

Sun Server X4-4 Service Manual

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Using This Documentation

This section describes how to get the latest firmware and software for the system, documentation and feedback, and a document change history.

- “Sun Server X4-4 Model Naming Convention” on page 11
- “Getting the Latest Firmware and Software” on page 11
- “Documentation and Feedback” on page 12
- “About This Documentation” on page 12
- “Support and Training” on page 12
- “Contributors” on page 12
- “Change History” on page 13

Sun Server X4-4 Model Naming Convention

The Sun Server X4-4 name identifies the following:

- X identifies an x86 product.
- The first number, 4, identifies the generation of the server.
- The second number, 4, identifies the number of processor sockets in the server.

Getting the Latest Firmware and Software

Firmware, drivers, and other hardware-related software for each Oracle x86 server are updated periodically.

You can obtain the latest version in one of following ways:

- Oracle System Assistant – This is a factory-installed option for Sun Oracle x86 servers. It has all the tools and drivers you need and resides on an internal USB flash stick.
- My Oracle Support – This is the Oracle support web site located at: <https://support.oracle.com>.

Documentation and Feedback

Documentation	Link
All Oracle products	http://www.oracle.com/technology/documentation/index.html
Sun Server X4-4	http://www.oracle.com/goto/X4-4/docs
Oracle Integrated Lights Out Manager (ILOM). Refer to the documentation for your supported version of Oracle ILOM listed in the <i>Product Notes</i> .	http://www.oracle.com/goto/ILOM/docs
Oracle Hardware Management Pack. Refer to the documentation for your supported version of Oracle Hardware Management Pack listed in the <i>Product Notes</i> .	http://www.oracle.com/goto/ohmp/docs

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

About This Documentation

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

Support and Training

These web sites provide additional resources:

- Support: <https://support.oracle.com>
- Training: <http://education.oracle.com>

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Change History

The following lists the release history of this documentation set:

- April 2014. Initial publication.
- May 2014. Updated *Product Notes* for SW 1.0.1. Updated *Product Notes*, *Installation Guide* and *Service Manual* information for the 8 GB DIMM which will no longer be orderable as of June 2014.
- October 2014. Updated *Product Notes* for SW 1.1.0. Updated *Installation Guide* and *Sun Server X4-4 Installation Guide for Linux Operating System* information to add support for the Oracle Linux Fault Management Architecture software available with Oracle Hardware Management Pack 2.3. Minor editorial updates to *Sun Server X4-4 Installation Guide for Windows Operating System*.
- January 2015. Updated *Product Notes* for SW 1.1.1.
- August 2015. Updated *Product Notes* for SW 1.2. Updated the *Service Manual* information for the fan module replacement. Updated the *Installation Guide* for minor technical edits.
- September 2015. Updated *Product Notes* for SW 1.2.1.
- October 2015. Updated *Product Notes* to add note about important updates. Removed information in all books about obtaining physical media for Oracle software.

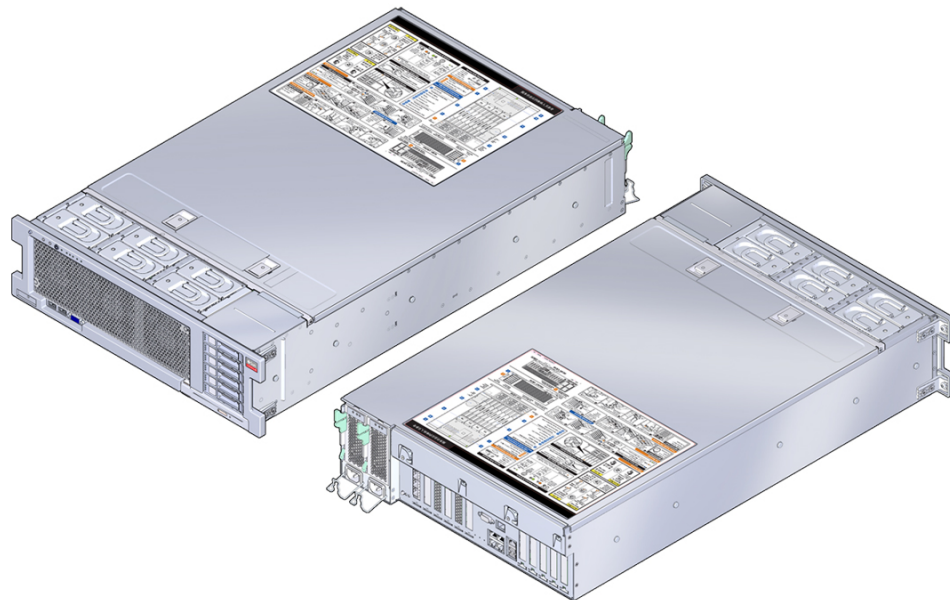
Sun Server X4-4 Service Manual Overview

This document contains service, maintenance, and component replacement procedures and information for the Oracle® Sun Server X4-4. The following table describes the major sections of this manual.

Description	Link
Server system overview.	“Sun Server X4-4 Overview” on page 17
Troubleshooting and diagnostic procedures and information.	“Troubleshooting and Diagnostics” on page 35
Sun Server X4-4 service-related information and procedures.	“Servicing the Server” on page 69
Procedures for preparing to service the server.	“Preparing to Service the Server” on page 93
Procedures for servicing customer-replaceable units (CRUs).	“Servicing CRU Components” on page 115
Procedures for servicing field-replaceable units (FRUs).	“Servicing FRU Components” on page 175
Procedures for preparing the server for operation.	“Returning the Server to Operation” on page 231
Accessing the BIOS setup program.	“BIOS Setup Utility Menu Options” on page 243
Listing of Power On Self-Test (POST) error codes and their meaning.	“POST and Checkpoint Codes” on page 281

Sun Server X4-4 Overview

This section describes the major features, components, and capabilities of the Oracle Sun Server X4-4.



Description	Link
Server overview statement	“Server Overview” on page 18
Components and features of the server front and back panels	“External Components and Features” on page 19
Server subsystem components	“Server Subsystems Overview” on page 21

Server Overview

The Sun Server X4-4 is a 3RU tall rack-mount server system that features two or four Intel Xeon E4890 Series 15-core 2.8 GHz CPUs. The system memory is contained on memory riser (MR) cards, each with the capacity for up to 12 low-voltage DDR3 DIMMs. The server can support up to eight MR cards (four-CPU system). The server has two hot-plug redundant power supplies and slot capability for up to 11 PCI-Express Gen 3 low-profile (LP) cards. An internal HBA card provides connectivity to the six SAS2 disks slots accessible from front of the chassis. The following table lists the server-supported components, refer to.

Supported Components

Component	Description
Processor (CPU)	<p>Intel Xeon® E7-8895 v2 15-core 2.8 GHz processor.</p> <p>Supported configurations:</p> <ul style="list-style-type: none">■ Two processors installed in sockets 0 and 1■ Four processors installed in sockets 0 through 3
Memory	<p>Up to eight memory riser cards are supported (two risers per CPU) in the server chassis. Each memory riser supports up to twelve DDR3-1600 ECC low-voltage registered or load-reduced DIMMs, allowing up to twenty-four DIMMs per processor. Installed DIMMs must be the same type and size.</p> <ul style="list-style-type: none">■ In a two CPU system, you can install up to a maximum of 1.5 TB of system memory.■ In a four CPU system, you can install up to a maximum of 3 TB of system memory. <p>For information on supported DIMM configurations, see “Supported DIMMs and DIMM Population Rules” on page 151.</p>
Storage devices	<p>For internal storage, the server chassis provides:</p> <ul style="list-style-type: none">■ Six 2.5-inch drive bays, accessible through the front panel. All bays can be populated with SAS-2 HDDs or SATA-3 SSDs.■ An optional slot-loading or tray-load DVD+/-RW drive on the front of the server, below the drive bays.■ SAS-2 HBA PCIe card options:<ul style="list-style-type: none">■ Sun Storage 6 Gb SAS PCIe HBA. Supports RAID levels : 0, 1, 10.■ Sun Storage 6 Gb SAS PCIe RAID HBA. Supports RAID levels : 0, 1, 1E, 10, 5, 5EE, 6 with Battery Backed Write Cache (BBWC).
USB 2.0 ports	<ul style="list-style-type: none">■ Four external high-speed USB ports: two in front and two in back.■ Two internal high-speed USB ports on the motherboard.

Component	Description
	One internal port holds the optional factory-installed Oracle System Assistant (OSA) flash drive. A second internal port can hold a USB flash drive for system booting.
VGA ports	One front and one back high-density DB-15 video port is available. The server includes an embedded VGA 2D graphics controller with 8 MB which support resolutions up to 1600 x 1200 x 16bits @ 60 Hz (1024 x 768 when viewed remotely via Oracle ILOM RKVMS). Note - The back VGA port supports VESA Device Data Channel for monitor identification.
PCIe 3.0 I/O slots	Eleven PCIe 3.0 slots that accommodate low-profile PCIe cards. <ul style="list-style-type: none"> ■ All slots support x8 PCIe connections ■ Slots 1 through 7, 9, and 10: x8 connector ■ Slots 8 and 11: x8 or x16 connector Note - PCIe slots 7 through 11 are only functional in four CPU systems.
PCI Express I/O cards	For a list of supported I/O cards, refer to the <i>Product Notes</i> .
Ethernet ports	Four 10 GbE RJ-45 Ethernet ports (back panel)
Service processor	Emulex Pilot 3 base management controller (BMC): <ul style="list-style-type: none"> ■ Supports the industry-standard IPMI feature set ■ Supports remote KVMs, DVD, and floppy over IP, and ISO image over IP ■ Includes serial port ■ Supports Ethernet access to SP through a dedicated 10/100/1000 RJ-45 Gigabit Ethernet (GbE) management port and optionally through one of the host GbE ports (sideband management)
Power supplies	Two hot-swappable power supplies, each with 1030/2060 watts (low line/high line) capacity, auto-ranging, light load efficiency mode and redundant over-subscription
Cooling fans	<ul style="list-style-type: none"> ■ Six hot-swappable, redundant fans at chassis front (top-loading) ■ Two redundant fans, one in each power supply
Management software	The following options are available: <ul style="list-style-type: none"> ■ Oracle Integrated Lights Out Manager (ILOM) on the Service Processor. ■ Oracle System Assistant (OSA) on an optional internal USB flash drive. ■ Oracle Hardware Management Pack. ■ Oracle Enterprise Management Ops Center, which can be downloaded from the Oracle site.

External Components and Features

The following sections call out the features of the server front and back panels.

- [“Server Front Panel Features” on page 20](#)
- [“Server Back Panel Features” on page 20](#)

Server Front Panel Features

The following illustration shows the server front panel and describes its features.

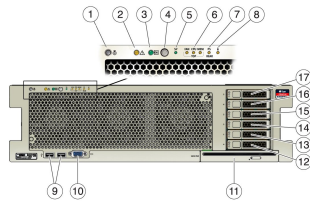


Figure Legend	Description
1	Locate LED/Locate button: white
2	Service Action Required indicator: amber
3	System OK indicator: green
4	Power button
5	SP OK indicator: green
6	Service Action Required indicators (3) for fan module (FAN), Processor (CPU) and Memory: amber
7	Power Supply (PS) Fault (Service Action Required) indicator: amber
8	Over Temperature Warning indicator: amber
9	USB 2.0 connectors (2)
10	DB-15 video connector
11	SATA DVD drive (optional)
12–17	Storage drive slots 0–5 (from bottom to top)

Server Back Panel Features

The following illustration shows the server back panel and describes its features.

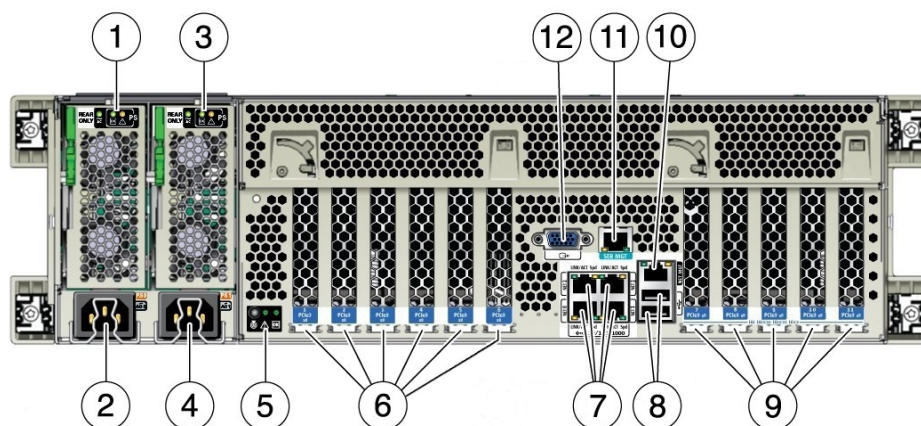


Figure Legend	Description
1	Power supply unit (PSU) 0 indicator panel
2	PSU 0 AC inlet
3	PSU 1 indicator panel
4	PSU 1 AC inlet
5	System status indicator panel
6	PCIe card slots 1–6
7	Network (NET) 10 GbE ports: NET0–NET3
8	USB 2.0 connectors (2)
9	PCIe card slots 7–11
10	Service processor (SP) network management (NET MGT) port
11	Serial management (SER MGT)/RJ-45 serial port
12	DB-15 video connector

Server Subsystems Overview

This section provides information about the server subsystems:

- [“System Block Diagrams” on page 22](#)
- [“Processor Subsystem” on page 25](#)
- [“Memory Subsystem” on page 28](#)
- [“Cooling Subsystem” on page 28](#)

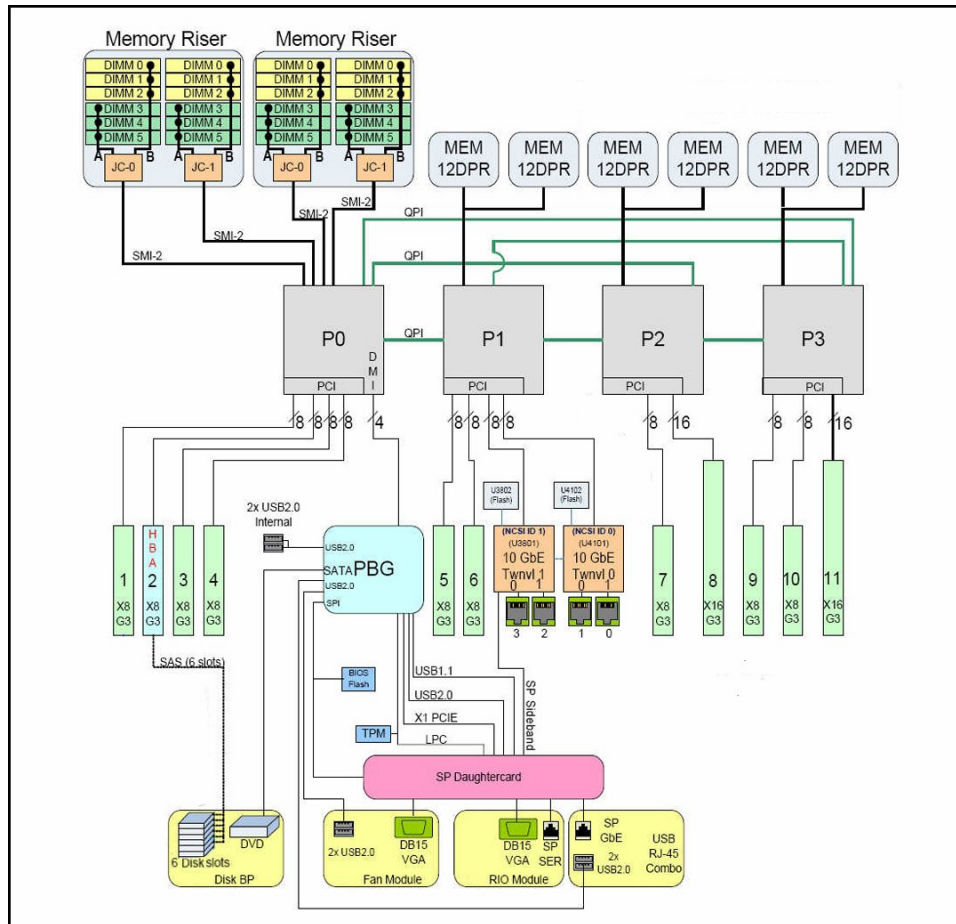
- [“Input/Output \(I/O\) Subsystem” on page 31](#)
- [“System Management Subsystem” on page 33](#)

System Block Diagrams

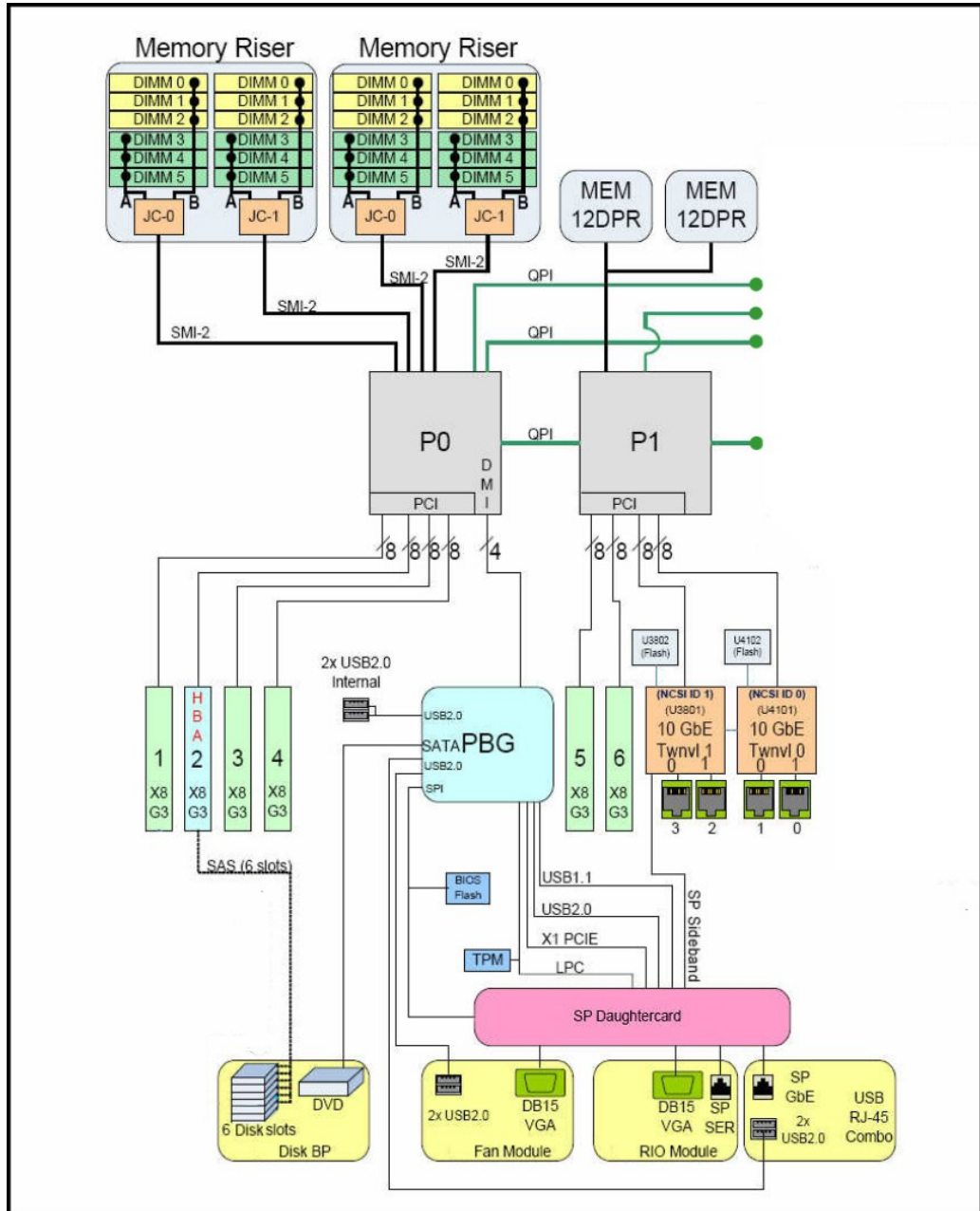
The Sun Server X4-4 can be configured with four CPUs or two CPUs. This section shows the system block diagrams for these two server configurations:

- [“Four-CPU Block Diagram” on page 23](#)
- [“Two-CPU Block Diagram” on page 24](#)

Four-CPU Block Diagram



Two-CPU Block Diagram

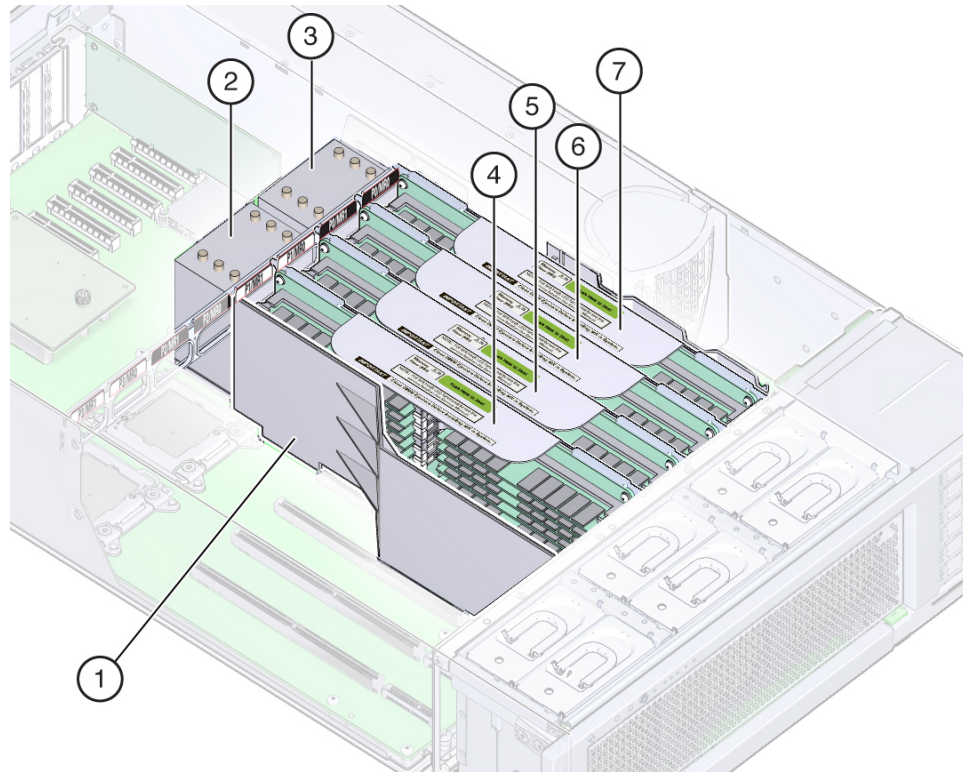


Processor Subsystem

The Sun Server X4-4 uses the Intel Xeon E7-8895 v2 15-core 2.8 GHz processor and supports two CPU-based configurations: a two-CPU configuration and a four-CPU configuration.

Two-CPU Configuration

Servers with two CPUs have CPUs and heatsinks in sockets 0 and 1 and CPU cover plates installed in sockets 2 and 3. This configuration requires four memory riser cards and an air baffle to control airflow for maximum cooling. The following illustration shows the components that distinguish a two-CPU server configuration.

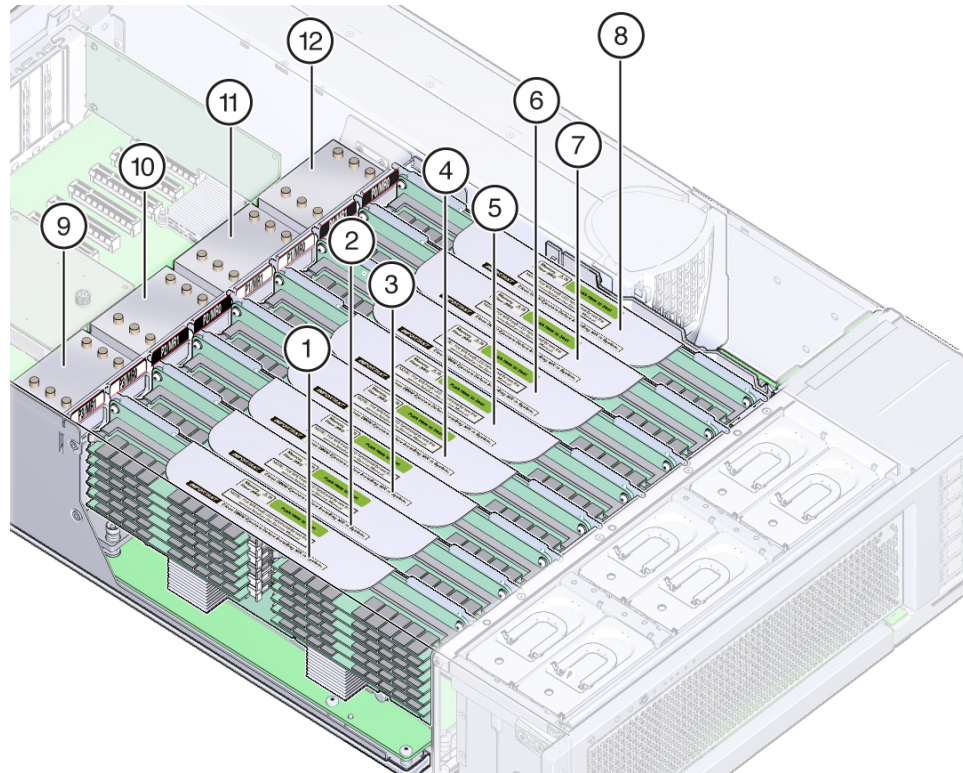


Call Out	Description
1	Air baffle
2	CPU P1
3	CPU P0
4	Memory riser card P1/MR1
5	Memory riser card P1/MR0
6	Memory riser card P0/MR1
7	Memory riser card P0/MR0

For more information, see [“Two-CPU Block Diagram”](#) on page 24.

Four-CPU Configuration

In addition to four CPUs, this configuration requires eight memory riser cards. The following illustration shows the components in a server configured with four-CPU.



Call Out	Description	Call Out	Description
1	Memory riser card P3/MR1	7	Memory riser card P0/MR1
2	Memory riser card P3/MR0	8	Memory riser card P0/MR0
3	Memory riser card P2/MR1	9	CPU P3
4	Memory riser card P2/MR0	10	CPU P2
5	Memory riser card P1/MR1	11	CPU P1
6	Memory riser card P1/MR0	12	CPU P0

The four-CPU configuration offers a greater level of resiliency with redundant QPI interconnects that allow working CPUs to route around a disabled CPU as the system starts.

For more information, see [“Four-CPU Block Diagram” on page 23](#).

Memory Subsystem

The system memory is installed on memory riser (MR) cards. The system requires eight MR cards for a four-CPU configuration and four MR cards for a two-CPU configuration (Each processor has two assigned MR cards). MR cards contain twelve DIMM slots, four DDR3 channels, and two memory buffer ASICs. Each memory buffer has two channels (A and B) and links to three DIMM slots per channel. Each memory buffer is connected to the processor's built-in memory controller by an SMI-2 link.

For balanced performance, each channel for each memory buffer on the MR card must be populated. The only exception supported is a minimum orderable configuration of two 16 GB DIMMs in channel's A and B of memory buffer 0.

For more information about MR cards, and memory layout, including guidelines for populating cards and DIMMs, see: [“Memory Riser Card and DIMM Reference” on page 148](#)

Cooling Subsystem

The internal components in the Sun Server X4-4 are cooled by air that is pulled in through the front of the server and exhausted out the back of the server. Cooling occurs in two areas of the chassis, the power supply area and the motherboard area.

Power Supply Cooling Area

The power supply area uses fans at the back of the power supplies to draw cool air in past the drives, through power supplies, and out the back of the server.

Motherboard Cooling Area

The motherboard area is divided into three zones where six 92-mm high-performance fans pull cool air in from the front of the server, move it across the motherboard, memory risers, processors, and I/O cards, and exhausts warm air out the back of the server.

The six fans are arranged in two rows allowing for a pair of stacked fans for each of the three motherboard zones. The pairing and stacking provides fan redundancy. For example, if one of the fan modules fails, the other fan in the pair has sufficient power to cool the zone until the

failed fan can be replaced. However, if in the rare case that both fans in a pair fail, Oracle ILOM will power off the system to prevent thermal damage.

Pressure Areas

The power supply and motherboard cooling areas have separate air pressures. The pressures are maintained by a plastic divider that, combined with the top cover, creates a seal between the two areas. It is important to maintain this seal because separate pressurizations for each area is the key to maintaining the integrity of the cooling system and the health of the server.

Cooling Zones and Temperature Sensors

The two cooling areas are divided into four zones, one zone for the power supply area and three zones for the motherboard area. Dividing the cooling into zones allows for greater use of system resources, since each zone can operate independently at its highest efficiency. The zones are designated from left to right (from the front of the server) as: zone 0, zone 1, zone 2, and zone 3 (power supply area). Temperature monitoring of each zone is accomplished using motherboard-mounted temperature sensors.

The following illustration shows the cooling zones and the approximate location of the temperature sensors. The accompanying legend table provides sensor NAC names and sensor motherboard designations:

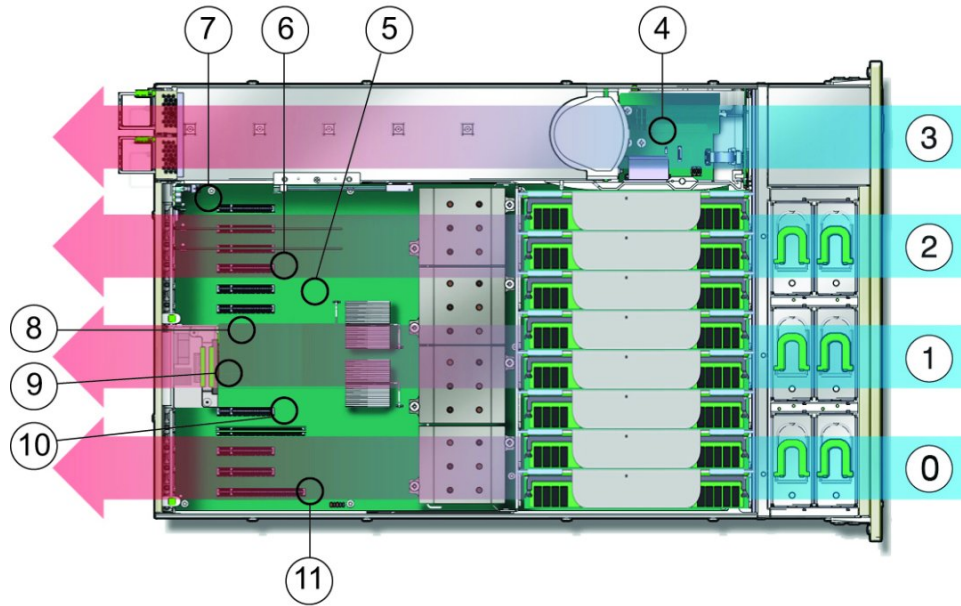


Figure Legend	Description
0	Cooling zone 0
1	Cooling zone 1
2	Cooling zone 2
3	Cooling zone 3 (power supply backplane area)
4	Temperature sensor TS_PS (U4603)
5	Temperature sensor TS_ZONE1 (U4507)
6	Temperature sensor TS_ZONE2 (U4505)
7	Temperature sensor TS_OUT (U4506)
8	Temperature sensor TS_TVL_1 (U4002)
9	Temperature sensor TS_TVL_0 (U4302)
10	Temperature sensor TS_ZONE0_B (U4509)
11	Temperature sensor TS_ZONE0_A (U4508)

Cooling the Two-CPU Configuration

A two-CPU server configuration has fewer components than a fully loaded, four-CPU configuration. To maximize cooling in a two-CPU configuration, an air baffle is installed in the memory riser area. The air baffle directs the fan output across the four memory riser cards and the two CPUs. For more information about the processor subsystem, see [“Processor Subsystem” on page 25](#).

Over-Temperature Issues

When the server cooling system is compromised by a hardware component failure or a airflow blockage, the internal temperature of the server can increase. This temperature increase can cause component failure. To protect against over-temperature conditions, the server temperature and components are monitored using sensors. If the reading from a sensor indicates a temperature outside of the normal operating range of the component, or if a cooling subsystem-related component (such as a fan module) fails, the server management software lights the server fault indicator LED for the component and logs an event in the system event log (SEL). When a fault event occurs, address the issue *immediately*.

For information about troubleshooting the server cooling subsystem, see [“Troubleshooting System Cooling Issues” on page 52](#).

Power Subsystem

This section contains information about the server power subsystem.

The server is equipped with two 1030/2060 watt auto-ranging hot-swappable power supplies that support a two-CPU configuration at 110–127 VAC, or two or four CPU configuration at 200–240 VAC. The dual power supply configuration provides N+N redundancy.

For information about the processor subsystem, see [“Processor Subsystem” on page 25](#).

Input/Output (I/O) Subsystem

The server I/O storage subsystem consists of the following:

- [“11 PCIe Gen 3 Slots” on page 32](#)
- [“Six 2.5-inch Drive Bays” on page 32](#)
- [“SATA DVD +/-RW Drive” on page 32](#)
- [“Two Internal and Four External High-Speed USB Ports” on page 33](#)

11 PCIe Gen 3 Slots

The server contains 11 PCIe Gen 3 slots, of which nine are x8 slots and two are x16 slots. All 11 slots are available in a four-CPU configured server. Only the first six slots (1-6) are available in a two-CPU configured server. Slot 2 is reserved for the HBA to drive the six storage drive slots. For slot designation information, see [“PCIe Slot Designations” on page 77](#).

For information about the processor subsystem, see [“Processor Subsystem” on page 25](#).

Six 2.5-inch Drive Bays

The six 2.5-inch storage drive bays are located at the front of the server. The supported drive interfaces for each bay depend on the type of host bus adapter (HBA) installed in the server. When configured with any 2.5-inch SAS drives, the system must have one PCI Express (PCIe) Gen-2 internal HBA card installed in slot 2 to support the front 2.5-inch drive bays. Each PCIe Gen-2 HBA has 8 SAS2/SATA2 internal ports accessible through two SAS4I connectors (Port 0-3 and Port 4-7). Since the drive cage has only six bays, Port 6-7 of an internal HBA are not used.

Supported SAS2 slot 2 HBA cards:

- Sun Storage 6 Gb SAS PCIe RAID Internal HBA (SGX-SAS6-R-INT-Z)
- Sun Storage 6 Gb SAS PCIe Internal HBA (SGX-SAS6-INT-Z)

For slot designations, see [“DVD, Storage Drive, and USB Designations” on page 78](#).

SATA DVD +/-RW Drive

An optional DVD-RW SATA-Gen2 drive. The DVD drive is located at the front of the server below the drive bays.

For DVD designation, see [“DVD, Storage Drive, and USB Designations” on page 78](#).

Two Internal and Four External High-Speed USB Ports

The two internal USB ports are located on the motherboard between the disk drive backplane and the PSU backplane boards. The ports can take a standard USB flash device, which can be used for system booting. Your system might be equipped with a preinstalled Oracle System Assistant USB device. Do not use the Oracle System Assistant USB drive for booting an OS or as server storage. If installed in your server, the Oracle System Assistant USB drive must be installed in the internal port labeled "OSA USB" and it must contain only the Oracle System Assistant file system.

Note - Port P0 is reserved for the Oracle System Assistant USB device.

For port designations, see [“DVD, Storage Drive, and USB Designations” on page 78](#).

Additionally, the server has four external USB ports, two on the front panel and two on the back panel. See [“External Components and Features” on page 19](#).

System Management Subsystem

The server has two embedded system management tools: Oracle ILOM and Oracle System Assistant.

Service Processor (SP) Oracle ILOM

The server comes with a removable service processor (SP) daughter card that is mounted on the server motherboard. The SP supports the industry-standard IPMI feature set and includes Oracle Integrated Lights Out Manager (ILOM) 3.2.2 and remote redirection of keyboard, video, mouse, and storage (KVMS).

The SP runs Oracle ILOM, a single-server management tool that allows you to monitor and maintain your server by providing real-time status and detailed information about the subsystems and components in your server. Oracle ILOM runs independently of the server OS and is accessible in both full power and standby power modes. The SP Oracle ILOM is accessible through the SP GigabitEthernet NET MGT port located on the server back panel or through one of the host 10 GbE ports (using sideband management).

Oracle System Assistant

Your server might also come equipped with Oracle System Assistant. Oracle System Assistant is a server provisioning and update tool that assists in initial server set up and OS installation and allows you to easily manage server updates. As an option, Oracle System Assistant is delivered on a USB flash drive that is factory-installed in the internal USB slot labeled "OSA USB." The drive is configured with a server-specific version of Oracle System Assistant. You can start Oracle System Assistant from the server boot screen or from Oracle ILOM.

With Oracle System Assistant, you can:

- Get a single server-specific bundle of the latest available BIOS, Oracle ILOM, and hardware firmware and the latest tools and OS drivers from the Oracle support site.
- Update OS drivers and component firmware and configure RAID.
- Install supported operating systems with the latest drivers and supported tools.
- Configure a subset of Oracle ILOM settings.
- Save and restore customized BIOS settings or revert the BIOS to the factory defaults.
- Access embedded product documentation.
- Display system overview and detailed hardware inventory information.

Oracle Hardware Management Pack

Oracle Hardware Management Pack provides scriptable command-line tools that help you manage and configure your Oracle servers from the host operating system.

Hardware Management Pack enables you to do the following using command-line tools:

- Configure BIOS, UEFI BIOS, RAID volumes, and Oracle Integrated Lights Out Manager (ILOM).
- Upgrade server component firmware.
- Access the service processor and perform management tasks using IPMItool.
- View hardware configuration information and the status of your Oracle servers.
- Enable in-band monitoring of your Oracle hardware over Simple Network Management Protocol (SNMP). You can use this information to integrate your Oracle servers into your data center management infrastructure.
- Set up an Oracle ILOM trap proxy that forwards SNMP traps from your Oracle ILOM service processor to the host OS.

Troubleshooting and Diagnostics

This section includes information about troubleshooting hardware component faults for the Sun Server X4-4. It contains the following topics.

Description	Link
Maintenance-related information and procedures that you can use to troubleshoot and repair server hardware issues.	“Troubleshooting Server Component Hardware Faults” on page 35
Information about software and firmware diagnostic tools that you can use to isolate problems, monitor the server, and exercise the server subsystems.	“Troubleshooting Server Component Hardware Faults” on page 35
Information about attaching devices to the server to perform troubleshooting.	“Back Panel Pinhole Switches” on page 65
Information about contacting Oracle support.	“Getting Help” on page 65

Troubleshooting Server Component Hardware Faults

This section contains maintenance-related information and procedures that you can use to troubleshoot and repair server hardware issues. The following topics are covered.

Description	Section Links
Troubleshooting overview information and procedure.	“Troubleshooting Server Hardware Faults” on page 36
Source listing for troubleshooting and diagnostic information.	“Troubleshooting and Diagnostic Information” on page 40
Discerning the server state using the front panel indicators.	“Troubleshooting the Front Panel Indicators ” on page 40
Explanation of the system Fault Remind Test Circuit.	“The Server Fault Remind Test Circuits ” on page 51

Description	Section Links
Causes, actions, and preventative measures for problems related to the cooling subsystem.	“Troubleshooting System Cooling Issues” on page 52
Causes, actions, and preventative measures for problems related to the power subsystem.	“Troubleshooting Power Issues” on page 54

Troubleshooting Server Hardware Faults

When a server hardware fault event occurs the system lights the Service Action Required indicator and captures the event in the system event log (SEL). If you have set up notification through Oracle ILOM, you also receive an alert through the notification method you chose. When you become aware of a hardware fault, you should address it immediately.

To investigate a hardware fault, see the following:

- [“Basic Troubleshooting Process” on page 36](#)
- [“Troubleshoot Hardware Faults” on page 37](#)

Basic Troubleshooting Process

Use the following process to address a hardware fault (for the step-by-step procedure, see [“Troubleshoot Hardware Faults” on page 37](#)):

1. **Identify the server subsystem containing the fault.**
You can use Oracle ILOM to identify the failed component.
2. **Review the *Product Notes* document.**
Once you have identified the hardware issue, review the *Product Notes* document for up-to-date information about the server, including hardware-related issues.
3. **Prepare the server for service using Oracle ILOM.**
If the hardware fault requires service (physical access to the server), use Oracle ILOM to power off the server, activate the Locate LED, and take the server offline.
4. **Prepare the service work space.**
Before servicing the server, prepare the work space, ensuring ESD protection for the server and components.
5. **Service components.**
To service the components, see the removal, installation, and replacement procedures in this document.

Note - A component designated as FRU must be replaced by Oracle Service personnel. Contact Oracle Service.

6. **Clear the fault in Oracle ILOM.**

Depending on the component, you might need to clear the fault in Oracle ILOM. Generally, components that have a FRU ID clear the fault automatically.

Related Information:

- See [“Troubleshoot Hardware Faults” on page 37](#)

▼ Troubleshoot Hardware Faults

Note - The screens shown in this procedure might differ from those for your server.

This procedure follows the basic troubleshooting process as described in [“Basic Troubleshooting Process” on page 36](#).

Use this procedure to troubleshoot hardware faults with the Oracle ILOM web interface and, if necessary, prepare the server for service.

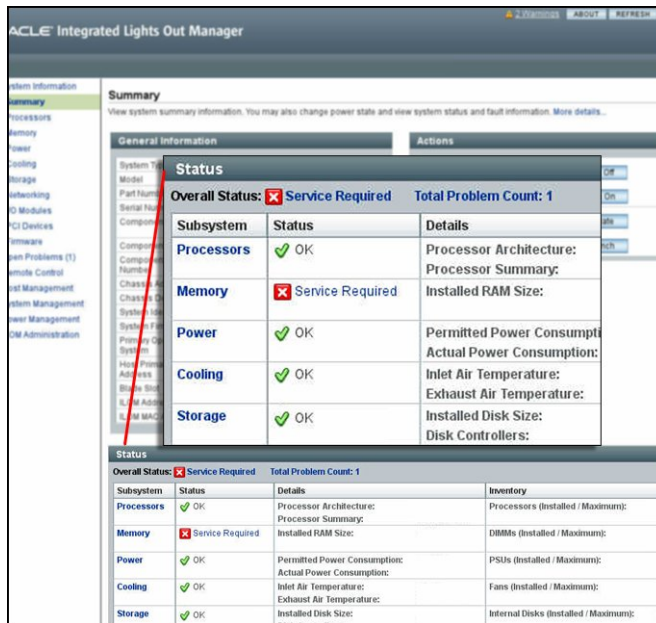
1. **Log in to the server SP Oracle ILOM web interface.**

Open a browser and enter the IP address of the server SP. At the login screen, type a user name (with administrator privileges) and password. The Summary screen appears.

The Status section of the Summary screen provides information about the server subsystems, including:

- **Processors**
- **Memory**
- **Power**
- **Cooling**
- **Storage**
- **Networking**
- **I/O Modules**

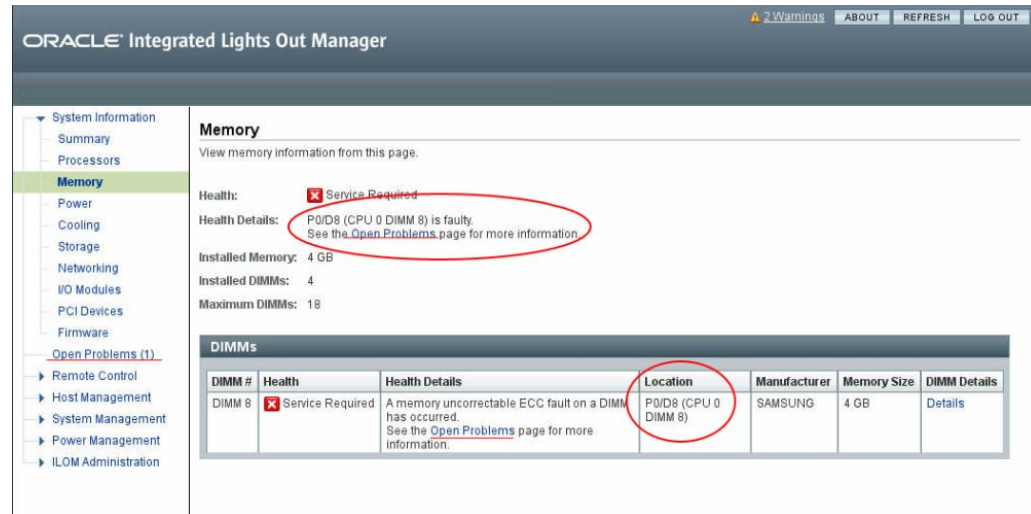
2. In the Status section of the summary screen, identify the server subsystem that requires service.



In the above example, the Status screen shows that the Memory subsystem requires service. This indicates that a hardware component within the subsystem is in a fault state.

3. To identify the component, click on the subsystem name.

The subsystem screen appears.



The above example shows the Memory subsystem screen and indicates that DIMM 8 on CPU 0 has an uncorrectable ECC fault.

4. To get more information, click one of the Open Problems links.

The Open Problems screen provides detailed information, such as the time the event occurred, the component and subsystem name, and a description of the issue. It also includes a link to a KnowledgeBase article.

Tip - The System Log provides a chronological list of all the system events and faults that have occurred since the log was last reset and includes additional information, such as severity levels and error counts. The System Log also includes information on devices not reported in the Subsystem Summary screen. To access it, click the System Log link.

In this example, the hardware fault with DIMM 8 of CPU 0 requires local/physical access to the server.

5. Before going to the server, review the server *Product Notes* document for information related to the issue or the component.

The *Product Notes* document contains up-to-date information about the server, including hardware-related issues.

6. To prepare the server for service, see [“Preparing to Service the Server” on page 93](#).
7. Service the component.

Note - After servicing the component, you might need to clear the fault in Oracle ILOM. For more information, refer the component service procedure.

Troubleshooting and Diagnostic Information

The following table lists diagnostic and troubleshooting procedures and references that can help you resolve server issues.

Description	Link
Diagnostic information for the x86 servers, including procedures for performing runtime and firmware-based tests, using Oracle ILOM, and running U-Boot and Pc-Check to exercise the system and isolate subtle or intermittent hardware-related problems.	Server Diagnostics Guide: http://docs.oracle.com/cd/E23161_01/index.html
Administrative information for the Oracle Sun Server X-4 series servers, including information about how to use Oracle System Assistant and the Oracle ILOM system event log (SEL) to identify the source of a problem.	Server Administration Guide: Oracle X4 Series Servers Administration Guide
Information about the DIMM and processor test circuit.	“The Server Fault Remind Test Circuits ” on page 51
A listing of the power-on self test (POST) checkpoint code sequence.	“POST and Checkpoint Codes” on page 281

Troubleshooting the Front Panel Indicators

The eight indicators on the server front panel show the state of the server. For more information about the front panel indicator locations, see [“Server Front Panel Features” on page 20](#).

The following sections describe the conditions of the front panel indicators for various server states:

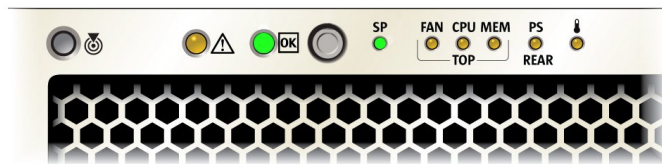
- [“Server Boot Process and Normal Operating State Indicators” on page 41](#)

- [“Locator Indicator On” on page 42](#)
- [“Over Temperature Condition” on page 42](#)
- [“PSU Failure” on page 43](#)
- [“Memory Failure” on page 43](#)
- [“CPU Failure” on page 44](#)
- [“Fan Module Failure” on page 44](#)
- [“SP Failure” on page 45](#)
- [“Front Panel Lamp Test” on page 45](#)

Server Boot Process and Normal Operating State Indicators

A normal server boot process involves two indicators, the service processor (SP) indicator and the system OK indicator. The process is described below:

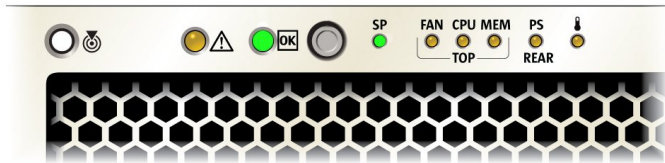
1. When the AC power is applied to the server, the service processor (SP) boots. While the SP boots its indicator blinks at the slow blink rate (for indicator blink rate information, see [“Indicator Blink Rates” on page 46](#)), and the system OK indicator is off steady.
2. When the SP has successfully booted, the SP indicator is on steady, and the system OK indicator blinks at the single blink rate. When the SP indicator is on steady and the system OK indicator is at the single blink rate, the server is in standby power mode (see [“Standby Power Mode” on page 108](#)).
3. When the server is booting (powered on), the system OK indicator blinks at the fast blink rate, and the SP indicator is on steady. When the server has successfully booted, the system OK indicator turns on steady. When the system OK indicator and the SP indicator are on steady, the server is in full power mode (see [“Full Power Mode” on page 108](#)).
4. For a server in a normal operating state, the green system OK indicator and the green SP indicator are on steady (no blink).



Locator Indicator On

When the Locator indicator is activated from Oracle ILOM or from the front panel (by pressing the Locate button), the indicator blinks at the fast blink rate. The indicator assists in finding a server within a rack of servers (for example, when activated remotely to correctly identify a server requiring service).

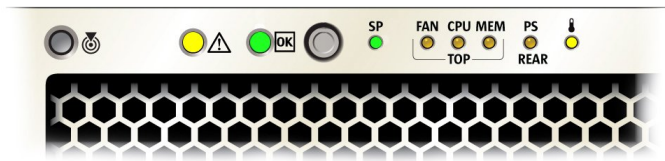
For indicator blink rate information, see [“Indicator Blink Rates” on page 46](#).



Over Temperature Condition

For a server in an over-temperature state, the amber Service Action Required and Temperature indicators are on steady. The green system OK indicator and the green SP indicator are on steady.

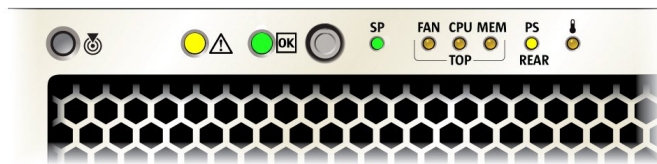
For indicator blink rate information, see [“Indicator Blink Rates” on page 46](#).



PSU Failure

For a server with one of its PSU's in a failed state, the amber Service Action Required and PS REAR indicators are on steady. The green system OK indicator and the green SP indicator are on steady.

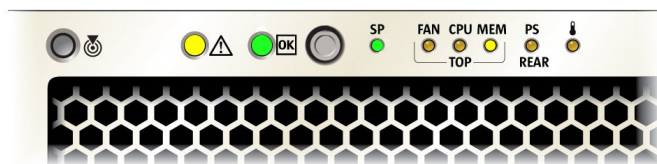
For indicator blink rate information, see [“Indicator Blink Rates” on page 46](#).



Memory Failure

For a server with a failure in the memory subsystem, the amber Service Action Required and MEM TOP indicators are on steady. The green system OK indicator and the green SP indicator are on steady.

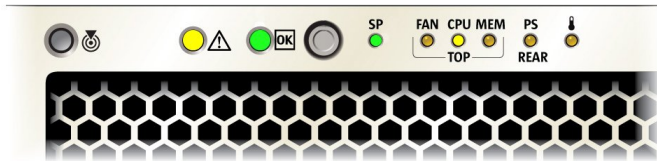
For indicator blink rate information, see [“Indicator Blink Rates” on page 46](#).



CPU Failure

For a server with a fault in the processor subsystem, the amber Service Action Required and CPU TOP indicators are on steady. The activity of green system OK indicator and the green SP indicator vary depending on whether the server can boot successfully. The server might not be able to boot out of standby power mode.

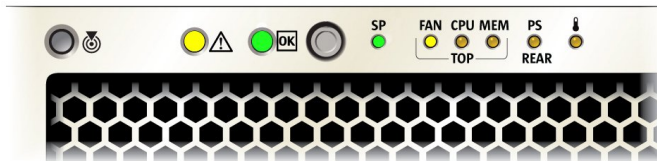
For indicator blink rate information, see [“Indicator Blink Rates” on page 46](#).



Fan Module Failure

For a server with a fan module fault, the amber Service Action Required and the FAN TOP indicators are on steady. The green system OK indicator and the green SP indicator are on steady.

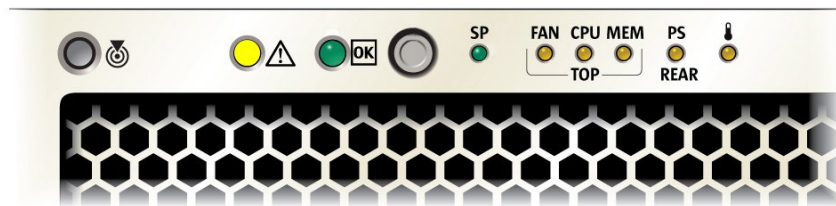
For indicator blink rate information, see [“Indicator Blink Rates” on page 46](#).



SP Failure

For a server with an SP fault, the amber Service Action Required indicator is on steady. The green system OK indicator and the green SP indicator are off.

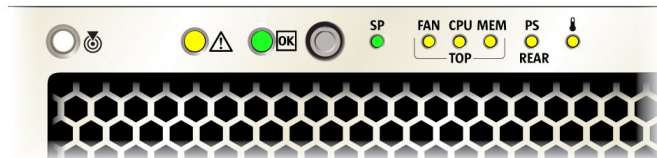
For indicator blink rate information, see [“Indicator Blink Rates” on page 46](#).



Front Panel Lamp Test

To perform a lamp test of all front panel indicators, press the Locate button three times within a five second period. All the indicators light up and remain on steady for 15 seconds (see [“Unison Steady On” on page 49](#)).

For indicator blink rate information, see [“Indicator Blink Rates” on page 46](#).



Indicator Blink Rates

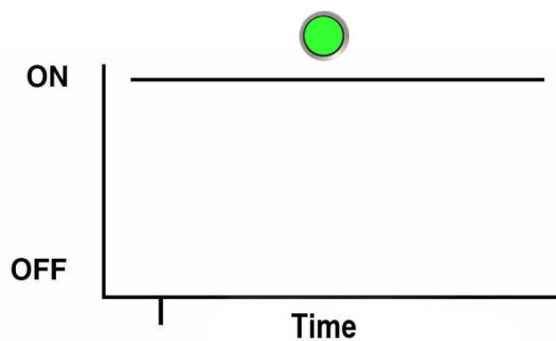
Note - The blink rate information described here might not apply to all server types (for example, blade or rack mount).

This section describes the following indicator blink rates:

- “Steady On” on page 46
- “Steady Off” on page 47
- “Slow Blink Rate” on page 47
- “Fast Blink Rate” on page 48
- “Single (Standby) Blink Rate” on page 48
- “Slow Unison Blink Rate” on page 49
- “Insertion Blink” on page 49
- “Unison Steady On” on page 49
- “Alternating (Invalid FRU) Blink Rate” on page 50
- “Feedback Flash” on page 51
- “Data Blink Rate” on page 51
- “Sequential (Diagnostic) Blink Rate” on page 51

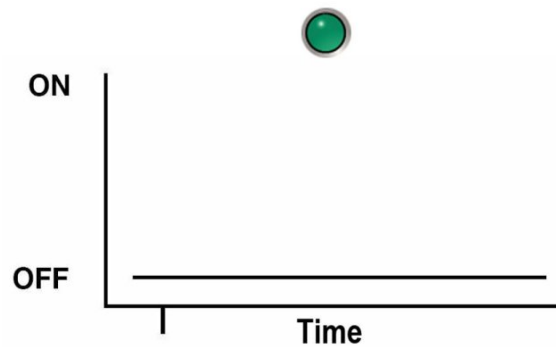
Steady On

For the steady on state, an indicator is continually on (lit) and does not blink. This indicates a continuing condition, for example, an operational state (green) or a Service Action Required fault state (amber).



