Oracle® Server X5-8 Service Manual

Part No: E56311-04
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Contents

Using This Documentation

- **Overview** – Describes how to troubleshoot and maintain the Oracle Server X5-8.
- **Audience** – Technicians, system administrators, authorized service providers, and trained hardware service personnel who have been instructed on the hazards within the equipment and are qualified to remove and replace hardware.
- **Required knowledge** – Advanced experience troubleshooting and replacing hardware.

Product Documentation Library

Documentation and resources for this product and related products are available at https://www.oracle.com/goto/x5-8/docs-videos.

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About This Document

This document provides service, maintenance, and component replacement procedures for the Oracle Server X5-8.

The following table describes the major sections of this document.

Section Description	Link
Important service information	“Service Notes” on page 15
Server component and subsystem overviews	“About Oracle Server X5-8” on page 17
Troubleshooting procedures and information	“Troubleshooting and Diagnostics” on page 65
Information and procedures for preparing the server for service	“Preparing for Service” on page 91
Procedures and information for removing and installing components	“Servicing Components” on page 111
Procedures and information for returning the server to operation after performing service procedures	“Returning the Server to Operation” on page 229
Server BIOS Setup Utility information and screen captures	“BIOS Setup Utility” on page 233

Service Notes

This section contains preliminary service information:

Intended Audience

This guide is intended for trained technicians and authorized service personnel who have been instructed on the hazards within the equipment and qualified to replace and install hardware.

Warning Label

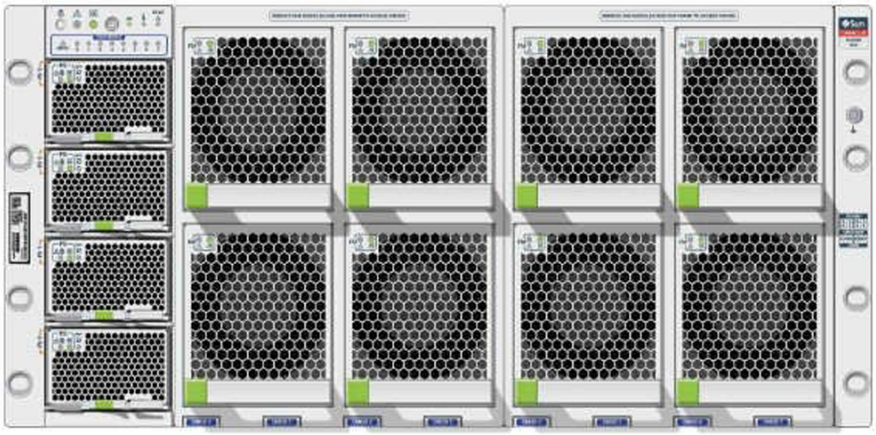
The following warning label is visible from the front of the server when you remove a fan module. It warns you to not insert your hands or any object into the space left vacant by the removal of the fan module. Fan modules are hot-swap components. Removing a fan module from a fully-powered server exposes open and active power connectors that can cause electric shock.

About Oracle Server X5-8

This section describes the server and its subsystems. It includes:

Section Description	Link
List of server features	“Product Description” on page 18
The locations of components	“Illustrated Parts Breakdown” on page 19
Hot, warm, or cold service, and whether components can be replaced by customers	“Component Serviceability Requirements” on page 21
List of Customer-Replaceable Units (CRUs)	“Customer-Replaceable Units” on page 21
List of Field-Replaceable Units (FRUs)	“Field-Replaceable Units” on page 22
The numeric designations of components	“Component Designations” on page 23
Chassis front, internal, and back components	“Chassis Overview” on page 31
Server subsystems, their functions, and related components	“Server Subsystems” on page 34
Features and components of the CPU module (CMOD)	“CPU Module (CMOD) Overview” on page 49
Features and components of the system module (SMOD)	“System Module (SMOD) Overview” on page 55
Schematic-type block diagram of the server interconnects	“Server Block Diagram” on page 61
Component Network Access Control (NAC) Names	“Component Network Access Control (NAC) Names” on page 63
Brief description of how the Oracle servers are named.	“Oracle Server X5-8 Model Naming Convention” on page 63

Product Description



The Oracle Server X5-8 is a 5 rack-unit (RU) server with the following features:

- Four and eight socket configurations that use Intel EX Xeon® E7-8895 v3 processors for a total of 72 or 144 cores.
- Maximum memory: 3 TB (four socket) and 6 TB (eight socket) of DDR3 1333 memory.
- Eight backside accessible SAS3 or SATA storage drive bays.
- Expandable IO: eight 16-lane and eight 8-lane PCIe Gen3 slots and one 4 lane PCIe Gen 2 HBA slot.
- One Emulex Pilot 3 service processor (SP) with 256 MB DDR3 memory, 256 MB of flash memory, and Oracle ILOM.
- Four (N+N) hot-swap power supplies (PSUs).
- Eight hot-swap redundant 100 watt cooling fan modules.

Note - For server specification information, see "Server Specifications" in *Oracle Server X5-8 Installation Guide*.

The following sections provide overviews of the main server components:

Component	Link
Chassis	"Chassis Overview" on page 31

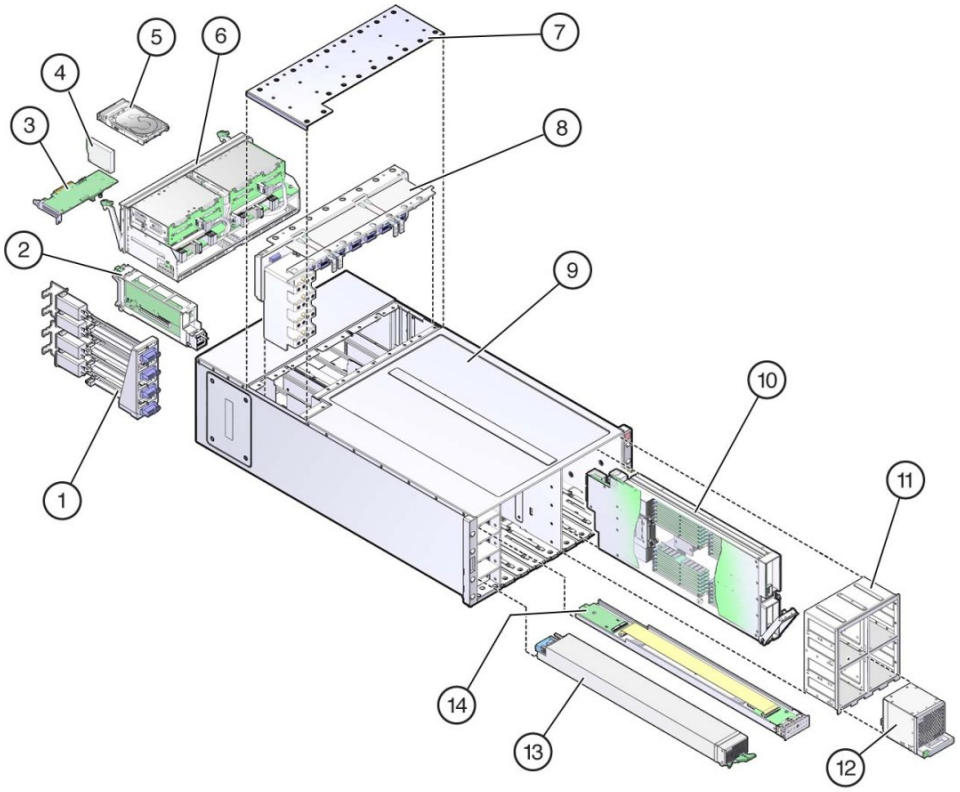
Component	Link
CMODs	“CPU Module (CMOD) Overview” on page 49
SMOD	“System Module (SMOD) Overview” on page 55

About System Components

This section shows the location, designation, and orientation of components in the server.

Illustrated Parts Breakdown

The following illustration shows the locations of the server components.



Call Out	Description	Call Out	Description
1	AC power block[†]	8	Midplane
2	Dual PCIe carrier card (DPCC) with PCIe card (8)	9	Server chassis[‡]
3	Host bus adapter (HBA) card	10	CPU module (CMOD) (4 or 8)
4	Energy storage module	11	Fan frame (2)
5	Storage drive (8)	12	Fan module (8)
6	System module (SMOD)	13	Power supply (PSU) (4)
7	Top cover	14	Front indicator module (FIM)

[†]The AC power block is not a removable component.

[‡]The chassis is not a removable component.

Component Serviceability Requirements

The following table lists the system components and identifies whether they are hot, warm, or cold service components, and whether they are a customer-replaceable unit (CRU) or a field-replaceable unit (FRU).

- *Hot service* components can be serviced while the server is powered on and running in full-power mode.
- *Warm service* components can be serviced while the server is in standby power mode. These include CMODs, DIMMs, and processors and heatsinks.
- *Cold service* components must be serviced when the server is completely powered off and disconnected from the power source.

See "Hot, Warm, and Cold Service" on page 93.

A CRU or FRU designation determines who is qualified to service a component.

- CRUs can be serviced by customers. See "Customer-Replaceable Units" on page 21.
- FRUs must be serviced by qualified Oracle Service personnel. See "Field-Replaceable Units" on page 22.

Customer-Replaceable Units

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

CRU	Serviceability	Description	Replacement Instructions
Storage drive (HDD, SSD)	Hot	Storage drive configurations can comprise both hard disk drives (HDDs) or solid state disk drives (SSDs).	"Servicing Storage Drives" on page 175
Power supplies (PS0-3)	Hot	Four fully redundant AC-powered power supplies.	"Servicing Power Supply Units (PSUs)" on page 124
PCIe Cards	Hot service as part of DPCC, which must be removed first.	Optional add-in cards that can expand the functionality of the server.	"Servicing PCIe Cards and the Dual PCIe Card Carriers (DPCCs)" on page 180
Dual PCIe card carrier (DPCC)	Hot	Each DPCC holds two PCIe cards.	"Servicing PCIe Cards and the Dual PCIe Card Carriers (DPCCs)" on page 180
Fan modules (FM0-7)	Hot	Eight fan modules for cooling the server components.	"Servicing Fan Modules and Fan Frames" on page 115

CRU	Serviceability	Description	Replacement Instructions
Fan frames	Cold	Two fan frames contain four fan modules for cooling the server components.	“Servicing Fan Modules and Fan Frames” on page 115
Memory (DIMMs)	Warm	Add or replace memory modules located in CMODs.	“Install a DIMM” on page 148 and “Remove a DIMM” on page 151
System Clock Battery	Cold	3V Lithium Coin Cell Battery that powers the CMOS BIOS and real-time clock located in SMOD.	“Replace the Real Time Clock (System) Battery” on page 214
External USB flash drive	Hot	The SMOD includes two external USB ports.	“Servicing System Module (SMOD) Components” on page 192
Energy Storage Module (ESM) and cables	Cold	The ESM provides backup power for the internal HBA card.	“Servicing the Energy Storage Module and Cables” on page 204
ESM cable	Cold	Cable connects the ESM to the HBA.	“Servicing the Energy Storage Module and Cables” on page 204

Field-Replaceable Units

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

These components must be serviced by Oracle service personnel.

FRU	Serviceability	Description	Replacement Instructions
CPU module (CMOD0-7)	Cold	Add or replace CPU module assemblies including a processor and memory.	“Servicing the CPU Module (CMOD) Components” on page 134
Front indicator module (FIM)	Cold	Contains push-button circuitry and LED indicators that are displayed on the chassis bezel.	“Servicing the Front Indicator Module (FIM)” on page 130
Processor and heatsink	Cold and warm	Add or replace the CPU that carries out system instructions located in CMODs.	“Remove a Heatsink and Processor (FRU)” on page 156 and “Install a Heatsink and Processor (FRU)” on page 167
Internal USB flash drives	Cold	The SMOD includes two internal USB ports.	“Servicing the Internal USB Flash Drives” on page 210

FRU	Serviceability	Description	Replacement Instructions
Host bus adapter (HBA) card	Cold	The SMOD includes an internal SAS HBA card.	“Servicing the Host Bus Adapter (HBA) Card” on page 197
HBA SAS cable	Cold	The SAS cable between the SMOD disk backplane and the internal HBA card.	“Servicing the Host Bus Adapter (HBA) Card” on page 197
Midplane assembly	Cold	Replace the system midplane.	“Replace the Midplane Assembly” on page 218

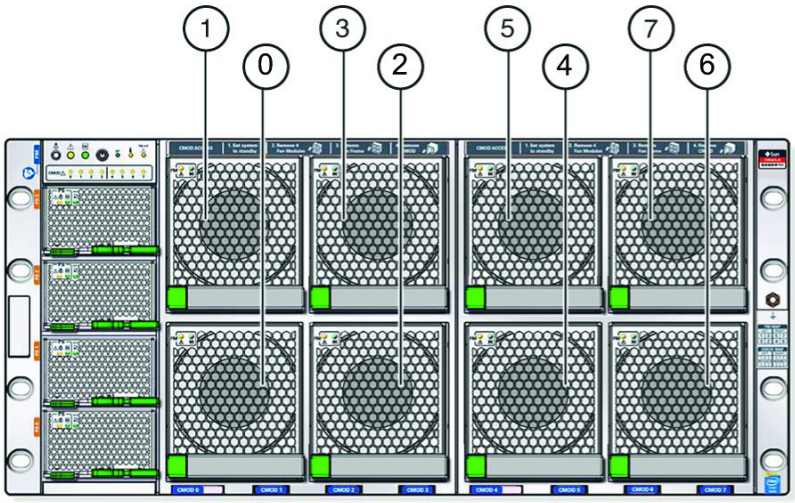
Component Designations

These sections show the designation and orientation of CRU and FRU components:

Fan Module Designations

The eight fan modules (FMs) are directly accessible at the front of the server and are arranged in two stacked rows of four FMs.

- Bottom row from left to right: FM 0, FM 2, FM 4, and FM 6.
- Top row from left to right: FM 1, FM 3, FM 5, and FM 7.



Call Out	Description
0	FM 0
1	FM 1
2	FM 2
3	FM 3
4	FM 4
5	FM 5
6	FM 6
7	FM 7

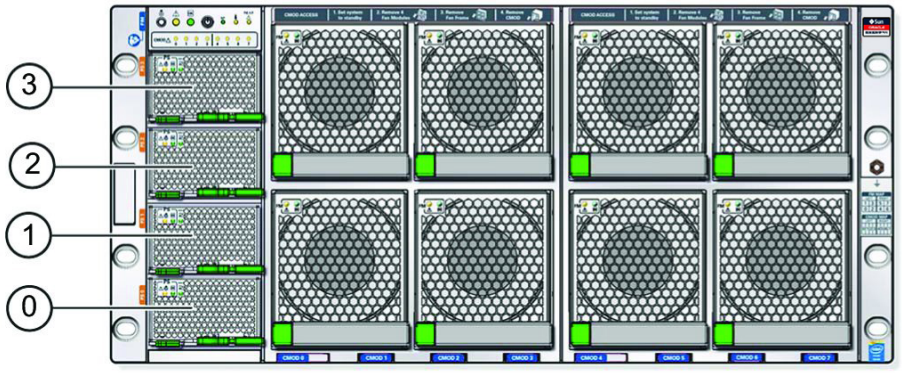
The eight fan modules are installed in two fan frames The left frame contains FM 0, FM1, FM2, and FM 3. The right frame contains FM 4, FM 5, FM 6, and FM 7.

Each vertical pair of FMs provides cooling for the corresponding CPU modules (CMODs), which are located directly behind the FMs. For example, FMs 0 and 1 provide cooling for CMODs 0 and 1, and FMs 6 and 7 provide cooling for CMODs 6 and 7.

For CMOD designations, see “CMOD Slot Designations” on page 25.

Power Supply Slot Designations

The four slots for the power supply units (PSUs) are directly accessible at the front of the server and are arranged in a single stacked row. They are designated from the bottom to the top as, PSU 0, PSU 1, PSU 2, and PSU 3. The following illustration shows the arrangement of the PSUs.



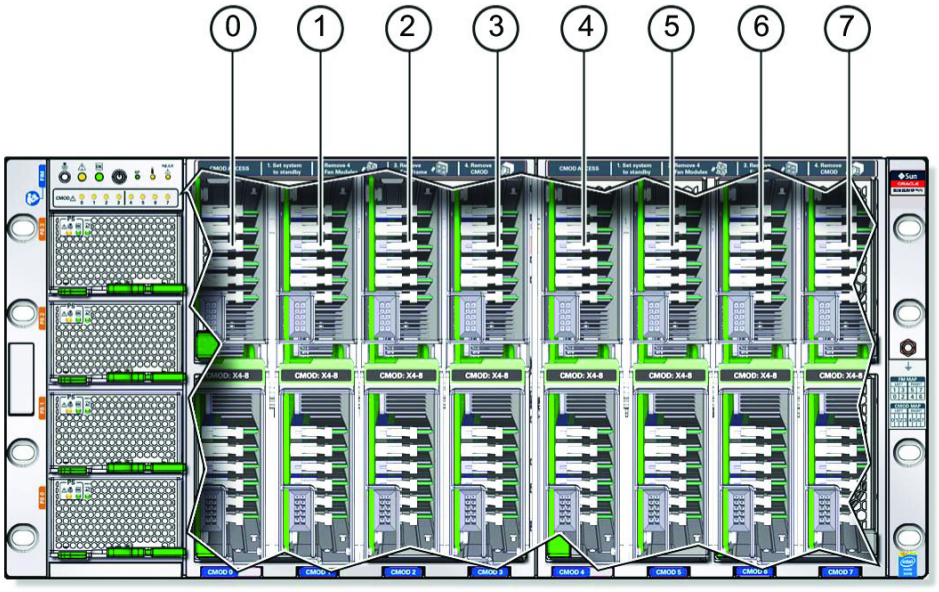
Call Out	Description
0	PSU 0
1	PSU 1
2	PSU 2
3	PSU 3

CMOD Slot Designations

CPU module slots are arranged in a single row and are designated from left to right as, CMOD 0–CMOD 7. The CMOD slots are accessible from the front of the server by removing the FMs and frames.

The server is available with four CMODs or eight CMODs. Four-CMOD systems have CMODs in CMOD 0–CMOD 3, and filler panels in CMOD 4–CMOD 7.

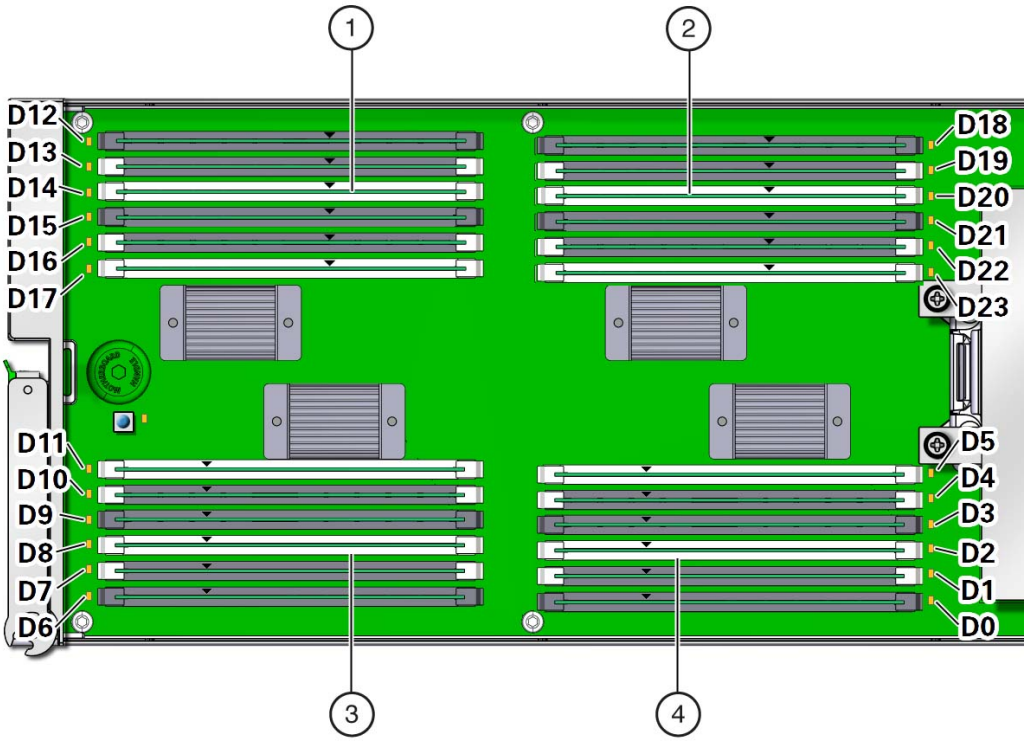
For more information, see “CPU Module (CMOD) Overview” on page 49.



Call Out	Description
0	CMOD 0
1	CMOD 1
2	CMOD 2
3	CMOD 3
4	CMOD 4
5	CMOD 5
6	CMOD 6
7	CMOD 7

Memory Slot Designations

Each CMOD contains 24 DIMM slots arranged in four groups of six slots. The following illustration shows the groups and their slot designations.



Call Out	Description
1	Slots D12–D17
2	Slots D18–D23
3	Slots D6–D11
4	Slots D0–D5

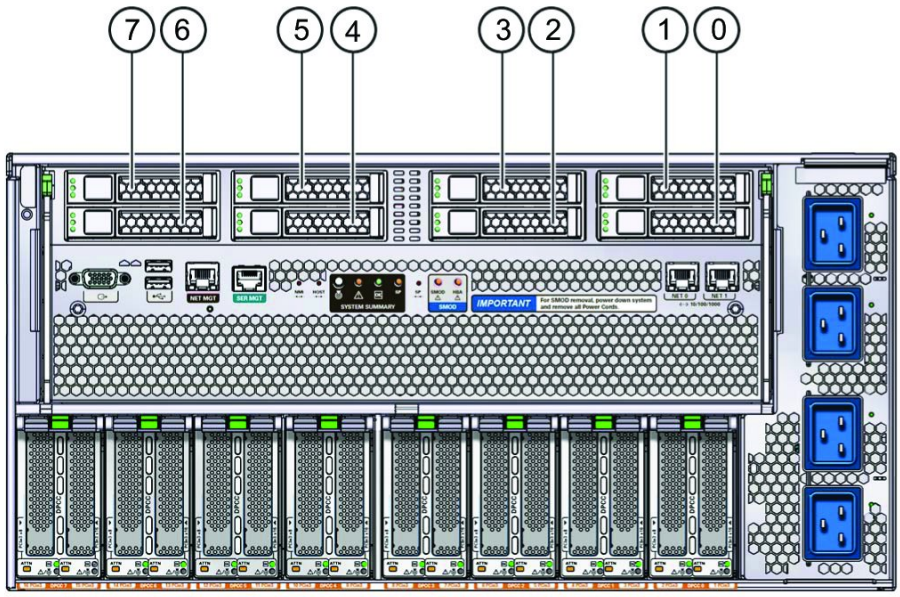
See Also

- “Memory and DIMM Reference” on page 152

Storage Drive Slot Designations

The eight storage drive slots are in the system module (SMOD) and directly accessible at the back of the server. Slots are arranged in two stacked rows of four slots and designated from right to left.

- The top row contains slots 0, 2, 4, and 6.
- The bottom row contains slots 1, 3, 5, and 7



Call Out	Description
0	Slot 0
1	Slot 1
2	Slot 2
3	Slot 3
4	Slot 4
5	Slot 5
6	Slot 6
7	Slot 7

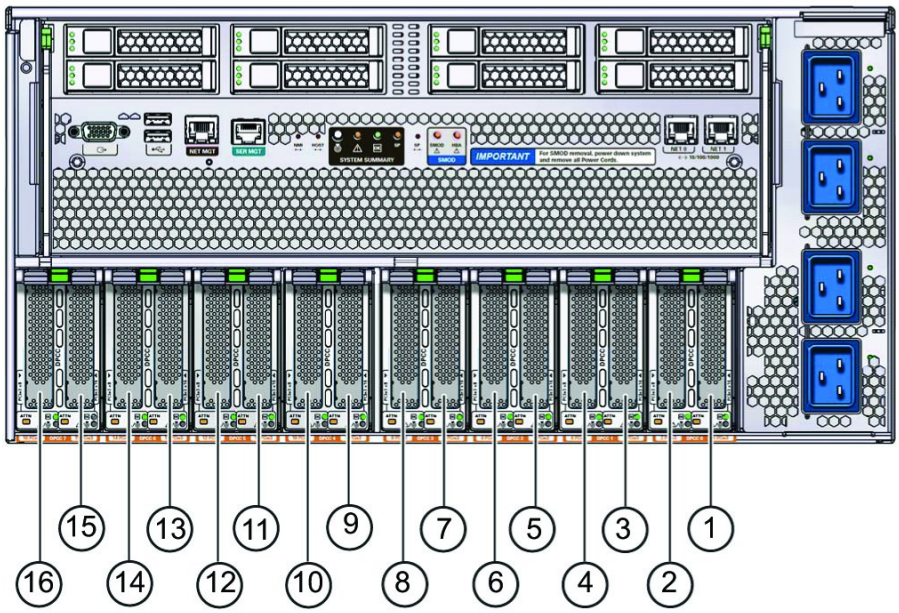
DPCC and PCIe Card Slot Designations

The eight dual PCIe card carrier (DPCC) slots are arranged in a single row at the back of the server. The slots are designated from right to left as, DPCC 0–DPCC 7.

Each DPCC supports two PCIe slots, for a total of 16. The PCIe slots are designated from right to left as PCIe 1–PCIe 16.

- DPCC 0 contains PCIe slots 1 and 2
- DPCC 1 contains PCIe slots 3 and 4
- DPCC 2 contains PCIe slots 5 and 6
- DPCC 3 contains PCIe slots 7 and 8
- DPCC 4 contains PCIe slots 9 and 10
- DPCC 5 contains PCIe slots 11 and 12
- DPCC 6 contains PCIe slots 13 and 14
- DPCC 7 contains PCIe slots 15 and 16

The following illustration shows the location and designations of the PCIe slots.



Call Out	Description	Call Out	Description
1	PCIe Slot 1 in DPCC 0	9	PCIe PCIe Slot 9 in DPCC 4
2	PCIe Slot 2 in DPCC 0	10	PCIe Slot 10 in DPCC 4
3	PCIe Slot 3 in DPCC 1	11	PCIe Slot 11 in DPCC 5

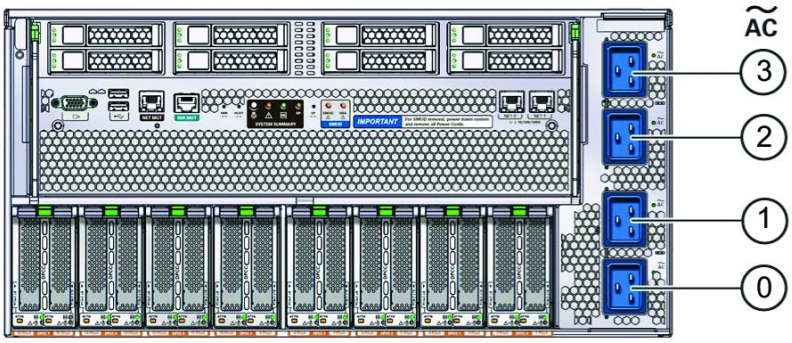
Call Out	Description	Call Out	Description
4	PCIe Slot 4 in DPCC 1	12	PCIe Slot 12 in DPCC 5
5	PCIe Slot 5 in DPCC 2	13	PCIe Slot 13 in DPCC 6
6	PCIe Slot 6 in DPCC 2	14	PCIe Slot 14 in DPCC 6
7	PCIe Slot 7 in DPCC 3	15	PCIe Slot 15 in DPCC 7
8	PCIe Slot 8 in DPCC 3	16	PCIe Slot 16 in DPCC 7

AC Input Power Block

The four AC power inputs at the back of the server are arranged in a stack. Starting at the bottom, they are designated AC 0, AC 1, AC 2, and AC 3. The designations match the corresponding PSUs.

The AC power block is not a removable component.

The following illustration shows the location and designation of the inlets on the AC power block.



Call Out	Description
0	AC 0
1	AC 1
2	AC 2
3	AC 3

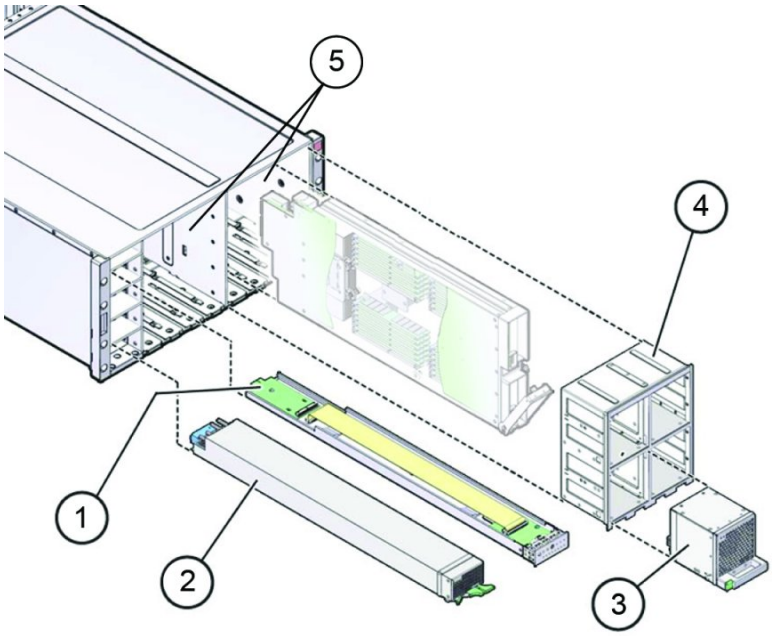
Chassis Overview

The chassis consists of the front accessible components, internal components, and components accessible from the back of the server:

- “Chassis Front Side Components” on page 31
- “Chassis Internal Components” on page 32
- “Chassis Backside Components” on page 33

Chassis Front Side Components

The following figure shows the front side components:



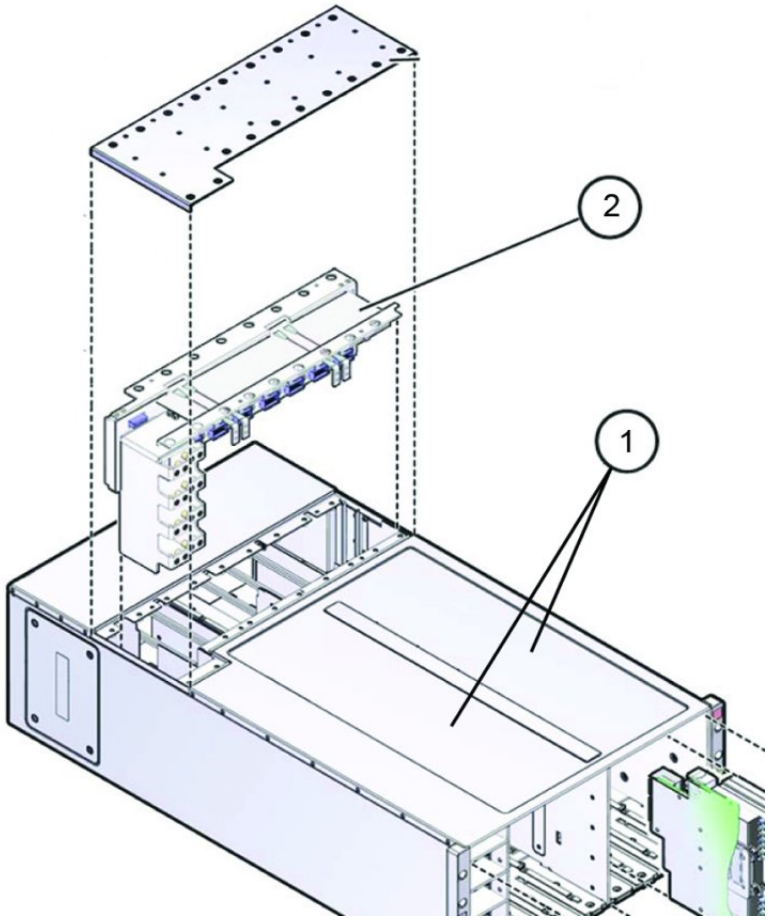
The front-side components include:

Call Out	Component	Link
1	Front indicator module (FIM)	“Controls and Indicators” on page 34

Call Out	Component	Link
2	Four power supplies	“Power Subsystem” on page 49.
3 and 4	Eight fan modules (FMs) in two fan frames	“Chassis Cooling Subsystem” on page 46
5	Two internal CMOD bays	“CPU Module (CMOD) Overview” on page 49

Chassis Internal Components

The following figure shows the chassis internal components:

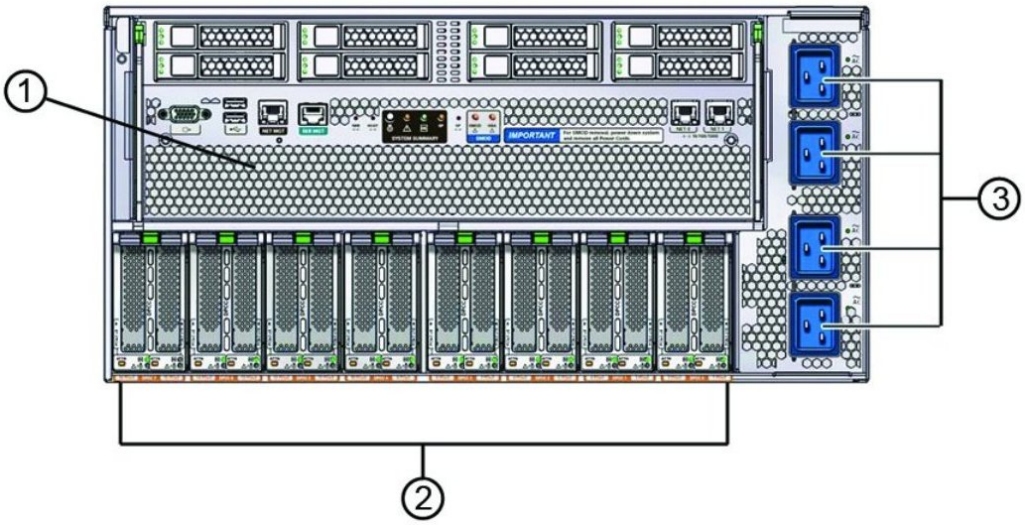


The chassis internal components include:

Call Out	Component	Description
1	CPU module (CMOD) bays	CMOD bays can support either four or eight CMODs. Servicing CMODs requires warm or cold service. For information about the CMODs, see "CPU Module (CMOD) Overview" on page 49.
2	Midplane/busbar	The mid-plane assembly provides an interconnect between the backside components and the front-side components. This component requires cold service.

Chassis Backside Components

The following figure shows the chassis backside components:



The chassis backside components include:

Call Out	Component	Description
1	System Module (SMOD)	The SMOD has internal components that can only be accessed by removing it from the backside of the server.

Call Out	Component	Description
		For more information, see “System Module (SMOD) Overview” on page 55.
2	Dual PCIe card carrier (DPCC) bay	The DPCC bay contains eight DPCCs and up to 16 PCIe cards. For more information, see “Storage and IO Subsystem” on page 44.
3	AC power block	The AC power block has four AC power inlet connectors. The power block is not a removable component. For more information, see “Power Subsystem” on page 49.

