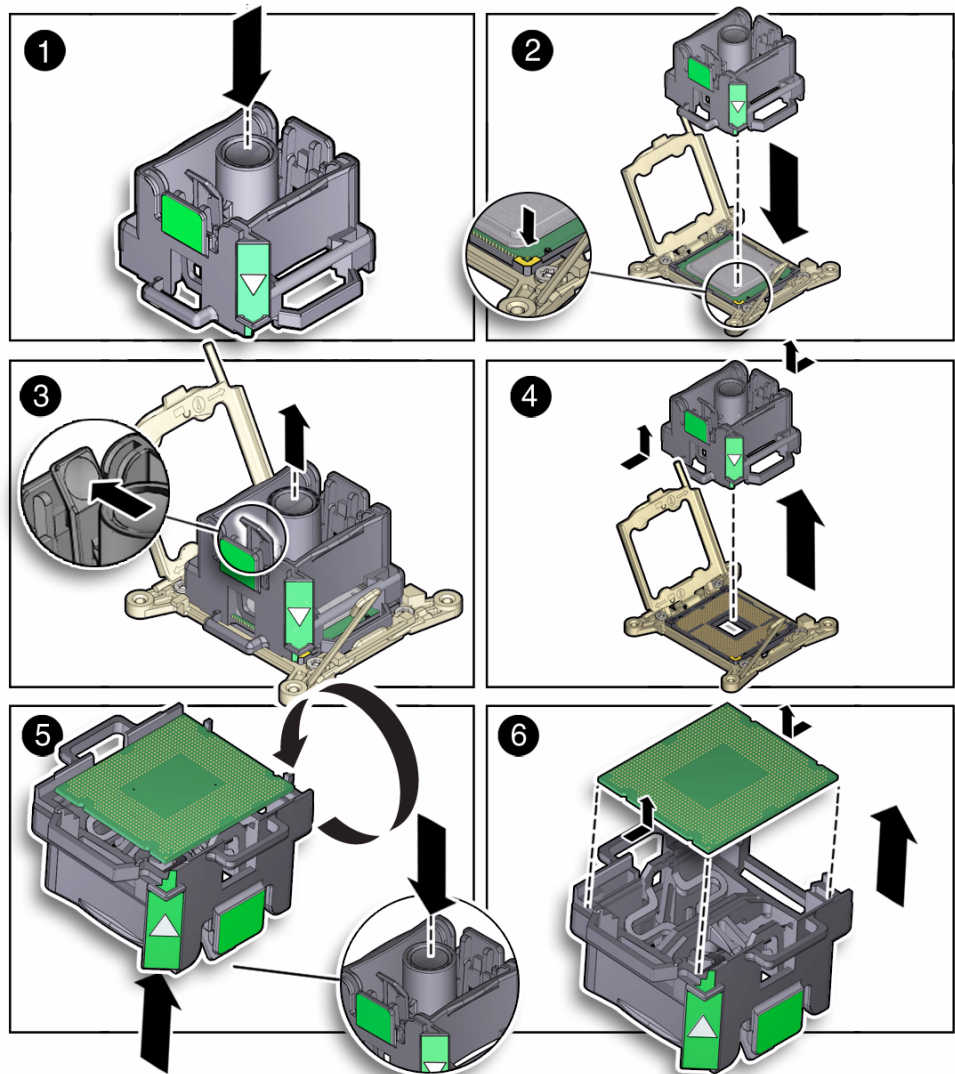
11. To remove the processor from the socket, acquire the processor removal/replacement tool and perform the following steps:
  - a. Locate the button in the center of the top of the processor removal/replacement tool and press it to the down position [1].
  - b. Properly position the tool over the processor socket and lower it into place over the processor socket [2].

To properly position the tool over the processor socket, rotate the tool until the green triangle on the side of the tool is facing the front of the server and it is over the left side of the processor socket when viewing the server from the front.
  - c. Press the release lever on the tool to release the center button and engage the processor [3].

An audible click indicates that the processor is engaged.
  - d. Grasp the tool by its sides and remove it from the server [4].
  - e. Turn the tool upside down and verify that it contains the processor [5].
  - f. While holding the processor tool up side down, press the center button on the tool to release the processor [5].

- g. Carefully grasp the processor on the front and back edges, lift it out of the tool and place it with its circuit side down (the installed orientation) into an antistatic container [6].
- h. Carefully clean the thermal grease off the top of the processor.

**FIGURE:** Removing a Processor



#### Related Information

- [“Install a Processor” on page 94](#)

## ▼ Install a Processor



---

**Caution** – Processors should be installed only by an Oracle qualified service technician.

---



---

**Caution** – The processor socket used in the Oracle ZFS Storage ZS3-ES is the Intel LGA2011. Processor removal and replacement must be done using the green color-coded tool (see [FIGURE: Installing a Processor on page 96](#)). Using a tool with a different color code might result in damage to the processor and the socket. The supported replacement processor for the server includes the correct tool.

---



---

**Caution** – Handle the processor socket pins with extreme care. Processor socket pins are very fragile. A light touch can bend the processor socket pins and damage the board beyond repair.

---

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

See [“Electrostatic Discharge Safety” on page 24](#).

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

3. **Ensure that the replacement processor is identical to the failed processor that was removed.**

4. **Ensure that the two processor socket release levers and the processor pressure frame are in the fully open position.**

For instructions for opening the processor release levers and the pressure frame, see [Step 8](#) through [Step 10](#) of [“Remove a Processor” on page 89](#).

5. **To install the replacement processor into the processor removal/replacement tool, acquire the tool and perform the following steps:**

- a. **Press the button in the center of the tool to the down position [1].**
- b. **Turn the tool upside down, grasp the processor by its front and back edges and position the processor (circuit side up) in the tool so that the triangle on the corner of the processor aligns with the triangle on the side of the processor removal/replacement tool [2].**
- c. **Lower the processor into the tool and press the tool release lever to release the center button and engage the processor [3].**

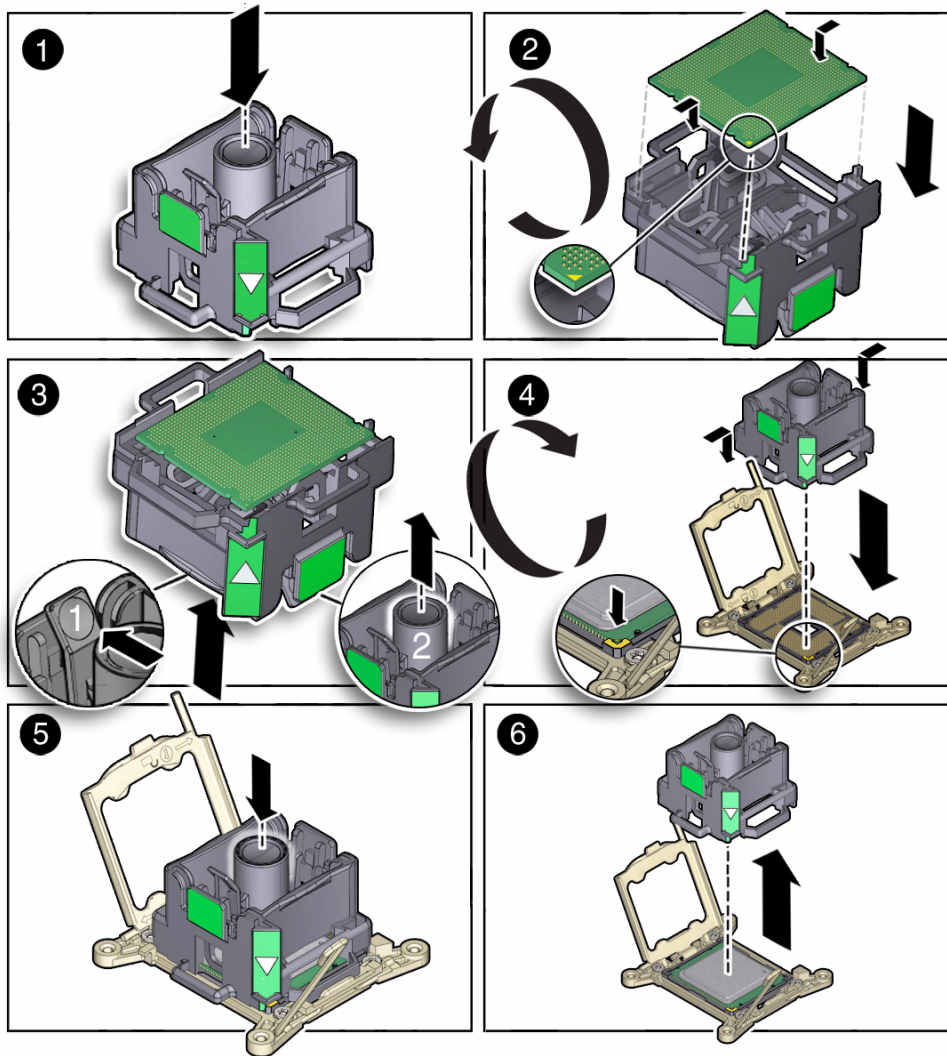
An audible click indicates that the processor is locked in place.

- d. Properly position the tool over the processor socket and lower it into place [4].**

To properly position the tool in the processor socket, rotate the tool until the green triangle on the side of the tool is facing the front of the server and it is over the left side of the processor socket (when viewing the server from the front) and lower the tool into the processor socket.

- e. Press the center button in the tool down to release the processor so that it is placed in the socket [5].**
- f. Remove the processor removal/replacement tool [6].**

**FIGURE:** Installing a Processor



**6. Visually check the alignment of the processor in the socket.**

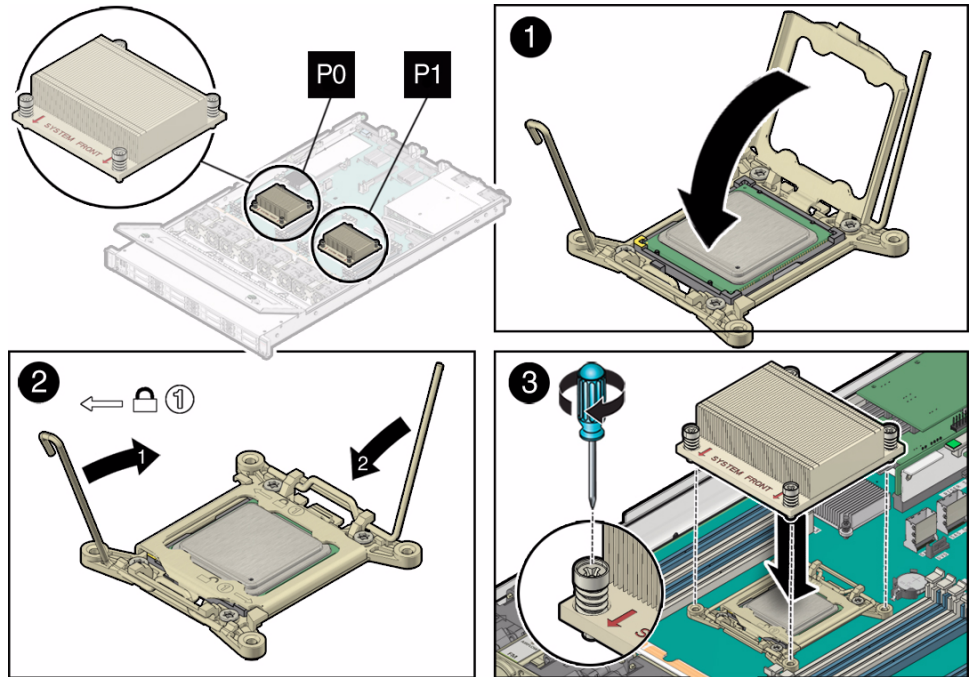
When properly aligned, the processor sits flat in the processor socket.



**Caution** – Do not press down on the processor. Irreparable damage to the processor or motherboard might occur from excessive downward pressure. Do not forcibly seat the processor into the socket. Excessive downward pressure might damage the socket pins.

7. Swing the processor pressure frame into the closed position [1].

Ensure that the pressure frame sits flat around the periphery of the processor.



8. Engage the socket release lever on the left side of the socket (viewing the server from the front) by rotating it downward and slipping it under the catch [2].

9. Engage the socket release lever on the right side of the socket (viewing the server from the front) by rotating it downward and slipping it under the catch [2].

10. Use the syringe (supplied with the new or replacement processor) to apply approximately 0.1 ml of thermal grease to the center of the top of the processor.  
To measure 0.1ml of thermal grease, use the graduated scale on the thermal grease syringe.

---

**Note** – Do not distribute the grease; the pressure of the heatsink will do so for you when you install it.

---

11. Inspect the heatsink for dust and lint.

Clean heatsink if necessary.



12. Orient the heatsink so that the screws line up with the mounting studs [3].

The processor heatsink is not symmetrical.

13. Carefully position the heatsink on the processor, aligning it with the mounting posts to reduce movement after it makes initial contact with the layer of thermal grease [3].