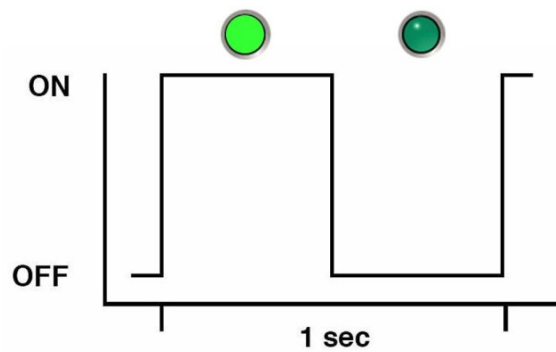
Steady Off

For the steady off state, an indicator is continually off (not lit) and does not blink. This indicates that a system is not operational, for example, no AC power (unlit green system OK indicator) or a subsystem not in a fault state (unlit amber Service Action Required indicator).



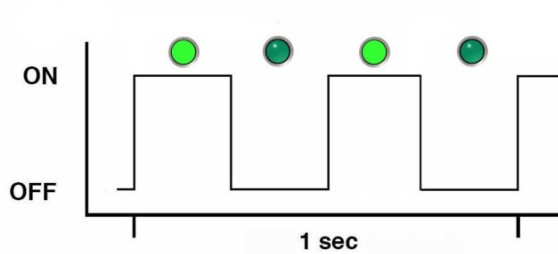
Slow Blink Rate

For the slow blink rate, the indicator (typically green) repeatedly lights for half a second during a one second interval (1 Hz) and turns off for half a second. The slow blink rate indicates an on-going activity. For example, the slow blink rate occurs when a device is rebuilding, booting, or in transition from one mode to another.



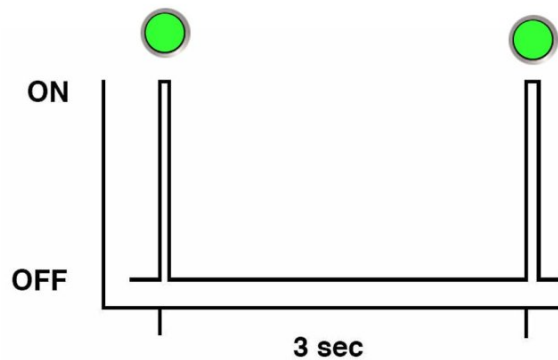
Fast Blink Rate

For the fast blink rate, the indicator repeatedly blinks twice (on, off, on) during a one second interval (2 Hz). The fast blink rate indicates activity or data transfer.



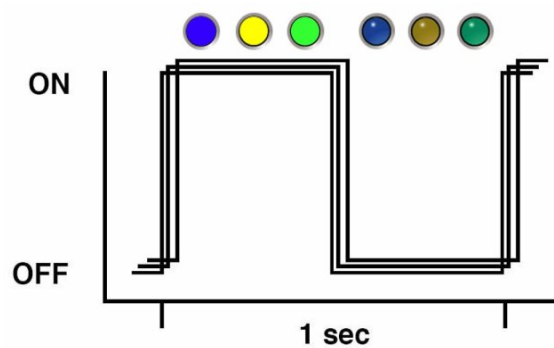
Single (Standby) Blink Rate

For the single blink rate, the indicator repeatedly flashes once at the beginning of a three second interval. This indicates a component or system in standby mode. For example, the single blink rate occurs when a server is in standby power mode or a when hot spare device is waiting to be used (also used with amber indicators to indicate a predicted fault).



Slow Unison Blink Rate

For the slow unison blink rate, the indicators on the component blink in unison for half a second during a one second interval (1 Hz). Typically, this is limited to three successive blinks. This confirms the successful insertion of a removable device (for example, a storage drive or blade) into a powered system (confirming the power connection).

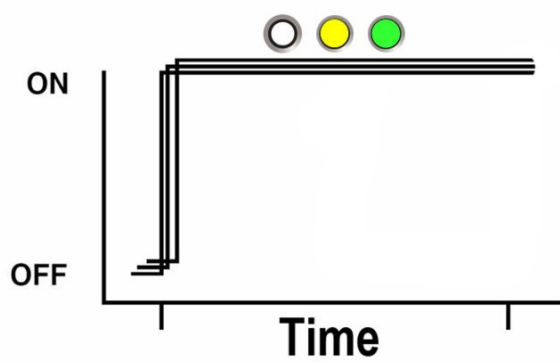


Insertion Blink

The insertion blink is three successive blinks of a hot-swap component's primary status indicator (for example, the green system OK indicator). The insertion blink occurs immediately after three successive unison blinks (see [“Slow Unison Blink Rate” on page 49](#)) of all the component indicators.

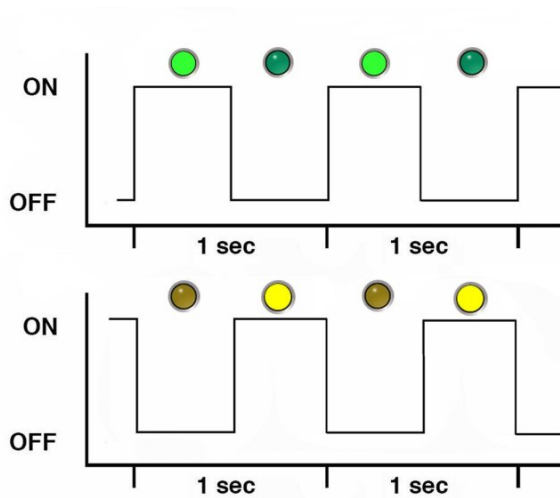
Unison Steady On

For the unison steady on, all indicators are simultaneously on steady (see [“Steady On” on page 46](#)). This occurs during the front panel lamp test (see [“Front Panel Lamp Test” on page 45](#)).



Alternating (Invalid FRU) Blink Rate

A repeating sequence of lit green and amber indicators at 1 Hz. Indicates that a component has an incorrect version or mismatch (for example, a power supply with a lower rating than the one specified). Also used for an unsupported component, a component in an unsupported slot, or a blade (server module) that causes a power supply to be oversubscribed for that system.



Feedback Flash

An indicator flashes on and off during periods of activity, commensurate with the activity, but flashing does not exceed the 2 Hz fast blink rate (see, “[Fast Blink Rate](#)” on page 48). For example, disk drive read and write activity and communication port transmit and receive activity.

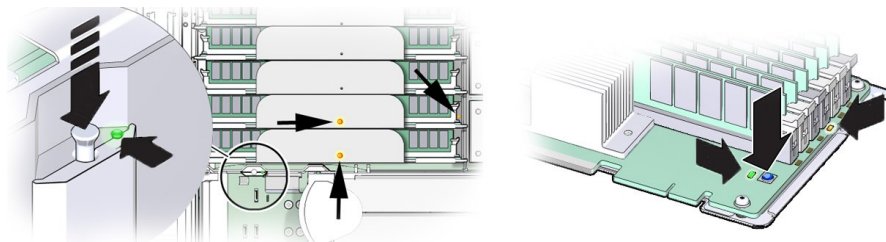
Data Blink Rate

An indicator that is normally on repeatedly turns off twice during a one-second interval (2 Hz—see also, “[Fast Blink Rate](#)” on page 48) while data activity is taking place.

Sequential (Diagnostic) Blink Rate

A repeating sequence in which each indicator successively lights for 0.5 sec each to indicate that diagnostics are running. This blink rate is used only on systems or components capable of running diagnostics (for example, blade servers).

The Server Fault Remind Test Circuits



The server has two internal test circuits, the System Fault Remind Circuit and the DIMM Fault Remind Circuit. The circuits help you locate failed components. For example, use the System Fault Remind Circuit to locate a failed CPU or memory riser card, and use the DIMM Fault Remind Circuit to locate a failed DIMM. Both circuits hold an electrical charge and have limited operational capabilities once power is removed from the server. For example, the DIMM Fault Remind Circuit is active for 10 minutes, and the System Fault Remind Circuit is active for 30 to 60 minutes.

For information about how to use the circuits to identify failed components, see [“Locate a Failed Memory Riser Card, DIMM, or CPU” on page 86](#).

Troubleshooting System Cooling Issues

Maintaining the proper internal operating temperature of the server is crucial to the health of the server. To prevent server shutdown and damage to components, address over temperature- and hardware-related issues as soon as they occur. If your server has a temperature-related fault, the cause of the problem might be one of the following:

- [“External Ambient Temperature Too High” on page 52](#)
- [“Airflow Blockage” on page 52](#)
- [“Internal Pressures Compromised” on page 53](#)
- [“Hardware Component Failure” on page 53](#)

External Ambient Temperature Too High

Server component cooling relies on the movement of cool ambient air pulled into the server from its external environment. If the ambient temperature of the server's external environment is too high, cooling does not occur, and the internal temperature of server and its components increases. This can cause poor server performance or a failure of one or more components.

Action: Check the ambient temperature of the server space against the environmental specifications for the server (see [“Server Specifications” on page 291](#)). If the temperature is not within the required operating range, remedy the situation immediately.

Prevention: Periodically check the ambient temperature of the server space to ensure that it is within the required range, especially if you have made any changes to the server space (for example, added additional servers). The temperature must be consistent and stable.

Airflow Blockage

The server cooling system uses fans to pull cool air in from the server front intake vents and exhaust warm air out the server back panel vents. If the front or back vents are blocked, the airflow through the server is disrupted and the cooling system fails to function properly causing the server internal temperature to rise.

Action: Inspect the server front and back panel vents for blockage from dust or debris. Additionally, inspect the server interior for improperly installed components or cables that can block the flow of air through the server.

Prevention: Periodically inspect and clean the server vents using a vacuum cleaner. Ensure that all components, such as cards, cable, fans, air baffles and dividers are properly installed. Never operate the server without the top cover installed.

Internal Pressures Compromised

The server has two main cooling area (see [“Cooling Subsystem” on page 28](#)). To function properly, these areas have separate pressures that are maintained using dividers, baffles, component filler panels, and the server top cover. These things need to be in place for the server to function as a sealed system. If the internal pressures are compromised, the server cooling system, which relies on the movement of cool air through the server, cannot function properly, and the airflow inside the server becomes chaotic and non-directional.

Action: Inspect the server interior to ensure that the air divider and air baffle ([“Two-CPU Configuration” on page 25](#)) are properly installed. Ensure that all external-facing slots (storage drive, DVD, PCIe) are occupied with either a component or a component filler panel. Ensure that the server top cover is in place and sits flat and snug on top of the server.

Prevention: When servicing the server, ensure that the divider and baffle are installed correctly and that the server has no unoccupied external-facing slots. Never operate the server without the top cover installed.

Hardware Component Failure

Components, such as power supplies and fan modules, are an integral part of the server cooling system. When one of these components fails, the server internal temperature can rise. This rise in temperature can cause other components to enter into an over temperature state. Additionally, some components, such as processors, might overheat when they are failing, which can also generate an over-temperature event.

Action: Investigate the cause of the over-temperature event, and replace failed components *immediately*. For hardware troubleshooting information, see [“Troubleshooting Server Hardware Faults” on page 36](#).

Prevention: Component redundancy is provided to allow for component failure in critical subsystems, such as the cooling subsystem. However, once a component in a redundant

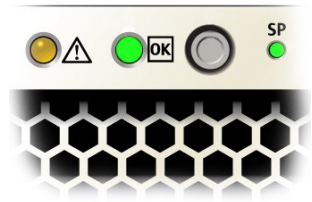
system fails, the redundancy no longer exists, and the risk for server shutdown and component failures increases. Therefore, it is important to maintain redundant systems and replace failed components *immediately*.

Troubleshooting Power Issues

If your server does not power on, the cause of the problem might be one of the following:

- [“AC Power Connection” on page 54](#)
- [“Power Supplies \(PSUs\)” on page 55](#)
- [“Top Cover” on page 56](#)

AC Power Connection

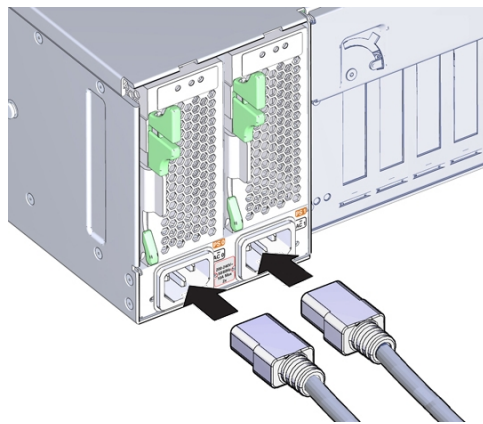


The AC power cords are the direct connection between the server power supplies and the power sources. The server power supplies need separate stable AC circuits. Insufficient voltage levels or fluctuations in power can cause server power problems. The power supplies are designed to operate at a particular voltage and within an acceptable range of voltage fluctuations (see [Server Specifications](#)). A four-CPU configured server needs to operate at 200-240 VAC, while a two-CPU configured server can operate at either 100-127 VAC or 200-240 VAC. For more information about the processor subsystem, see [“Processor Subsystem” on page 25](#).

Action: Check that both AC power cords are connected to the server and check that the correct power is present at the outlets . If necessary, monitor the power to verify that it is within the acceptable range. You can verify proper connection and operation of a power supply by checking its indicator panel. Lit green AC OK and DC OK indicators show a properly functioning PSU. An amber AC OK indicator indicates that the AC power to the PSU is insufficient.

Prevention: Use the AC power cord retaining clips and position the cords to minimize the risk of accidental disconnection. Ensure that the AC circuits that supply power to the server are stable and not overburdened.

Power Supplies (PSUs)

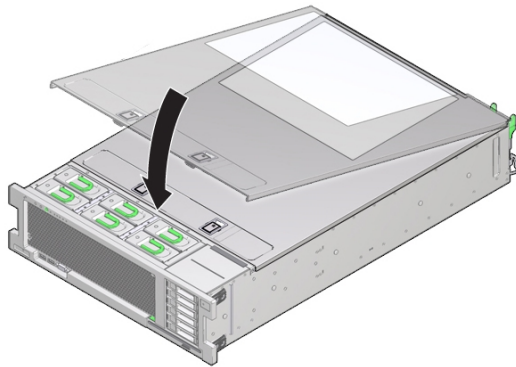


The server power supplies (PSUs) provide the necessary server voltages from the AC power outlets. If the PSUs are inoperable, unplugged, or disengaged from the internal connectors, the server cannot power on.

Action: Check that the AC cables are connected to both PSUs and that the PSUs are operational (the PSU indicator panel should have a lit green AC OK indicator). If not, ensure that the PSU is properly installed. A PSU that is not fully engaged with its internal connector does not have power applied and does not have a lit green AC OK indicator.

Prevention: When a power supply fails, replace it immediately. To ensure redundancy, the server has two PSUs. This redundant configuration prevents server downtime, or an unexpected shutdown, due to a failed PSU. The redundancy allows the server to continue to operate if one of the PSUs fails. However, when a server is being powered by a single PSU, the redundancy no longer exists, and the risk for downtime or an unexpected shutdown increases. When installing a power supply, ensure that it is fully seated and engaged with its connector inside the drive bay. A properly installed PSU has a lit green AC OK indicator.

Top Cover



The server top cover is an important component for a properly functioning server. The top cover is vital to the server cooling subsystem because it helps to maintain the pressure areas within the server. The top cover also protects against damage to internal components and accidental exposure to hazardous voltages. For these reasons, the server top cover is interlocked to the server power. The interlock is created by a switch. The switch has two components; one component is mounted inside the server on the housing for power supply, PS1, and the other component is mounted on the underside of the top cover. When the cover is installed on the server, these two components align, the switch closes, and power flows to the server. When the cover is removed, the switch opens, breaking the flow of power. If the cover is removed while the server is powered on to full power mode, power to the server is *immediately* switched off.

Action: If the server does not power on, check that switch is intact and properly aligned. Ensure that the server top cover is in place and sits flat and snug on top of the server. Ensure that the interlock switch components have not been damaged, removed, or misaligned.

Prevention: After removing the top cover, take care that the cover doesn't get bent, or that the component on the underside is not damaged. When servicing the server, take care that the internally mounted interlock switch component doesn't get damaged or misaligned. Never operate the server without the top cover installed.

Troubleshooting With Diagnostic Tools

The server and its accompanying software and firmware contain diagnostic tools and features that can help you isolate component problems, monitor the status of a functioning system, and exercise one or more subsystems to disclose more subtle or intermittent hardware-related problems.

Each diagnostic tool has its own specific strength and application. Review the tools listed in this section and determine which tool might be best to use for your situation. Once you've determined the tool to use, you can access it locally (while at the server) or remotely.

- [“Diagnostic Tools” on page 57](#)
- [“Diagnostic Tool Documentation” on page 58](#)

Diagnostic Tools

The selection of diagnostic tools available for your server range in complexity from a comprehensive validation test suite (Oracle VTS) to a chronological event log (Oracle ILOM System Log). The selection of diagnostic tools also include standalone software packages, firmware-based tests, and hardware-based LED indicators.

The following table summarizes the diagnostic tools that you can use when troubleshooting or monitoring your server.

Diagnostic Type Tool		What It Does	Accessibility	Remote Capability
Oracle ILOM	SP firmware	Monitors environmental conditions and component functionality sensors, generates alerts, performs fault isolation, and provides remote access.	Can function on either standby power mode or full power mode and is not OS dependent.	Designed for remote and local access.
Preboot Menu	SP firmware	Enables you to restore some Oracle ILOM default settings when Oracle ILOM is not accessible.	Can function on standby power and when operating system is not running.	Local, but remote serial access is possible if the SP serial port is connected to a network-accessible terminal server.
Hardware-based LED indicators	Hardware and SP firmware	Indicates status of overall system and particular components.	Available when system power is available.	Local, but sensor and indicators are accessible from Oracle ILOM web interface or command-line interface (CLI).

Diagnostic Tool	Type	What It Does	Accessibility	Remote Capability
Power-on Self-Test (POST)	Host firmware	Tests core components of system: CPUs, memory, and motherboard I/O bridge integrated circuits.	Runs on startup. Available when the operating system is not running.	Local, but can be accessed through Oracle ILOM Remote Console.
U-Boot	SP firmware	Initializes and tests aspects of the service processor (SP) prior to booting Oracle ILOM and the operating system. Tests SP memory, SP, network devices and I/O devices.	Can function on standby power and when operating system is not running.	Local, but remote serial access is possible if the SP serial port is connected to a network-accessible terminal server.
UEFI Diagnostics	System BIOS	The UEFI diagnostics can test and detect problems on all CPU, memory, disk drives, and network ports. It is used on systems that support UEFI.	You can use either the Oracle ILOM web interface or the command-line interface (CLI) to run UEFI diagnostics..	Remote access through Oracle ILOM Remote Console.
Oracle Solaris commands	Operating system software	Displays various kinds of system information.	Requires operating system.	Local, and over network.
Oracle Linux commands	Operating system software	Displays various kinds of system information.	Requires operating system.	Local, and over network.
Oracle VTS	Diagnostic tool standalone software	Exercises and stresses the system, running tests in parallel.	Requires operating system. Install Oracle VTS software separately.	View and control over network.

Diagnostic Tool Documentation

The following table identifies where you can find more information about diagnostic tools.

Diagnostic Tool	Information	Location
Oracle ILOM	Oracle Integrated Lights Out Manager 3.2 Documentation Library	http://www.oracle.com/goto/ILOM/docs
Preboot Menu	<i>Oracle x86 Servers Diagnostics Guide</i>	http://www.oracle.com/goto/x86AdminDiag/docs
System indicators and sensors	<i>Sun Server X4-4 Service Manual</i>	“Troubleshooting the Front Panel Indicators” on page 40
POST	POST codes and BIOS information	“BIOS Setup Utility Menu Options” on page 243

Diagnostic Tool	Information	Location
U-Boot	<i>Oracle x86 Servers Diagnostics Guide</i>	http://www.oracle.com/goto/x86AdminDiag/docs
or		
UEFI Diags		
Oracle VTS	Oracle VTS software and documentation	http://docs.oracle.com/cd/E19719-01/index.html

Attaching Devices to the Server

The following sections contain procedural information for attaching devices to the server: so you can access diagnostic tools when troubleshooting and servicing the server:

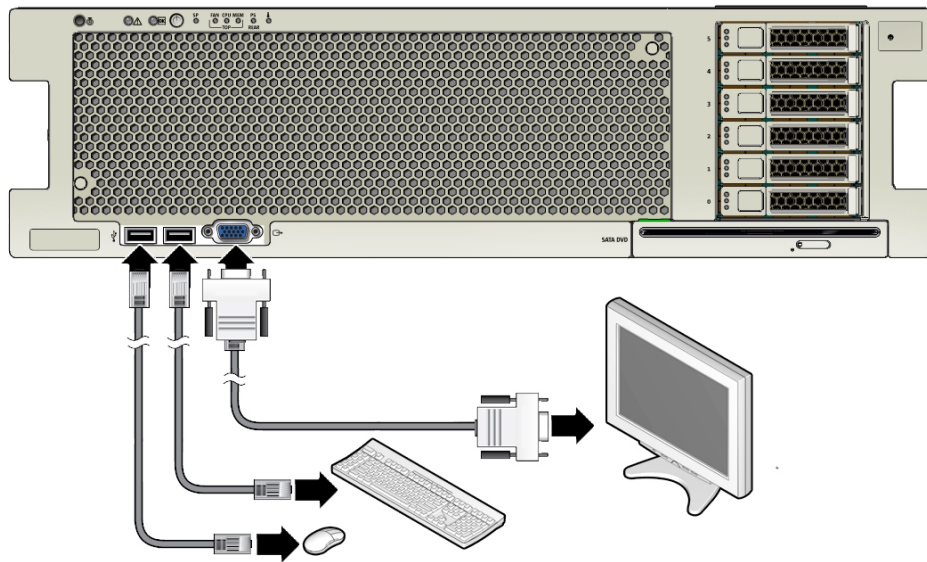
- [“Attach Devices to the Server” on page 59](#)
- [“Back Panel Connector Locations” on page 60](#)
- [“Configuring Serial Port Sharing” on page 61](#)
- [“Ethernet Port Boot Order and Device Naming” on page 63](#)
- [“Back Panel Pinhole Switches” on page 65](#)

▼ Attach Devices to the Server

This section provides information about connecting devices to server (remotely and locally), so you can interact with the service processor (SP) and the server console.

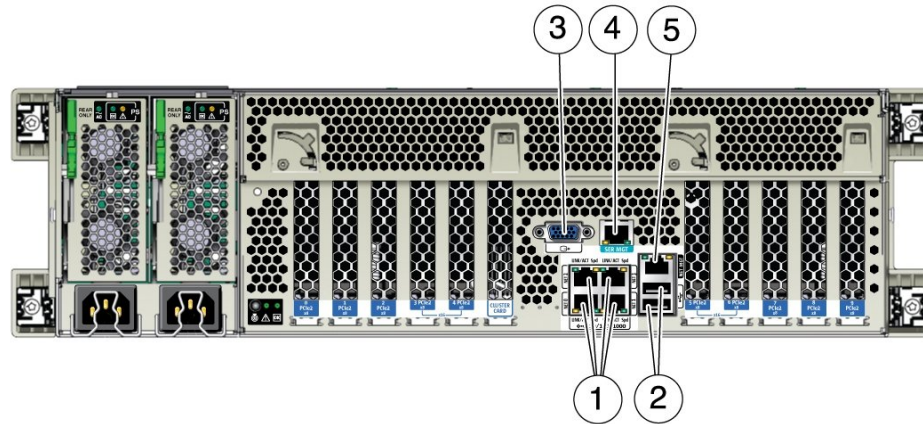
1. **Connect an Ethernet cable to the Gigabit Ethernet (NET) connectors. See [“Back Panel Connector Locations” on page 60](#).**
2. **To connect to the service processor's Oracle ILOM over the network, connect an Ethernet cable to the Ethernet port labeled NET MGT. See [“Back Panel Connector Locations” on page 60](#).**
3. **To access the Oracle ILOM command-line interface (CLI) locally using the management port, connect a serial null modem cable to the RJ-45 serial port labeled SER MGT. See [“Back Panel Connector Locations” on page 60](#).**

4. To interact with the system console locally, connect a mouse and keyboard to the server front panel USB connectors and a monitor to the server front panel DB-15 video connector (as shown in the illustration below).



Back Panel Connector Locations

The following illustration shows and describes the locations of the back panel connectors. Use this information to set up the server, so you can access diagnostic tools and manage the server during service.



Call Out	Description
1	10 Gigabit Ethernet ports NET-0, 1, 2, 3 [†]
2	USB 2.0 ports
3	DB-15 video connector
4	Serial management (SER MGT)/RJ-45 serial port
5	1 Gigabit Ethernet Service processor (SP) network management (NET MGT) port

[†]For OS port naming information, see [“Ethernet Port Boot Order and Device Naming”](#) on page 63.

Configuring Serial Port Sharing

By default, the service processor (SP) console (NET MGT) port sends serial port output from the server. Using Oracle ILOM, you can specify that the host console (COM1) be assigned as owner of the server serial port output. This feature is useful for Windows kernel debugging, as it enables you to view non-ASCII character traffic from the host console.

You can assign serial port output using either the Oracle ILOM web interface or the command-line interface (CLI). For instructions, see the following sections:

- [“Assign Serial Port Output Using the CLI”](#) on page 62
- [“Assign Serial Port Output Using the Web Interface”](#) on page 62

▼ Assign Serial Port Output Using the CLI

Before You Begin Set up the network on the SP before attempting to change the serial port owner to the host server. If the network is not set up, and you switch the serial port owner to the host server, you will be unable to connect using the CLI or web interface to change the serial port owner back to the SP.

To return the serial port owner setting to the SP, you need to restore access to the serial port on the server. For more details about restoring access to the server port on your server, see the Oracle Integrated Lights Out Manager (ILOM) 3.2 Documentation Library at: <http://www.oracle.com/goto/ILOM/docs>.

1. Open an SSH session and at the command line log in to the SP Oracle ILOM CLI.

Log in as a user with root or administrator privileges. For example:

```
ssh root@ipaddress
```

where *ipaddress* is the IP address of the server SP.

For more information, see [Oracle X4 Series Servers Administration Guide](#).

The Oracle ILOM CLI prompt appears:

```
->
```

2. To set the serial port owner, type:

```
-> set /SP/serial/portsharing owner=host
```

Note - The serial port sharing value by default is owner=SP.

3. Connect a serial host to the server.

▼ Assign Serial Port Output Using the Web Interface

Before You Begin Set up the network on the SP before attempting to change the serial port owner to the host server. If the network is not set up, and you switch the serial port owner to the host server, you will be unable to connect using the CLI or web interface to change the serial port owner back to the SP.

To return the serial port owner setting to the SP, you need to restore access to the serial port on the server. For more details about restoring access to the server port on your server, see the Oracle Integrated Lights Out Manager (ILOM) 3.2 Documentation Library at: <http://www.oracle.com/goto/ILOM/docs>.

1. Log in to the service processor Oracle ILOM web interface.

To log in, open a web browser and direct it using the IP address of the server SP. Log in as root or a user with administrator privileges. See [Oracle X4 Series Servers Administration Guide](#) .

The Summary screen appears.

2. In the ILOM web interface, select ILOM Administration --> Connectivity from the navigation menu on the left side of the screen.

3. Select the Serial Port tab.

The Serial Port Settings page appears.

Note - The serial port sharing setting by default is Service Processor.

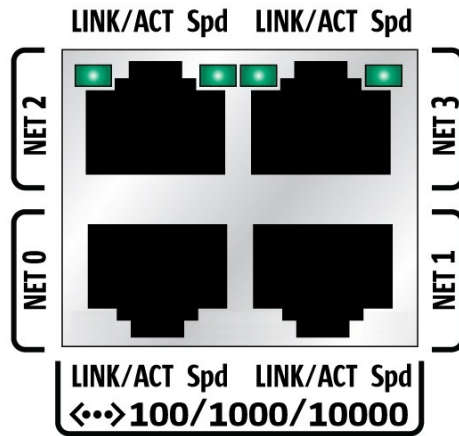
4. In the Serial Port Settings page, select Host Server as the serial port owner.

5. Click save for the changes to take effect.

6. Connect a serial host to the server.

Ethernet Port Boot Order and Device Naming

This section contains information about the boot order and device naming for the four 10 GigabitEthernet ports on the back panel of the server (see [“Back Panel Connector Locations” on page 60](#)). From left to right, the two bottom ports are NET 0 and NET 1; the two top ports are NET2 and NET 3, as shown in the following illustration.



Ethernet Port Boot Order

The order in which the BIOS detects the Ethernet ports during server boot is listed below.

1. NET 0
2. NET 1
3. NET 2
4. NET 3

Note - You can change the boot priority using the Boot Device Priority screen available in the Boot menu of the BIOS Setup Utility.

Ethernet Port Device Naming

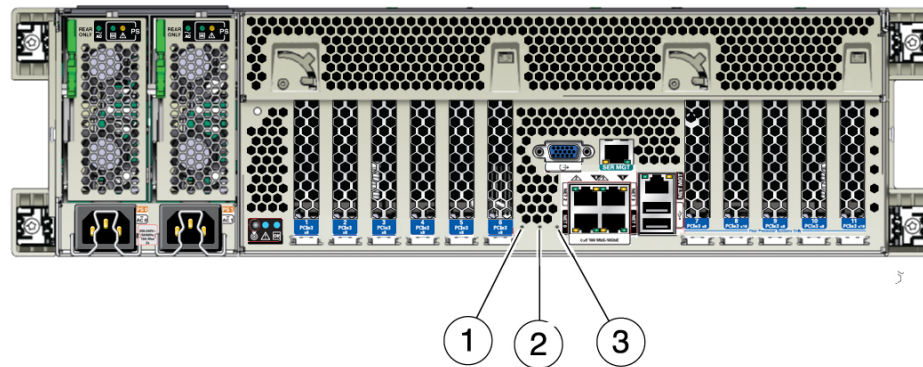
Note - Naming used by the interfaces might vary from that listed below, depending on which devices are installed in the system.

The device naming for the Ethernet interfaces is reported differently by different interfaces and operating systems. The following illustration explains the logical (operating system) and physical (BIOS) naming conventions used for each interface. These naming conventions might vary depending on conventions of your operating system and which devices are installed in the server.

Port	BIOS	Solaris	Linux	Windows
Net 3	8101	igb 3	eth 3	net 4
Net 2	8100	igb 2	eth 2	net3
Net 1	0701	igb 1	eth 1	net2
Net 0	0700	igb 0	eth 0	net

Back Panel Pinhole Switches

This section shows the location of the back panel pinhole switches.



Call Out	Description
1	SP Reset
2	Host Warm Reset
3	NMI (Oracle Service use only)

Getting Help

The following sections describe how to get additional help to resolve server-related problems.

- [“Contacting Support” on page 66](#)
- [“Locating the Chassis Serial Number” on page 66](#)

Contacting Support

If the troubleshooting procedures in this chapter fail to solve your problem, use the following table to collect information that you might need to communicate to support personnel.

System Configuration Information Needed	Your Information
Service contract number	
System model	
Operating environment	
System serial number	
Peripherals attached to the system	
Email address and phone number for you and a secondary contact	
Street address where the system is located	
Superuser password	
Summary of the problem and the work being done when the problem occurred	
Other Useful Information	
IP address	
Server name (system host name)	
Network or internet domain name	
Proxy server configuration	

See Also:

- [“Locating the Chassis Serial Number” on page 66](#)

Locating the Chassis Serial Number

You might need to have your server serial number when you ask for service on your system. Record this number for future use. Use one of the following methods to locate your server serial number:

- On the front panel of the server, look at the bottom left of the bezel to locate the server serial number.
- Locate the yellow Customer Information Sheet (CIS) attached to your server packaging. This sheet includes the serial number.
- From Oracle ILOM:
 - From the Oracle ILOM command-line interface (CLI), type the command: `show/SYS`.
 - From the Oracle ILOM web interface, view the serial number in the System Information tab.
- From Oracle System Assistant, view the serial number in the System Overview (home screen).

Servicing the Server

This section includes information about servicing the replaceable components in the server, including serviceability issues, location of the components, component filler panels, and required tools. The following table describes the contents of this section.

Description	Link
Component information, including component location, serviceability, and system designations	“Component Serviceability, Locations, and Designations” on page 69
Procedural information for setting up an ESD-safe work space.	“Performing Electrostatic Discharge and Static Prevention Measures” on page 79
Recommended and required tools for servicing the server.	“Tools and Equipment” on page 81
Information about component filler panels.	“Component Filler Panels” on page 81
Procedural information for using the fault remind test circuits.	“Locating a Failed Memory Riser Card, DIMM, or CPU” on page 82
Procedural information about clearing hardware faults in Oracle ILOM.	“Clear Hardware Fault Messages” on page 90

Component Serviceability, Locations, and Designations

This section contains information about component service designations, serviceability, and locations.

- [“Component Serviceability” on page 70](#)
- [“Location of Replaceable Components” on page 70](#)
- [“Component Designations” on page 73](#)

Component Serviceability

The replaceable components in your server are designated as either a customer-replaceable unit (CRU) or a field-replaceable unit (FRU). A part designated as a FRU must be replaced by an Oracle-qualified service technician. A part designated as a CRU can be replaced by a person who is not an Oracle-qualified service technician.

If the component can be serviced while the server is powered on, it is called a hot-service component. If the server has to be powered off before the component can be serviced, it is called a cold-service component.

The following table lists the components, their service designations, and their serviceability.

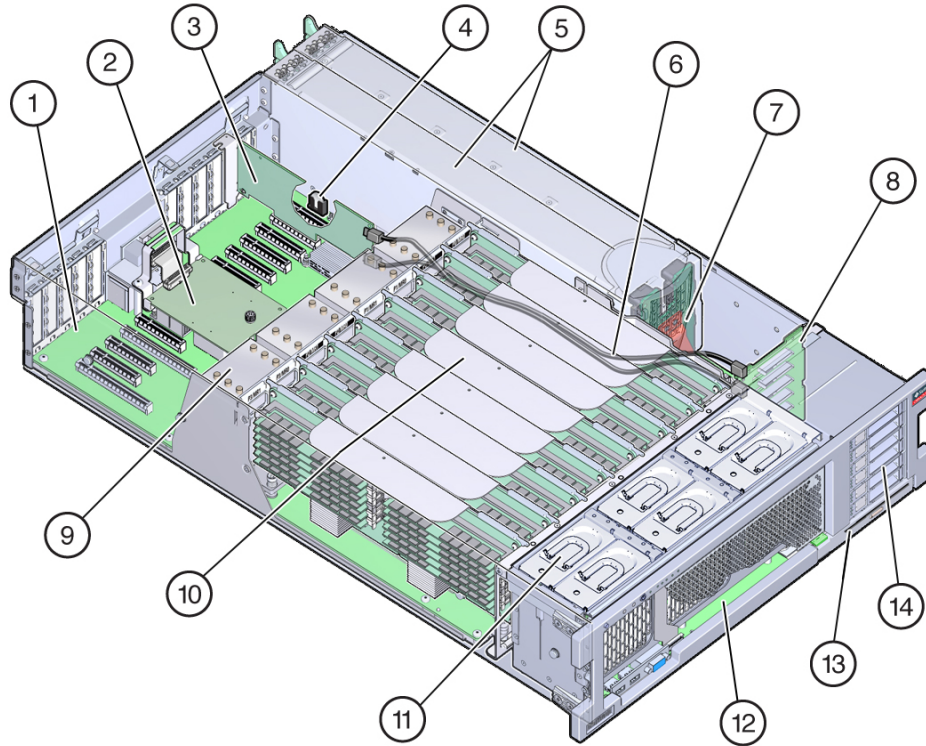
Component	Service Designation	Serviceability
Storage drives	CRU	Hot
Fan modules	CRU	Hot
Power supplies	CRU	Hot
Memory risers and DIMMs	CRU	Cold
PCIe cards	CRU	Cold
DVD drive	CRU	Cold
System battery	CRU	Cold
CPUs and heatsinks	FRU	Cold
Fan board	FRU	Cold
Power supply backplane	FRU	Cold
Storage drive backplane	FRU	Cold
HBA cable (HBA-to-disk backplane)	FRU	Cold
SP card	FRU	Cold
Motherboard	FRU	Cold

Location of Replaceable Components

The following illustrations show the Sun Server X4-4 components:

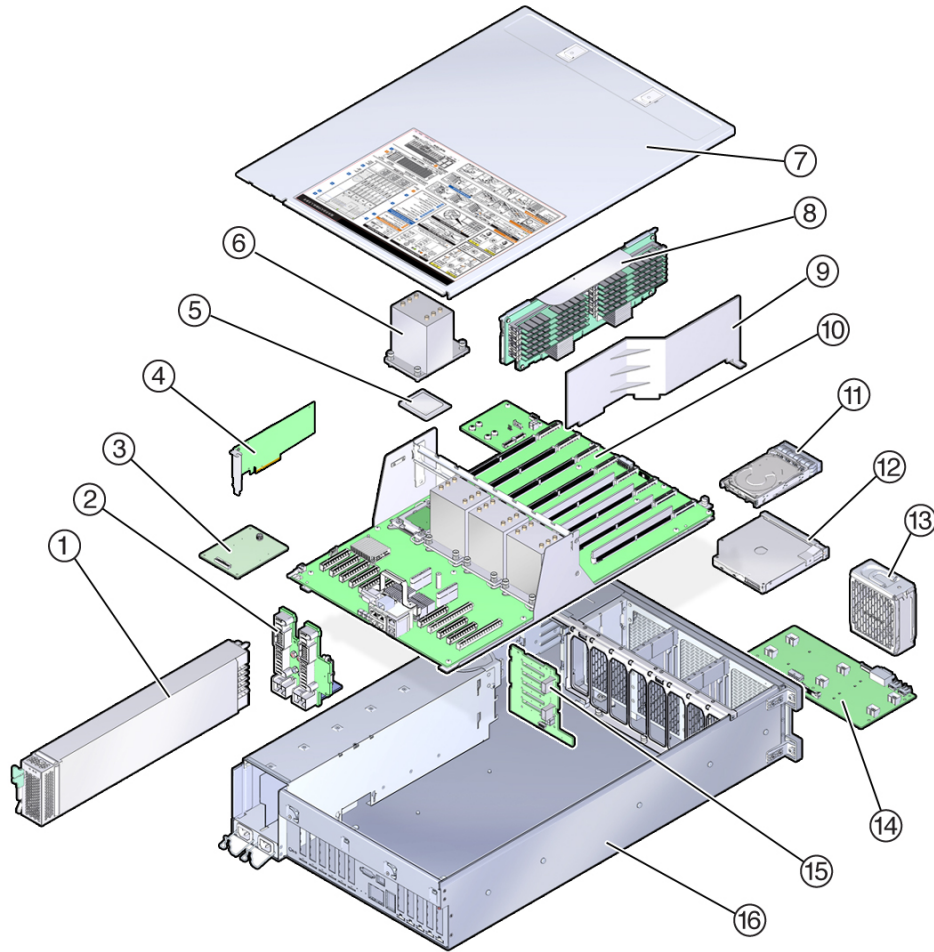
- [“Replaceable Components” on page 71](#)
- [“Components \(Exploded View\)” on page 72](#)

Replaceable Components



Call Out	Description	Call Out	Description
1	Motherboard	8	Storage drive backplane board
2	SP card	9	Heatsinks and CPUs (2 or 4)
3	HBA card	10	Memory riser cards (4 or 8)
4	System battery (CR 2032)	11	Fan modules
5	Power supplies	12	Fan board
6	HBA cable	13	DVD Drive
7	Power supply backplane board	14	Storage drive slots (6)

Components (Exploded View)



Call Out	Description	Call Out	Description
1	Power supplies	9	Air baffle (2-CPU configuration only)
2	Power supply backplane board	10	Motherboard
3	SP card	11	Storage drive
4	HBA/PCIe cards	12	DVD drive
5	CPU	13	Fan module

Call Out	Description	Call Out	Description
6	Heatsink	14	Fan board
7	Cover	15	Storage drive backplane board
8	Memory riser card	16	Server chassis

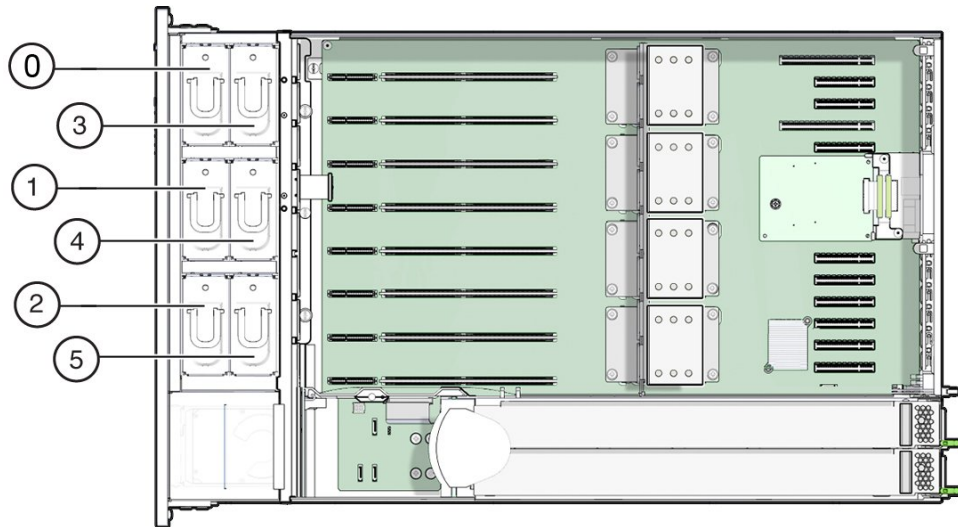
Component Designations

This section shows the slot naming designations for internal and external slots:

- [“Fan Module Slot Designations” on page 73](#)
- [“CPUs and Memory Riser Card Slots Designations” on page 74](#)
- [“DIMM Slot Designations” on page 75](#)
- [“Power Supply Designations” on page 76](#)
- [“PCIe Slot Designations” on page 77](#)
- [“DVD, Storage Drive, and USB Designations” on page 78](#)

Fan Module Slot Designations

The six fan module slots are at the front of the server and are set in two rows of three slots. The slots are designated from left to right. As pictured in the illustration below, the three front row slots are designated as: FM0, FM1, and FM2. The three back row slots are: FM3, FM4, and FM5.



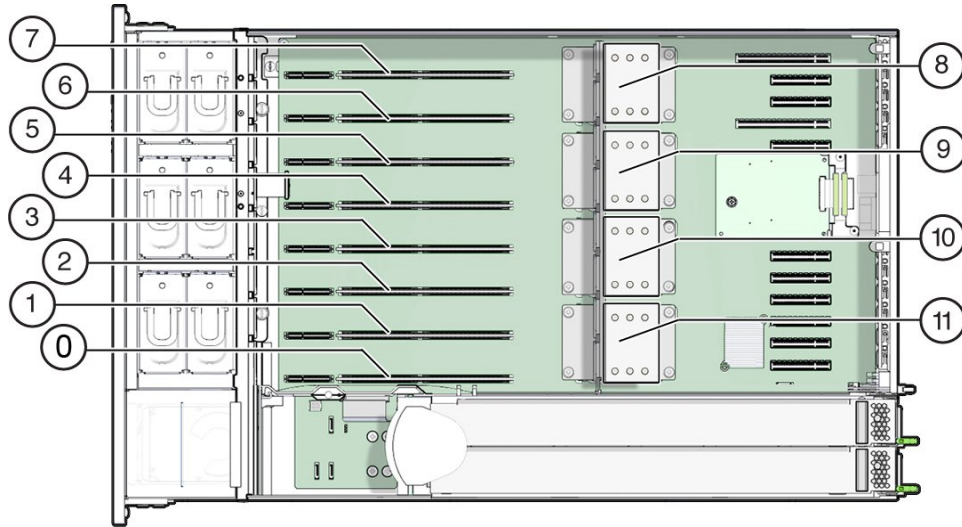
Call Out	Description	Call Out	Description
0	Fan Module, FM 0	3	Fan Module, FM 3
1	Fan Module, FM 1	4	Fan Module, FM 4
2	Fan Module, FM 2	5	Fan Module, FM 5

CPUs and Memory Riser Card Slots Designations

The four CPU sockets are located in the middle of the server and are designated consecutively from right to left (from the front of the server). The rightmost socket is CPU-0 and is designated as P0, and the leftmost socket is CPU-3, designated as P3.

The eight memory riser (MR) card slots are located between the fan module slots and the CPU sockets. Consecutively from right to left, the rightmost slot is slot 0, and the leftmost slot is slot 7.

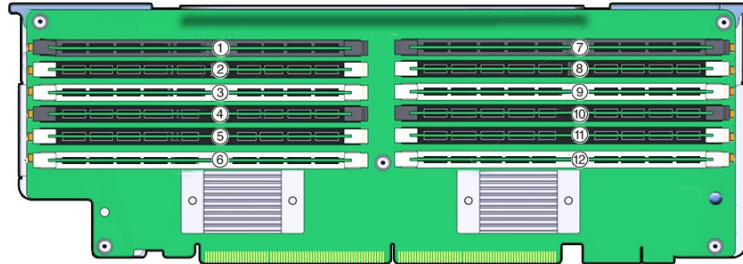
The slots are also designated by their association with the four CPU sockets (P0-P3). Two slots are assigned to each CPU socket. For example, slots 0 and 1 are paired with CPU socket, P0, and are designated as P0/MR0 and P0/MR1. Slots 2 and 3 are paired with CPU socket, P1 and are designated as P1/MR0 and P1/MR1. This numbering pattern continues for the remaining slots.



Call Out	Description	Call Out	Description
0	MR card slot 0, P0/MR0	6	MR card slot 6, P3/MR0
1	MR card slot 1, P0/MR1	7	MR card slot 7, P3/MR1
2	MR card slot 2, P1/MR0	8	CPU-3 (P3)
3	MR card slot 3, P1/MR1	9	CPU-2 (P2)
4	MR card slot 4, P2/MR0	10	CPU-1 (P1)
5	MR card slot 5, P2/MR1	11	CPU-0 (P0)

DIMM Slot Designations

The DIMM slots are located on the memory riser cards. The DIMMs are arranged in two banks of six slots for a total of 12 slots. The slots are designated numerically from top to bottom. The left bank of slots are designated as D0–D6. The right bank of slots are designated as D7–D11.



Call Out	Description	Call Out	Description
1	Slot D0	7	Slot D6
2	Slot D1	8	Slot D7
3	Slot D2	9	Slot D8
4	Slot D3	10	Slot D9
5	Slot D4	11	Slot D10
6	Slot D5	12	Slot D11

Power Supply Designations

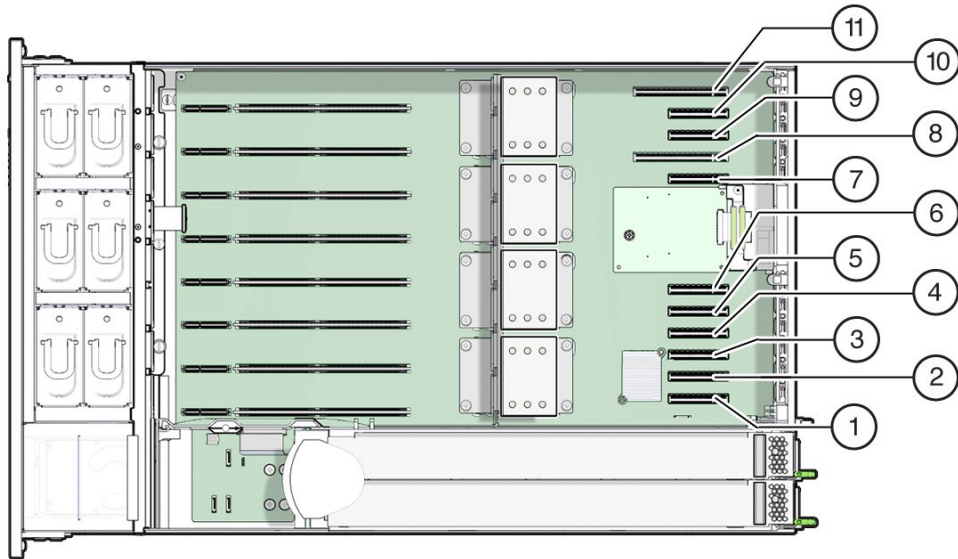
The two power supply slots are located on the right side of the server (from the front of the server) and are designated from right to left. The slots are accessible from the back of the server. From the back of the server, the left slot is designated as PS-0, and the right slot is PS-1.



Call Out	Description	Call Out	Description
1	PS 1	2	PS 0

PCIe Slot Designations

The eleven PCIe slots are located inside the server at the back. As viewed from the front of the server, the slots are divided into two groups, a group of six on the right of the SP card and a group of five on the left of the SP card. The slots are designated from right to left. The six slots on the right side are designated as PCI-1 to PCI-6. The five slots on the left are designated as PCI-7 to PCI-11.



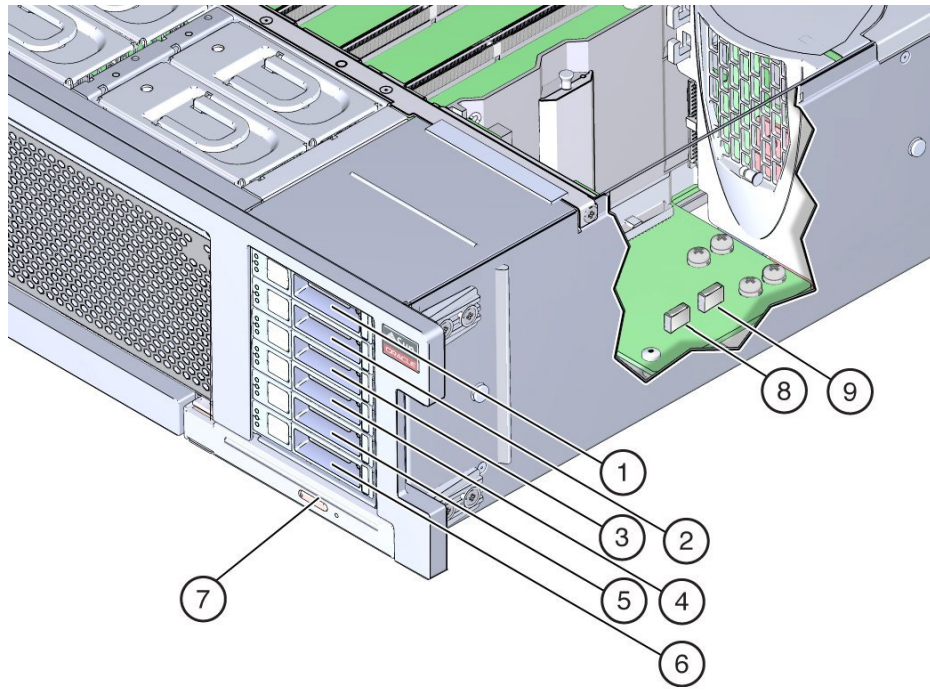
Call Out	Description	Call Out	Description
1	PCIe 1	7	PCIe 7
2	PCIe 2	8	PCIe 8
3	PCIe 3	9	PCIe 9
4	PCIe 4	10	PCIe 10
5	PCIe 5	11	PCIe 11
6	PCIe 6		

DVD, Storage Drive, and USB Designations

The DVD drive is located at the right lower front side of the front of the server.

The six storage drive slots are on the right side of the server and are designated consecutively from bottom to top. The bottommost slot is designated as HDD-0, and the topmost slot is HDD-5.

The two internal USB slots are located between the disk backplane board and the power supply backplane board. The front slot is used for the optional Oracle System Assistant USB stick and is marked "OSA USB".



Call Out	Description	Call Out	Description
1	HDD5	6	HDD0
2	HDD4	7	DVD
3	HDD3	8	OSA USB port
4	HDD2	9	USB port
5	HDD1		

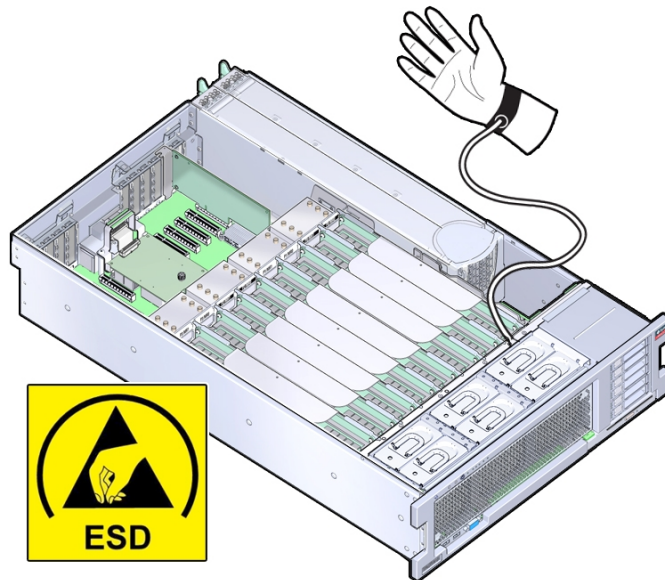
Performing Electrostatic Discharge and Static Prevention Measures

Electrostatic discharge (ESD) sensitive devices, such as the PCIe cards, hard drives, CPUs, and memory cards, require special handling.

Using an Anti-static Wrist Strap

Wear an anti-static wrist strap when handling components such as disk drive assemblies, circuit boards, or PCIe cards. When servicing or removing server components, attach an anti-static strap to your wrist and then to a metal area on the server chassis. Following this practice equalizes the electrical potentials between you and the server.

Note - An anti-static wrist strap is not shipped with the servers. However, anti-static wrist straps are included with customer-replaceable units (CRUs), field-replaceable units (FRUs), and optional components.



Using an Anti-Static Mat

In addition to wearing an anti-static wrist strap when handling components, create an ESD-free work place by using an anti-static mat as a work surface and as a place to set ESD-sensitive components such as printed circuit boards, DIMMs, and CPUs. You can use the following items as anti-static mats:

- Anti-static bag used to wrap a replacement part
- ESD mat (orderable from Oracle)
- A disposable ESD mat (shipped with some optional system components)

Tools and Equipment

To service the system, you need the following tools:

- No. 2 Phillips screwdriver
- Anti-static wrist strap
- ESD mat and grounding strap

You might also need a system console device, such as one of the following:

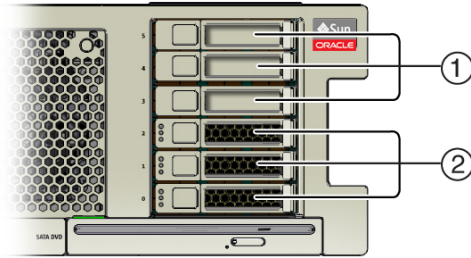
- PC or workstation with RS-232 serial port
- ASCII terminal
- Terminal server
- Patch panel connected to a terminal server

Component Filler Panels

Your server might be shipped with module-replacement filler panels for CPUs, storage drives (HDD or SSD), the DVD drive, and the PCIe cards. A filler panel is an empty metal or plastic enclosure that does not contain any functioning system hardware or cable connectors.

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

The following illustration shows the storage drives and storage drive filler panels installed in the server.



Legend

1	Storage drive filler panels	2	Storage drives
---	-----------------------------	---	----------------

Locating a Failed Memory Riser Card, DIMM, or CPU

The following sections provide information about using the system and DIMM Fault Remind test circuits:

- [“System Fault Remind Circuit Components” on page 82](#)
- [“DIMM Fault Remind Circuit Components” on page 85](#)
- [“Locate a Failed Memory Riser Card, DIMM, or CPU” on page 86](#)

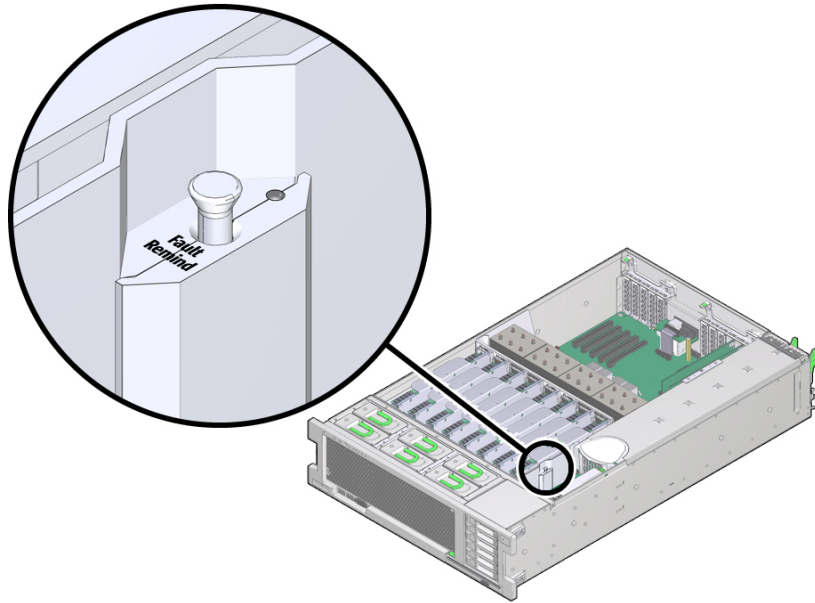
System Fault Remind Circuit Components

The following sections show the locations of the system Fault Remind circuit components:

- [“System Fault Remind Button and Charge Status Indicator” on page 82](#)
- [“Memory Riser Card and CPU Fault Indicators” on page 83](#)
- [“CPU Fault Indicators” on page 84](#)

System Fault Remind Button and Charge Status Indicator

The Fault Remind Button is located on the divider between the cooling zone 1 and cooling zone 2. The Charge Status Indicator is located next to the button.