Server Subsystems

This section contains overviews of the server subsystems:

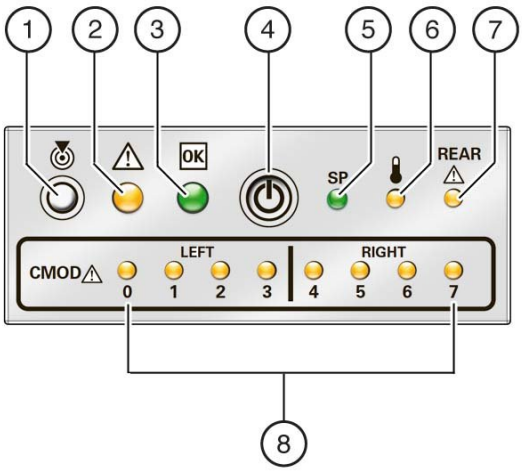
Controls and Indicators

The system management subsystem includes the buttons, switches, and indicators on the front and back of the server, and the embedded server management software, Oracle System Assistant and Oracle ILOM:

Front Indicator Module (FIM) Panel

The front indicator module (FIM) panel is located at the top left corner of the server (as viewed from the front of the server). It contains indicators and buttons that allow you to manage the server and determine its status.

The following illustration shows the buttons and indicators on the FIM.

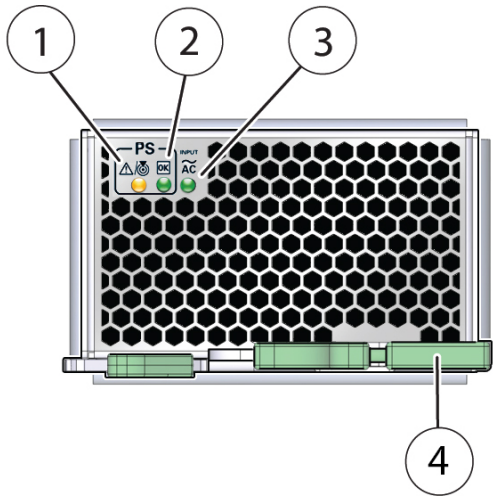


Call Out	Description	Details
1	Locator indicator and button	When activated remotely, it helps you find the server in a rack or room of servers. For more information about managing the Locator indicator remotely and locally, see “Managing the Locator Indicator” on page 107.
2	Service Action Required indicator	When lit, it indicates that a system fault has occurred. Other amber (fault) indicators might also be lit, which can help you isolate the fault to a particular subsystem. For more information about using the Service Action Required and subsystem fault indicators, see “Troubleshooting Indicators” on page 70.
3	Power OK indicator	Along with the SP indicator (below), it provides the status of the system power. For more information about using the Power and SP indicators to determine power state, see “Troubleshooting Indicators” on page 70.
4	Power on and off button	Use it to manage power locally, when at the server. The duration of the button press determines the type of power off (graceful or immediate). For more information about using the Power button, see “Powering Off the Server” on page 99 and “Power On the Server” on page 230.
5	SP OK indicator	Along with the Power OK indicator (above), it provides the status of the system power. For more information about using the Power and SP indicators to determine power state, see “Troubleshooting Indicators” on page 70.

Call Out	Description	Details
6	Server over-temperature indicator	When lit, it indicates that a fault has occurred in the cooling subsystem. The system Service Action Required indicator might also be lit. For more information about using the subsystem fault indicators and the system Service Action Required indicator, see “Troubleshooting Indicators” on page 70.
7	Rear (Back) Service Action Required indicator	When lit, it indicates that a fault has occurred to one of the components on the server backside (SMOD, DPCC, PCIe card, or HBA). Other indicators (status and fault) might also be lit or in non-normal operating condition state (for example, if the backside SP Service Action Required indicator is lit, the system might not be able to boot and the Power OK indicator might not turn on). For more information about using the subsystem indicators and the system Service Action Required indicator, see “Troubleshooting Indicators” on page 70.
8	CMOD service action required indicators (0-7)	These light if the corresponding CMOD is in a fault state.

Power Supply Unit (PSU) Indicators

Each power supply unit (PSU) has three indicators arranged in a single row from left to right.



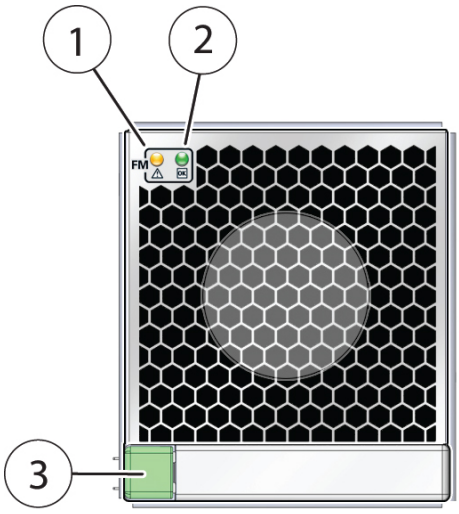
Call Out	Description	Description
1	Service Action Required/Locate (amber)	Lights steady on when the power supply is in a fault state.

Call Out	Description	Description
2	Status OK indicator (green)	Lights steady on when the PSU is powered on and in a normal functioning state (in this state, the AC indicator is also lit)
3	AC OK indicator (green)	Lights steady on when the PSU is connected to a properly rated AC power source
4	Release lever	Used to release the power supply from the chassis

Fan Module (FM) Indicators

Each fan module (FM) has two indicators arranged in a single row and from left to right as follows:

The following illustration shows the front of the FM.

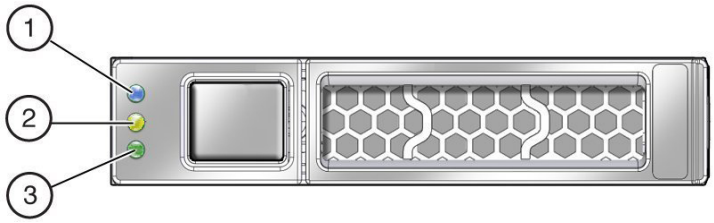


Call Out	Description	Function
1	Service Action Required indicator (amber)	Lights steady on when the FM is in a fault state.
2	Status OK indicator (green)	Lights steady on when the FM is powered on and functioning properly.
3	Release button	Press to release the fan module so you can remove it.

Storage Drive Unit Indicators

Storage drives are installed in carriers. Each storage drive carrier has three indicators arranged in a single stacked row and from bottom to top.

The following illustration shows the front of the storage drive carrier and the storage drive indicators.

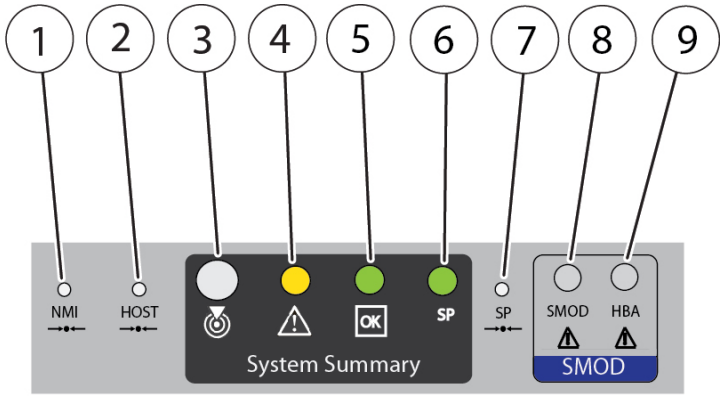


Call Out	Description	Function
1	Ready to Remove indicator (blue)	Lights when the storage drive is ready to be removed from the server in response to an action initiated from the server OS.
2	Service Action Required indicator (amber)	Lights steady on when the drive is in a fault state.
3	OK indicator (green)	Lights when the storage drive is functioning normally and blinks to show activity. **Note -** The storage drive indicators blink at various rates depending on the activity. For more information on blink rates, see “Indicator Blink Rates” on page 74.

Back Indicator Panel

The back indicator panel located on the SMOD allows you manage the server and determine its status. It includes some indicators and buttons not found on the front indicator module (FIM), including reset switches and indicators for SMOD components.

The following figure shows the back inidcator panel:

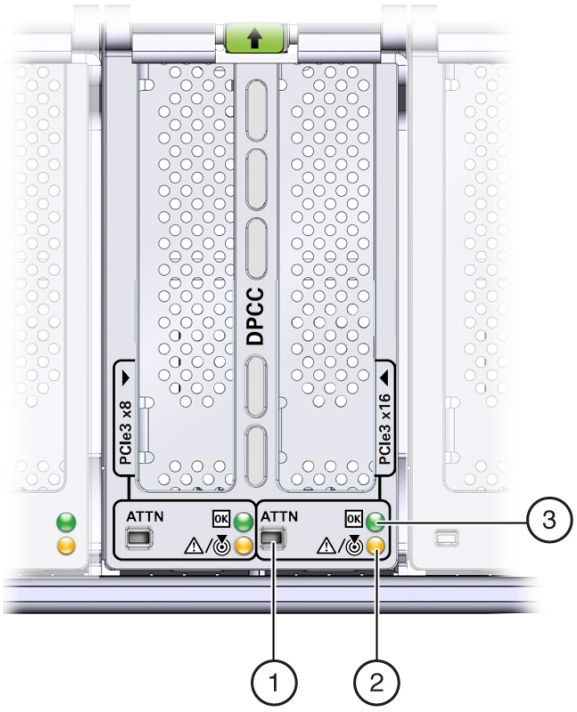


Call Out	Description	Details
1	Non-Maskable Interrupt (NMI) button	Service personnel only. Do not press. This button requires a stylus.
2	Host reset button (recessed)	This button performs an immediate host reboot This button requires a stylus.
3	Locator indicator and button	When activated remotely, it helps you find the server. Locally it can be pressed to prove physical presence. For more information about managing the Locator indicator remotely and locally, see “Managing the Locator Indicator” on page 107.
4	System Service Action Required indicator	When lit, it indicates that a system fault has occurred. Other amber (fault) indicators might also be lit, which can help you isolate the fault to a particular subsystem. For more information about using the Service Action Required and subsystem fault indicators, see “Troubleshooting Indicators” on page 70.
5	Power OK indicator	Along with the SP indicator (below), it provides the status of the system power. For more information about using the Power and SP indicators to determine power state, see “Troubleshooting Indicators” on page 70.
6	SP OK indicator	Along with the Power OK indicator (above), it provides the status of the system power. For more information about using the Power and SP indicators to determine power state, see “Troubleshooting Indicators” on page 70.
7	SP reset button (recessed)	Press to manually reset the service processor if it becomes unresponsive, requires a reset, or fails to boot to standby power. This button requires a stylus.

Call Out	Description	Details
8	SMOD Service Action Required indicator	Lights when the SMOD requires service.
9	HBA Service Action Required indicator	Lights when the HBA requires service.

Dual PCIe Card Carrier (DPCC) Indicators

Each DPCC has two indicator panels, one for each PCIe slot inside the server. Each panel contains a green OK indicator, an amber Service Action Required indicator, and a recessed pinhole Attention (ATTN) button.

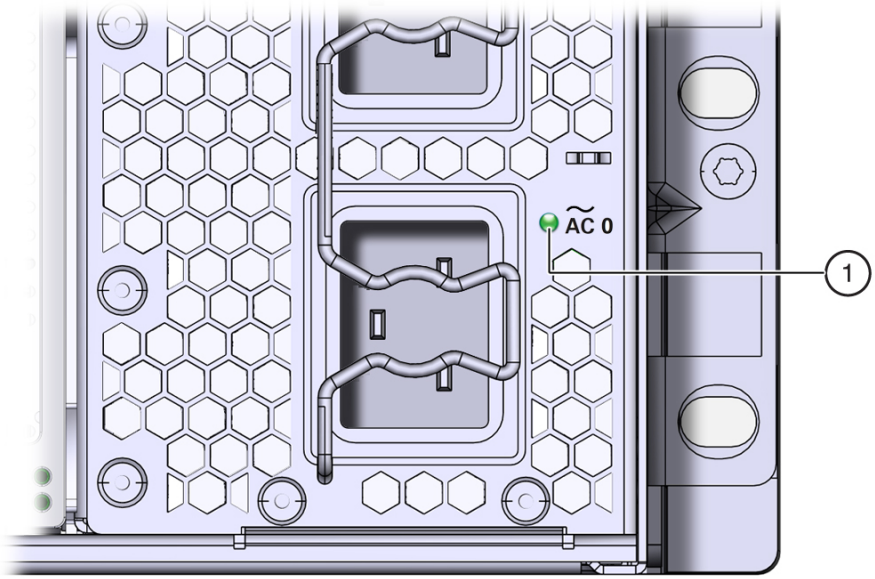


Call Out	Description
1	Recessed pinhole button
2	Service Action Required/Locator indicator

Call Out	Description
3	OK indicator

AC Power Inlet Indicators

Each power inlet on the AC power block at the back of the server has a single green OK indicator that turns on steady only when the power at the connector is sufficient for the power supply unit. In the following illustration, call out 1 shows the OK indicator for inlet AC 0.



Switches and Buttons

When you are at the server, the following switches and buttons are accessible:

- Front panel Power button

  Allows you to control server power while local to (at) the server. For power off information, see “Powering Off the Server” on page 99. For power on information, see “Power On the Server” on page 230.

- Two Locator indicator buttons (one on the front of the server and one on the back)

  The buttons allow you to manage the Locator indicator locally. To deactivate (or activate) the Locator indicator, press and release the button (see “Managing the Locator Indicator” on page 107).
- Service processor (SP) pinhole reset button on the back of the server

  The SP reset button allows you to manually reset the SP. Use the reset button if the SP becomes unresponsive, requires a reset, or fails to boot into standby power mode (activating the button requires the use of a stylus).

  For location information, see “Back Indicator Panel” on page 38.
- Host pinhole reset button on the back of the server

  The Host Reset button allows you to perform an immediate reboot of the server (activating the button requires the use of a stylus).

  For location information, see “Back Indicator Panel” on page 38.
- NMI pinhole button on the back of the server

  The NMI button is used by Service personnel only. Do not press.

  For location information, see “Back Indicator Panel” on page 38.
- CMOD Fault Remind button

  Each CMOD has a motherboard-mounted Fault Remind button. The button is part of the CMOD Fault Remind circuit. The circuit is charged and allows you to identify a failed DIMM or CPU after the CMOD has been removed for the server.

  For button location information, see “CMOD Layout” on page 54.
- Sixteen (16) recessed ATTN (attention) buttons (two on each DPCC)

  The buttons are used to initiate DPCC removal and install. Before removing a DPCC, use a stylus to press *both* ATTN buttons. After installing a DPCC that contains a PCIe card, press the button again.

  For button location information, see “Front Indicator Module (FIM) Panel” on page 35 and “Back Indicator Panel” on page 38.

Server Management Software

The system management software includes:

- “Service Processor (SP) Oracle ILOM” on page 43
- “Oracle System Assistant” on page 43
- “Oracle Hardware Management Pack” on page 43

Service Processor (SP) Oracle ILOM

The server System Module (SMOD) includes an Emulex Pilot 3 service processor (SP) that runs Oracle ILOM. Oracle ILOM allows you to manage and monitor the server locally or remotely in full power or standby power modes. Local and remote interface and control connections to the SP are on the back of the server and include a RJ45 10/100/1000 GigabitEthernet port (remote access) and an RJ45 serial connector and DB15 VGA connector (local access). For information about Oracle ILOM, including initial release version and update information, see https://www.oracle.com/goto/ilom/docs.

Oracle System Assistant

Your server might also come equipped with Oracle System Assistant, a server provisioning and update tool that assists in initial server set up and OS installation and allows you to easily manage server updates. A server-specific version of Oracle System Assistant is installed on the internal SMOD USB slot P0 at the factory.

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.
- Display system overview and detailed hardware inventory information.

For more information, refer to the *Oracle X5 Series Servers Administration Guide* at: https://www.oracle.com/goto/x86admindiag/docs

Oracle Hardware Management Pack

Oracle Hardware Management Pack (HMP) provides a family of command-line interface (CLI) tools for managing your servers, and an SNMP monitoring agent.

- You can use the Oracle Server CLI tools to configure Oracle servers. The CLI tools work with Oracle Solaris, Oracle Linux, Oracle VM, other variants of Linux, and Windows operating systems. They can be scripted to support multiple servers, as long as the servers are of the same type.
- With the Hardware Management Agent SNMP Plugins, you can use SNMP to monitor Oracle servers from the operating system using a single host IP address. This prevents you from having to connect to two management points (Oracle ILOM and the host).

  The Hardware Management Agent fetches and pushes information to and from Oracle ILOM. The SNMP Plugins provides an industry-standard SNMP user interface.

  Oracle Linux Fault Management Architecture (FMA) allows you to manage faults at the operating system level using commands similar to those in the Oracle ILOM Fault Management shell on systems with Oracle Linux 6.5 or newer. Oracle Linux FMA is available on Hardware Management Pack 2.3.

For more details on Oracle Hardware Management Pack, refer to:

https://www.oracle.com/goto/ohmp/docs

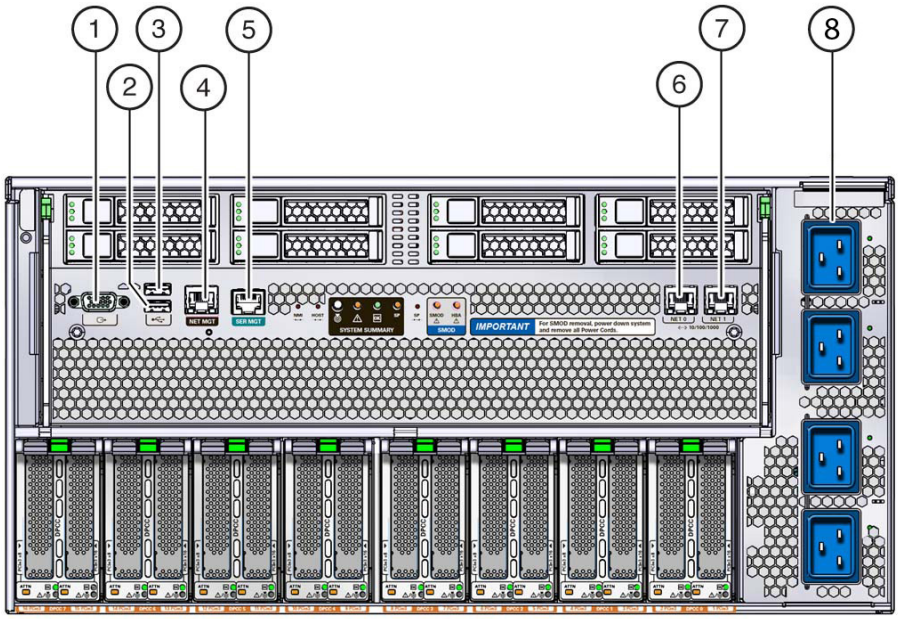
Storage and IO Subsystem

The server storage and input/ouput subsystem consists of the following:

- 8 or 16 PCIe Gen3 IO slots (up to eight 16-lane + eight 8-lane)
- 8 SAS2/SATA3 HDD or SSD SFF drive
- Two 1G/100/10 Ethernet ports
- 4 USB 2.0 ports (2 external, 2 internal)

Back Panel Ports and Connectors

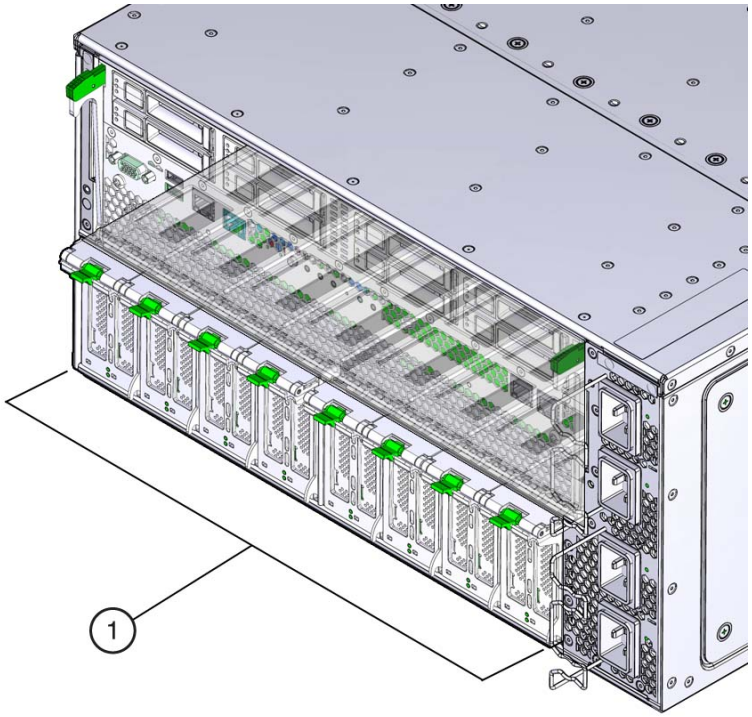
The following figure shows the back panel ports and connectors.



Call Out	Description
1	Video DB-15
2	USB 2.0 port
3	USB 2.0 port
4	1 RJ45 10/100/1000 Ethernet service processor (SP) port (NET MGT)
5	1 RJ45 RS-232 serial console port (SER MGT)
6	RJ45 Host GigabitEthernet port (NET 0)
7	RJ45 Host GigabitEthernet port (NET 1)
8	AC power inlets

Dual PCIe Card Carrier (DPCC)

In the following illustration, call out 1 shows the location of the dual PCIe card carriers (DPCCs). The eight DPCCs are directly accessible from the back of the server and are located below the SMOD. Each DPCC holds two PCIe cards.



- For component information, see “About System Components” on page 19.

Chassis Cooling Subsystem

System cooling air flows from front to back. Primary cooling is provided by eight redundant front-side accessible 100 watt hot-swappable cooling fan modules. To maintain the integrity of the cooling system, ensure that:

- All CMOD processors have a heat sink.
- Each drive bay contains a storage device or a drive slot filler.
- Every DPCC is installed regardless of whether it contains a card or not.
- Both fan frames are populated with fan modules.

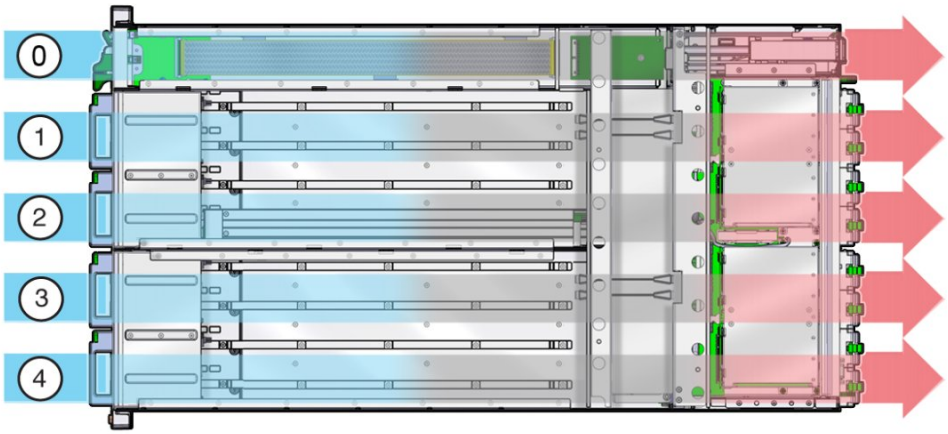
Cooling Zones

The server has five cooling zones. The cooling zones are designated from left to right (from the front of the server) as zone 0 - zone 4. The airflow cooling in zone 0 is concentrated through the power supplies (PSUs) and is provided by the internal PSU fan modules.

The fan modules (FMs) provide the airflow cooling for zones 1-4. Each zone has a pair of dedicated FMs:

- Zone 1 airflow cooling is concentrated on the CPU modules (CMODs) 0 and 1 and is provided by FMs 0 and 1.
- Zone 2 airflow cooling is concentrated on CMODs 2 and 3 and is provided by FMs 2 and 3.
- Zone 3 airflow cooling is concentrated on CMODs 4 and 5 and is provided by FMs 4 and 5.
- Zone 4 airflow is concentrated on CMODs 6 and 7 and is provided by FMs 6 and 7.

Note - In a four-CMOD configured server, the fan modules for cooling zones 3 and 4 are not powered. However, to maintain the integrity of the cooling subsystem, FMs 4-7 must be installed in the server.



Call Out	Description
0	Zone 0: Power supplies Cooling provided by power supply fans

Call Out	Description
1	Zone 1: CMODS 0 and 1 Cooling provided by FMs 0 and 1
2	Zone 2: CMODs 2 and 3 Cooling provided by FMs 2 and 3
3	Zone 3: CMODs 4 and 5 Cooling provided by FMs 4 and 5
4	Zone 4: CMODs 6 and 7 Cooling provided by FMs 6 and 7

Cooling Fan Power

Power for the internal PSU cooling fans (zone 0) is provided by the PSUs. Power for the fan modules (zones 1-4) is supplied by CMODs 0, 2, 4, and 6.

- The chassis cooling fans operate only when the chassis is in full power mode (see "Full Power Mode" on page 106).
- The PSU fans operate when the system is in full power or standby power mode.

The following table shows the CMODs and the fan modules to which they supply power:

CMOD	Fan Modules Powered
CMOD 0	FMs 0 and 1
CMOD 2	FMs 2 and 3
CMOD 4	FMs 4 and 5
CMOD 6	FMs 6 and 7

Note - The fan power connectors for CMODs in slots 1,3,5, and 7 are not used.

Fan Module Redundancy

The eight fan modules (FMs) provide airflow for chassis cooling zones 1-4. For redundancy, each zone has two dedicated FMs. If an FM fails, replace it immediately. The FMs are hot-serviceable.

Caution - Data Loss. Do not remove more than one fan module from a column while the system is in full power mode. This action removes power from the CMODs and causes an immediate shutdown. On an eight-CMOD system, this applies to all fan modules. On a four-CMOD system, this applies to the fan modules in the left-hand fan frame.

For FM reference and servicing information, see "Servicing Fan Modules and Fan Frames" on page 115.

Power Subsystem

Chassis power is provided by four hot-serviceable front-side accessible power supply units (PSUs). The four PSUs provide dual (2+2) redundancy. Therefore, the minimum PSU configuration is two. To ensure redundancy, power for the server should come from at least two separate circuits.

When the AC power cords are connected to AC inputs at the back of the chassis, the PSUs supply power to the Ethernet ports, the system sensors and inventory circuits, and the service processor (SP). When power is supplied to the SP, it boots, and the server enters the low-power standby power mode.

Once the SP boots into standby power mode, full power mode is initiated by pressing and releasing the chassis front-panel Power button or by powering on the server remotely from Oracle ILOM.

For more information about power modes, see "Power Modes, Shutdowns, and Resets" on page 105.

CPU Module (CMOD) Overview

CPU modules (CMODs) contain the processors (CPUs) and the system memory, and supply power to the fan modules and the DPCCs.

CMODs are internal warm or cold-service components. To access the CMODs, you must remove the fan modules and the fan frames.

The following sections describe the CMOD configuration options and the internal layout of components:

Processor and Memory Overview

Each CMOD contains one Intel Xeon® E7-8895 v3 (18-core 2.6 GHz) processor.

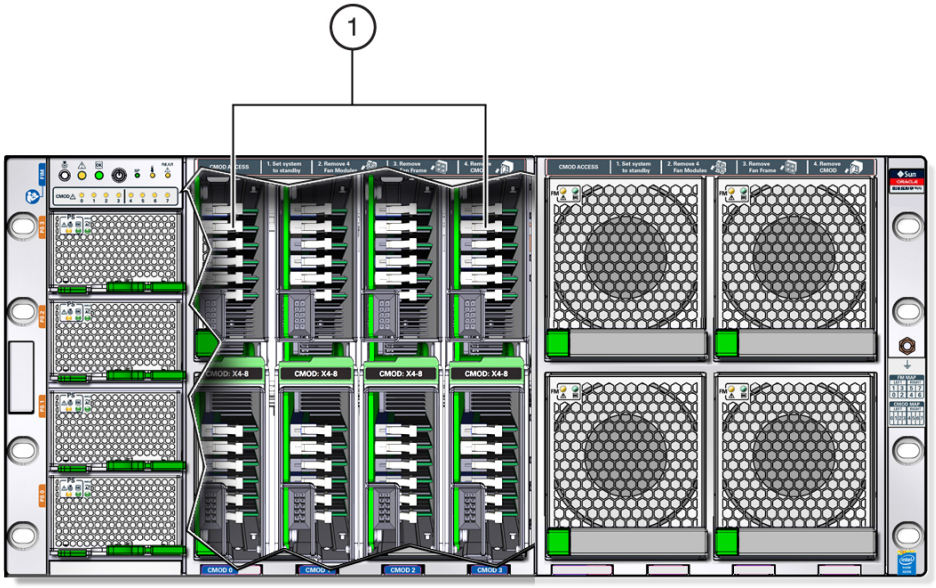
The maximum system memory with DDR3 1333 32 GB DIMMs is:

- Four CMODs: 3 TB
- Eight CMODs: 6TB

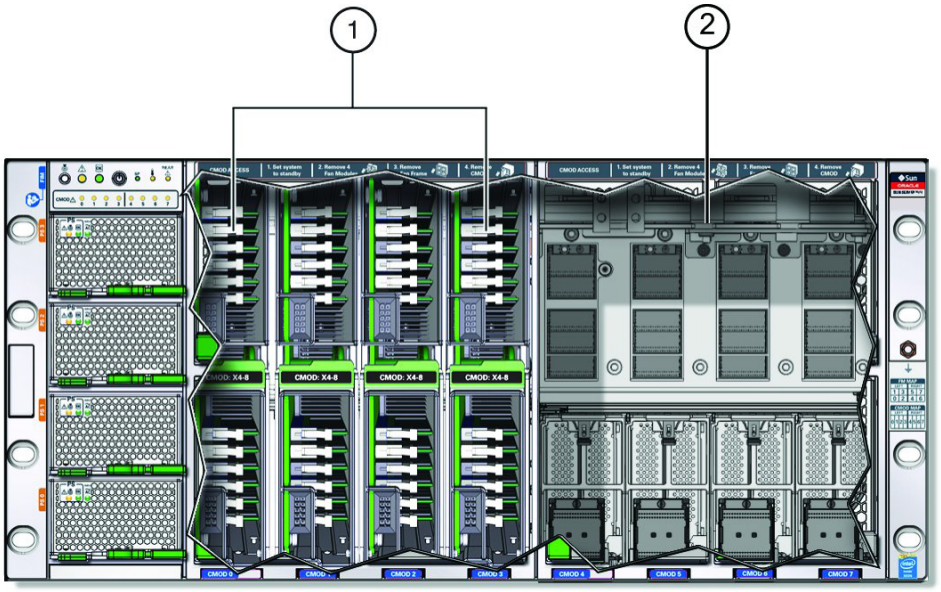
CMOD Configuration Options

The server supports four- and eight-CMOD configurations. In the four-CMOD configuration, the first four slots on the left (slots 0-3) are occupied and the four slots on the right (4-7) are unoccupied.

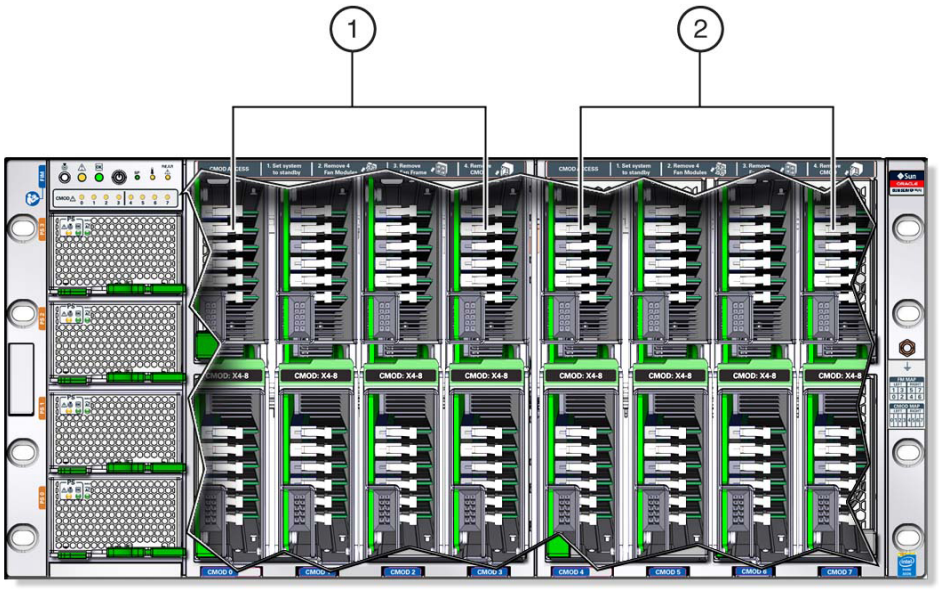
The following illustration shows a server with a four-CMOD configuration. In the illustration, the left-side fan modules and fan frame have been removed to show the four CMODs. Call out 1 identifies the group of four CMODs.



The following illustration shows a server with a four-CMOD configuration with all eight fan modules and with both fan frames removed, exposing the empty CMOD bay on the right. The four right-side fan modules are not powered; however in a four-CMOD configuration, these fan modules must be installed. Call out 1 identifies the group of four CMODs installed on the left side of the server. Call out 2 identifies the empty CMOD bay on the right side of the server.



The following illustration shows a server with an eight (full) CMOD configuration. Call out 1 identifies the group of four CMODs installed on the left side of the server, and call out 2 identifies the second group of four CMODs installed on the right side of the server.



In both CMOD configurations, the system includes four power supplies, eight fan modules, and eight DPCCs. However, fan modules and DPCCs receive power from the CMODs, so in a four-CPU configuration, only fan modules 0-3 and DPCCs 0-3 are active. Fan modules 4-7 and DPCCs 4-7 are not powered and not active.

CMOD Population Rules

The Oracle Server X5-8 supports four and eight CMOD configurations. Each CMOD supports a single socket containing a single Intel EX Xeon E7-8895 v3 processor.

For the four-socket server configuration:

- CPU modules (CMODs) must be installed in slots 0-3.
- DPCC slots 0-3 are active; however DPCCs 4-7 must be installed.
- Both fan frames must be installed.
- All eight fan modules (FMs) must be installed but only FMs 0-3 are active.

For the eight-socket server configuration:

- CMODs must be installed in slots 0-7.
- DPCC slots 0-7 are active.