---

**Caution** – Avoid moving the heat sink after it has contacted the top of the processor. Too much movement could disturb the layer of thermal grease, causing voids, and leading to ineffective heat dissipation and component damage.

---

14. Tighten the Phillips screws alternately one-half turn until fully seated.

15. Return the server to operation.

- a. Install the top cover.

See [“Install the Top Cover”](#) on page 120.

- b. Close the server fan door.

- c. Return the server to the normal rack position.

See [“Return the Server to the Normal Rack Position”](#) on page 123.

- d. Reconnect the data cables and the power cords to the server power supplies.

See [“Reconnect Data Cables and Power Cords”](#) on page 133.

- e. Power on the server.

See [“Power On the Server”](#) on page 134.

Verify that the Power/OK indicator is steady on.

16. To confirm the status, go to the BUI Maintenance > Hardware screen, click the [Show Details](#) link for the server, click the CPU submenu, and confirm that the processor status icon is green.

#### Related Information

- [“Remove a Processor”](#) on page 89

---

## Servicing the Disk Backplane (FRU)

This section covers the following topics:





---

**Caution** – Ensure that all power is removed from the server before removing or installing the disk backplane. You must disconnect the power cables before performing this procedure

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- “Disk Backplane Configuration” on page 99
- “Remove the Disk Backplane” on page 100
- “Install the Disk Backplane” on page 102

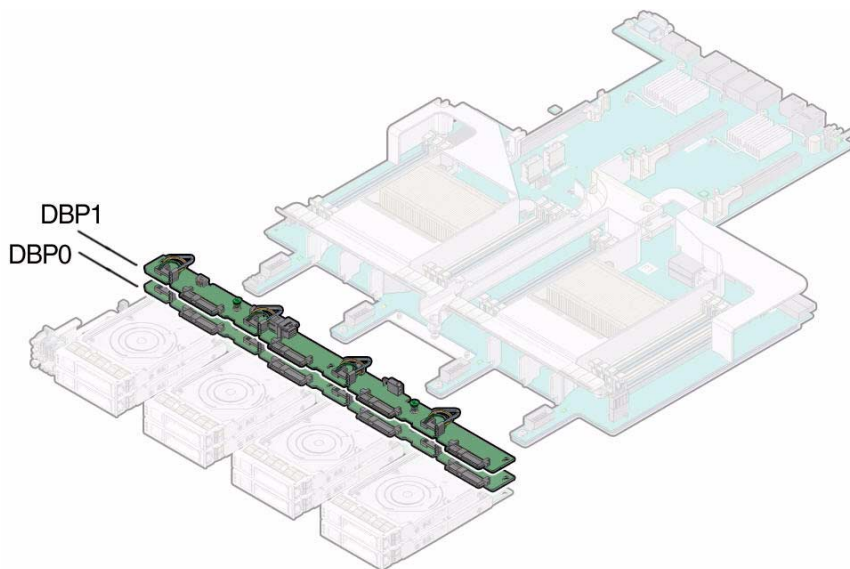
#### Related Information

- “Disconnect Cables From the Server” on page 31
- “Take Antistatic Measures” on page 39
- “Extend the Server to the Maintenance Position” on page 31
- “Open the Server Fan Door” on page 39

## Disk Backplane Configuration

The server has two disk backplanes: DBP0 and DBP1. Storage drives 0-3 plug into DBP0. Storage drives 4-7 plug into DBP1.

**FIGURE:** Disk Backplane Configuration



## ▼ Remove the Disk Backplane



---

**Caution** – Ensure that all power is removed from the server before removing or installing disk backplane. You must disconnect the power cables before performing these procedures.

---

### 1. Prepare the server for service.

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

See [“Powering Down the Server” on page 26](#)

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

See [“Extend the Server to the Maintenance Position” on page 31](#).

- c. **Attach an antistatic wrist strap.**

See [“Take Antistatic Measures” on page 39](#).

- d. **Open the server fan door to gain access to the disk backplanes.**

### 2. Pull out each storage drive out far enough to disengage it from the disk backplane.

See [“Remove a Storage Drive” on page 45](#).

---

**Note** – It is not necessary to completely remove the storage drives from the server; simply pull them out far enough to disengage them from the disk backplane. If you do remove the storage drives from the server, make a note of their locations so that you can reinstall them in the same locations.

---

### 3. Remove all four fan modules.

See [“Remove a Fan Module” on page 48](#).

### 4. Starting with top disk backplane, disconnect the SAS cable from the disk backplane [1].

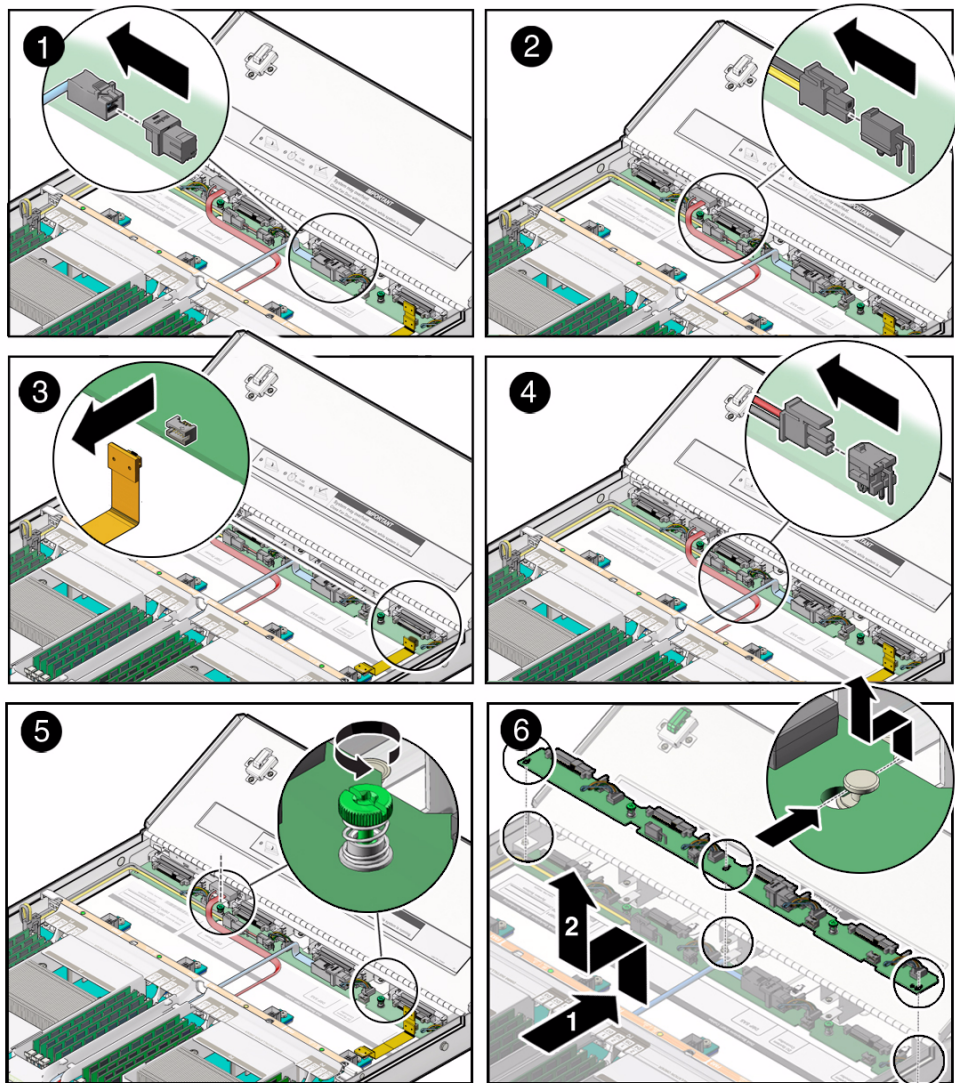
See [FIGURE: Removing the Disk Backplane on page 101](#).

---

**Note** – If you are going to remove and replace both backplanes, before disconnecting any backplane cables, make a note of, or tag, which cables connect to the top disk backplane and which cables connect to the bottom disk backplane for reference when you install the replacement disk backplanes.

---

**FIGURE:** Removing the Disk Backplane



5. Disconnect the disk backplane power cable from the disk backplane [2].
6. Disconnect the disk backplane LED cable from the disk backplane [3].
7. Using just your thumb and fingers, loosen the two captive thumb screws that secure the disk backplane to the chassis [5].
8. Slide the backplane forward toward the front of the server to release it from the three mushroom standoffs and lift it out of the chassis [6].

9. Place the disk backplane on an antistatic mat.
10. Repeat [Step 4](#) through [Step 9](#) to remove the second disk backplane.

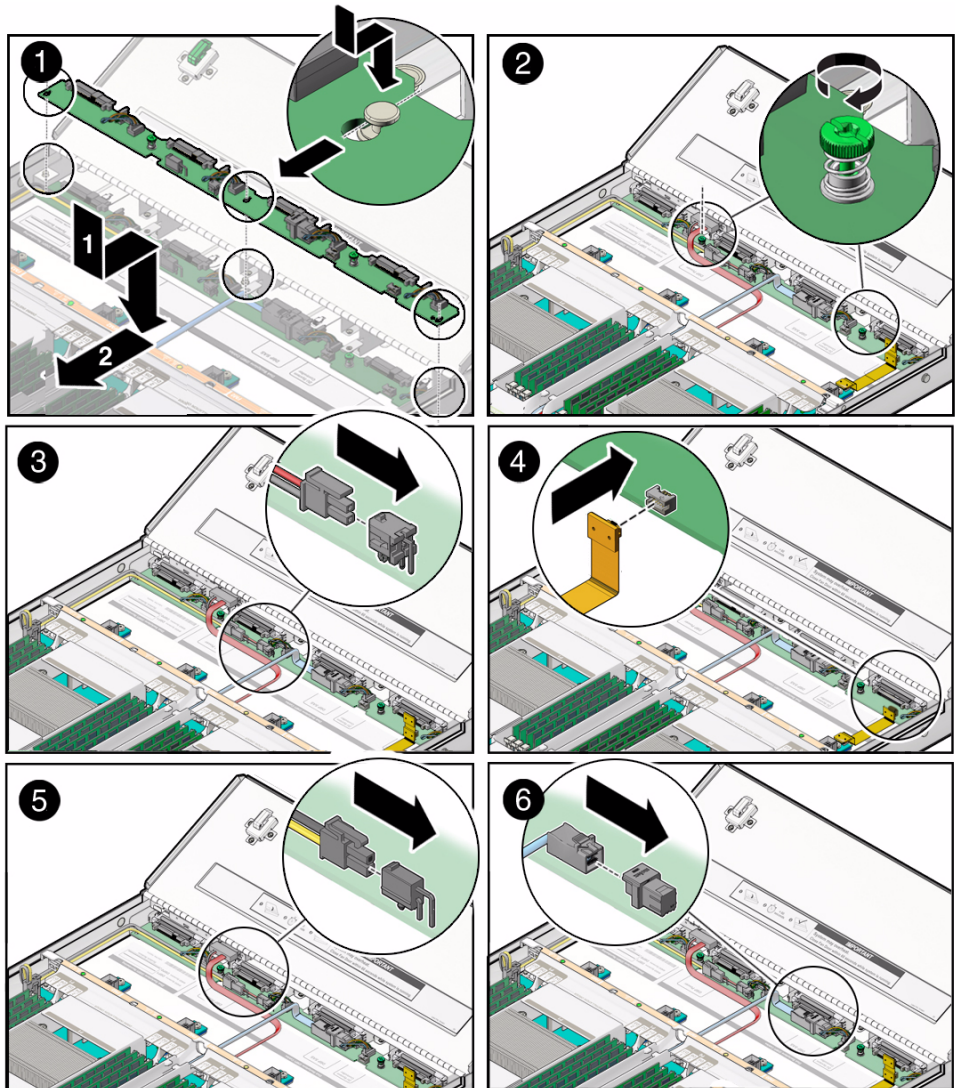
#### **Related Information**

- [“Install the Disk Backplane” on page 102](#)

## ▼ Install the Disk Backplane

1. Starting with the bottom disk backplane location, lower the backplane into the server and position it to engage the three mushroom standoffs [1].

**FIGURE:** Installing the Disk Backplane



2. Using just your thumb and fingers, tighten the two captive thumb screws to secure the disk backplane to the chassis [2].
3. Reconnect the disk backplane LED cable to the disk backplane [4].
4. Reconnect the disk backplane power cable to the disk backplane [5].
5. Reconnect the SAS cable to the disk backplane [6].

6. Repeat all of the preceding steps to install the second disk backplane.  
A server that has two disk backplanes does not have a DVD drive installed.
7. Reinstall all of the storage drives into the storage drive cage.  
See [“Install a Storage Drive” on page 46](#).
8. Install all four fan modules.  
(see [“Install a Fan Module” on page 51](#).)
9. Return the server to operation.
  - a. Close the server fan door.
  - b. Return the server to the normal rack position.  
See [“Return the Server to the Normal Rack Position” on page 123](#).
  - c. Reconnect the data cables and the power cords to the server power supplies.  
See [“Reconnect Data Cables and Power Cords” on page 133](#).
  - d. Power on the server.  
See [“Power On the Server” on page 134](#).  
Verify that the Power/OK indicator is steady on.