Memory Riser Card and CPU Fault Indicators

The memory riser card Fault indicator LEDs are visible through the small hole on top of the card.

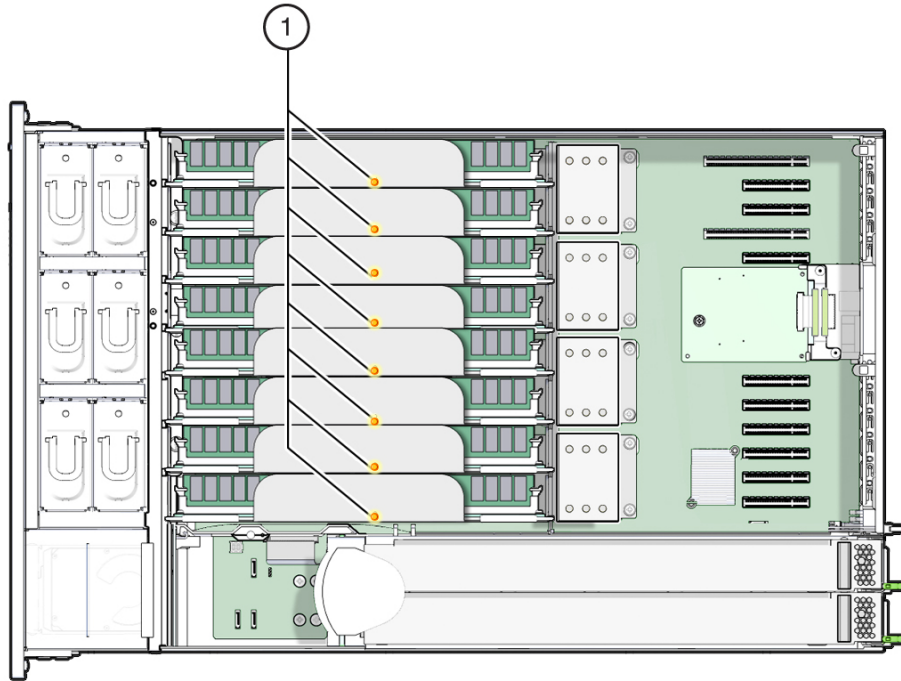
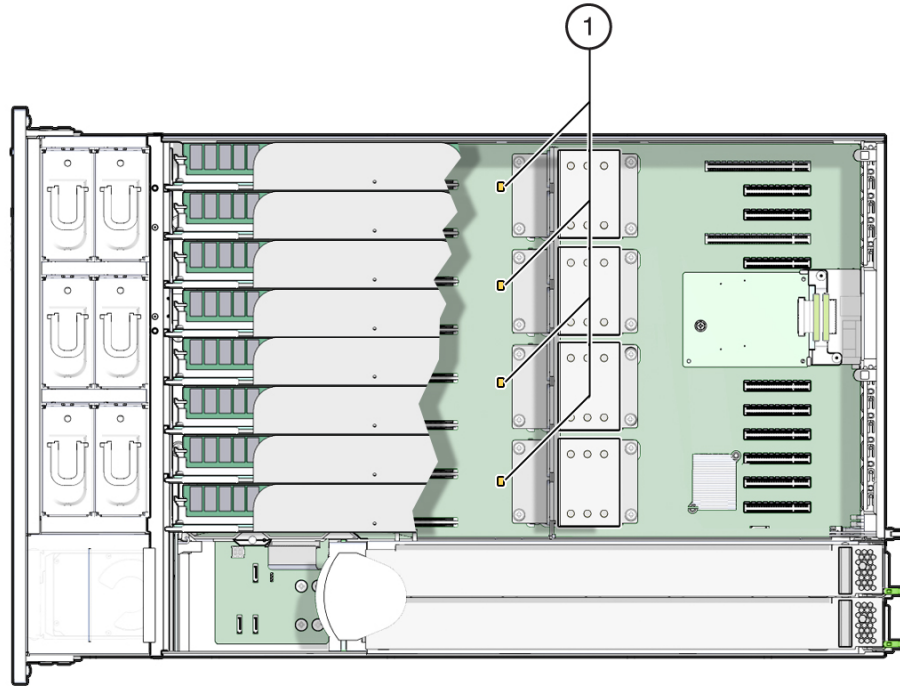


Figure Legend	Description
1	Memory riser card Fault indicators

CPU Fault Indicators

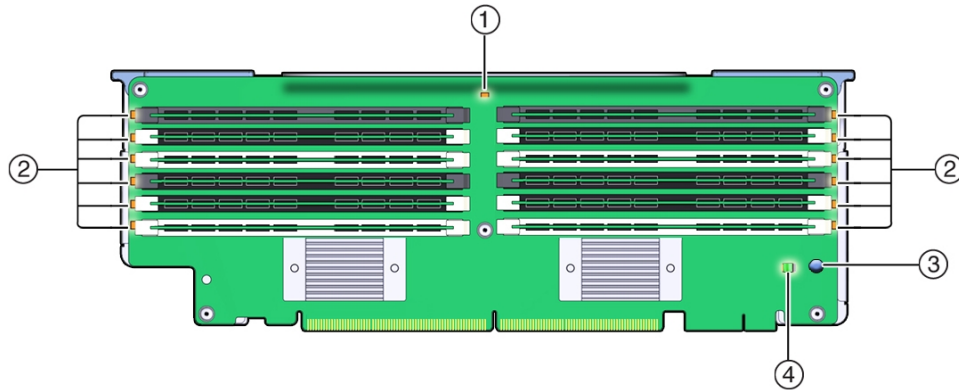
The CPU Fault indicator LEDs are located on the motherboard between the memory riser cards and the CPU. To see a lit CPU Fault indicators, look down from the top of the server and sight through the memory riser cards and the support bracket near the CPU. The following illustration shows the location of the CPU Fault indicators.



Legend	Description
1	CPU Fault indicators

DIMM Fault Remind Circuit Components

The DIMM Fault Remind Test Circuit is located on the memory riser card. The Fault Remind Button and Charge Status Indicator are located near the right-side bank of DIMM slots at the front edge of the card. The DIMM Fault indicators are located next to the DIMM slots.



Legend	Description	Legend	Description
1	MR card Fault indicator	3	Fault Remind button
2	DIMM Fault indicators	4	Charge Status indicator [†]

[†]The indicator lights when the circuit is charged.

▼ Locate a Failed Memory Riser Card, DIMM, or CPU

To locate a failed memory riser card, DIMM or CPU, use the fault remind circuits inside the server. The circuit uses board-mounted indicator LEDs that allow you to identify the failed component. If the failed component is a memory riser card or a CPU, the indicators identify the component directly. If the failed component is a DIMM, the indicators identify the memory riser card containing the DIMM. Then to locate the failed DIMM, you need to remove the memory riser card and use the card's DIMM Fault Remind circuitry.

For more information about the system and DIMM Fault Remind circuits, see [“The Server Fault Remind Test Circuits”](#) on page 51.

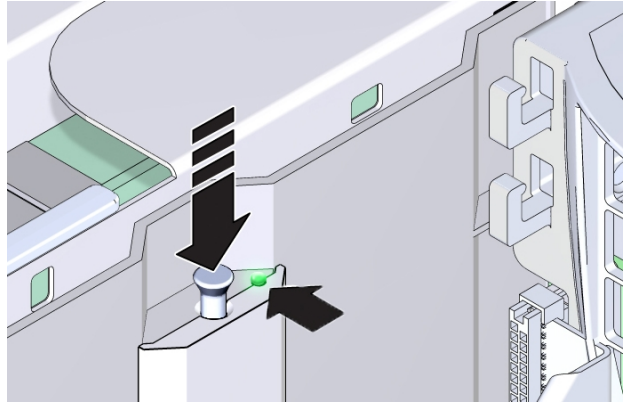
- Before You Begin**
- To troubleshoot faulty hardware components, see [“Troubleshooting Server Component Hardware Faults”](#) on page 35.

Note - The test circuits are charged, time-limited circuits. Once power is removed from the server you have 10 minutes to use the DIMM Fault Remind circuit and 30-60 minutes to use the System Fault Remind circuit.

1. **Prepare for service.** See [“Prepare the Server for Cold Service”](#) on page 94.

2. Press and hold the system Fault Remind button.

The Fault Remind button is located on the divider between the cooling zone 1 and cooling zone 2.



3. Verify that the system Fault Remind circuit is usable.

When the Fault Remind button is pressed, the Fault Remind button Power LED illuminates (green) to indicate that the remind circuitry is usable.

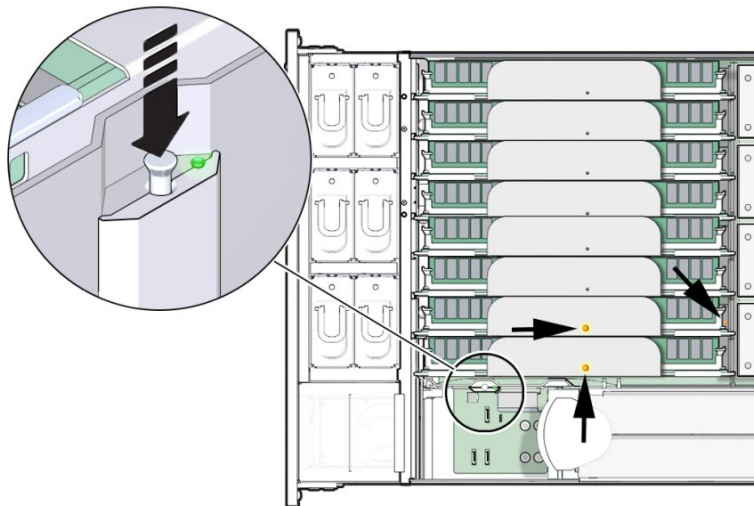
4. Look for the lit Fault indicators:

If the circuit is usable, identify the failed component by the lit Fault indicators. Use the information in the following table to help you find the component.

Component	Memory Riser LED	CPU LED	DIMM LED
CPU	On	On	Off
	The LEDs for both memory riser cards associated with the failed CPU turn on.		
Memory riser card	On	Off	Off
DIMM	On	Off	On
	To locate the failed DIMM, remove the MR card and use the DIMM Fault Remind circuit.		

- **To locate a failed CPU, look for the lit MR card Fault indicators and the lit CPU Fault indicator. For more information, see “[CPU Fault Indicators](#)” on page 84.**

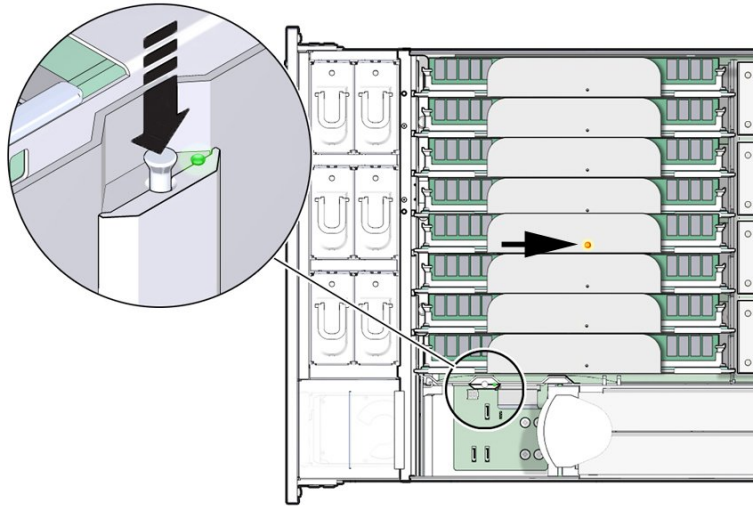
When a CPU is in a fault state, the Fault indicators for the CPU and both MR cards associated with the CPU light when the system Fault Remind button is pressed. The following illustration shows the lit indicators for a failed CPU, P0. In this example, the Fault indicators for memory riser cards, P0/MR0 and P0/MR1 are lit, as is the Fault indicator for CPU, P0.



- **To locate a failed MR card, look for the MR card Fault indicator. For more information, see “[Memory Riser Card and CPU Fault Indicators](#)” on page 83**

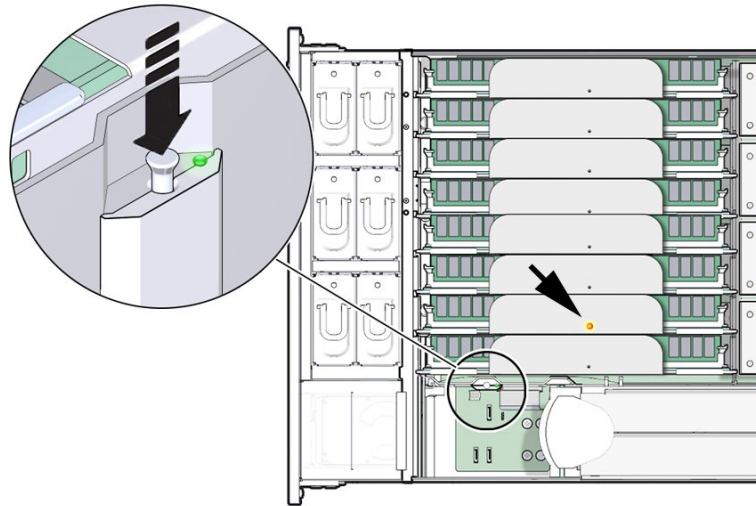
When an MR card is in a fault state, the Fault indicator for the card lights when the system Fault Remind button is pressed. The indicator is visible through the small hole on top of

the card. The following illustration shows a lit Fault indicator for memory riser card, P1/MR1.



- **To locate a failed DIMM, look for an MR card Fault indicator. For more information, see [“DIMM Fault Remind Circuit Components” on page 85.](#)**
When a DIMM is in a fault state, the Fault indicator for the MR card containing the DIMM lights when the system Fault Remind button is pressed. The following illustration shows a

lit Fault indicator for memory riser card, P0/MR1. This card contains the faulty DIMM. To locate the DIMM, remove the card and use the DIMM Fault Remind circuit.



5. Replace the failed component:

- To replace a failed CPU, see [“Replace a Faulty CPU \(FRU\)” on page 176.](#)
- To replace a failed memory riser card or a DIMM, see [“Replace a Faulty Memory Riser Card” on page 137.](#)

- Next Steps
- [“Replace a Faulty CPU \(FRU\)” on page 176](#)
or
 - [“Remove a Memory Riser Card” on page 139](#)
or
 - [“Replace a Faulty DIMM” on page 136](#)

▼ Clear Hardware Fault Messages

After servicing a component, you might need to manually clear the fault using Oracle ILOM. Faults are captured by Oracle ILOM's fault manager and stored in the fault management

database. If a component fault needs to be manually cleared, use the `fmadm` command from the Oracle ILOM Fault Management shell. The Fault Management shell is accessible by logging in to the Oracle ILOM CLI. For events logged in the Oracle ILOM event log, use the Oracle ILOM web interface.

For information about using `fmadm`, refer to the Oracle ILOM User Guide at <http://www.oracle.com/goto/ILOM/docs>

Before You Begin ■ This procedure requires the use of the Oracle ILOM CLI interface.

1. Open an SSH session and at the command line log in to the SP Oracle ILOM CLI.

Log in as a user with root or administrator privileges. For example:

```
ssh root@ipadress
```

where *ipadress* is the IP address of the server SP.

For more information, see “[Accessing Oracle ILOM](#)” in *Oracle X4 Series Servers Administration Guide* .

The Oracle ILOM CLI prompt appears:

```
->
```

2. To access `fmadm`, type:

```
start /SP|CMM/faultmgmt/shell
```

The `fmadm` prompt appears:

```
faultmgmtsp>
```

3. To get a listing of command options for displaying or clearing a fault with `fmadm`, type :

```
help fmadm
```

The following output appears:

where <subcommand> is one of the following:

```
faulty [-asv] [-u <uuid>] : display list of faulty resources
```

```
faulty -f [-a] : display faulty FRUs
```

```
faulty -r [-a] : display faulty FRUs (summary)
```

```
acquit <FRU> : acquit faults on a FRU
```

```
acquit <UUID> : acquit faults associated with UUID
```

```
acquit <FRU> <UUID> : acquit faults specified by (FRU, UUID) combination
```

replaced <FRU> : replaced faults on a FRU

repaired <FRU> : repaired faults on a FRU

repair <FRU> : repair faults on a FRU

rotate errlog : rotate error log

rotate fltlog : rotate fault log

4. Use `fmadm faulty` and the following options to display active faulty components:

- -a – Show active faulty components
- -f – Show active faulty FRUs.
- -r – Show active fault FRUs and their fault management states.
- -s – Show a one-line fault summary for each fault event.
- -u uuid – Show fault diagnosis events that match a specific universal unique identifier (uuid).

For command specifics, see the Oracle ILOM *User Guide* at: http://docs.oracle.com/cd/E37444_01/index.html

5. Use `fmadm` to clear the fault.

Clear the fault according to whether you want to use the `acquit`, `repair`, `replaced`, or `repaired`.

6. Close the Oracle ILOM session.

Preparing to Service the Server

This section includes preliminary and preparatory information and procedures for servicing the server. The following table describes the contents of this section.

Description	Links
Procedural information for preparing to perform hot service on the server.	“Prepare the Server for Hot Service” on page 93
Procedural information for preparing to perform cold service on the server.	“Prepare the Server for Cold Service” on page 94
Procedural information for releasing the Cable Management Arm (CMA)	“Release the CMA” on page 98
Procedural information for server power-off options.	“Powering Off the server” on page 101
Procedural information for using the Locator indicator.	“Managing the Locator Indicator” on page 110
Procedural information for the server cover.	“Remove the Server Cover” on page 112

▼ Prepare the Server for Hot Service

Note - This procedure uses the Oracle ILOM web interface. However, the procedure can be performed using the Oracle ILOM CLI interface. For more information, refer to the Oracle ILOM documentation.

A **hot-service** component can be serviced while the server is operating at full-power mode. For more information about component serviceability, see [“Component Serviceability” on page 70](#).

This procedure describes how to prepare the server to remove, replace, or install the following hot-service components:

- Storage drives
- Fan modules
- Power supplies

- Before You Begin**
- **Important:** Review the server *Product Notes* document before performing removal and installation procedures.
 - For troubleshooting information, see [“Troubleshooting and Diagnostics” on page 35](#).

1. Log in to the service processor Oracle ILOM web interface.

To log in, open a web browser and direct it using the IP address of the server SP. Log in as root or a user with administrator privileges. For more information, see [Oracle X4 Series Servers Administration Guide](#) .

The Summary screen appears.

2. In the Actions section of the Summary screen, click the Locator Indicator Turn On button.

This action activates the Locator indicator on the server front panel. For more Locator indicator management options, see [“Managing the Locator Indicator” on page 110](#).

3. Once at the service location, press the Locator indicator button to deactivate the indicator. For more information, see [“Manage the Locator Indicator Locally” on page 112](#).

4. Set up an ESD-safe space at the service location.

Set up a space where you can set components. The space needs to be ESD safe. See [“Performing Electrostatic Discharge and Static Prevention Measures” on page 79](#).

- Next Steps**
- [“Servicing Storage Drives \(CRU\)” on page 115](#)
 - or-
 - [“Servicing Fan Modules \(CRU\)” on page 121](#)
 - or-
 - [“Servicing Power Supplies \(CRU\)” on page 129](#)

▼ Prepare the Server for Cold Service

Note - This procedure uses a combination of the Oracle ILOM web and CLI interfaces. However, the procedure can also be performed using only the Oracle ILOM CLI interface. For more information about the Oracle ILOM CLI interface, refer to the Oracle ILOM documentation.

A **cold-service** component must be serviced when the server is completely powered off. For more information about component serviceability, see [“Component Serviceability” on page 70](#).

This procedure describes how to prepare the server for service, so you can:

- Remove, replace, or install cold-serviceable components
- Remove, replace, or install internal components
- Use the motherboard processor and DIMM fault remind circuitry

Before You Begin

- **Important:** Review the server *Product Notes* document before performing removal and installation procedures.
- For troubleshooting information, see [“Troubleshooting Server Hardware Faults” on page 36](#).

1. To power down the server and activate the front panel Locator indicator, do the following:

a. Log in to the Oracle ILOM web interface.

Type the server SP IP address into a web browser and log in as a user with root or administrator privileges. For more information, see [Oracle X4 Series Servers Administration Guide](#).

b. In the Actions section of the Summary screen, click the Power State Turn Off button.

This action powers off the server to standby power mode. For more power off options, see [“Powering Off the server” on page 101](#).

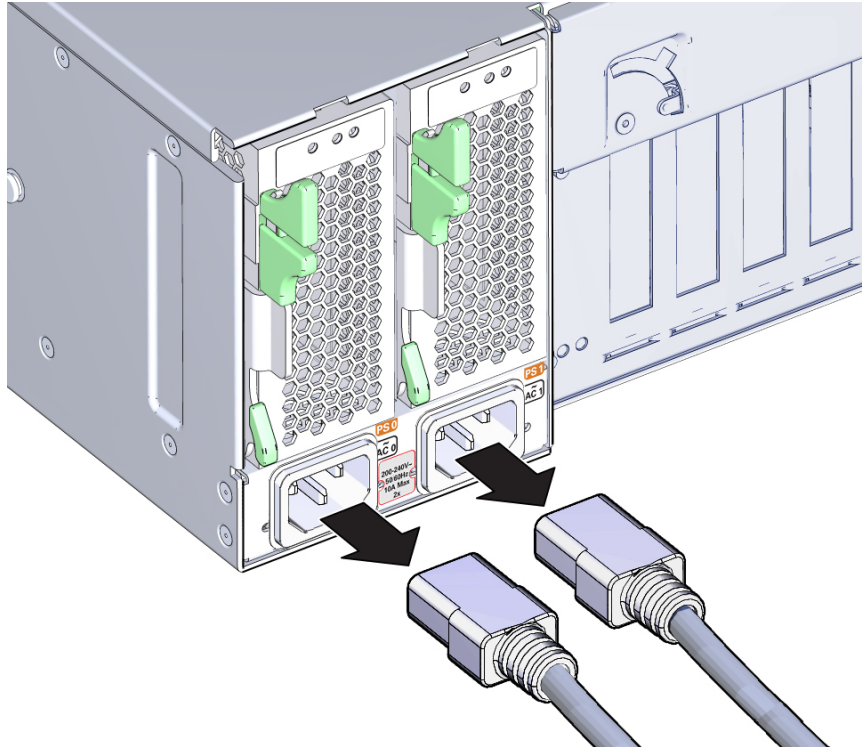
c. In the Actions section of the Summary screen, click the Locator Indicator Turn On button.

This action activates the Locator indicator on the server front panel. For more Locator indicator management options, see [“Managing the Locator Indicator” on page 110](#).

2. Remove both server power cords.



Caution - Data loss. Removing the power cord when the server is in full power mode results in an immediate shut down of the server. Do not remove the power cord if the server is in full power mode.



3. To slide the server out of the rack to the maintenance position, do the following:

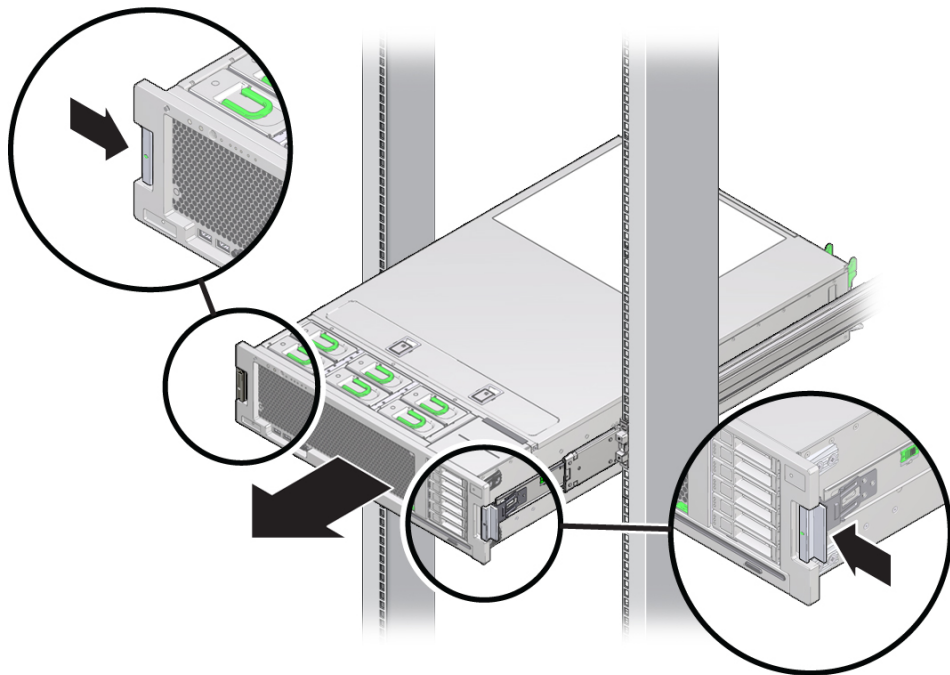
Most component service procedures can be performed without removing the server entirely from the rack. Instead, the server can be slid out of the rack on its support rails to an extended and locked position called the maintenance position.

- a. At the back of the server, verify that the cables have sufficient length and clearance to accommodate the distance required to extend the server to the maintenance position.**

The cable management arm (CMA) that is supplied with the server is hinged to facilitate extending the server to the maintenance position. However, ensure that the cables do not

impede with, or are damaged by, the sliding movement. If necessary, label and remove cables from the back of the server.

- b. **(Optional)** To move the CMA for access to the back of the server, see [“Release the CMA” on page 98](#).
- c. **At the front of the server, release the slide rails by pushing the two green latches inward.**



- d. **Slowly pull the server forward until both slide rails lock at the fully extended maintenance position.**
The locking action is accompanied by an audible click. The server is now in the maintenance position and ready for service.
4. **(Optional)** To remove the server entirely from the rack, see [“\(Optional\) Remove the Server from the Rack” on page 99](#).
5. **Set up an ESD-safe service location.**

Set up a space where you can set components. The space needs to be ESD safe. See [“Performing Electrostatic Discharge and Static Prevention Measures” on page 79](#).

6. Remove the top cover. See [“Remove the Server Cover” on page 112](#).



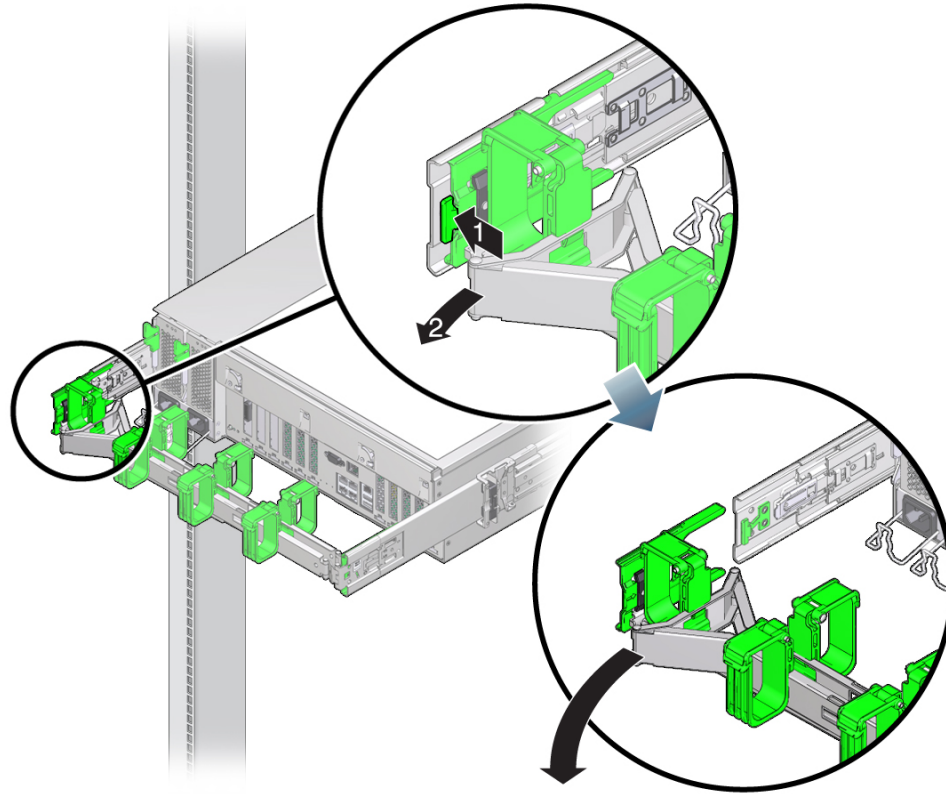
Caution - Component ESD damage. Circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Do not touch or handle components unless you are wearing a properly grounded anti-static wrist strap.

- Next Steps**
- [“Servicing the Server” on page 69](#)
 - [“Servicing CRU Components” on page 115](#)
 - [“Servicing FRU Components” on page 175](#)

▼ **Release the CMA**

If you are using a cable management arm (CMA), you might need additional access to the back of the server. To gain additional access to the back of the server, release and reposition the CMA.

1. Press and hold the tab.



2. Swing the CMA away from the server.

▼ (Optional) Remove the Server from the Rack

To perform some service procedures, you might find it necessary or more convenient to completely remove the server from the rack, rather than work on the server while it is the maintenance position. These optional steps show you how to remove the server entirely from the rack.

1. Prepare the server for service. See [“Prepare the Server for Cold Service”](#) on page 94.

2. **Ensure that the server is in the maintenance position.**

3. **Set up an ESD-safe service location.**



Caution - Component ESD damage. Circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Do not touch or handle components unless you are wearing a properly grounded anti-static wrist strap.

Set up a space where you can set components. See [“Performing Electrostatic Discharge and Static Prevention Measures” on page 79](#).

4. **Pull the mounting release brackets toward the front of the server.**

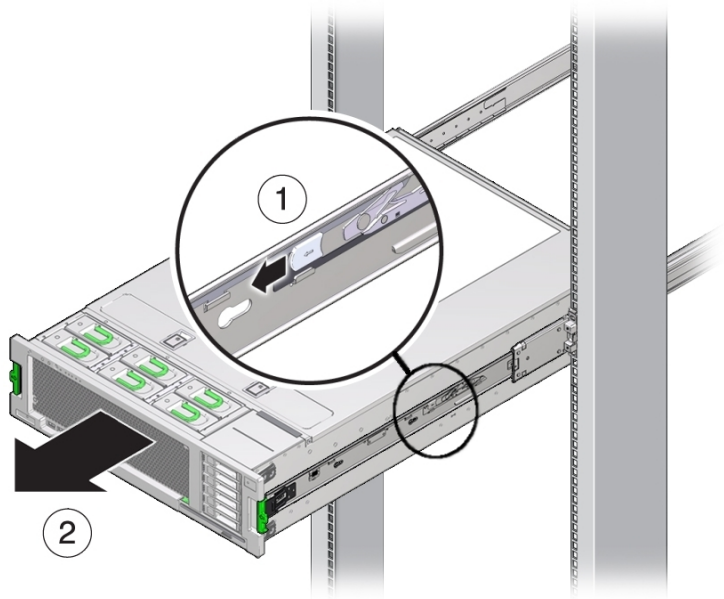
The brackets are located on each side of the server.



Caution - Physical or component damage. The server is heavy and cannot be safely removed from the rack by a single person. Use multiple personnel and a mechanical lift to remove the server from the rack.

5. **Using multiple personnel, slide the server entirely out of the rack.**

Slide the server out of the rack and onto a mechanical lift.



6. Place the server chassis on an anti-static mat before servicing internal components.
7. Remove the top cover. See [“Remove the Server Cover” on page 112.](#)

Powering Off the server

Powering off involves powering down the server from full power mode to standby power mode. You can power down the server to standby power mode *locally* or *remotely*. To power off locally, use the front panel Power button. To power off remotely, use the server OS shutdown procedure or Oracle ILOM.

This section contains information and procedures related to power modes and power off options, including complete power removal:

- [“Power Off, Graceful \(Power Button\)” on page 102](#)

- [“Power Off, Immediate \(Power Button\)” on page 103](#)
- [“Power Off, Remote \(Oracle ILOM CLI\)” on page 105](#)
- [“Power Off, Remote \(Oracle ILOM Web Interface\)” on page 106](#)
- [“Remove Power” on page 107](#)
- [“Power Modes, Shutdowns, and Resets” on page 108](#)

▼ Power Off the Server Using the Server OS

If the server OS is running, you can use the OS shutdown procedure to power off the server to standby power mode. The OS shutdown procedure provides a graceful shutdown of the server.

- **To power off the server, use the OS-specific shutdown procedure.**

- Next Steps**
- [“Performing Electrostatic Discharge and Static Prevention Measures” on page 79](#)
 - [“Power Modes, Shutdowns, and Resets” on page 108](#)

▼ Power Off, Graceful (Power Button)

Note - This procedure is performed locally and requires access to the server front panel.

Powering off the server by pressing the front panel Power button causes operating systems with Advanced Configuration and Power Interface (ACPI) to perform an orderly shutdown of the OS. Non-ACPI enabled operating systems might ignore this event and not shut down the host. If your OS ignores this event, shut down the server using the server OS or Oracle ILOM (remotely or locally).

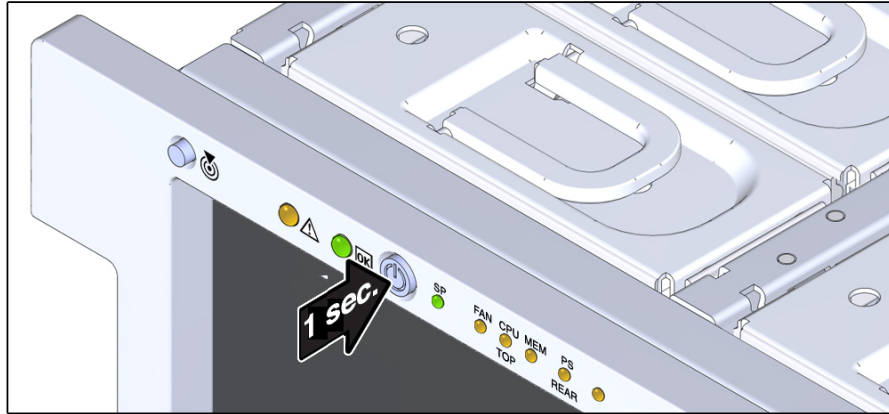
Use this procedure to perform a graceful power off of the server to standby power mode.

- Before You Begin** [“Power Modes, Shutdowns, and Resets” on page 108](#)

1. **To power off the server gracefully, press and *immediately* release the front panel Power button.**



Caution - Potential for loss of data. Do *not* press in and hold the power button for longer than five seconds. Doing so initiates an immediate server shutdown. Press in and release the button immediately.



2. **Verify that the server is in standby power mode.**

The system OK indicator on the front panel blinks, indicating that the server is in standby power mode.

Next Steps ■ [“Performing Electrostatic Discharge and Static Prevention Measures” on page 79](#)

▼ Power Off, Immediate (Power Button)

An immediate shutdown should be used in emergency situations or when you know that the loss of data is nonexistent or acceptable.

Use this procedure to immediately power off the server to standby power mode.

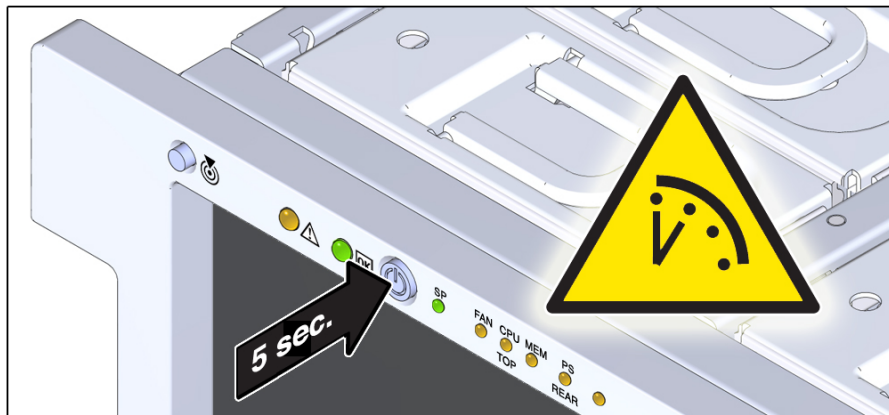


Caution - Data loss. All applications and files close abruptly without saving. Warn users and close all applications before powering off.

This procedure is performed locally and requires physical access to the server front panel.

- Before You Begin**
- Physical access to the server front panel is required.
 - [“Power Modes, Shutdowns, and Resets” on page 108](#)

1. **Press and hold the Power button for at least five seconds until full power is off and the server enters standby power mode.**

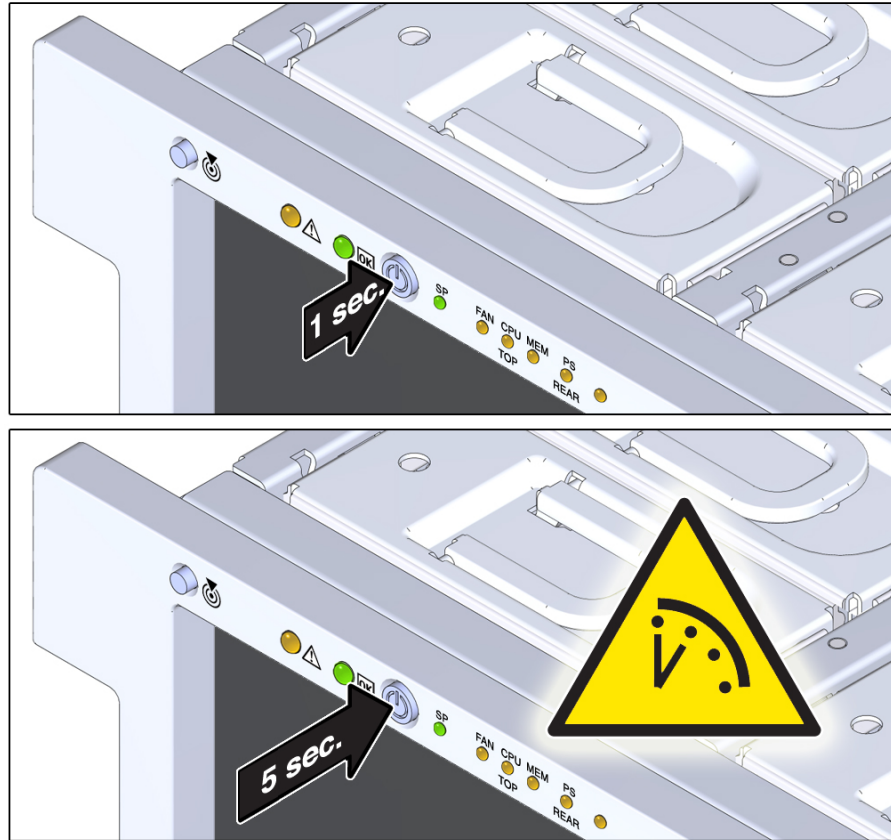


2. **Verify that the full power is off, and that the system OK indicator on the front panel blinks, indicating that the server is in standby power mode.**

- Next Steps**
- [“Performing Electrostatic Discharge and Static Prevention Measures” on page 79](#)

Front Panel Power Off Options

- To power off the server gracefully, press the power button for one second (or release when you feel the button click).
- To power off the server immediately, press and hold the power button for five seconds.
- [“Power Modes, Shutdowns, and Resets” on page 108](#)



▼ Power Off, Remote (Oracle ILOM CLI)

You can use the Oracle ILOM SP command-line interface (CLI) to remotely power off the server to standby power mode.

Before You Begin [“Power Modes, Shutdowns, and Resets” on page 108](#)

- 1. Open an SSH session and log in to the SP Oracle ILOM CLI.**

Log in as a user with root or administrator privileges. For example:

```
ssh root@ipadress
```

where *ipadress* is the IP address of the server SP.

For more information, see [Oracle X4 Series Servers Administration Guide](#) .

The Oracle ILOM CLI prompt appears:

->

2. At the prompt, type one of the following commands:

- For *graceful* power off:

stop /System

- For *immediate* power off:

An immediate shutdown should be used in emergency situations or when you know that the loss of data is nonexistent or acceptable.

stop -force /System

- Next Steps**
- [“Managing the Locator Indicator” on page 110](#)
 - Oracle Integrated Lights Out Manager 3.2 Documentation Library at: <http://www.oracle.com/goto/ILOM/docs>

▼ Power Off, Remote (Oracle ILOM Web Interface)

You can use the Oracle ILOM web interface to remotely power off the server to standby power mode.

Before You Begin [“Power Modes, Shutdowns, and Resets” on page 108](#)

1. Log in to the service processor Oracle ILOM web interface.

To log in, open a web browser and enter the IP address of the server SP. Log in as root or a user with administrator privileges. For more information, see [Oracle X4 Series Servers Administration Guide](#) .

The Summary screen appears.

2. In the Actions section of the Summary screen, verify that the power state is ON.

3. To perform a graceful power off of the server, click the Turn Off button.

Power off options are available in the Host Management > Power Control screen.

4. Click OK.

- Next Steps**
- [“Managing the Locator Indicator” on page 110](#)

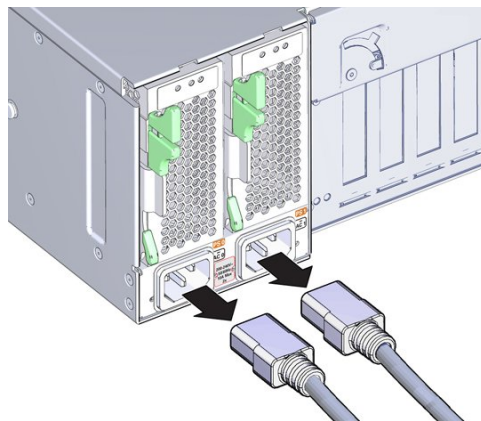
- Oracle Integrated Lights Out Manager 3.2 Documentation Library at: <http://www.oracle.com/goto/ILOM/docs>

▼ Remove Power

Powering the server from full power mode to standby power mode does *not* completely remove power from the server. If you need to completely remove power from the server to perform a cold reset or to place it in a non-powered state, you must disconnect the AC power cables on the back of the server. Use this procedure to completely remove power from the server.

Before You Begin [“Power Modes, Shutdowns, and Resets” on page 108](#)

- 1. Place the server in standby power mode.**
Use one of the power off methods. See [“Powering Off the server” on page 101](#).
- 2. If necessary, do the following:**
 - a. Extend the server to the maintenance position.**
 - b. Position the CMA.**
- 3. Access the back of the server.**
- 4. To remove power from the server, disconnect the AC power cables from the power supplies.**



This action completely removes power from the server.

- 5. If you are performing a cold reset, wait at least 60 seconds before connecting the AC power cables to the power supplies.**

For information about cold resets, see [“Cold Reset” on page 109](#).

Next Steps ■ [“Performing Electrostatic Discharge and Static Prevention Measures” on page 79](#)

Power Modes, Shutdowns, and Resets

This section contains information about power modes, server shutdowns, and server resets.

Full Power Mode

Full power mode is the normal operational mode for the server. When the server enters full power mode, power is supplied to all the server components, the server boots, and the operating system (OS) functions. You achieve full power mode by pressing the Power button on the server front panel when the server is in standby power mode. You can also achieve full power mode by powering on the server from Oracle ILOM. Once the server is operating in full power mode, the system OK and service processor (SP) indicators are on steady (see [“Server Boot Process and Normal Operating State Indicators” on page 41](#)).

Standby Power Mode

Standby power is a non-operating mode (OS does not boot), in which low-level power is supplied only to the components that are required to run the SP. To enter standby power mode, connect the AC power cables to the back of the server, but do not press the front panel Power button. You can also enter standby power mode by powering off the server (from an operational full power mode) using one of the power-off methods (see below). In standby power mode, the SP indicator blinks quickly while the SP is booting. Once the SP has booted, the indicator is on steady, and the system OK indicator flashes (see [“Server Boot Process and Normal Operating State Indicators” on page 41](#)).

Graceful Shutdown

A graceful shutdown (also referred to as an orderly shutdown) is the safest method of shutting down the server to standby power mode because it warns users, closes files, and prepares the file system. To perform a graceful shutdown use the server OS, Oracle ILOM, or the server front panel Power button.

Immediate Shutdown

An immediate shutdown of the server (also referred to as an emergency shutdown) should be used only in situations when you know that the loss of data is nonexistent or acceptable. An immediate shutdown does not warn users, does not properly close files, nor does it prepare the file system for shut down to standby power mode.

Complete Power Removal

Shutting down the server from full power mode to standby power mode does *not* completely remove power from the server. When it is in standby power mode, the server is in a low-power state. This low-power state is enough to maintain the service processor (SP), which runs Oracle ILOM. To completely remove power from the server, you need to remove the power cords.

Warm Reset or Reboot

A warm reset is a reboot or restart of the server. It involves cycling the server power from full power mode to standby power mode and back to full power mode. For example, a warm reset might be required after a software or firmware update or when you want to launch Oracle System Assistant or the BIOS Setup Utility.

Cold Reset

A cold reset of the server is a restart of the server from a completely powered-off state. A cold reset might be required to resolve a system issue. To perform a cold reset, place the server in

standby power mode, disconnect the server from its power source by performing a complete power removal (see above), wait 30-60 seconds, and then connect the server to its power source.

See Also:

- [“Powering Off the server” on page 101.](#)

Managing the Locator Indicator

This section provides procedures for turning the Locator indicator on and off remotely (using Oracle ILOM) and locally (using the front panel Locator button).

- [“Turn On the Locator Indicator Remotely \(Oracle ILOM CLI\)” on page 110](#)
- [“Turn On the Locator Indicator Remotely \(Oracle ILOM Web Interface\)” on page 111](#)
- [“Manage the Locator Indicator Locally” on page 112](#)

▼ Turn On the Locator Indicator Remotely (Oracle ILOM CLI)

Before going to the server, activate the server Locator indicator. This allows you to identify the correct server within the rack.

1. **Open an SSH session and at the command line log in to the SP Oracle ILOM CLI.**

Log in as a user with root or administrator privileges. For example:

```
ssh root@ipaddress
```

where *ipaddress* is the IP address of the server module SP.

For more information, see [Oracle X4 Series Servers Administration Guide](#) .

The Oracle ILOM CLI prompt appears:

```
->
```

2. **To *turn on* the Locator indicator, type the following command at the prompt:**

```
set /System/ locator_indicator=on
```

Note - To *turn off* the Locator indicator, type: `set /System/ locator_indicator=off`

3. To verify the status of the Locator indicator, type:

→ `show /System/ locator_indicator`

The output of the command appears:

```
/System
```

```
Properties:
```

```
locator_indicator = Off
```

The value `locator_indicator` shows the status as either On or Off.

- Next Steps**
- [“Performing Electrostatic Discharge and Static Prevention Measures” on page 79](#)
 - Oracle Integrated Lights Out Manager 3.2 Documentation Library at: <http://www.oracle.com/goto/ILOM/docs>

▼ Turn On the Locator Indicator Remotely (Oracle ILOM Web Interface)

Before going to the server, activate the server Locator indicator. This allows you to identify the correct server within the rack.

1. Log in to the service processor Oracle ILOM web interface.

To log in, open a web browser and direct it using the IP address of the server SP. Log in as root or a user with administrator privileges. For more information, see [Oracle X4 Series Servers Administration Guide](#) .

The Summary screen appears.

2. In the Actions section, verify that the Locator indicator is off, and then click the Turn On button.

3. Click OK.

The Locator indicator on the Summary screen changes to indicate the status of the Locator indicator.

- Next Steps**
- [“Performing Electrostatic Discharge and Static Prevention Measures” on page 79](#)

- Oracle Integrated Lights Out Manager 3.2 Documentation Library at: <http://www.oracle.com/goto/ILOM/docs>

▼ Manage the Locator Indicator Locally

Once you have identified the server by its blinking Locator indicator, use this procedure to turn off the LED.

Use this procedure to turn the Locator indicator off and on when local to the server.

- Before You Begin**
- You must be physically present at the server.
 - For button and indicator location information, see “[Server Front Panel Features](#)” on page 20.
- **To manage the Locator indicator locally, do one of the following:**
 - **To turn off the blinking LED, press the Locator indicator button.**
 - **To turn on the Locator indicator, press the Locator indicator button.**

Note - Some Oracle ILOM security procedures require that you turn on the Locator indicator locally, as part of a physical presence verification step.

- **To perform a lamp test of all front panel LEDs, press the Locator indicator three times within a five-second period.**

All of the front panel LEDs light up and remain lit for 15-20 seconds.

- See Also**
- “[Performing Electrostatic Discharge and Static Prevention Measures](#)” on page 79
 - Oracle Integrated Lights Out Manager 3.2 Documentation Library at: <http://www.oracle.com/goto/ILOM/docs>

▼ Remove the Server Cover

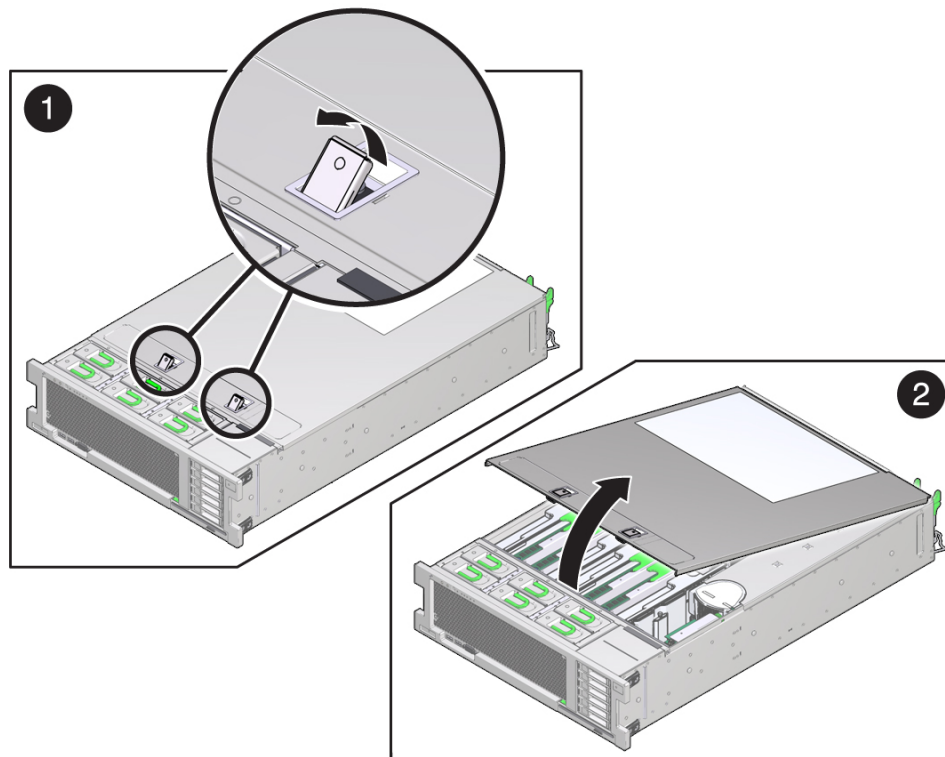
Servicing internal components requires that you remove the server cover. The server cover has an interlock switch which is a safety mechanism that prevents power from being applied to the

server when the cover is off. The switch prevents accidental contact with high-voltage areas inside the server; it also prevents a potential over-temperature condition, which would result from a disruption of the server cooling system. Removing the cover when the server is powered on performs an immediate power off of the server, which can cause loss of data and possible component damage.



Caution - Loss of data and possible component damage. Do not remove the server top cover until the server has been shut down to standby power mode. The top cover acts as an interlock switch. Removing the top cover from a fully powered-on server results in an immediate server power off.

1. **Ensure that the AC power cords are disconnected from the server power supplies.**
2. **To unlatch the server top cover, simultaneously lift both release latches and pull the cover upward.**



3. **To remove the cover, slide it slightly toward the front of the server chassis and lift it away from the server.**



Caution - Component damage. Part of the power interlock switch is mounted on the underside of the cover. It can be damaged (or misaligned) if the cover is dropped or the component jarred. Take care not to damage the switch.

Servicing CRU Components

This section describes how to service customer-replaceable units (CRUs) and includes reference information and removal and installation procedures for the components listed in the following table.

Description	Link
Server storage drives	“Servicing Storage Drives (CRU)” on page 115
Fan modules	“Servicing Fan Modules (CRU)” on page 121
Power supplies	“Servicing Power Supplies (CRU)” on page 129
Memory riser cards and DIMMs	“Servicing Memory Risers and DIMMs (CRU)” on page 136
PCIe cards	“Servicing PCIe Cards and PCIe Card Filler Panels” on page 154
DVD drive	“Servicing the DVD Drive (CRU)” on page 165
Server system battery	“Replace the System Battery (CRU)” on page 169

Servicing Storage Drives (CRU)

Use the following procedures to remove and install storage drives and storage filler panels from the server:

- [“Remove a Storage Drive Filler Panel \(CRU\)” on page 115](#)
- [“Remove a Storage Drive \(CRU\)” on page 116](#)
- [“Install a Storage Drive \(CRU\)” on page 118](#)
- [“Install a Storage Drive Filler Panel \(CRU\)” on page 119](#)
- [“Storage Drive Reference” on page 119](#)

▼ Remove a Storage Drive Filler Panel (CRU)

For information about component filler panels, see [“Component Filler Panels” on page 81](#).

1. **Prepare the server for service.** See [“Preparing to Service the Server” on page 93](#).
2. **If necessary, press the Locate indicator button to deactivate the indicator.**
3. **Identify the storage drive filler panel you want to remove.**
4. **Push the release button to open the latch.**
5. **To remove the filler panel, use the latch to pull the filler panel out of the slot.**

▼ Remove a Storage Drive (CRU)

Use this procedure to remove a storage drive from the server.

Before You Begin

- For serviceability considerations, see [“Component Serviceability” on page 70](#).
- For storage drive designation information, see [“DVD, Storage Drive, and USB Designations” on page 78](#).

1. **Determine whether you can replace the storage drive using the hot-plug or hot-swap procedure or whether you need to power off the server and use the cold-swap procedure.**

A cold-swap is required if the storage drive:

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

2. **Do one of the following:**

- **To hot-plug the drive:**

- a. **Take the drive offline.**

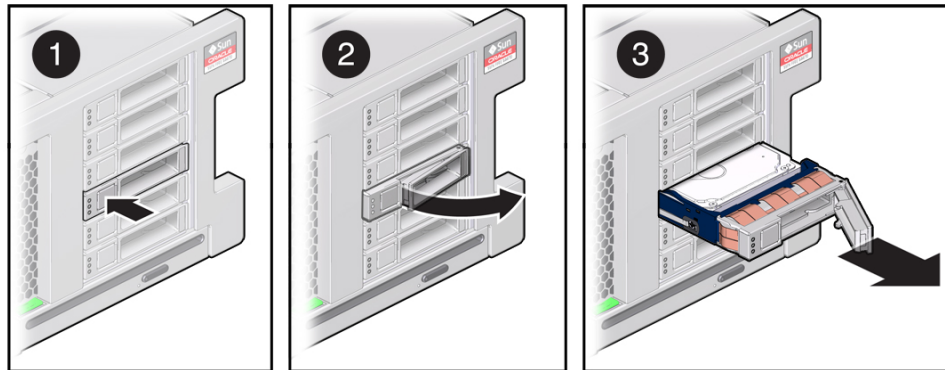
This removes the logical software links to the drive and prevents any applications from accessing it. To take a storage drive offline, use the server OS-specific instructions.

- b. **Prepare the server for service.** See [“Prepare the Server for Hot Service” on page 93](#).