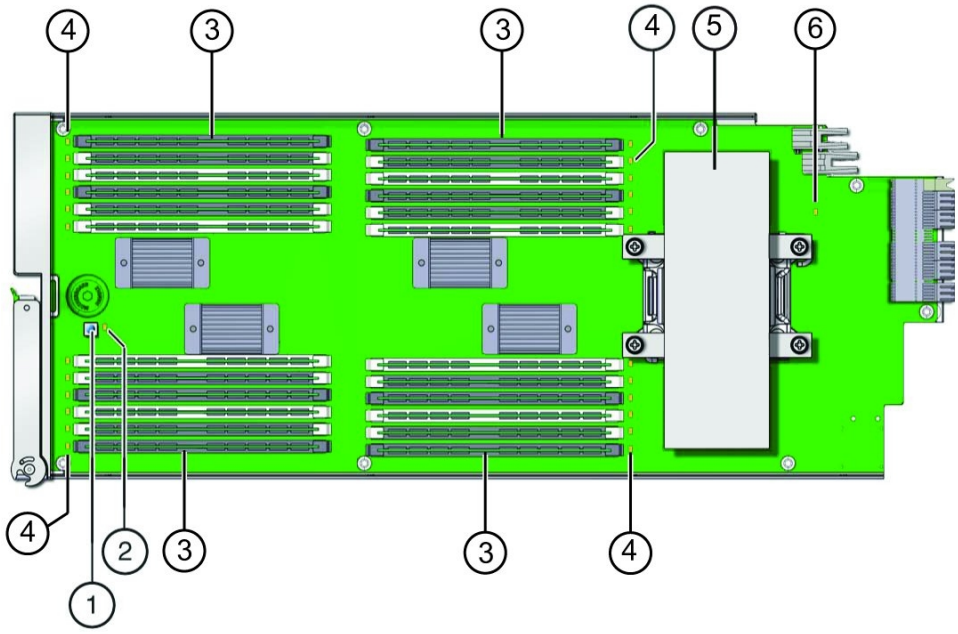
- Both fan frames must be installed.
- All eight fan modules (FMs) must be installed and all FMs are active.

CMOD Layout

Each CMOD contains the following components:

- Heatsink and processor assembly
- 24 DIMM slots arranged in four groups of six
- DIMM test circuit, which helps you locate failed DIMMs and verify a failed CPU
  - Fault Remind button
  - Circuit Charge Status indicator
  - 24 DIMM slot fault indicators
  - CPU fault indicator

The following illustration shows the location of the CMOD components.



Call Out	Description
1	Fault Remind button
2	Circuit Charge Status indicator
3	DIMM slots (24, four banks of six each)
4	DIMM slot fault indicators (24, one for each slot)
5	Heatsink and CPU assembly
6	CPU fault indicator

For component information, see “About System Components” on page 19.

CMOD and Fan Module Power

Fan modules (FMs) get power from CMODs. However, only CMODs in even-numbered slots supply power to fan modules. The following table shows which CMOD slots provide FM power.

Power Slots	Fan Modules Powered
CMOD 0	FMs 0 and 1
CMOD 2	FMs 2 and 3
CMOD 4	FMs 4 and 5
CMOD 6	FMs 6 and 7

CMODs in slots 1, 3, 5, and 7 do not supply FM power.

System Module (SMOD) Overview

This section provides information about the server system module (SMOD) and its components. It includes:

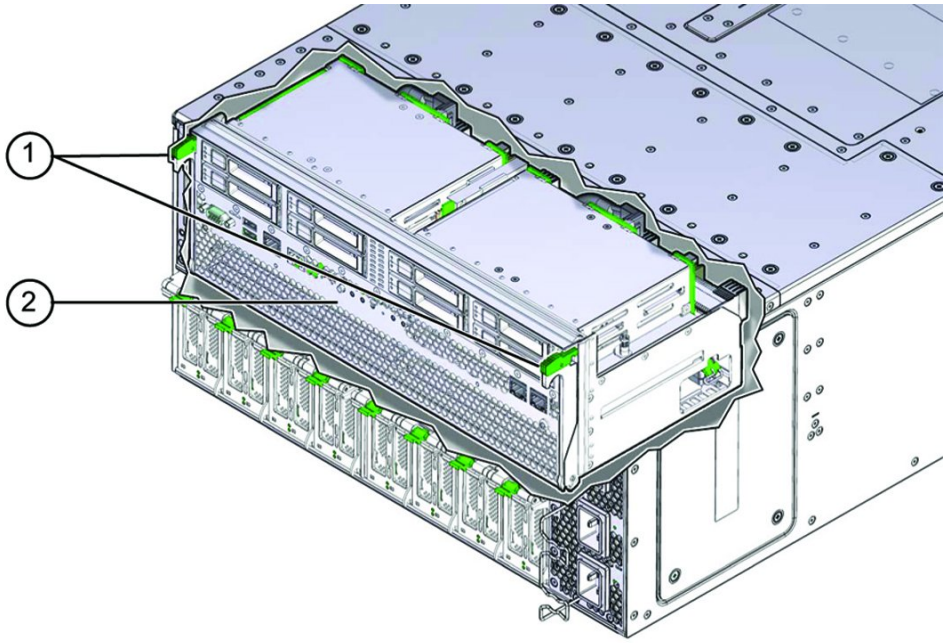
SMOD Overview

The SMOD components include:

- Externally-accessible:
  - Server storage drives (HDD/SSD)
  - IO ports and two external USB ports
- Internally accessible:
  - SMOD motherboard
  - Service processor (SP)
  - Storage drive backplane
  - SAS host bus adaptor (HBA)
  - Internal USB ports (2)
  - Energy storage module (ESM)
  - Real time clock battery

The SMOD is located at the back of the server. It includes two removal and installation levers with green lock release tabs.

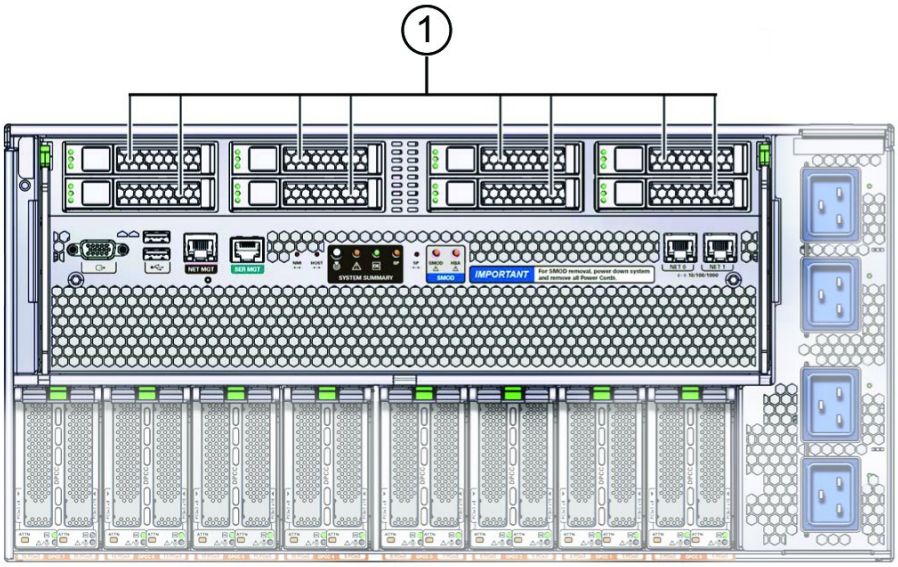
The following illustration shows the SMOD and the two release levers:



Call Out	Description
1	Removal and installation levers (2)
2	SMOD

Storage Drives

In the following illustration, call out 1 shows the location of the eight storage drive slots, which are arranged in two rows of four each.



For component information, see “About System Components” on page 19.

SMOD Motherboard

The SMOD motherboard hosts the service processor (SP), two disk backplanes (for the externally accessible server storage drives), the system real time clock battery, and an energy storage module for the HBA. It also has a PCIe riser for the server storage HBA, and two internal USB ports. The PCIe riser and the internal USB ports are located on the bottom of the SMOD.

For component information, see “About System Components” on page 19.

Service Processor (SP)

The system Emulex Pilot 3 service processor (SP) is located on the SMOD motherboard and is accessible locally and remotely through management ports on the front of the SMOD. The SP contains Oracle ILOM, an embedded server management tool. The SP is not removable.

Storage Drive Backplanes

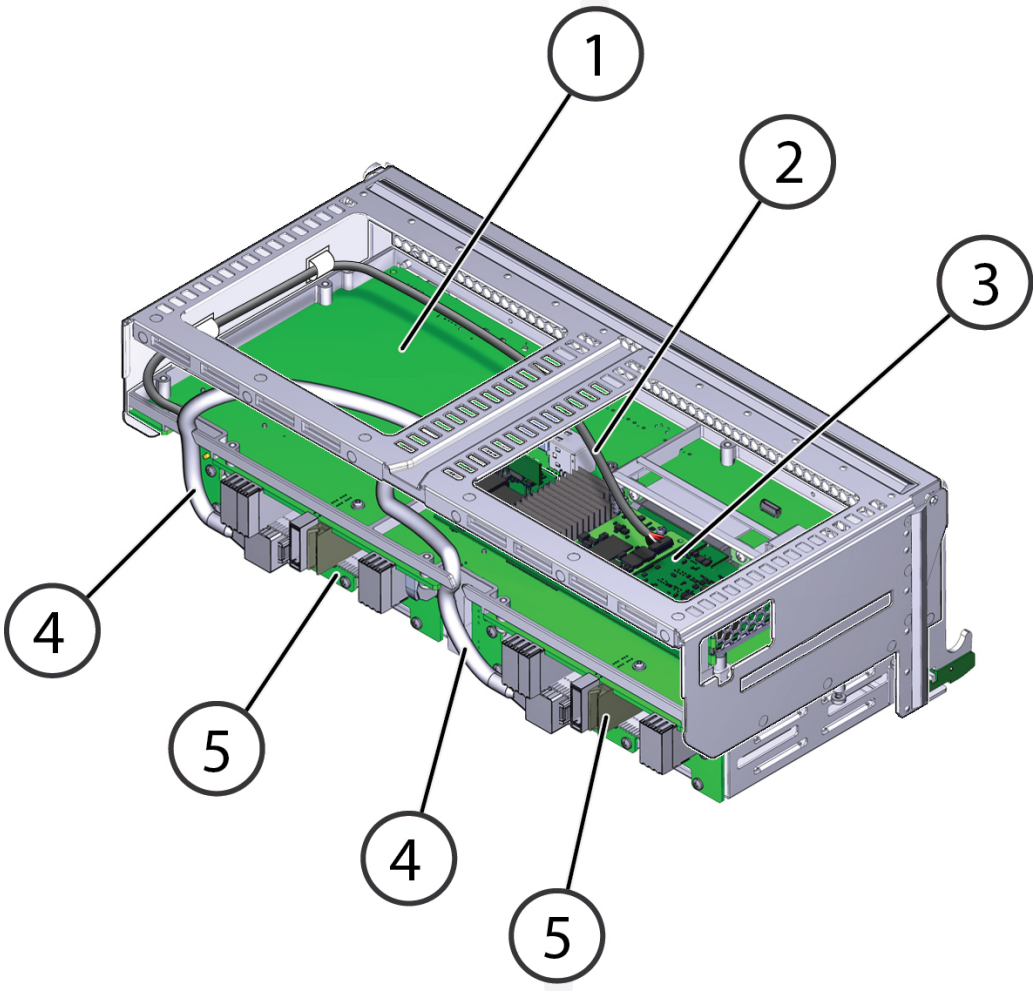
The externally accessible server storage drives on the SMOD connect to two backplanes mounted on the SMOD motherboard. A SAS cable also connects the backplane to the HBA card that is installed in a riser slot on the bottom of the SMOD. The backplanes are not removable or replaceable.

- For component information, see "About System Components" on page 19.

SAS Host Bus Adapter (HBA) Card, Riser, and Cables

The server requires one internal HBA (Oracle Storage 12 Gb/s RAID HBA, Internal) for the externally-accessible SAS (or SATA) SMOD server storage drives. The HBA is installed in a riser slot on the underside of the SMOD motherboard and is connected to the backplanes by two mini-SAS4I connector cables.

The following illustration shows the HBA card installed on the underside (bottom) of the SMOD, the two SAS cables that connect the HBA to the server storage backplanes, and the cable that connects the energy storage module to the HBA.



Call Out	Description
1	SMOD motherboard
2	Cable from HBA to ESM.
3	HBA
4	SAS cables
5	Backplanes

For component information, see “About System Components” on page 19.

Internal USB Ports

The SMOD has two internal USB ports on the underside of the SMOD motherboard next to the PCIe card riser slot. The ports are designated as P0 and P1.

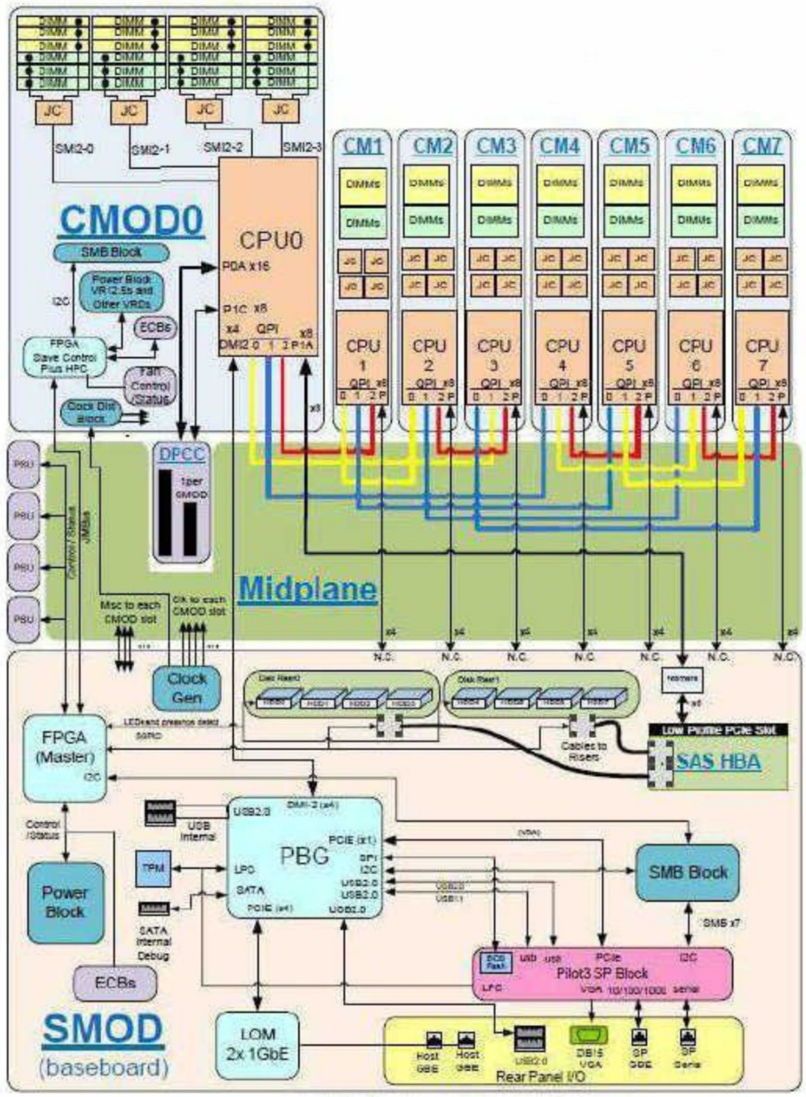
Unless you have opted out, port P0 has a factory-installed flash drive that contains Oracle System Assistant, a bootable server set-up, provisioning, and update tool. Port P0 can only be used to support Oracle System Assistant. It cannot be used to boot an OS or store files unrelated to Oracle System Assistant.

Energy Storage Module and Cable

The Energy Storage Module (ESM) provides backup power for the HBA. It sits in a holder in the top center of the SMOD, and has a cable that connects it to the HBA.

Server Block Diagram

The following illustration shows the a block diagram of the server interconnects between the CMODs, the midplane, and the SMOD. It also shows the interconnects between attached and integrated components:


CMOD0
CPU0
SMB Block
ECBs
CM1
CM2
CM3
CM4
CM5
CM6
CM7
DPCC
Midplane
Clock Gen
FPGA (Master)
SAS HBA
PBG
SMB Block
Power Block
ECBs
Pilot3 SP Block
SMOD
(baseboard)
LOM
2x 1GbE
Rear Panel I/O

Component Network Access Control (NAC) Names

Name	Description
/SYS	System
/SYS/UUID	Unique system ID
/SYS/PS[0-3]	Power supplies (static FRUID)
/SYS/SMOD/DBP[0/1]	Disk backplanes (dynamic FRUID)
/SYS/FM[0-7]	Fan modules (No FRUID)
/SYS/HDD[0-7]	Hard disk drives
/SYS/SMOD/MB	System module (SMOD) (dynamic FRUID)
/SYS/SMOD/MB/NET[0/1]	System host network interfaces (static FRUID)
/SYS/SMOD/MB/CPLD	CPLD on SMOD
/SYS/SMOD/MB/SP	Service processor (SP) module (dynamic FRUID)
/SYS/SPNET[0/1]	SP network interfaces
/SYS/CMOD[0-7]	CPU modules (dynamic FRUID)
/SYS/CMOD[0-7]/P[0-7]	Processors (CPUs) on CMOD (static FRUID)
/SYS/CMOD[0-7]/P[0-7]/P[0-23]	DIMMs on CMOD MB (dynamic FRUID
/SYS/CMOD[0-7]/CPLD	CPLDs on CMODs
/SYS/BIOS	System BIOS
/SYS/DPCC[0-7]	Dual PCIe card carriers (DPCCs)
/SYS/DPCC[0-7]/PCIE[1-16]	PCIe cards
/SYS/FIM	Front indicator module

Oracle Server X5-8 Model Naming Convention

The Oracle Server X5-8 name identifies the following:

- X identifies an x86 product.
- The first number, 5, identifies the generation of the server.
- The second number, 8, identifies the maximum number of processors.

Troubleshooting and Diagnostics

This section provides information about troubleshooting hardware component faults for the Oracle Server X5-8. It contains the following topics.

Description	Link
Maintenance-related information and procedures used to troubleshoot and repair server hardware issues.	“Troubleshooting Server Hardware Component Faults” on page 65
Information about software and firmware diagnostic tools used to isolate problems, monitor the server, and exercise the server subsystems.	“Troubleshooting With Diagnostic Tools” on page 82
Information about attaching devices to the server to perform troubleshooting.	“Attaching Devices to the Server” on page 85
Information about contacting Oracle support.	“Getting Help” on page 87

Troubleshooting Server Hardware Component Faults

This section contains maintenance-related information and procedures used to troubleshoot and repair server hardware. It includes the following topics.

Description	Section Links
Troubleshooting overview information and procedure	“Troubleshooting Server Hardware Faults” on page 66
Source listing for troubleshooting and diagnostic information	“Troubleshooting and Diagnostic Information” on page 70
Discerning the server state using the front panel indicators	“Troubleshooting Indicators” on page 70
Explanation of indicator blink rates	“Indicator Blink Rates” on page 74
Explanation of the CMOD Fault Remind Test Circuit	“The CMOD Fault Remind Test Circuit” on page 80

Description	Section Links
Causes, actions, and preventative measures for problems related to the cooling subsystem	“Troubleshooting System Cooling Issues” on page 80
Causes, actions, and preventative measures for problems related to the power subsystem	“Troubleshooting Power Issues” on page 81

Troubleshooting Server Hardware Faults

When a server hardware fault event occurs the system lights the Service Action Required LED and captures the event in the system event log (SEL). If you have set up notifications 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 Steps” on page 66
- “Troubleshoot Hardware Faults” on page 67

Basic Troubleshooting Steps

Use the following process to address a hardware fault (for the step-by-step procedure, see “Troubleshoot Hardware Faults” on page 67):

1. **Identify the server subsystem containing the fault**.

   You can use Oracle ILOM to identify the failed component.
2. **Review the** *Product Notes*.

   Once you have identified the hardware issue, review the *Oracle Server X5-8 Product Notes*. This document contains up-to-date information about the server, including hardware-related issues.
3. **Prepare the server for service using Oracle ILOM**.

   If you have determined that 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 to ensure 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 a 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.

See Also:

- "Troubleshoot Hardware Faults" on page 67

▼ Troubleshoot Hardware Faults

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

This procedure uses the basic troubleshooting steps described in "Basic Troubleshooting Steps" on page 66.

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

Note - This procedure provides one basic approach to troubleshooting hardware faults. It uses a combination of the Oracle ILOM web and CLI interfaces. However, the procedure can be performed using only the Oracle ILOM CLI interface. For more information about the Oracle ILOM web interface, refer to the Oracle ILOM documentation.

Before You Begin

- Obtain the latest version of the *Oracle Server X5-8 Product Notes*.

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

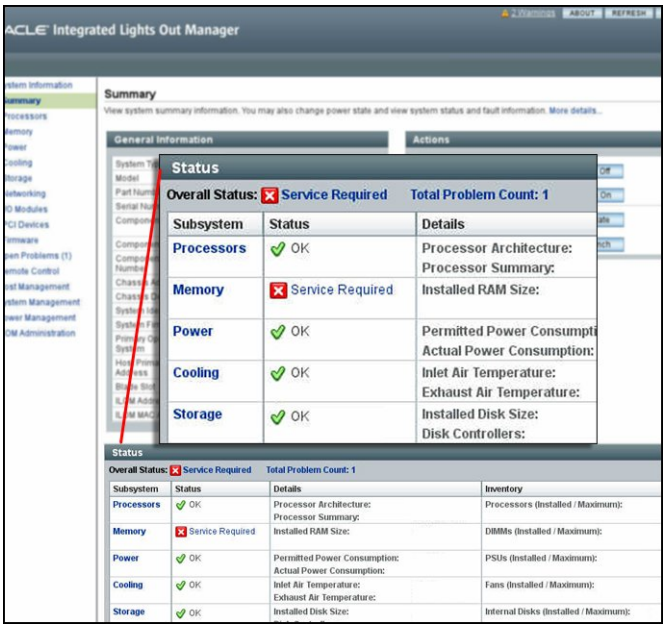
   Open a browser and type in the IP address of the server SP. Enter a user name (with administrator privileges) and password at the log-in screen. The Summary screen appears.

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

   - **Processors**

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

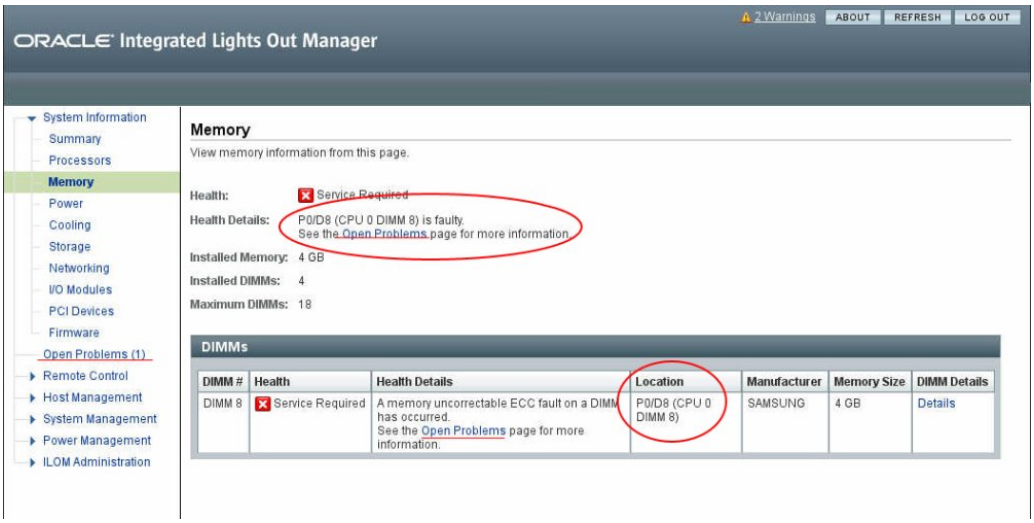
2. **In the Status section of the summary screen, identify the server subsystem that requires service.**



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. 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 *Oracle Server X5-8 Product Notes* contains up-to-date information about the server, including hardware-related issues.

6. **To prepare the server for service, see "Preparing for Service" on page 91.**

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

Troubleshooting and Diagnostic Information

The following table lists diagnostic- and troubleshooting-related procedures and references that can assist you with resolving 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 UEFIdiag to exercise the system and isolate subtle and intermittent hardware-related problems.	*Oracle x86 Server Diagnostics, Applications, and Utilities Guide for Servers with Oracle ILOM 3.1 and Oracle ILOM 3.2.x*
Administrative information for the Oracle Server X5 series servers, including information about how to use Oracle System Assistant and using the Oracle ILOM system event log (SEL) to identify a problem's possible source.	*Oracle X5 Series Servers Administration Guide*

Troubleshooting Indicators

The eight indicators on the server front panel show the state of the server. For more information about indicator locations, see “Front Indicator Module (FIM) Panel” on page 35 and “Back Indicator Panel” on page 38.

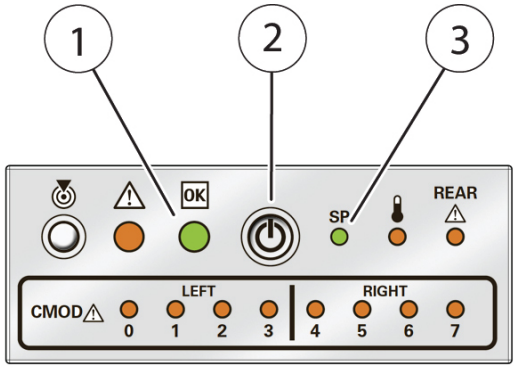
The following sections describe the status of the front panel indicators for various server states:

Note - For the error state scenarios described below, the state of the Power OK indicator depends on presence of redundant components and the severity of the fault.

- “Server Boot Process and Normal Operating State Indicators” on page 71
- “Locator Indicator On” on page 72
- “Over Temperature Condition” on page 72

Server Boot Process and Normal Operating State Indicators

A normal server boot process involves the service processor (SP) indicator and the Power OK indicator. In the illustration below, call out 1 shows the Power OK indicator and call out 3 shows the SP indicator. Call out 2 shows the power button.



The following table describes the indicator activity during a normal boot sequence.

System Condition	SP Indicator	Power OK Indicator
AC power applied to server. SP is booting.	Blinks	Off
SP is booted and ready to use. Host is off.	Steady On	Blinks at single blink rate (quick flash every 3 seconds)
SP is running. Host is booting.	Steady On	Blinks at fast rate
SP and host are running. This is the normal operating state of the system.	Steady On	Steady On

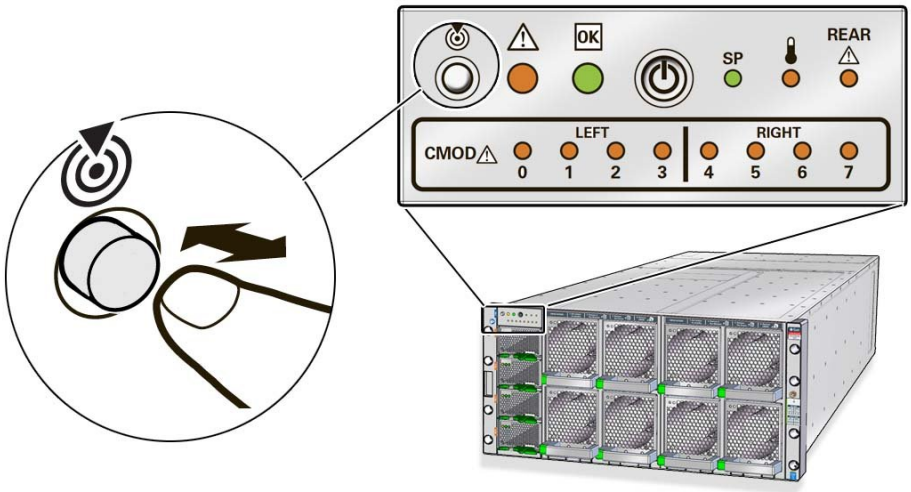
Locator Indicator On

The Locator indicator is a white combination button/indicator located on both the front and back panels. When it is on, it blinks at the fast blink rate:

- Turn it on remotely from Oracle ILOM to locate the server in a rack.

  Typically, a server readied for service is placed in standby power mode and the Locator indicator is turned on.
- Press the button to prove physical presence. Some service procedures require you to prove physical presence by pressing the Locator indicator button.
- You can turn the Locator indicator off remotely from Oracle ILOM, or by pressing the button.

The following figure shows the Locator indicator on the front panel:



For indicator blink rate information, see “Indicator Blink Rates” on page 74.

Over Temperature Condition

For a server in an over-temperature state, the server amber over-temperature indicator and the amber Service Action Required indicators (front and back) are on steady. The state of the front and back green Power OK indicator and the green SP indicator depends on the severity of the condition.

For indicator blink rate information, see “Indicator Blink Rates” on page 74.

PSU Failure

For a server with a PSU in a failed state, the server amber Service Action Required indicators (front and back) and the amber Servic Action Required indicator on the PSU are on steady. The front and back green Power OK indicator and the green SP indicator are on steady.

For indicator blink rate information, see “Indicator Blink Rates” on page 74.

Memory Failure

For a server with a failure in the memory subsystem, the server amber Service Action Required indicators (front and back) and an amber CMOD Service Action Required indicator are on steady. The front and back green Power OK indicator and the green SP indicator are on steady.

For indicator blink rate information, see “Indicator Blink Rates” on page 74.

CPU Failure

For a server with a fault in the processor subsystem, the server amber Service Action Required indicators (front and back) and an amber CMOD Service Action Required indicator are on steady. The activity of front and back green Power 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 74.

Fan Module Failure

For a server with a fan module fault, the server amber Service Action Required indicators (front and back) and an amber Service Action Required indicator on a fan module are on steady. The front and back green server OK indicator and the green SP indicator are on steady.

For indicator blink rate information, see “Indicator Blink Rates” on page 74.

SP Failure

For a server with an SP fault, the server amber Service Action Required indicators (front and back) are on steady. The front and back System OK indicators and the SP OK indicator are off.

For indicator blink rate information, see “Indicator Blink Rates” on page 74.

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 front and back indicators light up and remain on steady for 15 seconds (see “Unison Steady On” on page 78).

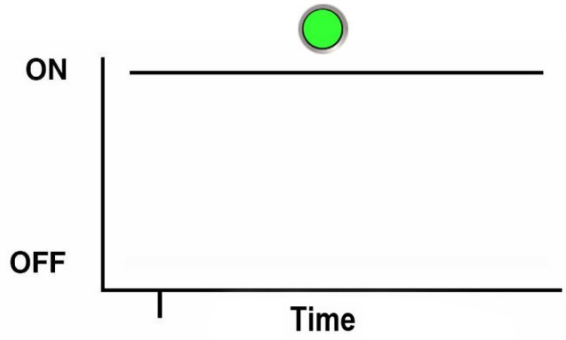
For indicator blink rate information, see “Indicator Blink Rates” on page 74.

Indicator Blink Rates

This section describes the following indicator blink rates:

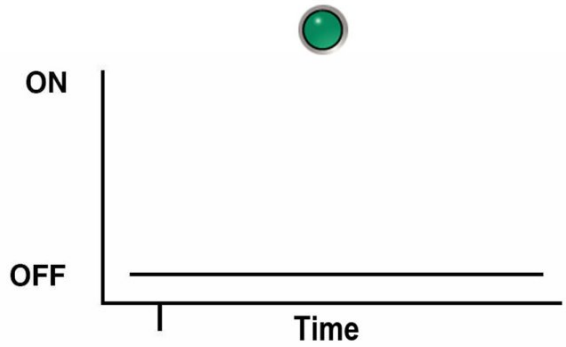
Steady On

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).



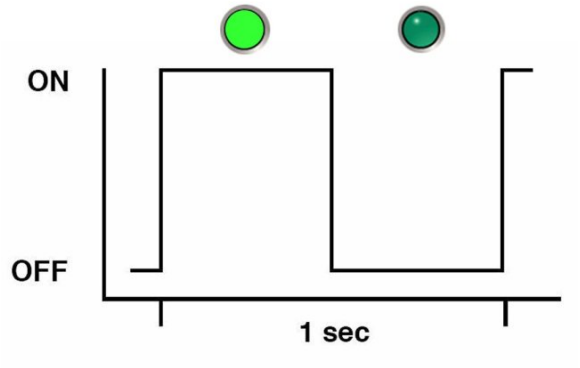
Steady Off

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 Power OK indicator) or a subsystem not in a fault state (unlit amber Service Action Required indicator).



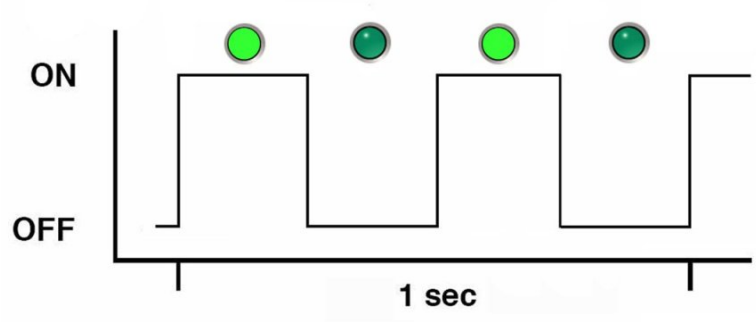
Slow Blink Rate

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, device rebuilding, booting, or in transition from one mode to another.



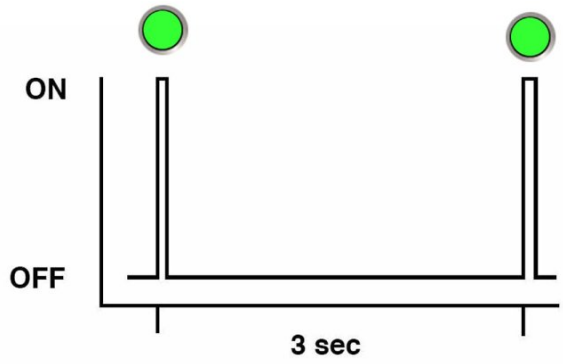
Fast Blink Rate

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.



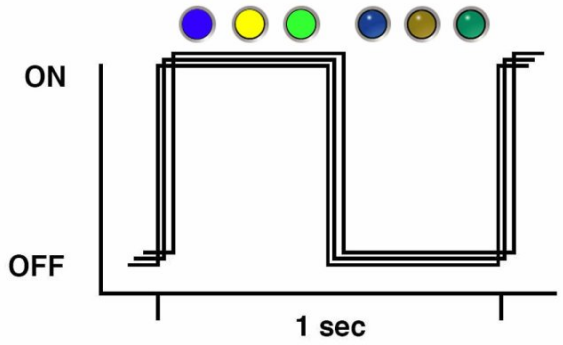
Single (Standby) Blink Rate

For the single blink rate, the indicator repeatedly flashes once at the beginning of a three second interval. This indicates a system or component in standby mode. For example, a server in standby power mode or a hot spare device 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) into a powered system (confirming the power connection).



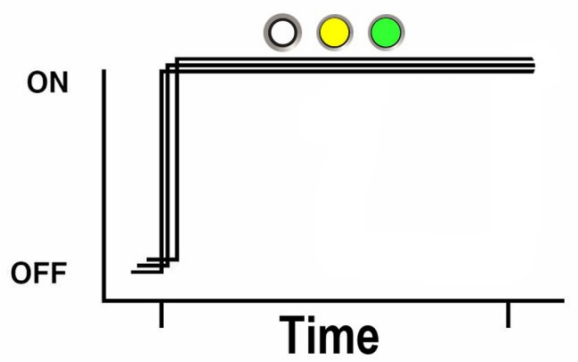
Insertion Blink

The insertion blink is three successive blinks of a hot-swap component's primary status indicator (for example, the green Power OK indicator). The insertion blink occurs immediately

after three successive unison blinks (see “Slow Unison Blink Rate” on page 77) of all the component indicators.