---

**Note – IMPORTANT:** After replacing the disk backplane, you must manually program the product serial number (PSN) into the new disk backplane. This is necessary because the disk backplane is the primary quorum member for maintaining the PSN for service entitlement.

---

#### **Related Information**

- [“Remove the Disk Backplane” on page 100](#)

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## Servicing the Front Indicator Module (FRU)

Follow these tasks to remove and install the front indicator module (FIM).

- [“Remove the Front Indicator Module” on page 105](#)
- [“Install the Front Indicator Module” on page 106](#)



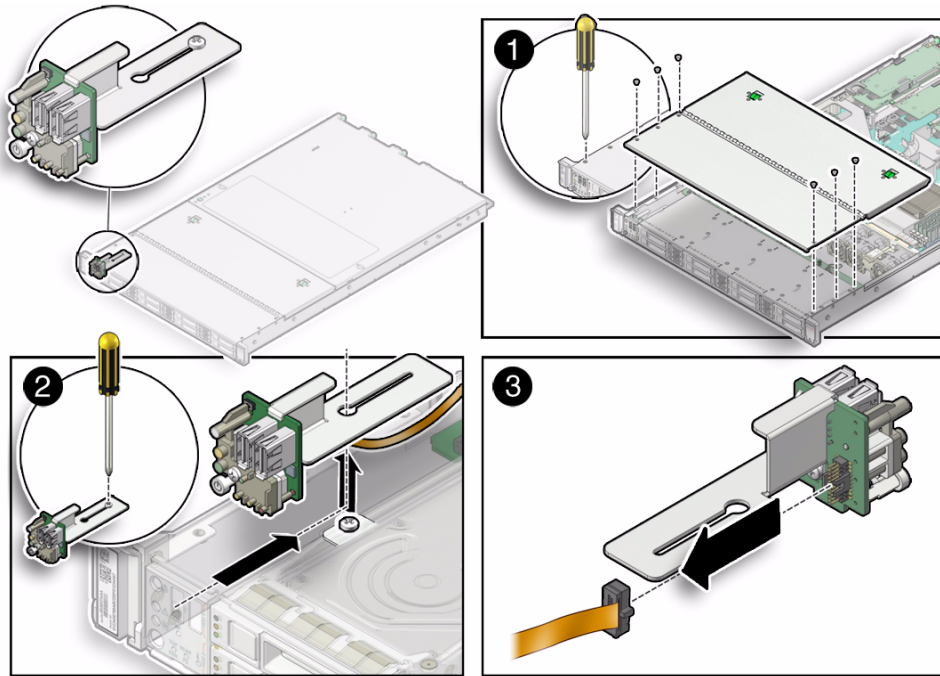
### Related Information

- [“Disconnect Cables From the Server” on page 31](#)
- [“Remove the Server From the Rack” on page 33](#)
- [“Take Antistatic Measures” on page 39](#)
- [“Open the Server Fan Door” on page 39](#)

## ▼ Remove the Front Indicator Module

1. **Prepare the server for service.**
  - a. **Power off the server and disconnect the power cords from the power supplies.**  
[See “Powering Down the Server” on page 26](#)
  - b. **Extend the server to the maintenance position.**  
[See “Extend the Server to the Maintenance Position” on page 31.](#)
  - c. **Attach an antistatic wrist strap.**  
[See “Take Antistatic Measures” on page 39.](#)
2. **To remove the top cover from the storage drive cage, do the following:**
  - a. **Remove six Phillips screws from the top of the drive cage—three on each side [1].**
  - b. **Open the server fan door.**  
[See “Open the Server Fan Door” on page 39.](#)
  - c. **To remove the storage drive cover, slide it forward (toward the front of the server) and lift it up.**
3. **Loosen the screw that secures the FIM assembly to the server chassis [2].**

**FIGURE:** Removing the FIM



4. Carefully slide the FIM assembly toward the rear enough to lift it over the Phillips screw and lift the FIM assembly out of the server [2].
5. Disconnect the FIM cable from the FIM assembly and set the assembly aside [3].
6. Continue to [“Install the Front Indicator Module” on page 106.](#)

#### **Related Information**

- [“Install the Front Indicator Module” on page 106](#)

## ▼ Install the Front Indicator Module

1. Attach an antistatic wrist strap.  
[See “Take Antistatic Measures” on page 39](#)
2. Unpack the replacement FIM and place it on an antistatic mat.
3. Connect the FIM cable to the replacement FIM assembly [3].  
[See \*\*FIGURE: Removing the FIM\*\* on page 106.](#)



4. Carefully lower the FIM assembly into the chassis, position it over the Phillips screw in the server chassis, and slide it forward so that all the LEDs, USB connectors and Power On button fit into place on the server front panel [2].
5. Tighten the Phillips screw to secure the FIM assembly to the server chassis [2].
6. Place the drive cage cover over the server drive cage and install the six Phillips (three on each side) to secure the cover to the server.
7. Ensure that server fan door is closed.
8. Return the server to operation.
  - a. Return the server to the normal rack position.

See [“Return the Server to the Normal Rack Position”](#) on page 123.
  - b. Reconnect the data cables and the power cords to the server power supplies.

See [“Reconnect Data Cables and Power Cords”](#) on page 133.
  - c. Power on the server.

See [“Power On the Server”](#) on page 134.

Verify that the Power/OK indicator is steady on.

#### Related Information

- [“Remove the Front Indicator Module”](#) on page 105

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## Servicing the Motherboard (FRU)

Follow these tasks to remove and install the motherboard.



---

**Caution** – The motherboard should be serviced only by an Oracle qualified service technician.

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

---



---

**Caution** – These procedures require that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Take Antistatic Measures” on page 39](#).

---



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**Caution** – This procedure requires removing the server from the rack. The server is heavy. Two people might be required to remove it from the rack.

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- [“Remove the Motherboard” on page 108](#)
- [“Install the Motherboard” on page 111](#)

#### **Related Information**

- [“Remove the Server From the Rack” on page 33](#)
- [“Take Antistatic Measures” on page 39](#)
- [“Remove the Server Top Cover” on page 40](#)

## ▼ Remove the Motherboard



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**Caution** – The motherboard should be serviced only by an Oracle qualified service technician.

---



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**Caution** – Use of the ILOM backup utility prior to removing the motherboard. This utility backs up the ILOM configuration of the service processor.

---

### **1. Prepare the server for service.**

- a. **Power off the server and disconnect the power cords from the power supplies.**  
See [“Powering Down the Server” on page 26](#)
- b. **Extend the server to the maintenance position.**  
See [“Extend the Server to the Maintenance Position” on page 31](#).
- c. **Attach an antistatic wrist strap.**  
See [“Take Antistatic Measures” on page 39](#).

**d. Remove the server top cover.**

See [“Remove the Server Top Cover”](#) on page 40.

**2. Remove the following reusable components**



---

**Caution** – During the motherboard removal procedure, it is important to label the power supplies with the slot numbers from which they were removed (PS0, PS1). This is required because the power supplies must be reinstalled into the same slots from which they were removed; otherwise, the server FRU top-level indicator (TLI) data might be lost. When a server requires service, the FRU TLI is used by Oracle to verify that the server warranty has not expired.

---

**a. Fan modules.**

For instructions, see [“Remove a Fan Module”](#) on page 48.

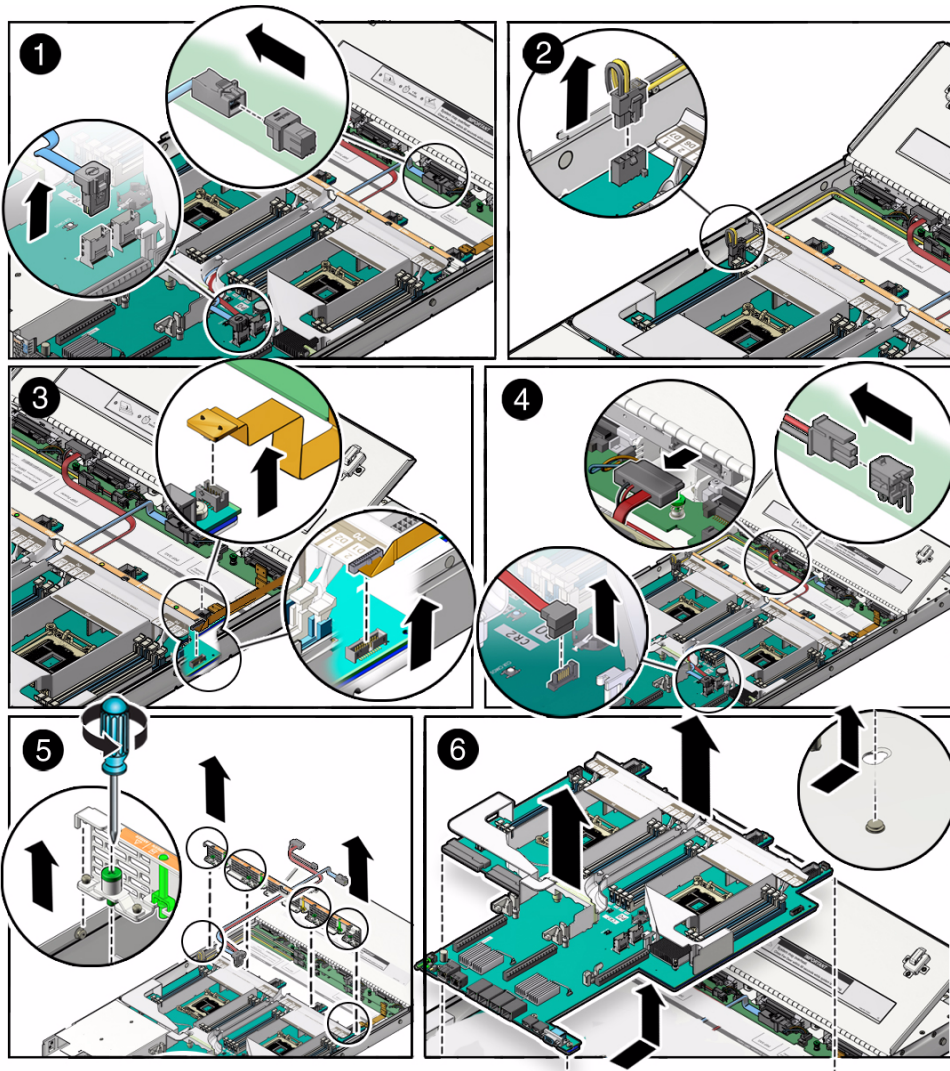
**b. Power supplies.**

For instructions, see [“Remove a Power Supply”](#) on page 53.

**c. PCIe risers and attached PCIe cards.**

For instructions, see [“Servicing PCIe Risers \(CRU\)”](#) on page 64.

**3. Disconnect the disk backplane power cable from the motherboard [1].**



4. Disconnect disk backplane LED cable from the motherboard [2].
5. Disconnect the front indicator module (FIM) cable from the motherboard [3].
6. Carefully lift the SAS cables that you disconnected from the internal HBA out of the cable trough.
7. Remove the server mid-wall [5].
  - a. Loosen the four green captive screws that secure the mid-wall to the server chassis.

- b. Lift the mid-wall slightly up and toward the front of the server to disengage it from the mushroom standoffs that are located on the server chassis sidewall (one on each end of the mid-wall).
      - c. Place the mid-wall and SAS cables toward the front of the server out of the way of the motherboard.
  8. Remove the motherboard from the server chassis [6].
    - a. Grasp the middle of the air duct in the front and back, slide the motherboard toward the front of the server, and lift it slightly to disengage the six mushroom standoffs that are located on the server chassis under the motherboard.
    - b. Lift the motherboard out of the server chassis and place it on an antistatic mat, and next to the replacement motherboard.
  9. Remove the following reusable components from the motherboard and install them on the replacement motherboard.
    - a. Internal USB flash drive.

For instructions, see [“Servicing the Internal USB Flash Drive \(CRU\)” on page 81.](#)
    - b. DDR3 DIMMs.

For instructions, see [“Servicing the DIMMs \(CRU\)” on page 58.](#)
    - c. Processors.