- To cold-swap the drive, take the drive offline and power off the server using one of the power-off options described at [“Prepare the Server for Cold Service” on page 94](#).
3. **Identify the storage drive you want to remove.**

The blue Ready to Remove indicator and the amber Service Action Required indicator on the drive might be lit.

See [“Storage Drive Reference” on page 119](#).
 4. **If necessary, press the Locate indicator button to deactivate the indicator.**
 5. **On the drive you plan to remove, push the storage drive release button to open the latch.**
 6. **Grasp the latch and pull the drive out of the drive slot.**



7. **Populate the empty slot with either a storage drive or a storage drive filler.**
8. **If you performed a cold-service procedure, power on the server.**

- Next Steps**
- [“Install a Storage Drive \(CRU\)” on page 118](#)
 - [“Install a Storage Drive Filler Panel \(CRU\)” on page 119](#)

▼ Install a Storage Drive (CRU)

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

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

Before You Begin

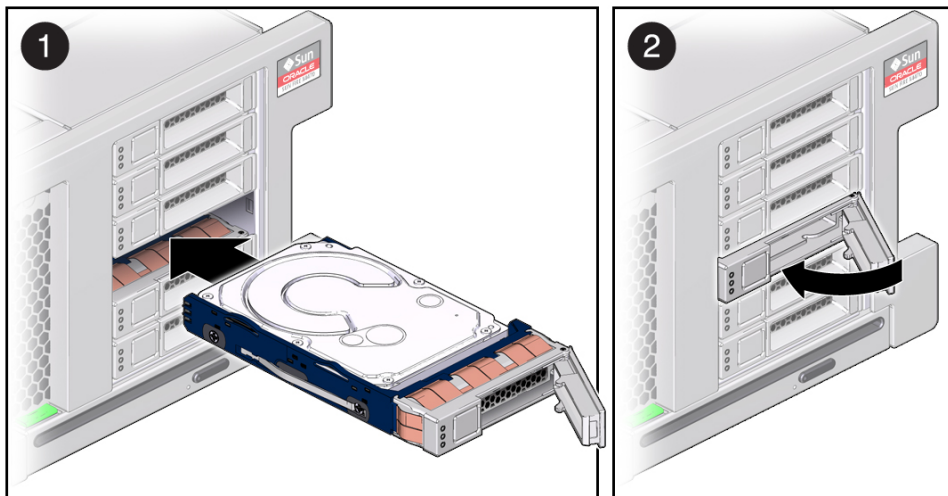
- For serviceability considerations, see [“Component Serviceability” on page 70.](#)
- For storage drive designation information, see [“DVD, Storage Drive, and USB Designations” on page 78.](#)

1. Prepare the server:

- For hot service, see [“Prepare the Server for Hot Service” on page 93.](#)
- For cold service, see [“Prepare the Server for Cold Service” on page 94.](#)

2. Verify that the release lever on the storage drive is fully opened.

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



4. Close the latch to lock the drive in place.
5. Do one of the following:
 - If you have performed a cold-service procedure, power on the server using one of the options described in [“Powering Off the server” on page 101](#) and configure the storage drive accordingly. Refer to the server OS-specific instructions.
 - If you have a hot-service procedure, configure the storage drive accordingly. Refer to the server OS-specific instructions.

See Also ■ [“Storage Drive Reference” on page 119](#)

▼ Install a Storage Drive Filler Panel (CRU)

For information about component filler panels, see [“Component Filler Panels” on page 81](#).

1. **Verify that the release lever on the storage drive filler panel is fully opened.**
To open the lever, push the release button on the front of the filler panel.
2. **Slide the storage drive filler panel into the drive slot until it is fully seated.**
3. **Close the latch to lock the filler panel in place.**

See Also ■ [“Storage Drive Reference” on page 119](#)

Storage Drive Reference

This section shows the location and explains the functions of the storage drive status indicators.

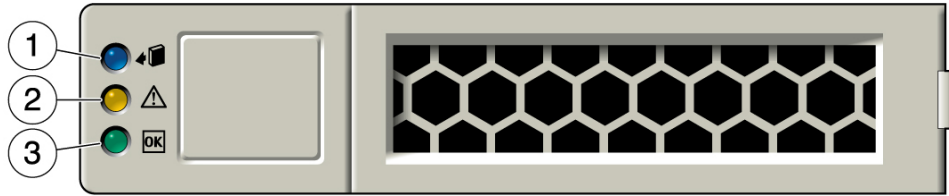


Figure Legend	Description
1	OK to Remove indicator
2	Service Action Required indicator
3	OK/Activity indicator

The functions of the drive status indicators are described below.

For indicator blink rate information, see [“Indicator Blink Rates” on page 46](#).

OK to Remove Indicator



Blue indicator. Indicates that the storage drive can be removed safely during a hot-service operation.

Service Action Required Indicator



Amber indicator. Indicates that the storage drive is faulty. The front and back panel Service Action Required indicators are also lit if the system detects a storage drive fault.

OK/Activity Indicator



Green indicator. Indicates that the drive is properly inserted into the system. Indicator flashes when the drive is being accessed.

See Also:

- [“Servicing Storage Drives \(CRU\)” on page 115](#)

Servicing Fan Modules (CRU)

Use the following procedures to remove and install fan modules from the server:

- [“Remove a Fan Module” on page 121](#)
- [“Install a Fan Module” on page 124](#)
- [“Fan Module Reference” on page 127](#)

▼ Remove a Fan Module

Fan modules provide server cooling to the motherboard and its components. The fan modules are arranged in stacked pairs (a front row and a back row) to provide redundancy. If you remove a fan module fails, replace it immediately.

Fan modules are hot-serviceable components. It is not necessary to power off the server or to remove the server cover to service a fan module. However, depending on server rack configuration, it might be necessary to partially extend the server from the rack to access the fan modules. (Optional steps for partially extending the server from the rack are included in this procedure.) Take care when partially extending the server from the rack during hot service. Ensure that the cables at the back of the server do not become dislodged, particularly the power cables. As an option, you can also perform this procedure using cold service.

Tip - To view a video of replacing a fan module, see http://docs.oracle.com/cd/E38212_01/videos/E58906/fanreplace.html.

- Before You Begin**
- For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - For fan module designation information, see [“Component Designations” on page 73](#).

1. Prepare the server for service. See [“Prepare the Server for Hot Service” on page 93](#).

To perform a cold-service procedure, see [“Prepare the Server for Cold Service” on page 94](#).

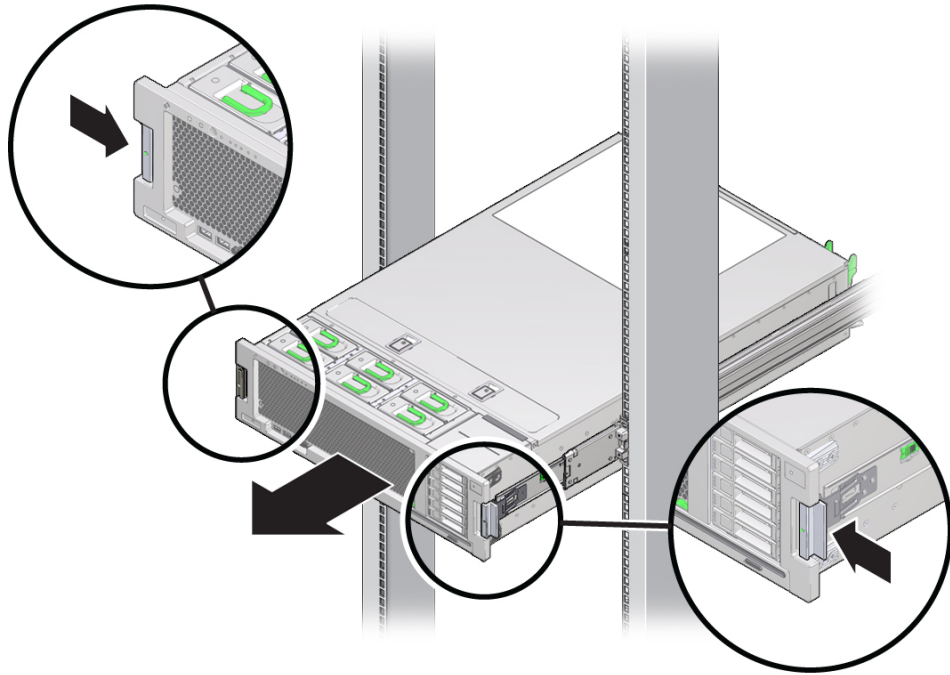
2. If necessary, slide the server partially out from the rack.

a. At the back of the server, verify that the cables have sufficient length and clearance to extend the server.

The cable management arm (CMA) that is supplied with the server is hinged to facilitate extending the server to the maintenance position. However, ensure that the cables do not impede with, or are damaged by, the sliding movement. If necessary, label and remove cables from the back of the server.

b. (Optional) To move the CMA for access to the back of the server, see [“Release the CMA” on page 98](#).

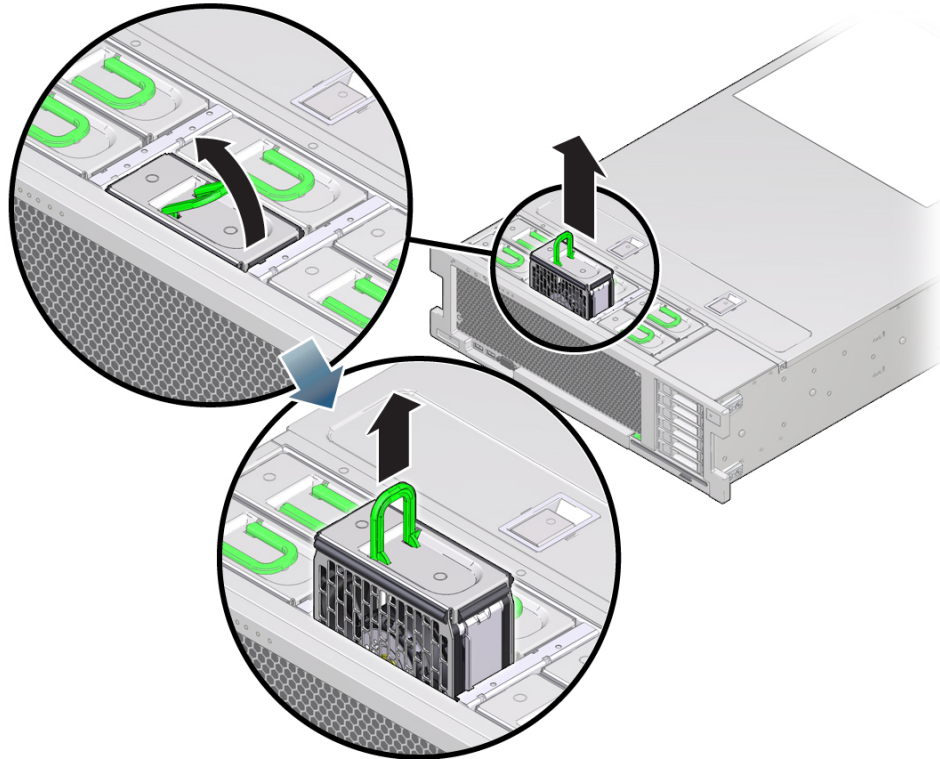
- c. At the front of the server, release the slide rails by pushing the two green latches inward.



3. **Identify the faulty fan module using the fan module indicators.**
The Service Action Required indicators are located on the fan module. A lit amber color Service Action Required indicator identifies a faulty component. For more information, see [“Fan Module Reference” on page 127](#).
4. **Lift the green handle on the fan module and use it to pull the module straight up and out of the server.**



Caution - Component damage. Excessive movement or rocking of the fan module during removal can cause damage to the internal connector on the fan module board. When removing a fan module, do not rock it back and forth.



Next Steps ■ [“Install a Fan Module” on page 124](#)

▼ Install a Fan Module

This procedure describes how to install a fan module in the server.

Fan modules are hot-serviceable components. It is not necessary to power off the server or to remove the server cover to service a fan module. However, depending on server rack

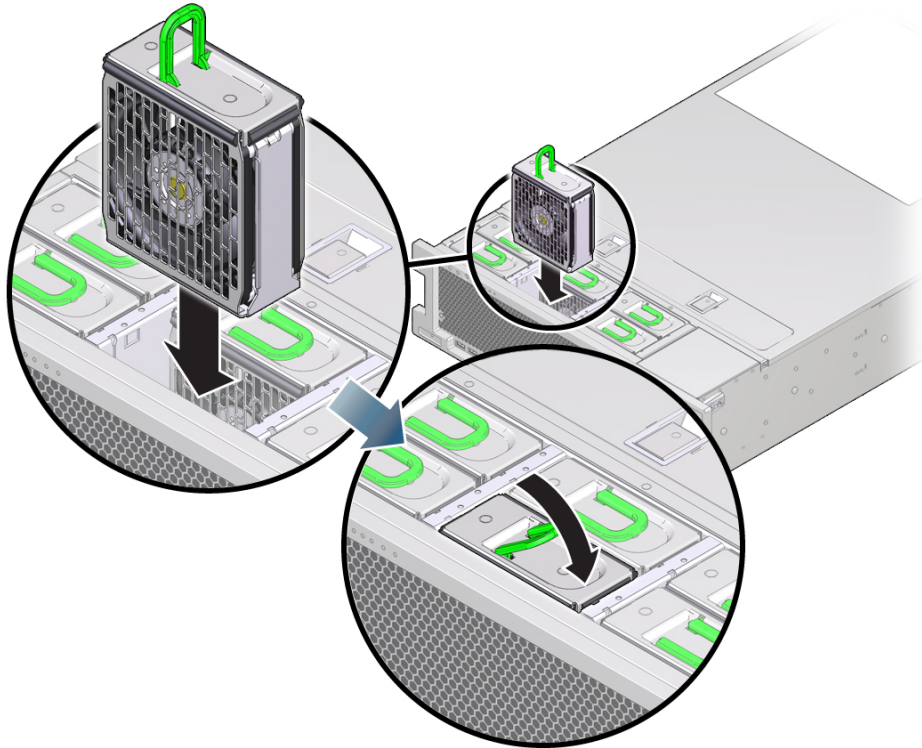
configuration, it might be necessary to partially extend the server from the rack to access the fan modules. Take care when partially extending the server from the rack during hot service. Ensure that the cables at the back of the server are not dislodged, particularly the power cables. You can also perform this procedure using cold service. Optional steps for partially extending the server from the rack are included in this procedure.

Tip - To view a video of replacing a fan module, see http://docs.oracle.com/cd/E38212_01/videos/E58906/fanreplace.html.

- Before You Begin**
- For serviceability considerations, see “[Component Serviceability](#)” on page 70.
 - For fan module designation information, see “[Component Designations](#)” on page 73.
 - For instructions on removing a fan module, see “[Remove a Fan Module](#)” on page 121.
1. **If you are installing a replacement fan module for one that has failed, check the indicator of the failed fan slot to ensure the fault indicator is no longer lit.**

This is necessary to ensure the indicator status is cleared before you insert the new fan. See “[Fan Module Reference](#)” on page 127 for fan module indicator locations.
 2. **Orient the fan module so the connector on the bottom of the module is aligned with the connector on the inside of the slot and all keying and labeling are correctly positioned.**

The fan modules are keyed to ensure that they are installed in the correct orientation.



3. **Slide the fan module into the slot until it stops.**
4. **Press downward on the top of the fan module at the Press Here to Latch label until the fan module is fully seated.**
5. **Verify that the green OK indicator is lit.**
6. **Verify that the Top Fan indicator and the Service Action Required indicator on the server front panel are not lit.**
See [“Server Front Panel Features” on page 20](#) and [“Server Back Panel Features” on page 20](#) for locations of system indicators.
7. **If necessary, return the server to the normal rack position.**

- a. **Ensure the cables are free from binding and pinching.**
 - b. **Slide the server into the rack until it locks into place.**
 - c. **If necessary, close the CMA.**
8. **If you performed a cold-service procedure, power on the server.**

Fan Module Reference

The six fan modules are located at the front of the chassis and provide cooling for the three motherboard cooling zones (for more information, see [“Cooling Subsystem” on page 28](#)). The fans are hot-serviceable and accessible by partially extending the server from the rack. You do not have to remove the server cover to service the fan modules.



Caution - Server shutdown or component damage due to over-temperature condition. Fan modules provide system cooling. If a fan module fails, replace it as soon as possible. When you remove one of the fans in the back row, you must replace it within 30 seconds to prevent overheating of the server.

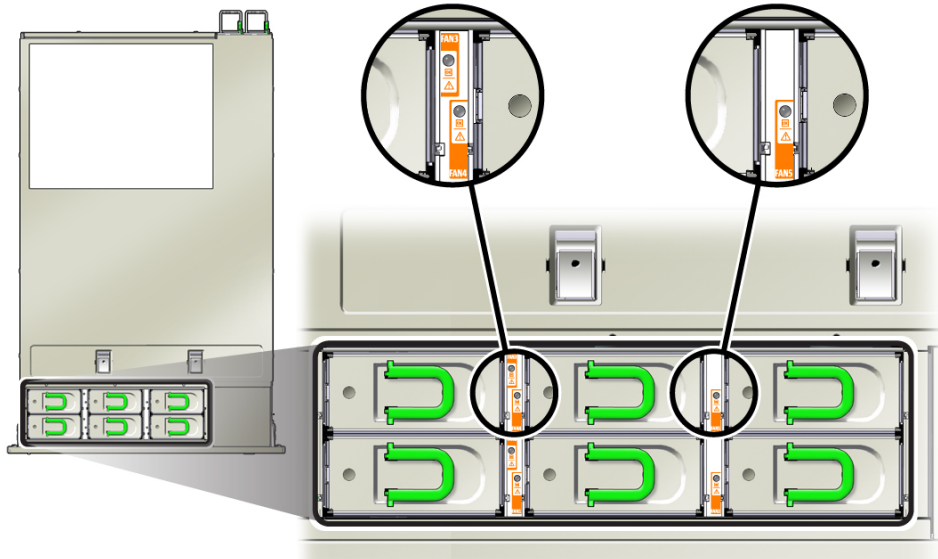
The functions of the fan module status indicators is described below.

Fan Module Indicators

The following indicators are lit when a fan module fault is detected:

- Front and back Service Action Required indicators. See [“Server Front Panel Features” on page 20](#) and [“Server Back Panel Features” on page 20](#) for locations of system indicators.
- Fan module Service Action Required indicator on the faulty fan module.
- Over Temperature Warning LED. This indicator might also light if a fan fault causes an unacceptable increase in system operating temperature.

Each fan module contains indicators that are visible from the top of the server.



OK Indicator



Green indicator. The system is powered on and the fan module is functioning correctly.

Service Action Required Indicator



Amber indicator. The fan module is faulty.

The server front and back panel Service Action Required indicators are also lit if the system detects a fan module fault.

Servicing Power Supplies (CRU)

The following sections contain procedures and information about servicing power supplies.

- [“Remove a Power Supply” on page 129](#)
- [“Install a Power Supply” on page 132](#)
- [“Power Supply Reference” on page 134](#)

▼ Remove a Power Supply



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

This procedure describes how to remove a power supply from the server.

Before You Begin

- For serviceability considerations, see [“Component Serviceability” on page 70](#).
- For power supply designation information, see [“Component Designations” on page 73](#).
- The server can be configured to use low-line 110VAC input voltage in a 2-processor configuration, however 4-processor configurations require power supplies to be configured with high-line 220VAC input.

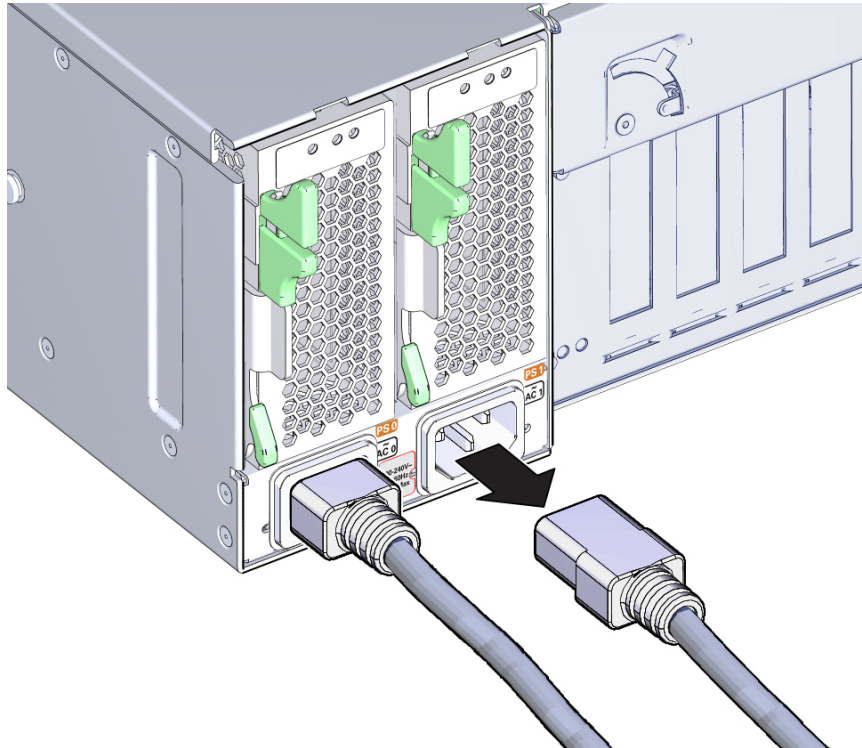
1. Prepare the server for service. See [“Prepare the Server for Hot Service” on page 93](#).

To perform a cold-service procedure, see [“Prepare the Server for Cold Service” on page 94](#).

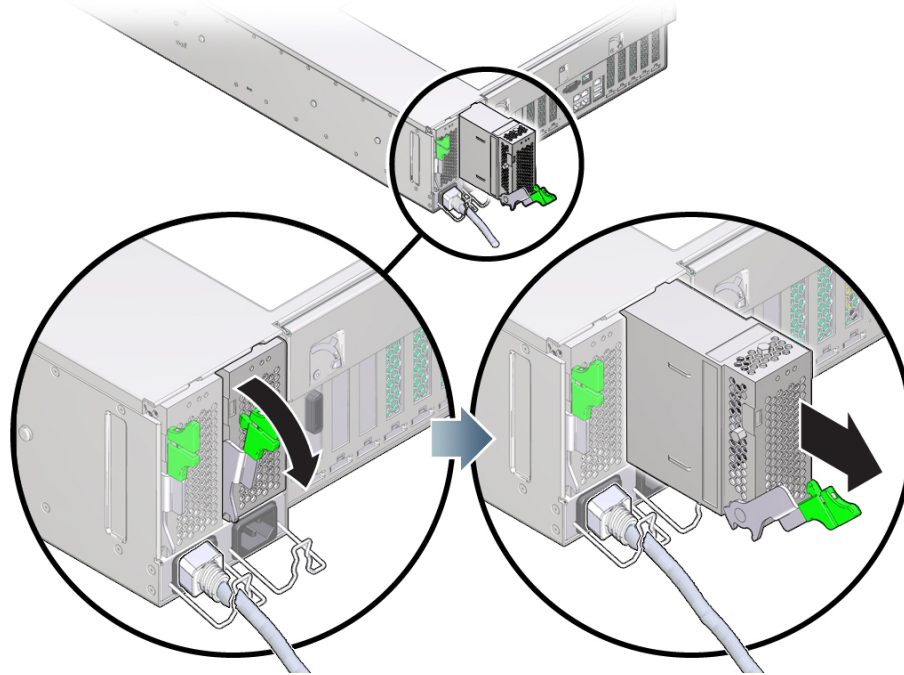
2. Identify the power supply that needs to be replaced.

A lit amber color Service Action Required indicator indicates a failed component. For more information, see [“Power Supply Reference” on page 134](#).

3. Disconnect the power cord from the failed power supply.



4. To unlock the power supply handle, squeeze the release latch.



5. To disengage the power supply, rotate the release latch fully downward.

Note - If you are replacing the power supply backplane board, the completion of this step concludes the *partial removal* of the power supply. The power supply is now disengaged from the internal power supply backplane connector.

6. To remove the power supply, use the latch to slide it partially out of the chassis until you can support it with your free hand and remove it completely.
7. To install a power supply, see [“Install a Power Supply” on page 132](#).
8. If you performed a cold-service procedure, power on the server.

▼ Install a Power Supply

This procedure describes how to install a power supply (PSU). When installing a PSU, ensure that the pawl near the hinge of the latch engages the slot in the sidewall of the PSU bay. The pawl supplies the necessary leverage to seat the PSU connector with the PSU backplane.

The correct power supply for the Sun Server X4-4 is the **A239C** model.



Caution - System overheat and shut down. Installing the incorrect model of power supply can cause the server to over heat. Install only the supported model.

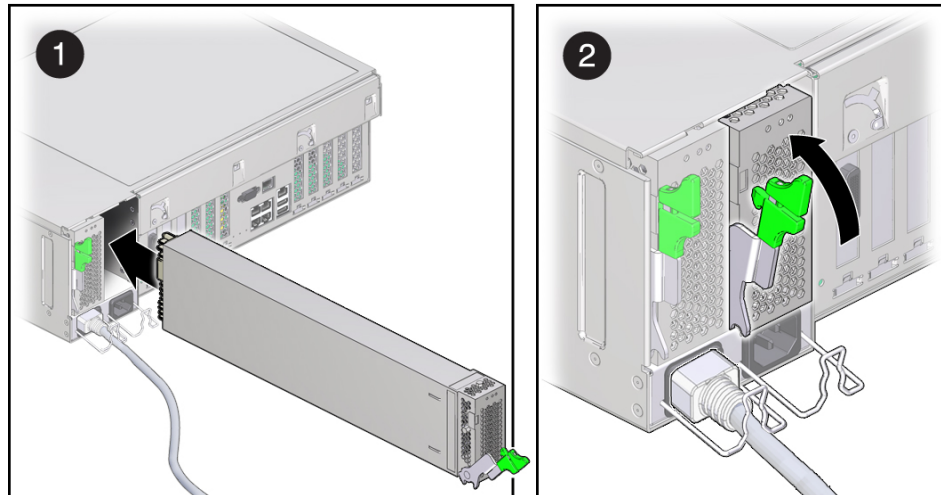
Before You Begin

- For serviceability considerations, see [“Component Serviceability” on page 70](#).
- For power supply designation information, see [“Component Designations” on page 73](#).

1. **If necessary, remove the failed power supply. See [“Remove a Power Supply” on page 129](#).**
2. **Prepare the server for service. See [“Prepare the Server for Hot Service” on page 93](#).**
To perform a cold-service procedure, see [“Prepare the Server for Cold Service” on page 94](#).
3. **Ensure that the power supply handle is in the open position.**
4. **Align the power supply with the empty power supply bay.**
5. **Slide the power supply into the bay until it stops.**
6. **To seat the power supply, rotate the release handle upward until it locks in place.**

Note - The pawl at the hinge of the handle must engage the slot at the bottom of the power supply bay.

This action of rotating the handle upward draws the power supply into the server and engages it with the internal connector.



7. **Connect the AC power cord to the power supply.**
8. **Verify that the AC Present indicator is lit.**
For more information, see [“Power Supply Reference”](#) on page 134.
9. **Verify that the following indicators are not lit:**
 - Service Action Required indicator on the power supply
 - Front and back Service Action Required indicators
 - Rear PS Failure indicator on the bezel of the serverSee [“Server Front Panel Features”](#) on page 20 and [“Server Back Panel Features”](#) on page 20 for locations of system indicators.
10. **If you performed a cold-service procedure, power on the server.**

Power Supply Reference

The server has two power supplies. The two-power supply configuration ensures redundancy. This allows the server to operate when one of the power supplies fails. However when the server is operating on one power supply, redundancy no longer exists, and the risk for an unexpected shut down and a loss of data is high. When a power supply or any component that is part of a redundant configuration fails, replace it immediately.

Power Supply Indicators

Each power supply contains an indicator panel. The following indicators are lit when a power supply fault is detected:

- Front and back Service Action Required indicators
- Rear PS Fault indicator on the front bezel of the server
- Service Action Required indicator on the faulty power supply

See [“Server Front Panel Features” on page 20](#) and [“Server Back Panel Features” on page 20](#) for locations of system indicators.

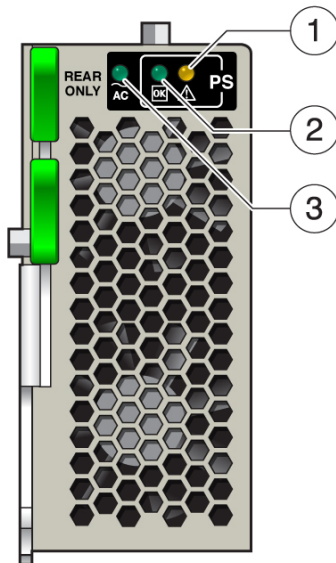


Figure Legend	Description
1	Amber Service Action Required
2	Green DC OK
3	Green AC OK

Service Action Required Indicator



Amber indicator. Indicates that the power supply is faulty and service-related action is required.

DC OK Indicator



Green indicator. Indicates that both DC outputs (3.3V standby and 12V main) are active and within regulation.

AC OK Indicator



Green or Amber indicator. Indicates:

- Green: AC voltage within operating range is applied to the power supply.
- Amber: AC range below operating range is applied to the power supply.

Servicing Memory Risers and DIMMs (CRU)

Use the following sections when servicing memory riser cards and DIMMs:

- [“Removing and Installing Memory Riser Cards and DIMMs” on page 136](#)
- [“Memory Riser Card and DIMM Reference” on page 148](#)

Removing and Installing Memory Riser Cards and DIMMs

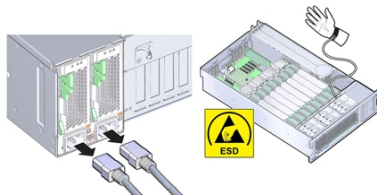
Use the following procedures to remove and install memory risers, DIMMs, and filler panels.

- [“Replace a Faulty DIMM” on page 136](#)
- [“Replace a Faulty Memory Riser Card” on page 137](#)
- [“Remove a Memory Riser Card” on page 139](#)
- [“Identify a Faulty DIMM” on page 140](#)
- [“Remove a DIMM” on page 141](#)
- [“Install a DIMM” on page 143](#)
- [“Install a Memory Riser Card” on page 145](#)

▼ Replace a Faulty DIMM

Use this procedure to replace a faulty DIMM.

When servicing the components in this section, unplug the AC power cords and use ESD protection.

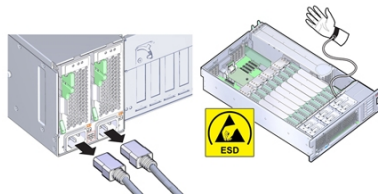


Tip - To view a video of replacing a DIMM, see http://docs.oracle.com/cd/E38212_01/videos/E55189/dimmreplace.html.

- Before You Begin**
- For serviceability considerations, see “Component Serviceability” on page 70.
 - For DIMM designation information, see “Component Designations” on page 73.
 - For reference information, see “Memory Riser Card and DIMM Reference” on page 148.
1. **Identify the MR card containing the faulty DIMM.** See “Locate a Failed Memory Riser Card, DIMM, or CPU” on page 86.
 2. **Remove the MR card.** See “Remove a Memory Riser Card” on page 139.
 3. **Identify the faulty DIMM.** See “Identify a Faulty DIMM” on page 140.
 4. **Remove the faulty DIMM.** See “Remove a DIMM” on page 141.
 5. **Install the replacement DIMM.** See “Install a DIMM” on page 143.
 6. **Install the MR card.** See “Install a Memory Riser Card” on page 145.
 7. **Prepare the server for operation.** See “Prepare the Server for Operation” on page 231.

▼ Replace a Faulty Memory Riser Card

When servicing the components in this section, unplug the AC power cords and use ESD protection.



Tip - To view a video of replacing a Memory Riser card, see http://docs.oracle.com/cd/E38212_01/videos/E56130/memoryriser3b.html.

- Before You Begin**
- For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - For memory riser card designation information, see [“Component Designations” on page 73](#).
 - For reference information, see [“Memory Riser Card and DIMM Reference” on page 148](#).

1. **Identify the faulty MR card.** See [“Locate a Failed Memory Riser Card, DIMM, or CPU” on page 86](#).
2. **Remove the MR card.** See [“Remove a Memory Riser Card” on page 139](#).
3. **Set the faulty card next to the replacement card on an ESD-safe work space.**

Tip - Position the cards, so the orientation is the same.

4. **Make note of the DIMM population configuration on the faulty card.**
You must replicate this same DIMM population configuration on the replacement card. The slots are color coded (for more information, see [“Memory Riser Card and DIMM Reference” on page 148](#)).

Note - Ensure that you replicate the same DIMM configuration on the replacement card.

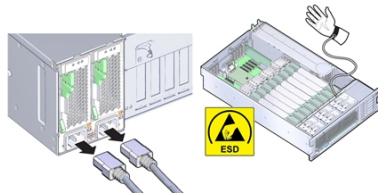
5. **Transfer the DIMMs from the slots on the faulty MR card to the same slots on the replacement card:**

Tip - Transfer the DIMMs from the faulty card to the replacement card one at a time.

- a. **Remove a DIMM from the faulty MR card.** See [“Remove a DIMM” on page 141](#).
 - b. **Install the DIMM on the replacement card.** See [“Install a DIMM” on page 143](#).
 - c. **Repeat the above steps until all DIMMs are transferred from the faulty card to the replacement card.**
6. **Install the MR card.** See [“Install a Memory Riser Card” on page 145](#).
 7. **Prepare the server for operation.** See [“Prepare the Server for Operation” on page 231](#).

▼ Remove a Memory Riser Card

When servicing the components in this section, unplug the AC power cords and use ESD protection.



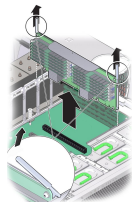
Use this procedure to remove a memory riser (MR) card to:

- [“Replace a Faulty DIMM” on page 136](#)
- [“Replace a Faulty Memory Riser Card” on page 137](#)

Before You Begin

- For serviceability considerations, see [“Component Serviceability” on page 70](#).
- For memory riser card designation information, see [“Component Designations” on page 73](#).
- For reference information, see [“Memory Riser Card and DIMM Reference” on page 148](#).

1. **Prepare for service. See [“Prepare the Server for Cold Service” on page 94](#).**
2. **To remove the MR card, pull the handles upward to disengage the connector from the motherboard and carefully lift the memory riser straight up and out of the server.**



The handles act as levers against the sidewalls to extract the card connector from the connector on the motherboard.

- Next Steps**
- [“Install a Memory Riser Card” on page 145](#)

-or-

- [“Remove a DIMM” on page 141](#)

-or-

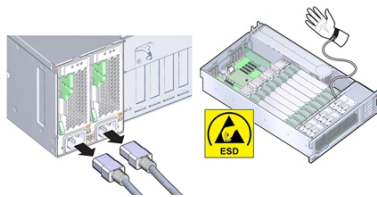
- [“Install a DIMM” on page 143](#)

-or-

- [“Replace the Motherboard \(FRU\)” on page 223](#)

▼ Identify a Faulty DIMM

When servicing the components in this section, unplug the AC power cords and use ESD protection.



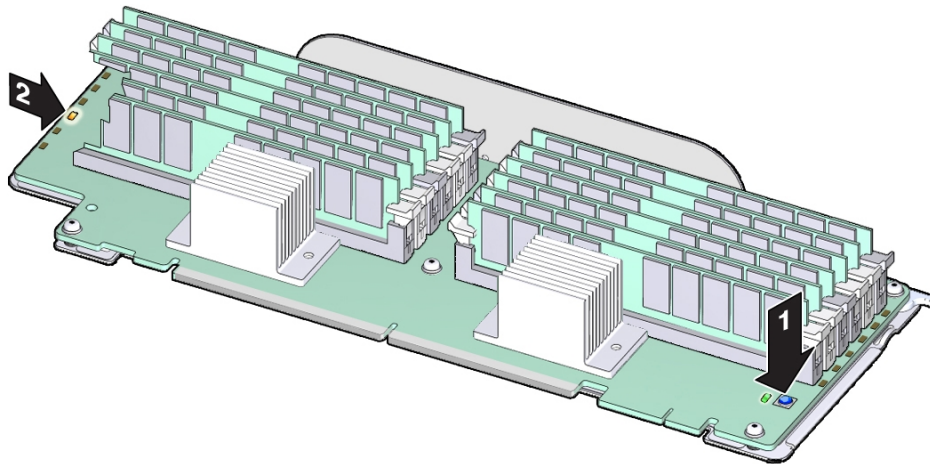
To identify a faulty DIMM, use the DIMM Fault Remind circuitry that is located on the memory riser (MR) card.

Note - Once power is removed from the server, you have 10 minutes to use the DIMM fault remind test circuit.

- Before You Begin**
- For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - For DIMM designation information, see [“Component Designations” on page 73](#).
 - For reference information, see [“Memory Riser Card and DIMM Reference” on page 148](#).

1. **Use Oracle ILOM to identify the failed DIMM in the system. See [“Troubleshoot Hardware Faults” on page 37](#)**
Oracle ILOM can provide the memory riser card and DIMM designations for the failed DIMM.
2. **If Oracle ILOM is showing multiple DIMMs in a failed state, see [“Troubleshooting a Multi-DIMM Failure State” on page 153](#).**

3. **Identify the memory riser card that contains the failed DIMM.** See [“Locate a Failed Memory Riser Card, DIMM, or CPU” on page 86.](#)
4. **Remove the MR card.** See [“Remove a Memory Riser Card” on page 139.](#)
5. **Press and hold the DIMM Fault Remind button.**
The DIMM Fault Remind button activates the on board Fault Remind circuitry.

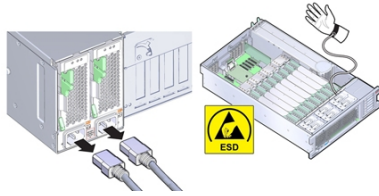


6. **Ensure that when the button is pressed, the DIMM Fault Remind OK indicator is lit.**
The indicator is located next to the Fault Remind button. A lit indicator confirms that the circuit has power and is usable.
7. **With the Fault Remind button pressed, look for a lit DIMM Fault indicator LED.**
The indicators are located next to each DIMM slot. A lit indicator identifies the slot containing the faulty DIMM.

Next Steps ■ [“Remove a DIMM” on page 141](#)

▼ Remove a DIMM

When servicing the components in this section, unplug the AC power cords and use ESD protection.

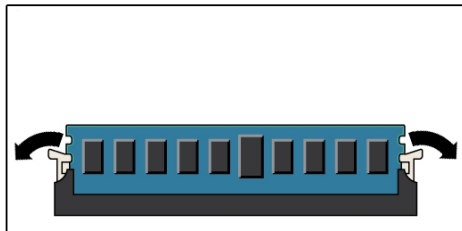


Note - DIMMs are cold-service components. The server must be completely removed from its power source.

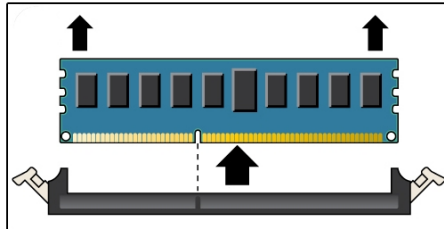
Use this procedure to remove a DIMM from its slot on the memory riser (MR) card.

- Before You Begin**
- For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - For DIMM designation information, see [“Component Designations” on page 73](#).
 - For reference information, see [“Memory Riser Card and DIMM Reference” on page 148](#)

1. **If necessary, identify the faulty DIMM. See [“Identify a Faulty DIMM” on page 140](#).**
2. **To remove the DIMM do the following:**
 - a. **Rotate both DIMM slot ejector levers outward as far as they will go.**
The action unlocks and expels the DIMM from the socket.



- b. Carefully lift the DIMM straight up to remove it from the socket.

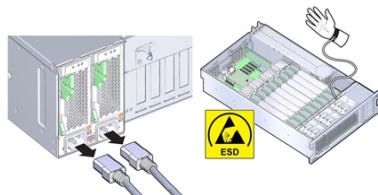


3. Repeat the above steps until all faulty DIMMs are removed.

Next Steps ■ [“Install a DIMM” on page 143](#)

▼ Install a DIMM

When servicing the components in this section, unplug the AC power cords and use ESD protection.



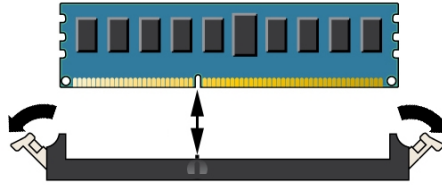
Use this procedure to install a DIMM into a slot on a memory riser (MR) card.

- Before You Begin**
- For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - For DIMM designation information, see [“Component Designations” on page 73](#).
 - For reference information, see [“Memory Riser Card and DIMM Reference” on page 148](#).

1. Ensure that the DIMM ejector levers at both ends of the DIMM slot are in a fully open position.

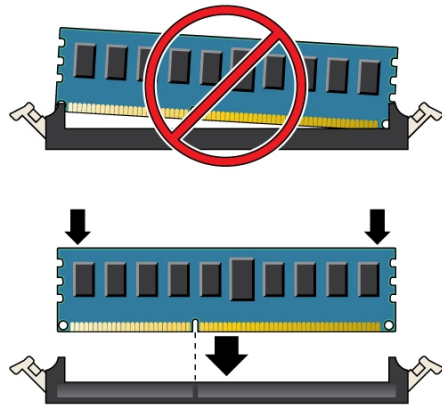
2. Align the DIMM with the empty slot.

The DIMM is keyed with a notch that needs to align with a protrusion in the DIMM slot. The keying ensures that the DIMM is installed correctly.



3. Gently and evenly push the DIMM into the slot until the ejector levers rise.

The levers rise as the DIMM is pushed further into the slot.



4. Ensure that the levers have risen completely and have locked the DIMM in the slot.



5. Repeat the above steps until all replacement DIMMs are installed.

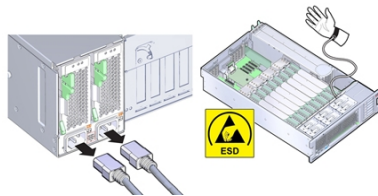


Caution - Component damage. Open DIMM ejector levers can break off during the installation of the memory riser (MR) card. All populated and unpopulated DIMM slot ejector levers on the MR card must be in the fully-closed position before installing the card in the server. Ensure that all levers are closed and locked.

Next Steps ■ [“Install a Memory Riser Card” on page 145](#)

▼ Install a Memory Riser Card

When servicing the components in this section, unplug the AC power cords and use ESD protection.



Use this procedure to install a memory riser (MR) card into its slot.

Before You Begin ■ For serviceability considerations, see [“Component Serviceability” on page 70](#).

- For DIMM designation information, see [“Component Designations”](#) on page 73.
- For reference information, see [“Memory Riser Card and DIMM Reference”](#) on page 148.

1. **Ensure that all populated and unpopulated DIMM slot ejector levers are in the closed and locked position.**



Caution - Component damage. Open DIMM ejector levers can break off during the installation of the memory riser (MR) card. All populated and unpopulated DIMM slot ejector levers on the MR card must be in the fully-closed and locked position before installing the card in the server.

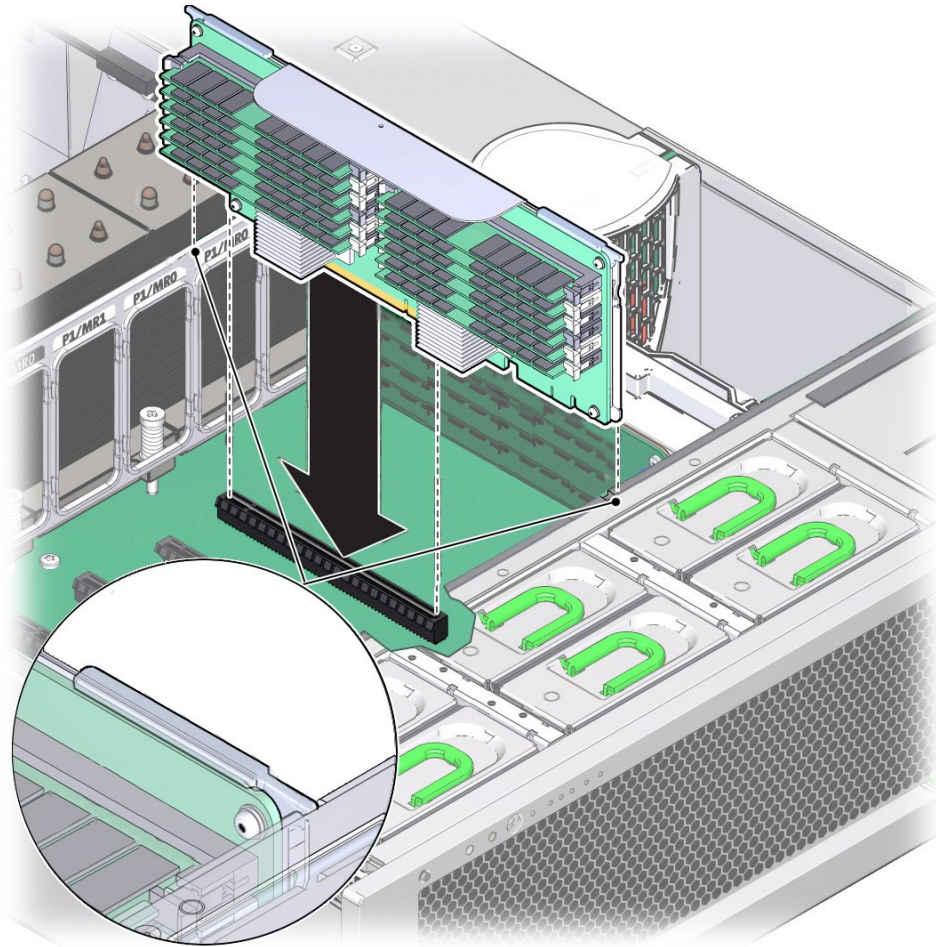
2. **Ensure that the MR card ejector levers are in the closed position.**

The ejector levers are only used to remove a MR card and are **not** used to install a card.

3. **Orient the MR card over the slot on the motherboard.**

The DIMMs on the card must face the left (when positioned at the front of the server).

4. Lower the MR card into the server and set it on the slot on the motherboard.



5. Ensure that the MR card connector is aligned with the slot.
6. To install the card, firmly push down on the metal bracket on top of the card. This action seats the card within the connector on the motherboard.
7. Prepare the server for operation. See [“Prepare the Server for Operation”](#) on page 231.

See Also ■ [“Replace the Motherboard \(FRU\)” on page 223](#)

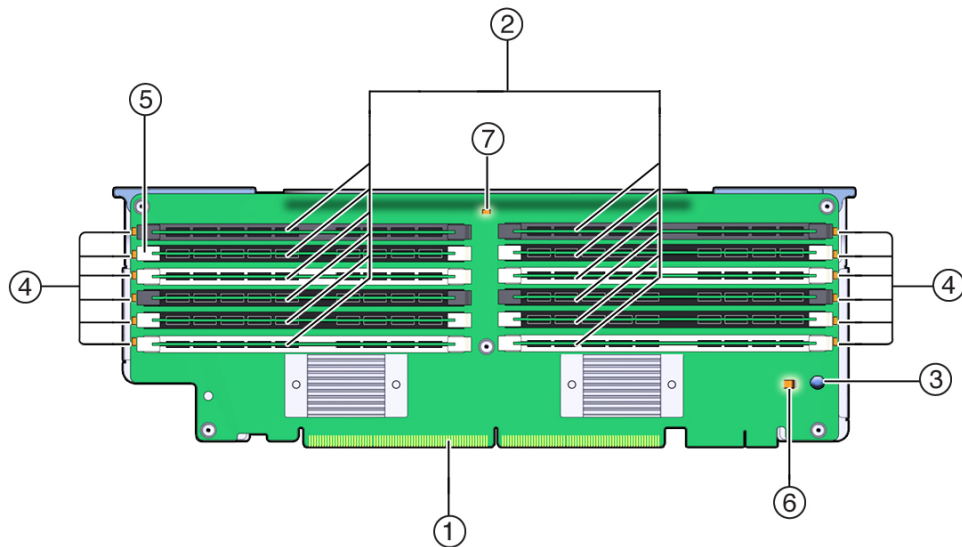
Memory Riser Card and DIMM Reference

The following sections contain information about memory riser cards and DIMMs:

- [“Memory Riser Card Components” on page 148](#)
- [“Memory Riser Cards Physical Layout” on page 149](#)
- [“Memory Riser Card Population Rules” on page 150](#)
- [“Supported DIMMs and DIMM Population Rules” on page 151](#)
- [“Troubleshooting a Multi-DIMM Failure State” on page 153](#)

Memory Riser Card Components

The following illustration shows the components of the memory riser card.



Call Out	Description	Call Out	Description
1	Connector	5	DIMM ejector/locking levers (two on each slot)
2	DIMM slots (12)	6	Charge status indicator (green)
3	Fault Remind button	7	Memory riser card fault indicator
4	DIMM fault indicators		

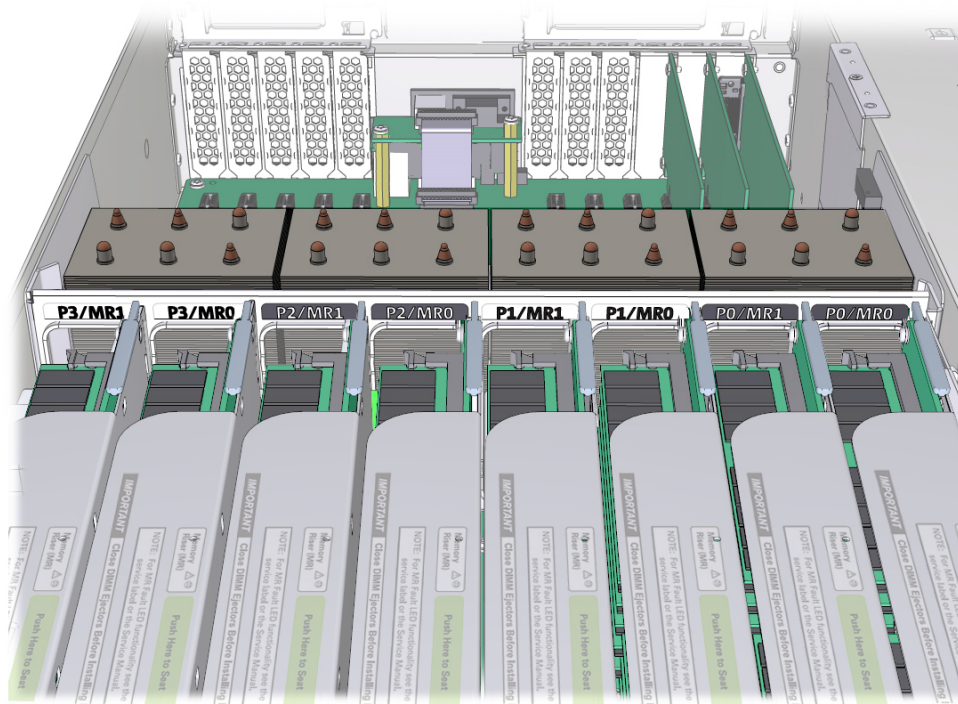
Memory Riser Cards Physical Layout

The memory riser cards are located behind the fan module bay. The designations for the memory riser (MR) card slots, and the CPUs that are associated with each slot, are located inside the server on labels affixed to the rear MR card bracket. The cards are designated as MR, and the CPUs are designated as P. The slots and CPUs are labeled from right to left (when viewed from the front of the server) as:

Note - Each CPU has two assigned card slots (MR0 and MR1).

- P0/MR0 (rightmost slot)
- P0/MR1
- P1/MR0
- P1/MR1
- P2/MR0
- P2/MR1
- P3/MR0
- P3/MR1 (leftmost slot)

The following illustration shows the numbering for the memory riser slots and their associated CPUs as described above:



Memory Riser Card Population Rules

The memory riser population rules for the Sun Server X4-4 are as follows:

1. Each CPU has two dedicated memory riser card slots (MR0 and MR1).
2. The dedicated memory riser slots for each installed CPU must contain a memory riser card.
 - A two CPU system must contain four memory riser cards
 - A four CPU system must contain eight memory riser cards
3. When populating the server with memory riser cards:
 - First populate riser slot MR0 for each CPU, starting with the lowest numbered CPU (P0).
 - Then populate riser slot MR1 for each CPU, starting with the lowest numbered CPU (P0).

Supported DIMMs and DIMM Population Rules

This section describes the supported DIMM configuration and population rules for memory risers in the system. Use only Oracle supported DIMMs in the system.

Supported configurations:

- Minimum supported configuration:
 - Two or Four-CPU system:
 - Two DDR3 (Double Data Rate 3) 16 GB low voltage RDIMMs (Registered Dual In-Line Memory Modules) installed in each memory riser (slots D0 and D3).
- Maximum supported configuration:
 - Two-CPU system:
 - Up to 48 DDR3 low voltage RDIMMs *or* LRDIMMs (Load Reduced Dual In-Line Memory Modules) are supported.
 - Four-CPU system:
 - Up to 96 DDR3 low voltage RDIMMs *or* LRDIMMs are supported.

Supported DIMM types and sizes available from Oracle:

Note - DIMM system performance speed maximum is 1333 MHz (even if the DIMM is rated higher).

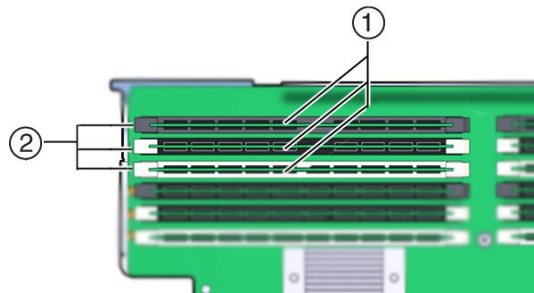
DIMM Size	Type	Organization
8 GB	DDR3-1600 LV RDIMM	Dual-rank by-4 (2Rx4)
(These DIMMs are no longer orderable as of June 2014.)		
16 GB	DDR3-1600 LV RDIMM	Dual-rank by-4 (2Rx4)
32 GB	DDR3-1600 LV LRDIMM	Quad-rank by-4 (4Rx4)

Population rules:

- Only one type and size DIMM is supported in the system at any time. Mixing DIMMs of different size or technology (such as RDIMMs and LRDIMMs) is not supported.
- When upgrading to a different size DIMM, replace all DIMMs in the system to match the new capacity.
- All memory riser cards must be populated identically.

- Install DIMMs in the following sequence for each memory riser card (refer to the illustrations that follow for additional details):
 1. For a system with the minimum configuration (two DIMMs per riser), add two more DIMMs to memory riser slots D6 and D9 for each memory riser in the system. The end result being that DIMM slots D0, D3, D6 and D9 (black/black slots) are all populated. This provides a one DIMM per channel configuration across both memory buffers. Additional memory upgrades are done in increments of *four* DIMMs per riser, as follows:
 2. Next, populate riser slots D1, D4, D7 and D10 (black/white slots). This provides a two DIMM per channel configuration.
 3. And finally, populate riser slots D2, D5, D8 and D11 (white/white slots). This provides a three DIMM per channel configuration.

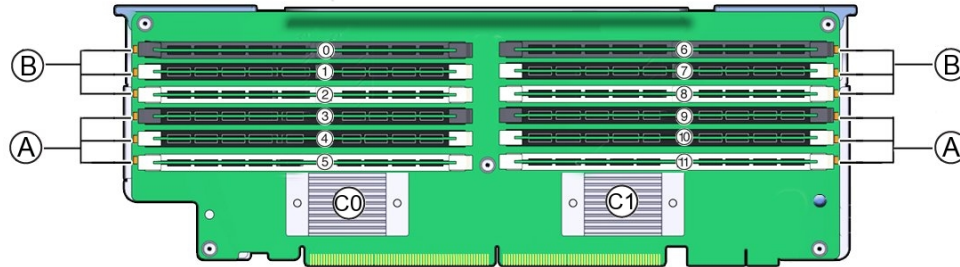
The memory slots and ejector levers are color coded using a black and white color scheme to aid in installation. Slots can have a black slot with black levers (black/black slots), black slot with white levers (black/white slots), or white slot with white levers (white/white slots) as shown in the following illustration:



Call Out	Description
1	Slots
2	Levers

Memory Riser layout:

The following illustration shows the DIMM slot and channel designations on the memory riser card:



Call Out	Description
0 - 11	DIMM slot numbers. Board labeling prepends a "D" to the slot number (for example: D0–D11).
B	Channel B slots: D0–D2 for memory buffer 0; D6–D8 for memory buffer 1.
A	Channel A slots: D3–D5 for memory buffer 0; D9–D11 for memory buffer 1.
C0	Memory buffer 0.
C1	Memory buffer 1.