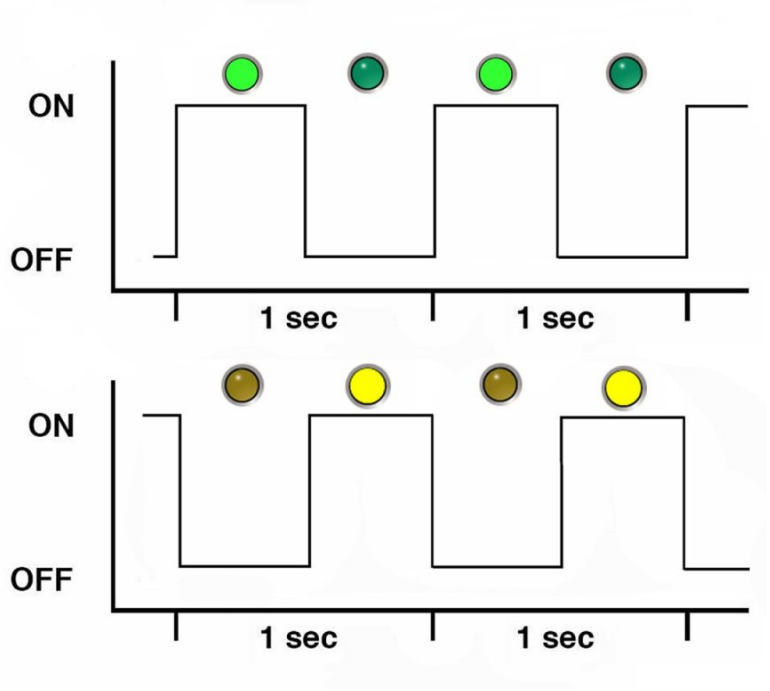
Unison Steady On

For the unison steady on, all indicators are simultaneously on steady (see “Steady On” on page 74. This occurs during the front panel lamp test (see “Front Panel Lamp Test” on page 74). This is the only time that the Locator indicator is on steady.



Alternating (Invalid FRU) Blink Rate

The alternating (invalid FRU) blink rate is a repeating sequence of lit green and amber indicators at 1 Hz. This indicates that a component has an incorrect version or mismatch (for example, a power supply with a lower rating than the one specified). The blink rate is also used for an unsupported component, or a component in an unsupported slot.



Feedback Flash

The indicator flashes on and off during periods of activity, commensurate with the activity, but the flashing does not exceed the 2 Hz fast blink rate (see, “Fast Blink Rate” on page 76). For example, this blink rate occurs during disk drive read and write activity and communication port transmit and receive activity.

Data Blink Rate

For this blink rate, a normally on Indicator repeatedly turns off twice during a one-second interval (2 Hz—see also, “Fast Blink Rate” on page 76) while data activity is taking place.

Sequential (Diagnostic) Blink Rate

This blink rate is a repeating sequence in which each indicator successively lights for 0.5 sec to indicate that diagnostics are running. This blink rate is used only on systems or components capable of running diagnostics.

The CMOD Fault Remind Test Circuit

The CMODs have an internal test circuit that you can use to locate failed DIMMs and verify a failed CPU after removing the CMOD from the server. The DIMM and CPU Fault Remind circuits hold an electrical charge for 10 minutes after power is removed from the server, allowing enough time to remove the CMOD and use the circuit.

For more information, see "Replace a Failed DIMM" on page 143 and "Remove a Heatsink and Processor (FRU)" on page 156.

Troubleshooting System Cooling Issues

Maintaining the proper internal operating temperature of the server is crucial to a 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 fault, the cause of the problem might be:

- "External Ambient Temperature Too High" on page 80
- "Airflow Blockage" on page 80
- "Hardware Component Failure" on page 81

External Ambient Temperature Too High

If the ambient temperature in the server space is too high, the cool air that is pulled into the server cannot cool the server sufficiently to prevent the internal temperature from rising. This can cause poor performance or component failure.

Action: Check the ambient temperature of the server space against the environmental specifications for the server. 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, cables, fans, air baffles and dividers are properly installed.

Hardware Component Failure

Fan modules and power supply fans drive 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.

To reduce the risk related to component failure, power supplies and fan modules are installed in pairs to provide redundancy. Redundancy ensures that if one component in the pair fails, the remaining component can continue to maintain the subsystem. For example, power supplies serve a dual function; they provide both power and airflow. If one power supply fails, the other functioning power supply is able to maintain both the power and the cooling subsystems.

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 66.

Prevention: 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:

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 operating at specific

voltage levels. Insufficient voltage levels or voltage fluctuations can cause server power problems.

Action: Check that the AC power cords are connected to the server. Check that the correct power is present at the outlets and monitor the power to verify that it is within the acceptable range.

- AC OK indicators next to the AC inlets on the back of the server are green when the power is connected, and off when it is not.
- The AC OK and DC OK indicators on the PSU indicator panels on the front of the system are green when the PSU is functioning properly.

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. Check that the PSUs are operational (the PSU indicator panel should have a lit green AC OK indicator). 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. 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.

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

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

The following table summarizes the diagnostic tools.

Diagnostic Tool	Type	What It Does	Availability	Remote Capability
Oracle ILOM	SP firmware	Monitors environmental condition and component functionality sensors, generates alerts, performs fault isolation, and provides remote access.	Available in either standby power mode or full power mode. It is not OS dependent.	Designed for remote and local access.
Preboot Menu	SP firmware	Enables you to restore some of Oracle ILOM defaults (including firmware) when Oracle ILOM is not accessible.	Available in either standby power mode or full power mode. It is not OS dependent.	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	Indicate 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).
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 test aspects of the service	Available in either standby power	Local, but remote serial access is

Diagnostic Tool	Type	What It Does	Availability	Remote Capability
		processor (SP) prior to booting the Oracle ILOM SP and operating system. Tests SP memory, SP, network devices and I/O devices.	mode or full power mode. It is not OS dependent.	possible if the SP serial port is connected to a network-accessible terminal server.
Solaris 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.
UEFI Diagnostics	A suite of diagnostic tests	Run diagnostic tests from Oracle ILOM.	Run tests manually or automatically. Read the results on screen or in log files.	Remote access using Oracle ILOM.

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 Documentation Library	`https://www.oracle.com/goto/ilom/docs`
Preboot Menu	Using the Preboot Menu Utility	*Oracle X5 Series Servers Administration Guide*
U-Boot	*Oracle x86 Servers Diagnostics Guide*	*Oracle x86 Server Diagnostics, Applications, and Utilities Guide for Servers with Oracle ILOM 3.1 and Oracle ILOM 3.2.x*
System indicators and sensors	*Oracle Server X5-8 Service Manual*	"Troubleshooting Indicators" on page 70
UEFI diagnostics	*Oracle x86 Servers Diagnostics Guide*	*Oracle x86 Server Diagnostics, Applications, and Utilities Guide for Servers with Oracle ILOM 3.1 and Oracle ILOM 3.2.x*
Oracle VTS	Oracle VTS software and documentation	*Oracle x86 Server Diagnostics, Applications, and Utilities Guide for Servers with Oracle ILOM 3.1 and Oracle ILOM 3.2.x*

Attaching Devices to the Server

The following sections contain procedures for attaching devices to the server. These allow you to access diagnostic tools when troubleshooting and servicing the server:

▼ Attach Devices to the Server

This section provides instructions for connecting remote and local devices to server so you can interact with the service processor (SP) and the server console.

For port and connector information, see "Back Panel Ports and Connectors" on page 44.

1. **Connect an Ethernet cable to the Gigabit Ethernet (NET) connectors as needed for OS support.**
2. **To connect to Oracle ILOM over the network, connect an Ethernet cable to the Ethernet port labeled NET MGT.**
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.**
4. **To connect to 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.**

Configuring Serial Port Sharing

By default, the NET MGT serial port connects to the SP console. Using Oracle ILOM, you can configure it to connect to the host console instead. This feature is useful for Windows kernel debugging, as it enables you to view non-ASCII character traffic from the host console.

Do not configure the NET MGT port to connect to the host console until after you have configured the Oracle ILOM network connection. Otherwise you cannot connect to Oracle ILOM to switch it back.

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: https://www.oracle.com/goto/ilom/docs.

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 86
- "Assign Serial Port Output Using the Web Interface" on page 86

▼ Assign Serial Port Output Using the CLI

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 *Oracle X5 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

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 X5 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 Device Naming

This section contains information about the device naming for the Ethernet ports on the back panel of the server (see "Back Panel Ports and Connectors" on page 44).

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	Oracle Solaris	Linux	Windows
Net 1	0701	igb 1	eth 1	net2
Net 0	0700	igb 0	eth 0	net

Getting Help

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

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	
IP address	
Server name (system host name)	
Network or internet domain name	
Proxy server configuration	

See Also

- “Locating the Chassis Serial Number” on page 88

Locating the Chassis Serial Number

You might need to have your server's 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's serial number:

- On the front panel of the server, look at the middle left of the bezel to locate the server's serial number.
- Locate the yellow Customer Information Sheet (CIS) attached to your server packaging. This sheet includes the serial number.

- From Oracle System Assistant, see the Summary screen.
- From Oracle ILOM, enter the `show /SYS` command or go to the System Information tab in the Oracle ILOM browser interface.

Preparing for Service

This section includes preliminary information and procedures that assist you with preparing to service the server. The following table describes the contents of this section.

Section Description	Link
Protect the server and its components from damage caused by electrostatic discharge	“Performing Electrostatic Discharge and Static Prevention Measures” on page 91
Required tools and equipment	“Tools and Equipment” on page 92
Overview of filler panels and non-powered components	“Component Filler Panels and Non-Powered Components” on page 93
Conditions required for servicing components	“Hot, Warm, and Cold Service” on page 93
Server power-off options.	“Powering Off the Server” on page 99
Methods for activating and deactivating the server Locator indicator.	“Managing the Locator Indicator” on page 107

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. If your wrist strap is equipped

with a banana connector, insert it into the grounding socket on the right-hand side of the chassis front panel.

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

Most server component removal and installation procedures can be performed without tools. However, to service the system, you need the following:

- ESD mat and grounding strap
- Anti-static wrist strap

You might also need:

- No. 2 Phillips screwdriver
- 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 and Non-Powered Components

A filler panel is a metal or plastic enclosure that does not contain any functioning system hardware or cable connectors. Filler panels occupy vacant component slots to help control noise, EMI, and airflow. They are installed at the factory and must remain in the server until you replace them with a component. If you remove a filler panel and continue to operate your system with an empty slot, the server might overheat due to improper airflow. Additionally, some components are installed but are not powered (for exampole, DPCCs and fan modules). As with filler panels, these components must remain installed in a fully powered-on server.

Hot, Warm, and Cold Service

Components can be divided into three categories, based on what you must do to the server before servicing them.

- *Hot service* components can be serviced while the server is powered on and running in full-power mode.

  See “Prepare the Server for Hot Service” on page 93.
- *Warm service* components can be serviced while the server is in standby power mode. These include CMODs, DIMMs, and processors and heatsinks.

  See “Prepare the Server for Warm Service” on page 94.
- *Cold service* components must be serviced when the server is completely powered off and disconnected from the power source.

  See “Prepare the Server for Cold Service” on page 97.

▼ Prepare the Server for Hot Service

Note - The steps in this remote procedure use the Oracle ILOM web interface. However, the procedure can also be performed remotely 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 Requirements” on page 21.

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

- Fan modules
- Power supplies
- Storage drives
- Dual PCIe Card Carriers (DPCCs)

Before You Begin

- **Important**: Review the *Oracle Server X5-8 Product Notes* for hardware-related information before performing removal and installation procedures.

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

   Direct a web browser to Oracle ILOM using the IP address of the server SP and log in as root or a as user with administrator privileges. See *Oracle X5 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 other options, see "Managing the Locator Indicator" on page 107.

3. **Once at the service location, press the Locator button to deactivate the indicator. For more information, see "Control the Locator Indicator Locally" on page 109.**

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 91.

Next Steps

- "Servicing Fan Modules and Fan Frames" on page 115
- "Servicing Power Supply Units (PSUs)" on page 124
- "Servicing Storage Drives" on page 175
- "Servicing PCIe Cards and the Dual PCIe Card Carriers (DPCCs)" on page 180

▼ Prepare the Server for Warm Service

This procedure describes how to prepare the server for warm service, so you can remove and replace CMODs, DIMMs, and processors and heatsinks without disconnecting the power cords or shutting down Oracle ILOM.

When Oracle ILOM detects that two fan modules in a single cooling zone (a vertical column) have been removed, it removes power from the CMODs, allowing you to service CMODs and their subcomponents without removing the power cords. Oracle ILOM remains available in warm service mode.

This procedure uses a combination of the Oracle ILOM web and CLI interfaces. However, the procedure can be performed using only the Oracle ILOM CLI interface (for more information, refer to the Oracle ILOM documentation).

For more information about component serviceability, see "Component Serviceability Requirements" on page 21.

Caution - Loss of service or component damage. Do not replace any components except for CMODs and their subcomponents while the server is in warm service mode.

Caution - Data Loss. Do not remove more than one fan module from a column while the system is in full power mode. This action removes power from the CMODs and causes an immediate shutdown. On an eight-CMOD system, this applies to all fan modules. On a four-CMOD system, this applies to the fan modules in the left-hand fan frame.

Before You Begin

- **Important**: Review the *Oracle Server X5-8 Product Notes* for hardware-related information before performing removal and installation procedures.

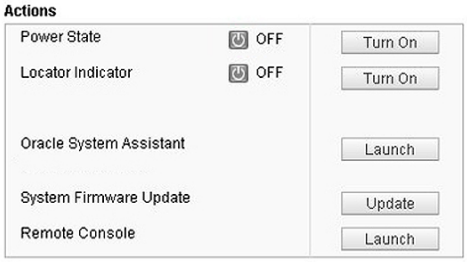
1. **To power down the host and activate the front panel Locator indicator, do the following:**

   a. **Log in to the Oracle ILOM web interface.**

      Direct a web browser to Oracle ILOM using the IP address of the server SP and log in as root or a as user with administrator privileges. See "Accessing Oracle ILOM" in *Oracle X5 Series Servers Administration Guide*.

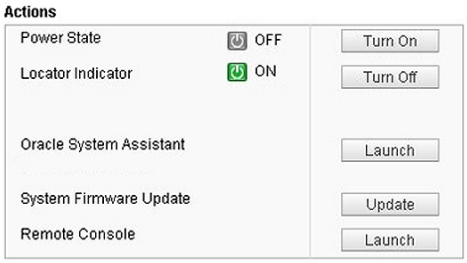
   b. **In the Actions section of the Summary screen, click the Power State Turn Off button.**

This action powers off the server to standby power mode. For more power off options, see "Powering Off the Server" on page 99.



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 and back panel. For other options, see "Managing the Locator Indicator" on page 107.



2. **When at the server, set up an ESD-safe service space where you can place components.**

See "Performing Electrostatic Discharge and Static Prevention Measures" on page 91.

3. **Press the Locator indicator button to deactivate the indicator. For more information, see "Control the Locator Indicator Locally" on page 109.**

4. **Begin the CMOD removal procedures. For details, see "Servicing the CPU Module (CMOD) Components" on page 134.**

The server transitions to warm service mode by removing power from the CMODs when it senses one of the following events:

- On an eight-CMOD system, when both fans in a single column are removed.
- On a four CMOD system, when both fans in a single column are removed from the left-hand fan frame (CMODs 0 through 3), or when a CMOD is inserted into an unoccupied CMOD slot (4 through 7).

Next Steps

- "Servicing Components" on page 111

▼ Prepare the Server for Cold Service

Note - This procedure uses a combination of the Oracle ILOM web and CLI interfaces. However, the procedure can be performed using only the Oracle ILOM CLI interface (for more information, 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 Requirements" on page 21.

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

- Remove, replace, or install cold-serviceable components.
- Use the motherboard processor and DIMM fault remind circuitry.
- Access internal components, such as the internal USB drives.

Before You Begin

- **Important**: Review the *Oracle Server X5-8 Product Notes* for hardware-related information before performing removal and installation procedures.

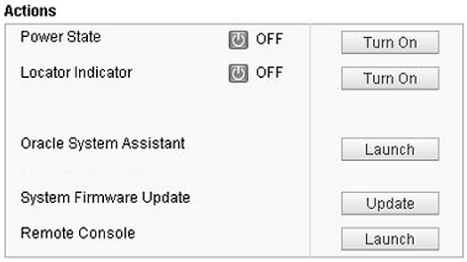
1. **To power down the server and activate the front panel Locator indicator, do the following:**

   a. **Log in to the Oracle ILOM web interface.**

      Direct a web browser to Oracle ILOM using the IP address of the server SP and log in as root or a as user with administrator privileges. See "Accessing Oracle ILOM" in *Oracle X5 Series Servers Administration Guide*.

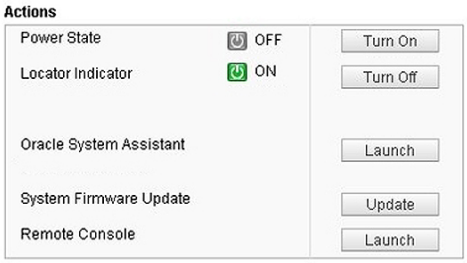
   b. **In the Actions section of the Summary screen, click the Power State Turn Off button.**

This action powers off the server to standby power mode. For more power off options, see "Powering Off the Server" on page 99.



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 and back panel. For other options, see "Managing the Locator Indicator" on page 107.



2. When at the server, set up an ESD-safe service space.

Set up a space where you can place components. The space needs to be ESD safe. See "Performing Electrostatic Discharge and Static Prevention Measures" on page 91.

3. Disconnect the server power cords.

Caution - Data loss. Removing the power cords 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. Power off the server to standby power mode first.

4. **If necessary, label and disconnect any other cables attached to the server back panel.**

   If you plan to remove a component that has cables attached to it (SMOD, DPCC), label the port or slot to which the cable is attached and remove the cable.

Next Steps

- "Servicing Components" on page 111

Powering Off the Server

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

▼ Power Off the Server Using the Server OS

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

Before You Begin

See: "Power Modes, Shutdowns, and Resets" on page 105

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

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

   When the server is in standby power mode, the SP indicator is on steady, and the Power OK indicator blinks at the single blink rate (a quick flash every three seconds).

Next Steps

- "Performing Electrostatic Discharge and Static Prevention Measures" on page 91

Power Off, Graceful (Power Button)

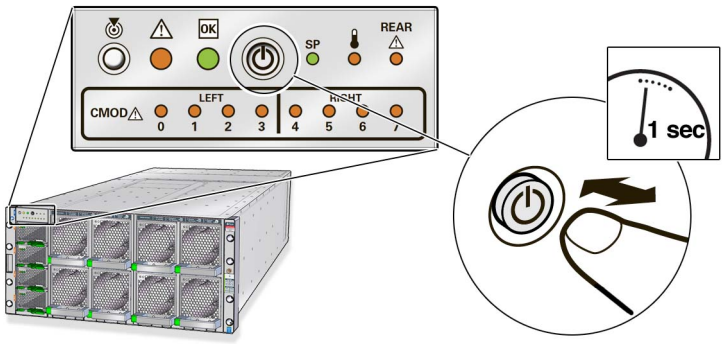
Note - This procedure is performed locally and requires physical access to the server front panel.

Use this procedure when you are at the server to perform a graceful power off of the server to standby power mode.

Before You Begin See: "Power Modes, Shutdowns, and Resets" on page 105

1. **To power off the server, press and *quickly* 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 and release the button immediately.



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

   When the server is in standby power mode, the SP indicator is on steady, and the Power OK indicator blinks at the single blink rate (a quick flash every three seconds).

Next Steps

- "Performing Electrostatic Discharge and Static Prevention Measures" on page 91

▼ Power Off, Immediate (Power Button)

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

An immediate shutdown should be used in situations when you know that the loss of data is nonexistent or acceptable (for more information, see “Power Modes, Shutdowns, and Resets” on page 105).

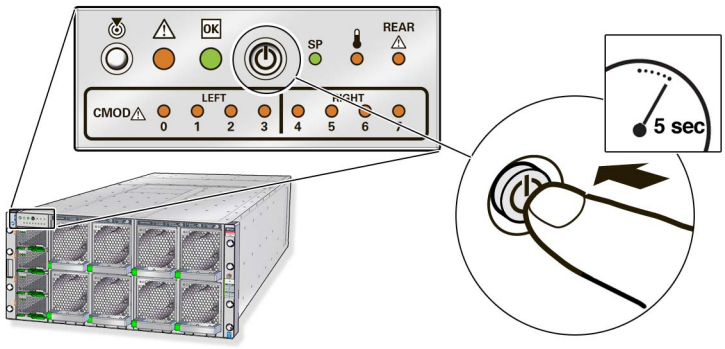
Caution - Data loss. All applications and files close abruptly without saving. Warn users and close all applications before powering off.

Use this procedure when you are at the server to immediately power off the server to standby power mode.

Before You Begin

- Physical access to the server front panel is required.

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



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

   When the server is in standby power mode, the SP indicator is on steady, and the Power OK indicator blinks at the single blink rate (a quick flash every three seconds).

Next Steps

- “Performing Electrostatic Discharge and Static Prevention Measures” on page 91

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 See: "Power Modes, Shutdowns, and Resets" on page 105

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 module SP.

   For more information, see "Accessing Oracle ILOM" in *Oracle X5 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:

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

     stop -force /System

     An immediate shutdown should be used in situations when you know that the possible loss of data is nonexistent or acceptable. For more information, see "Power Modes, Shutdowns, and Resets" on page 105.

Next Steps

- "Managing the Locator Indicator" on page 107
- Oracle Integrated Lights Out Manager Documentation Library at: `https://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 See: "Power Modes, Shutdowns, and Resets" on page 105

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 "Accessing Oracle ILOM" in *Oracle X5 Series Servers Administration Guide*.

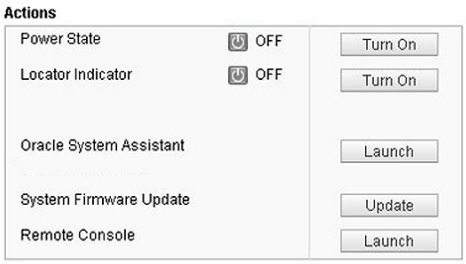
   The Summary screen appears.

2. **In the Actions section of the Summary screen, verify that the Power State is ON.**

   If the Power State status shows off, the server is already powered off.

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

   The power, as indicated in the Actions section, changes from on to off. In this state the server is in standby power mode.



Alternatively, other power off options are available in the Host Management > Power Control screen.

Note - The Immediate shutdown option should be used only in emergency situations or when you know that the loss of data is nonexistent or acceptable. For more information, see "Immediate Shutdown" on page 106.

---

4. **Click OK.**

Next Steps

- “Managing the Locator Indicator” on page 107
- Oracle Integrated Lights Out Manager Documentation Library at:

  `https://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 cold service or a cold reset or to place the server in a non-powered state, you must disconnect the AC power cables from the back of the server. Use this procedure to completely remove power from the server.

Before You Begin See: “Power Modes, Shutdowns, and Resets” on page 105

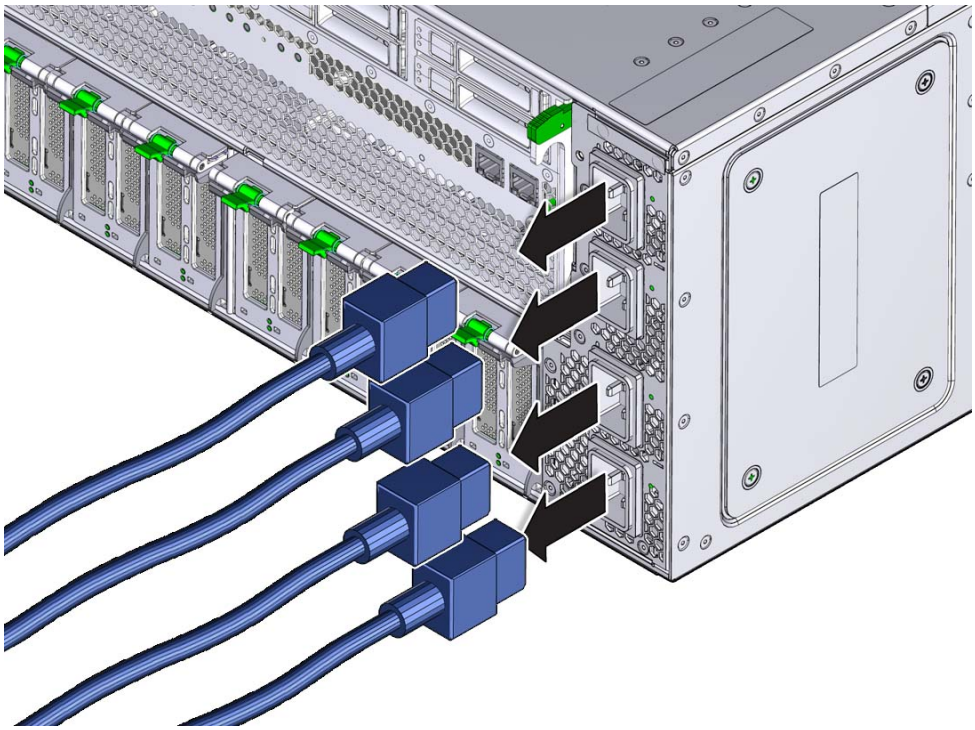
1. **Place the server in standby power mode.**

   Use one of the power off methods. See “Powering Off the Server” on page 99.

2. **Access the back of the server.**

3. **To remove power from the server, lift the power cord retaining clips, and disconnect each AC power cable from the AC power block.**

This action completely removes power from the server.



4. **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 107.

See Also

- "Performing Electrostatic Discharge and Static Prevention Measures" on page 91

Power Modes, Shutdowns, and Resets

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

Full Power Mode

When the server enters full power mode, power is supplied to all the server components, the server boots, and the operating system (OS) functions. This is the normal operating condition for the server. The Power OK and SP OK indicators are steady on.

To enter full power mode, press the Power button on the server front panel when the server is in standby power mode. You can also enter full power mode by powering on the server from Oracle ILOM.

Standby Power Mode

In standby power mode, low-level power is supplied only to the components required to run the SP. The OS does not boot.

To enter standby power mode, either:

- Connect the AC power cables to the back of the server but do not press the Power button.
- From full power mode, either press the front panel power button, or use Oracle ILOM.

When you connect power to the server, the SP boots. The SP OK indicator blinks while the SP is booting, then remains steady on once it has booted. The Power OK indicator flashes briefly every 3 seconds.

Graceful Shutdown

A graceful shutdown (also referred to as an orderly shutdown) closes files and prepares the file system before it shuts down the server to standby power mode. *This is the safest method of shutting down the server.*

To perform a graceful shutdown use the server OS, Oracle ILOM, or the server front panel Power button.

Immediate Shutdown

An immediate shutdown (also referred to as an emergency shutdown) shuts down the host immediately without closing files or preparing the file system. *It should be used only in situations when you know that the chance of losing data is nonexistent or acceptable.*

Complete Power Removal

To completely remove power from the server, remove the power cords.

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.

Warm Reset or Reboot

A warm reset is a reboot or restart of the server. It requires 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 99.

Managing the Locator Indicator

This section provides procedures for turning the Locator indicator on and off remotely (using Oracle ILOM) and locally (using the server Locator buttons). The Locator indicator helps you identify the server in a rack.

- “Turn On the Locator Indicator Remotely (Oracle ILOM CLI)” on page 108
- “Turn On the Locator Indicator Remotely (Oracle ILOM Web Interface)” on page 109
- “Control the Locator Indicator Locally” on page 109

Turn On the Locator Indicator Remotely (Oracle ILOM CLI)

Before going to the server, you can activate the server Locator indicator to help you identify the server in 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@*ipadress*

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

   For more information, see "Accessing Oracle ILOM" in *Oracle X5 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`.

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

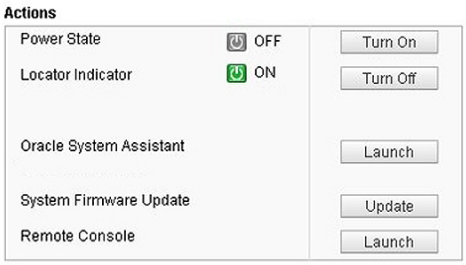
Before going to the server, you can activate the server Locator indicator to help you identify the server in the rack.

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. See "Accessing Oracle ILOM" in *Oracle X5 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.

▼ Control the Locator Indicator Locally

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

Use this procedure to turn off or to turn on the Locator indicator.

Before You Begin

- You must be physically present at the server.
- For button and indicator location information, see "Front Indicator Module (FIM) Panel" on page 35.

- **To control the Locator indicator locally, do one of the following:**

  - **To turn off the blinking Locator indicator, 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 indicators, press the Locator indicator three times within a five-second period.**

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

Servicing Components

This section includes the following removal and installation procedures for customer-replaceable and field-replaceable components in the Oracle Server X5-8:

Section Description	Link
Upgrade server from four to eight CMODs.	“Upgrade the Server from Four to Eight CMODs” on page 111
Remove and install fan modules (FMs).	“Servicing Fan Modules and Fan Frames” on page 115
Remove and install power supplies (PSUs)	“Servicing Power Supply Units (PSUs)” on page 124
Remove and install the font indicator module (FIM).	“Servicing the Front Indicator Module (FIM)” on page 130
Remove and install CPU modules (CMODs).	“Servicing the CPU Module (CMOD) Components” on page 134
Remove and install server storage drives.	“Servicing Storage Drives” on page 175
Remove and install PCIe cards and dual PCIe card carriers (DPCCs).	“Servicing PCIe Cards and the Dual PCIe Card Carriers (DPCCs)” on page 180
Removing and installing SMOD components.	“Servicing System Module (SMOD) Components” on page 192
Replacing the midplane assembly.	“Replace the Midplane Assembly” on page 218

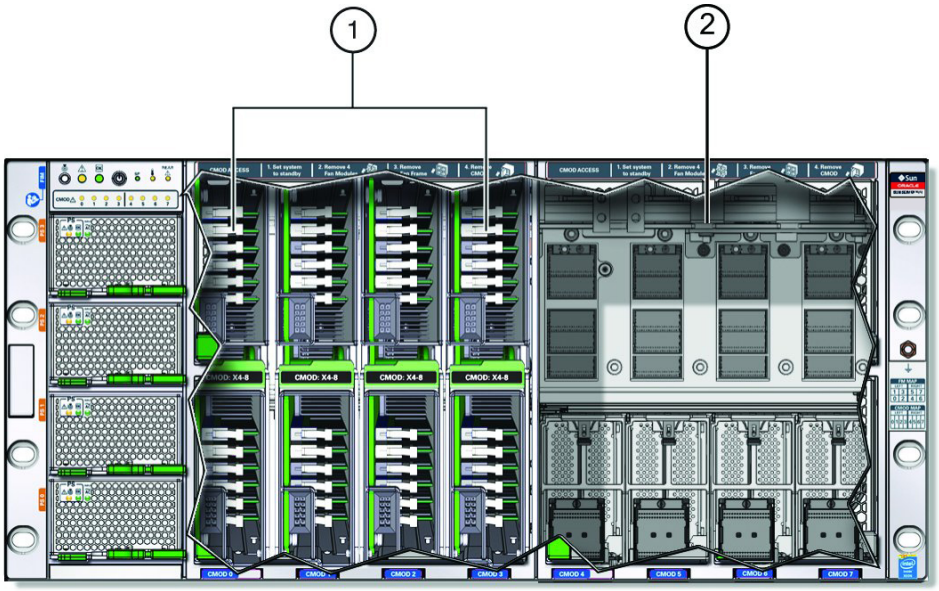
▼ Upgrade the Server from Four to Eight CMODs

If you have a server configured with four CMODs, you can expand the server's processing capabilities by upgrading the server configuration to eight CMODs.

Before You Begin Obtain the CMOD upgrade kit. The kit contains the components required to upgrade the server.

1. **Prepare the server for warm or cold service. See “Prepare the Server for Warm Service” on page 94 or “Prepare the Server for Cold Service” on page 97.**
2. **Remove all eight fan modules. See “Remove a Fan Module” on page 115.**
3. **Remove both fan frames. See “Remove a Fan Frame” on page 120.**

In a four-CPU configuration, the four CMOD slots on the right side of the server are vacant.

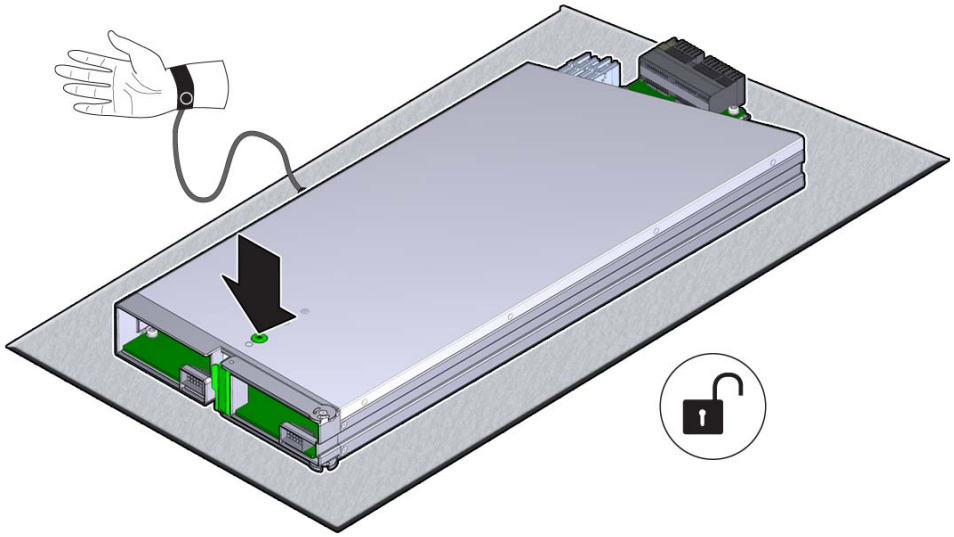


Call Out	Description
1	Four CMODs installed in left bay
2	Empty right-side bay

4. **Open each new CMOD and ensure that the DIMMs are configured correctly and properly seated in their slots:**

Caution - Component damage. CMOD components are extremely sensitive to electrostatic discharge. Wear a wrist strap and use an anti-static wrist mat.

a. **To remove the CMOD cover, press down on the green release button and slide the cover away from the front of the CMOD.**



b. **Check that all DIMMs are installed in their slots and the that the DIMM levers are in their fully upright and locked position.**

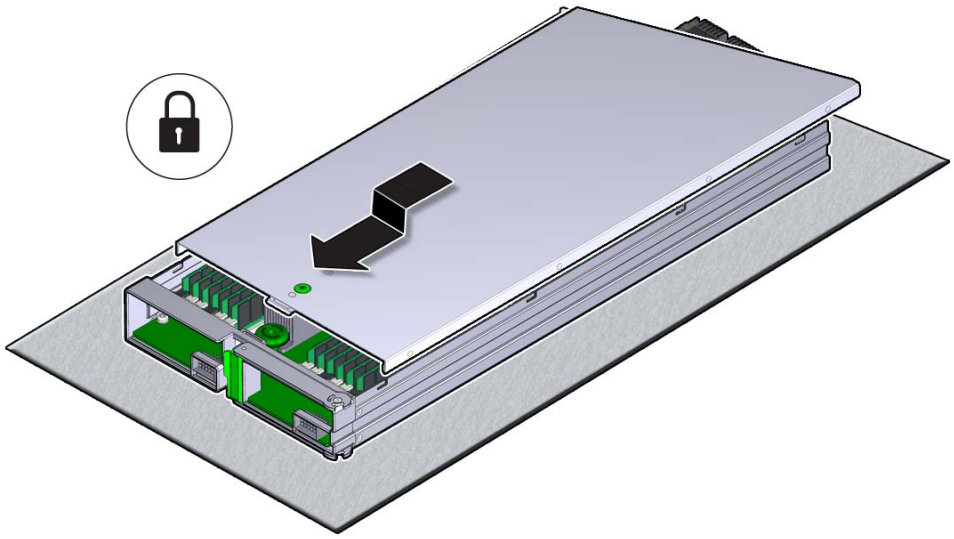
c. **Ensure that the DIMM configuration matches the other CMODs.**

For DIMM configuration information, see “Memory and DIMM Reference” on page 152.

d. **To install the CMOD cover, align the standoffs on the inside of the cover with the slots in the CMOD chassis.**

e. **Lower the cover onto the CMOD.**

This position leaves a gap between the lead edge of the cover and the front edge of the CMOD.



f. **Slide the cover toward the front of the CMOD until it locks in place.**

5. **To upgrade the server, do the following:**

   a. **Install a CMOD in the first vacant leftmost slot. See "Install a CMOD" on page 140.**

   b. **Repeat the above step for the remaining three slots.**

6. **Install both fan frames. See "Install a Fan Frame" on page 122.**

7. **Install all eight fan modules. See "Install a Fan Module" on page 118.**

Servicing Fan Modules and Fan Frames

This section includes information and procedures for servicing fan modules (FMs) and fan frames:

▼ Remove a Fan Module

Access fan modules (FMs) from the front of the server. Remove a FM to replace it when it has failed, or remove it as part of the process for accessing CMODs.