For instructions, see [“Servicing Processors \(FRU\)” on page 88.](#)

### Related Information

- [“Install the Motherboard” on page 111](#)

## ▼ Install the Motherboard



---

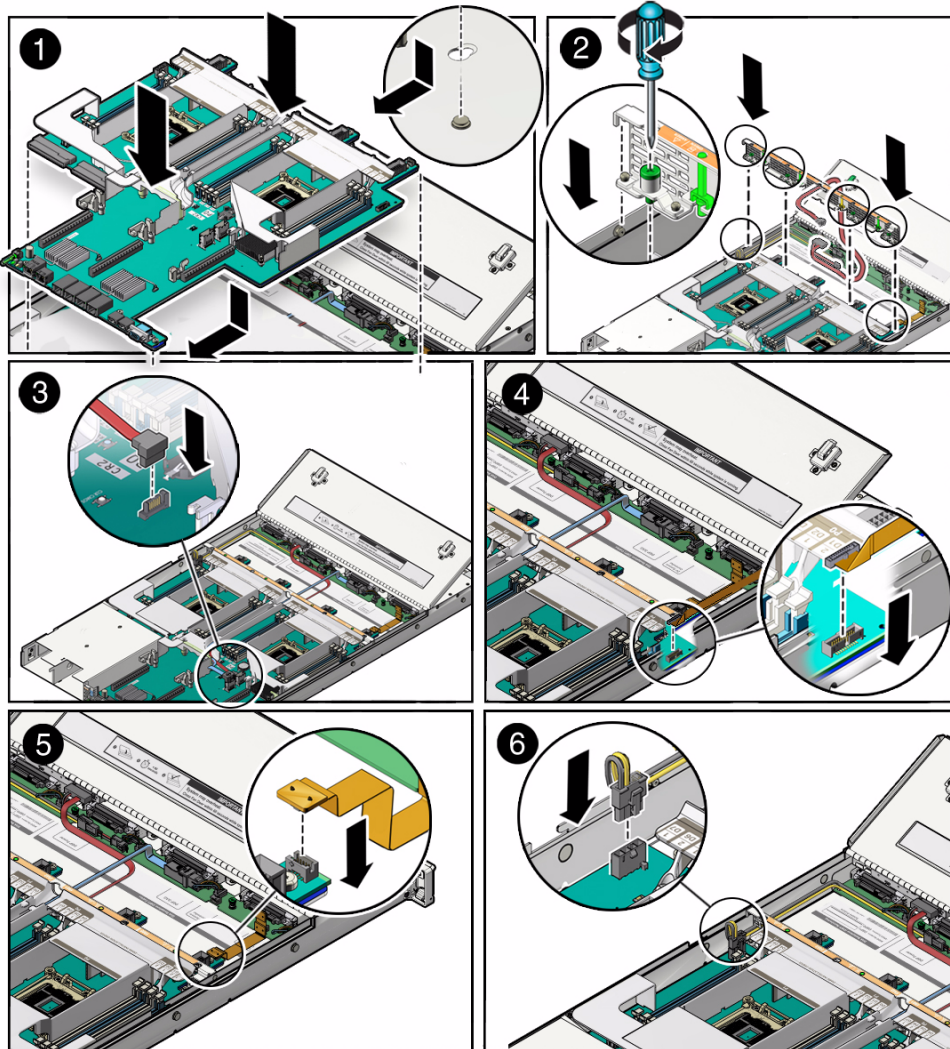
**Caution** – The motherboard should be installed only by an Oracle qualified service technician.

---

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

See [“Take Antistatic Measures” on page 39.](#)
2. **Install the motherboard into the server chassis [1].**

- a. To install the motherboard into the server, grasp the middle of the air duct in the front and back and tilt the front of the motherboard up slightly and push it into the opening in the rear of the server chassis.
- b. Lower the motherboard into the server chassis and slide it to the rear until it engages the six mushroom standoffs located on the server chassis under the motherboard.



- c. Ensure that the indicators, controls and connectors on the rear of the motherboard fit correctly into the rear of the server chassis.

### 3. Install the server mid-wall [2].

- a. Ensure that the SAS cables are running through the opening in the center of the mid-wall.
  - b. Position the mid-wall with cables in front of the motherboard so that it engages the mushroom standoffs that are located on the server chassis sidewall (one for each side of the mid-wall).
  - c. Place the FIM cable and the disk backplane power cable along side the mid-wall next to their respective motherboard connectors.
  - d. Ensure that FIM cable and the disk backplane power cable are not pinched by the mid-wall and that they run beside the mid-wall and not under it; otherwise, the cables might be damaged.
  - e. To secure the mid-wall to the server chassis, tighten the four green captive screws.
4. Carefully place the SAS cable(s) that you disconnected from the internal HBA into the cable trough provided by the air duct on the motherboard.
  5. Reconnect the front indicator module (FIM) cable to the motherboard [4].
  6. Reconnect disk backplane LED cable to the motherboard [5].
  7. Reconnect the disk backplane power cable to the motherboard [6].
  8. Reinstall the following reusable components:
    - a. PCIe risers and attached PCIe cards.  
For instructions, see [“Servicing PCIe Risers \(CRU\)” on page 64](#).
    - b. Power supplies.




---

**Caution** – When reinstalling power supplies, it is important to reinstall them into the slots from which they were removed during the motherboard removal procedure; otherwise, the server FRU top-level indicator (TLI) data might be lost. When a server requires service, the FRU TLI is used by Oracle to verify that the server warranty has not expired.

---

For instructions, see [“Install a Power Supply” on page 54](#).

**c. Fan modules.**

For instructions, see [“Install a Fan Module” on page 51](#).

**9. Return the server to operation.**

**a. Install the top cover.**

See [“Install the Top Cover” on page 120](#).



b. Close the server fan door.

c. Return the server to the normal rack position.

See [“Return the Server to the Normal Rack Position”](#) on page 123.

d. Reconnect the data cables and the power cords to the server power supplies.

See [“Reconnect Data Cables and Power Cords”](#) on page 133.

e. Power on the server.

See [“Power On the Server”](#) on page 134.

Verify that the Power/OK indicator is steady on.

---

**Note – IMPORTANT:** After replacing the motherboard, you might need to manually program the product serial number (PSN) into the new motherboard. This is necessary because the motherboard is a secondary quorum member for maintaining the PSN for service entitlement and if you replace more than one of the quorum members during any given service procedure, a secondary quorum member might need to be programmed with PSN.

---

#### Related Information

- [“Remove the Motherboard”](#) on page 108

---

## Servicing the SAS Cables (FRUs)



---

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

---

To remove and install cables, follow the procedures in these sections:

- [“Remove Storage Drive SAS Cables”](#) on page 115
- [“Install Storage Drive SAS Cables”](#) on page 116

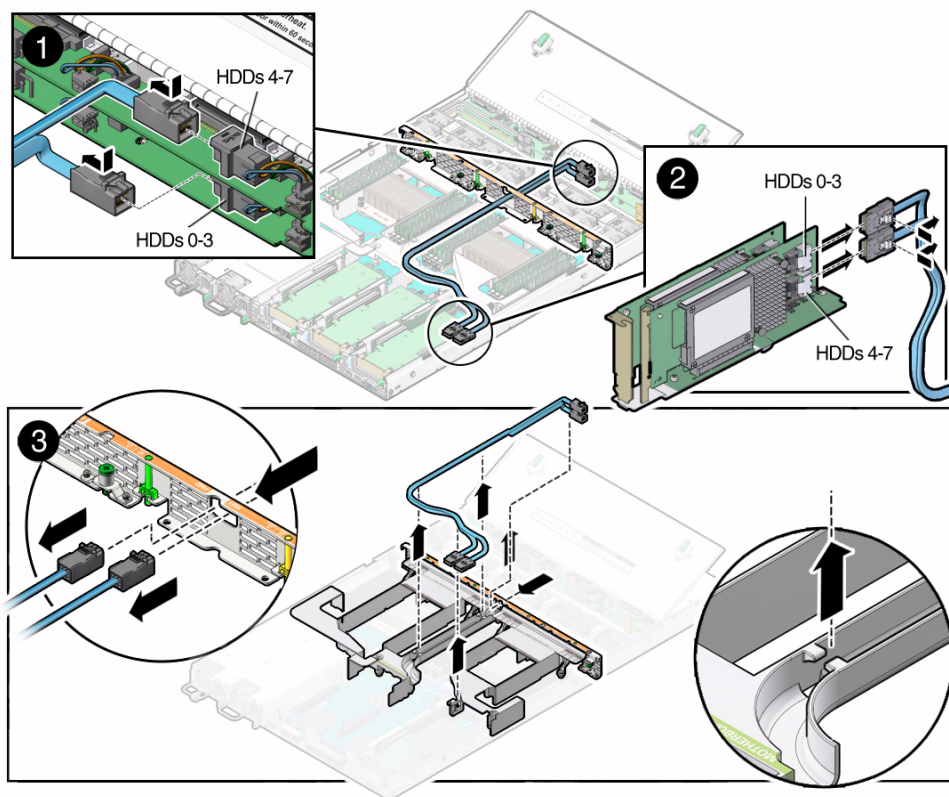
#### Related Information

- [“Extend the Server to the Maintenance Position”](#) on page 31
- [“Take Antistatic Measures”](#) on page 39
- [“Remove the Server Top Cover”](#) on page 40



## ▼ Remove Storage Drive SAS Cables

1. **Prepare the server for service.**
  - a. **Power off the server and disconnect the power cords from the power supplies.**  
See [“Powering Down the Server” on page 26](#)
  - b. **Extend the server to the maintenance position.**  
See [“Extend the Server to the Maintenance Position” on page 31.](#)
  - c. **Attach an antistatic wrist strap.**  
See [“Take Antistatic Measures” on page 39.](#)
  - d. **Remove the top cover.**  
See [“Remove the Server Top Cover” on page 40.](#)
2. **Remove all of the server fan modules.**  
See [“Remove a Fan Module” on page 48.](#)
3. **Remove the PCIe riser from PCIe slot 3 and 4.**  
See [“Remove a PCIe Riser From PCIe Slots 3 and 4” on page 70.](#)
4. **Disconnect the cables from the disk backplanes.**
  - a. **To disconnect the SAS cable from top disk backplane, press the latch, push in toward the connector, and then pull out to remove the cable [1].**
  - b. **Remove the top disk backplane.**  
See [“Remove the Disk Backplane” on page 100.](#)
  - c. **To disconnect the SAS cable from bottom disk backplane, press the latch, push in toward the connector, and then pull out to remove the cable [1].**



**5. Disconnect the SAS cable(s) from the internal host bus adapter (HBA) [2].**

To disconnect the SAS cable(s) from the internal HBA card, press the latch and pull out to remove the cables.

**6. Carefully remove the SAS cables from the trough in the air duct [3].**

**7. Carefully pull the internal SAS cables through the mid-wall and remove them from the chassis [3].**

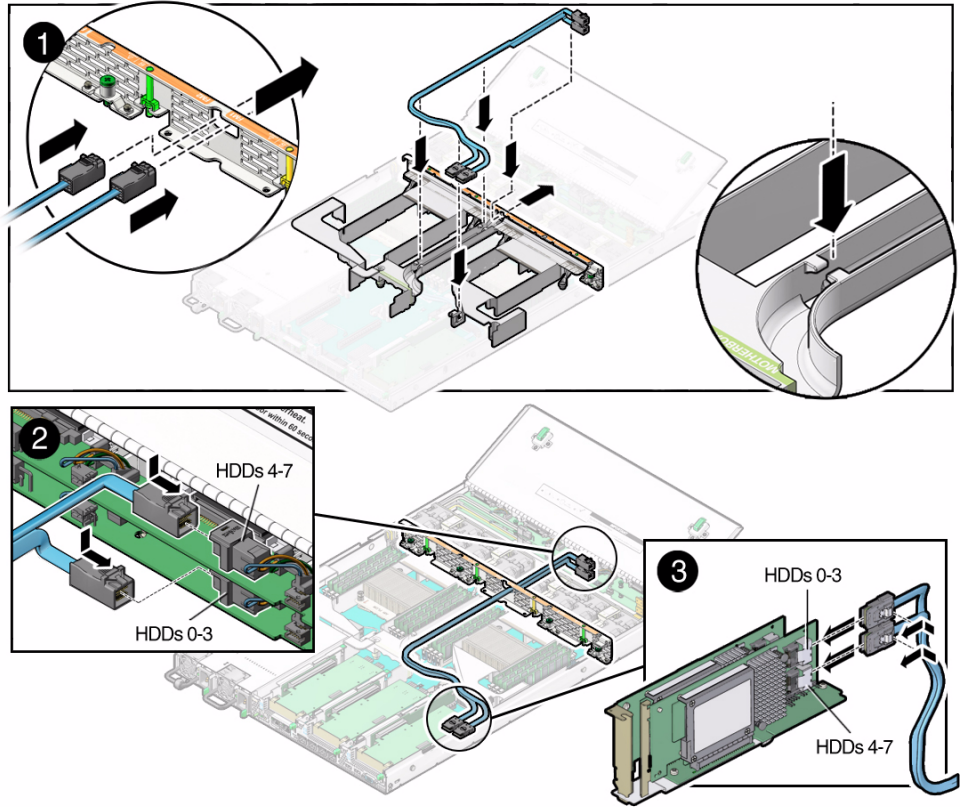
**Related Information**

- [“Install Storage Drive SAS Cables” on page 116](#)

## ▼ Install Storage Drive SAS Cables

1. Properly orient the ends of the SAS cables to connect to the disk backplane and the HBA respectively.

2. Carefully push the SAS cables through the mid-wall and place them into the cable trough in the middle of the air duct [1].