Troubleshooting a Multi-DIMM Failure State

A multi-DIMM failure state is when a single DIMM failure causes other DIMMs in the same channel (or a second channel) on a memory riser card to become disabled or appear as if they have failed.

When a DIMM failure occurs, check the Oracle ILOM system event log (SEL) to:

- Identify the first DIMM that failed.
- Note any additional DIMM failures occurring closely after the initial DIMM failure.
- Identify the memory riser card that contains the failed DIMM.
- Note the channel(s) in which any additional DIMM failures have occurred.

If another DIMM (or DIMMs) has failed after the initial occurrence of a single DIMM failure, and, if the DIMM failure is on the same memory riser card, then the server might be in multi-DIMM failure state.

For example, you might see the following in the system error log:

135 Sun May 21 00:53:57 2000 DIMM Service Required Memory P0/MR0/D9 (CPU Memory Riser 0 DIMM 9)

A failure has occurred during Memory Reference Code (MRC) DIMM module training. (Probability:100, UUID:2a182715-983f-c4fb-e94f-b5a5b50d3650, Part Number:001-0003-01,HMT42GR7AFR4A-PB, Serial Number:00AD011321345849FF, Reference Document:<http://support.oracle.com/msg/SPX86A-8004-67>)

126 Sun May 21 00:53:56 2000 DIMM Service Required Memory P0/MR0/D6 (CPU Memory Riser 0 DIMM 6)

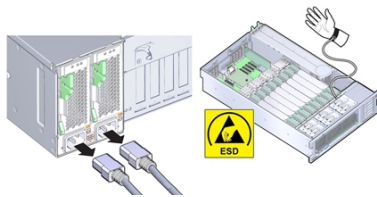
A failure has occurred during Memory Reference Code (MRC) DIMM module training. (Probability:33, UUID:9014a82c-7bf9-ee96-b61b-9c7ccedc9aed, Part Number:001-0003-01,HMT42GR7AFR4A-PB, Serial Number:00AD01132129B11E9E, Reference Document:<http://support.oracle.com/msg/SPX86A-8004-67>)

In this scenario, the DIMM in D6 shows as failed at 00:53:56, and that failure is subsequently followed by a reported failure of the DIMM in D9, which failed at 00:53:57. Both DIMMs are on the same memory riser card (P0/MR0). Each DIMM is on a separate channel, but both are linked to the same memory buffer ASIC. Additionally, all of the DIMMs in both channels might have been disabled by the system. This scenario could be an instance of a multi-DIMM failure state.

How to Troubleshoot a Multi-DIMM Failure State

To troubleshoot this issue, replace only the DIMM that logged the initial failure and return the server to operation to see if the multi-DIMM failure state persists. If a multi-DIMM failure state had occurred, replacing only the DIMM that failed initially would rectify the fault state of the initial DIMMs and the subsequent DIMMs. If the failures persists, the issue could be with the DIMMs or with the memory riser card.

Servicing PCIe Cards and PCIe Card Filler Panels

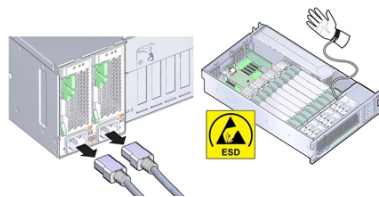


Use the following procedures to remove and install PCIe cards and PCIe card filler panels:

- [“Remove a PCIe Slot Filler Panel” on page 155](#)
- [“Remove a PCIe Card” on page 156](#)
- [“Install a PCIe Card” on page 158](#)
- [“Install a PCIe Card Filler Panel” on page 162](#)
- [“PCIe Slot Reference” on page 164](#)

▼ Remove a PCIe Slot Filler Panel

When servicing the components in this section, unplug the AC power cords and use ESD protection.



Caution - Component damage. Ensure that all power is removed from the server before removing or installing expansion cards. You must disconnect the power cables before performing this procedure.

1. **Prepare for service.** See [“Prepare the Server for Cold Service” on page 94](#).
2. **Locate the PCIe card filler panel that you want to remove.**
See [“Server Back Panel Features” on page 20](#) for information about PCIe slots and their locations.
3. **Disengage the PCIe slot crossbar from its locked position and rotate the crossbar into an upright position.**
4. **Remove the PCIe card filler panel from the PCIe slot.**

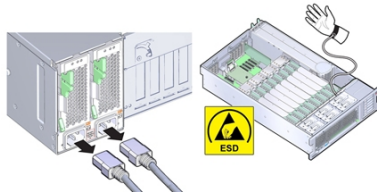


Caution - Server over temperature. Whenever you remove a PCIe card filler panel, you should replace it with another filler panel or a PCIe card; otherwise, the server might overheat due to improper airflow.

Next Steps ■ [“Install a PCIe Card” on page 158](#)

▼ Remove a PCIe Card

When servicing the components in this section, unplug the AC power cords and use ESD protection.



Caution - Component damage. Ensure that all power is removed from the server before removing or installing expansion cards. You must disconnect the power cables before performing this procedure.

Tip - To view a video of replacing a PCIe card, see http://docs.oracle.com/cd/E38212_01/videos/E56831/pcie-replace.html.

- Before You Begin**
- For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - For PCIe slot designation information, see [“Component Designations” on page 73](#).

1. Prepare for service. See [“Prepare the Server for Cold Service” on page 94](#).

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

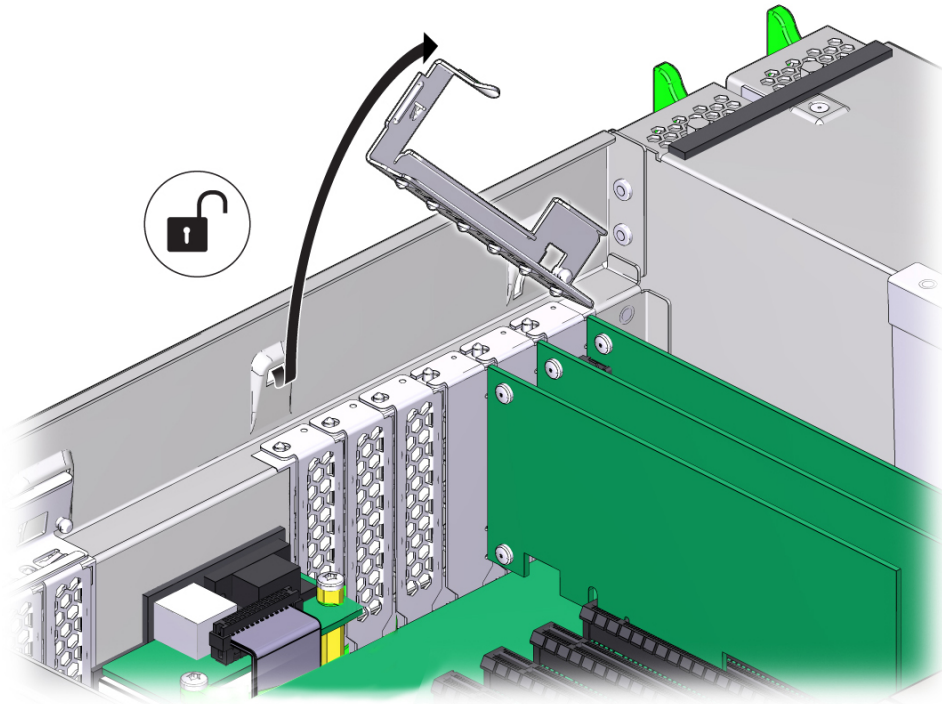
See [“Server Back Panel Features” on page 20](#) for information about PCIe slots and their locations.

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

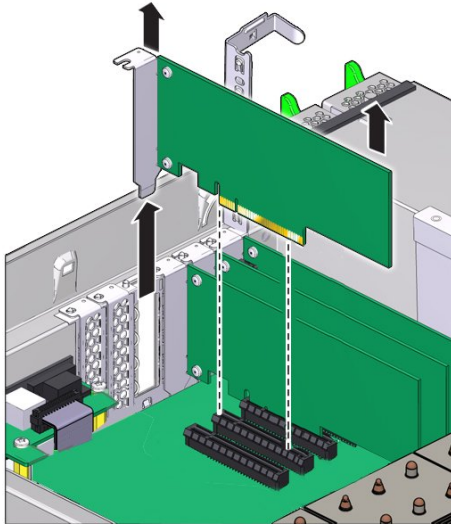
4. Unplug all data cables from the PCIe card.

Make note of the cables, so you can install them in the same connectors on the replacement card.

5. To disengage the PCIe card retaining bar, push down on the bar, move it away from the server back wall, and lift it to an upright position.



6. Carefully remove the PCIe card from the PCIe card slot.



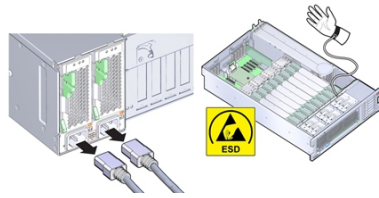
Caution - Server over temperature. Whenever you remove a PCIe card, you should replace it with another PCIe card or a filler panel; otherwise, the server might overheat due to improper airflow.

7. If you are not installing a card in the slot, install a PCIe slot filler.

- Next Steps
- [“Install a PCIe Card” on page 158](#)
 - OR-
 - [“Replace the Motherboard \(FRU\)” on page 223](#)
 - OR-
 - [“Prepare the Server for Operation” on page 231](#)

▼ Install a PCIe Card

When servicing the components in this section, unplug the AC power cords and use ESD protection.



This procedure describes how to install a PCIe card.



Caution - Component damage. Ensure that all power is removed from the server before removing or installing PCIe cards. You must disconnect the power cables before performing this procedure.

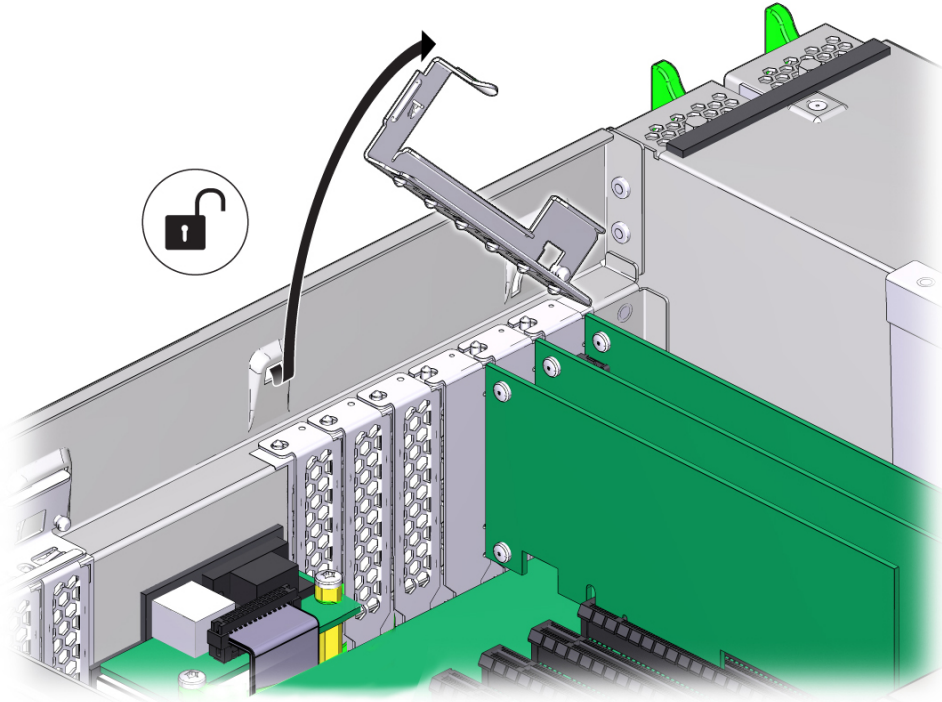
Tip - To view a video of installing a PCIe card, see http://docs.oracle.com/cd/E38212_01/videos/E56832/pcie-install.html.

Before You Begin

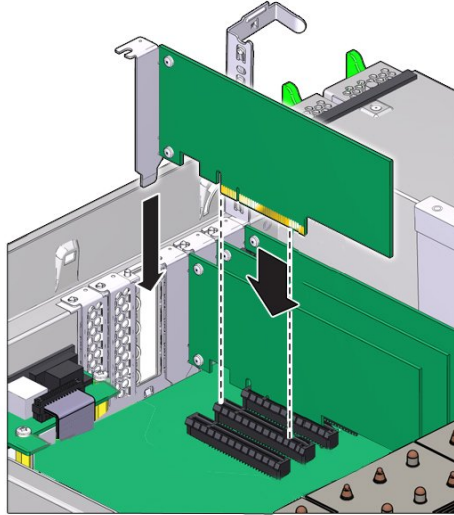
- For serviceability considerations, see “[Component Serviceability](#)” on page 70.
- For PCIe slot designation information, see “[Component Designations](#)” on page 73.

1. **Unpack the PCIe card and place it on an antistatic mat.**
2. **Prepare the server for service. See “[Prepare the Server for Cold Service](#)” on page 94.**

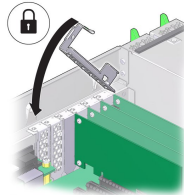
3. To disengage the PCIe card retaining bar, push down on the bar, move it away from the server back wall, and lift it to an upright position.



4. Install the PCIe card into the PCIe card slot.



5. Return the PCIe card slot crossbar to its closed and locked position.



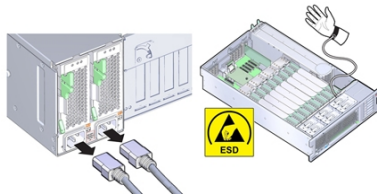
6. Prepare the server for operation. See [“Prepare the Server for Operation” on page 231](#).
7. If the PCIe card being installed is replacing a faulty PCIe card, manually clear the PCIe card fault using Oracle ILOM (see [“Clear Hardware Fault Messages” on page 90](#)).
8. Refer to the documentation shipped with the PCIe card for information about configuring the PCIe card, including installing required operating systems.

To create or recover RAID configurations, refer to the *LSI MegaRAID SAS Software User's Guide*, which is available at the following location: <http://www.lsi.com/support/sun>

See Also ■ [“Replace the Motherboard \(FRU\)” on page 223](#)

▼ Install a PCIe Card Filler Panel

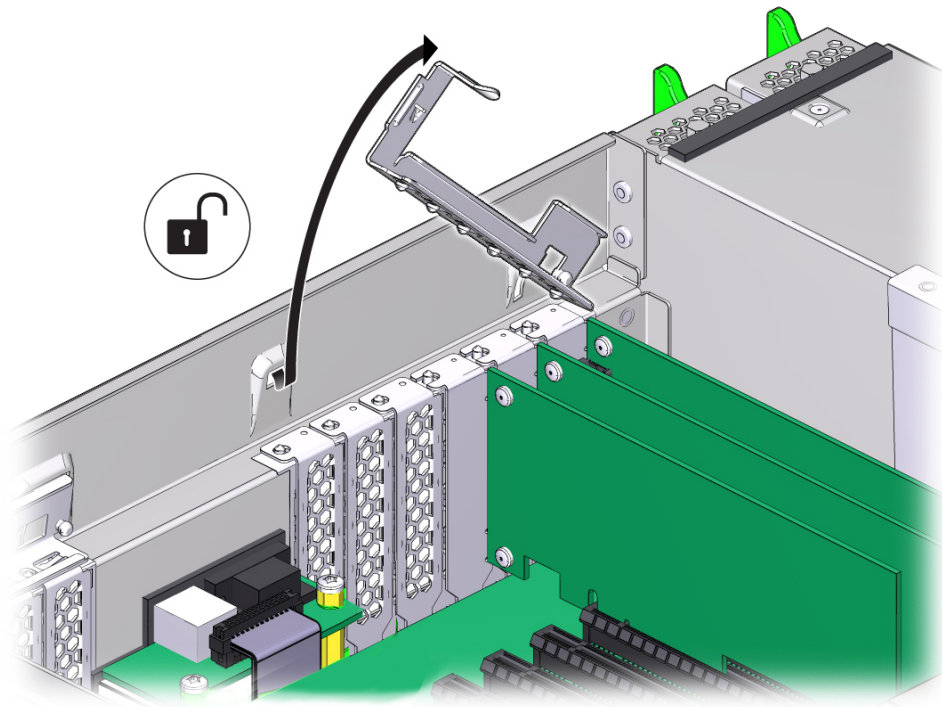
When servicing the components in this section, unplug the AC power cords and use ESD protection.



Caution - Component damage. Ensure that all power is removed from the server before removing or installing PCIe card filler panels. You must disconnect the power cables before performing this procedure.

1. **Prepare the server for service.** See [“Prepare the Server for Cold Service” on page 94.](#)

2. To disengage the PCIe card retaining bar, push down on the bar, move it away from the server back wall, and lift it to an upright position.



3. Install the PCIe card filler panel into the PCIe card slot.
4. Return the PCIe card slot crossbar to its closed and locked position.
5. Prepare the server for operation. See [“Prepare the Server for Operation”](#) on page 231.

HBA Reference

The six-slot storage backplane and the DVD-RW drive are connected to a low-profile SAS2 PCIe HBA (factory installed in PCIe Slot 2) by two mini SAS4I cables. The two cables are

color coded. One cable has white labels on both ends (with the designation 7044138). One end of the cable has a single mini SAS4I connector, and the other end has two connectors (a split end) with a mini SAS4I connector and a smaller SATA connector. The other cable has a yellow labels on both ends (with the designation: 7044137), and both ends have mini SAS4I connectors.

Cable Connections and Routing

The split end of the white cable (7044138) connects to the HBA side. The larger mini-SAS4I connector connects to the bottom slot on the HBA card, and the smaller (SATA DVD-RW drive) connector connects to the motherboard at J5105. Route the cables between processor P0 and the PSU sidewall, ensuring that the white cable is on top and the two cables are flat and not twisted. Continue to route the cables through the divider using the cables clips to ensure the cables pass to the other side of the divider. At the storage backplane, the white cable connects to the top connector and the yellow cable connects to the bottom connector.

PCIe Slot Reference

This section contains the following information about the server PCIe slots:

- [“PCIe Slot Length and Capabilities” on page 164](#)
- [“PCIe Card Slot Population Order” on page 165](#)
- [“PCIe Cards With Boot Devices” on page 165](#)

For slot designation information, see [“PCIe Slot Designations” on page 77](#).

For details about supported PCIe cards, card quantity, and slot restrictions, refer to the *Sun Server X4-4 Product Notes*

PCIe Slot Length and Capabilities

The server contains 11 low-profile PCIe 2.0 card slots, which have the following length and capabilities:

- Slots 1, 2, 3, 4, 5, 6, 7, 9 and 10 have a x8 connector (x8 electrical interface)
- Slots 8 and 11: x16 connector (x8 or x16 electrical interface)

PCIe Card Slot Population Order

The total number of PCIe cards and the slot population order depends on the server CPU configuration.

- A two-CPU configuration has CPUs installed in processor sockets P0 and P1, which gives the server access to PCIe slots 1,2,3,4,5, and 6.
- A four-CPU configuration has CPUs installed in all four processor sockets, which gives the server access to all 11 PCIe slots.

In both configurations, PCIe slot 2 is reserved for the storage drive HBA, which leaves five available slots for a two-CPU configuration and 10 available slots for a four-CPU configuration.

As a general rule, when installing a PCIe card in the server, use the following population order:

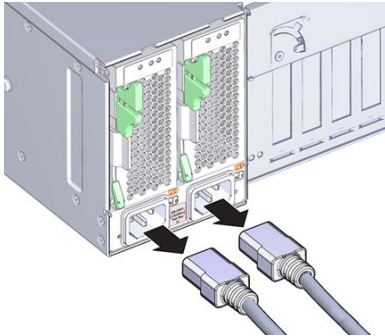
- For a two-CPU configuration, the slot population order is: slot 6, 4, 5, 3, 1.
For example: When installing a PCIe card in a two-CPU configured server, first, determine if slot 6 is available. If it is available, install the card in the slot. If it is not available, determine if slot 4 is available. If slot 4 is not available, determine if slot 5 is available. Continue this process with slots 3, and 1 until you find an available slot.
- For a four-CPU configuration, the slot population order is: slot 11, 8, 6, 4, 10, 7, 5, 3, 9, 1
For example, when installing a PCIe card in a four-CPU configured server, first determine if slot 11 is available. If it is available, install the card in the slot. If it is not available, determine if slot 8 is available. If slot 8 is not available, determine if slot 6 is available. Continue this process with slots 4, 10, 7, 5, 3, 9, and 1 until you find an available slot.

PCIe Cards With Boot Devices

If the server has several PCIe cards installed that provide boot devices, disable the Option ROM on the PCIe slots not used for booting. By default, the BIOS enables Option ROMs for PCIe slot 2 and the four on-board 10 Gigabit Ethernet ports.

Servicing the DVD Drive (CRU)

When servicing the components in this section, unplug the AC power cords.

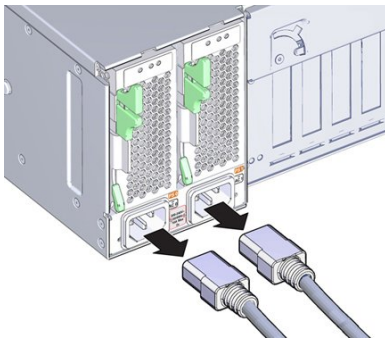


Use the following procedures to remove and replace the DVD drive and DVD drive filler panel:

- [“Remove the DVD Drive or DVD Drive Filler Panel” on page 166](#)
- [“Install the DVD Drive or DVD Drive Filler Panel” on page 168](#)

▼ Remove the DVD Drive or DVD Drive Filler Panel

When servicing the components in this section, unplug the AC power cords.



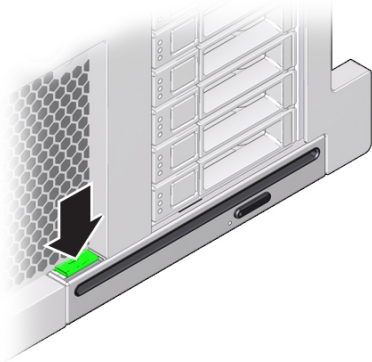
This procedure describes how to remove the DVD drive or DVD drive filler panel.

Before You Begin ■ For serviceability considerations, see [“Component Serviceability” on page 70](#).

1. **Prepare for service** (see [“Prepare the Server for Cold Service” on page 94](#)).

To replace the DVD drive, the server must be disconnected from the power source.

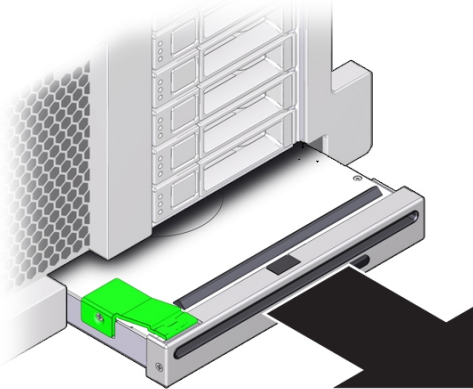
2. At the front of the server, push down on the latch on the top left corner of the DVD drive or filler panel.



3. Slide the DVD drive or filler panel out of the server.

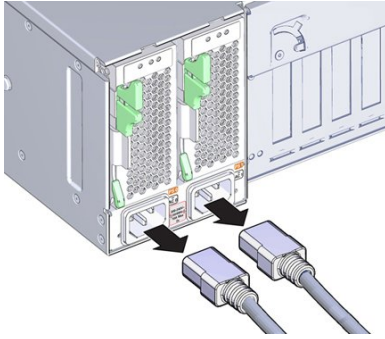


Caution - Whenever you remove the DVD drive or filler panel, you should replace it with another DVD drive or a filler panel; otherwise the server might overheat due to improper airflow.



Next Steps ■ [“Install the DVD Drive or DVD Drive Filler Panel” on page 168](#)

▼ Install the DVD Drive or DVD Drive Filler Panel



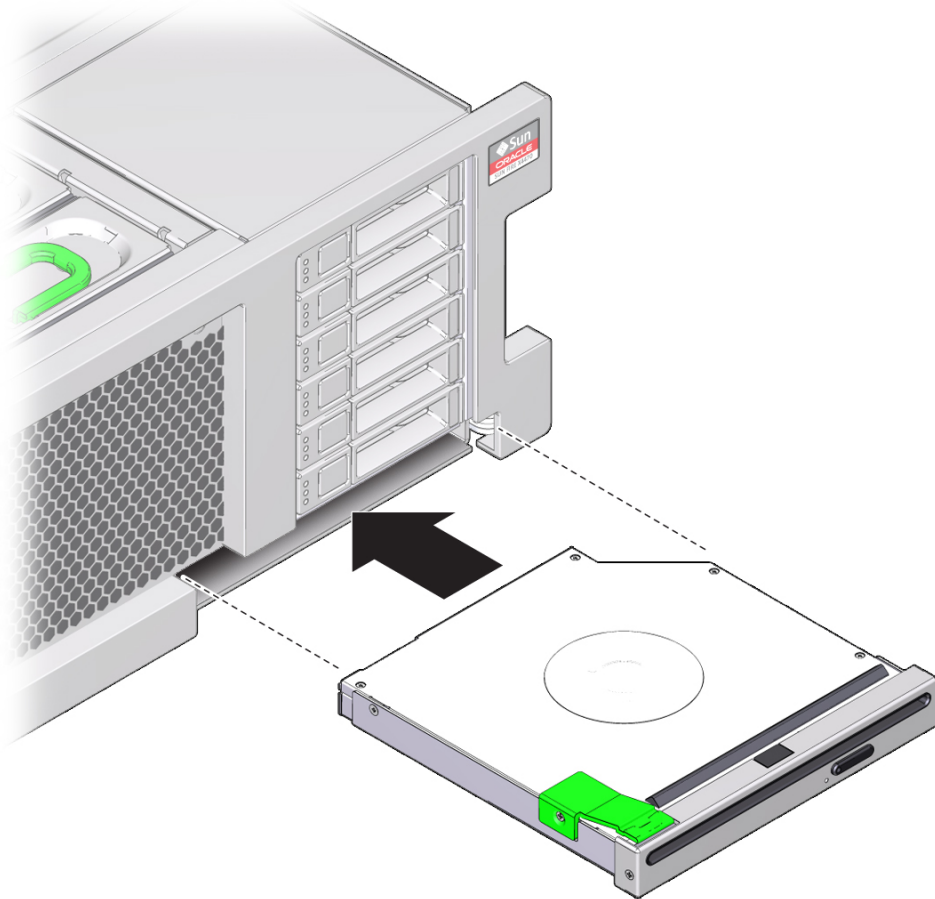
This procedure describes how to install the DVD drive or a DVD drive filler panel.

Before You Begin ■ [“Remove the DVD Drive or DVD Drive Filler Panel” on page 166](#)

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

If it is a DVD drive, place it on an anti static mat.

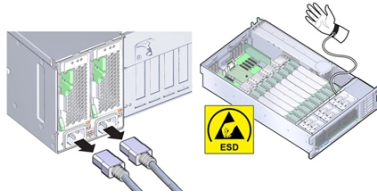
2. Slide the DVD drive or filler panel into the front of the chassis until it seats.



3. Prepare the server for operation. See [“Prepare the Server for Operation”](#) on page 231.

▼ Replace the System Battery (CRU)

When servicing the components in this section, unplug the AC power cords and use ESD protection.



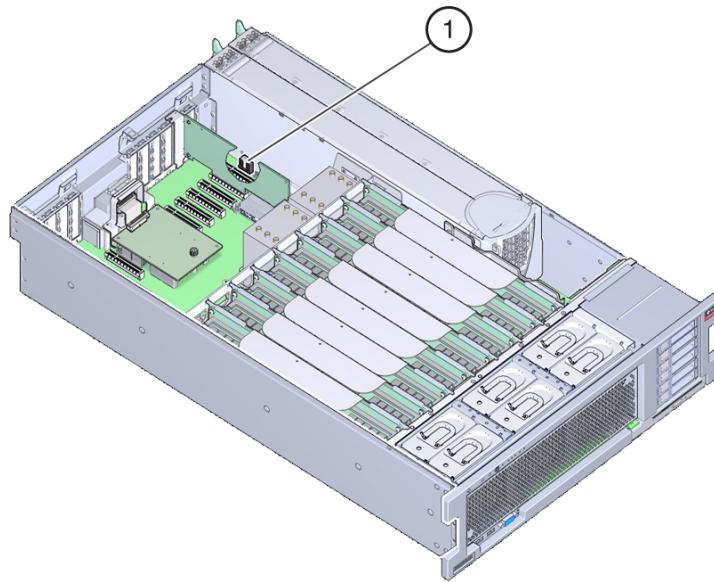
The system battery maintains system time when the server is powered off and disconnected from AC power. Use the following procedures to remove and replace the system battery when it has failed.



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.

1. **Prepare for service.** See [“Prepare the Server for Cold Service” on page 94.](#)

The battery is located toward the back of the server between PCIe slot 1 and the power supply side wall.

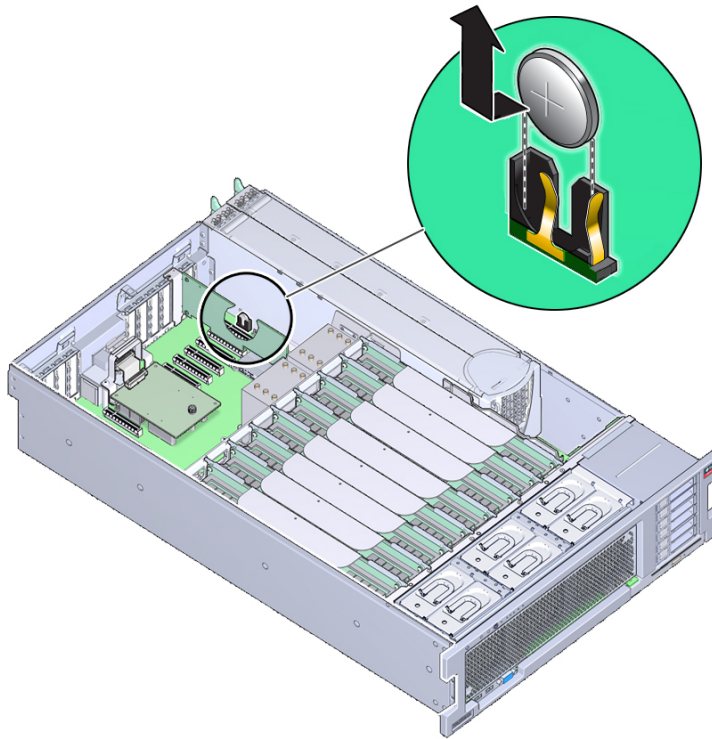


Legend	Description
1	System battery

2. **If necessary, remove the PCIe card in slot 1. See [“Remove a PCIe Card” on page 156.](#)**
You might need to remove the card to access the battery.
3. **Remove the battery from the battery holder by pushing the back of the battery (negative side) toward the metal tab (on the positive side) and lifting the battery up and out of the battery holder.**
Take care not to deform the tab when pushing against it.

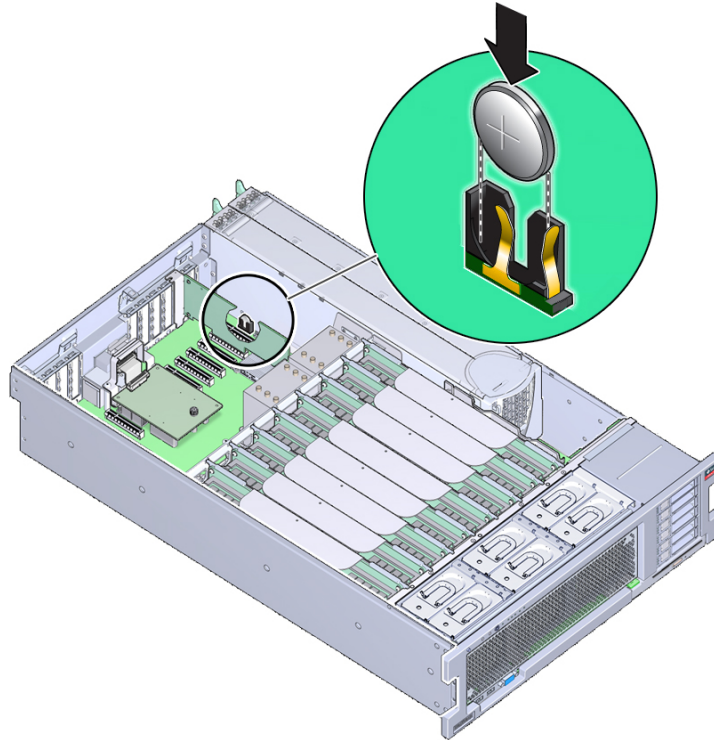


Caution - Component damage. Do not deform the metal tab on the positive side of the battery. The metal tab maintains the positive battery connection and secures the battery in the holder.



4. Press the new battery into the battery holder with the positive side facing the metal tab that holds it in place.

The positive side of the battery is marked with a plus sign (cross).



5. **If the service processor is not configured to use NTP, you must reset the Oracle ILOM clock using the Oracle ILOM CLI or the web interface.**

Note - If the service processor is configured to synchronize with a network time server using the Network Time Protocol (NTP), the Oracle ILOM clock resets as soon as the server is powered on and connected to the network.

For instructions, see the Oracle Integrated Lights Out Manager 3.2 Documentation Library at: <http://www.oracle.com/goto/ILOM/docs>

6. **Prepare the server for operation. See “Prepare the Server for Operation” on page 231.**
7. **Use the BIOS Setup Utility to update the System Time and System Date.**

Refer to [“BIOS Setup Utility Menu Options”](#) on page 243 for information about using the BIOS Setup Utility.

Servicing FRU Components

This section describes how to service field-replaceable units (FRUs). For serviceability information, see [“Component Serviceability” on page 70](#). The following table describes the contents of this section.

Note - Only Oracle-authorized service providers should service FRU components.

Description	Link
Removal and installation procedures and reference information for the server processors and heatsinks.	“Servicing Processors and Heatsinks (FRU)” on page 175
Replacement procedures and reference information for the server fan board.	“Replace the Fan Board (FRU)” on page 197
Replacement procedures and reference information for the server power supply backplane board.	“Replace the Power Supply Backplane Board (FRU)” on page 202
Replacement procedures and reference information for the server disk drive backplane.	“Replace the Disk Drive Backplane (FRU)” on page 213
Removal and installation procedures and reference information for the server service processor.	“Servicing the SP Card (FRU)” on page 219
Replacement procedures and reference information for the server motherboard.	“Replace the Motherboard (FRU)” on page 223

Servicing Processors and Heatsinks (FRU)

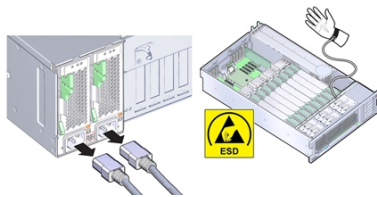
For processor overview information, see [“Processor Subsystem” on page 25](#). For serviceability information related to this component, see [“Component Serviceability, Locations, and Designations” on page 69](#).

The following procedures describe how to service the server CPUs, including removing and installing CPUs and upgrading the server from a two-CPU system to a four-CPU system:

- [“Replace a Faulty CPU \(FRU\)” on page 176](#)
- [“Remove a CPU Cover Plate \(FRU\)” on page 177](#)
- [“Remove a Heatsink and CPU \(FRU\)” on page 183](#)
- [“Install a Heatsink and CPU \(FRU\)” on page 190](#)

▼ Replace a Faulty CPU (FRU)

Disconnect the server from the AC power and protect components from ESD by wearing an antistatic wrist strap.



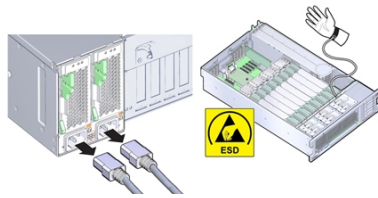
For processor overview information, see [“Processor Subsystem” on page 25](#).

- Before You Begin**
- For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - For fan module designation information, see [“Component Designations” on page 73](#).

1. **Remove the heatsink and CPU.** See [“Remove a Heatsink and CPU \(FRU\)” on page 183](#).
2. **Install the CPU and the heatsink.** See [“Install a Heatsink and CPU \(FRU\)” on page 190](#).
3. **Prepare the server for operation.** See [“Returning the Server to Operation” on page 231](#).

▼ Remove a CPU Cover Plate (FRU)

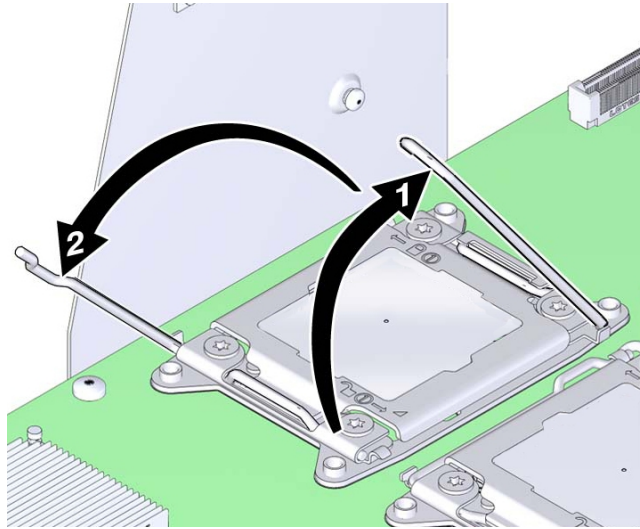
When servicing the components in this section, unplug the AC power cords and use ESD protection.



Cover plates are plastic inserts that attach to the CPU load plate and protect the pins of an unoccupied CPU socket. Cover plates are used in a two-CPU server (for the unoccupied sockets) and on replacement motherboards. When replacing a motherboard, remove the covers and installed them on the failed board.

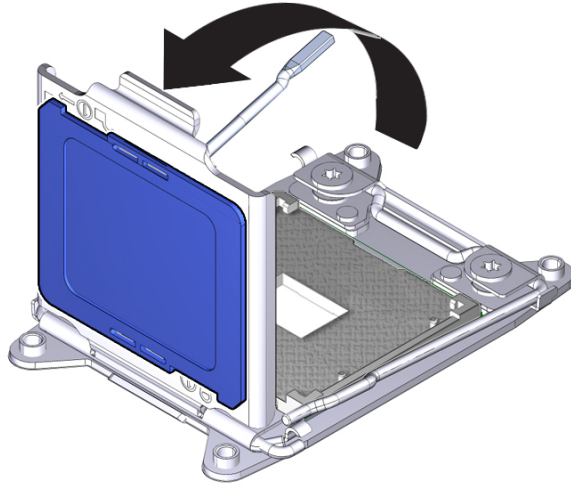
- Before You Begin**
- For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - For fan module designation information, see [“Component Designations” on page 73](#).
1. **Prepare the server for service.** See [“Prepare the Server for Cold Service” on page 94](#).
 2. **Disengage the CPU load plate release levers by pushing them down and moving them slightly toward the CPU socket and away from their retaining clips.**

The levers are numbered with their required order of operation. The left-side lever (when viewed from the front of the server) must be operated first.

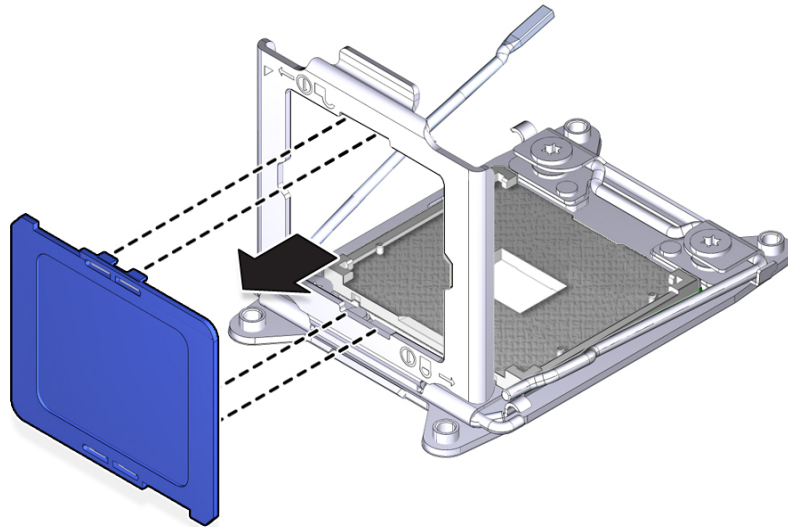


- 3. Rotate the levers to the fully-open position.**
When the second lever is in its fully-open position, the load plate is unlocked.
- 4. To open the load plate, lift the unhinged end to its fully-open position.**

A black plastic cover (CPU cover plate) is attached to the load plate.



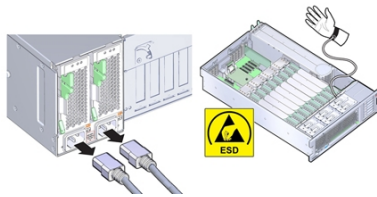
- 5. To remove the CPU cover plate, push on the underside of the plate.**
The cover is snap-fitted into the opening in the load plate.



- Next Steps**
- [“Install a CPU Cover Plate” on page 180](#)
 - [“Install a Heatsink and CPU \(FRU\)” on page 190](#)

▼ Install a CPU Cover Plate

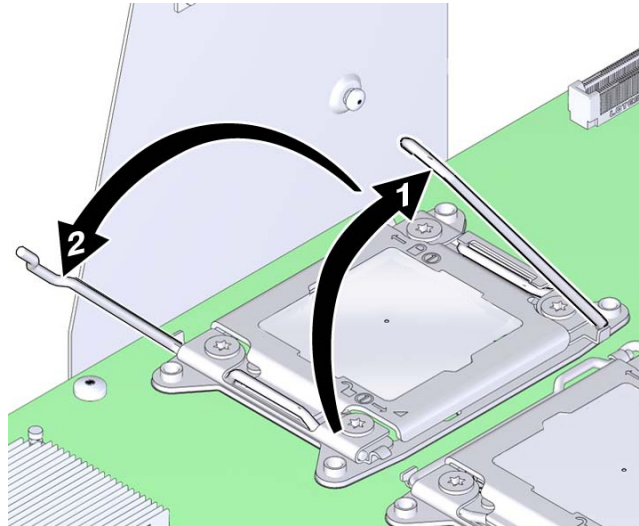
When servicing the components in this section, unplug the AC power cords and use ESD protection.



Cover plates are plastic inserts that attach to the CPU load plate and protect the pins of an unoccupied CPU socket. Cover plates are used in a two-CPU server (for the unoccupied slots) and on replacement motherboards. When replacing a motherboard, remove the covers and installed them on the failed board.

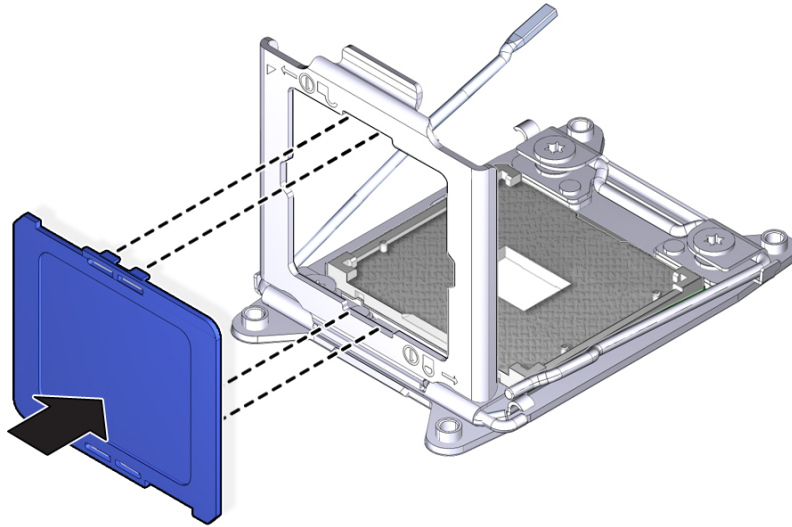
- Before You Begin**
- [“Remove a CPU Cover Plate \(FRU\)” on page 177](#)
 - For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - For fan module designation information, see [“Component Designations” on page 73](#).
1. **Prepare the server for service. See [“Prepare the Server for Cold Service” on page 94](#).**
 2. **Disengage the CPU load plate release levers by pushing them down and moving them slightly toward the CPU socket and away from their retaining clips.**

The levers are numbered with their required order of operation. The left-side lever (when viewed from the front of the server) must be operated first.

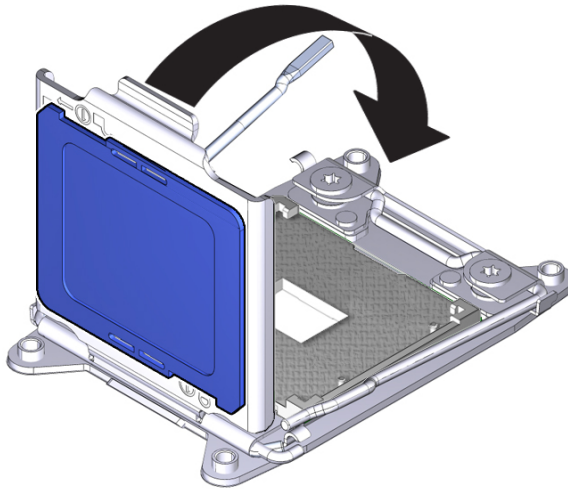


- 3. Rotate the levers to the fully-open position.**
When the second lever is in its fully-open position, the load plate is unlocked.
- 4. To open the load plate, lift the unhinged end to its fully-open position.**
- 5. If necessary remove the CPU using the CPU replacement tool. See [“Remove a Heatsink and CPU \(FRU\)”](#) on page 183.**
- 6. To install the CPU cover plate, push it onto the top side of the load plate.**

The cover snap-fits into the opening in the load plate.

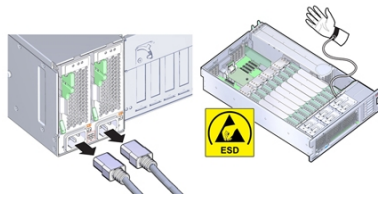


7. Close and lock the load plate.



▼ Remove a Heatsink and CPU (FRU)

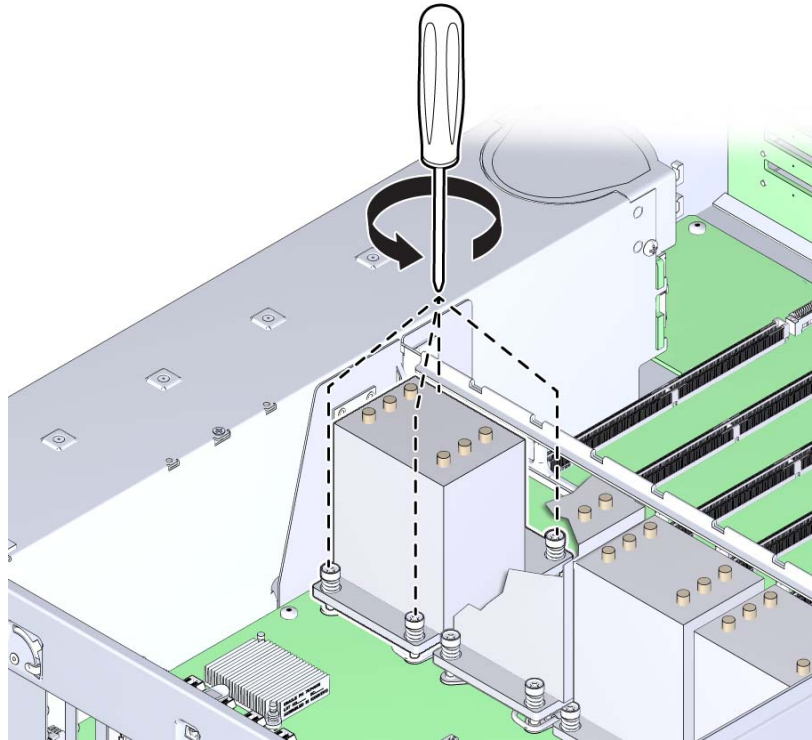
When servicing the components in this section, unplug the AC power cords and use ESD protection.



Use this procedure when replacing a failed CPU to remove a heatsink and CPU.

- Before You Begin**
- For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - For fan module designation information, see [“Component Designations” on page 73](#).
1. **Prepare for service.** See [“Prepare the Server for Cold Service” on page 94](#).
 2. **Identify the failed CPU.** See [“Locate a Failed Memory Riser Card, DIMM, or CPU” on page 86](#).
 3. **Remove the two memory riser cards associated with the failed CPU.**
 4. **Remove the heatsink:**
 - a. **Unscrew the four Phillips screws from the heatsink.**

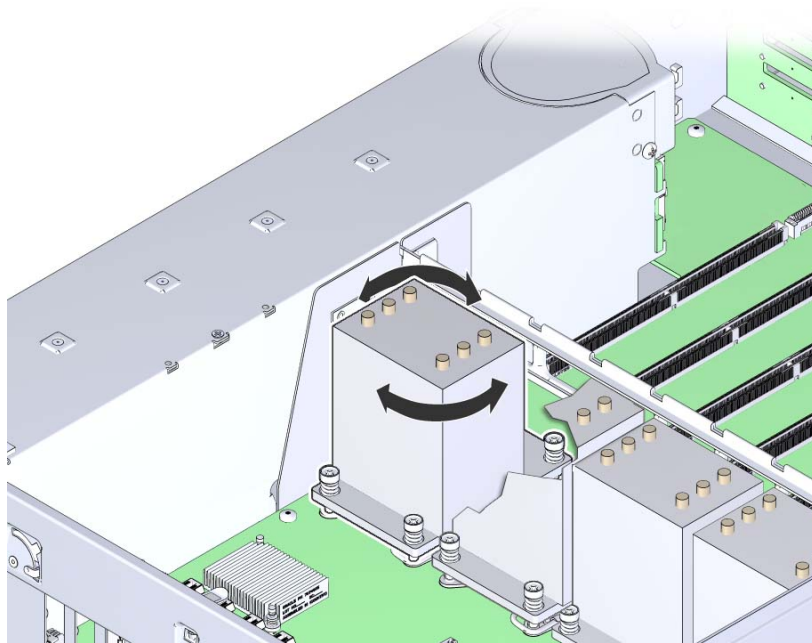
Turn the screws alternately one and one half turns until they are fully removed.



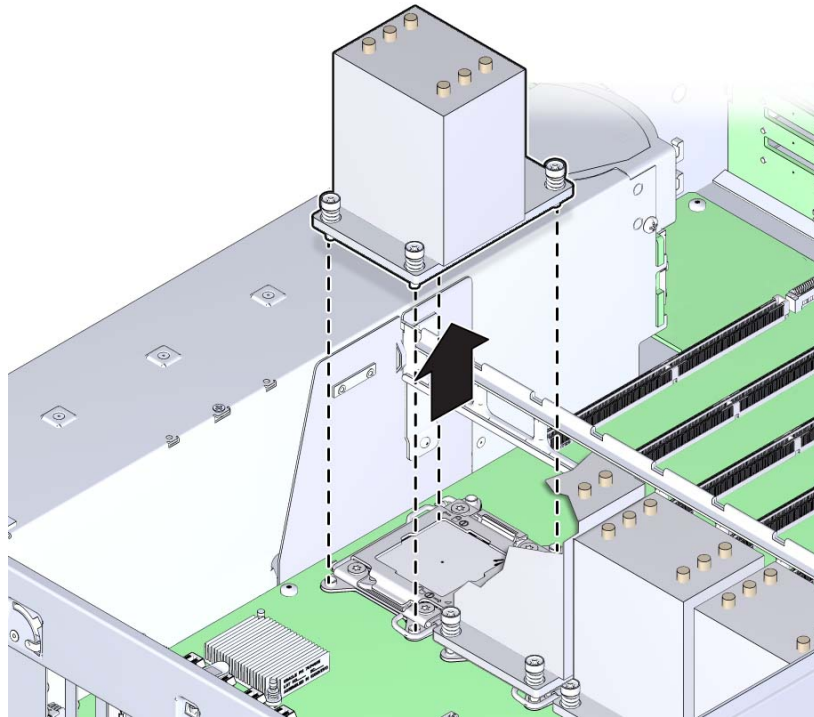
A thermal compound applied to the top of the CPU to facilitate heat transfer to the heatsink also acts as an adhesive.

- b. To remove the heatsink, break the seal created by the thermal compound by slightly twisting the heatsink left and right while pulling it upward.**

Do not allow the thermal compound to contaminate other components. Retain the heatsink. You need to reuse it.



- c. Remove the heatsink from the server.



- d. Place the heatsink upside down on the work space.
- e. Use an alcohol pad to clean the thermal compound from both the bottom of the heatsink and the top of the CPU.

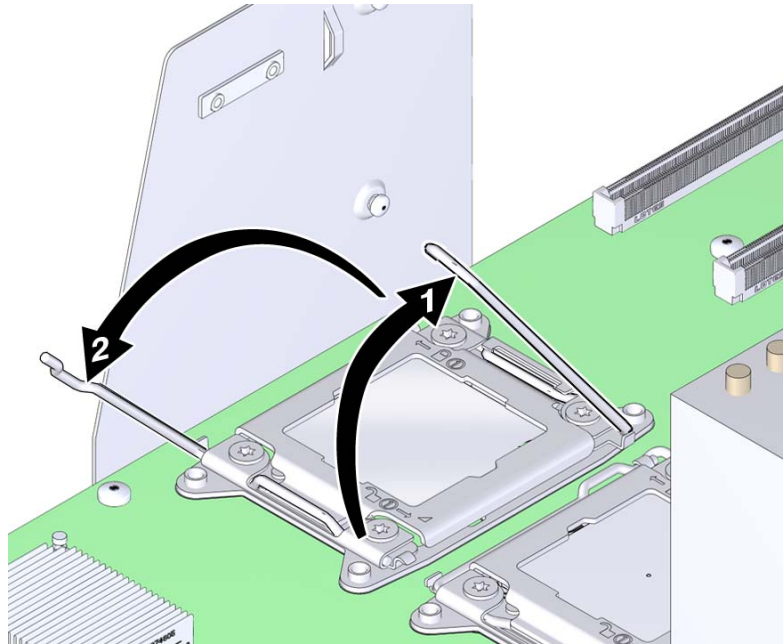


Caution - Component damage. Failure to clean the thermal compound from the heatsink and the CPU prior to removing the CPU could result in accidental contamination of the CPU socket, the removal tool, or other components. Also, be careful not to get the grease on your fingers as this could result in contamination of components.

To access the CPU, the CPU load plate needs to be opened. The load plate is locked in its closed position by the load plate lever.

5. **Open the spring-loaded CPU load plate release levers by pushing them down and moving them slightly toward the CPU socket and away from their retaining clips**

The levers are numbered by their required order of operation. The left-side lever (when viewed from the front of the server) must be opened first.



6. **Rotate the levers to the fully-open position.**
When the second lever is in its fully-open position, the load plate is unlocked.
7. **To open the load plate, lift the unhinged end to its fully-open position.**



Caution - Component damage. The pins of the CPU socket can be easily damaged. To remove the CPU, use the correct CPU replacement tool.

8. **To remove the CPU, use the CPU replacement tool:**

Note - Ensure that you use the correct CPU replacement tool. The correct tool has part number G29477-002 affixed to the side, and it has a green label. However, the label color alone is not an indicator of the correct tool. Verify that the part number is correct.

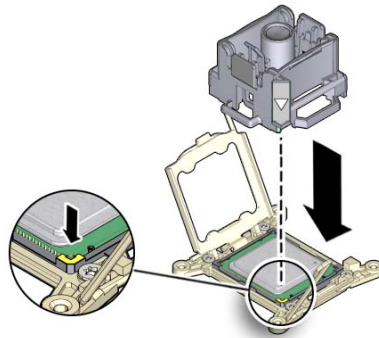
The tool is used to remove and install the CPU in the socket. The top side of the replacement tool has a button in the center and a tab on one side. Pressing down on the button opens the tool. Pressing the tab closes the tool (and releases the button).

a. Press down on the release button on top of the replacement tool.