FMs are hot-service components; however, accessing CMODs is a warm or cold-service procedure. For more information, see "Remove a CMOD" on page 135.

Before You Begin

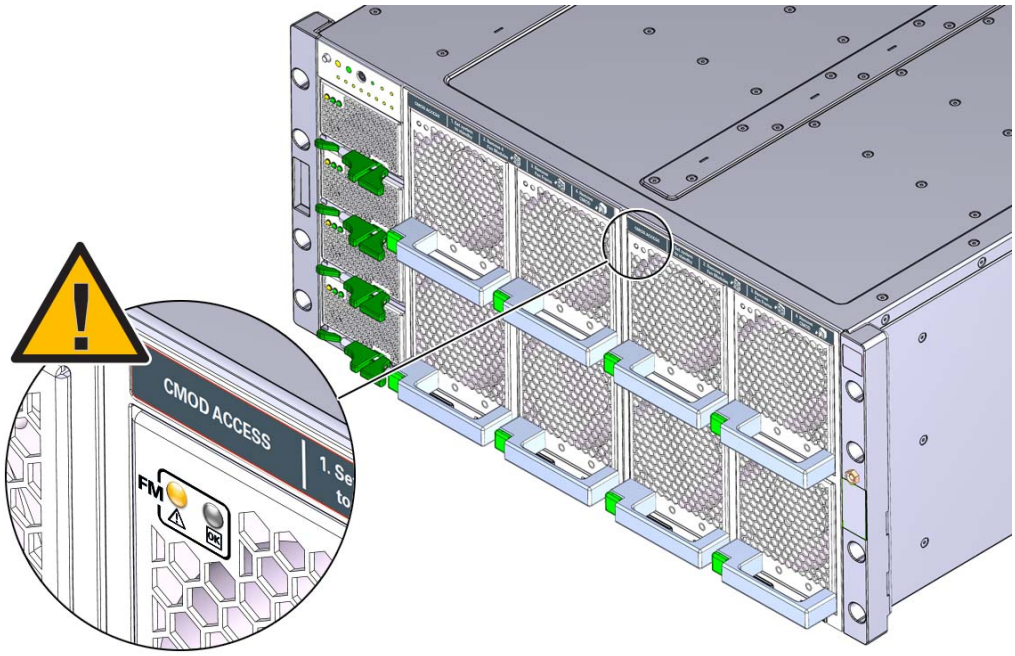
- For component information, see "About System Components" on page 19.

1. **Prepare the server for hot service. See "Prepare the Server for Hot Service" on page 93.**

   Alternatively, to prepare the server for warm or cold service, see "Prepare the Server for Cold Service" on page 97 or "Prepare the Server for Warm Service" on page 94.

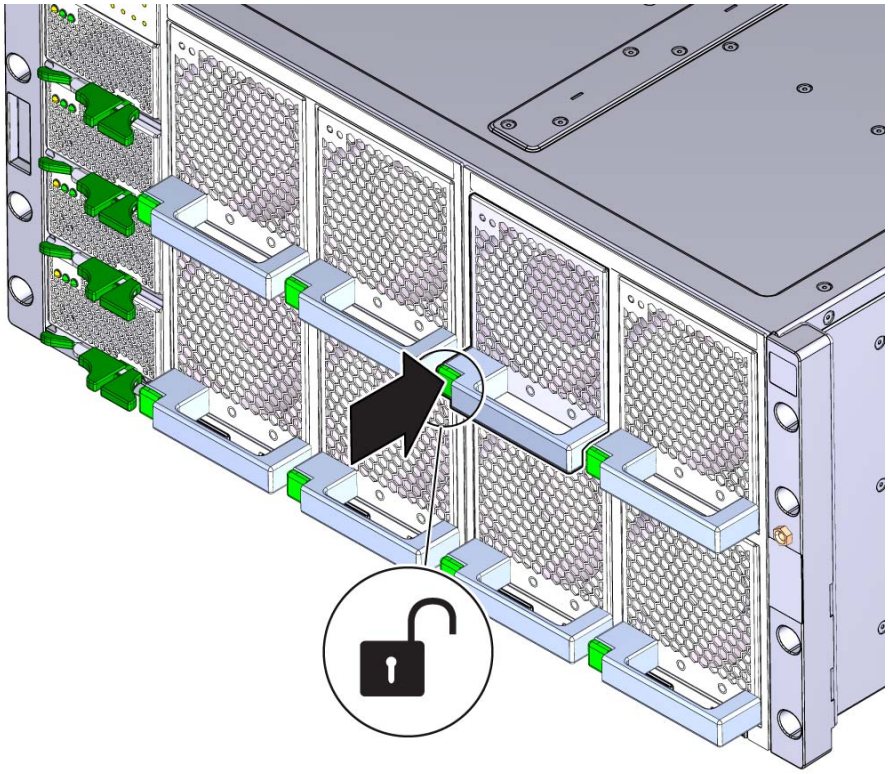
2. **Identify the fan module by its position and designation or, if it is in a failed state, by its steady on Service Action Required indicator.**

A fan in a failed state has a lit amber-color Service Action Required indicator.



3. **To unlock the fan module, push in the green release button.**

Caution - Data Loss. Do not remove more than one fan module from a column while the system is in full power mode. This action removes power from the CMODs and causes an immediate shutdown. On an eight-CMOD system, this applies to all fan modules. On a four-CMOD system, this applies to the fan modules in the left-hand fan frame.

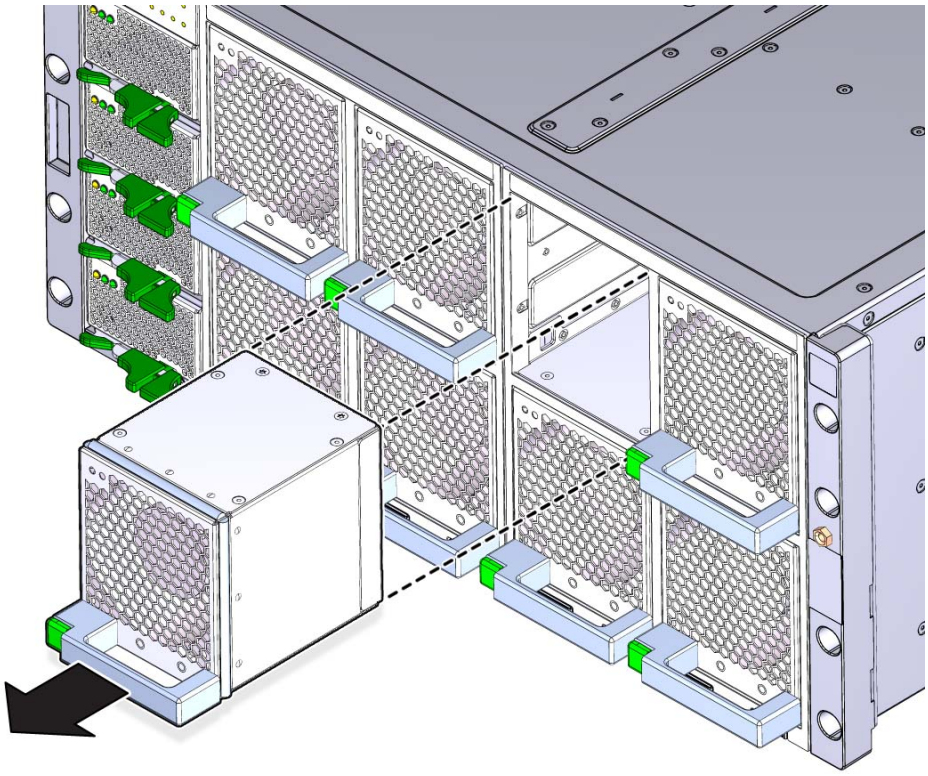


4. **To remove the fan module, pull it out of the slot.**

Caution - Electrical hazard. During a hot-service procedure, voltage is present. Do not reach into the vacant fan module slot with your hand or any object. Do not touch the exposed CMOD fan module power connector.

When the fan is removed from the slot, a hinged air vane drops down to close the slot. The vane maintains system cooling and prevents a disruption of server airflow during hot service.

Caution - Server over-temperature. The slot's air vane maintains system cooling by preventing a disruption of server airflow. Do not open the air vane when the system is running.



See Also

- “Remove a Fan Frame” on page 120
- “Install a Fan Module” on page 118

Install a Fan Module

Access this component directly from the front of the server. Use this procedure to install a replacement fan module or to install a fan module after accessing the CMODs behind it.

Before You Begin

- For component information, see “About System Components” on page 19.

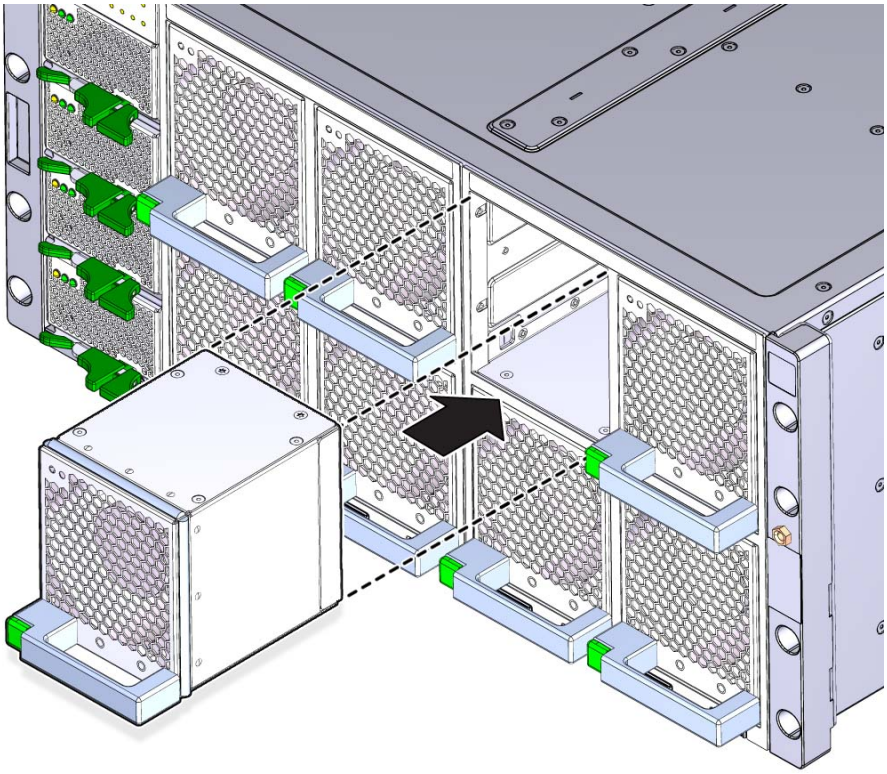
1. **Align the fan module with the slot.**

   Ensure the handle is positioned at the bottom of the slot with the green release button to the left and that the air vane for the slot swings freely.

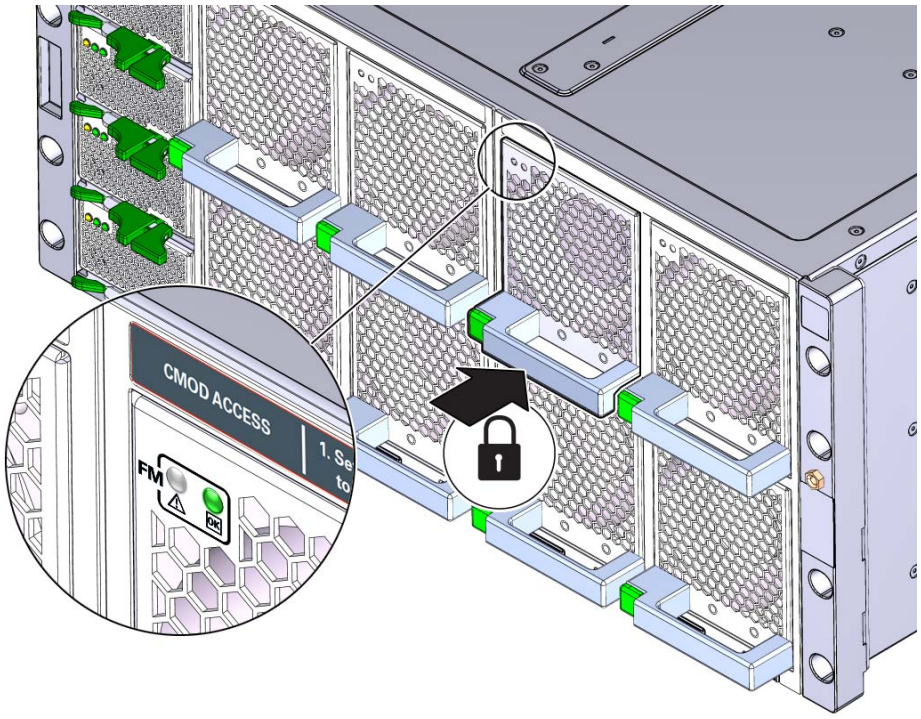
Caution - Component damage. Do not apply excessive force when sliding the fan module into the server. Ensure that the connector on the CMOD and the connector on the fan module are aligned correctly.

2. **To install the fan module, slide it into the slot until it stops and gently push it inward until the fan module locks into place.**

   The locking action is accompanied by a click sound.



3. **Verify that the green Fan OK indicator on the fan module lights and is on steady.**



▼ Remove a Fan Frame

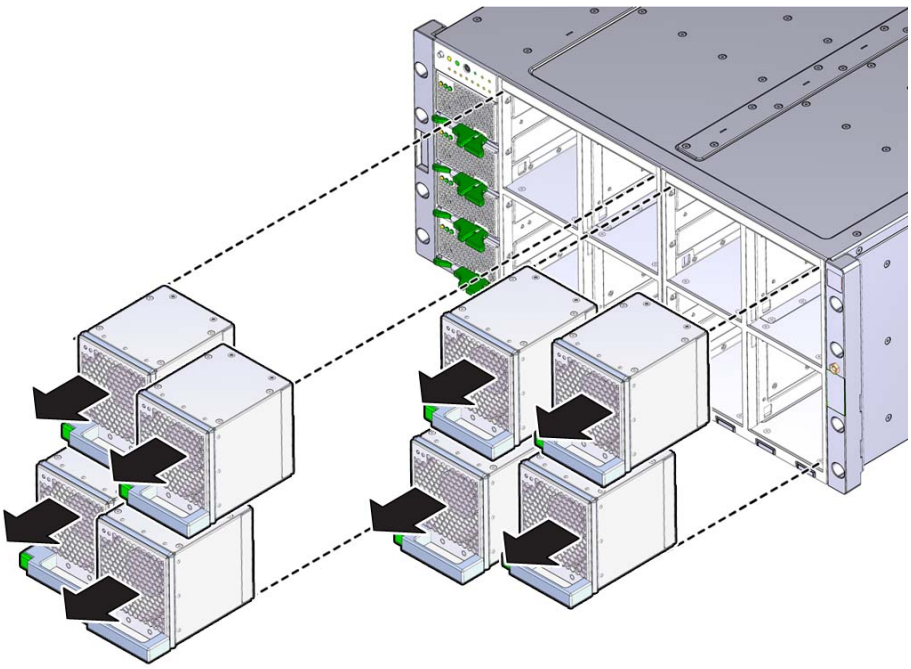
The server has two fan frames which are accessible from the front of the server. Each frame contains four fans. You need to remove the fan frame to access the CMODs behind it.

Before You Begin For component information, see "About System Components" on page 19.

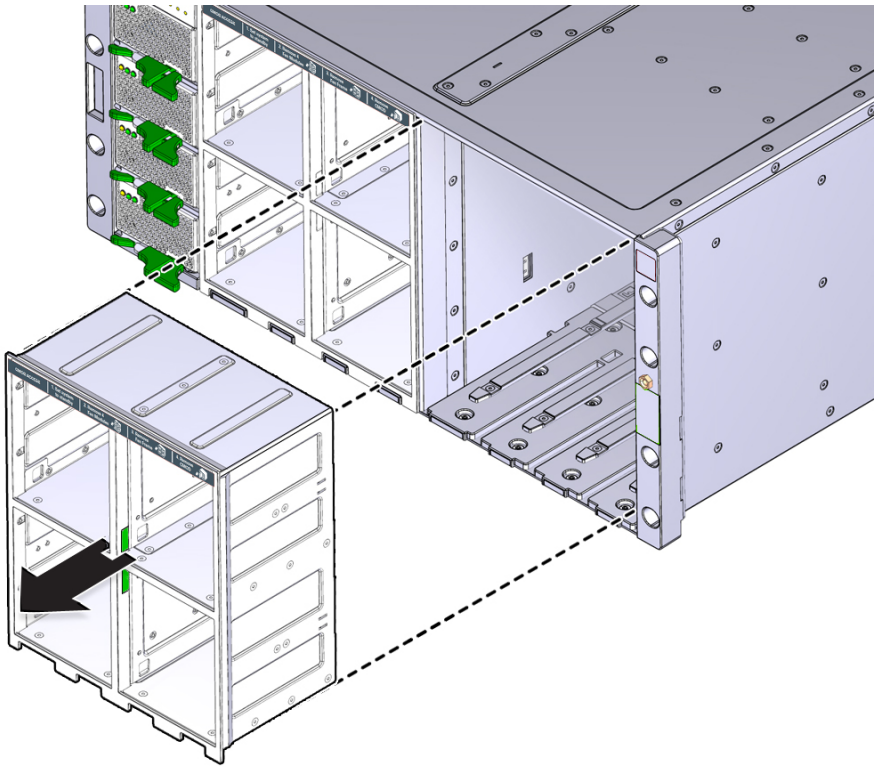
1. **Prepare the server for cold or warm service. See "Prepare the Server for Cold Service" on page 97 or "Prepare the Server for Warm Service" on page 94.**

2. **Remove the fans associated with the fan frame.**

Note - The center of the fan frame is marked with green labels. The labels indicate where to hold the frame when you want to install or remove it.



3. **To remove the fan frame, hold it by the green labels at the center of the frame and pull it out of the server.**



Next Steps

- "Remove a CMOD" on page 135

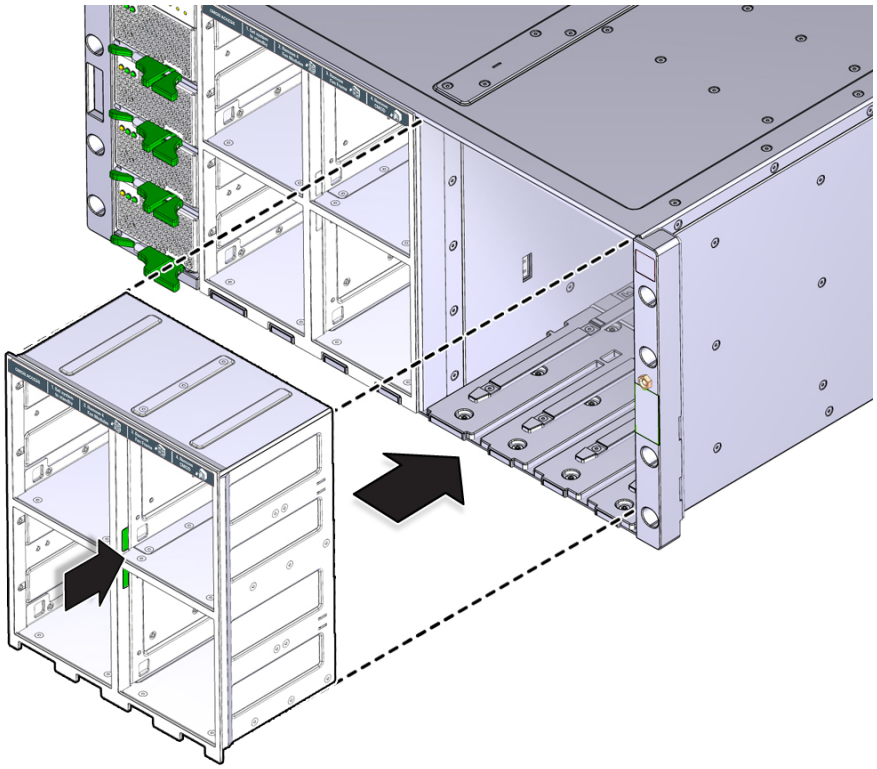
▼ Install a Fan Frame

When installing a fan frame, handle it by the green labels at the center of the frame. The two fan frames and all eight fan modules must be installed to operate both a four-CMOD and an eight-CMOD configured server.

Before You Begin

- For component information, see "About System Components" on page 19.
- For removal instructions, see "Remove a Fan Frame" on page 120.

1. **Position the fan frame at the opening in the front of the server with the air vane hinges at the top.**



Note - The center of the fan frame is marked with green labels. The labels indicate where to grab the frame when you want to install or remove it.

2. **Slide the fan fame into the server until it stops and is flush with the front of the server.**

Next Steps

- “Install a Fan Module” on page 118

Servicing Power Supply Units (PSUs)

This section contains information and procedures for servicing the power supply units (PSUs):

▼ Remove a PSU

Access this component directly from the front of the server. You might need to remove a PSU to replace it or to access the release latch for the front indicator module (FIM).

Before You Begin

- For component information, see "About System Components" on page 19.

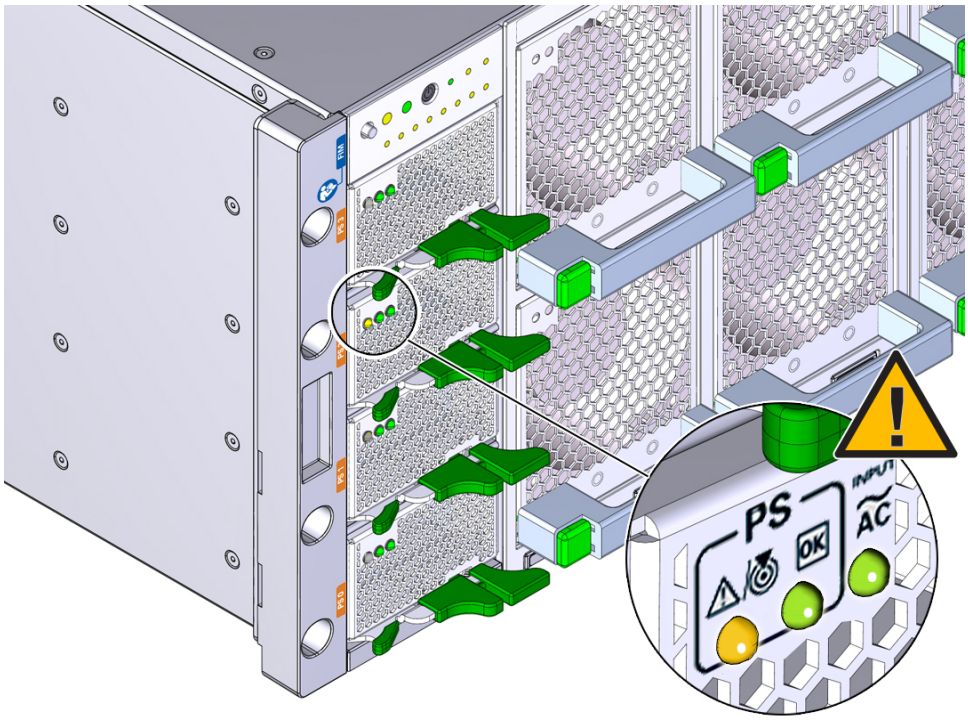
1. **Prepare the server for hot service. See "Prepare the Server for Hot Service" on page 93.**

   Alternatively, to prepare the server for cold service, see "Prepare the Server for Cold Service" on page 97.

2. **Identify the power supply by its position and designation or, if it has failed, by its steady on Service Action Required indicator.**

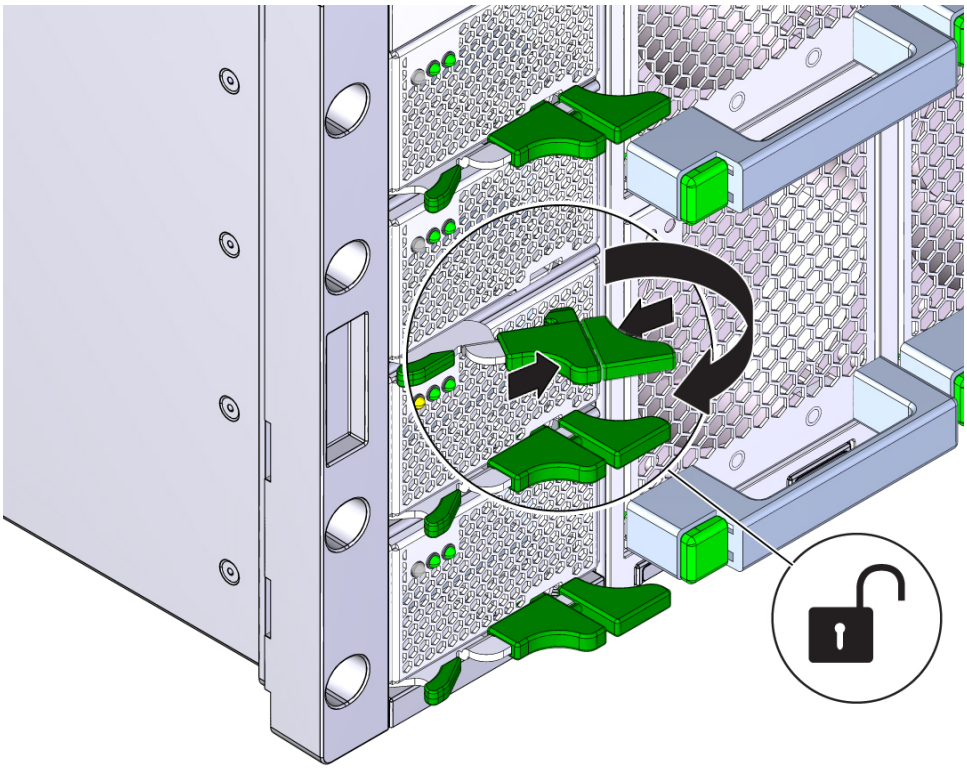
   A power supply in a fault state has a lit amber-color Service Action Required indicator.

Note - To access, the FIM release latch, you need to remove the topmost PSU.



3. **To unlock the power supply lever, squeeze together the two green release latches at the end of the lever.**

This action is accompanied by an click sound.

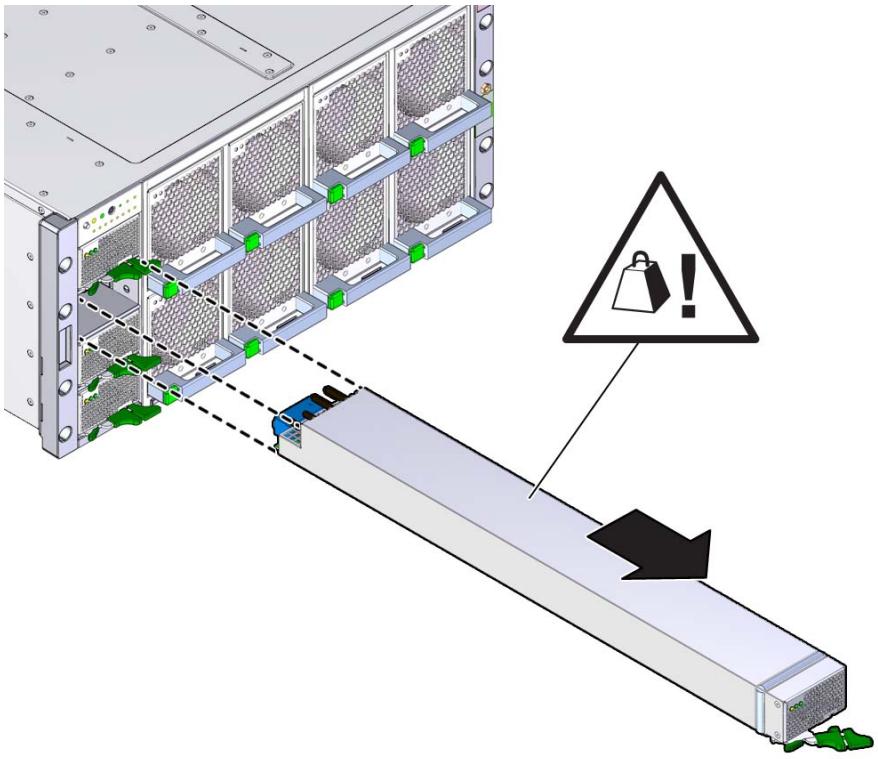


4. **To disengage the power supply from its internal connector, rotate the lever to the left.**

Caution - Pinch point. When operating the lever, keep your fingers clear of the hinged end of the lever.

The pawl at the hinged end of the lever engages the sidewall of the server and provides the pivot point for leverage to disengage the power supply. This action leaves the power supply extending partially from its slot.

5. **To remove the power supply, use two hands to slowly slide it completely out of the server.**



See Also

- “Install a PSU” on page 127
- “Returning the Server to Operation” on page 229

▼ Install a PSU

Access this component directly from the front of the server. Use this procedure when replacing a failed PSU or after having serviced the FIM.

Before You Begin

- For component information, see “About System Components” on page 19.

1. **Prepare the server for hot service. See “Prepare the Server for Hot Service” on page 93.**

   Alternatively, to prepare the server for cold service, see “Prepare the Server for Cold Service” on page 97.

2. **Ensure that the AC power cord for the power supply slot is connected and secured.**

   The power cord connects at the back of the server.

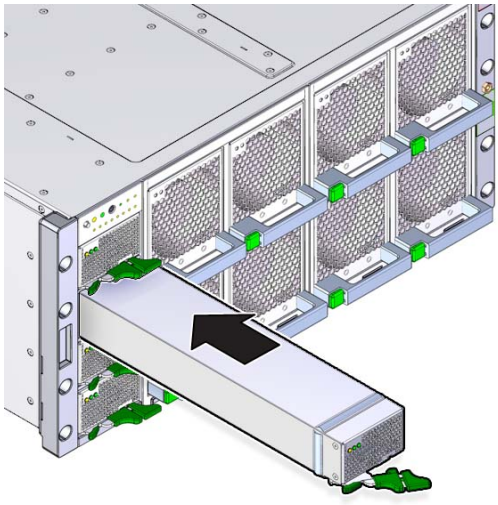
3. **Open the power supply lever. Squeeze together the two green release latches at the end of the lever and rotate the lever to the left.**

   Ensure that the power supply lever is in its fully open position.

4. **Align the power supply with its slot.**

   Ensure that the connector end of the PSU is at the opening of the slot and that the open hinge on the front of the PSU is at the bottom and to the left.

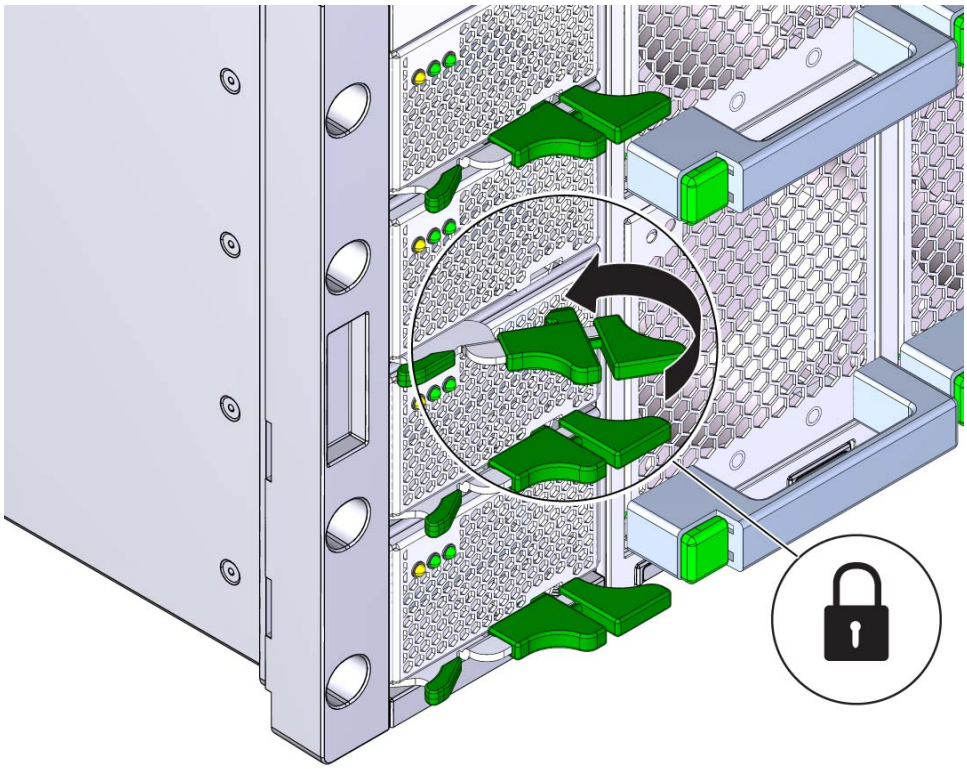
5. **Slide the power supply into the slot until it stops.**



6. **To install the power supply, rotate the lever to the right.**

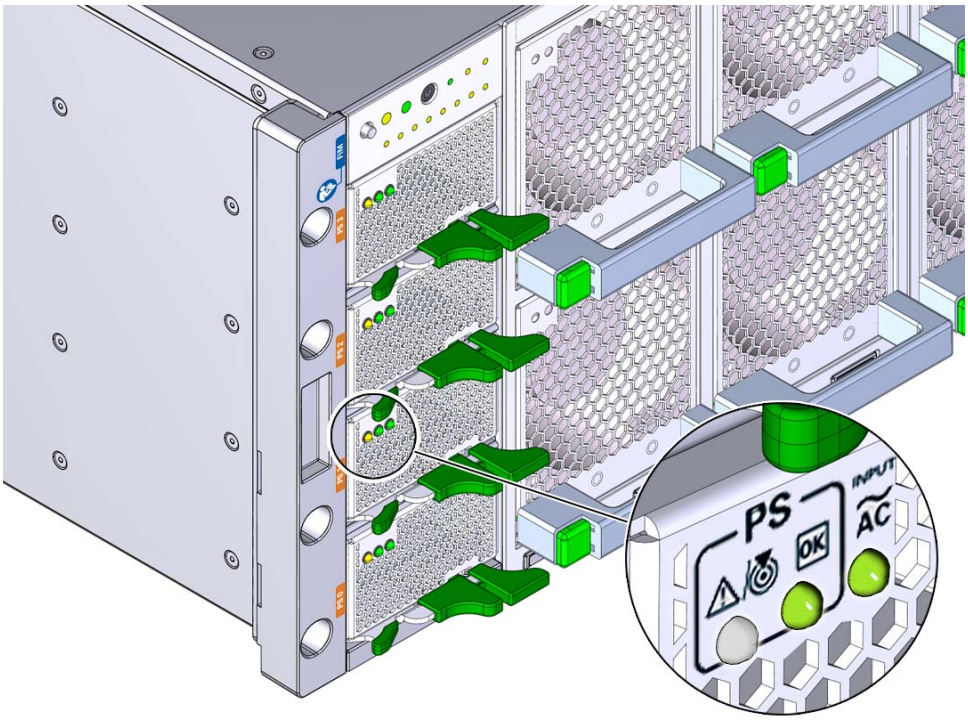
   The pawl at the hinged end of the lever engages the sidewall of the server and provides the pivot point for the leverage necessary to draw the power supply into the slot and engage the internal connector.