3. Install the HDDs 0-3 cable.
  - a. Install the HDDs 0-3 cable connector into the bottom disk backplane [2].
  - b. Plug the HDDs 0-3 cable connector into the connector on the left side of HBA card (the connector that is farther from the power supplies) [3].
4. Install the HDDs 4-7 cable.
  - a. Install the top disk backplane.  
See ["Install the Disk Backplane" on page 102](#)
  - b. Install the HDDs 4-7 cable connector into the top disk backplane [2].
  - c. Plug the HDDs 4-7 cable connector into the connector on the right side of HBA card (the connector that is closer to the power supplies) [3].

**5. Install the PCIe riser with the internal HBA card into PCIe slot 3.**

See [“Install a PCIe Riser Into PCIe Slots 3 and 4”](#) on page 71

**6. Install all of the server fan modules.**

See [“Install a Fan Module”](#) on page 51.

**7. Return the server to operation.**

**a. Install the top cover.**

See [“Install the Top Cover”](#) on page 120.

**b. Close the server fan door.**

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

See [“Return the Server to the Normal Rack Position”](#) on page 123.

**d. Reconnect the data cables and the power cords to the server power supplies.**

See [“Reconnect Data Cables and Power Cords”](#) on page 133.

**e. Power on the server.**

See [“Power On the Server”](#) on page 134.

Verify that the Power/OK indicator is steady on.

**Related Information**

- [“Remove Storage Drive SAS Cables”](#) on page 115

# Returning the Server to Operation

---

After replacing components inside of the server, perform the procedures in the following sections.

Description	Links
Learn about filler panels.	<a href="#">“Removing and Installing Server Filler Panels” on page 119</a>
Installing the top cover.	<a href="#">“Install the Top Cover” on page 120</a>
Removing antistatic measures.	<a href="#">“Remove Antistatic Measures” on page 122</a>
Installing the server chassis into the rack.	<a href="#">“Reinstall the Server Chassis Into the Rack” on page 122</a>
Installing the cable management arm.	<a href="#">“Install the Cable Management Arm” on page 125</a>
Returning the server to the normal rack position.	<a href="#">“Return the Server to the Normal Rack Position” on page 123</a>
Reconnecting power and data cables.	<a href="#">“Reconnect Data Cables and Power Cords” on page 133</a>
Powering on the server.	<a href="#">“Power On the Server” on page 134</a>

---

## Removing and Installing Server Filler Panels

Each server might be shipped with module-replacement filler panels for storage drives and PCIe cards. These filler panels are installed at the factory and must remain in the server until you replace them with a purchased option.

Before you can install an optional server component into the server, you must remove the filler panel from the location into which you intend to install the component. When you remove a storage drive or a PCIe card from the server, you must install either a replacement component or a filler panel.

- [“Remove and Install Filler Panels” on page 120](#)

### Related Information

- [“Servicing CRUs That Do Not Require Server Power Off” on page 43](#)
- [“Servicing CRUs That Require Server Power Off” on page 57](#)

## ▼ Remove and Install Filler Panels

- See the procedures in the following table to remove and install filler panels for storage drives and PCIe cards.

Filler Panel Type	Removal Procedure	Install Procedure
Storage Drive	<ol style="list-style-type: none"><li>1. Locate the storage drive filler panel to be removed from the server.</li><li>2. Push the lever on the front of the filler panel to the right and use the lever to pull the filler out of the server.</li></ol>	<ol style="list-style-type: none"><li>1. Locate the vacant disk drive module slot in the server.</li><li>2. Slide the filler panel into the vacant slot by pressing the middle of the filler panel faceplate with your thumb or finger.</li></ol>
PCI Slot	<ol style="list-style-type: none"><li>1. Remove the server top cover.</li><li>2. Remove the PCI slot filler panel from the location into which you intend to install the PCIe card.</li></ol>	<ol style="list-style-type: none"><li>1. Remove the server top cover.</li><li>2. Press the PCI filler panel into the vacant PCI slot.</li></ol>

## ▼ Install the Top Cover

1. **Open the server fan door.**  
See [“Open the Server Fan Door” on page 39](#).
2. **Place the top cover on the chassis.**

Place the cover down so that it hangs over the rear of the server by about 13 mm (0.5 inches) [1] and the side latches align with the slots in the sides of the chassis.

---

**Note** – There are three latching tabs on the sides of the cover, two on the right side and one on the left side (viewing the server from the front). There is also a latch on the underside of the cover in the front left corner near the green release button.

---

3. **Check both sides of the chassis to ensure that the four corners of the top cover are fully down and flush with the chassis.**

If the cover corners are not flush with the chassis, slide the cover towards the rear of the chassis until you can position the cover correctly.

---

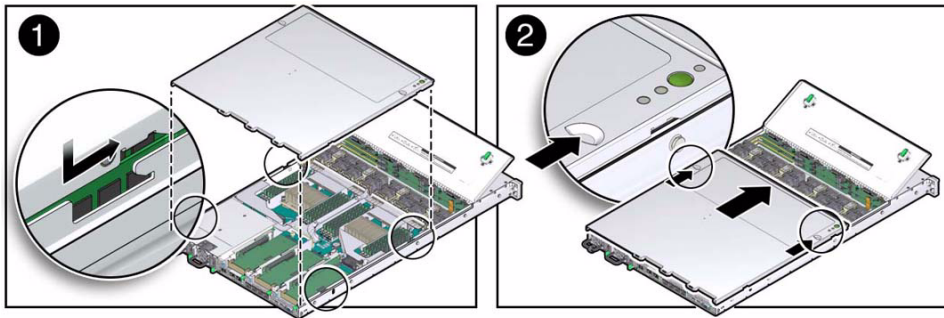
**Note** – If the top cover is not correctly positioned before attempting to slide the cover forward, the internal latch that is located on the underside of the cover might be damaged.

---

4. **Gently slide the cover forward until it locks into place (you hear an audible click) [2].**

As you slide the cover toward the front of the server, watch the green release button. You will hear an audible click when the green release button pops up, indicating that the cover is locked.

**FIGURE:** Installing the Top Cover



5. **Close the server fan door.**
6. **Remove the antistatic precautions.**  
See [“Remove Antistatic Measures”](#) on page 122.

#### **Related Information**

- [“Remove the Server Top Cover”](#) on page 40
- [“Remove Antistatic Measures”](#) on page 122

---

## ▼ Remove Antistatic Measures

1. Remove any antistatic straps or conductors from the server chassis.
2. Remove the antistatic wrist strap from yourself.

---

## ▼ Reinstall the Server Chassis Into the Rack

If you removed the server chassis from the rack, perform these steps to reinstall it.



---

**Caution** – Deploy any rack anti-tilt mechanisms before installing the server into the rack.

---



---

**Caution** – The server weighs approximately 18.1 kgs (39.9 pounds). Two people are required to carry the chassis and install it into the rack.

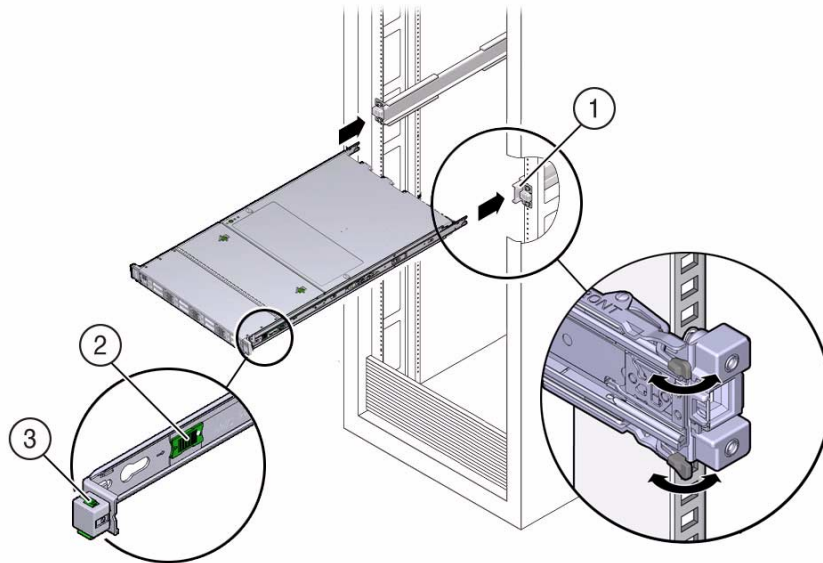
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1. Push the slide-rails into the slide-rail assemblies in the rack as far as possible.
2. Raise the server so that the rear ends of the mounting brackets are aligned with the slide-rail assemblies that are mounted in the rack.
3. Insert the mounting brackets into the slide-rails, then push the server into the rack until the mounting brackets encounter the slide-rail stops (approximately 12 inches, or 30 cm).

The server is now in the extended maintenance position.



**FIGURE:** Returning the Server to the Rack.



**Figure Legend**

- 
- |   |  |
|---|--|
| 1 | Inserting mounting brackets into slide-rails |
| 2 | Slide-rail release button (green)            |
| 3 | Slide-rail lock                              |
- 

### Related Information

- [“Remove the Server From the Rack” on page 33](#)
- [“Remove Antistatic Measures” on page 122](#)
- [“Reconnect Data Cables and Power Cords” on page 133](#)

---

## ▼ Return the Server to the Normal Rack Position

If the server is in the extended maintenance position, use this procedure to return the server to the normal rack position.

1. Push the server back into the rack, as described in the following steps.

- a. Simultaneously pull and hold the two green release tabs (one on each side of the server) toward the front of the server (see the following figure) while you push the server into the rack.

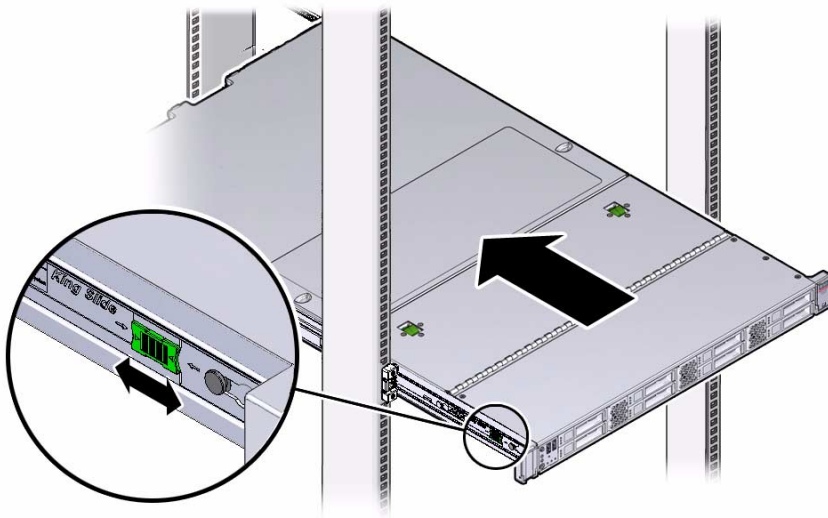
As you push the server into the rack, verify that the cable management arm (CMA) retracts without binding.

---

**Note** – To pull the green release tab, place your finger in the center of the tab, not on the end, and apply pressure as you pull the tab toward the front of the server.

---

**FIGURE:** Location of the Release Tabs on the Slide-Rails



- b. Continue pushing the server into the rack until the slide-rail locks (on the front of the server) engage the slide-rail assemblies.

You will hear an audible click when the server is in the normal rack position.

2. If the CMA is not installed, that is, you removed it because you removed the server completely out of the rack, install the CMA. See [“Install the Cable Management Arm”](#).
3. If the cables are disconnected from the rear of the server, that is, you disconnected the cables because you removed the server completely out of the rack, reconnect the cables. See [“Reconnect Data Cables and Power Cords”](#) on page 133.