This action opens the tool.

On one corner of the tool there is a label with a downward pointing triangle. Likewise, the CPU is marked with a triangle on one of its corners. This is a key that aids in correctly positioning the tool and the CPU with the CPU socket. The tool and the CPU are correctly positioned with the socket when all of the triangles are aligned.

b. Orient the bottom of the tool over the CPU, ensuring that the triangle on the tool aligns with the triangle on the CPU.

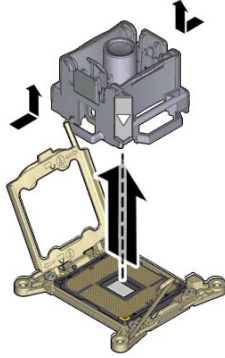


c. Lower the tool onto the CPU, ensuring that it sits evenly on the CPU.

d. Push the release tab away from the center button.

This action is accompanied by a click sound as the tool closes and grabs the CPU.

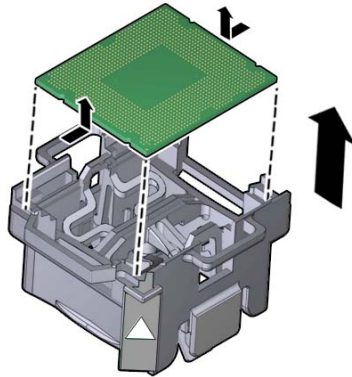
- e. To remove the CPU, lift the tool upward and out of the server.



- f. Turn the tool over, so the metal CPU contacts are facing upward and the topside of the tool is facing downward.
- g. Hold the CPU by its edges.
- h. On the topside of the tool (which is facing downward), pull the release tab away from the center button.

This action is accompanied by a click sound as the tool releases its hold on the CPU.

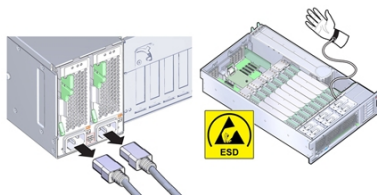
- i. Remove the CPU from the tool taking care not to touch the metal contacts on the underside.



- Next Steps**
- [“Replace a Faulty CPU \(FRU\)” on page 176](#)
-or-
 - [“Install a Heatsink and CPU \(FRU\)” on page 190](#)
-or-
 - [“Replace the Motherboard \(FRU\)” on page 223](#)

▼ Install a Heatsink and CPU (FRU)

Disconnect the server from the AC power and protect components from ESD by wearing an antistatic wrist strap.



Depending on whether you are adding a new CPU and heatsink, or replacing one or both of these components because they are damaged, your kit might contain the following:

- CPU and a heatsink with thermal compound applied
- Heatsink with thermal compound applied
- CPU with a syringe of thermal compound

Before You Begin

- For serviceability considerations, see [“Component Serviceability” on page 70](#).
- For fan module designation information, see [“Component Designations” on page 73](#).

1. **At the CPU socket, ensure that the CPU load plate and both load plate release levers are in their fully open position.**
2. **To install a CPU, use the CPU replacement tool.**

Note - Ensure that you use CPU replacement tool, part number G29477-002. The part number is printed on the side of the tool. The tool is shipped with a new CPU.

The tool is used to remove and install the CPU in the socket. The top side of the replacement tool has a button in the center and a tab on one side. Pressing down on the button opens the tool. Pressing the tab releases the button and closes the tool.

- a. **Press down on the release button on top of the replacement tool.**
This action opens the tool.
On one corner of the tool there is a label with a downward pointing triangle. Likewise, the CPU is marked with a triangle on one of its corners. This is a key that aids in correctly positioning the tool and the CPU with the CPU socket. The tool and the CPU are correctly positioned with the socket when all of the triangles are aligned.
- b. **Turn the replacement tool upside down, noting the corner of the tool that is marked with a triangle (alignment key).**
- c. **Note the corner of the CPU that is marked with a triangle (alignment key).**
- d. **Lift the CPU by its edges, taking care not to touch the metal contacts on the underside of the CPU.**
- e. **Turn the CPU upside down (metal contacts facing upward) and set it on the replacement tool, ensuring that the triangle on the CPU aligns with the triangle on the tool and that the CPU sits flat in the tool. Do *not* release your hold the CPU.**

The CPU is not yet secured in the tool.

- f. **With the tool and the CPU in the topside down position, press the topside release tab outward, away from the center button.**

This action is accompanied by a click sound as the tool closes and grabs the CPU. The CPU should now be secured in the tool.

- g. **Ensure that the CPU is secured in the tool.**

When the CPU is secured in the tool, there is no side-to-side movement of the CPU within the tool.

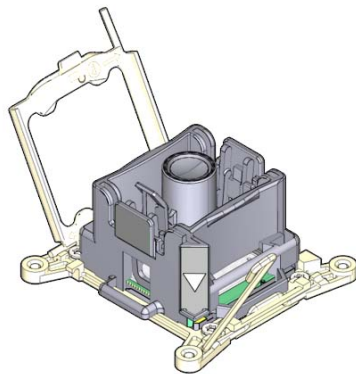
3. **Turn the tool over, so that the CPU contacts are facing downward.**

This positions the tool with the topside facing upward.

4. **Orient the tool so that the triangle on the tool aligns with the triangle on the socket.**

5. **Lower the tool onto the socket, ensuring that the CPU is correctly positioned and sits flat and evenly in the socket.**

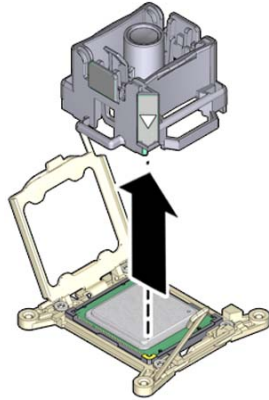
When the CPU is correctly positioned, there is no side-to-side movement of the CPU within the socket.



6. **To release the CPU from the tool, press the center button.**

This action is accompanied by a click sound as the tool opens and releases the CPU.

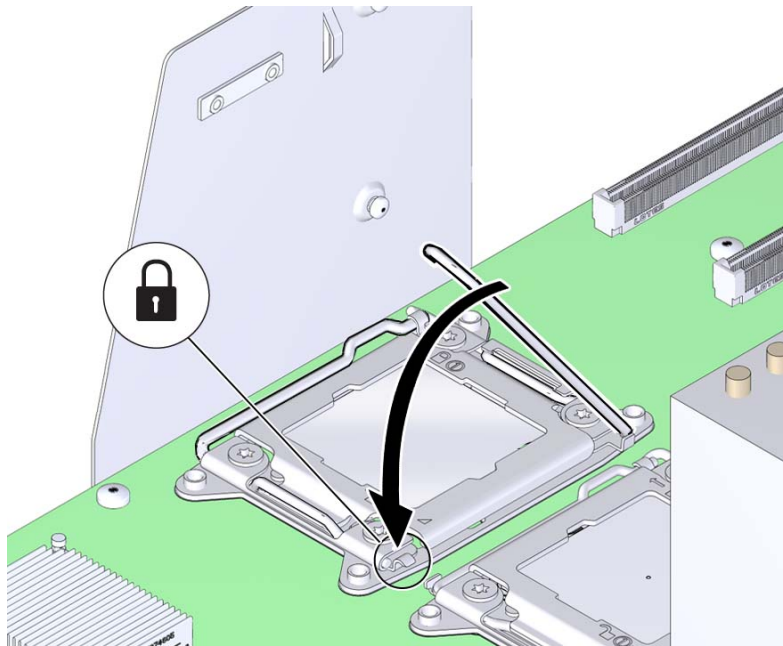
7. **Remove the tool.**



8. **Inspect the CPU to ensure that it sits evenly within the socket.**
9. **Close the CPU load plate.**
10. **Lower and lock the right side lever, ensuring that the lever is secured under its retaining clip and that the bend in the lever locks the cover plate.**

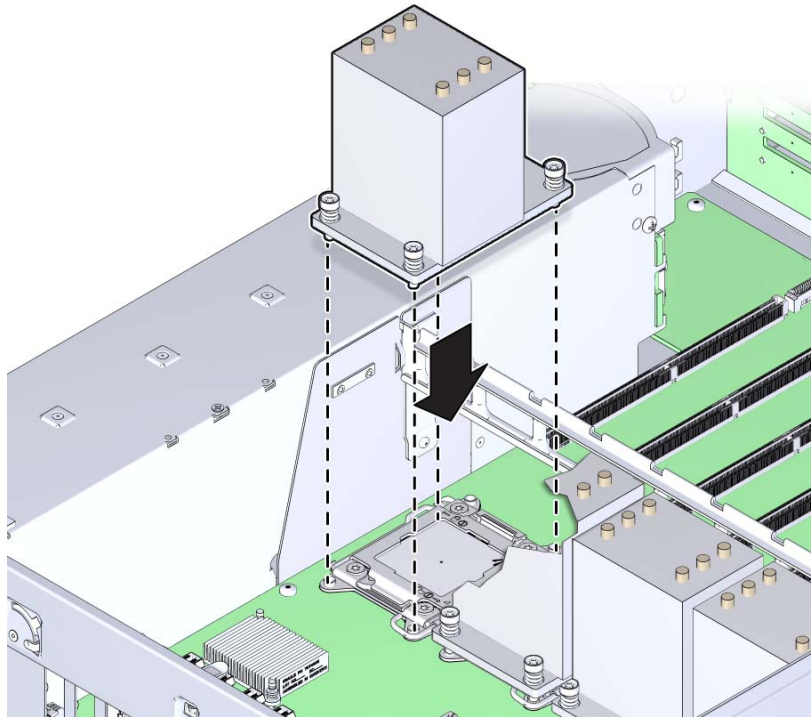
The right side lever must be closed first.

- 11. Lower and lock the left side load plate lever, ensuring that it is secured under its retaining clip.**



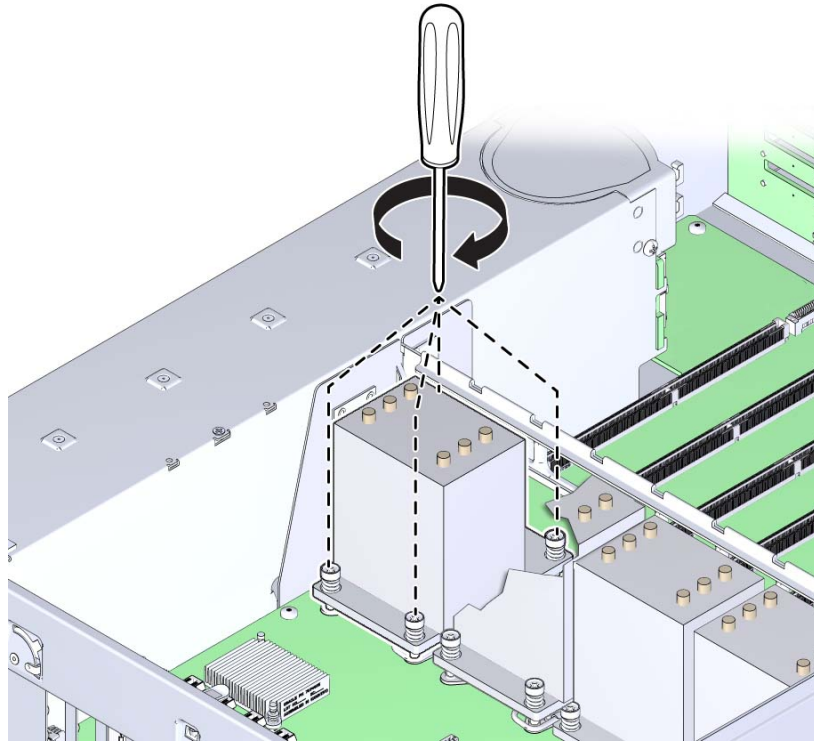
- 12. To apply the thermal compound, dispense the contents of the syringe as a single dollop in the center on the top of the CPU.**
Do not spread the thermal compound. The pressure applied during the heatsink installation performs this action.
- 13. To install the heatsink:**

- a. **Align the captive spring-loaded heatsink screws with the threaded standoffs on the motherboard.**



- b. **Set the heatsink on top of the CPU.**
Once the heatsink is in contact with the CPU, avoid extra movement of the heatsink.

- c. Use a number 2 Phillips screwdriver and alternately tighten each screw one-half turn until all screws are completely tightened.



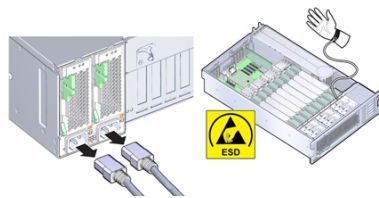
14. Prepare the server for operation. See [“Prepare the Server for Operation” on page 231.](#)
15. If the CPU being installed is replacing a faulty CPU, manually clear the CPU fault using Oracle ILOM.

For instructions on clearing server faults, refer to the *Oracle Integrated Lights Out Manager (ILOM) 3.2.2 Users Guide*.

- Next Steps**
- Back to [“Replace a Faulty CPU \(FRU\)” on page 176](#)
 - or-
 - Back to [“Replace the Motherboard \(FRU\)” on page 223](#)

▼ Replace the Fan Board (FRU)

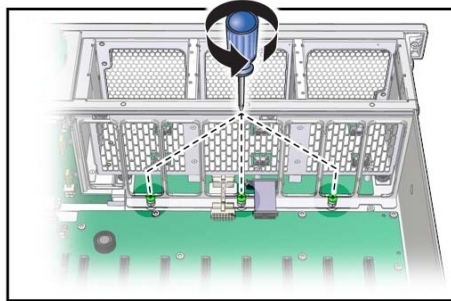
When servicing the components in this section, unplug the AC power cords and use ESD protection.



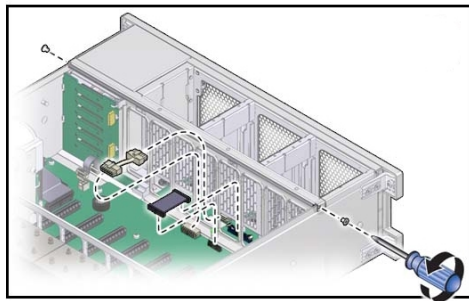
Before You Begin ■ For serviceability considerations, see [“Component Serviceability” on page 70](#).

- 1. Prepare the server for service.** See [“Prepare the Server for Cold Service” on page 94](#).
- 2. Remove all fan modules.**
See [“Remove a Fan Module” on page 121](#).
- 3. Remove all memory risers.**
See [“Remove a Memory Riser Card” on page 139](#).
- 4. Disconnect any cables plugged into the USB or video connectors on the front of the server.**
- 5. Remove the fan board:**

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

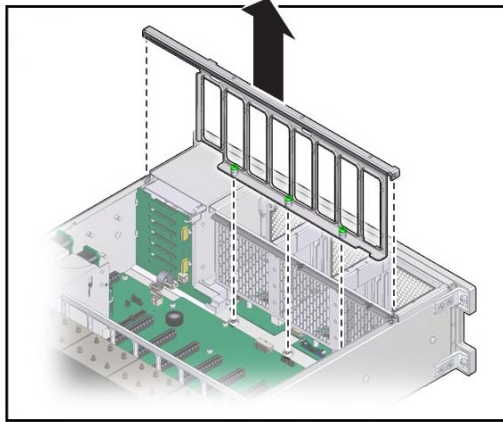


- b. **Remove the two screws on each side of the outside of the chassis that hold the fan board unit in place.**

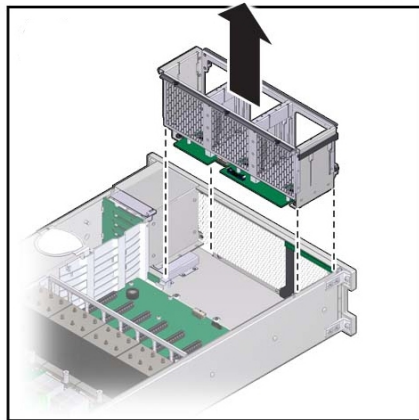


- c. **Unplug the fan board cable and power cables from motherboard.**

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



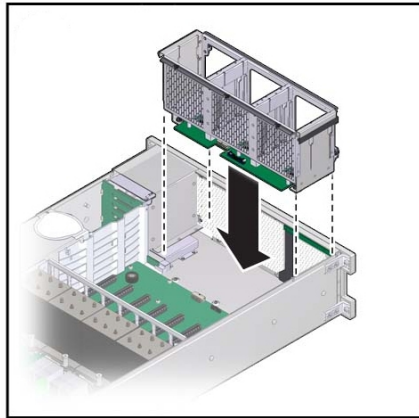
- e. To remove, slide the fan board cage away from the front of the server (to clear the lip at the front of the chassis) and lift it out of the server.



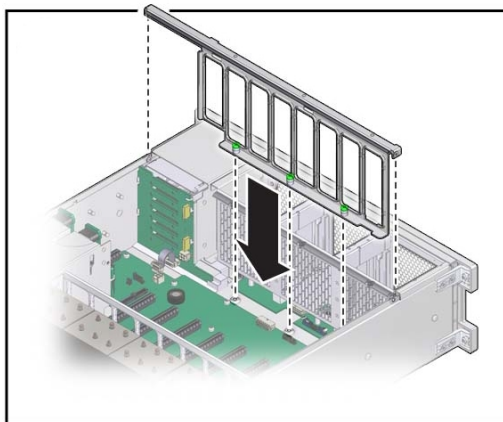
6. Remove the fan board cable and power cables from the faulty fan board unit and plug them into the fan board on the replacement fan board unit.

7. To install the fan board unit:

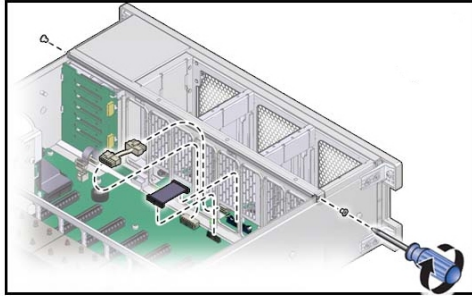
- a. Insert the fan board unit into the chassis, moving it down and toward the front.**



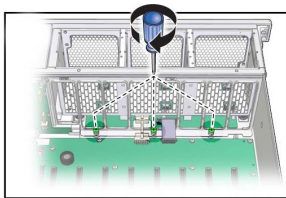
- b. Reposition the front memory riser guide, routing the fan board and power cable through the riser guide.**



- c. **Connect the fan board cable and power cable into the connectors on the motherboard and partially tighten the two screws that secure the riser guide to the chassis.**



- d. **Tighten the three captive screws to hold the front memory riser guide in place.**

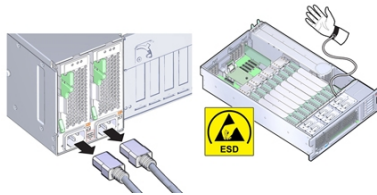


- e. **To secure the fan board unit in place, fully tighten the two screws that secure the riser guide to the chassis.**
8. **Install the fan modules.**
See [“Install a Fan Module” on page 124.](#)
 9. **Install the memory risers.**
See [“Install a Memory Riser Card” on page 145.](#)
 10. **Prepare the server for operation. See [“Prepare the Server for Operation” on page 231.](#)**

Note - The product serial number used for service entitlement and warranty coverage might need to be reprogrammed by authorized service personnel with the correct product serial number.

▼ Replace the Power Supply Backplane Board (FRU)

When servicing the components in this section, unplug the AC power cords and use ESD protection.



Caution - Hazardous voltage. The system supplies power to the power board even when the server is in standby power mode. Disconnect power cords before servicing the power supply backplane board.

Before You Begin ■ For serviceability considerations, see [“Component Serviceability” on page 70](#).

1. **Prepare the server for service.** See [“Prepare the Server for Cold Service” on page 94](#).
2. **Disconnect the SAS/SATA cables from the disk drive backplane and the HBA.**
3. **Remove all PCIe cards from the server taking care to note their slot assignments.** See [“Remove a PCIe Card” on page 156](#).

Make a note of where each PCIe card installed so they can be put back in the same slots. The internal SAS/SATA cables do not need to be removed, but must be out of the way as the motherboard needs to be removed.

4. **If the server has two CPUs, carefully remove the air baffle, taking care not to damage the fan board ribbon cable.**

Lift the baffle slowly and maneuver its front edge away from the ribbon cable while removing.



Caution - Component damage. Lifting the baffle straight up from the server can damage the fan board ribbon cable. The front support foot for the air baffle is located under the cable.

5. **Remove all memory riser cards. See “[Remove a Memory Riser Card](#)” on page 139.**
6. **Disconnect the fan board data and power cables from the motherboard.**
7. **Disconnect the power supplies from the power supply backplane connectors by removing both power supplies at least part way out of the chassis. See “[Remove a Power Supply](#)” on page 129.**
8. **Move the air divider.**

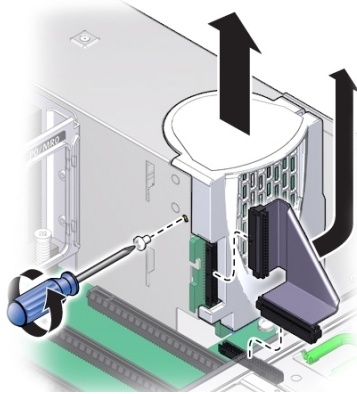
The air divider that separates the disk drive backplane area from the rest of the chassis (and includes the system Fault Remind button mechanism) must be moved to allow access to the power supply backplane board and allow removal of the motherboard. The air divider is mounted to the power supply side wall using two tabs which are inserted into slots in the side wall. For this procedure, you can leave the cables attached to the air divider.



Caution - Hardware damage. Try not to allow the SAS cables to rub against the CPU0 heatsink radiator fins. They are sharp and can damage the cable insulation.

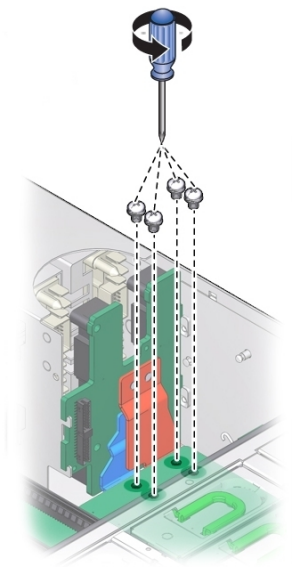
- a. **Lift the air divider so the tabs clear the slots in the power supply side wall.**
 - b. **Move the air divider away from the side wall and gently rotate the divider and the cables attached to it away from the backplane area and set it in the empty memory riser area.**
9. **Disconnect the disk drive backplane power and data cables from the disk drive backplane.**
See “[Replace the Disk Drive Backplane \(FRU\)](#)” on page 213.
 10. **Remove the ribbon cable connecting the power supply backplane to the motherboard.**

- 11. Remove the screw holding the power supply cover in place and remove the power supply cover.**



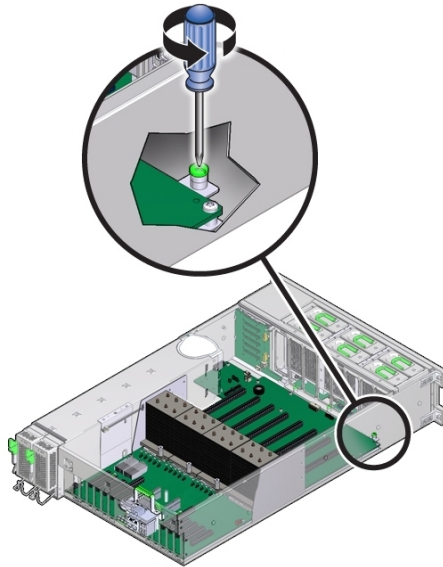
- 12. Remove the four screws securing the power supply backplane bus bar to the motherboard.**

The backplane board rests on the two support flanges. The bus bars are attached at contact pads underneath the motherboard.



- 13. Loosen the green captive screw that secures the motherboard to the chassis.**

The screw is located at the left front corner of the motherboard behind FM3.



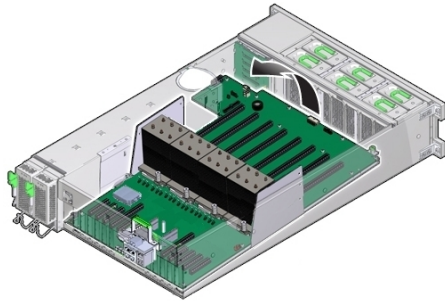
14. **To unlock the motherboard, use the memory riser card guide by the processors and the handle above the SP card slot to slide the motherboard toward the front of the server.**

This action unlocks the motherboard and plate assembly.

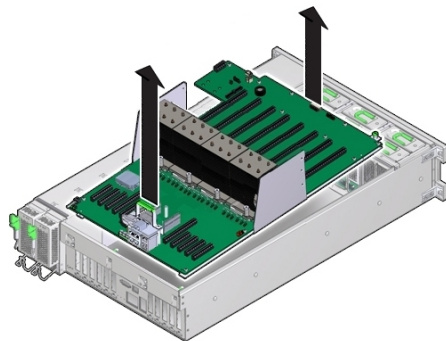
Note - As you slide the motherboard forward, check that the Locator indicator light pipe extension piece slides out of its hole in the chassis back wall.

15. **While gently sliding it away from the back of the server, carefully lift the front end of the motherboard several inches.**

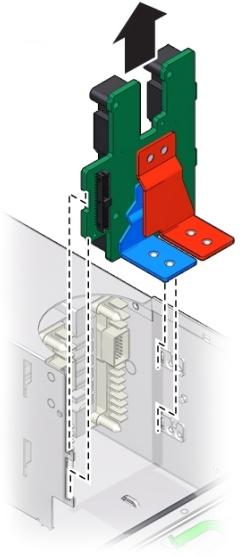
Note - If Locator indicator light pipe extension detaches during removal, ensure that you retrieve it from the server. The extension is a clear plastic piece that transmits light and allows you to activate the Locator indicator switch from the back of the server.



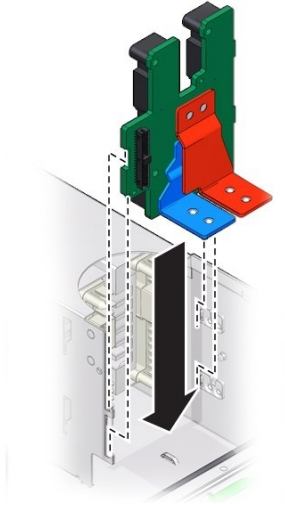
16. To remove the motherboard, slowly guide it up and out of the server.



17. **Lift out the power supply backplane board from its support flanges and out of the chassis.**

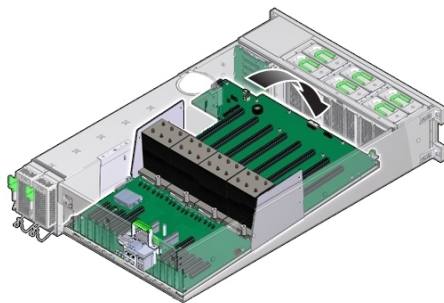


18. **Insert the replacement power supply backplane board into the server. The tabs on the power board must slide onto the flanges on the power supply cage.**

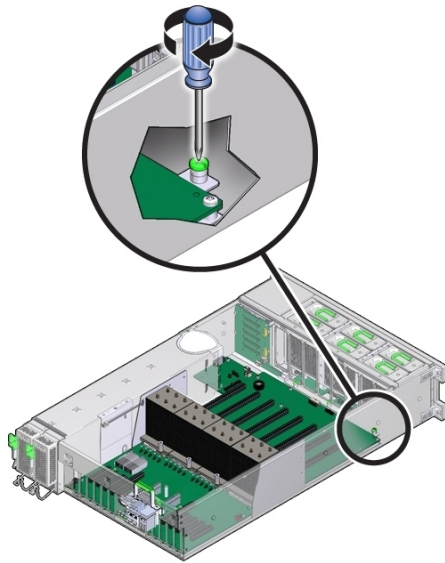


19. **Lower the motherboard into the server and guide the light pipe extension piece for the Locator indicator at the back of the motherboard into its hole on the server back wall.**
This should also align the bus bar holes on the motherboard to the power supply backplane bus bar connector holes.

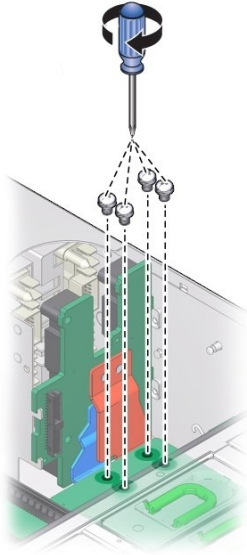
Note - Ensure that the red and blue bus bar connectors are under the motherboard bus bar connection pads.



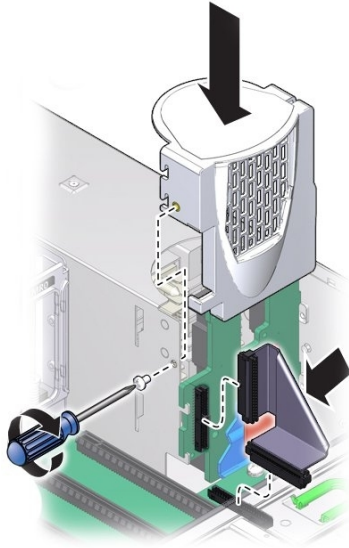
20. **Ensure that the Locator indicator switch at the back of the server operates easily and is not stuck in the depressed position.**
21. **To secure the motherboard to the chassis, tighten the captive screw.**



22. Use the four screws to secure the bus bar to the motherboard.



23. **Connect the ribbon cable from the motherboard to the power supply backplane.**



24. **Replace the power supply cover and fasten it in place with the screw.**
25. **Connect the data and power cables from the fan board to the motherboard.**
26. **Connect the disk drive backplane power cable and ribbon data cable.**
27. **To install the air divider:**

Note - The air divider contains the Fault Remind button mechanism. To ensure that the mechanism can engage the motherboard-mounted switch, the divider *must* be installed correctly.

- a. **Align the two tabs on the divider with the two slots in the power supply side wall.**
- b. **Push the tabs into the slots and push the air divider downward to secure it against the wall.**

To ensure proper alignment of the Fault Remind switch, both tabs *must* be engaged with their slots.

- 28. Ensure the SAS/SATA cables are routed through the slot in the air divider.**

The back side of the divider has enough room to house the cables if they are flat and side-by-side. Do not allow the cables to interfere with the Fault Remind button mechanism.
 - 29. Connect the SAS/SATA cables to the disk drive backplane.**

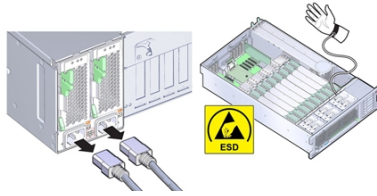
The mini-SAS plug that terminates the short SAS/SATA cable must be inserted into the upper mini-SAS connector on the disk backplane. This short cable connects the SATA DVD to its USB-SATA bridge on the motherboard. The longer SAS/SATA cable connects drive bays 4 and 5 to a storage device in the back of the system. The lower mini-SAS connector on the disk backplane requires the standard, four-channel mini-SAS cable for drive bays 0 to 3.
 - 30. Install all memory risers.**

See [“Install a Memory Riser Card” on page 145.](#)
 - 31. For a two-CPU system, install the air baffle, ensuring that the foot on the front of the baffle is under the fan board ribbon cable.**
 - 32. Install all PCIe cards.**

See [“Install a PCIe Card” on page 158.](#)
-
- Note** - During the process of reinstallation of the HBA card, it might be easier to reconnect the SAS/SATA cables before installing the card in its PCIe slot.
-
- 33. Install the power supplies. See [“Install a Power Supply” on page 132.](#)**
 - 34. Prepare the server for operation. See [“Prepare the Server for Operation” on page 231.](#)**

▼ Replace the Disk Drive Backplane (FRU)

When servicing the components in this section, unplug the AC power cords and use ESD protection.



Before You Begin ■ For serviceability considerations, see [“Component Serviceability”](#) on page 70.

1. **Prepare the server for service.** See [“Prepare the Server for Cold Service”](#) on page 94.
2. **Remove and label all disk drives and fillers.** See [“Remove a Storage Drive \(CRU\)”](#) on page 116.
To ensure that the drives are returned to their slots, label the drives with their slot position.
3. **Remove the DVD drive.** See [“Remove the DVD Drive or DVD Drive Filler Panel”](#) on page 166.
4. **Disconnect the power cable, ribbon data cable, and any SAS/SATA cables from the disk drive backplane.**
You do not need to remove the cables from the HBA board.
5. **To move the air divider:**
You need to move the air divider, so you can access to the disk drive backplane board. The divider is mounted to the power supply side wall using two tabs, which are inserted into slots in the side wall.
 - a. **Lift the air divider so the tabs clear the slots in the power supply housing side wall.**
 - b. **Move the air divider away from the side wall, lift it up, and bend the cables, so you can rotate the divider away from the backplane and set it in the PCIe slot area.**

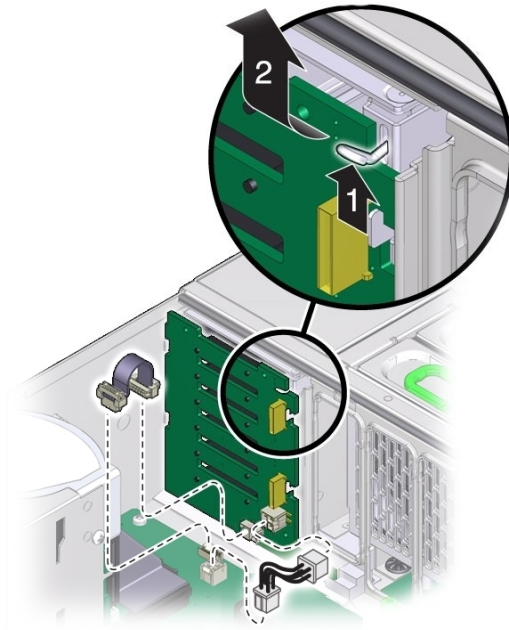
The disk drive backplane sets on metal flanges and is secured by a spring-loaded lever.

6. **Disconnect the ribbon data cable and the power cable at the bottom of the disk backplane board.**

See the illustration shown in step 7.

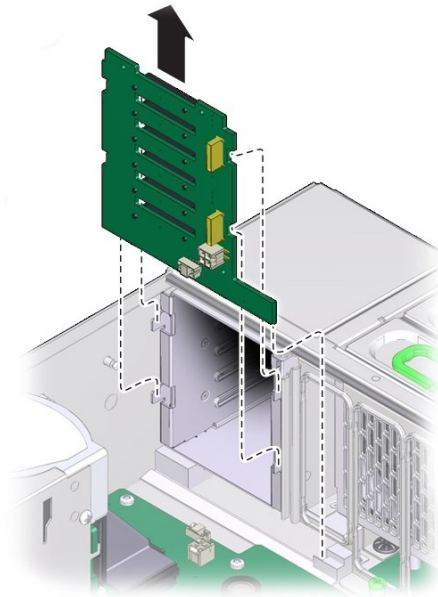
7. To release the spring-loaded lever, lift it upward.

The disk drive backplane sets on metal flanges and is secured by a spring-loaded lever.



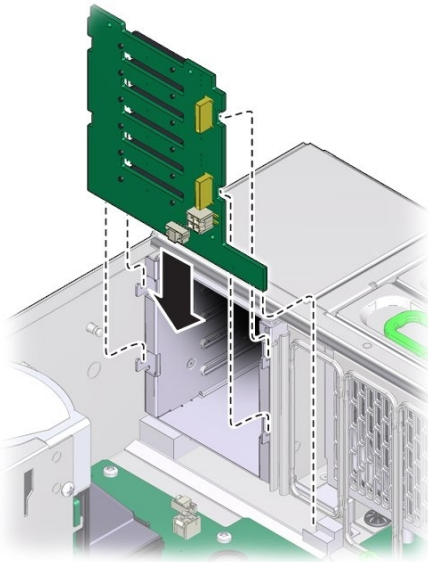
8. To remove the disk drive backplane, lift it, so it clears the support flanges, and remove it from the server.

You might need to tilt the board slightly while removing it to slide the DVD connector out from under the disk drive mounting cage.



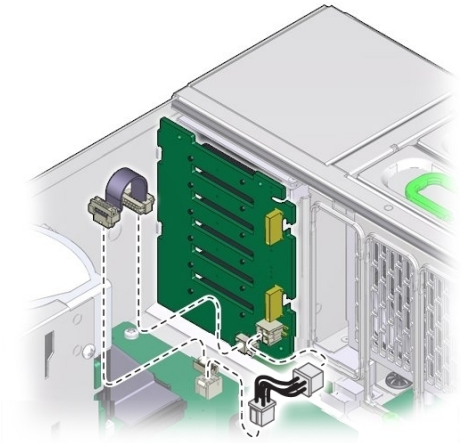
9. **Orient the replacement disk drive backplane board in the chassis.**
10. **Tilt the backplane board and insert its bottom edge in the plastic slot at the bottom of the server.**

The DVD connector on the bottom of the back side of the board needs to be positioned under the disk drive mounting cage.



11. **Lift the spring-loaded metal hook and tilt the backplane board to its upright position.**
12. **Set the board on its support flanges.**
13. **To secure the board, release the metal hook.**

14. **Reconnect the ribbon data cable and power cable to the bottom of the disk backplane board.**



15. **To install the air divider:**

Note - The air divider contains the Fault Remind button mechanism. To ensure that the mechanism can engage the motherboard-mounted switch, the divider *must* be installed correctly.

- a. **Ensure the SAS/SATA cables are routed through the slot in air divider.**

The back side of the divider has enough room to house the cables if they are flat and side-by-side. Do not allow the cables to interfere with the Fault Remind button mechanism.

- b. **Align the two tabs on the divider with the three slots in the power supply side wall.**

- c. **Push the tabs into the slots and push the divider downward to secure it against the wall.**

To ensure proper alignment of the Fault Remind switch, both tabs *must* be engaged with their slots.

16. **Connect the power cable, ribbon data cable, and any SAS/SATA cables.**

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

17. **Install all disk drives and filler panels.**
See [“Install a Storage Drive \(CRU\)” on page 118.](#)
18. **Install the DVD drive. See [“Install the DVD Drive or DVD Drive Filler Panel” on page 168.](#)**
19. **Prepare the server for operation. See [“Prepare the Server for Operation” on page 231.](#)**

Note - The product serial number used for service entitlement and warranty coverage might need to be reprogrammed by authorized service personnel with the correct product serial number.

Servicing the SP Card (FRU)

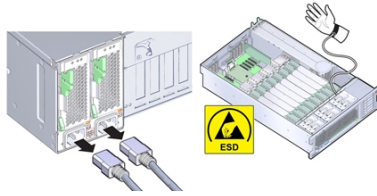
The service processor (SP) card runs the embedded server management software, Oracle ILOM. The motherboard-mounted SP card is replaceable. It is located inside at the back end of the server between PCIe slots 6 and 7.

This section describes how to remove and replace the motherboard-mounted SP card.

- [“Remove the SP Card \(FRU\)” on page 219](#)
- [“Install the SP Card \(FRU\)” on page 221](#)

▼ Remove the SP Card (FRU)

When servicing the components in this section, unplug the AC power cords and use ESD protection.

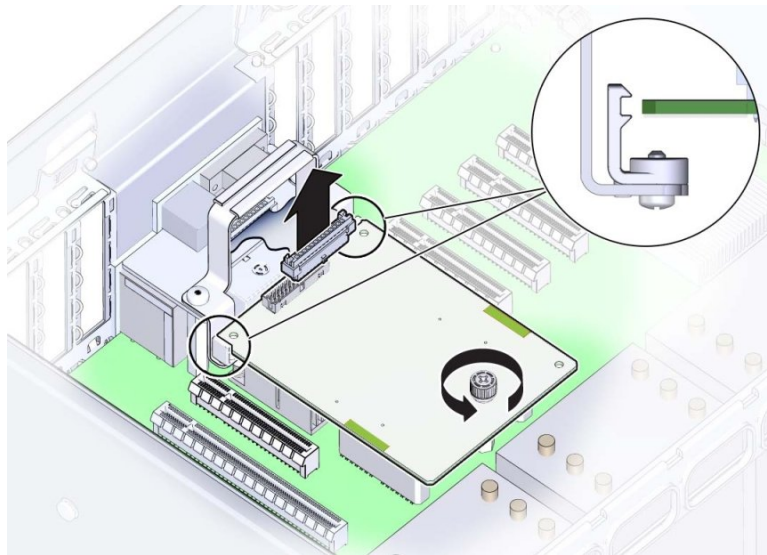


Before You Begin ■ For serviceability considerations, see [“Component Serviceability”](#) on page 70.

1. **Prepare the server for service.** See [“Prepare the Server for Cold Service”](#) on page 94.

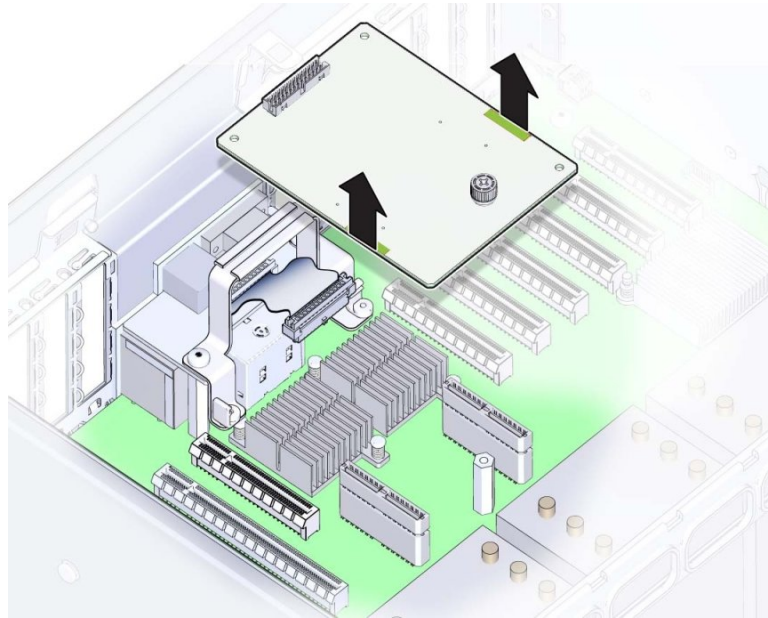
2. **Disconnect the SP card cable.**

The SP card is mounted on the motherboard between the two groups of PCIe slots.



3. **Completely loosen the green captive screw on the top of the SP card.**

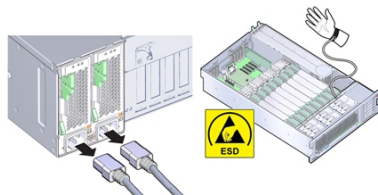
4. To remove the SP card, disconnect it by pulling it upward and then lift it out of the server.



Next Steps ■ [“Install the SP Card \(FRU\)” on page 221](#)

▼ Install the SP Card (FRU)

When servicing the components in this section, unplug the AC power cords and use ESD protection.



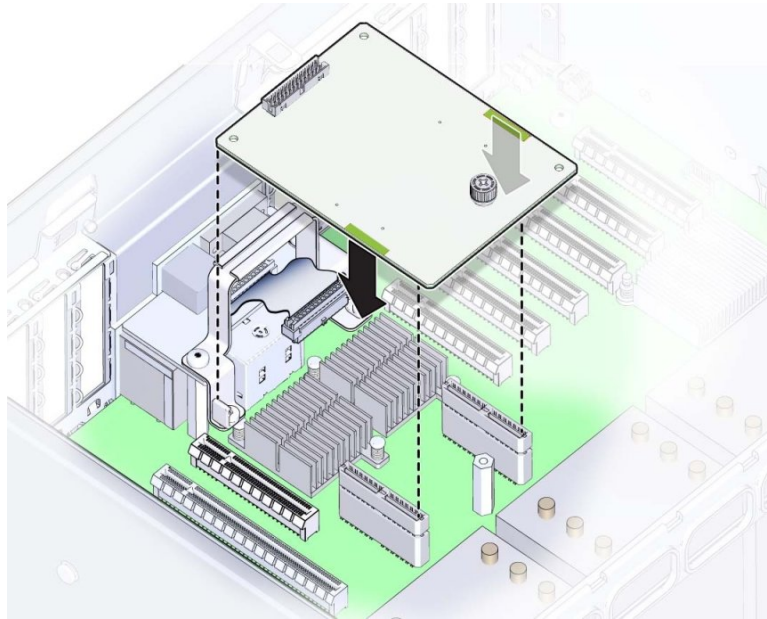
Before You Begin ■ For serviceability considerations, see [“Component Serviceability”](#) on page 70.

- 1. Position the SP card with the two motherboard connectors facing downward.**

The green captive screw head faces upward.

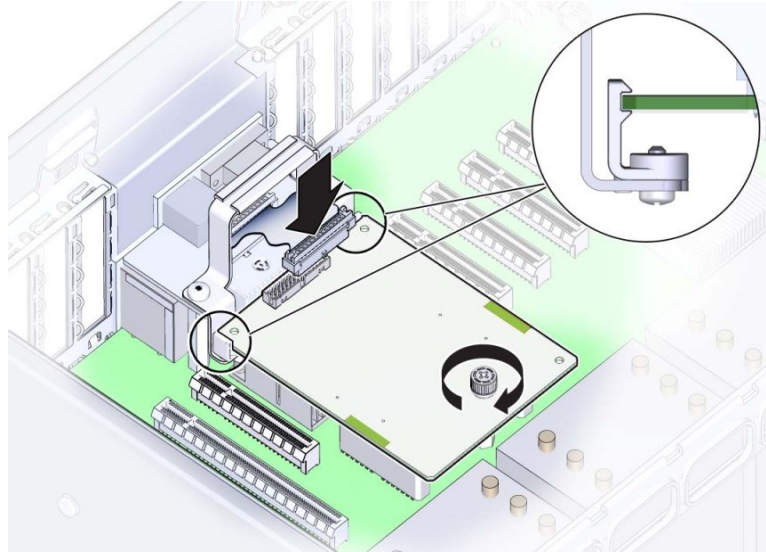
- 2. Align the connectors on the bottom of the SP card with the connectors on the motherboard.**

Use the screw hole and card mounting bracket to assist with the alignment. When correctly positioned, the mounting bracket cradles the edges of the card.



- 3. To engage the two connectors, gently push the card downward at the two green pressure points on the edges of the card.**

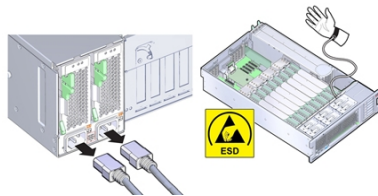
4. Connect the SP card cable to the connector on the SP Card.



5. To secure the card, tighten the green captive screw.
6. Prepare the server for operation. See [“Prepare the Server for Operation”](#) on page 231.

▼ Replace the Motherboard (FRU)

When servicing the components in this section, unplug the AC power cords and use ESD protection.



To replace the motherboard, remove and retain internal motherboard-mounted components.

- Before You Begin**
- For serviceability considerations, see [“Component Serviceability” on page 70](#).
 - To complete this procedure, you need:
 - Alcohol wipes
 - Thermal compound

1. **Prepare the server for service. See [“Prepare the Server for Cold Service” on page 94](#).**
2. **Remove the SP card. See [“Remove the SP Card \(FRU\)” on page 219](#).**
3. **Remove all PCIe cards from the server taking care to note their slot assignments. See [“Remove a PCIe Card” on page 156](#).**

The slot population on the replacement motherboard needs to match the population on the failed board.

4. **If the server has two CPUs, carefully remove the air baffle, taking care not to damage the fan board ribbon cable.**

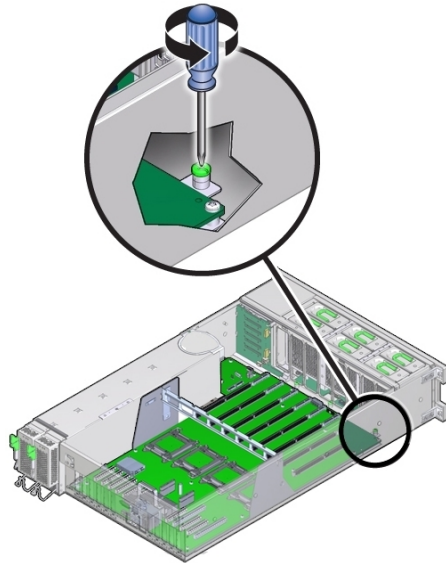
Lift the baffle slowly and maneuver its front edge away from the ribbon cable while removing.



Caution - Component damage. Lifting the baffle straight up from the server can damage the fan board ribbon cable. The front support foot for the air baffle is located under the cable.

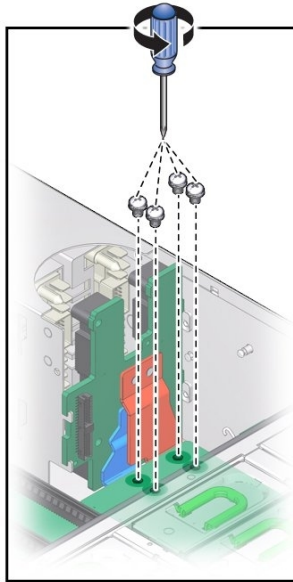
5. **Remove all memory riser cards. See [“Remove a Memory Riser Card” on page 139](#).**
6. **Disconnect the fan board ribbon cable from the motherboard.**
7. **Remove the CPUs and heatsinks from the motherboard. See [“Remove a Heatsink and CPU \(FRU\)” on page 183](#)**
8. **Loosen the green captive screw that secures the motherboard to the chassis.**

The screw is located at the left front corner of the motherboard behind FM3.



9. **Disconnect all cables that connect the power supply backplane, disk drive backplane, and fan board to the motherboard.**
10. **Remove the air divider by lifting it out of the chassis.**

- 11. Remove the four bus bar screws securing the motherboard to the power supply backplane.**



- 12. Position the cables off to the side, using the tab on the power supply cover.**

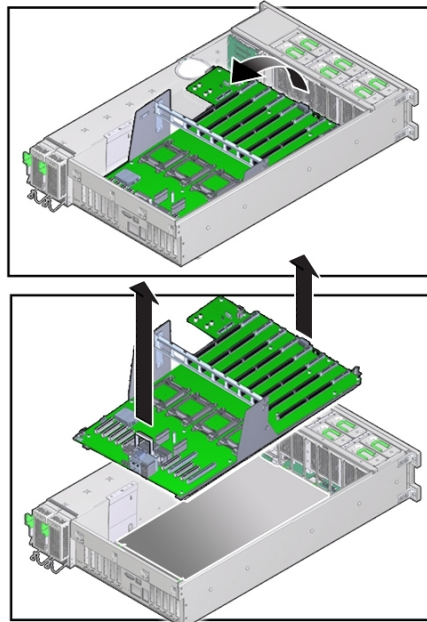
The motherboard is mounted to a metal plate. The plate has eight keyed slots that align with eight standoffs mounted to the bottom of the chassis. The standoffs lock the motherboard and plate assembly to the chassis. To unlock the assembly, you need to slide the assembly toward the front of the server before you can lift it out.

- 13. To unlock the motherboard, use the memory riser card guide and the handle above the SP card slot to slide the motherboard toward the front of the server.**

This action unlocks the motherboard and plate assembly.

- 14. Lift the front end of the motherboard while gently sliding it away from the back of the server, ensuring that the Locator indicator light pipe extension piece slides out of its hole in the chassis back wall .**

Note - If Locator indicator light pipe extension detaches during removal, ensure that you retrieve it from the server. The extension is a clear plastic piece that transmits light and allows you to activate the Locator indicator switch from the back of the server.



15. To remove the motherboard, slowly guide it up and out of the server.
16. Lift the replacement motherboard by the memory riser card guide and the handle above the SP card slot.

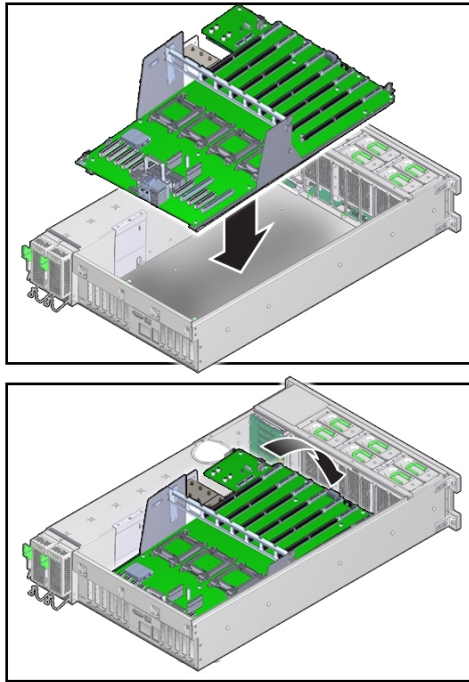
Note - Ensure that the removable light pipe extension piece for the Locator indicator is attached to the indicator switch. The extension is a clear plastic piece that transmits light and allows you to activate the Locator switch from the back of the server.

Position the motherboard so that PCIe slots at the back of the server and the memory riser card slots are toward the front.

17. Align the motherboard over the server with the memory riser card slots toward the front.

- 18. Lower the motherboard into the server and guide the light pipe extension piece for the Locator indicator at the back of the motherboard into its hole on the server back wall.**

Ensure that the switch operates easily and is not stuck in the depressed position.

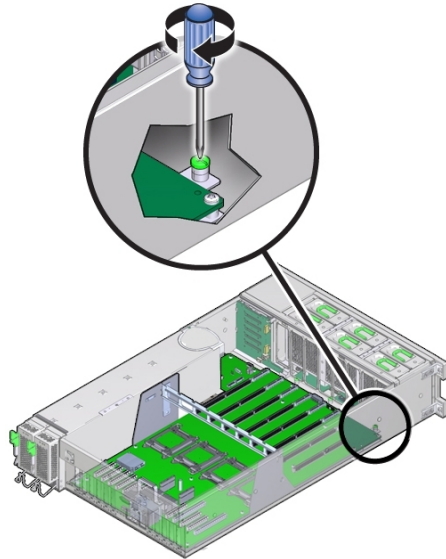


- 19. Ensure that the keyed holes in the plate attached to the underside of the motherboard are aligned with the locking standoffs in the chassis.**

- 20. Slide the motherboard toward the back of the server.**

This action locks the motherboard and aligns the captive screw on the motherboard plate with its thread hole in the chassis.

21. To secure the motherboard to the chassis, tighten the captive screw.



22. Before install the CPUs, remove the CPU cover plates relevant sockets. See [“Remove a CPU Cover Plate \(FRU\)” on page 177.](#)
23. Install the CPUs and heatsinks. See [“Install a Heatsink and CPU \(FRU\)” on page 190.](#)
24. Insert and tighten the four bus bar screws that secure the motherboard to the power supply backplane.
25. Install the air divider by aligning it with its guide and lowering it into the server. Ensure that the flanges on the divider enter their respective slots on the side wall and that the plunger for the Fault Remind button is aligned with the button on the motherboard.
26. Connect all cables from the power supply backplane, disk drive backplane, and fan board to the motherboard.
27. Install all memory risers.
See [“Install a Memory Riser Card” on page 145.](#)

28. **For a two-CPU system, install the air baffle, ensuring that the foot on the front of the baffle is under the fan board ribbon cable.**
29. **Install all PCIe cards.**
See [“Install a PCIe Card” on page 158.](#)
30. **Install the SP card. See [“Install the SP Card \(FRU\)” on page 221.](#)**
31. **Install the power supply backplane cover plate.**

Note - Do not route the cables on the power supply backplane cover plate.

32. **Prepare the server for operation. See [“Prepare the Server for Operation” on page 231.](#)**

Note - The product serial number used for service entitlement and warranty coverage might need to be reprogrammed by authorized service personnel with the correct product serial number.