Caution - Pinch point. Keep your fingers clear of the backside of the lever.



7. **Verify that the green Power OK indicator on the power supply indicator panel turns on steady and that the amber Service Action Required indicator is not lit.**

The Service Action Required indicator lights when the component is in a fault state.



See Also ■ “Returning the Server to Operation” on page 229

Servicing the Front Indicator Module (FIM)

This section includes information and procedures for servicing the server front indicator module (FIM):

- “Remove the FIM” on page 131
- “Install the FIM” on page 132

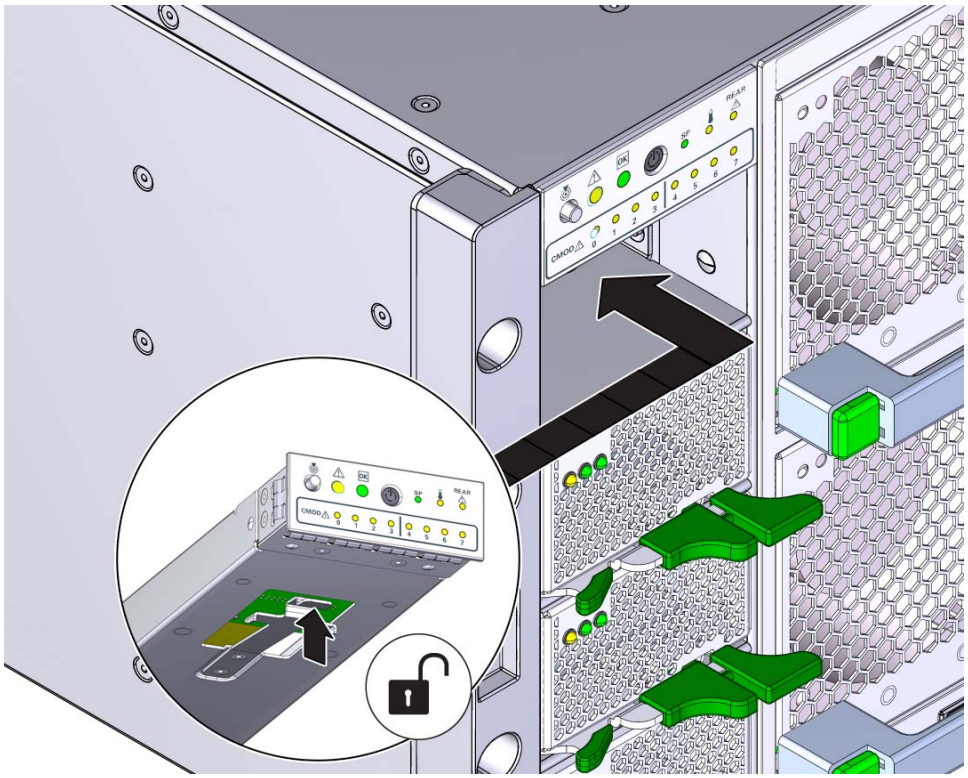
▼ Remove the FIM

Access this component directly from the front of the server. Remove the FIM when you need to replace it.

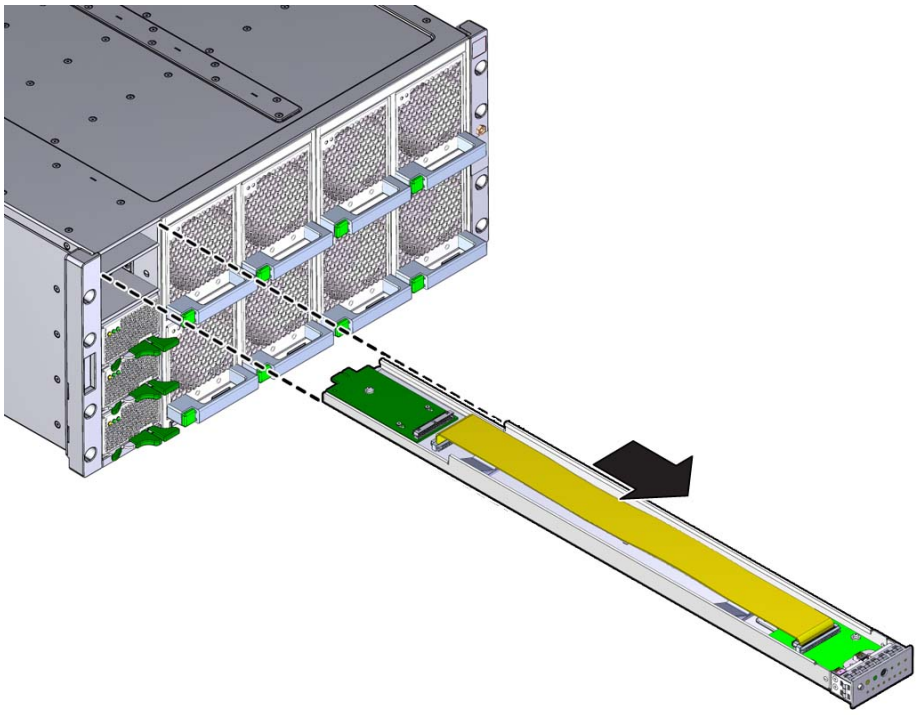
Before You Begin

- For component information, see “About System Components” on page 19.

1. **Prepare the server for cold service. See “Prepare the Server for Cold Service” on page 97.**
2. **Remove the topmost power supply (PSU 3). See “Remove a PSU” on page 124.**
3. **To unlock the FIM, reach into the vacant power supply slot, locate the release latch on the underside of the FIM, and push the latch upward.**



4. **To remove the FIM, press and hold the release latch and slide the FIM completely out of its slot.**



Next Steps

- "Install the FIM" on page 132

▼ Install the FIM

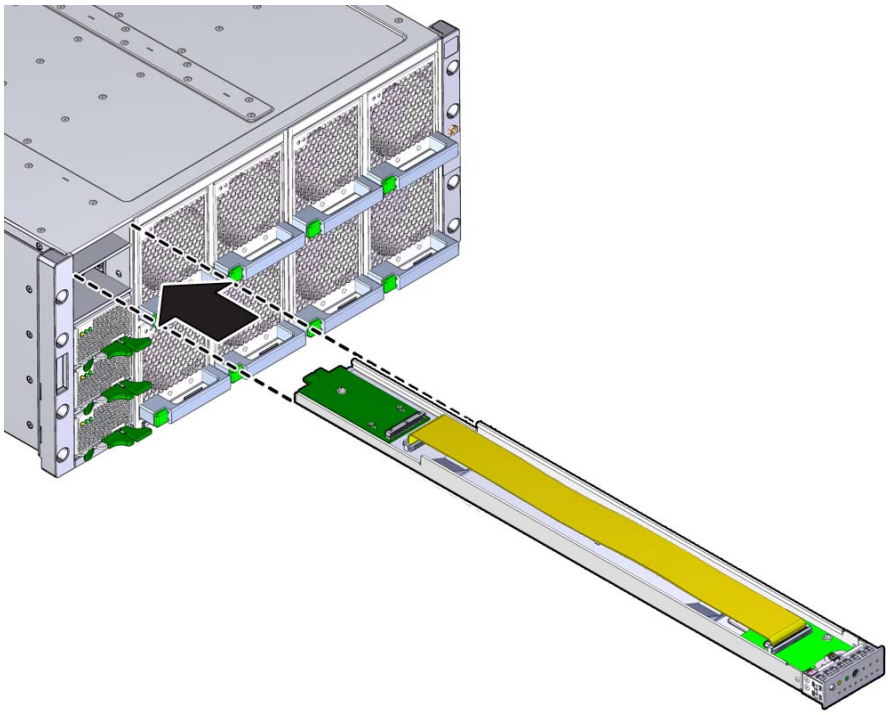
Access this component directly from the front of the server.

Before You Begin

- For component information, see "About System Components" on page 19.

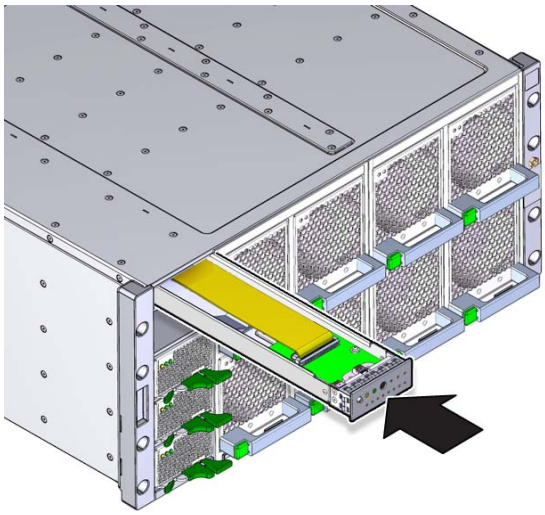
1. **Position the connector end of the FIM at the opening of the slot.**

Ensure that the open side (internal ribbon cable visible) of the FIM is facing upward.



2. **To install the FIM, slide it into the slot until it locks and is flush with the front of the server.**

This locking action is accompanied by a click sound.



3. **Install power supply, PSU 3. See “Install a PSU” on page 127.**
4. **Verify that the Power OK indicator on the PSU indicator panel turns on steady after power is supplied to the server and the server is in full power mode.**
5. **Clear any related component faults.**

See Also

- “Clear Hardware Fault Messages” on page 230

Servicing the CPU Module (CMOD) Components

This section includes information and procedures for servicing CMODs and CMOD components:

- “Install a DIMM” on page 148
- “Remove a DIMM” on page 151
- “Memory and DIMM Reference” on page 152
- “Remove a Heatsink and Processor (FRU)” on page 156
- “Install a Heatsink and Processor (FRU)” on page 167

▼ Remove a CMOD

You need to remove the CMOD to service it or its internal components.

Before You Begin For component information, see “About System Components” on page 19.

1. **Prepare the server for warm or cold service. See “Prepare the Server for Warm Service” on page 94 or “Prepare the Server for Cold Service” on page 97.**

2. **Identify which group of fan modules (left or right) to remove to access the CMOD.**

   CMODs 0-3 are in the leftmost group, and CMODs 4-7 are in the rightmost group. If you know the group, then you know which group of four fan modules to remove. If you are removing a CMOD in a failed state, the lit fault indicator for the CMOD on the FIM shows you the CMOD number and the group to which it belongs.

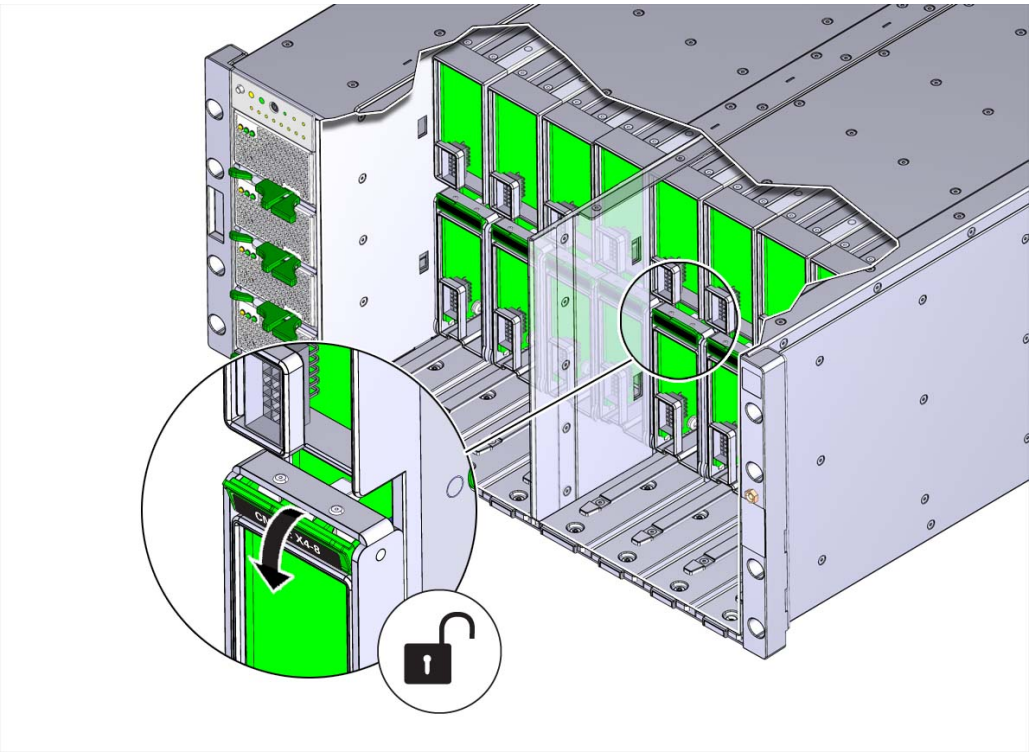
   In a four-CMOD configured server, remove the leftmost group of fans.

3. **Remove the fan modules. See “Remove a Fan Module” on page 115.**

4. **Remove the fan frame. See “Remove a Fan Frame” on page 120.**

5. **Identify the CMOD.**

6. **To unlock the CMOD, squeeze together the green tabs on the end of the CMOD lever.**

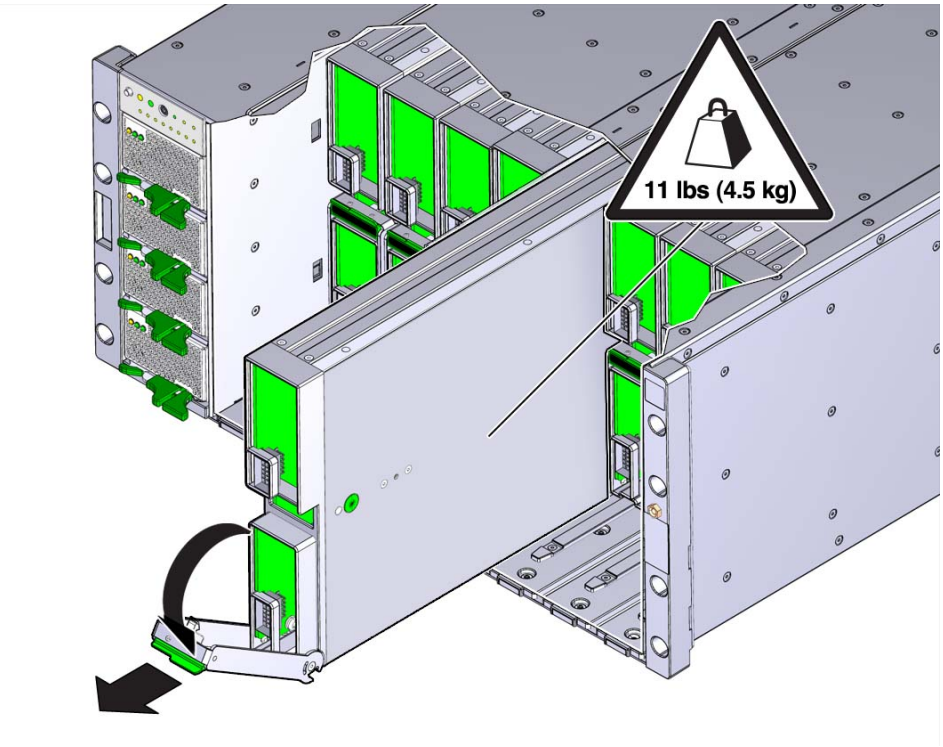


7. **To disconnect the CMOD from the connector on the midplane, rotate the CMOD lever downward and away from the CMOD.**

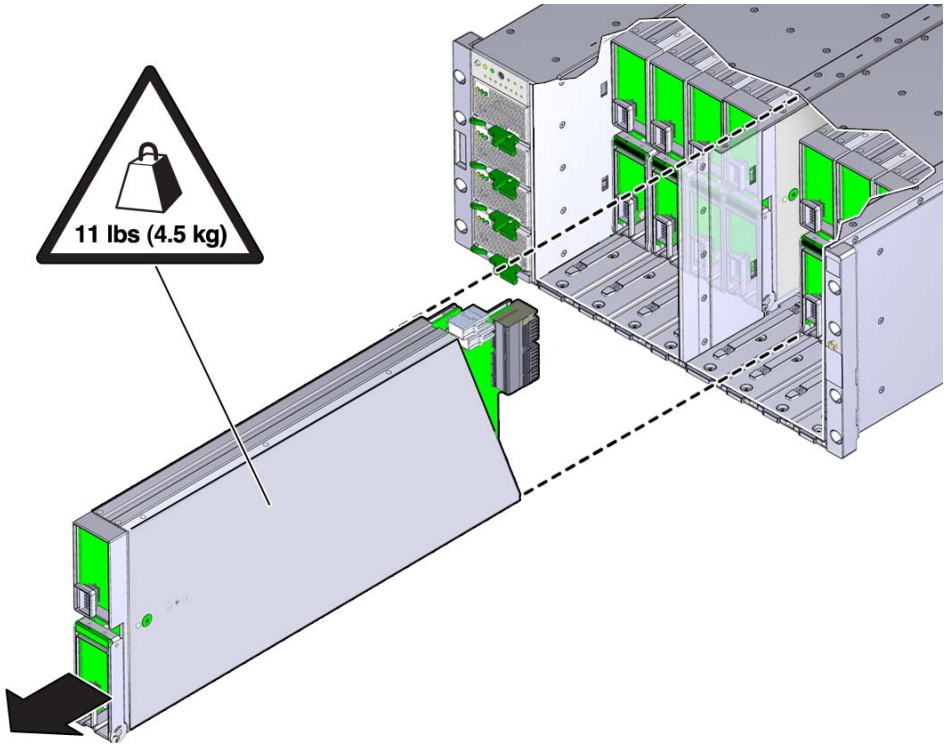
Caution - Pinch point. Keep your fingers clear of the underside of the lever.

The lever disconnects the CMOD from the midplane and its DPCC.

8. **Use the lever to slide the CMOD partially out of the server until you can grab it with both hands.**



9. **To remove the CMOD, slide it completely out of the server.**



Next Steps

- “Replace a Failed DIMM” on page 143
- “Remove a Heatsink and Processor (FRU)” on page 156

See Also

- “Install a CMOD” on page 140

▼ Remove and Install the CMOD Cover

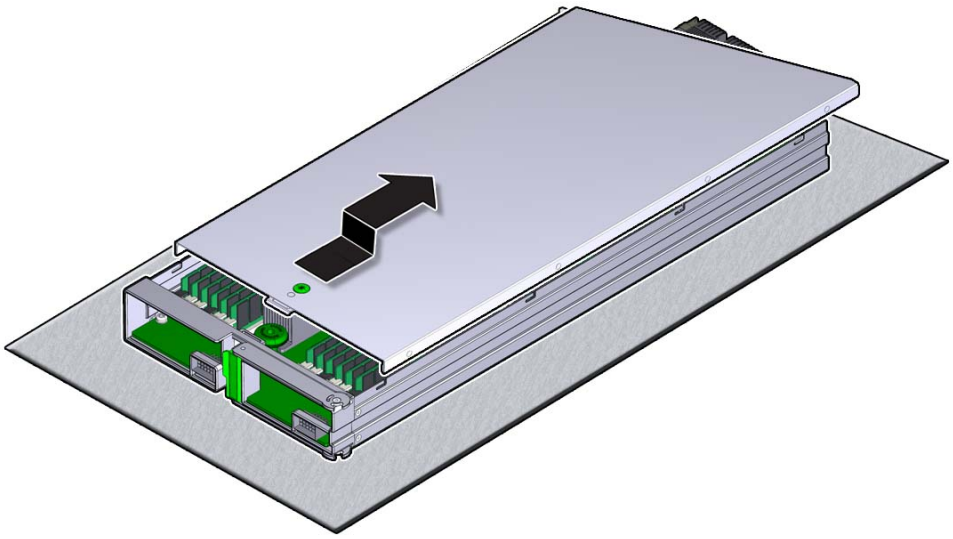
When removing or installing the CMOD cover, always maintain component serviceability requirements with regard to static protection. To protect components from damage, always use an anti static mat and wrist strap.

Before You Begin

- “Remove a CMOD” on page 135

1. **To remove the CMOD top cover, push the release button, slide the CMOD cover toward the back of the CMOD, and lift it away.**

Caution - Component damage. CMOD components are extremely sensitive to electrostatic discharge. Wear a wrist strap and use an anti-static wrist mat.

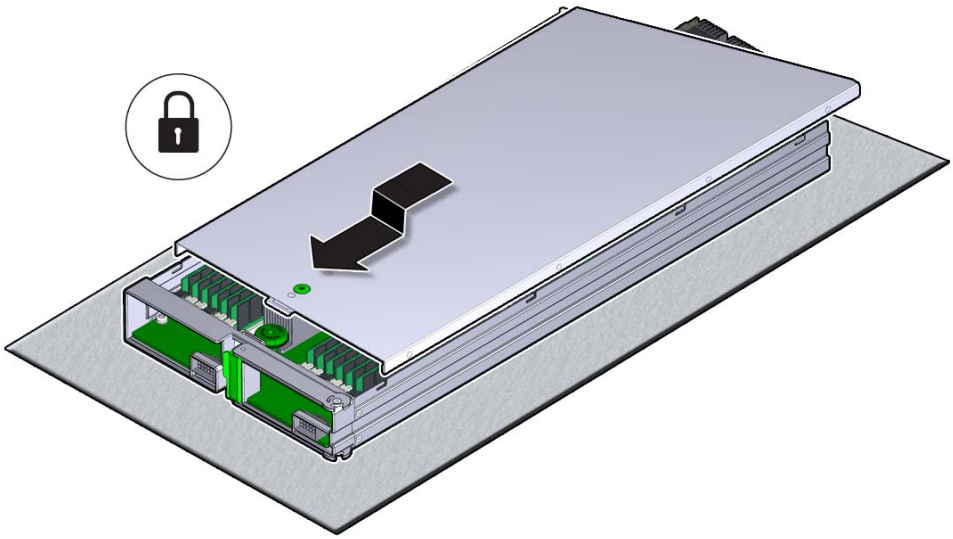


2. **To install the cover, position it over the CMOD chassis with the green button at the front.**

3. **Set the cover on the chassis, leaving a gap of approximately one inch (25 mm) between the lead edge of the cover and the front of the CMOD.**

4. **Ensure that the edges of the cover encapsulate the edges of the chassis, and that the pins in the cover are aligned with the slots in the chassis sidewall.**

5. **Slide the cover toward the front of the CMOD until it locks into place.**



This action is accompanied by a click sound.

▼ Install a CMOD

Use this procedure to install a CMOD after replacing it or after servicing its internal components.

Before You Begin

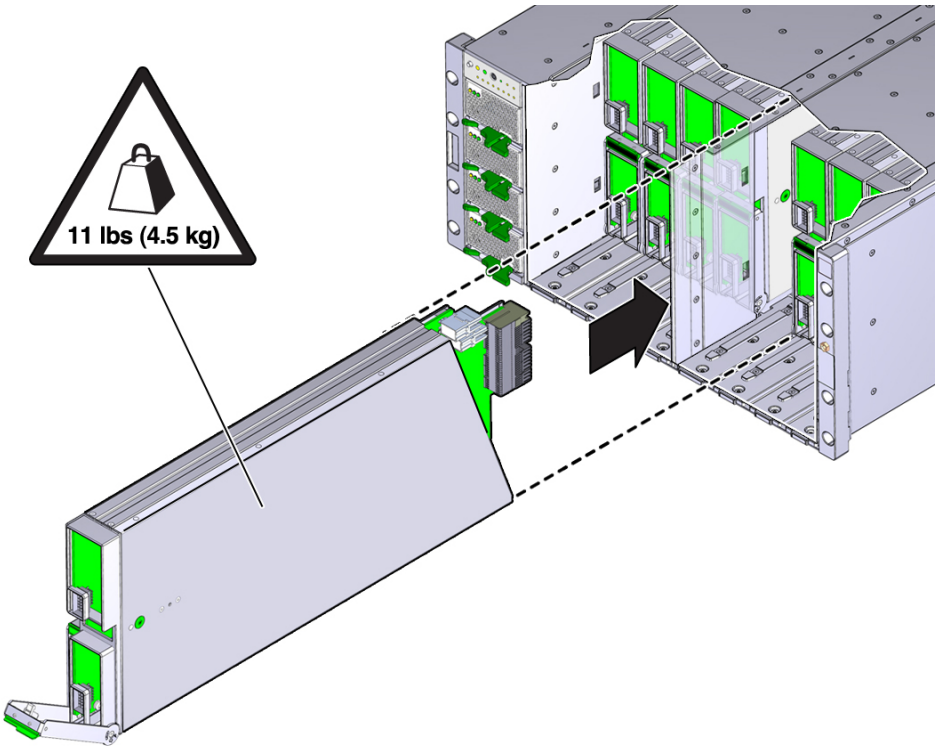
- "Remove a CMOD" on page 135.
- For component information, see "About System Components" on page 19.

1. **Ensure that the CMOD lever is in the fully-open position.**

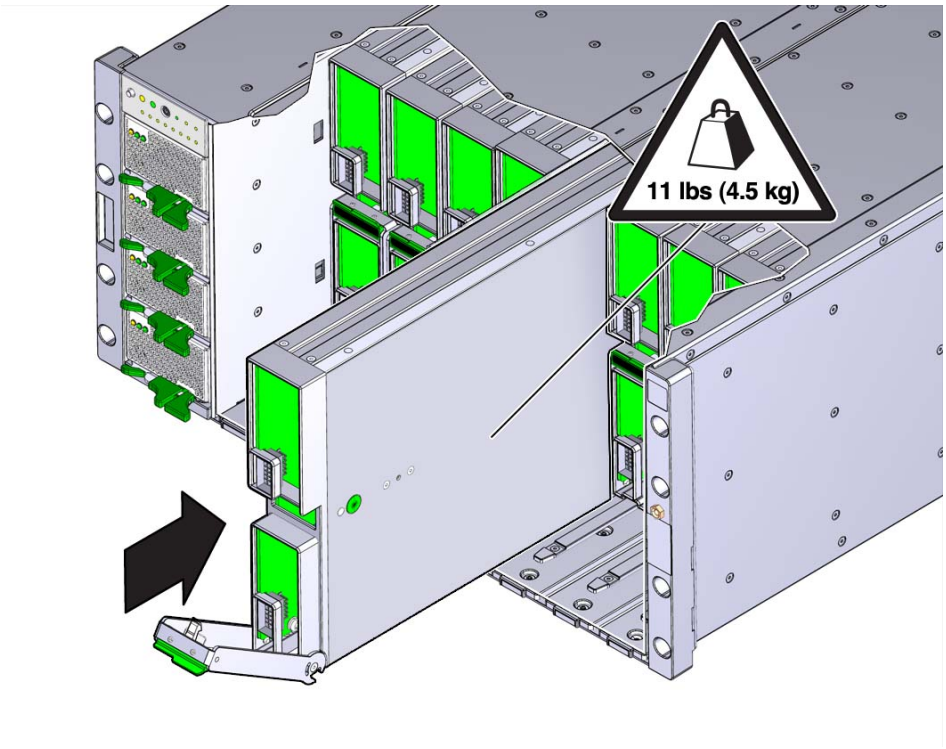
   a. **Squeeze together the green tabs on the end of the lever.**

   b. **Rotate the lever downward and away from the CMOD.**

2. Position the CMOD in the slot.



3. **On the front-facing side, ensure that the hinge for the lever is at the bottom.**



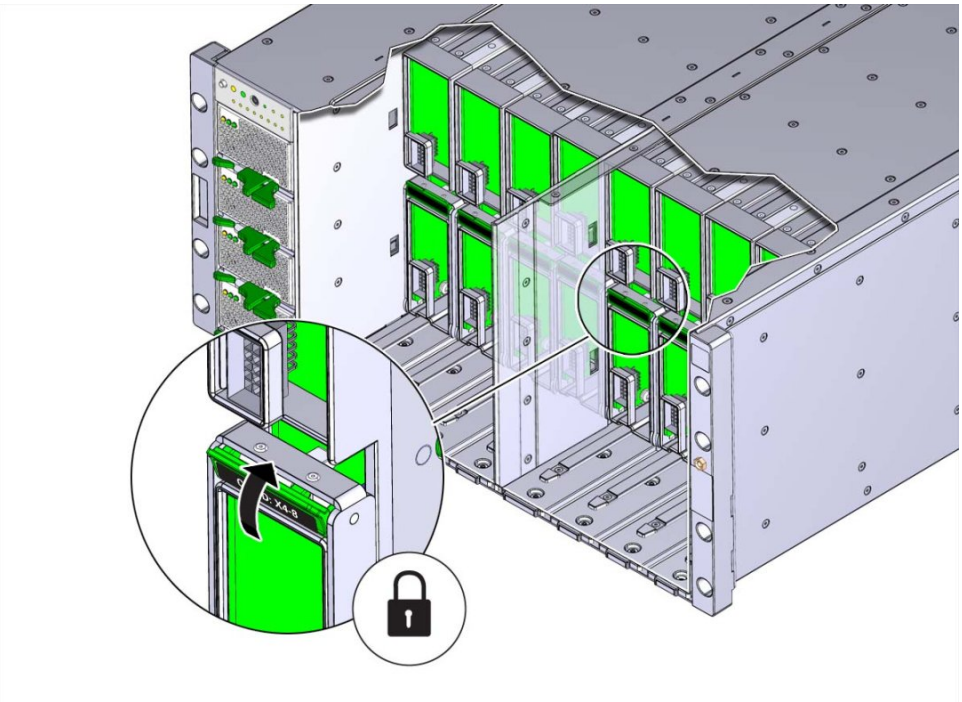
4. **Slide the CMOD into the slot until it stops.**

   In this position, the pawl at the lever hinge is aligned with the slot in the server.

5. **To install the CMOD, rotate the lever upward until it locks into place and is flush with the front of the CMOD.**

Caution - Pinch point. When operating the lever, keep your fingers clear of the back side and hinged end of the lever.

The action of rotating the lever upward draws the CMOD into the slot and engages the CMOD connector with the connector on the midplane.



6. **Install the fan frame. See “Install a Fan Frame” on page 122.**
7. **Install the four fan modules. See “Install a Fan Module” on page 118.**
8. **Prepare the server for operation. See “Returning the Server to Operation” on page 229.**

▼ Replace a Failed DIMM

This procedure uses the DIMM fault remind test circuit in the CMOD to identify the failed DIMM. The circuit is a charged, time-limited circuit. Once power is removed from the server you have 10 minutes to use the circuit.

Use this procedure to replace or reset a DIMM.

Before You Begin

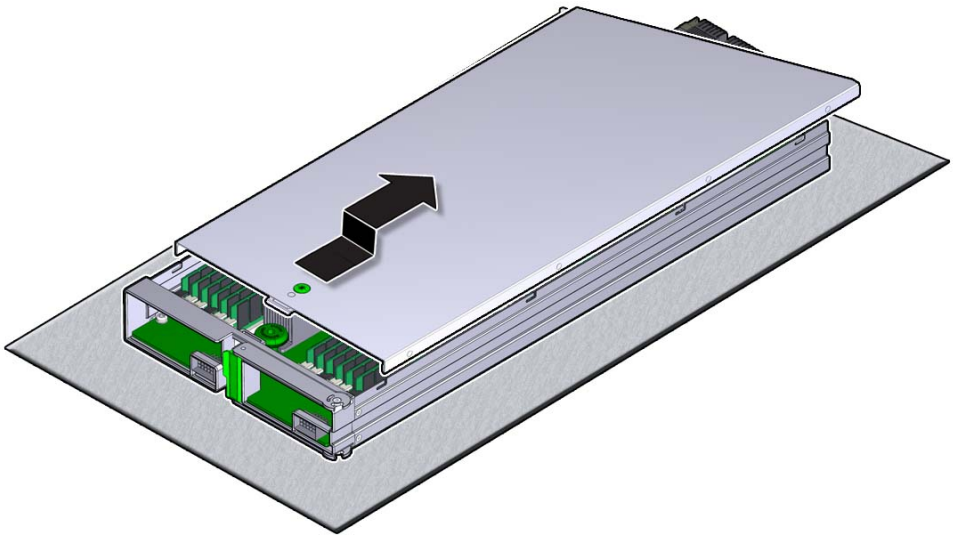
- For component information, see “About System Components” on page 19.
- Use Oracle ILOM to identify the location of the failed DIMM and obtain CMOD designation information.

Tip - For an overview video about replacing a failed DIMM, see Replacing DIMMs.