**Related Information**

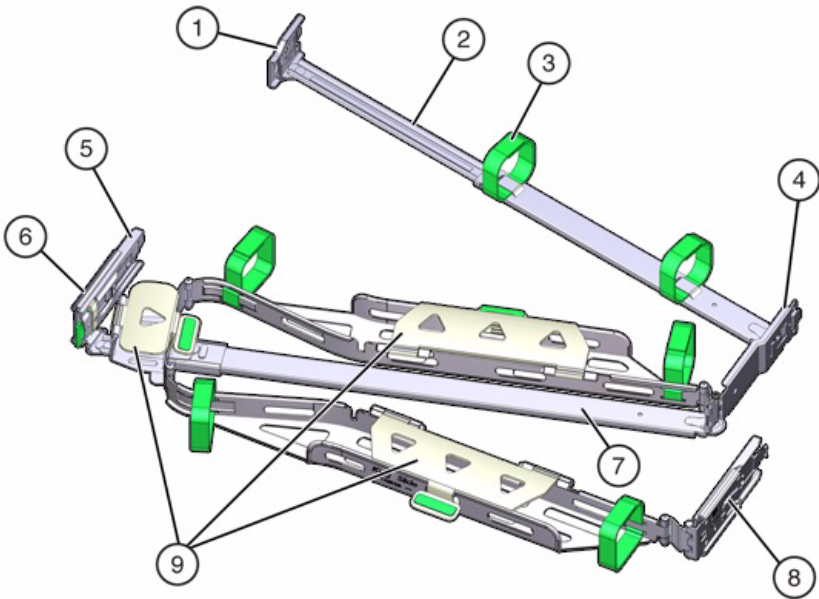
- [“Install the Cable Management Arm” on page 125](#)
- [“Reconnect Data Cables and Power Cords” on page 133](#)



# ▼ Install the Cable Management Arm

**1. Identify the CMA components.**

**FIGURE:** CMA Components



**Figure Legend**

1	Connector A	6	Connector D
2	Front slide bar	7	Slide-rail latching bracket (used with connector D)
3	Velcro straps (6)	8	Rear slide bar
4	Connector B	9	Cable covers
5	Connector C	10	not applicable

**2. Ensure that the six Velcro straps are threaded into the CMA as shown in [FIGURE: CMA Components on page 125](#).**

---

**Note** – Ensure that the two Velcro straps located on the front slide bar are threaded through the opening in the top of the slide bar as shown in FIGURE: CMA Components. This prevents the Velcro straps from interfering with the expansion and contraction of the slide bar when the server is extended out of the rack and returned into the rack.

---

3. To make it easier to install the CMA, extend the server approximately 13 cm (5 inches) out of the front of the rack.
4. Take the CMA to the back of the equipment rack, and ensure that you have adequate room to work at the back of the server.

---

**Note** – References to “left” or “right” in this procedure assume that you are facing the back of the equipment rack.

Throughout this installation procedure, support the CMA and do not allow it to hang under its own weight until it is secured at all four attachment points.

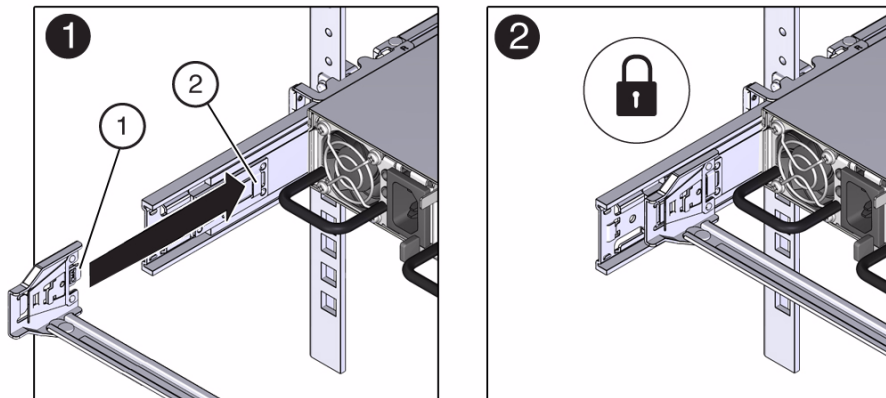
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5. Insert CMA connector A into the front slot on the left slide-rail until it locks into place with an audible click [frames 1 and 2].

The connector A tab (see callout 1) goes into the slide-rail front slot (callout 2).

Gently tug on the left side of the front slide bar to verify that connector A is properly seated.

**FIGURE:** Installing Connector A into the Left Slide-Rail



**Figure Legend**

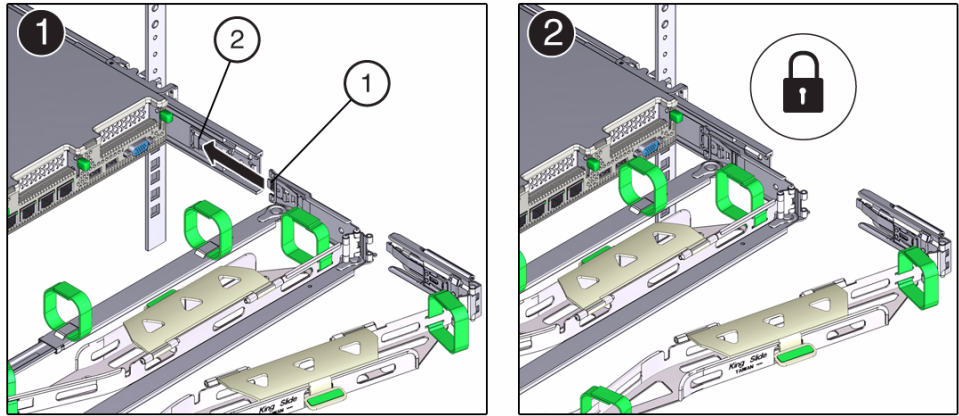
- 
- |   |                            |
|---|----------------------------|
| 1 | Connector A tab            |
| 2 | Left slide-rail front slot |
-

6. Insert CMA connector B into the front slot on the right slide-rail until it locks into place with an audible click [frames 1 and 2].

The connector B tab (callout 1) goes into the slide-rail front slot (callout 2).

Gently tug on the right side of the front slide bar to verify that connector B is properly seated.

**FIGURE:** Installing Connector B into the Right Slide-Rail

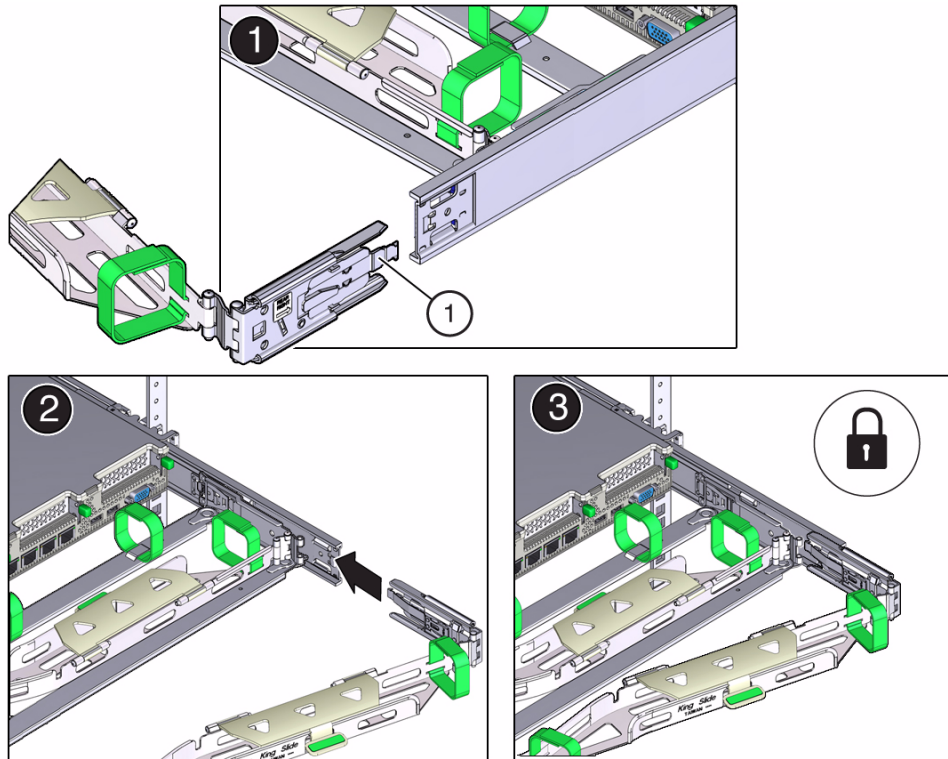


**Figure Legend**

- 
- |   |                             |
|---|-----------------------------|
| 1 | Connector B tab             |
| 2 | Right slide-rail front slot |
- 

7. To install CMA connector C into the right slide-rail, perform the following steps:
  - a. Align connector C with the slide-rail so that the locking spring (callout 1) is positioned inside (server side) of the right slide-rail [frame 1].

**FIGURE:** Installing Connector C into the Right Slide-Rail

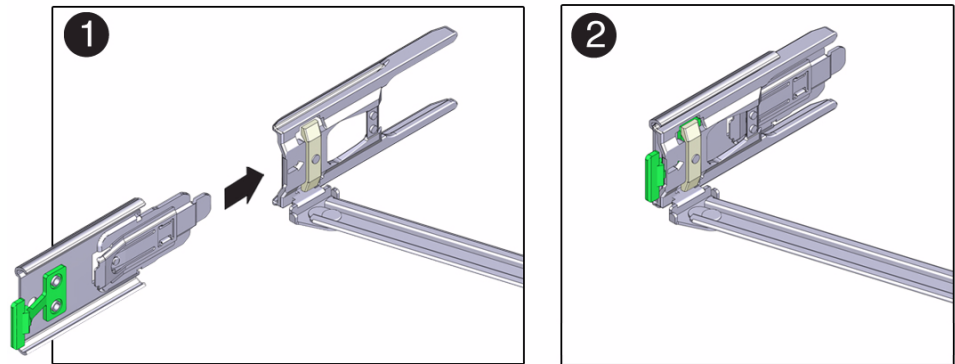


**Figure Legend**

1 Connector C locking spring

- b. Insert connector C into the right side-rail until it locks into place with an audible click [frames 2 and 3].
  - c. Gently tug on the right side of the CMA rear slide bar to verify that connector C is properly seated.
8. Align the CMA slide-rail latching bracket with connector D [frames 1 and 2].

**FIGURE:** Aligning the CMA Slide-Rail Latching Bracket with Connector D



9. While holding the slide-rail latching bracket in place, insert connector D and its associated slide-rail latching bracket into the left slide-rail until connector D locks into place with an audible click [frames 1 and 2].

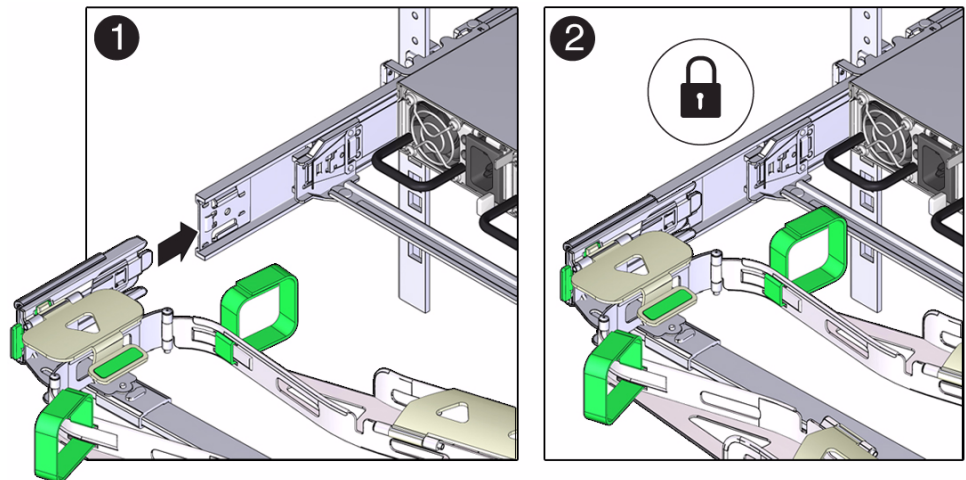
---

**Note –** When inserting connector D into the slide-rail, the preferred and easier method is to install connector D and the latching bracket as one assembly into the slide-rail.

---

Gently tug on the left side of the CMA rear slide bar to verify that connector D is properly seated.

**FIGURE:** Installing CMA Connector D





---

**Note** – The slide-rail latching bracket has a green release tab. This tab is used to release and remove the latching bracket so that you can remove connector D.

---

10. Gently tug on the four CMA connection points to ensure that the CMA connectors are fully seated before you allow the CMA to hang by its own weight.
11. To verify that the slide-rails and the CMA are operating properly before routing cables through the CMA, perform the following steps:
  - a. To prevent the rack from tipping forward when the server is extended, extend all rack anti-tilt devices.