Returning the Server to Operation

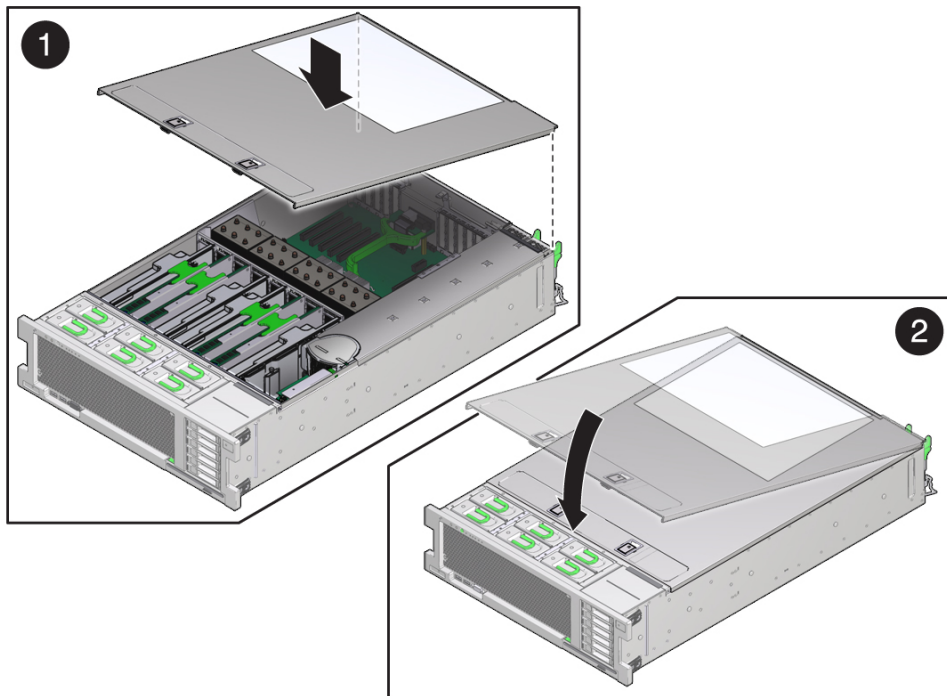
This section describes how to return the server to operation after performing service procedures. The following table describes the contents of this section.

Description	Link
Procedural information for preparing the server for service.	“Prepare the Server for Operation” on page 231
Optional procedural information for reinstalling the server in the rack.	“(Optional) Install the Server Into the Rack” on page 234
Optional procedural information for reinstalling CMA.	“(Optional) Install Cable Management Arm” on page 237
Procedural information for checking the installation of the server in the rack.	“Verify Operation of Slide-Rails and CMA” on page 239
Procedural information for repositioning the server in the rack.	“Return the Server to the Normal Rack Position” on page 240
Procedural information for server power-on options.	“Power On the Server” on page 241

▼ Prepare the Server for Operation

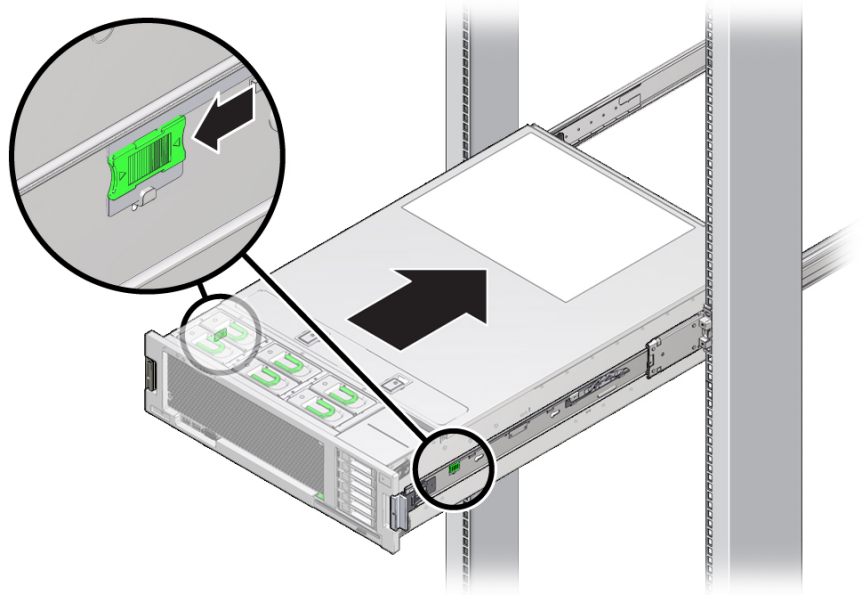
- 1. Ensure that all components are completely installed.**
Check for unconnected cables and unseated components and connect and install them correctly.
- 2. Place the cover on top of the server with the two latches at the front.**
- 3. Ensure that the edges of the cover encapsulate the server sidewalls.**
- 4. Lift the front edge of the cover and slide the cover away from the rear of the server about 1 inch (25.4 mm).**
This action ensures that the rear edge of the cover is positioned correctly.

5. **Slide the top cover toward the rear of the server, so that the rear edge of the cover slips under the retaining clip on the back wall of the server.**



6. **Set the front edge of the cover on the server.**
Ensure that the cover is properly seated and that both latches are fully engaged.
7. **Lift both latches and firmly push down on the front edge of the cover until both latches lock with an audible click.**
8. **Release the latches and verify that the cover is locked down.**
9. **(Optional) If you removed the server entirely from the rack, install it now:**
 - See **“(Optional) Install the Server Into the Rack”** on page 234.
These optional steps show you how to install the server in the rack,
10. **To return the server to its normal rack position, do the following:**

- a. Pull the both side rail release tabs toward the front of the server and slowly push the server into the rack.



11. **Verify that the server is securely mounted in the rack and that the slide-rail locks are engaged with the mounting brackets.**
12. **At the rear of the server, connect the AC power cables to the server power supplies.**
When the power cables are connected to the server, the server powers on to standby power mode.
13. **Connect any other cables to their connectors or ports on the back of the server.**
If the cable management arm (CMA) is in the way, disconnect the left CMA release and swing the CMA open.
14. **If necessary, reconnect the CMA. See [“\(Optional\) Install Cable Management Arm” on page 237](#).**
Swing the CMA closed and latch it to the left rack rail.

15. Power on the server. See [“Power On the Server” on page 241](#).

▼ (Optional) Install the Server Into the Rack

Before You Begin



Caution - Physical or component damage. The server is heavy and cannot be safely installed in the rack by a single person. Use multiple personnel and a mechanical lift to install the server in the rack.

When preparing the server for operation, use these optional steps to install the server in the rack.

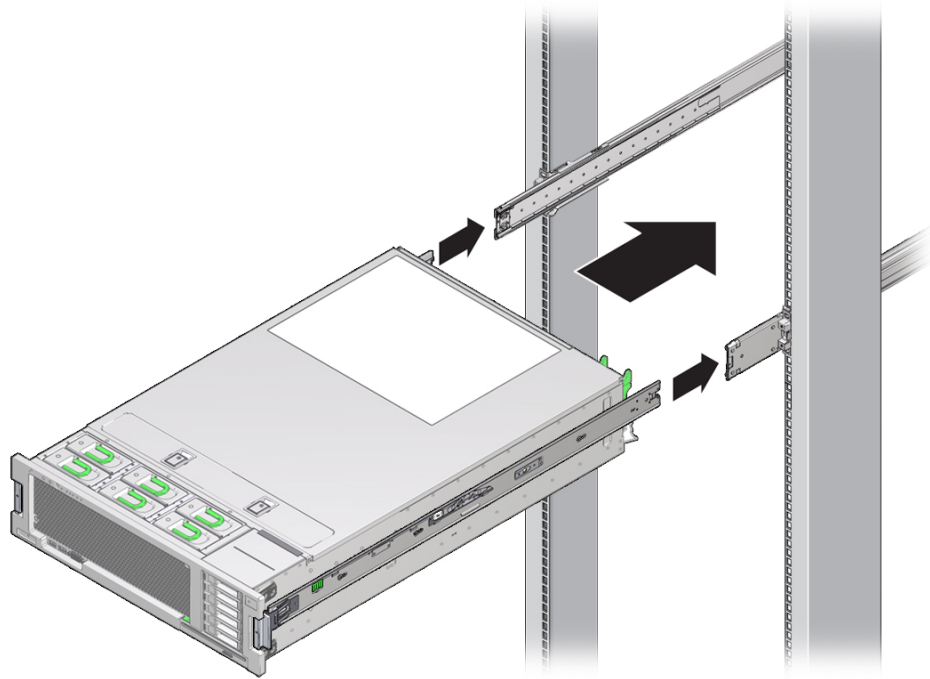
1. Push the slide-rails into the slide-rail assemblies into the rack as far as possible.
2. Raise the server so that the ends of the mounting brackets are aligned with the slide-rail assemblies that are mounted in the rack.
3. Ensure that both the top and bottom mounting lips of the mounting brackets are aligned with the slide-rails.



Caution - Physical or component damage. The server might fall if the mounting brackets are not inserted properly into the slide rails. Ensure that the mounting lips are properly aligned and the insert the brackets into the slide rails properly.

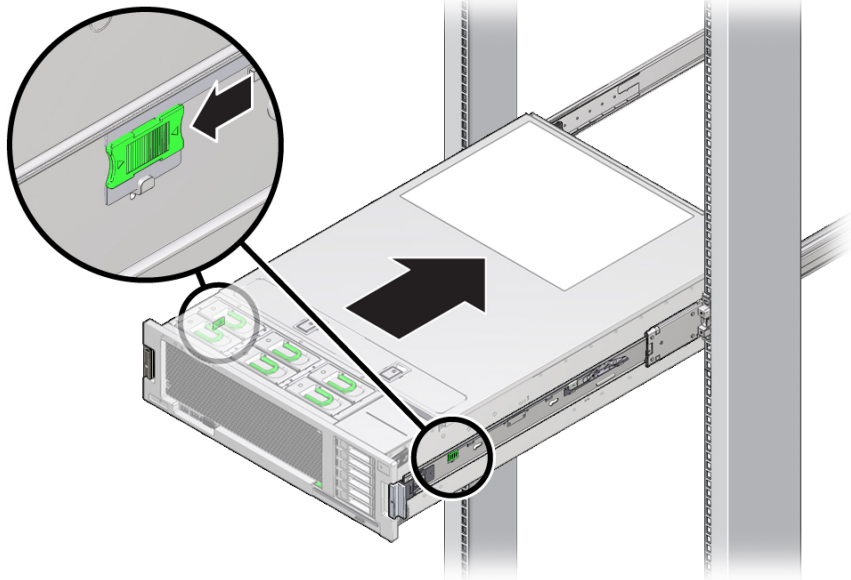
4. Insert the mounting brackets into the slide-rails and push the server into the rack until the mounting brackets encounter the slide-rail stops (approximately 12 inches, or 30 cm) and the server rails lock the server into the maintenance position.

The server cannot be slid past the slide rail stops. If correctly installed, the server should slide easily. If the server does not slide easily, it might not be inserted properly.



5. To unlock the server and slide it into the rack, simultaneously pull and hold the green slide-rail release buttons on each mounting bracket and push the server into the rack until it locks into place flush with the front of the rack.

The locking is accompanied by an audible click.

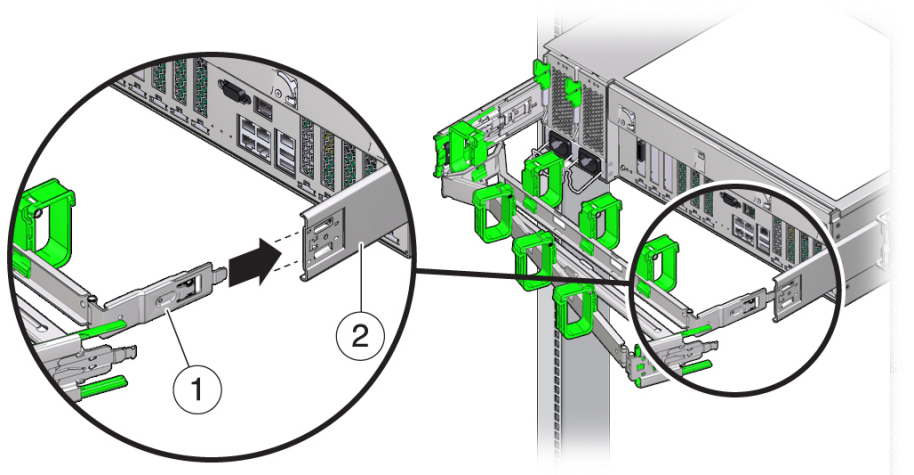


6. **Verify that the server is securely mounted in the rack and that the slide-rail locks are engaged with the mounting brackets.**
7. **At the rear of the server, connect the AC power cables to the server power supplies.**
When the power cables are connected to the server, the server powers on to standby power mode.
8. **Connect any other cables to their connectors or ports on the back of the server.**
If the cable management arm (CMA) is in the way, disconnect the left CMA release and swing the CMA open.
9. **If necessary, reconnect the CMA. See [“\(Optional\) Install Cable Management Arm” on page 237](#).**
Swing the CMA closed and latch it to the left rack rail.
10. **Power on the server. See [“Power On the Server” on page 241](#).**

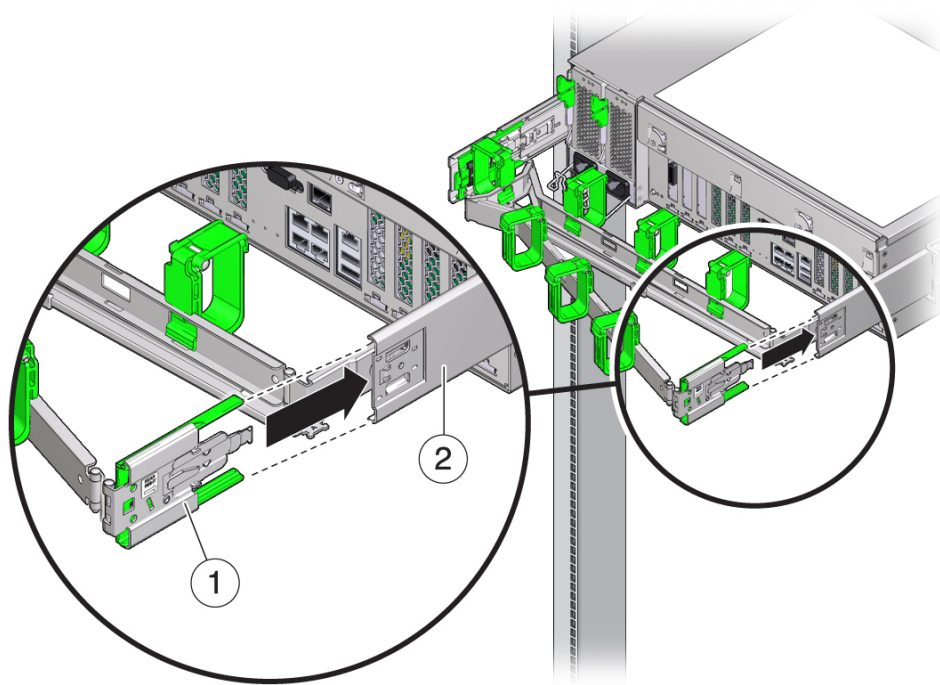
▼ (Optional) Install Cable Management Arm

Use this procedure to install the optional CMA.

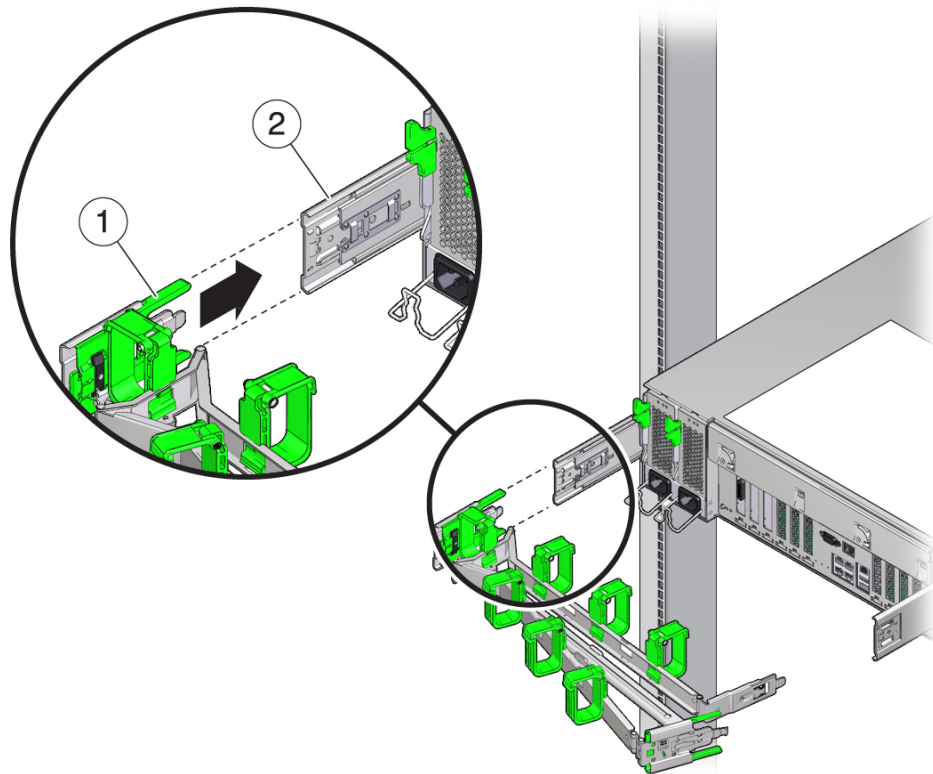
1. Insert the CMA's mounting bracket connector into the right slide-rail until the connector locks into place with an audible click).



2. Insert the right CMA slide-rail connector [1] into the right slide-rail assembly [2] until the connector locks into place with an audible click.



3. Insert the left CMA slide-rail connector [1] into the left slide-rail assembly [2] until the connector locks into place with an audible click.



4. Install and route cables to your server.
5. If required, re-attach the cable hook and loop straps to the CMA, and press them into place to secure the cables.

For best results, place three cable straps, evenly spaced, on the rear-facing side of the CMA and three cable straps on the side of the CMA nearest the server.

▼ Verify Operation of Slide-Rails and CMA

Use the following procedure to ensure that the slide-rails and CMA are operating correctly.

Note - Two people are recommended for this procedure: one to move the server in and out of the rack, and one to observe the cables and CMA.

1. **Slowly pull the server out of the rack until the slide-rails reach their stops.**
2. **Inspect the attached cables for any binding or kinks.**
3. **Verify that the CMA extends fully from the slide-rails.**
4. **Push the server back into the rack, as described in the following sub-steps.**

When the server is fully extended, you must release two sets of slide-rail stops to return the server to the rack:

- a. **Push in both green levers simultaneously and slide the server toward the rack.**

The first set of stops are levers located on the inside of each slide-rail, just behind the back panel of the server.

The server slides in approximately 18 inches (46 cm) and stops.

Verify that the cables and the CMA retract without binding before you continue.

- b. **Push the server completely into the rack until both slide-rail locks engage.**

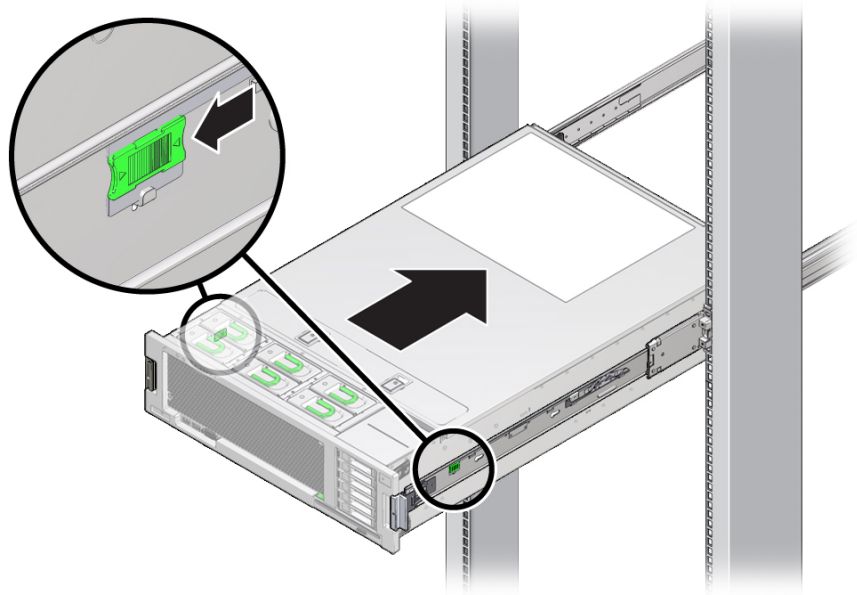
The second set of stops are the slide-rail release buttons, located near the front of each mounting bracket. Simultaneously push both of the green slide-rail release buttons.

5. **Adjust the cable straps and CMA, as required.**

▼ **Return the Server to the Normal Rack Position**

This procedure describes how to return the server to the normal rack position in preparation for operation.

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



2. **While pushing on the release tabs, slowly push the server into the rack.**
Ensure that the cables do not get in the way.
3. **Reconnect the cables to the back of the server.**
If the cable management arm (CMA) is in the way, disconnect the left CMA release and swing the CMA open.
4. **Reconnect the CMA.**
Swing the CMA closed and latch it to the left rack rail.

▼ Power On the Server

If you removed power from the server during maintenance, use the following procedure to reapply main power for all server components.

- 1. Verify that the power cords are connected to the server and that standby power is on.**

Shortly after power is applied to the server, the SP OK indicator blinks as the service processor boots. The SP OK indicator is illuminated solid green when the service processor has successfully booted. After the service processor has booted, the system OK indicator on the front panel begins flashing slowly, indicating that the host is in standby power mode.

- 2. Press and release the recessed Power button on the server front panel.**

When main power is applied to the server, the system OK indicator begins to blink more quickly while the system boots and lights solidly once the operating system boots.

Each time the server powers on, the power-on self-test (POST) can take several minutes to complete.

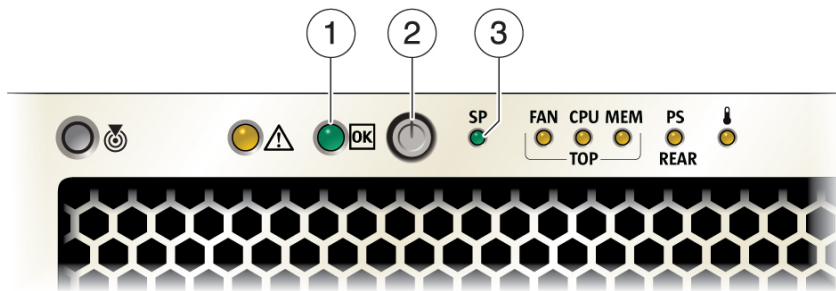


Figure Legend	Description
1	System OK indicator
2	Power Button
3	SP OK indicator

BIOS Setup Utility Menu Options

This section describes the Basic Input/Output System (BIOS) Setup Utility.

Note - For more information about BIOS, refer to [Oracle X4 Series Servers Administration Guide](#)

Description	Link
BIOS basics and screens	“About the BIOS Setup Utility” on page 243
BIOS screens	“Access the BIOS Setup Utility” on page 278
POST codes	“POST and Checkpoint Codes” on page 281

About the BIOS Setup Utility

The server's Basic Input/Output System (BIOS) is stored on the motherboard and managed using the BIOS setup utility. The utility reports system information and provides a graphical user interface that allows you to change the server BIOS settings from the factory-configured defaults.

The BIOS has two operational boot modes, Legacy and UEFI. Changing modes changes the content of some utility screens. The legacy boot mode is the default mode.

For a listing of the BIOS Setup Utility menus, see [“Legacy Mode BIOS Setup Utility Screens” on page 244](#).

BIOS Setup Utility Screens

This section contains screen captures of the higher-level BIOS Setup Utility menus.

- [“Legacy Mode BIOS Setup Utility Screens” on page 244](#)
- [“UEFI Mode BIOS Setup Utility Screens” on page 278](#)

Legacy Mode BIOS Setup Utility Screens

This section contains screen captures of legacy mode BIOS Setup Utility screens. To access the BIOS Setup Utility, see [“Access the BIOS Setup Utility” on page 278](#).

BIOS Menu Top-Level

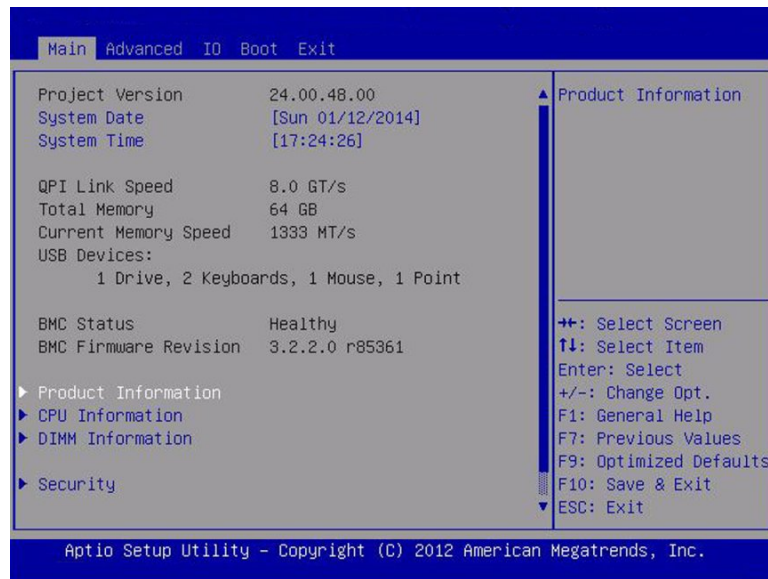
The following table provides descriptions for the Legacy mode top-level BIOS setup menus.

Menu	Description
Main	General system and product information, including date and time, security, hardware configuration and CPU, and DIMM information.
Advanced	Configuration information for processors, CPU power management, USB ports, serial ports, trusted computing, network stack, legacy iSCSI, BMC network configuration, and UEFI iSCSI configuration.
IO	Configuration interface for plug-and-play (PnP) devices, virtualization, internal devices, and add-in cards.
Boot	Configuration interface for boot settings, including boot mode (Legacy, UEFI), Oracle System Assistant Configuration, and boot option priority.
Exit	Save or discard changes.

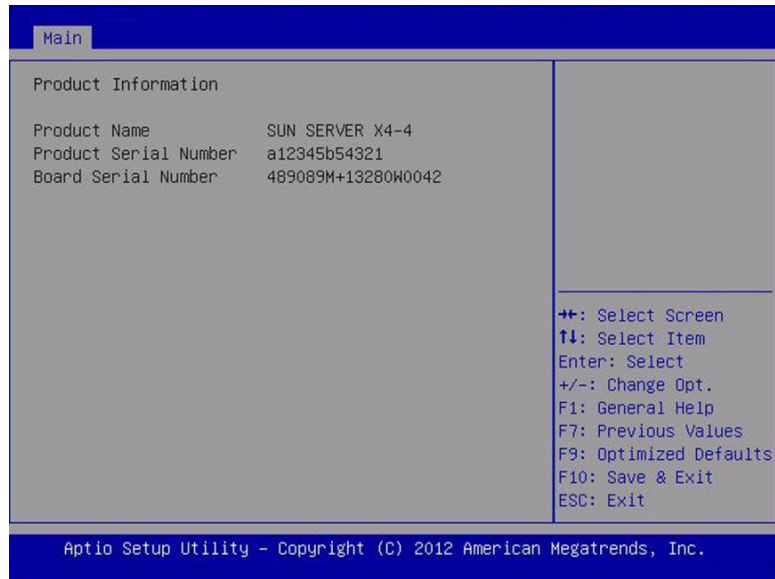
The following illustration identifies the sub-menus that you can access from each of the top-level BIOS menus.

Main Screen (Legacy)

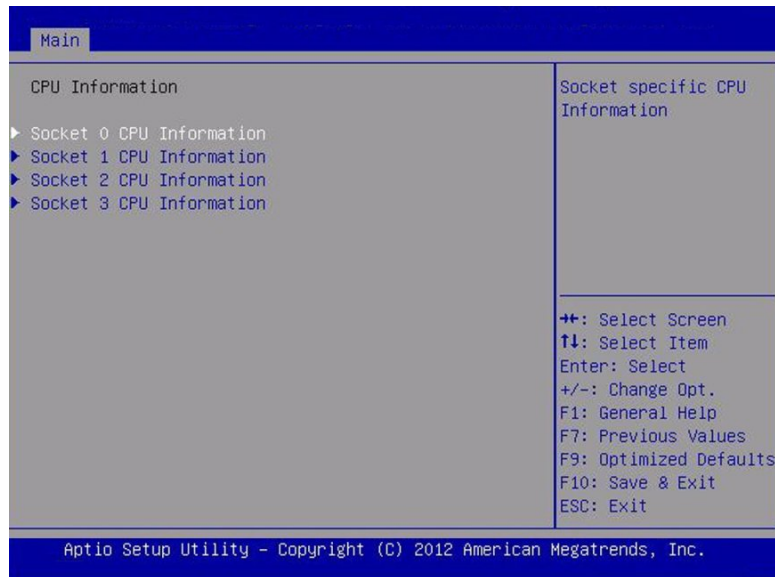
Note - To facilitate search, a list of keywords appears after each screen capture.



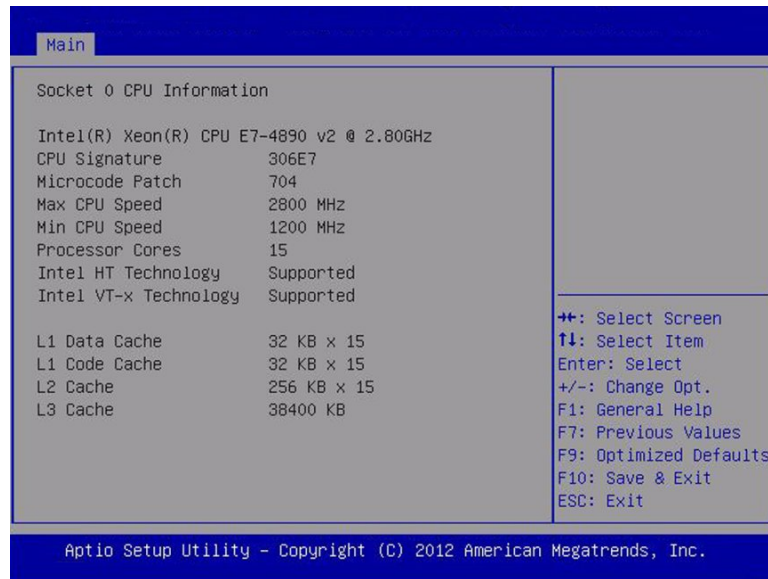
Keywords: Main Screen, Project Version, System Date, System Time, QPI Link Speed, Total Memory, Current Memory Speed, USB Devices, BMC Status, BMC Firmware Revision, Product Information, CPU Information, DIMM Information, Security



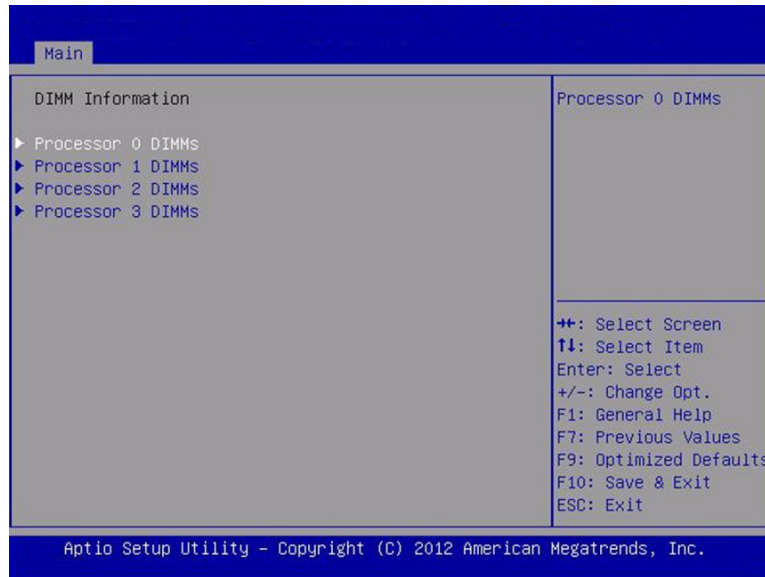
Keywords: Main, Product Information, Product Name, Product Serial Number, Board Serial Number



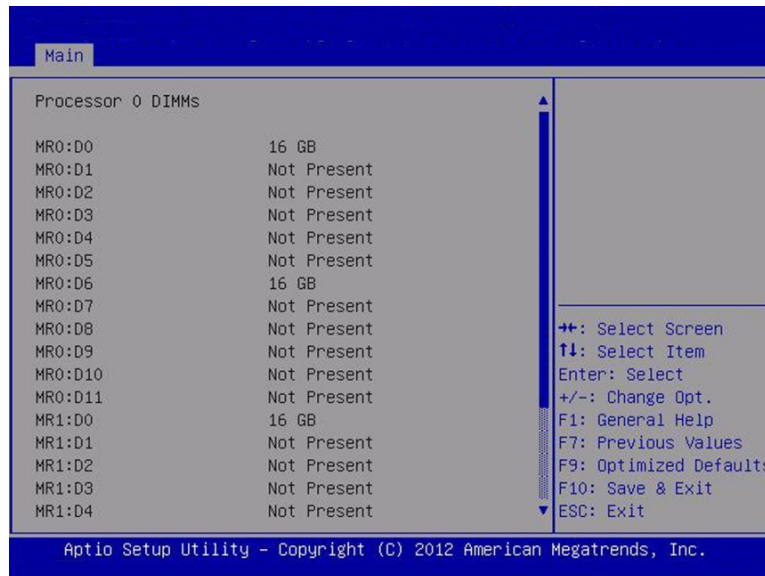
Keywords: Main, CPU Information Socket 0 CPU Information, Socket 1 CPU Information, Socket 2 CPU Information, Socket 3 CPU Information. Socket Specific CPU Information.



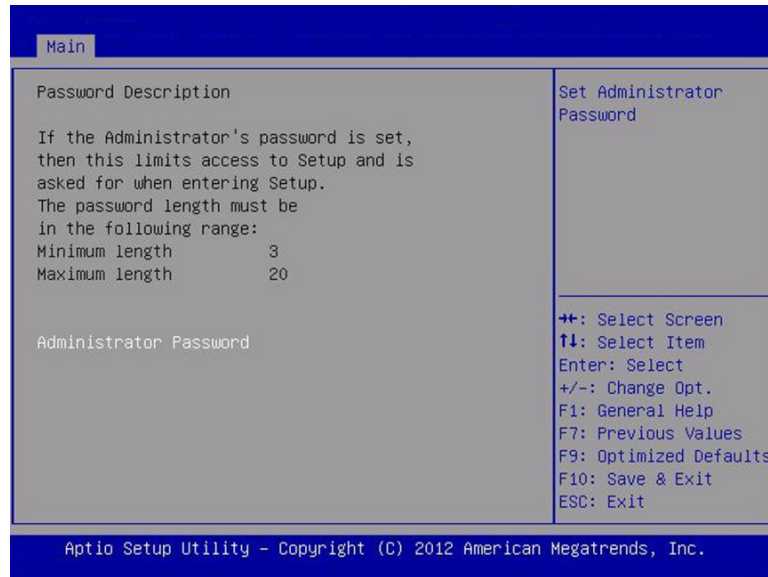
Keywords: Main, CPU Information Socket 0 CPU Information, Intel Xeon CPU Et-4890 v2, CPU Signature, Microcode Patch, Max CPU Speed, min CPU Speed, Processor Cores, Intel HT Technology, Intel VT-x Technology, L1 Data Cache, L1 Code Cache, L2 Cache, L3 Cache



Keywords: Main, DIMM Information, Processor 0 DIMMs

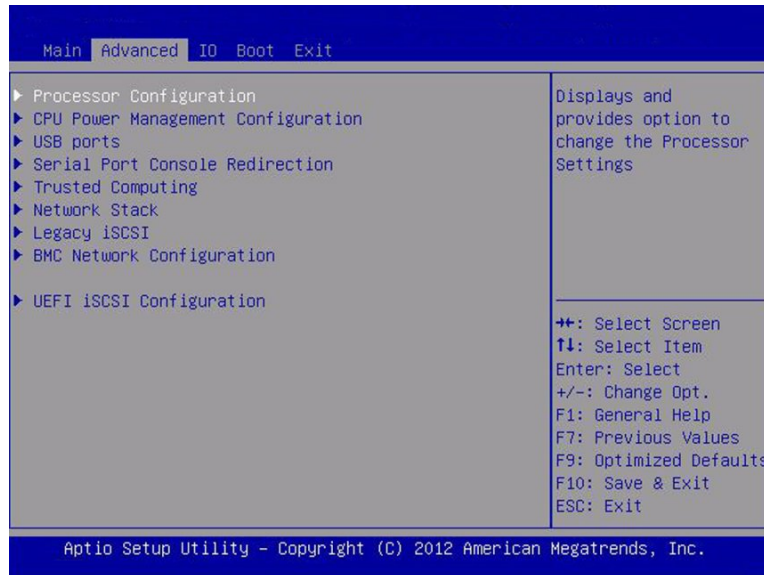


Keywords: Main, Processor 0 DIMMs, Not Present

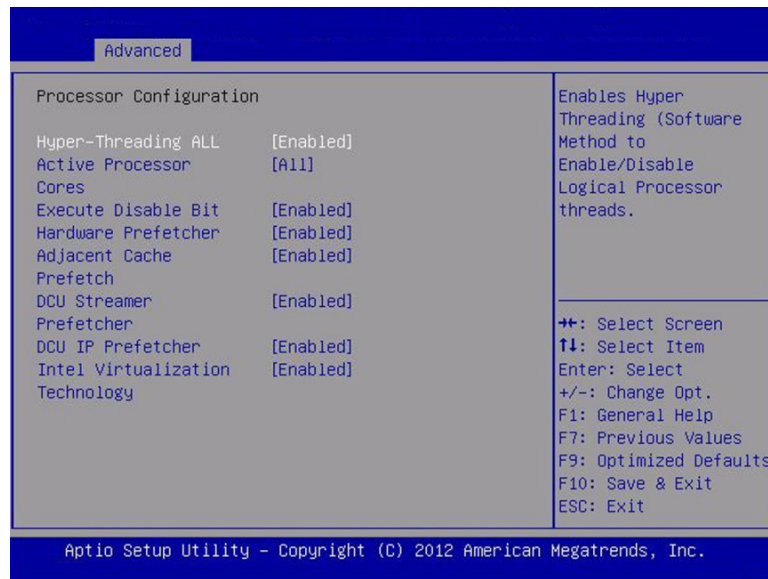


Keywords: Main security screen, set administrator password, password description, minimum length, maximum length, administrator password

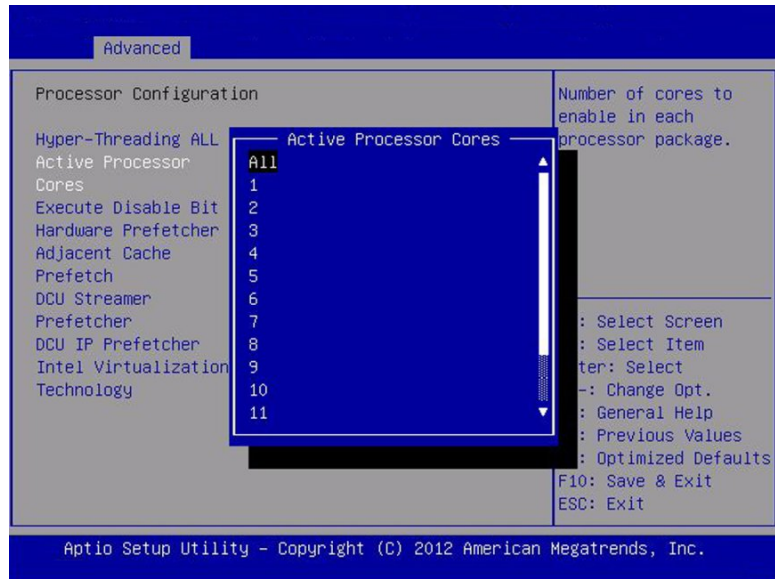
Advanced Screen (Legacy)



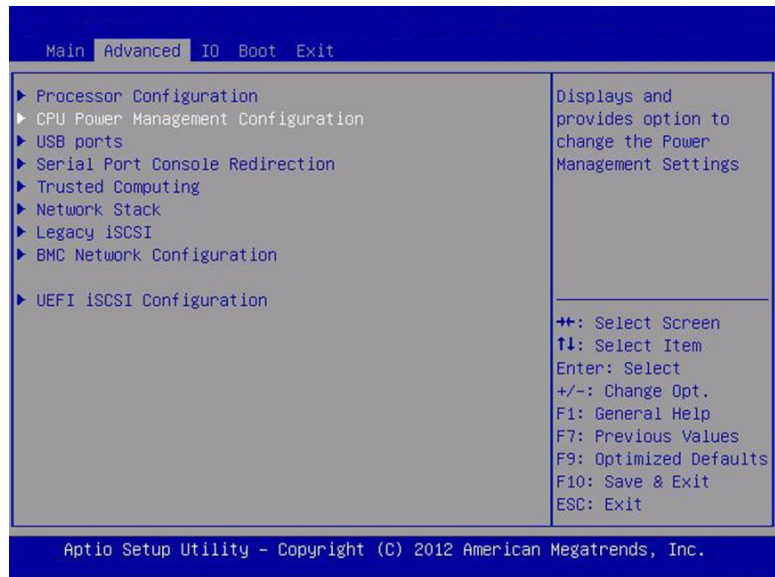
Keywords: Advanced, processor configuration, CPU power management configuration, USB ports, serial port console redirection, trusted computing, network stack, legacy iSCSI, BMC network configuration, UEFI iSCSI configuration



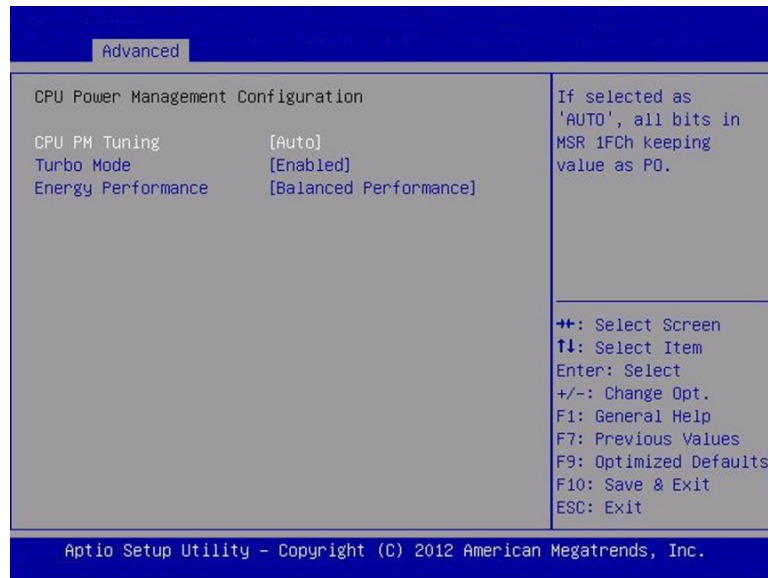
Keywords: Processor configuration, hyper-threading all, active processor, cores, execute disable bit, hardware prefetcher, adjacent cache, prefetch, DCU streamer, prefetcher, DCU IP prefetcher, Intel virtualization technology. Enables hyper-threading (software method) to enable/disable logical processor threads



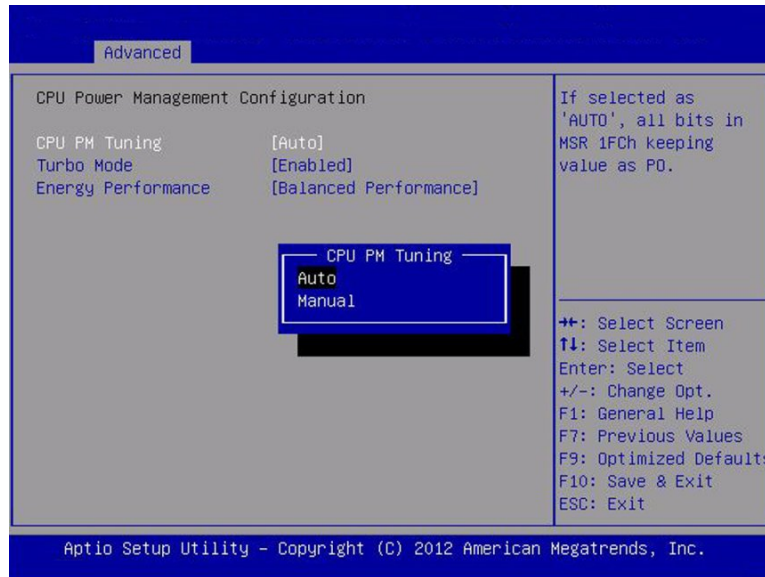
Keywords: Processor Configuration, Active Processor Cores, Number of cores to enable in each processor package



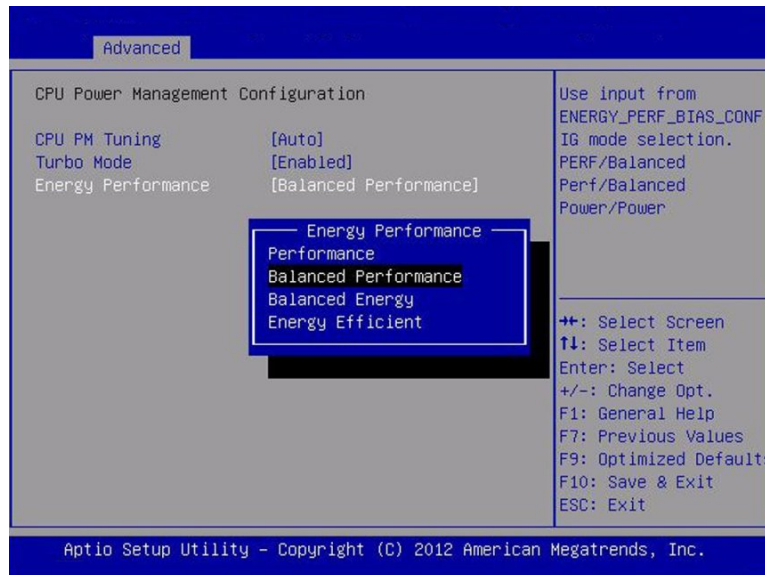
Keywords: Advanced, Processor Configuration, CPU Power Management Configuration, USB Ports, Serial Port Console Redirection, Trusted Computing, Network Stack, Legacy iSCSI, BMC Network Configuration, UEFI iSCSI Configuration



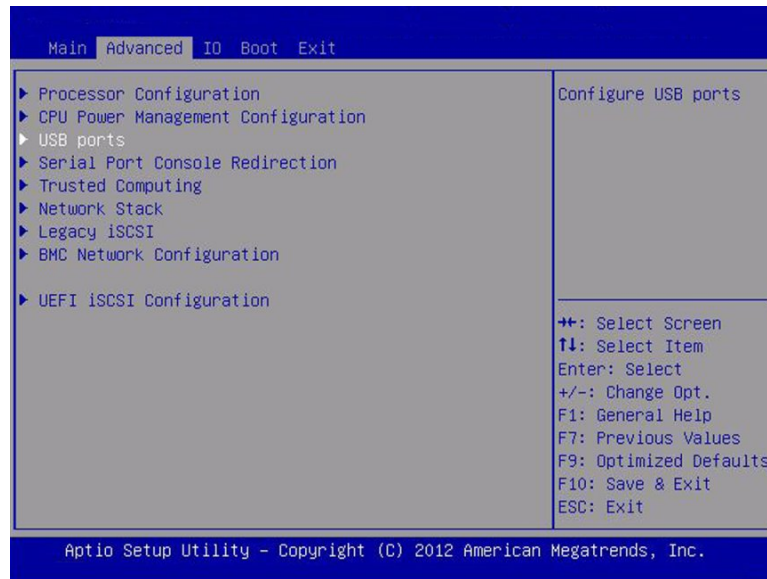
Keywords: CPU Power Management Configuration, CPU PM Tuning, Turbo Mode, Energy Performance, Balanced Performance



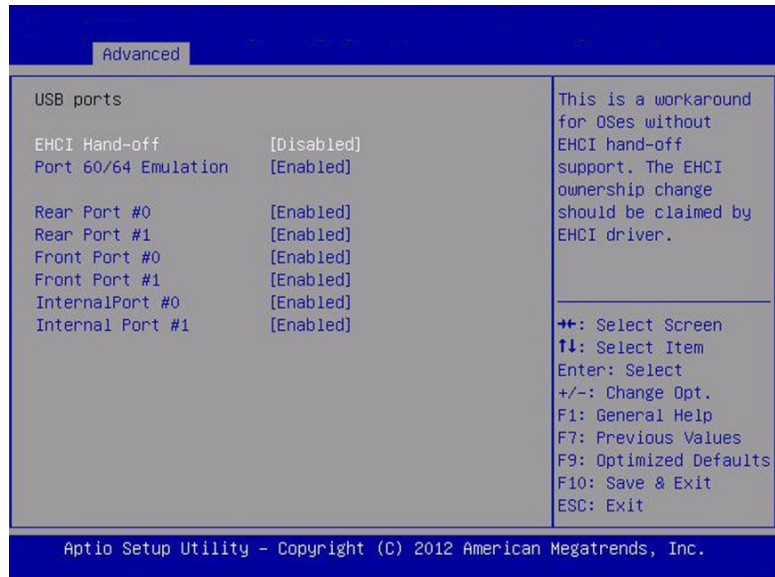
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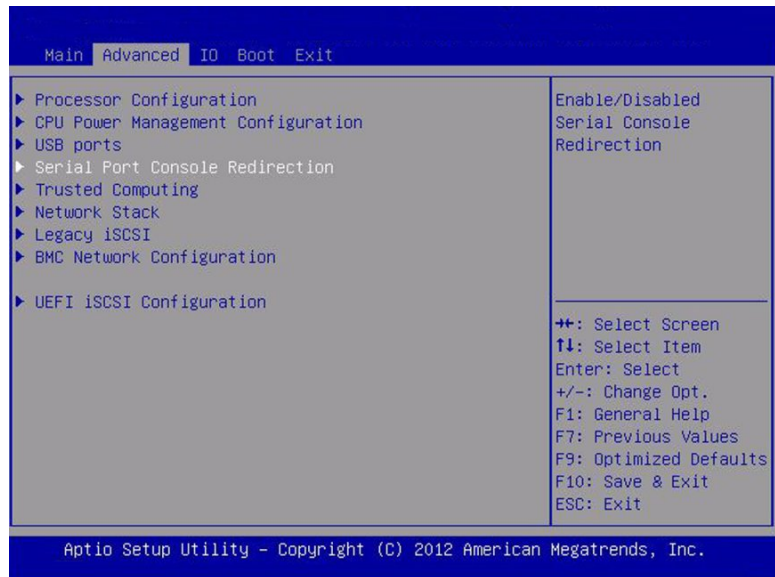
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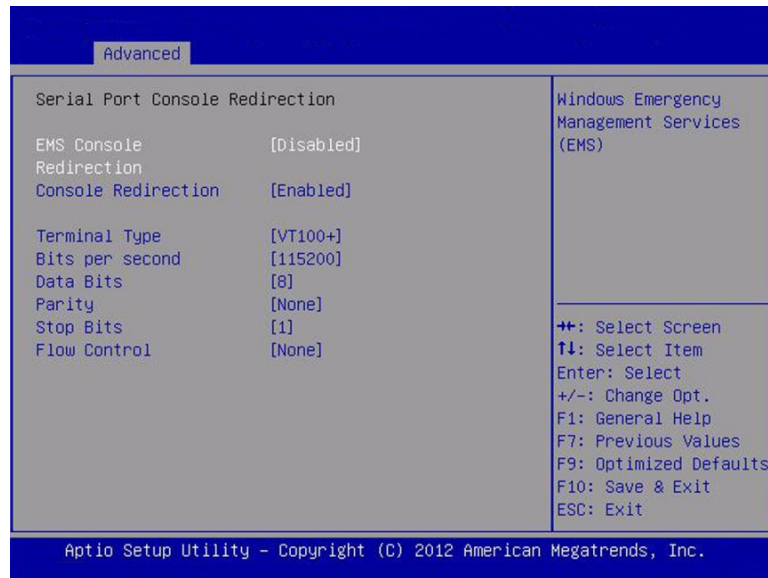
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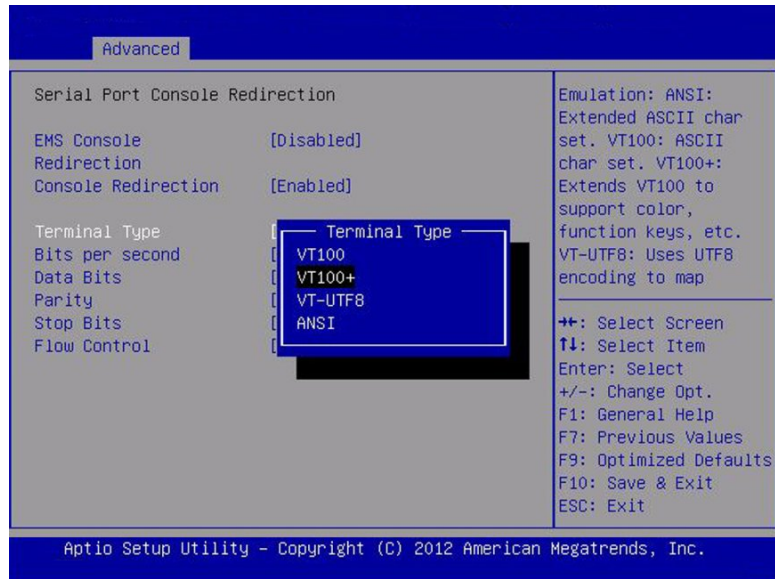
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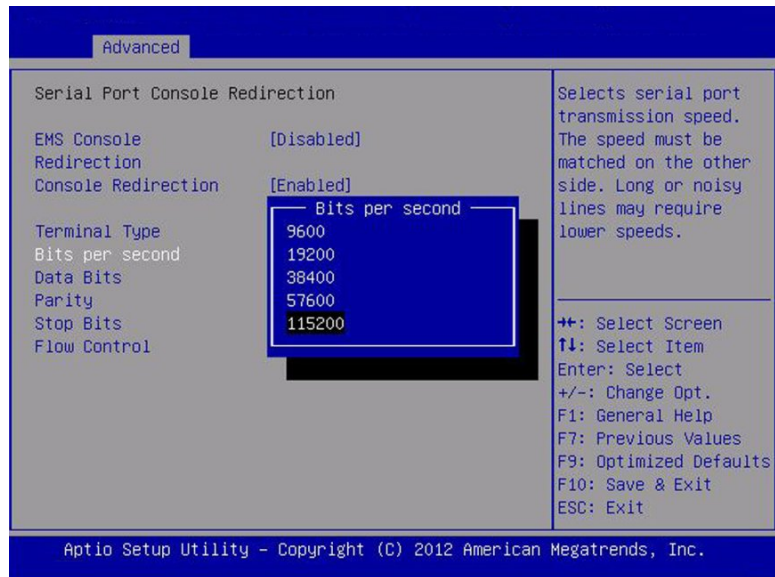
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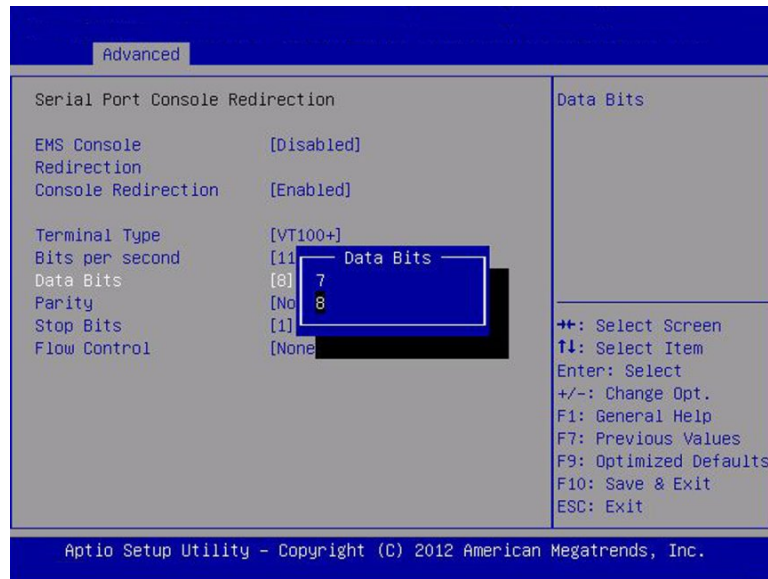
Keywords: Serial Port Redirection, EMS Console Redirection, Terminal Type, Bits per second, Data Bits, Parity, Stop Bits, Flow Control