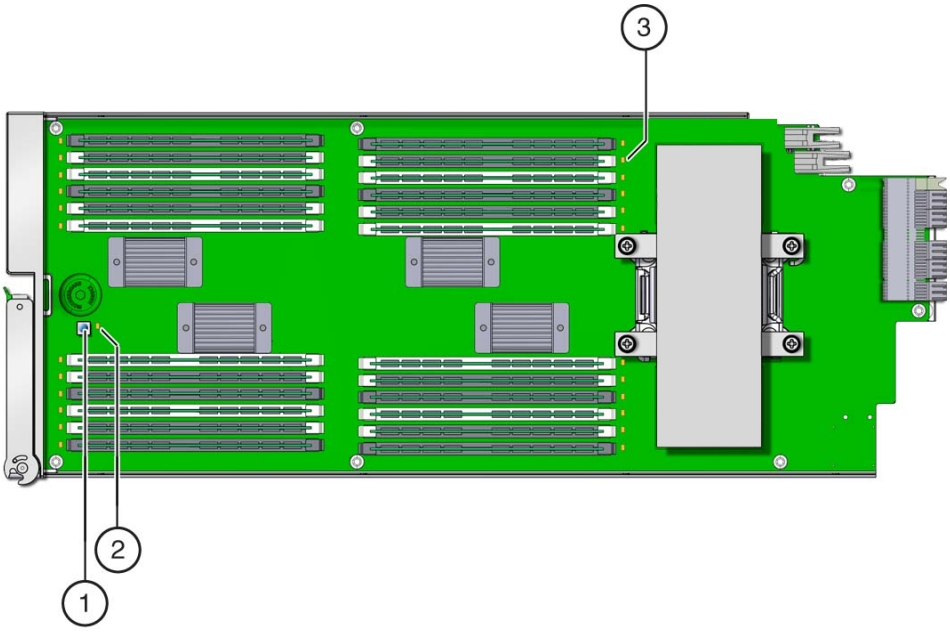
1. **Prepare the server for warm or cold service. See “Prepare the Server for Warm Service” on page 94 or “Prepare the Server for Cold Service” on page 97.**
2. **Remove the CMOD that contains the failed DIMM. See “Remove a CMOD” on page 135.**
3. **To remove the CMOD top cover, push the release button, slide the CMOD cover toward the back of the CMOD, and lift it away.**

Caution - Component damage. CMOD components are extremely sensitive to electrostatic discharge. Wear a wrist strap and use an anti-static wrist mat.

See “Remove and Install the CMOD Cover” on page 138.



4. **To locate the failed DIMM, press and hold the Fault Remind button [1].**



Call Out	Description
1	Fault Remind button
2	Fault Remind Power indicator
3	DIMM slot fault indicator (one for each slot)

5. **Verify that the green Fault Remind Power indicator [2] is lit.**

   The Charge Status indicator [2] lights if the Fault Remind circuit is operational.

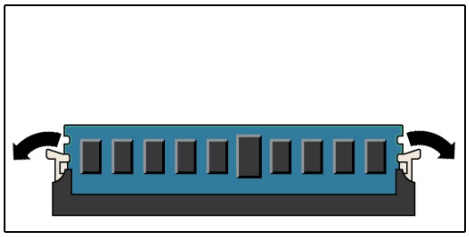
   The Fault Remind circuit remains charged for about 10 minutes after power is removed from the CMOD, either by disconnecting power from the server, or by removing the CMOD from the chassis. When you press the Fault Remind button, the Charge Status indicator lights if there is enough power to use the fault remind circuit. Otherwise it remains dark.

6. **With the Fault Remind button pressed, look for a lit DIMM fault indicator [3].**

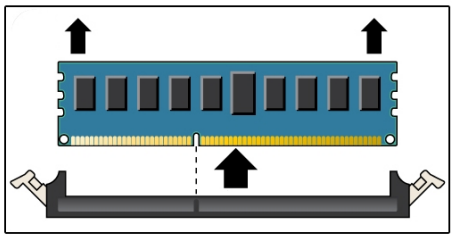
   The indicators are located next to the DIMM slots.

7. **To remove the failed DIMM from its slot, simultaneously rotate the two DIMM slot levers outward to their fully open position.**

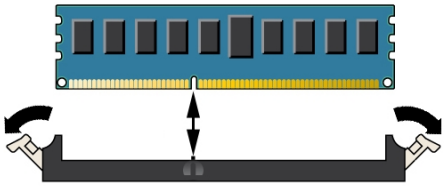
   This action extracts the DIMM from its connector.



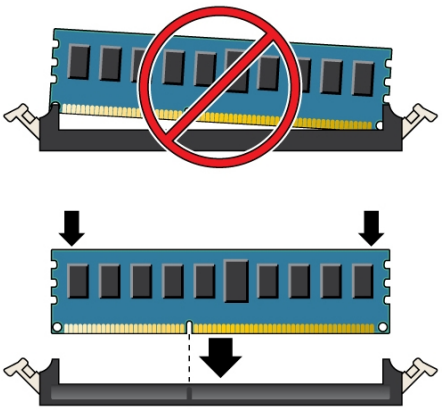
8. **Remove the DIMM from the CMOD.**



9. **To align the replacement DIMM in the slot, ensure that the notch on the DIMM connector edge lines up with the key in the DIMM slot.**



10. **To install the DIMM in the slot, simultaneously press down on both edges of the DIMM, so the DIMM enters the slot evenly.**



This action forces the DIMM into the slot and causes the two slot levers to rise and lock the DIMM in the slot.

11. **Verify that the DIMM sits evenly in the slot and is locked.**
Both levers should be in their fully closed and vertical position. In this position, the levers lock the DIMM in the slot.

12. **To align the CMOD cover, position it over the CMOD with the lip end of the cover toward the front of the CMOD.**

13. **Set the cover on the CMOD so that the edges of the cover encapsulate the edges of the CMOD.**
When correctly seated, the cover extends slightly over the back end of the CMOD.

14. **To lock the cover, slide it toward the front of the CMOD until it locks into place.**

    This action is accompanied by an audible click.

Next Steps

- “Install a CMOD” on page 140

▼ Install a DIMM

Use this procedure to install DIMMs for a memory upgrade or a configuration change or as part of a DIMM reset (removal and installation).

Before You Begin

- For component information, see “About System Components” on page 19.
- “Remove a DIMM” on page 151

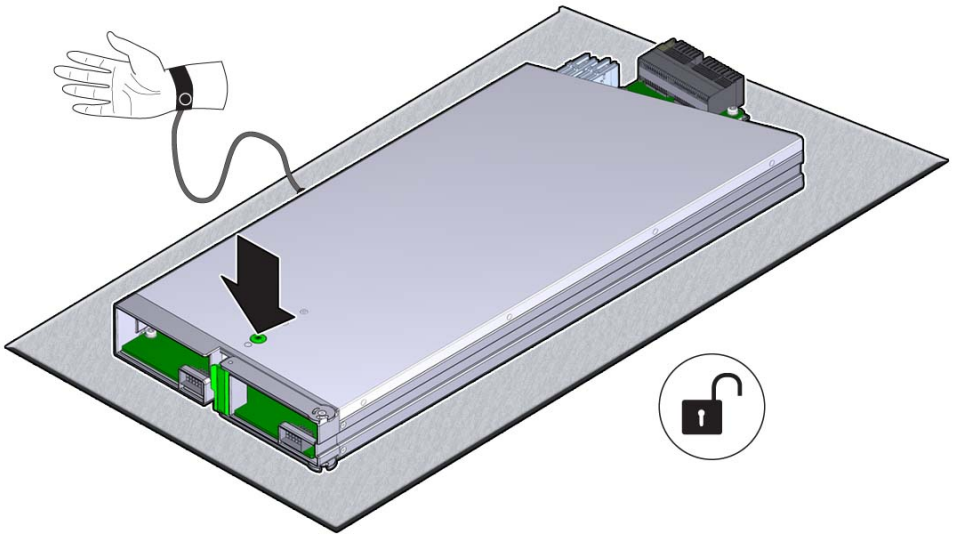
1. **Prepare the server for warm or cold service. See “Prepare the Server for Warm Service” on page 94 or “Prepare the Server for Cold Service” on page 97.**

2. **Remove the CMOD. See “Remove a CMOD” on page 135.**

3. **To remove the CMOD top cover, push the release button, slide the CMOD cover toward the back of the CMOD, and lift it away.**

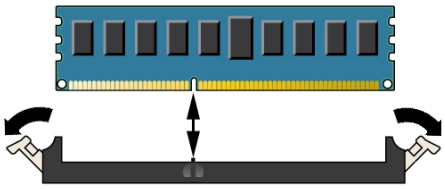
   See “Remove and Install the CMOD Cover” on page 138.

Caution - Component damage. CMOD components are extremely sensitive to electrostatic discharge. Wear a wrist strap and use an anti-static wrist mat.



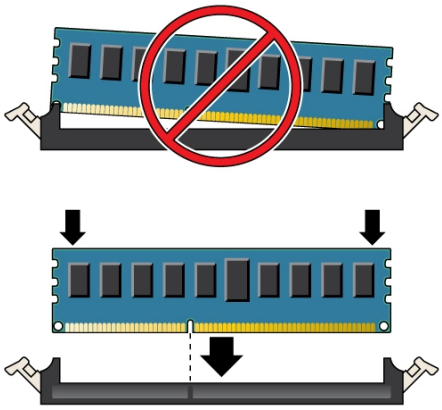
4. **Locate the DIMM slot.**

5. **To align the DIMM in the slot, ensure that the notch on the DIMM connector lines up with the key in the DIMM slot.**



6. **To install the DIMM in the slot, simultaneously press down on both edges of the DIMM.**

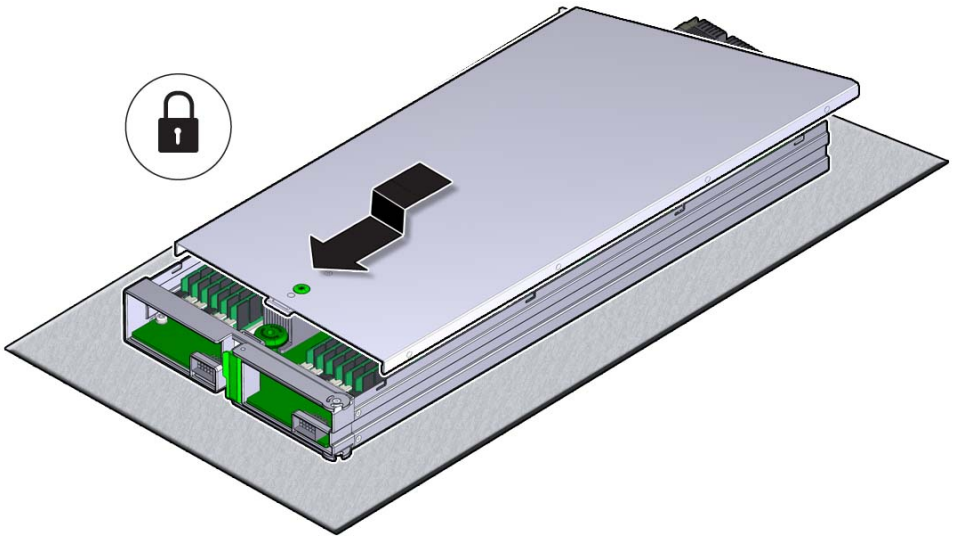
This action forces the DIMM into the slot and causes the two slot levers to rise and lock the DIMM in the slot.



7. **Verify that the DIMM sits evenly in the slot and is locked.**

   Both levers should be in their fully closed and vertical position. In this position the levers lock the DIMM in the slot.

8. **Install the CMOD cover. See “Remove and Install the CMOD Cover” on page 138.**



Next Steps ■ “Install a CMOD” on page 140

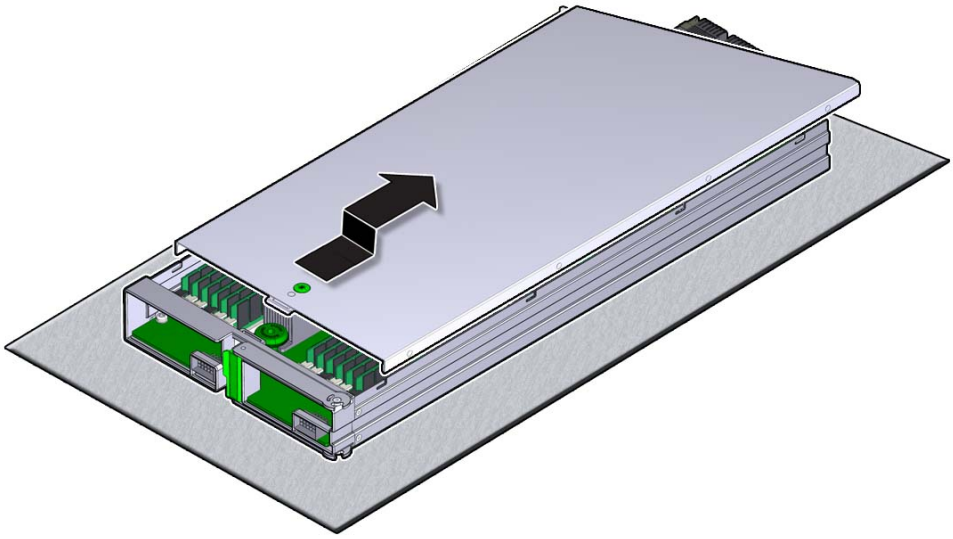
▼ Remove a DIMM

Use this procedure to remove DIMMs for a memory upgrade or a configuration change or when you need to physically reset a DIMM in its slot (removal and installation). For replacing a failed DIMM, see “Replace a Failed DIMM” on page 143.

For component information, see “About System Components” on page 19.

1. **Prepare the server for warm or cold service. See “Prepare the Server for Warm Service” on page 94 or “Prepare the Server for Cold Service” on page 97.**
2. **Remove the CMOD. See “Remove a CMOD” on page 135.**
3. **To remove the CMOD top cover, push the release button, slide the CMOD cover toward the back of the CMOD, and lift it away.**
   See “Remove and Install the CMOD Cover” on page 138.

Caution - Component damage. CMOD components are extremely sensitive to electrostatic discharge. Wear a wrist strap and use an anti-static wrist mat.



4. **To locate the DIMM slot, use the DIMM designation information.**

5. **To remove the failed DIMM from its slot, simultaneously rotate the two DIMM slot levers outward to their fully open position.**

   This action extracts the DIMM from its connector.

6. **Remove the DIMM from the CMOD.**

Next Steps

- “Install a DIMM” on page 148
- “Install a CMOD” on page 140

Memory and DIMM Reference

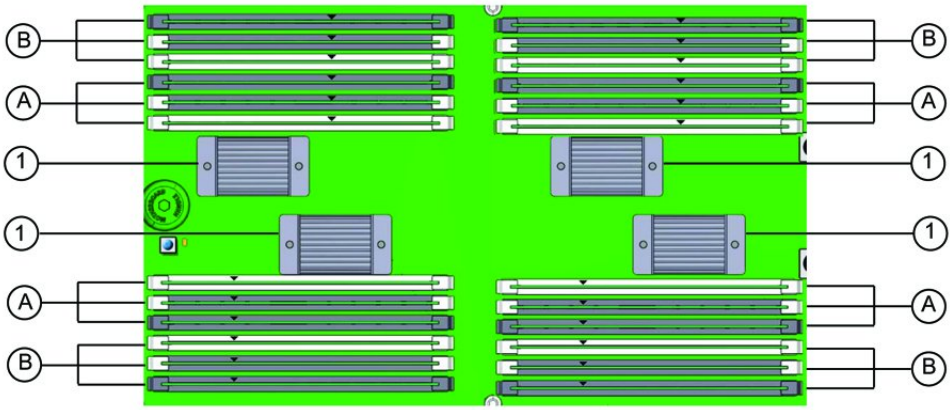
This section includes the following information about memory, DIMMs, and DIMM population:

DIMM Specifics

- Supported DIMM speeds: 1333 and 1600 MHz.
- All supported DIMMs, regardless of speed rating, operate at 1333MHz.
- Mixing of different size memory within one CMOD is not allowed (see “DIMM Rules” on page 155).
- Mixing of LVDIMM and LRDIMM in the same chassis is not allowed.

Memory Buffers and Channels

Each CMOD contains 24 DIMM slots arranged in four groups of six slots. Each group of slots is controlled by one of the four memory buffers. Each buffer has two independent memory channels, A and B (eight memory channels per CMOD). Each channel supports 1-3 DIMMs and has three assigned DIMM slots. The following illustration shows the location of the memory buffers, the groups of DIMM slots, and the slots assigned to each channel.



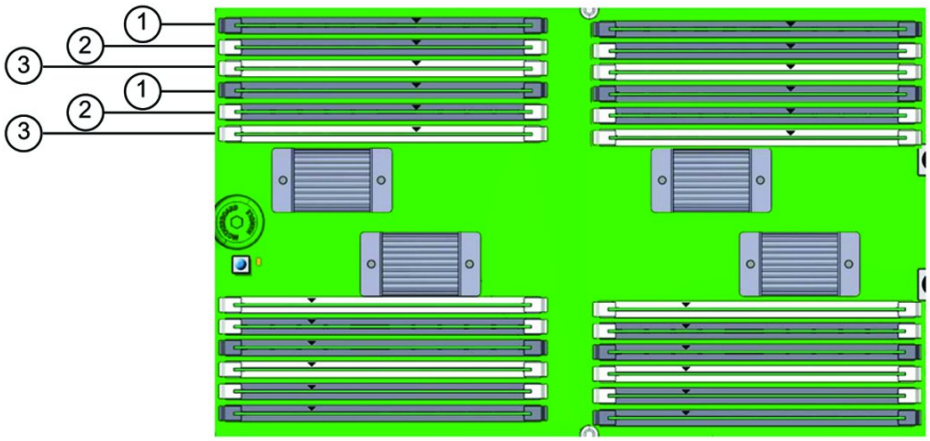
Call Out	Description
1	Memory buffers
A	DIMM slots assigned to channel A
B	DIMM slots assigned to channel B

DIMM Slot Numbering and Color Coding

For slot numbering information see “Memory Slot Designations” on page 26.

To differentiate the two memory channels within a group of slots, and to assist in DIMM population order, the three DIMM slots assigned to each channel have color-coded slots and levers. The color-coding is black slots with black levers, black slots with white levers, and white slots with white levers.

The following illustration shows the color code pattern for DIMM slots within one group of slots. The pattern is repeated for all groups of slots.



Call Out	Description
1	Black slots with black levers
2	Black slots with white levers
3	White slots with white levers

DIMM Rules

The DIMM installation rule aims to maximize the memory bandwidth available by spreading the memory across all eight memory channels.

When installing DIMMs, consider the following rules:

- All DIMMs in a system should be the same type and size.
- All CMODs should be populated identically.
- The minimum DIMM configuration as shipped from the factory is four 16 GB DIMMs in each CMOD, installed is slots D0, D6, D12 and D18.

  An upgrade of four DIMMs for each CMOD is allowed in this configuration by installing four DIMMs in slots D3, D9, D15 and D21.
- Aside from an upgrade to the minimum shipped configuration (stated above), DIMMs must be added to each CMOD in sets of eight (one for each memory buffer channel). Add eight DIMMs to each CMOD starting with CMOD 0 and ending with CMOD 3 (four-CMOD configuration) or CMOD 7 (eight-CMOD configuration). After all CMODs are populated, go back to CMOD 0 and repeat the sequence adding the next set of eight to each CMOD.

  For example: CMOD 0 gets the initial eight DIMMs, followed by CMOD 1 with the next eight DIMMs, continuing with all CMODs in the configuration. When 32 DIMMs (4-CMOD) or 64 DIMMs (8-CMOD) have been added across all CMODs in the configuration, go back to CMOD 0 for the next set of eight and continue this population pattern.
- Each CMOD must only contain one size of DIMM. Mixing of different size memory within a CMOD is not allowed; however, size mixing between CMODs is allowed.
- Mixing of LVDIMM and LRDIMM in the same chassis is not allowed.

DIMM Slot Population Order

The DIMM slot population order is as follows:

Note - Always populate the DIMM slot furthest from the memory buffer first.

1. Populate the slots with black slots and black levers: D0, D3, D6, D9, D12, D15, D18, D21

   The slot population for the minimum DIMM configuration is D0/D6/D12/D18 per CMOD
2. Populate the slots with black slots and white levers: D1, D4, D7, D10, D13, D16, D19, D22
3. Populate the white slot, white lever slots: D2, D5, D8, D11, D14, D17, D20, D23

▼ Remove a Heatsink and Processor (FRU)

Heatsinks and processors are field-replaceable units (FRUs) and must be serviced by an Oracle Service person.

This procedure uses the CPU fault remind test circuit. The circuit is a charged, time-limited circuit. Once power is removed from the server, you have 10 minutes to use the circuit.

Before You Begin

For component information, see “About System Components” on page 19.

- Obtain a Phillips screwdriver and an anti-static wrist strap.
- This procedure requires the use of the CPU Replacement tool (part number: 7080240). A tool is shipped with replacement CPUs.

Tip - For an overview video on using the CPU replacement tool, see Replacing a Heatsink and CPU.

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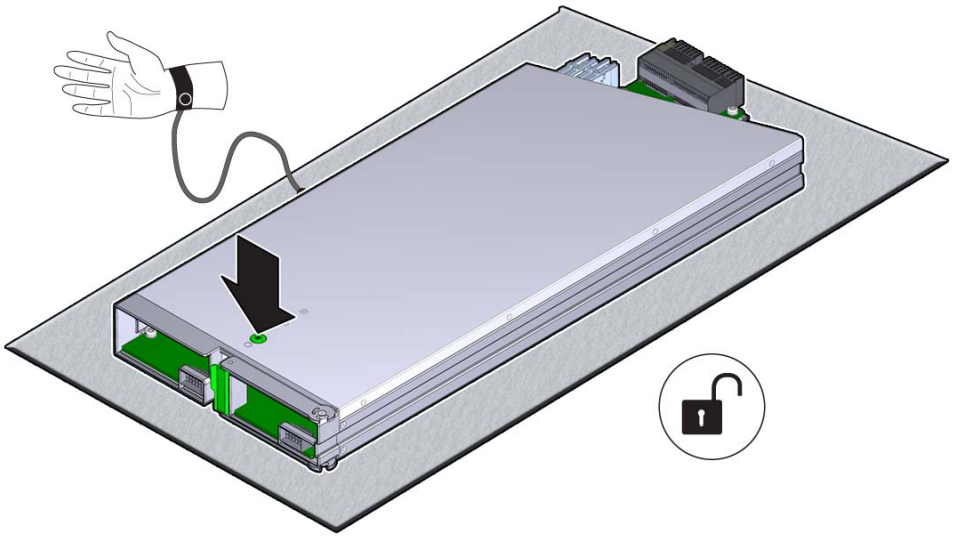
1. **Prepare the server for warm or cold service. See “Prepare the Server for Warm Service” on page 94 or “Prepare the Server for Cold Service” on page 97.**
2. **Remove the CMOD from the server. See “Remove a CMOD” on page 135.**
3. **To remove the CMOD top cover, push the release button, slide the CMOD cover toward the back of the CMOD, and lift it away.**

Caution - Component damage. CMOD components are extremely sensitive to electrostatic discharge. Wear a wrist strap and use an anti-static wrist mat.

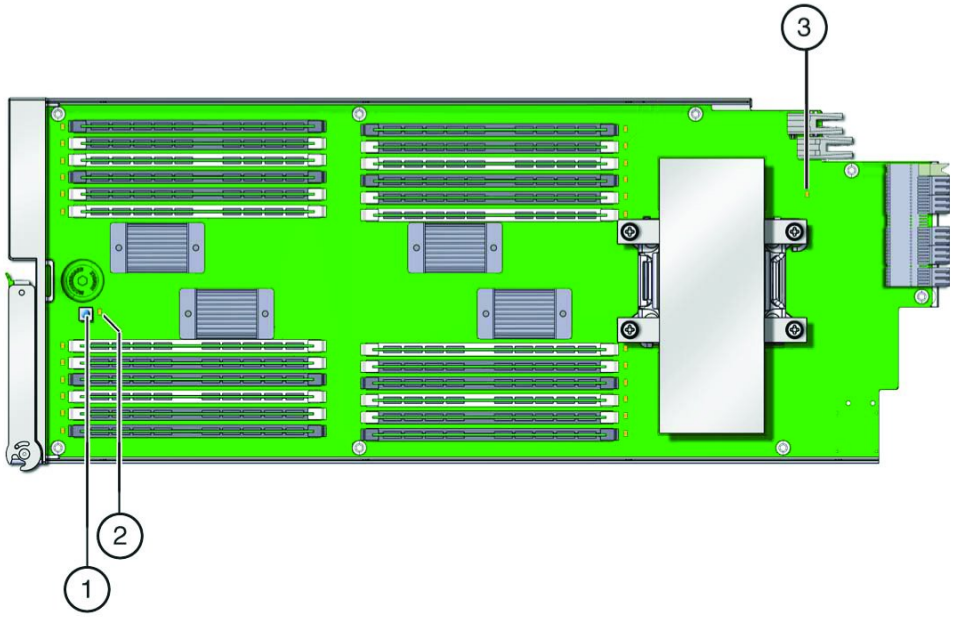


4. **To verify that the processor has failed, press and hold the Fault Remind button [1].**

   - The green Charge Status indicator [2] lights if the Fault Remind circuit is operational.

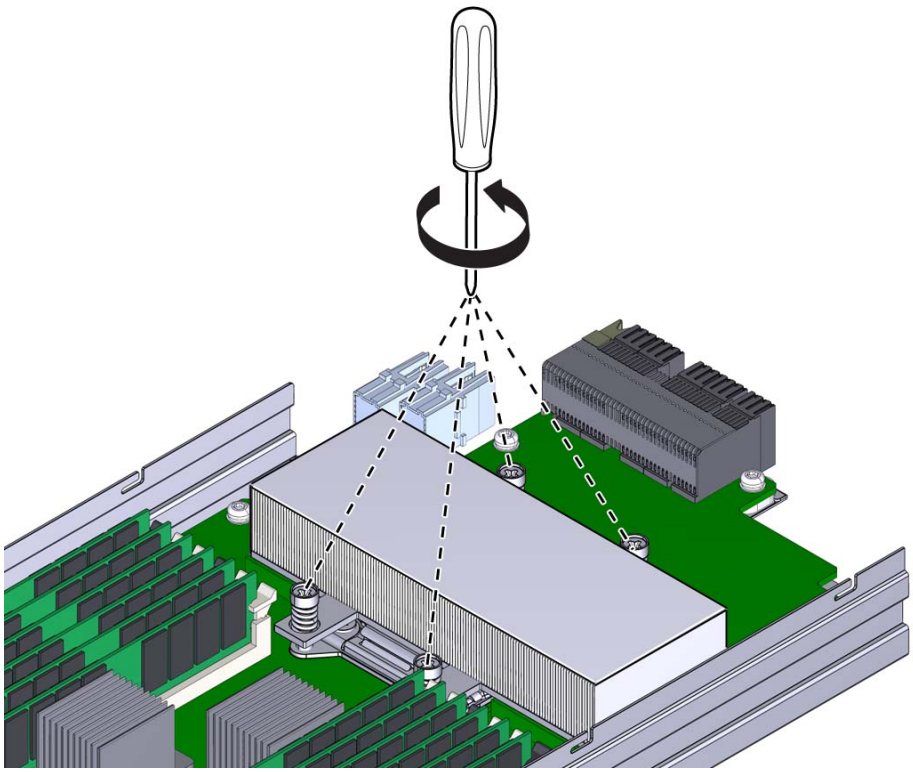
     The fault remind circuit remains charged for about 10 minutes after power is removed from the CMOD, either by disconnecting power from the server, or by removing the CMOD from the chassis. When you press the Fault Remind button, the Charge Status indicator lights if there is enough power to use the fault remind circuit. Otherwise it remains dark.

- The amber Processor Fault indicator [3] lights if the processor has failed.



Call Out	Description
1	Fault Remind button
2	Fault Remind Power indicator
3	DIMM slot fault indicator (one for each slot)

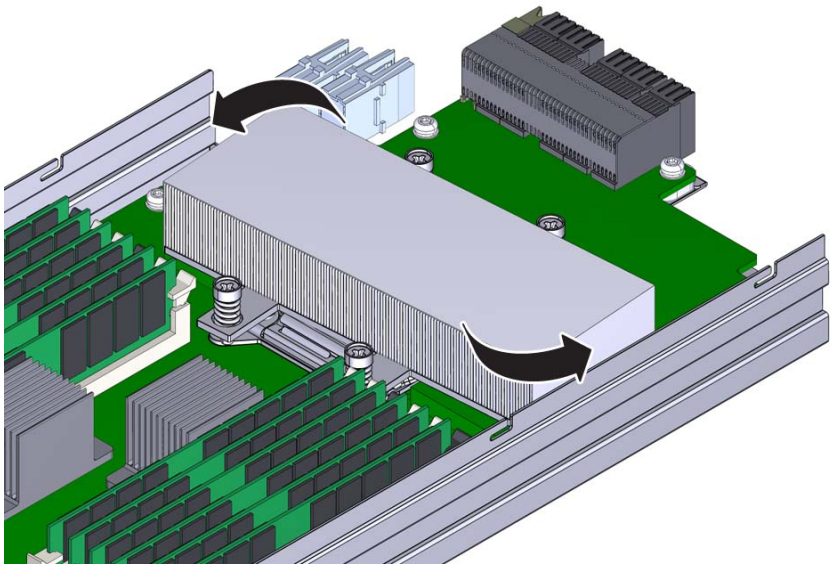
5. **Press down on the center of the heatsink and use a number 2 Phillips screwdriver to completely loosen the four spring-loaded screws.**



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

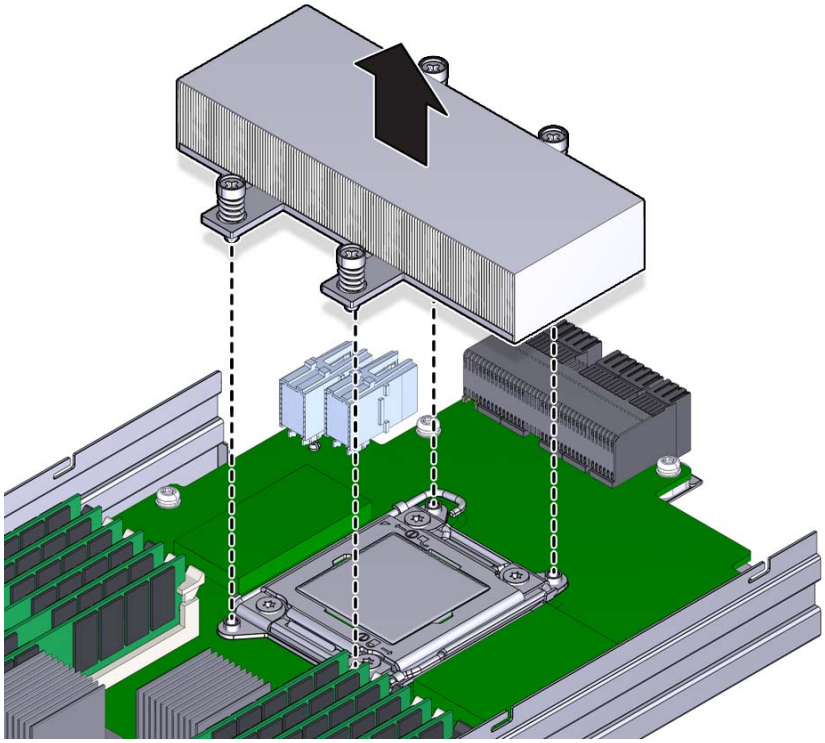
6. **To separate the heatsink from the top of the processor, gently twist the heatsink left and right while pulling it upward.**

The twisting action helps to break the seal created by the thermal compound.



7. **Remove the heatsink from the CMOD, taking care that you do not allow the thermal compound to contaminate other components.**

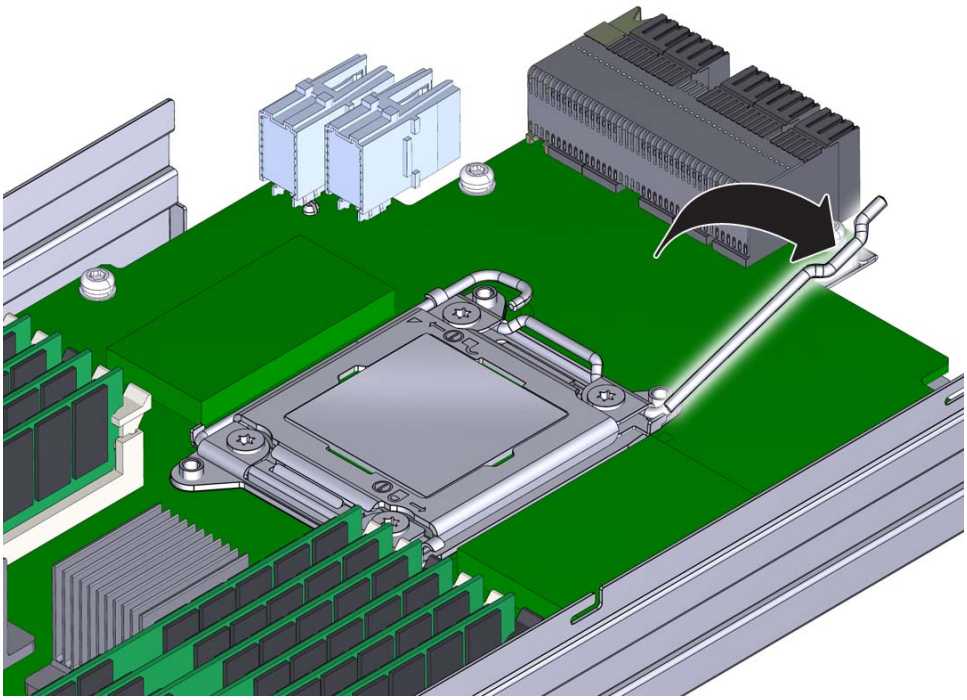
A residual amount of compound remains on the bottom of the heatsink and on the top of the CPU. This compound must be removed before using the CPU replacement tool. An alcohol wipe is included with the replacement CPU.



8. **Use the alcohol wipe to completely remove the thermal compound from the top of the CPU and the bottom of the heatsink, taking care that you do not allow the thermal compound to contaminate other components.**

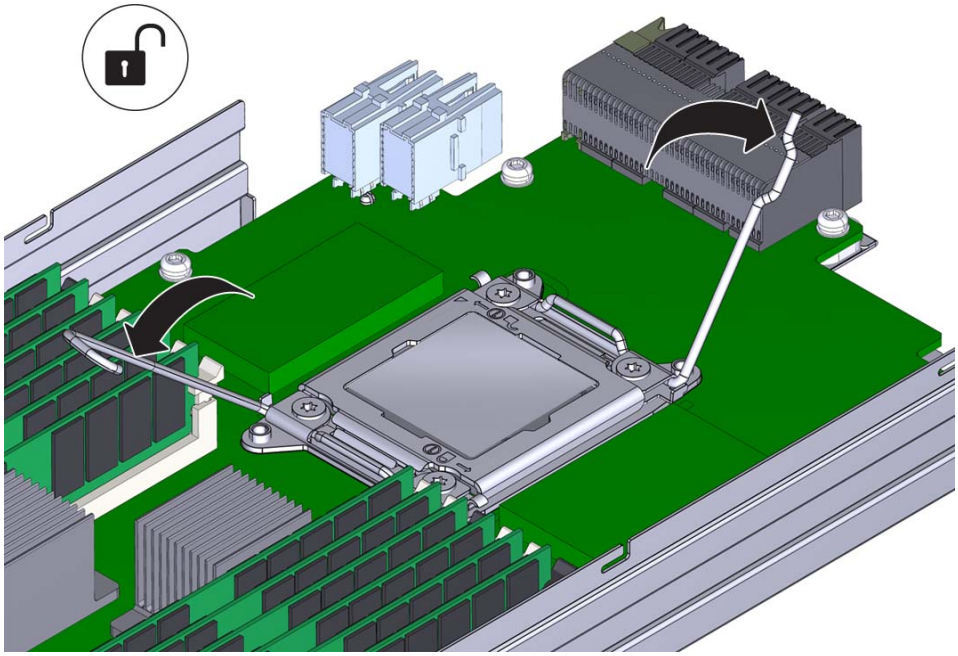
9. **Open the spring-loaded CPU load plate release levers by pushing them down and moving them slightly toward the CPU socket and away from their retaining clips**

The levers are numbered. Open lever number 1 first, and then open lever number 2.