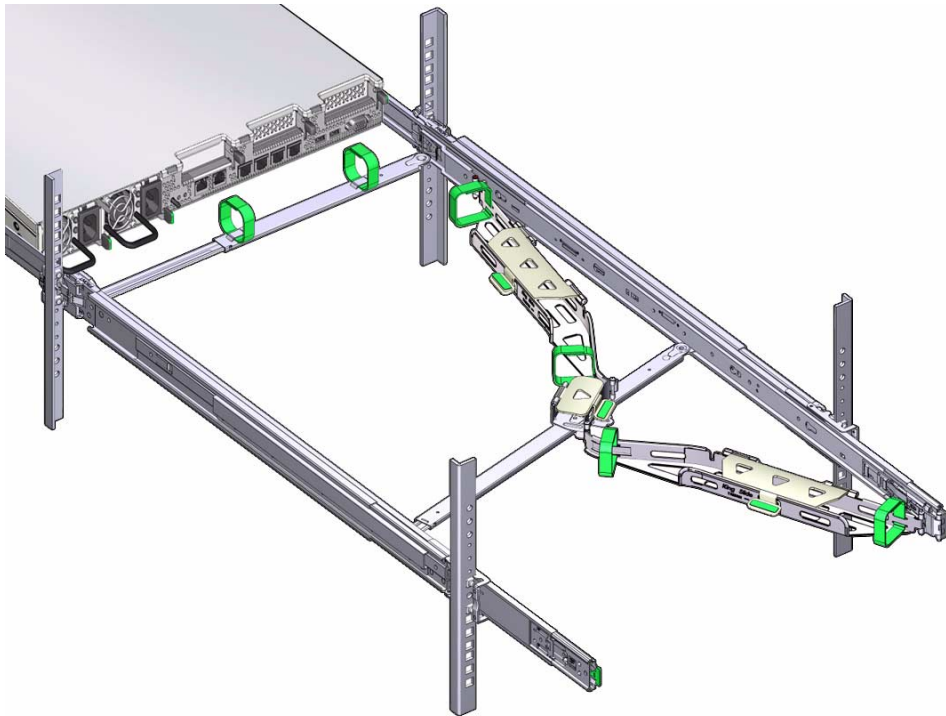
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**Caution** – To reduce the risk of personal injury, stabilize the expansion rack cabinet and extend all anti-tilt devices before extending the server from the rack.

---

- b. Extend the server from the front of the rack until the CMA is fully extended.

**FIGURE:** CMA Fully Extended





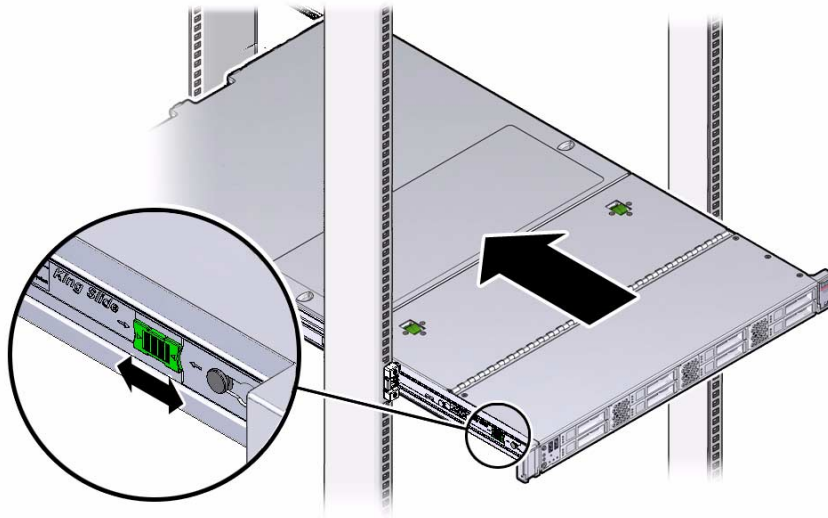
12. To return the server to the rack, perform the following steps:
  - a. Simultaneously pull and hold the two green release tabs (one on each side of the server) toward the front of the server (see the following figure) while you push the server into the rack. As you push the server into the rack, verify that the CMA retracts without binding.

---

**Note** – To pull the green release tabs, place your finger in the center of each tab, not on the end, and apply pressure as you pull the tab toward the front of the server.

---

**FIGURE:** Location of Slide-Rail Release Tabs



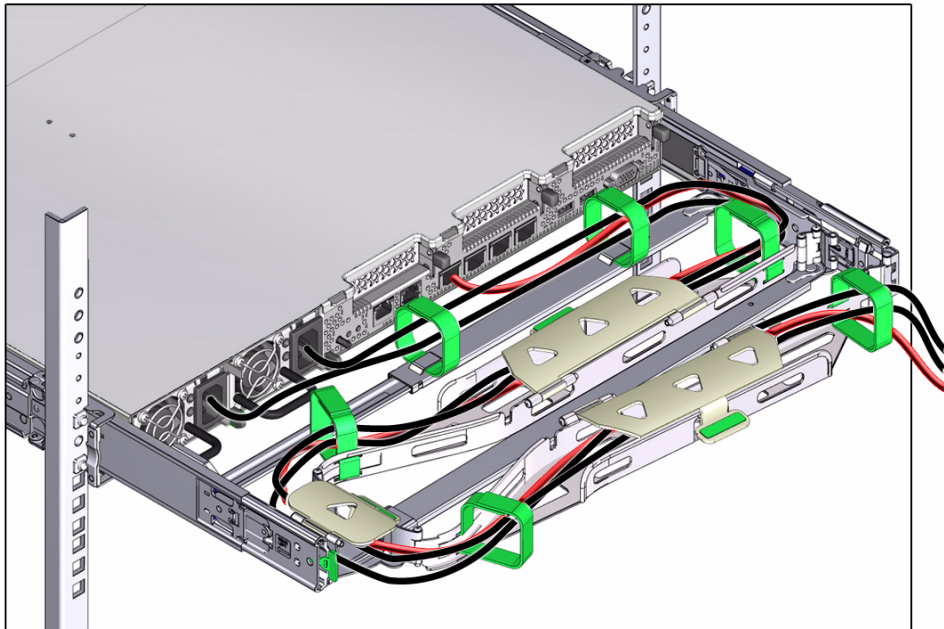
- b. Continue pushing the server into the rack until the slide-rail locks (on the front of the server) engage the slide-rail assemblies.  
You will hear an audible click when the server is in the normal rack position.
13. Connect cables to the server, as required.
14. Open the CMA cable covers, route server cables through the CMA cable troughs, close the cable covers, and secure the cables with the six Velcro straps.  
Route the cables through the cable troughs in this order:
  - a. First through the front-most cable trough.
  - b. Then through the small cable trough.
  - c. Then through the rear-most cable trough.

---

**Note** – When securing the cables with the Velcro straps located on the front slide bar, ensure that the straps do not wrap around the bottom of the slide bar; otherwise, expansion and contraction of the slide bar might be hindered when the server is extended from the rack and returned to the rack.

---

**FIGURE:** CMA with Cables Installed, Cable Covers Closed, and Cables Secured with Velcro Straps



15. Ensure that the secured cables do not extend above the top or below the bottom of the server to which they are attached; otherwise, the cables might snag on other equipment installed in the rack when the server is extended from the rack or returned to the rack.

---

**Note** – If necessary, bundle the cables with additional Velcro straps to ensure that they stay clear of other equipment. If you need to install additional Velcro straps, wrap the straps around the cables only, not around any of the CMA components; otherwise, expansion and contraction of the CMA slide bars might be hindered when the server is extended from the rack and returned to the rack.

---

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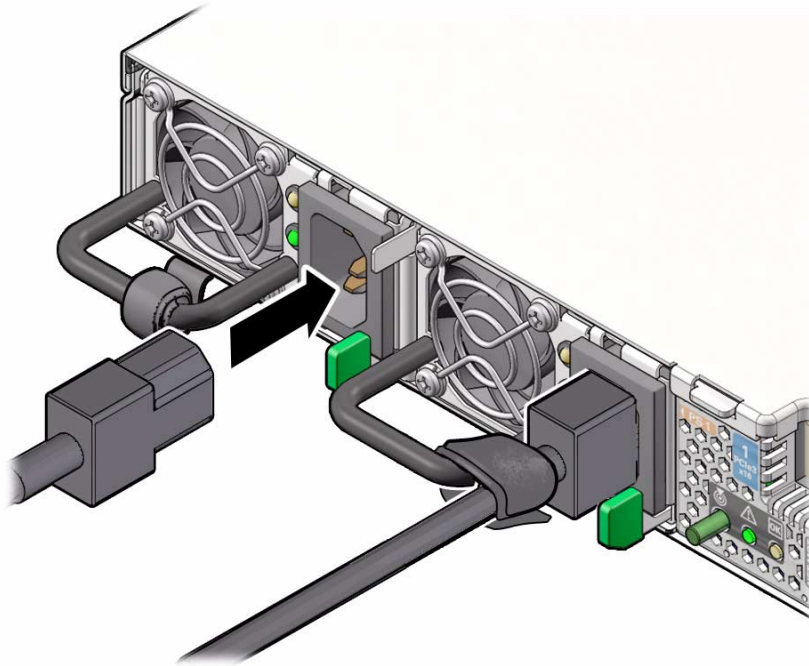
## ▼ Reconnect Data Cables and Power Cords

1. **Reconnect the data cables to the rear of the server, as required.**

If the cable management arm (CMA) is in the way, extend the server approximately 13 cm (5 inches) out of the front of the rack.

Ensure that you have reconnected the cables that connect the two servers together.

2. **Reconnect the power cables to the power supplies and secure them with the Velcro straps as shown in the following figure.**



3. **If necessary, reinstall the cables into the cable management arm and secure them with the Velcro straps.**
4. **If you pulled the server out of the rack to make it easier to connect the cables, push the server into the rack until the slide-rail locks (on the front of the server) engage the slide-rail assemblies.**

You will hear an audible click when the server is in the normal rack position.

### Related Information

- [“Disconnect Cables From the Server” on page 31](#)
- [“Reinstall the Server Chassis Into the Rack” on page 122](#)
- [“Power On the Server” on page 134](#)

---

## ▼ Power On the Server

As soon as the power cords are connected, standby power is applied and the green Power/OK status indicator on the server front panel blinks. Depending on the configuration of the firmware, the system might boot. If not, perform the first two steps.

1. **Power on disk shelves attached to the server by plugging the two power cords into the power connectors, connecting the cords to the external power source, and turning on the disk shelf power switches. Wait several minutes until the power indicators are lit a steady green.**
2. **Power on the server by performing one of the following:**
  - Press the Power button on the server front panel.
  - Log in to the Oracle ILOM web interface, click Host Management > Power Control and select Power On from the Select Action list box.
  - Log in to the Oracle ILOM command-line interface (CLI), and type the following command at the Oracle ILOM CLI prompt.

```
-> start /System
```

When the server is powered on and the power-on self-test (POST) code checkpoint tests have completed, the green Power/OK status indicator on the front panel lights and remains lit.

3. **If you performed a graceful power down earlier, return resources to the server that was just serviced.**
  - a. **In the BUI for the server that was not serviced, go to Configuration > Cluster.**
  - b. **Click FAILBACK.**

For information about configuring the clustered servers and attached disk shelves, see the *Oracle ZFS Storage System Administration Guide* for the appropriate software release.

**Related Information**

- [“Powering Down the Server” on page 26](#)
- [“Reconnect Data Cables and Power Cords” on page 133](#)



# Identifying the Server Ports

This section describes the pinouts of the server connectors.

Description	Links
Learn about the Gigabit Ethernet ports.	<a href="#">“Gigabit Ethernet Ports” on page 137</a>
Learn about the network management port.	<a href="#">“Network Management Port” on page 138</a>
Learn about the serial management port.	<a href="#">“Serial Management Port” on page 139</a>
Learn about video connector.	<a href="#">“Video Connector” on page 141</a>
Learn about USB ports.	<a href="#">“USB Ports” on page 142</a>

## Gigabit Ethernet Ports

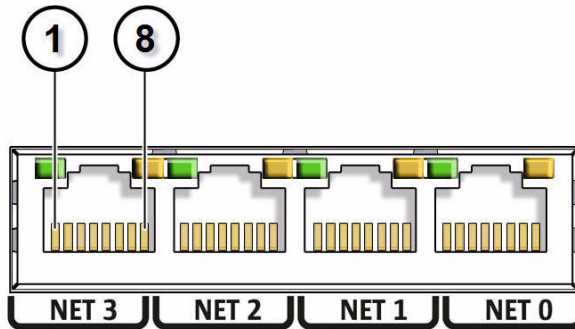
The server has four auto-negotiating 100/1000/10,000BASE-T GbE system domain ports. All four Ethernet ports use a standard RJ-45 connector.

The transfer rates are shown in the following table.

**TABLE:** Ethernet Port Transfer Rates

Connection Type	IEEE Terminology	Transfer Rate
Fast Ethernet	100BASE-TX	100 Mbps
Gigabit Ethernet	1000BASE-T	1,000 Mbps
10 Gigabit Ethernet	10GBASE-T	10,000 Mbps

The following figure and table describe the gigabit Ethernet port pin signals.