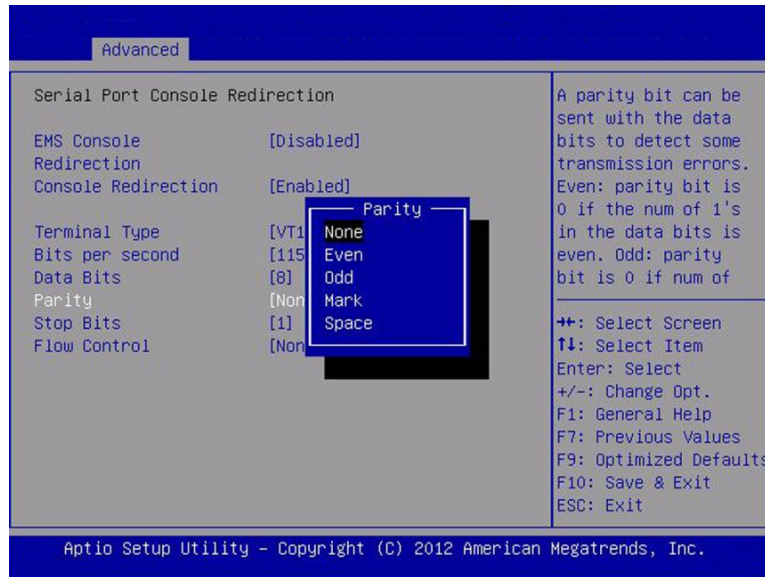
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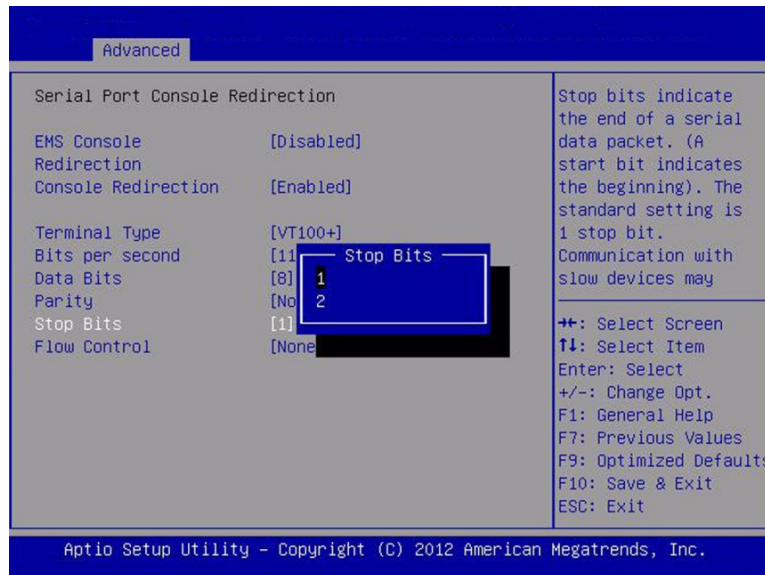
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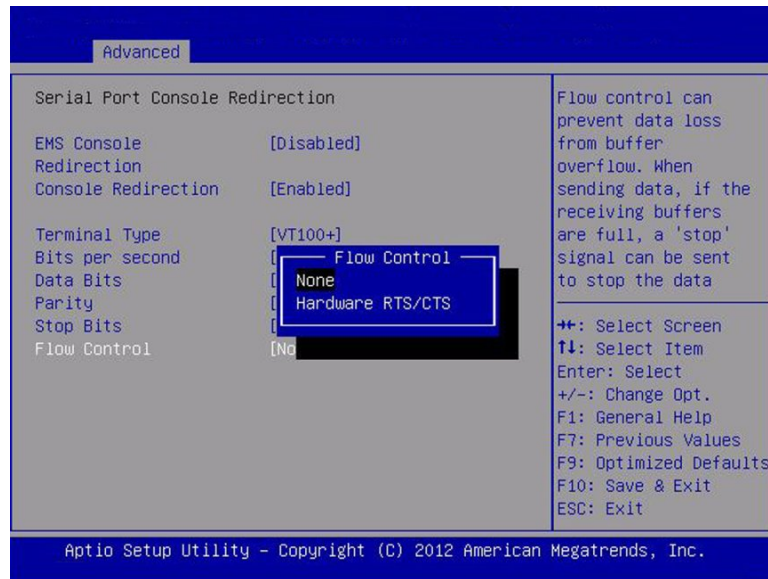
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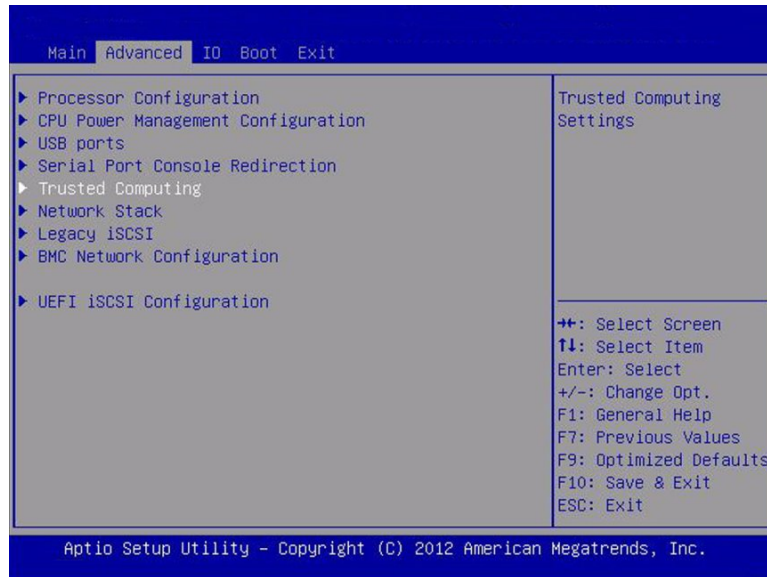
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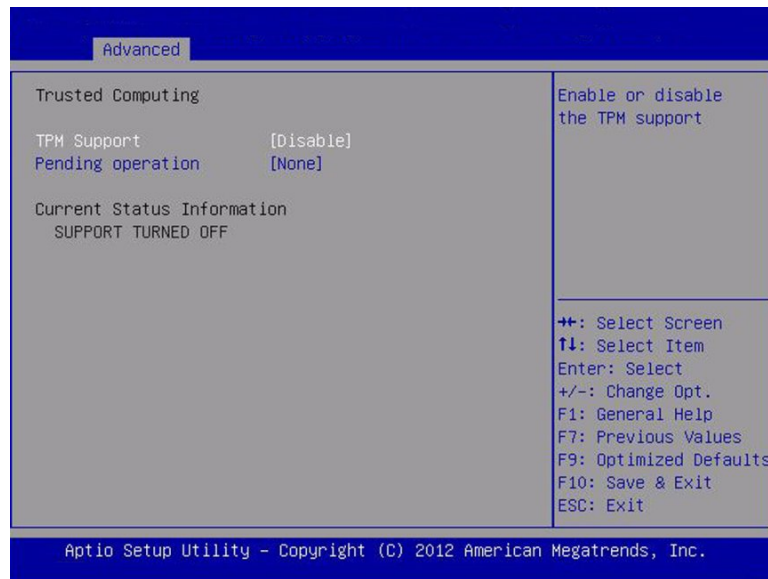
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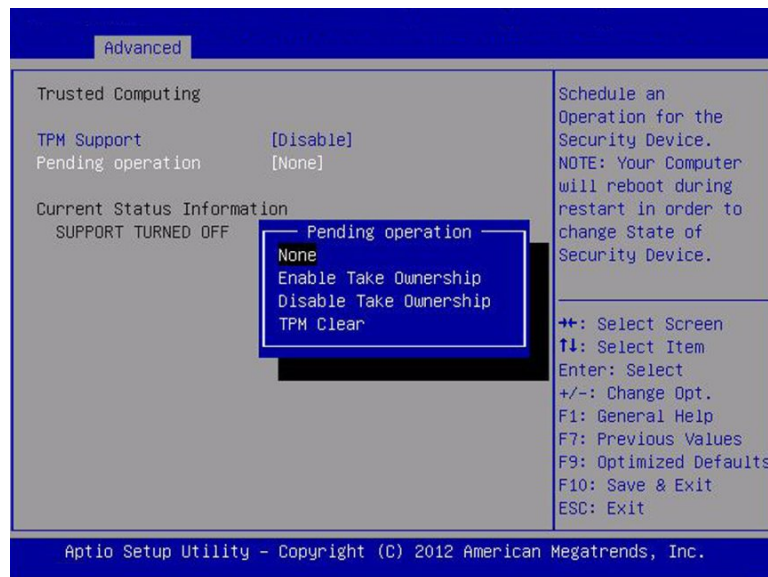
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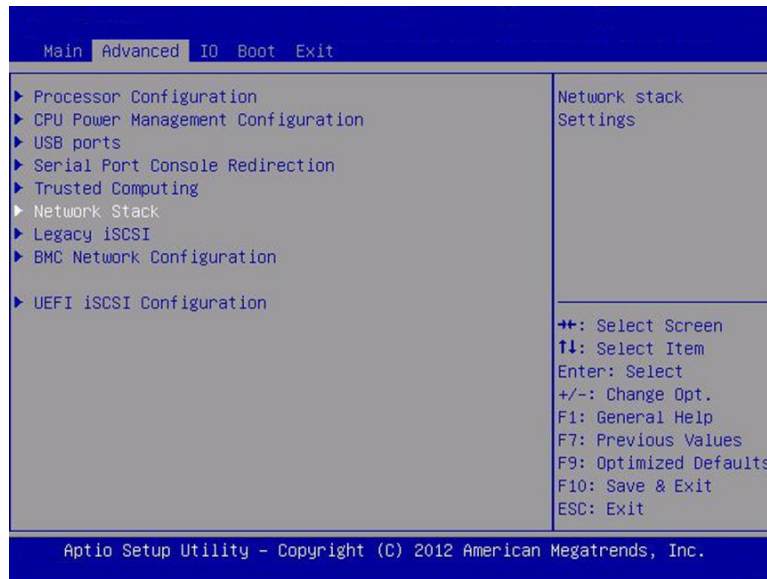
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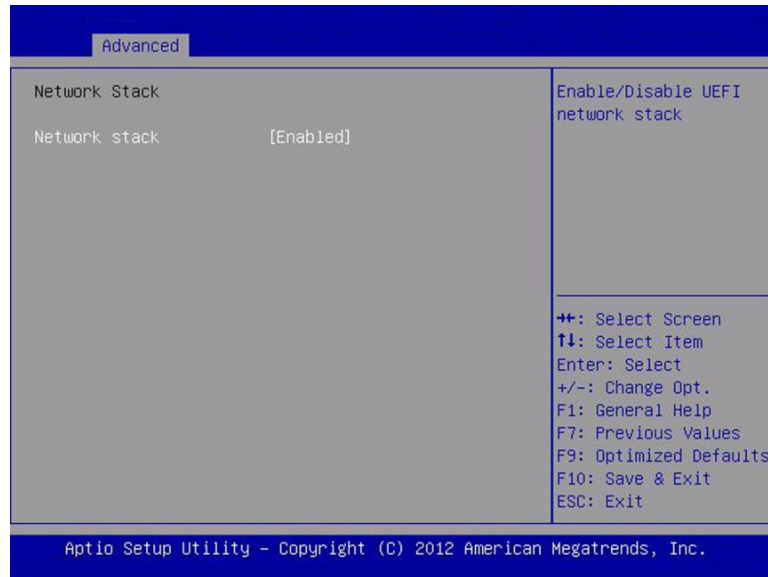
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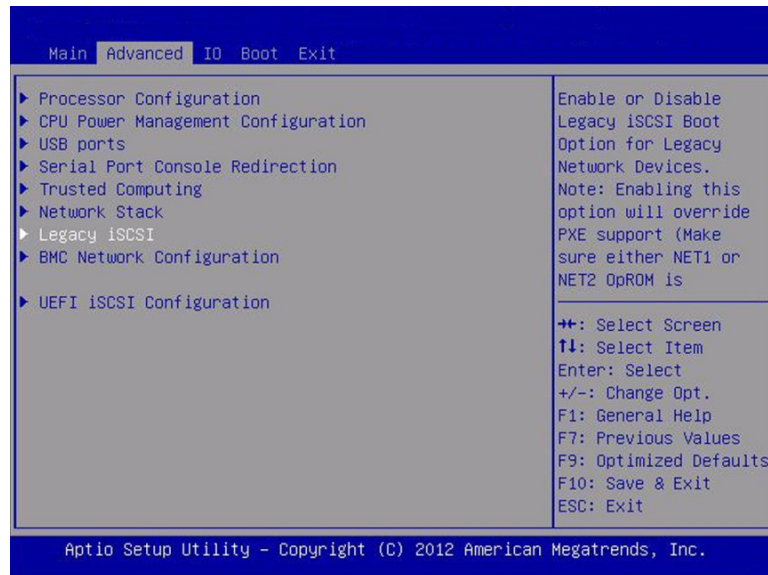
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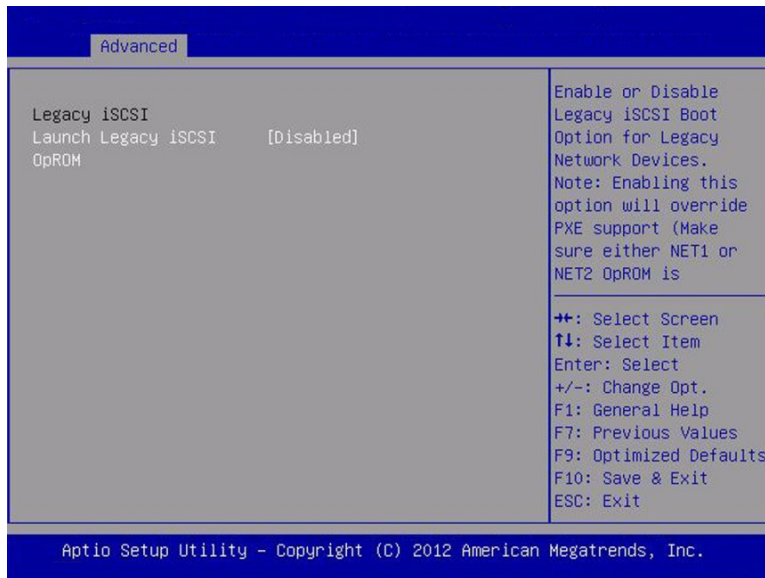
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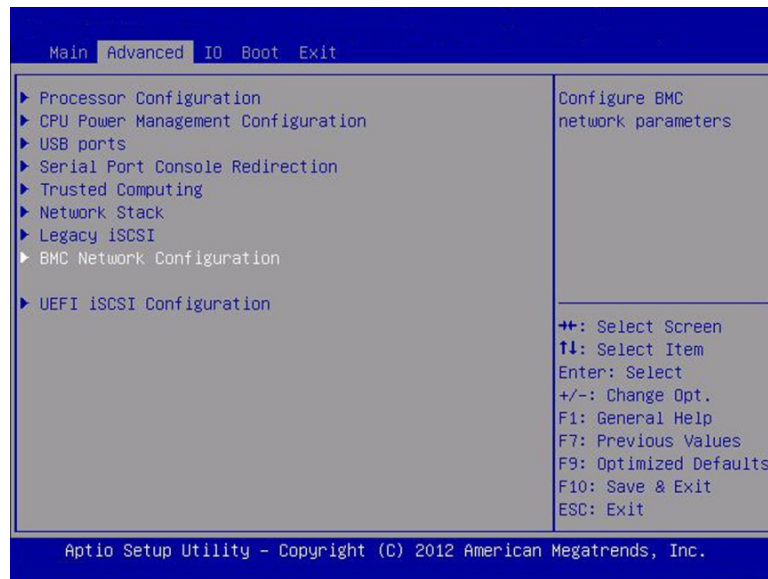
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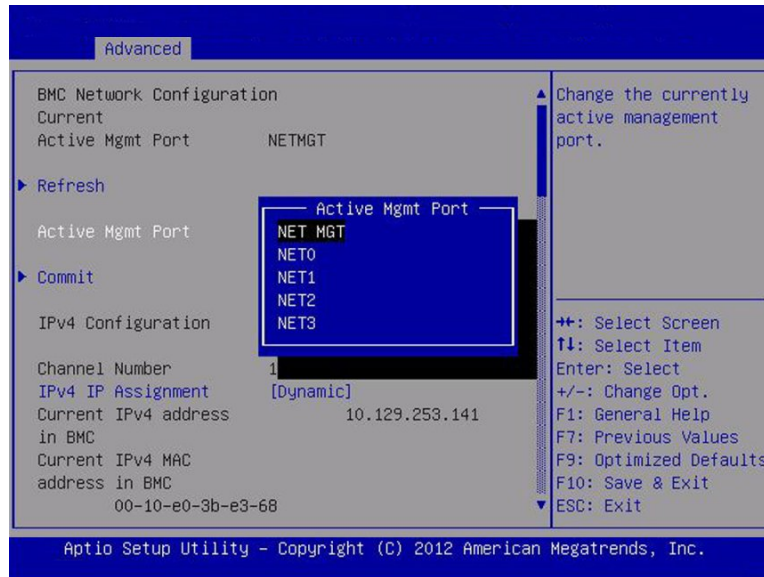
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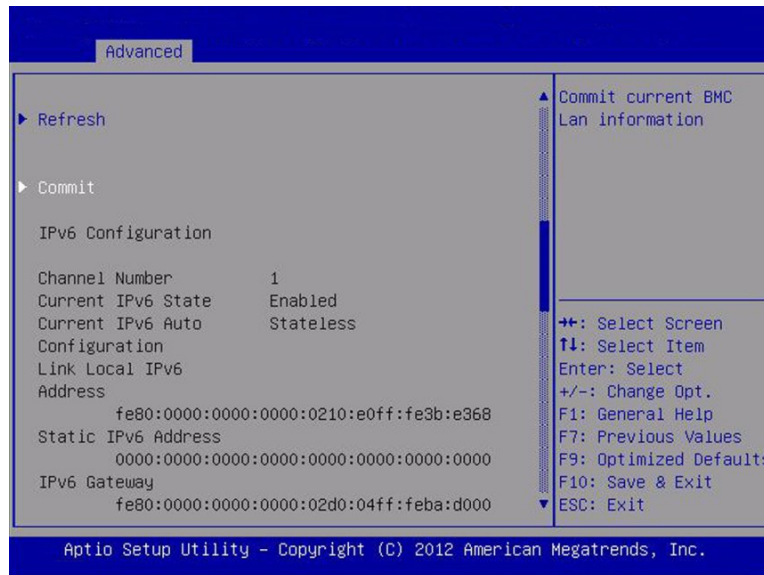
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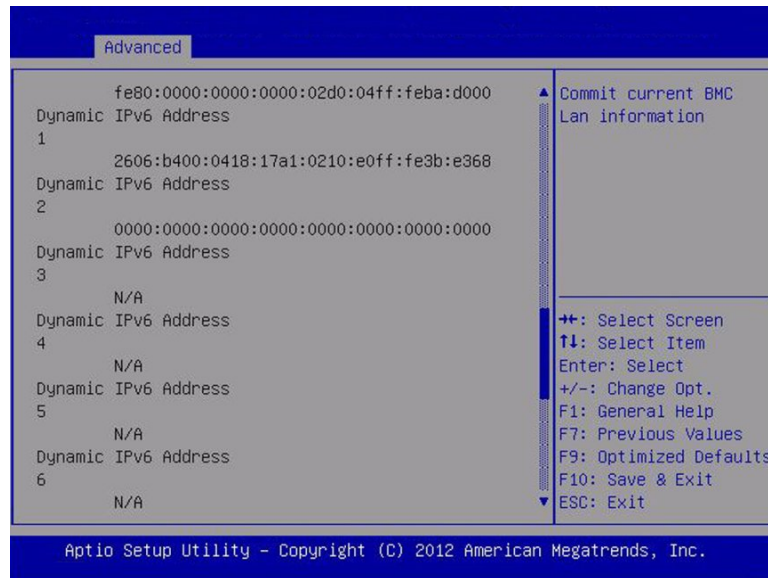
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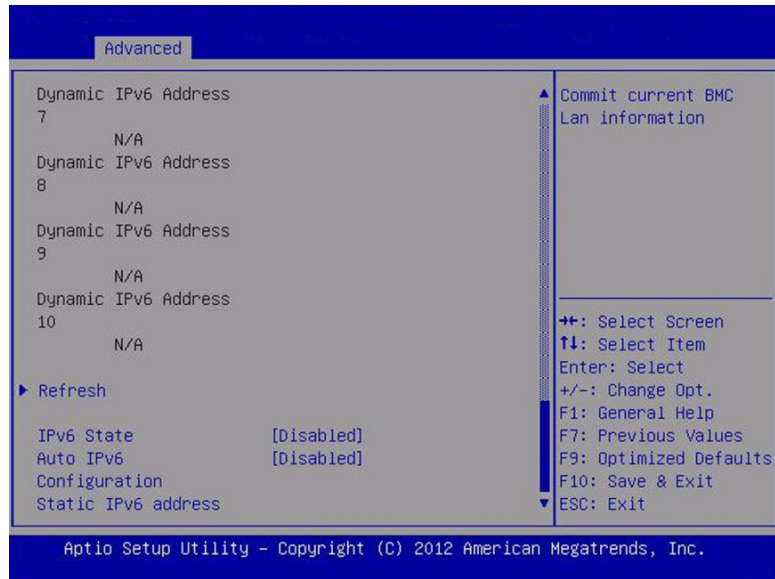
Keywords: Advanced, BMC Network Configuration, Active Mgmt Port, NET MGT, NET0, NET1, NET2, NET3



Keywords: Advanced, BMC Network Configuration, Refresh, Commit, IPV6 Configuration, Channel Number, Current IPV6 State, Current IPV6 Auto, Configuration, Link Local IPV6 Address, Static IPV6 Address, IPV6 Gateway

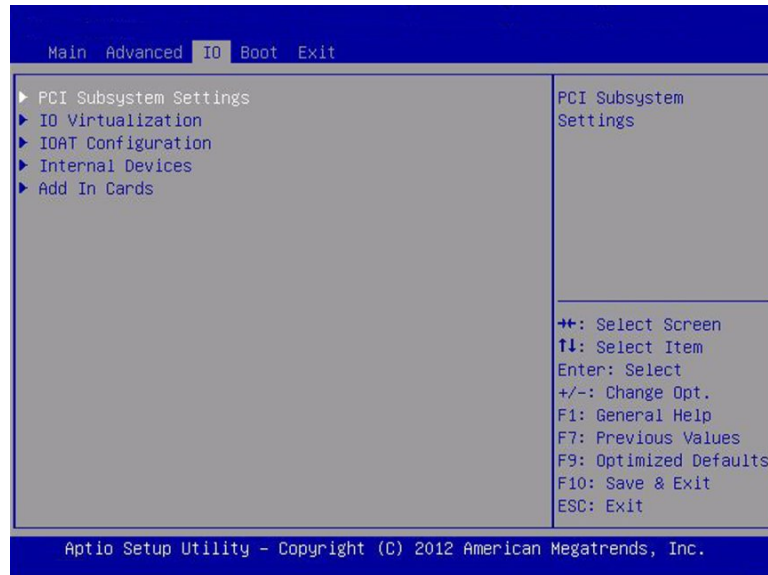


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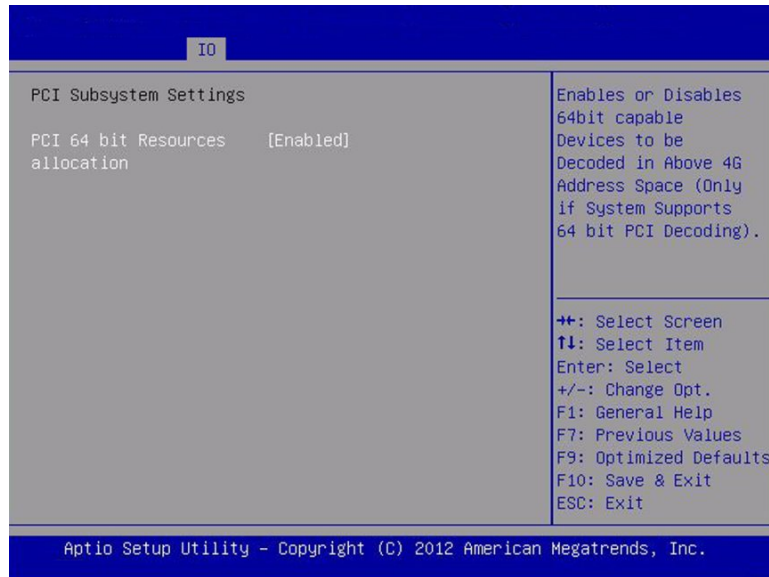


Keywords: Advanced, BMC Network Configuration, Dynamic IPv6 Address

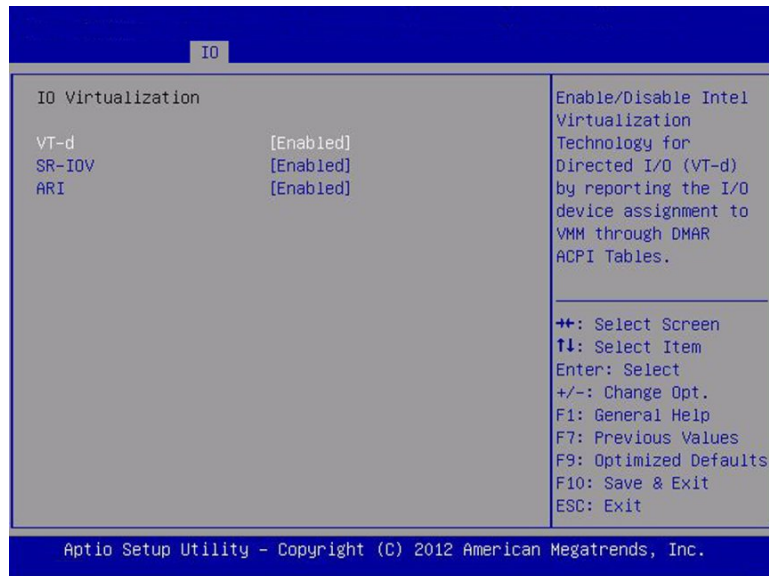
IO Screen



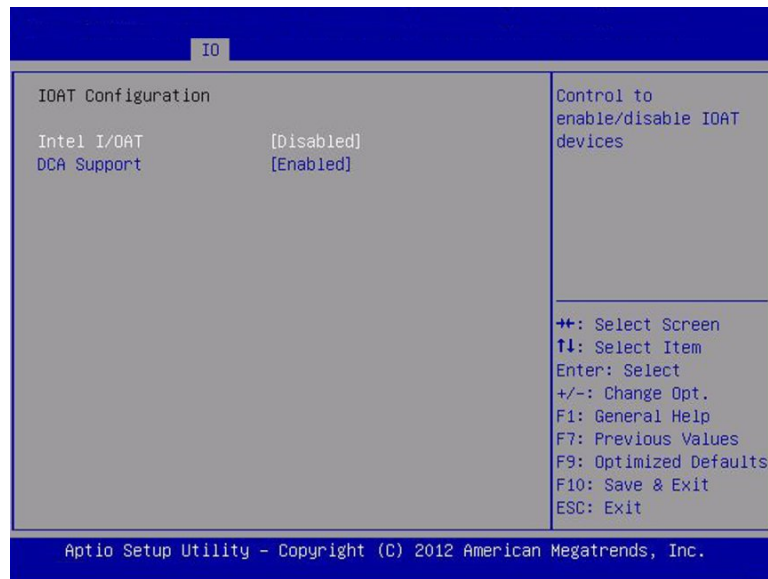
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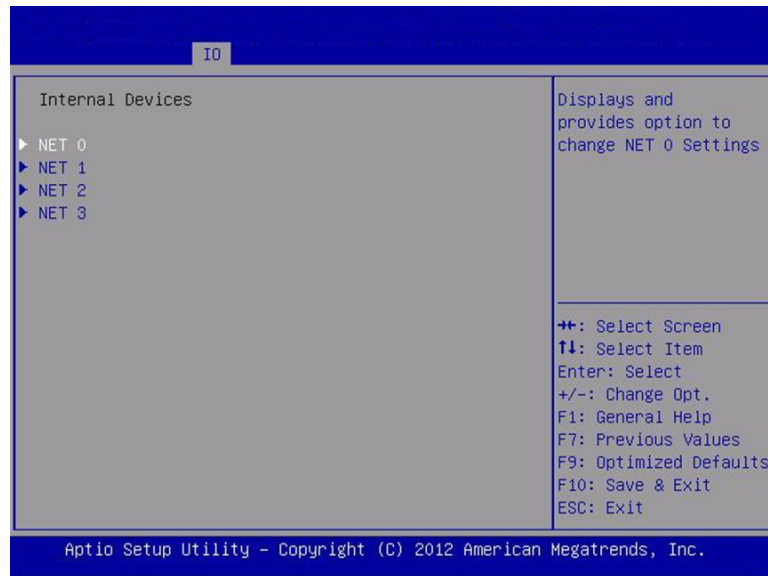
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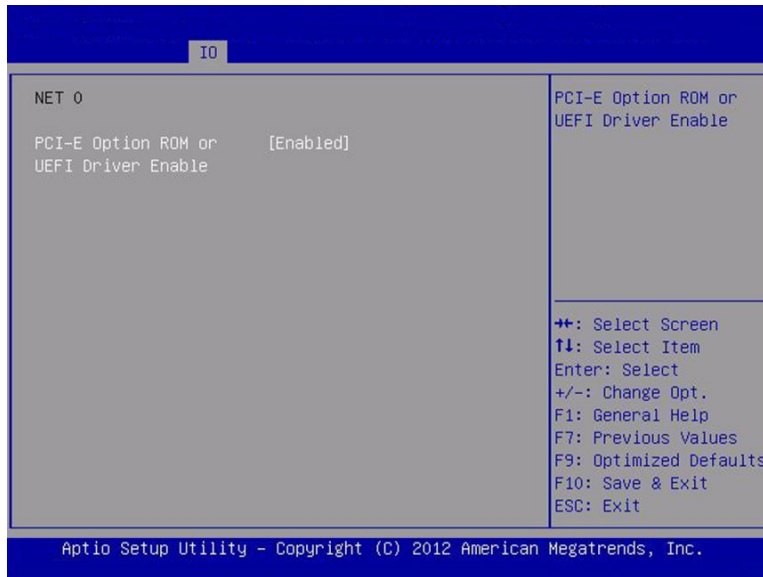
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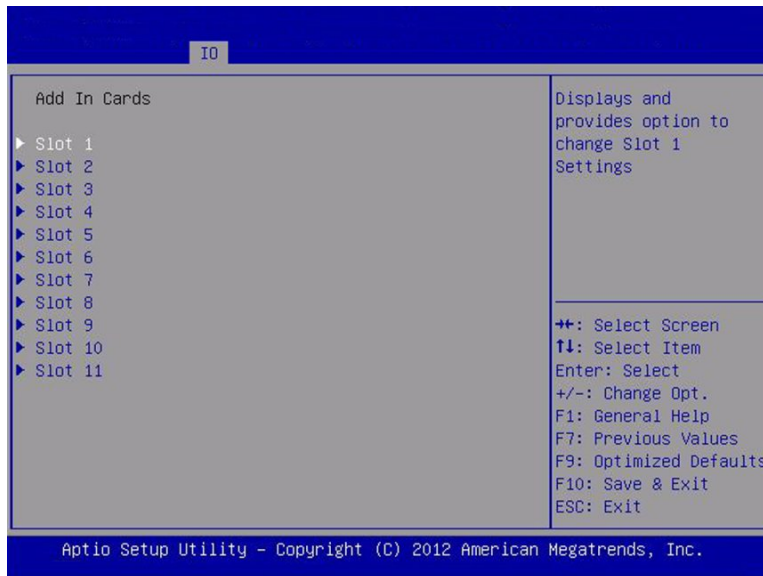
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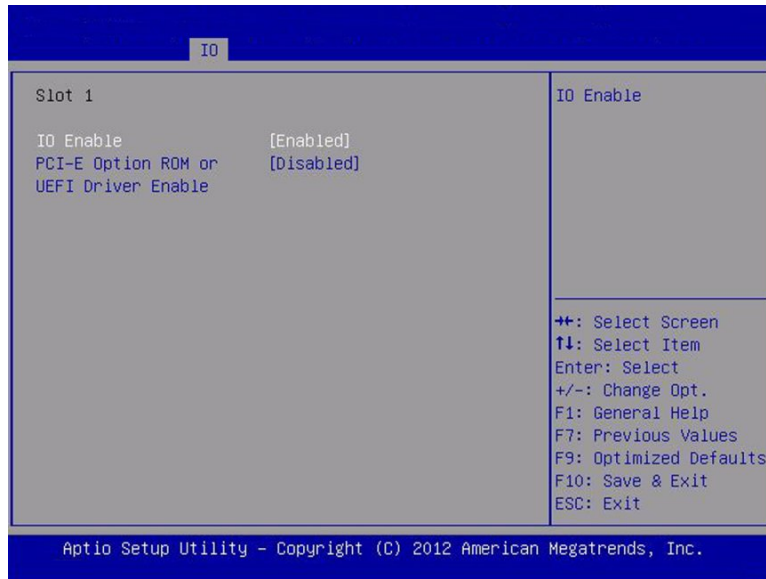
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Keywords: IO, Net 0, PCIE Option ROM or UEFI Driver Enable

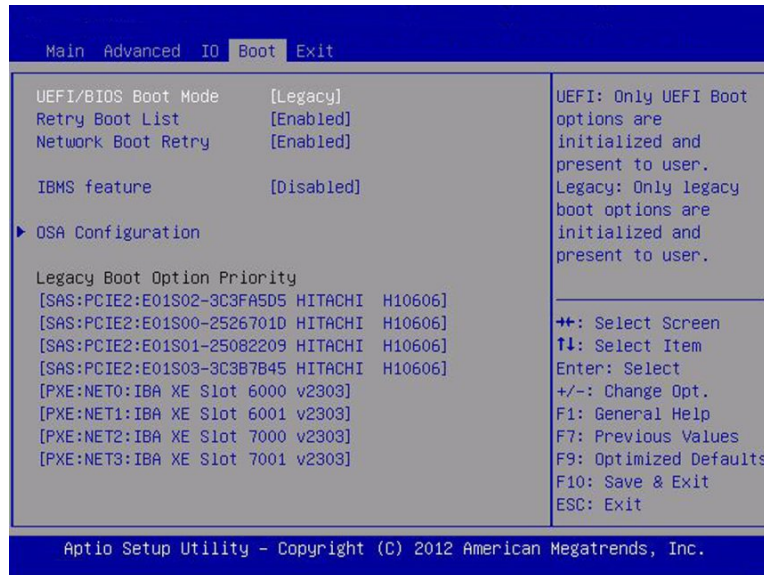


Keywords: IO, Add-In Cards, Slot 1 - Slot 11

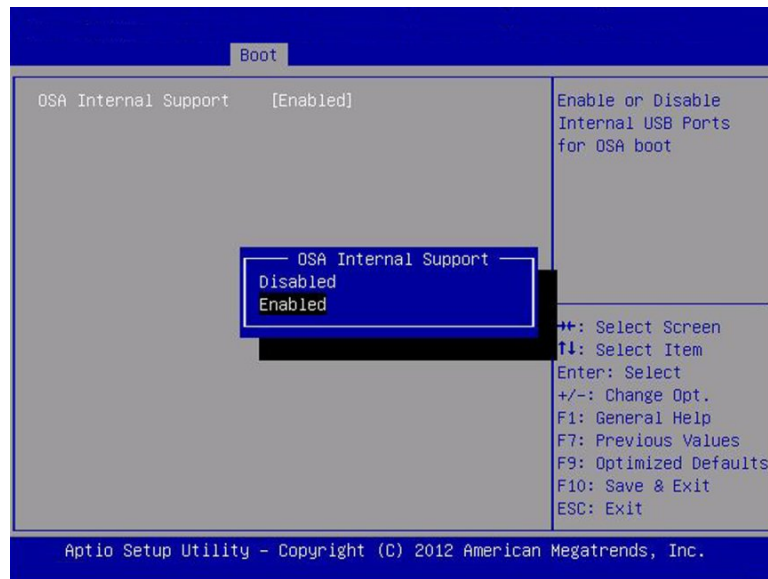


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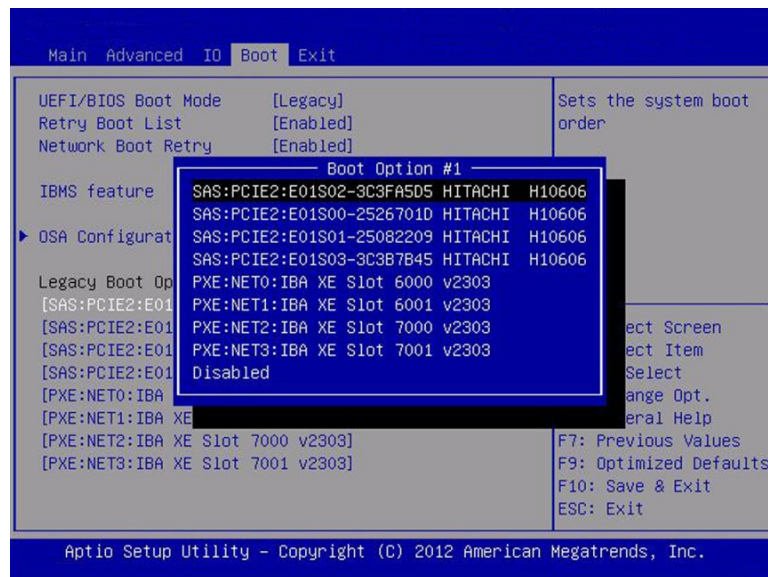
Boot Screen (Legacy)



Keywords: UEFI/BIOS Boot Mode, Retry Boot List, Network Boot Retry, IBMS feature, OSA Configuration, Legacy Boot Option Priority



Keywords: OSA Internal Support, Disabled, Enabled

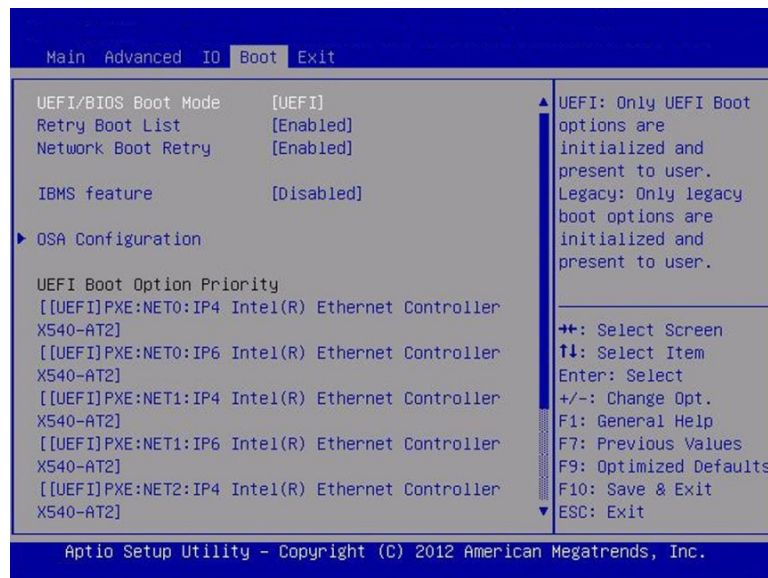


Keywords: UEFI/BIOS Boot Mode, Retry Boot List, Network Boot Retry, IBMS feature, OSA Configuration, Legacy Boot Option Priority, Boot Option #1

UEFI Mode BIOS Setup Utility Screens

This section shows the BIOS screens specific to UEFI mode.

Boot (UEFI)



Keywords: UEFI/BIOS Boot Mode, Retry Boot List, Network Boot Retry, IBMS feature, OSA Configuration, Legacy Boot Option Priority

▼ Access the BIOS Setup Utility

To access the BIOS Setup Utility, complete the following steps:

1. **Power-on or power-cycle the server.**

2. Press the F2 key while the system is performing the power-on self-test (POST).

Note - If there is an error during the boot process, you can press F1 to access the BIOS Setup Utility.

Alternatively, you can use the following hot key combinations to access the BIOS Setup Utility from a serial connection:

- F1 Control-Q
- F2 Control-E.
- F7 Control-D
- F8 Control-P
- F9 Control-O
- F10 Control-S
- F12 Control-N

The BIOS Setup Utility Main screen appears ([“Main Screen \(Legacy\)”](#) on page 244).

POST and Checkpoint Codes

During the power-on self test (POST) sequence, checkpoint codes appear to allow you to monitor the state of the system. The codes are primarily generated by the system BIOS (exceptions are noted).

AMI Checkpoint Ranges

Status Code Range	Description
0x01 – 0x0B	SEC execution (PEI).
0x0C – 0x0F	SEC errors.
0x10 – 0x2F	PEI execution up to and including memory detection.
0x30 – 0x4F	PEI execution after memory detection.
0x50 – 0x5F	PEI errors.
0x60 – 0x8F	DXE execution up to BDS.
0x90 – 0xCF	BDS execution.
0xD0 – 0xDF	DXE errors.
0xE0 – 0xE8	S3 resume (PEI).
0xE9 – 0xEF	S3 resume errors (PEI).
0xF0 – 0xF8	Recovery (PEI).
0xF9 – 0xFF	Recovery errors (PEI).

Standard Checkpoints - SEC Phase

Status Code Range	Description
0x00	Not used.
0x01	Power on. Reset type detection (soft/hard).

Status Code Range	Description
0x02	AP initialization before microcode loading.
0x03	North Bridge initialization before microcode loading.
0x04	South Bridge initialization before microcode loading.
0x05	OEM initialization before microcode loading.
0x06	Microcode loading.
0x07	AP initialization after microcode loading.
0x08	North Bridge initialization after microcode loading.
0x09	South Bridge initialization after microcode loading.
0x0A	OEM initialization after microcode loading.
0x0B	Cache initialization.
0x0C – 0x0D	Reserved for future AMI SEC error codes.
0x0E	Microcode not found.
0x0F	Microcode not loaded.

SEC Beep Codes

There are no SEC beep codes.

PEI Phase

Progress Codes	Description
0x10	PEI core is started.
0x11	Pre-memory CPU initialization is started.
0x10	PEI core is started.
0x11	Pre-memory CPU initialization is started.
0x12	Pre-memory CPU initialization (CPU module specific).
0x13	Pre-memory CPU initialization (CPU module specific).
0x14	Pre-memory CPU initialization (CPU module specific).
0x15	Pre-memory North Bridge initialization is started.
0x16	Pre-memory North Bridge initialization (North Bridge module specific).
0x17	Pre-memory North Bridge initialization (North Bridge module specific).
0x18	Pre-memory North Bridge initialization (North Bridge module specific).
0x19	Pre-memory South Bridge initialization is started.

Progress Codes	Description
0x1A	Pre-memory South Bridge initialization (South Bridge module specific).
0x1B	Pre-memory South Bridge initialization (South Bridge module specific).
0x1C	Pre-memory South Bridge initialization (South Bridge module specific).
0x1D – 0x2A	OEM pre-memory initialization codes.
0x2B	Memory initialization. Serial presence detect (SPD) data reading.
0x2C	Memory initialization. memory presence detection.
0x2D	Memory initialization. Programming memory timing information 0x2E memory initialization. Configuring memory.
0x2F	Memory initialization (other).
0x30	Reserved for ASL (see ASL Status Codes section below).
0x31	Memory installed.
0x32	CPU post-memory initialization is started.
0x33	CPU post-memory initialization. Cache initialization.
0x34	CPU post-memory initialization. Application processor(s) (AP) initialization.
0x35	CPU post-memory initialization. Boot strap processor (BSP) selection.
0x36	CPU post-memory initialization. System management mode (SMM) initialization.
0x37	Post-memory North Bridge initialization is started.
0x38	Post-memory North Bridge initialization (North Bridge module specific).
0x39	Post-memory North Bridge initialization (North Bridge module specific).
0x3A	Post-memory North Bridge initialization (North Bridge module specific).
0x3B	Post-memory South Bridge initialization is started.
0x3C	Post-memory South Bridge initialization (South Bridge module specific).
0x3D	Post-memory South Bridge initialization (South Bridge module specific).
0x3E	Post-memory South Bridge initialization (South Bridge module specific).
0x3F-0x4E	OEM post memory initialization codes.
0x4F	DXE IPL is started.

PEI Error Codes

Codes	Description
0x50	Memory initialization error. Invalid memory type or incompatible memory speed.
0x51	Memory initialization error. SPD reading has failed.
0x52	Memory initialization error. Invalid memory size or memory modules do not match.
0x53	Memory initialization error. No usable memory detected.

Codes	Description
0x54	Unspecified memory initialization error.
0x55	Memory not installed.
0x56	Invalid CPU type or speed.
0x57	CPU mismatch.
0x58	CPU self test failed or possible CPU cache error.
0x59	CPU micro-code is not found or micro-code update is failed.
0x5A	Internal CPU error.
0x5B	Reset PPI is not available.
0x5C-0x5F	Reserved for future AMI error codes.

S3 Resume Progress Codes

Codes	Description
0xE0	S3 resume is started (S3 resume PPI is called by the DXE IPL).
0xE1	S3 boot script execution.
0xE2	Video repost.
0xE3	OS S3 wake vector call.
0xE4-0xE7	Reserved for future AMI progress codes.
0x00E0	S3 Resume is started (S3 Resume PPI is called by the DXE IPL).

S3 Resume Error Codes

Codes	Description
0xE8	S3 resume failed.
0xE9	S3 resume PPI not Found.
0xEA	S3 resume Boot Script Error.
0xEB	S3 OS wake error.
0xEC-0xEF	Reserved for future AMI error codes.

Recovery Progress Codes

Codes	Description
0xF0	Recovery condition triggered by firmware (Auto recovery).
0xF1	Recovery condition triggered by user (Forced recovery).
0xF2	Recovery process started.
0xF3	Recovery firmware image is found.
0xF4	Recovery firmware image is loaded.
0xF5-0xF7	Reserved for future AMI progress codes.

Recovery Error Codes

Codes	Description
0xF8	Recovery PPI is not available.
0xF9	Recovery capsule is not found.
0xFA	Invalid recovery capsule.
0xFB – 0xFF	Reserved for future AMI error codes.

PEI Beep Codes

Number of Beeps	Description
1	Memory not Installed.
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice).
2	Recovery started.
3	DXEIPL was not found.
3	DXE core firmware volume was not found.
4	Recovery failed.
4	S3 resume failed.
7	Reset PPI is not available.

DXE Phase DXE Status Codes

Codes	Description
0x60	DXE core is started.
0x61	NVRAM initialization.
0x62	Installation of the South Bridge runtime services.
0x63	CPU DXE initialization is started.
0x64	CPU DXE initialization (CPU module specific).
0x65	CPU DXE initialization (CPU module specific).
0x66	CPU DXE initialization (CPU module specific).
0x67	CPU DXE initialization (CPU module specific).
0x68	PCI host bridge initialization.
0x69	North Bridge DXE initialization is started.
0x6A	North Bridge DXE SMM initialization is started.
0x6B	North Bridge DXE initialization (North Bridge module specific).
0x6C	North Bridge DXE initialization (North Bridge module specific).
0x6D	North Bridge DXE initialization (North Bridge module specific).
0x6E	North Bridge DXE initialization (North Bridge module specific).
0x6F	North Bridge DXE initialization (North Bridge module specific).
0x70	South Bridge DXE initialization is started.
0x71	South Bridge DXE SMM initialization is started.
0x72	South Bridge devices initialization.
0x73	South Bridge DXE initialization (South Bridge module specific).
0x74	South Bridge DXE initialization (South Bridge module specific).
0x75	South Bridge DXE initialization (South Bridge module specific).
0x76	South Bridge DXE initialization (South Bridge module specific).
0x77	South Bridge DXE initialization (South Bridge module specific).
0x78	ACPI module initialization.
0x79	CSM initialization.
0x7A – 0x7F	Reserved for future AMI DXE codes.
0x80 – 0x8F	OEM DXE initialization codes.
0x90	Boot device selection (BDS) phase is started.
0x91	Driver connecting is started.
0x92	PCI Bus initialization is started.
0x93	PCI bus hot plug controller initialization.
0x94	PCI bus enumeration.

Codes	Description
0x95	PCI bus request resources.
0x96	PCI bus assign resources.
0x97	Console output devices connect.
0x98	Console input devices connect.
0x99	Super IO initialization.
0x9A	USB initialization is started.
0x9B	USB reset.
0x9C	USB detect.
0x9D	USB enable.
0x9E – 0x9F	Reserved for future AMI codes.
0xA0	IDE initialization is started.
0xA1	IDE reset.
0xA2	IDE detect.
0xA3	IDE enable.
0xA4	SCSI initialization is started.
0xA5	SCSI reset.
0xA6	SCSI detect.
0xA7	SCSI enable.
0xA8	Setup verifying password.
0xA9	Start of Setup.
0xAA	Reserved for ASL (see ASL tatus Codes section below).
0xAB	Setup input wait 0xAC reserved for ASL (see ASL Status Codes section below).
0xAD	Ready to boot event.
0xAE	Legacy boot event.
0xAF	Exit boot services event.
0xB0	<ul style="list-style-type: none"> ■ AMI: Runtime set virtual address MAP begin. ■ Intel: STS_DIMM_DETECT
0xB1	<ul style="list-style-type: none"> ■ AMI: Runtime set virtual address MAP end ■ Intel: STS_CLOCK_INIT
0xB2	<ul style="list-style-type: none"> ■ Legacy option ROM initialization. ■ Intel: STS_SPD_DATA
0xB3	<ul style="list-style-type: none"> ■ System reset. ■ Intel: STS_GLOBAL_EARLY
0xB4	<ul style="list-style-type: none"> ■ USB hot plug. ■ Intel: STS_RNK_DETECT
0xB5	<ul style="list-style-type: none"> ■ PCI bus hot plug. ■ Intel: STS_CHANNEL_EARLY

Codes	Description
0xB6	<ul style="list-style-type: none"> ■ Clean-up of NVRAM. ■ Intel: STS_JEDEC_INIT
0xB7	<ul style="list-style-type: none"> ■ Configuration reset (reset of NVRAM settings). ■ Intel: STS_CHANNEL_TRAINING
0xB8 – 0xBF	Reserved for future AMI codes.
0x00B8	<ul style="list-style-type: none"> ■ Reserved for future AMI code. ■ Intel: STS_INIT_THROTTLING
0x00B9	<ul style="list-style-type: none"> ■ Reserved for future AMI code. ■ Intel: Memory BIST (Built In Self Test).
0x00BA	<ul style="list-style-type: none"> ■ Reserved for future AMI code. ■ Intel Memory initialization.
0x00BB	<ul style="list-style-type: none"> ■ Reserved for future AMI code. ■ Intel: DDR memory Map
0x00BC	<ul style="list-style-type: none"> ■ Reserved for future AMI code. ■ Intel: RAS Configuration.
0x00BD	Reserved for future AMI code.
0x00BE	Reserved for future AMI code.
0x00BF	<ul style="list-style-type: none"> ■ Reserved for future AMI code. ■ Intel: MRC done.
0xC0 – 0xCF	OEM BDS initialization codes.

DXE Error Codes

Codes	Description
0xD0	CPU initialization error.
0xD1	North Bridge initialization error.
0xD2	South Bridge initialization error.
0xD3	Some of the architectural protocols are not available.
0xD4	PCI resource allocation error. Out of resources.
0xD5	No space for legacy option ROM.
0xD6	No console output devices are found.
0xD7	No console input devices are found.
0xD8	Invalid password.
0xD9	Error loading boot option (LoadImage returned error).
0xDA	Boot Option is failed (StartImage returned error).
0xDB	Flash update is failed.

Codes	Description
0xDC	Reset protocol is not available.

DXE Beep Codes

Number of Beeps	Description
1	Invalid password.
4	Some of the architectural protocols are not available.
5	No console output devices are found.
5	No console Input devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

ACPI/ASL Checkpoints

Codes	Description
0x01	System is entering S1 sleep state.
0x02	System is entering S2 sleep state.
0x03	System is entering S3 sleep state.
0x04	System is entering S4 sleep state.
0x05	System is entering S5 sleep state.
0x10	System is waking up from the S1 sleep state.
0x20	System is waking up from the S2 sleep state.
0x30	System is waking up from the S3 sleep state.
0x40	System is waking up from the S4 sleep state.
0xAC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

OEM-Reserved Checkpoint Ranges

Codes	Description
0x05	OEM SEC initialization before microcode loading.

Codes	Description
0x0A	OEM SEC initialization after microcode loading.
0x1D – 0x2A	OEM pre-memory initialization code.s
0x3F – 0x4E	OEM PEI post memory initialization codes.
0x80 – 0x8F	OEM DXE initialization codes.
0xC0 – 0xCF	OEM BDS initialization codes.

Post Codes From hostdiags

Codes	Description
0x69DA	Oracle OSC - Entered OSC method.
0x69DB	Oracle OSC - Forced Legacy mode (granted OS nothing).
0x69DC	Oracle OSC - Granted OS native hot plug.
0x69DD	Oracle OSC - Granted OS native PME.
0x69DF	Oracle Legacy Hot Plug (Attn PB) SCI interrupt (Attn Push Button).
0x69D0	Oracle Legacy hot plug cleared presence change detect.
0x69D1	Oracle Legacy hot plug (Attn PB) SCI power-on sequence started.
0x69D2	Oracle legacy hot plug (Attn PB) power on error.
0x69D3	Oracle Legacy HotPlug (Attn PB) Link training(ed) failure .
0x69D4	Oracle legacy hot plug (OS PS0) OS power-on sequence started.
0x69D5	Oracle legacy hot plug (OS PS0) power-on error.
0x69D6	Oracle legacy hot plug (OS PS0) Link training(ed) failure.
0x69D7	Oracle legacy hot plug (OS EJ0) OS power-down sequence started.

Server Specifications

This section contains specifications for the Sun Server X4-4:

Server physical specifications	“Physical Specifications” on page 291
Electrical specifications	“Electrical Specifications” on page 292
Environmental specifications	“Environmental Requirements” on page 292

Server Specifications

This section includes physical, electrical and environmental specifications for the system.

- [“Physical Specifications” on page 291](#)
- [“Electrical Specifications” on page 292](#)
- [“Environmental Requirements” on page 292](#)

Physical Specifications

The following table lists the physical specifications for the Sun Server X4-4.

Parameter	Value
Height	129.9 mm (5.1 inches)
Width	436.5 mm (17.2 inches)
Depth	732 mm (28.8 inches)
	752.35 mm (29.6 inches) with PSU ejectors

Parameter	Value
Weight	40 kg (88 lbs)

Electrical Specifications

The following table lists the electrical specifications for the Sun Server X4-4.

Note - For up-to-date information on power consumption, refer to: <http://www.oracle.com/technetwork/server-storage/sun-x86/overview/index.html>

Parameter	Value
Nominal input frequencies	50/60 Hz
Operating input voltage range	100-127 VAC (Two-CPU configuration) 200-240 VAC (Two or Four-CPU configuration)
Rated input current	100-127 VAC 12A (Two-CPU configuration) 200-240 VAC 10A
Maximum power consumption	2000W
Maximum heat output	6824 BTU/hr

Environmental Requirements

The following table lists the environmental requirements for the Sun Server X4-4.

Parameter	Value
Operating temperature (single, non-rack system)	At sea level: 5° C to 35° C (41° F to 95° F) At altitude: 5° C to 31° C (41° F to 88° F)
Non-operating temperature (single, non-rack system)	-40° C to 68° C (-40° F to 154° F)
Operating humidity (single, non-rack system)	10% to 90% relative humidity, non-condensing

Parameter	Value
Non-operating humidity (single, non-rack system)	Up to 93% relative humidity, non-condensing
Operating altitude (single, non-rack system)	Up to 3,000 m (9,840 ft), maximum ambient temperature is derated by 1 degree C per 300m above 900 m, except in China where regulations may limit installations to a maximum altitude of 2,000 m
Non-operating altitude (single, non-rack system)	0 m to 12,000 m (0 ft to 40,000 ft)
Acoustic noise	LwAd: 8.9 B (idle and operating, room temp.), 8.9 B (max. ambient); LpAm: 75 dBA (bystander position, max. ambient)

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