---

**Note** – Ethernet ports NET 2 and NET 3 are nonfunctional in single-processor systems.

---

**TABLE:** 10GBE Port Signals

Pin	Signal Description	Pin	Signal Description
1	Transmit/Receive Data 0 +	5	Transmit/Receive Data 2 –
2	Transmit/Receive Data 0 –	6	Transmit/Receive Data 1 –
3	Transmit/Receive Data 1 +	7	Transmit/Receive Data 3 +
4	Transmit/Receive Data 2 +	8	Transmit/Receive Data 3 –

### Related Information

- “Server Back Panel View” on page 3
- “Disconnect Cables From the Server” on page 31
- “Reconnect Data Cables and Power Cords” on page 133

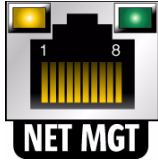
---

## Network Management Port

The server has one 10/100BASE-T Ethernet management domain interface, labeled NET MGT. For information on configuring this port for managing the server with Oracle ILOM, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1

Documentation Library at: <http://www.oracle.com/pls/topic/lookup?ctx=ilom31>





**TABLE:** Network Management Port Signals

Pin	Signal Description	Pin	Signal Description
1	Transmit Data +	5	Common Mode Termination
2	Transmit Data –	6	Receive Data –
3	Receive Data +	7	Common Mode Termination
4	Common Mode Termination	8	Common Mode Termination

### Related Information

- [“Server Back Panel View” on page 3](#)
- [“Disconnect Cables From the Server” on page 31](#)
- [“Reconnect Data Cables and Power Cords” on page 133](#)

---

## Serial Management Port

The serial management connector (labeled SER MGT) is an RJ-45 connector that can be accessed from the rear panel. This port is the default connection to the server. Use this port *only* for server management.

**TABLE:** Default Serial Connections for Serial Port

Parameter	Setting
Connector	SER MGT
Rate	9600 baud
Parity	None
Stop bits	1
Data bits	8

The following figure and table describe the pin descriptions of the SER MGT port.



**TABLE:** Serial Management Port Signals

Pin	Signal Description	Pin	Signal Description
1	Request to Send	5	Ground
2	Data Terminal Ready	6	Receive Data
3	Transmit Data	7	Data Set Ready
4	Ground	8	Clear to Send

If you need to connect to the SER MGT port using a cable with either a DB-9 or a DB-25 connector, follow the pin descriptions in the tables to create a crossover adapter appropriate for your serial connection.

**TABLE:** RJ-45 to DB-9 Adapter Crossovers Wiring Reference

Serial Port (RJ-45 Connector)		DB-9 Adapter	
Pin	Signal Description	Pin	Signal Description
1	RTS	8	CTS
2	DTR	6	DSR
3	TXD	2	RXD
4	Signal Ground	5	Signal Ground
5	Signal Ground	5	Signal Ground
6	RXD	3	TXD
7	DSR	4	DTR
8	CTS	7	RTS

**TABLE:** RJ-45 to DB-25 Adapter Crossovers Wiring Reference

Serial Port (RJ-45 Connector)		DB-25 Adapter	
Pin	Signal Description	Pin	Signal Description
1	RTS	5	CTS
2	DTR	6	DSR
3	TXD	3	RXD
4	Signal Ground	7	Signal Ground
5	Signal Ground	7	Signal Ground
6	RXD	2	TXD
7	DSR	20	DTR
8	CTS	4	RTS

**Related Information**

- [“Server Back Panel View” on page 3](#)
- [“Disconnect Cables From the Server” on page 31](#)
- [“Reconnect Data Cables and Power Cords” on page 133](#)

# Video Connector

The video connector is an DB-15 connector that can be accessed from the back panel.



**TABLE:** Video Connector Signals

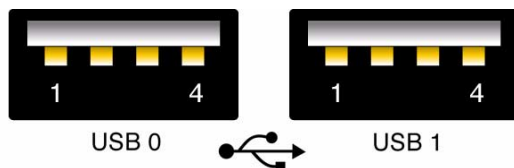
Pin	Signal Description	Pin	Signal Description
1	Red Video	9	[KEY]
2	Green Video	10	Sync Ground
3	Blue Video	11	Monitor ID - Bit 1
4	Monitor ID - Bit 2	12	Monitor ID - Bit 0
5	Ground	13	Horizontal Sync
6	Red Ground	14	Vertical Sync
7	Green Ground	15	N/C (Reserved)
8	Blue Ground		

### Related Information

- [“Server Back Panel View” on page 3](#)
- [“Disconnect Cables From the Server” on page 31](#)
- [“Reconnect Data Cables and Power Cords” on page 133](#)

## USB Ports

The server has five USB ports for attaching supported USB 2.0 compliant devices. There are two USB ports on the server front panel, two on the rear panel, and one on the motherboard.



**TABLE:** USB Port Signals

Pin	Signal Description
1	+5 V
2	DAT-
3	DAT+
4	Ground

### Related Information

- [“Server Back Panel View” on page 3](#)
- [“Disconnect Cables From the Server” on page 31](#)
- [“Reconnect Data Cables and Power Cords” on page 133](#)



# Getting Server Firmware and Software

---

This section explains the options for accessing server firmware and software.

Description	Links
Learn about server firmware and software updates.	<a href="#">“Firmware and Software Updates” on page 145</a>
Learn about the options for accessing firmware and software.	<a href="#">“Firmware and Software Access Options” on page 146</a>
Access the firmware and software packages through My Oracle Support.	<a href="#">“Download Firmware and Software Using My Oracle Support” on page 146</a>

---

## Firmware and Software Updates

Firmware and software, such as hardware drivers and tools for the server, are updated periodically. These are made available as a software release. The software release is a set of downloads (patches) that includes all available firmware, hardware drivers, and utilities for the server. All these have been tested together.

You should update your server firmware and software as soon as possible after the software release becomes available. Software releases often include bug fixes, and updating ensures that your server software is compatible with the latest server firmware and other component firmware and software.

---

# Firmware and Software Access Options

Use one of the following options to obtain the latest set of firmware and software for your server:

- **My Oracle Support** – All system firmware and software are available from My Oracle Support at <http://support.oracle.com>.

For instructions on how to download software releases from My Oracle Support, see “Download Firmware and Software Using My Oracle Support” on page 146.

- View release notes and download firmware and software at <https://wikis.oracle.com/display/FishWorks/Software+Updates>.
- 

## ▼ Download Firmware and Software Using My Oracle Support

1. Ensure that any resilvering operations have completed by checking the BUI Configuration > Storage screen.
2. Ensure that there are no active problems on the Maintenance > Problems screen.
3. Verify that hardware firmware updates are not in progress on the Maintenance > System screen.
4. Go to the following web site: <http://support.oracle.com>
5. Sign in to My Oracle Support.
6. At the top of the page, click the Patches & Updates tab.  
The Patches and Updates screen appears.
7. In the Search screen, click Product or Family (Advanced), which is near the top.  
The screen appears with search fields.
8. In the Product field, select the product from the drop-down list.  
Alternatively, type a full or partial product name until a match appears.
9. In the Release field, select a software release from the drop-down list.
10. Click Search.  
The patches available for downloading are listed.



11. **To select a patch for downloading, click on the Patch Name (you can use the shift key to select more than one patch).**  
A pop-up action panel appears. The pop-up panel contains several action options, including the Add to Plan and Download options. For information about the Add to Plan option, click on the associated drop-down button and select “Why use a plan?”
12. **View the Read Me file, which contains the Release Notes, by clicking the Read Me button. Read the information and address any release-specific requirements.**
13. **To download the patch(es), click Download in the pop-up action panel.**  
The File Download dialog box appears.
14. **In the File Download dialog box, click on the patch zip file.**  
The patch file downloads.
15. **Unzip the patch file.**  
The file is expanded into the All\_Supported\_Platforms directory.

---

**Note** – Do not attempt to open/unpack/decompress the zip file inside the server system archive.

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16. **To upload and apply the patch, go to the BUI Maintenance > System online help page, and click the link for information on updating the system software. Pay special attention to the section describing how to update a clustered system.**



# Index

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## A

- antistatic
  - mat, 25
  - measures
    - removing, 122
    - taking, 39
  - wrist strap, 25

## B

- battery
  - description, 13
  - installing, 85
  - removing, 84

## C

- cables
  - data and power
    - connecting, 133
    - disconnecting, 31

## D

- diagnostics, 16
  - Oracle ILOM firmware, 16
  - Pc-Check, 16, 17
- DIMMs
  - description, 13
  - fault LEDs
    - inconsistences with BIOS, 60
  - faulty
    - identifying, 62
  - physical layout, 59
  - removing, 62
- disk backplane
  - configurations, 99
  - description, 14
  - installing, 102
  - removing, 100

- disk drives
  - See* storage drive

## E

- electrostatic discharge
  - See* ESD
- ESD
  - prevention, 39
  - safety precautions, 24
- Ethernet ports
  - pinouts, 138
- exploded view of server, 11
- external inspection, 20

## F

- fan modules
  - description, 13
  - installing, 51
  - removing, 48
- Fault Remind Button
  - location, 61
  - using, 61
- FIM
  - description, 14
  - servicing, 104
  - with 2.5-inch storage drives
    - installing, 106
    - removing, 105
- FRU
  - locations, 87

## G

- gathering information for service visit, 17
- general troubleshooting guidelines, 17
- Gigabit Ethernet ports, 137
  - pinouts, 138

guidelines for troubleshooting, 17

## H

hard drives

*See* storage drive

hot-plugging storage drives, 44

## I

illustrated parts breakdown, 11

inspecting server

external, 20

internal, 20

installing

disk backplane, 102

fan modules, 51

PCIe risers, 68, 71

power supply, 54

processor(s), 94

server into rack, 122

storage drive, 46

top cover, 120

Integrated Lights Out Manager

*See* Oracle ILOM

Internal HBA card

installing, 80

removing, 79

internal inspection, 20

internal USB flash drive

installing, 83

removing, 82

## L

latch release button

storage drive, 46

LEDs

power supply, 52, 53

system status, 6

troubleshooting, 20

visual notification, 16

locator LED button, 6, 20

## M

motherboard

description, 14

installing, 111

removing, 108

servicing, 107

My Oracle Support, using to download software  
release packages, 146

## N

NET MGT port

pinout, 138

network management port

*See* NET MGT

## O

Oracle ILOM

diagnostics, 16

firmware, 16

POST, 16

## P

Pc-Check diagnostics, 16

PCIe cards

description, 13

installing to slot 1 and 2, 76

installing to slot 3, 78

removing from slot 1 and 2, 75

removing from slot 3, 77

servicing, 73

slot characteristics, 74

PCIe risers

description, 13

installing in slots 1 and 2, 68

installing in slots 3 and 4, 71

location and differences, 65

removing from slot 1 and 2, 66

removing from slot 3 and 4, 70

PCIe slot numbering, 74

pinouts

Ethernet ports, 138

Gigabit Ethernet ports, 138

RJ-45 to DB-25 crossover wiring, 141

RJ-45 to DB-9 crossover wiring, 140

SER MGT, 140

USB port, 143

video connector, 141

ports

Ethernet, 137

Gigabit Ethernet, 137

NET MGT, 138

network management, 138

SER MGT, 139

- serial management, 139
- USB, 142
- video, 141
- POST code checkpoint tests, 6, 84, 134
- power
  - standby mode, 28
  - standby power mode, 31
- power down server
  - gracefully, 27
- power problems, troubleshooting, 19
- power supply
  - description, 13
  - installing, 54
  - LEDs, 52, 53
  - removing, 53
  - servicing, 52
  - status indicators, 8
- Power/OK indicator, 6
- powering off the system, 26
- processor(s)
  - identifying faulty, 90
  - installing, 94
  - physical layout, 59
  - release lever
    - disengaging, 92
    - engaging, 97
  - removal/replacement tool, 95
  - removing, 89
- PSU
  - See power supply

## R

- rackmount
  - stabilizing the rack, 32
- removing
  - antistatic measures, 122
  - disk backplane, 100
  - fan modules, 48
  - motherboard, 108
  - power supply, 53
  - processor(s), 89
  - server from rack, 34
  - storage drive, 45

## S

- safety
  - ESD precautions, 24

- precautions, 23
- symbols, 24
- SER MGT
  - pinouts, 140
  - RJ-45 to DB-25 crossover pinouts, 141
  - RJ-45 to DB-9 crossover pinouts, 140
- serial management port
  - See SER MGT
- server
  - inspecting internal components, 20
  - installing into rack, 122
  - removing from rack, 34
- service
  - gathering information, 17
  - preparing server, 26
  - returning server to operation, 119
- Service Required LED, 6
- service visit information, gathering, 17
- shutting down the system
  - gracefully, 26
  - gracefully using Oracle ILOM CLI, 27
  - immediately, 26
  - immediately using Oracle ILOM CLI, 29
  - immediately using Oracle ILOM web
    - interface, 30
  - immediately using the Power button, 28, 29, 30
- software release packages
  - downloading using My Oracle Support, 146
- standby power, 28, 31
- status indicators
  - power supply, 8
  - storage drive, 8
- storage drive
  - description, 13
  - hot-plugging, 44
  - identification, 45
  - installing, 46
  - latch release button, 46
  - locations, 45
  - removing, 45
  - status indicators, 8
- storage drive SAS cables
  - installing, 116
  - removing, 115
- system status LEDs, 6

## **T**

tools required, 25

top cover

- installing, 120

- removing, 40

troubleshooting

- external components, 20

- gathering information, 17

- guidelines, 17

- inspecting server, 19

- internal components, 20

- LEDs, 20

- locator LED button, 20

- power problems, 19

- task list, 15

## **U**

USB port

- pinouts, 143

## **V**

video port

- pinouts, 141

## **W**

weight of server, 33