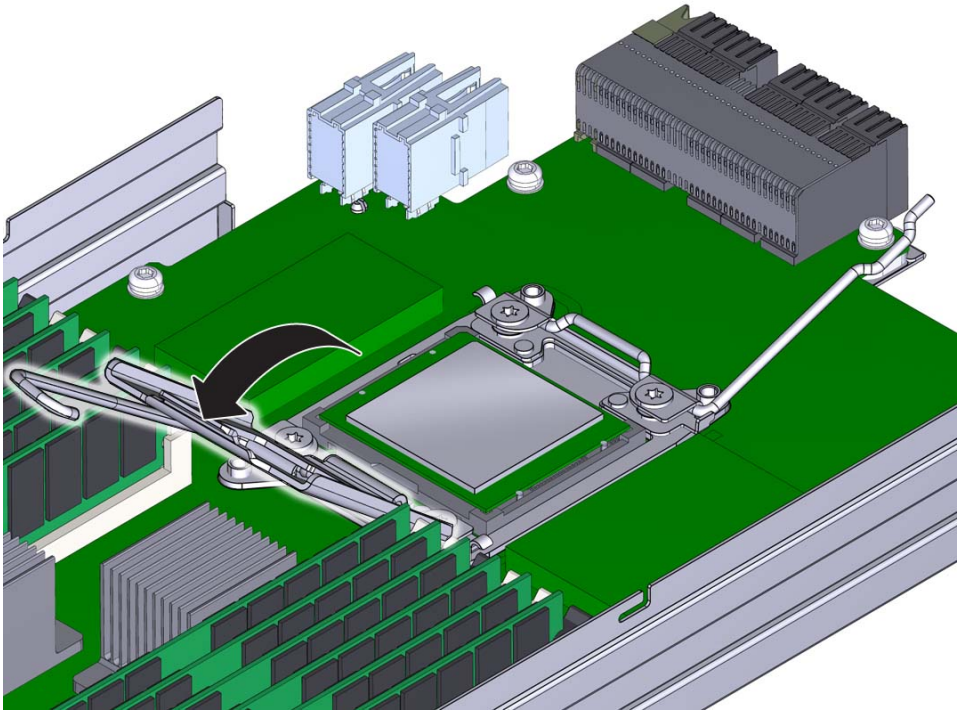
10. **Rotate the levers to their fully-open position.**

When the second lever is in its fully-open position, the load plate is unlocked and can be opened.



11. **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. Do not remove the CPU using your fingers. To remove the CPU, use the CPU replacement tool.



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

Note - Ensure that you use the correct CPU replacement tool. Always use the tool (part number: 7080240) that is included with the replacement CPU.

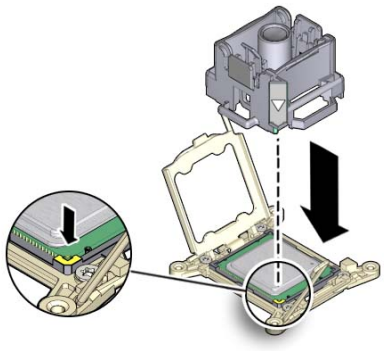
The tool is used to remove and install the CPU in the socket. The top side of the replacement tool has a button in the center and a tab on one side. Pressing down on the button opens the tool. Pressing the tab closes the tool (and releases the button).

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.

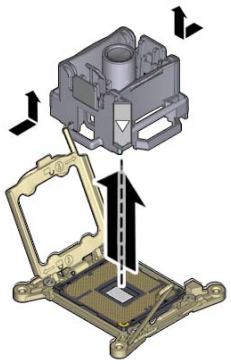


c. Lower the tool onto the CPU, ensuring that it sits evenly on the CPU.

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.**



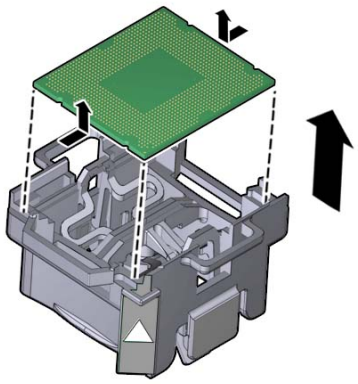
f. **Turn the tool over, so the metal CPU contacts are facing upward and the topside of the tool is facing downward.**

g. **Hold the CPU by its edges.**

h. **On the topside of the tool (which is now 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.**



Next Steps

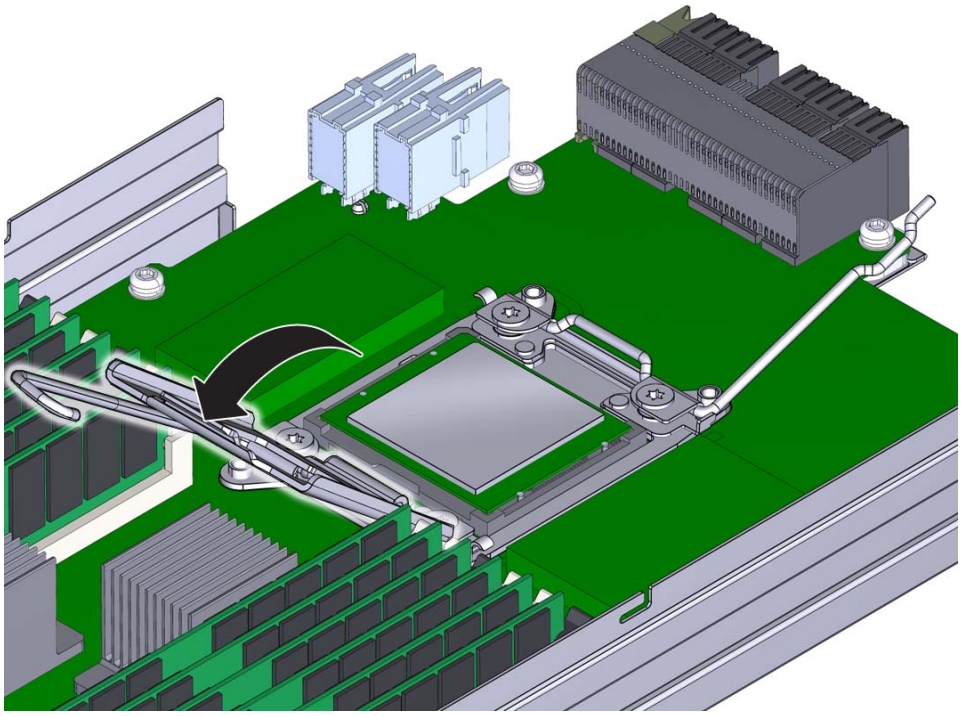
- “Install a Heatsink and Processor (FRU)” on page 167

▼ Install a Heatsink and Processor (FRU)

Before You Begin

- “Remove a Heatsink and Processor (FRU)” on page 156.
- For component information, see “About System Components” on page 19.
- This procedure requires a Phillips screwdriver and an anti-static wrist strap.

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 7080240. 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.

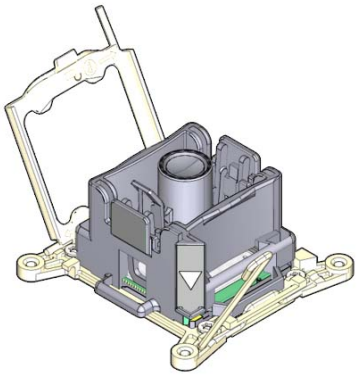
3. **Turn the tool over, so that the CPU contacts are facing downward.**

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.**

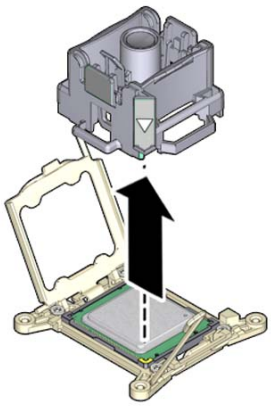
When the CPU is correctly positioned, there is no side-to-side movement of the CPU within the socket.



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.

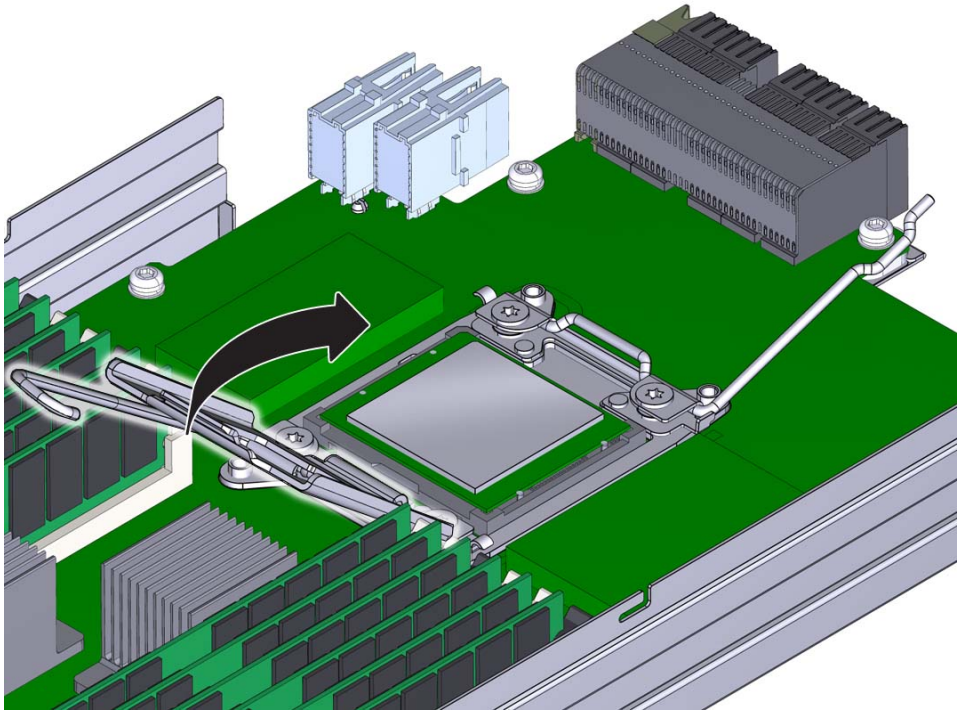
7. **Remove the tool.**



8. **Inspect the CPU to ensure that it sits evenly within the socket.**

Caution - Equipment Damage. Once the processor sits evenly in the socket, do not move it or push on it.

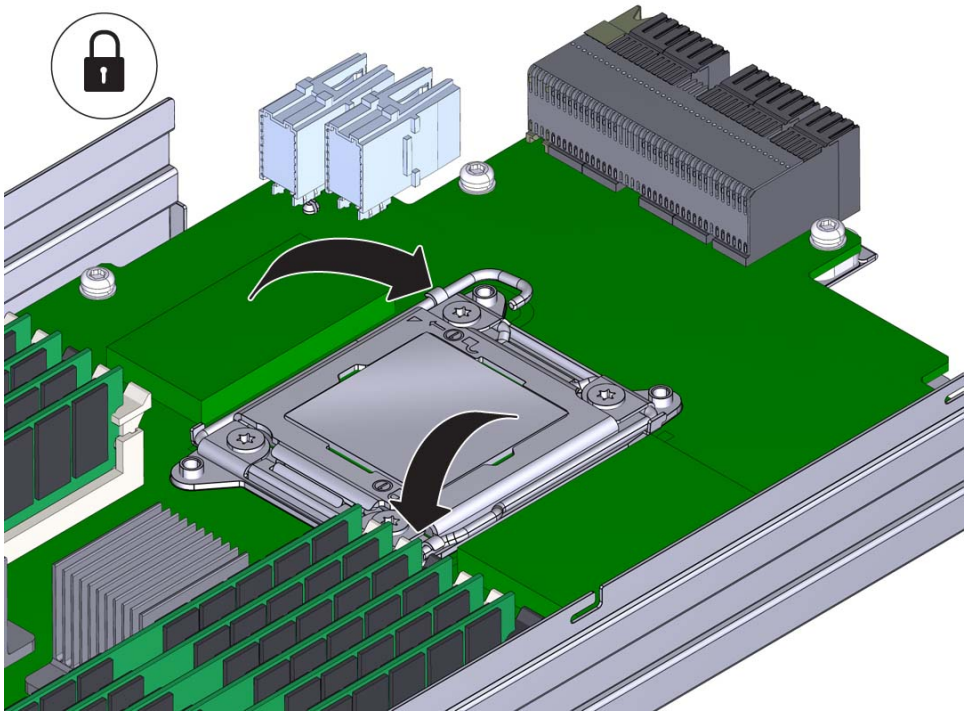
9. **Close the CPU load plate.**



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.**

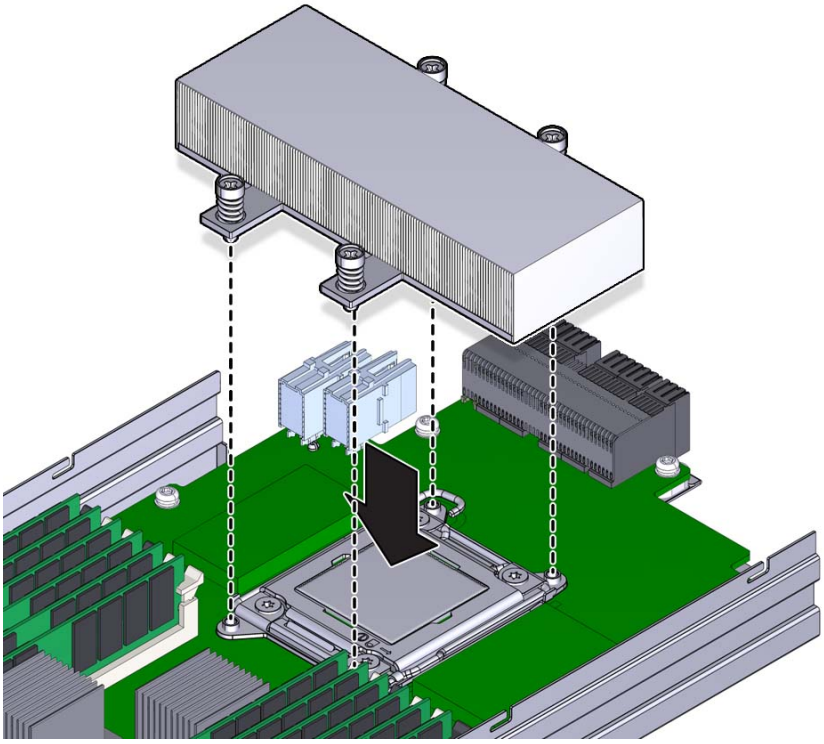


12. **To apply the thermal compound, dispense the contents of the syringe as a single dollop in the center on the top of the CPU.**

    Do not spread the thermal compound. The pressure applied during the heatsink installation performs this action.

13. **To install the heatsink:**

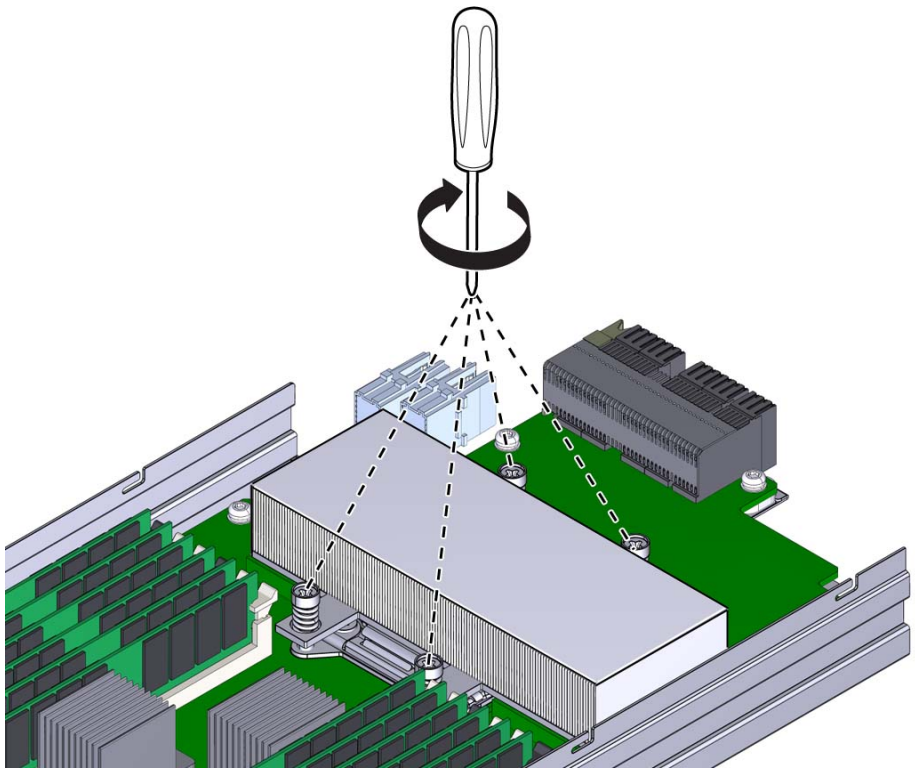
a. Align the captive spring-loaded heatsink screws with the threaded standoffs on the motherboard.



b. Set the heatsink on top of the CPU.

Once the heatsink is in contact with the CPU, avoid extra movement of the heatsink.

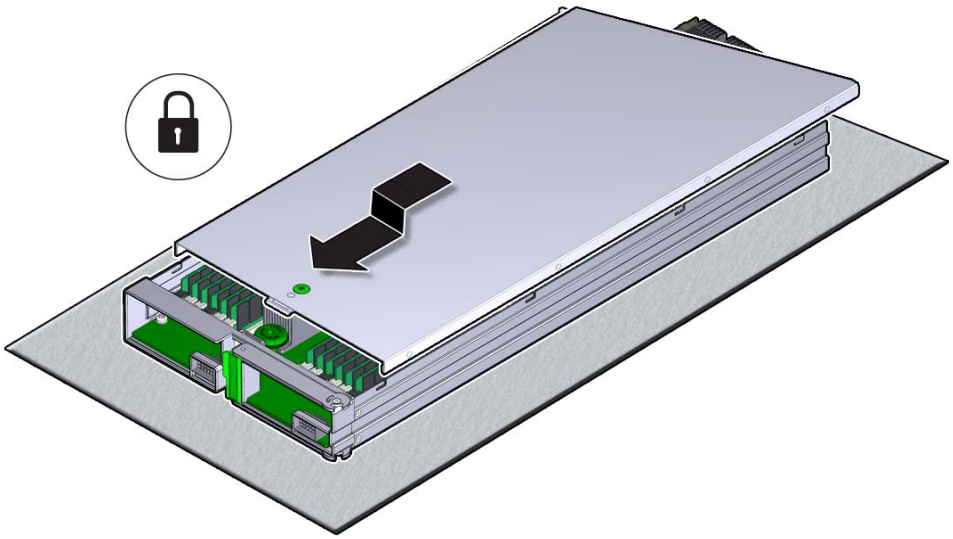
c. **Use a number 2 Phillips screwdriver and alternately tighten each screw one-half turn until both screws are completely tightened.**



14. **Ensure that all tools and debris are removed from the CMOD.**

15. **Install the CMOD cover. See “Remove and Install the CMOD Cover” on page 138.**

Note - After restoring service to the server, clear any related component faults. For more details, see “Clear Hardware Fault Messages” on page 230.



Next Steps

- “Install a CMOD” on page 140

Servicing Storage Drives

- “Remove a Storage Drive” on page 175
- “Install a Storage Drive” on page 177
- “Storage Drive Reference” on page 179.

▼ Remove a Storage Drive

Access this component directly from the rear of the server.

Before You Begin

- For component information, see “About System Components” on page 19.

- For storage drive information, see “Storage Drive Reference” on page 179.

1. **Prepare the server for hot service. See “Prepare the Server for Hot Service” on page 93.**

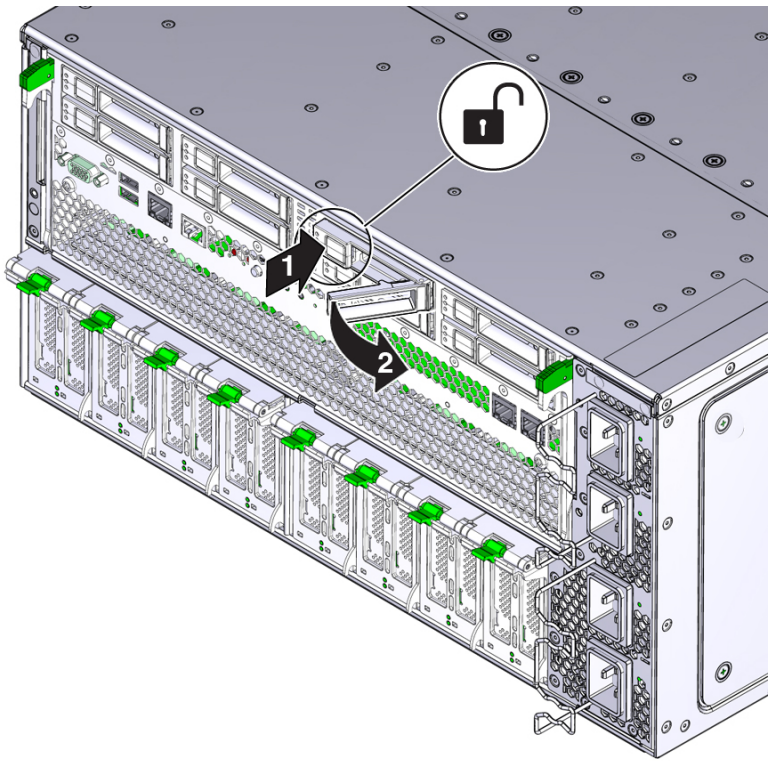
   Alternatively, to prepare the server for cold service, see “Prepare the Server for Cold Service” on page 97.

2. **Identify the storage drive by its position, designation, and the indicators on its front panel.**

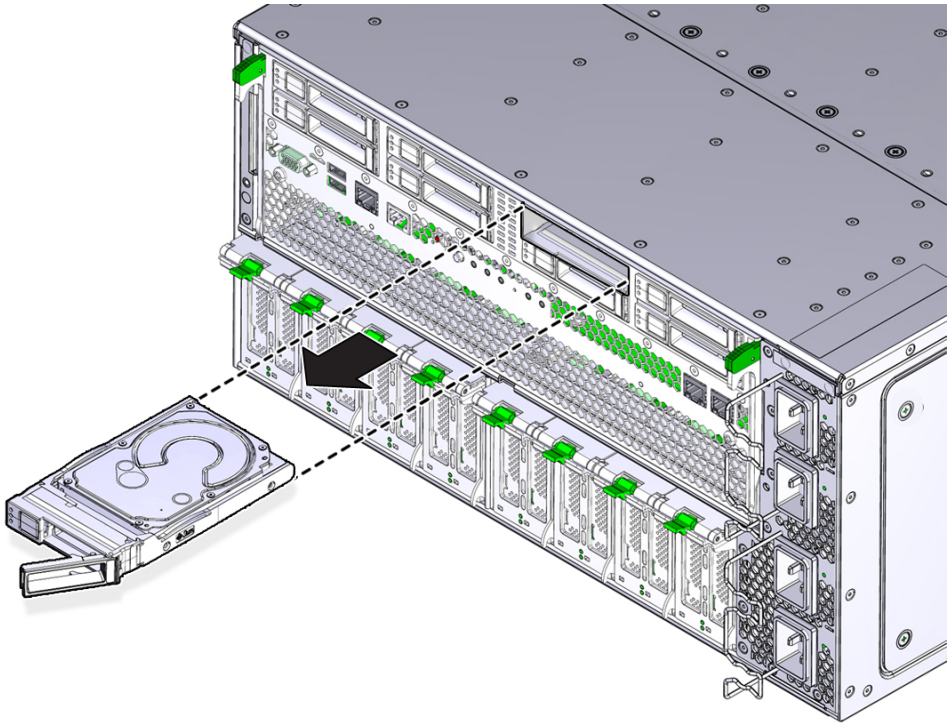
   For example, look for the blue steady on Ready to Remove indicator or the amber steady on Service Action Required indicator.

3. **To unlock the storage drive handle, press the handle release button on the front of the HDD.**

   The spring-loaded handle pops open.



4. **To remove the HDD, rotate the handle to its fully-open position and pull the HDD out of its slot.**



Rotating the handle to its fully-open position disengages the drive from its internal connector.

5. **If you are not replacing the HDD, install an HDD filler panel.**

See Also

- "Returning the Server to Operation" on page 229.

▼ Install a Storage Drive

Access this component directly from the front of the server.

Before You Begin

- For component information, see "About System Components" on page 19.
- For storage drive information, see "Storage Drive Reference" on page 179.

1. **Prepare the server for hot service. See “Prepare the Server for Hot Service” on page 93.**

   Alternatively, to prepare the server for cold service, see “Prepare the Server for Cold Service” on page 97.

2. **If necessary, remove the HDD filler panel from the slot.**

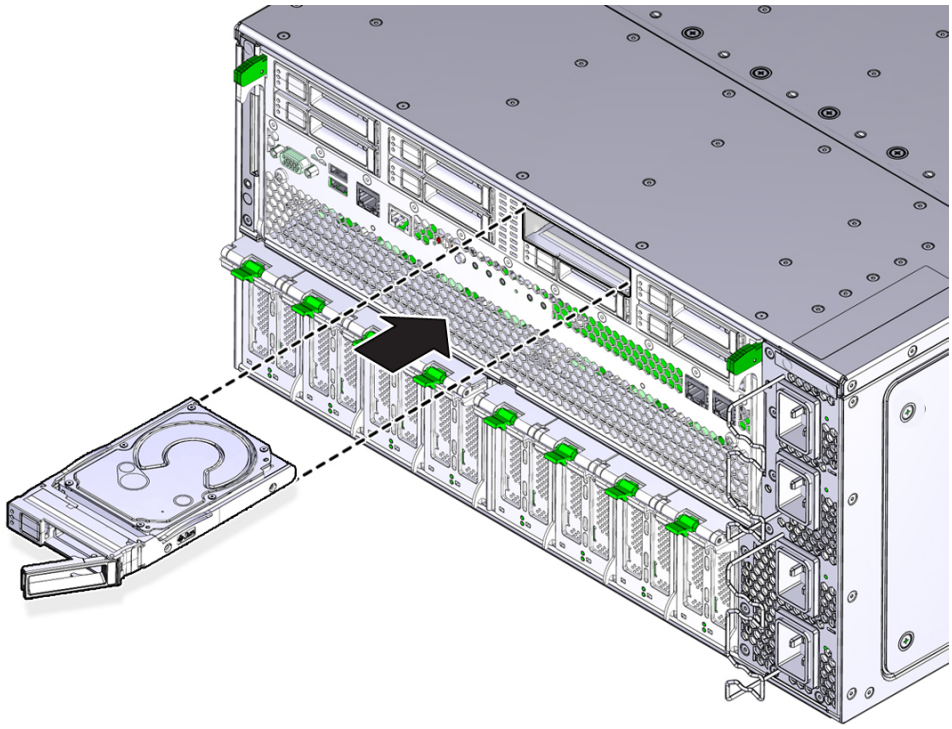
   a. **Press the handle release button on the front of the filler panel.**

      The spring-loaded handle pops open.

   b. **To remove the filler panel, use the handle to pull it out of the slot.**

3. **Ensure that the drive handle is open.**

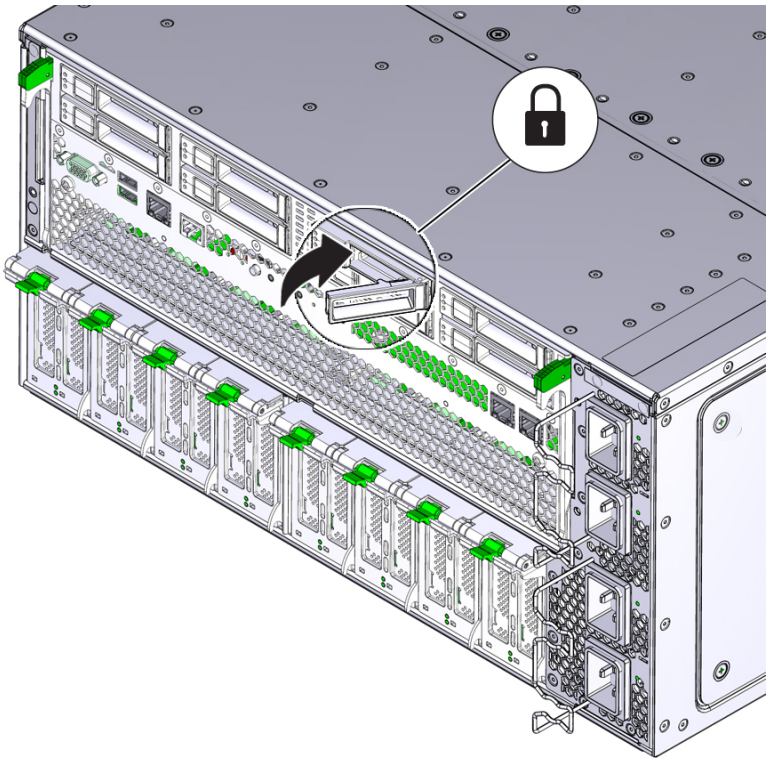
4. **Align the drive with the vacant slot so that the open handle is on the right.**



5. **Slide the drive into the slot and push it inward until it stops and the handle begins to close.**

6. **Rotate the handles to the closed position.**

   The drive is flush with the front of the SMOD.



See Also ■ “Returning the Server to Operation” on page 229.

Storage Drive Reference

This section contains storage drive reference information, including storage drive slot population rules.

Storage Drive Population Rules

When populating the storage drive slots, use the following rules:

1. Every slot in the storage drive bay must contain either a storage drive or a drive filler panel.
2. Sort disks by capacity and technology (HDD vs SSD) and install in this order:
   a. Install the HDDs first, starting with the smallest capacity in the drive slots in ascending slot order (0, 1, etc.).
   b. Install larger HDDs in increasing capacity and into storage slots increasing in number.
   c. Install SSDs into remaining storage slots increasing in number.

Servicing PCIe Cards and the Dual PCIe Card Carriers (DPCCs)

The server PCIe cards are housed in pairs inside card carriers called DPCCs (dual PCIe card carriers). The DPCCs allow the cards to be hot serviced (removed and installed while the server is powered on).

- "Remove a DPCC" on page 180
- "Remove a PCIe Card" on page 183
- "Install a PCIe Card" on page 185
- "Install a DPCC" on page 188
- "Replace a DPCC" on page 191

▼ Remove a DPCC

This component is accessed directly from the rear of the server. Dual PCIe Card Carriers (DPCCs) can house two PCIe cards. You need to perform this procedure to replace or to remove and install a PCIe card.

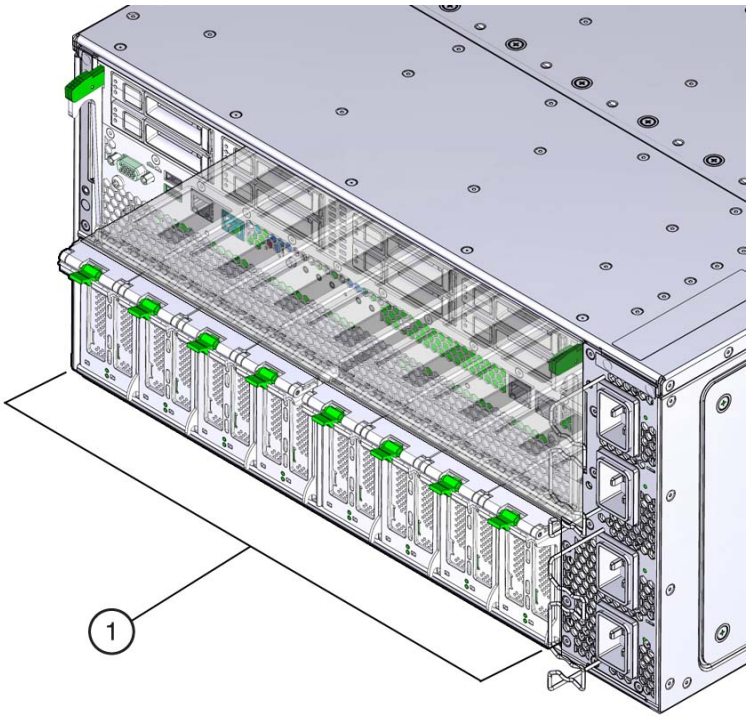
Before You Begin

- For component information, see "About System Components" on page 19.
- This procedure requires a non-conducting stylus.

1. **Prepare the server for hot service. See "Prepare the Server for Hot Service" on page 93.**

Alternatively, to prepare the server for cold service, see “Prepare the Server for Cold Service” on page 97.

2. **Identify the DPCC.**

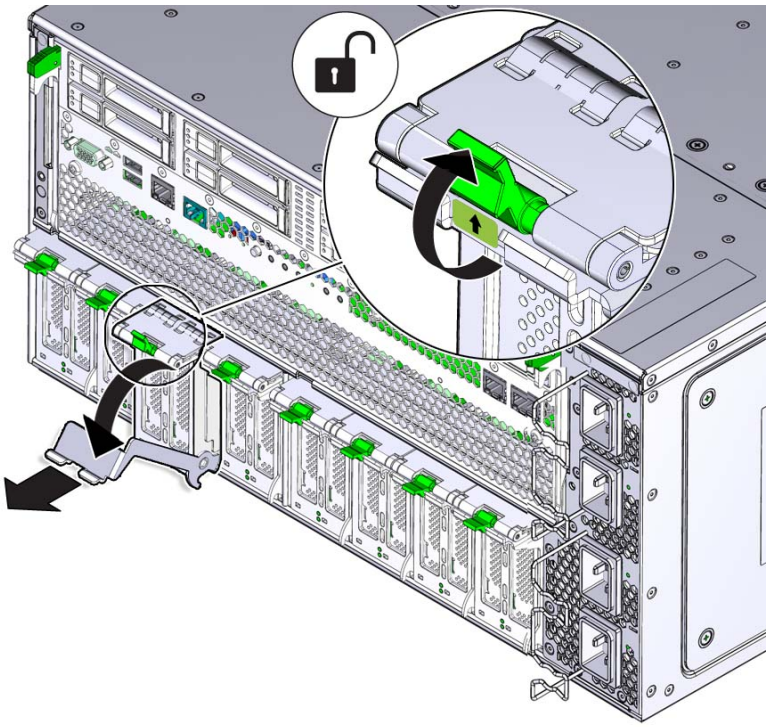


3. **Use a stylus to press *both* ATTN buttons on the front of the DPCC (for button location, see “Dual PCIe Card Carrier (DPCC) Indicators” on page 40).**

Note - If only a single PCIe card is present, press only the corresponding ATTN button.

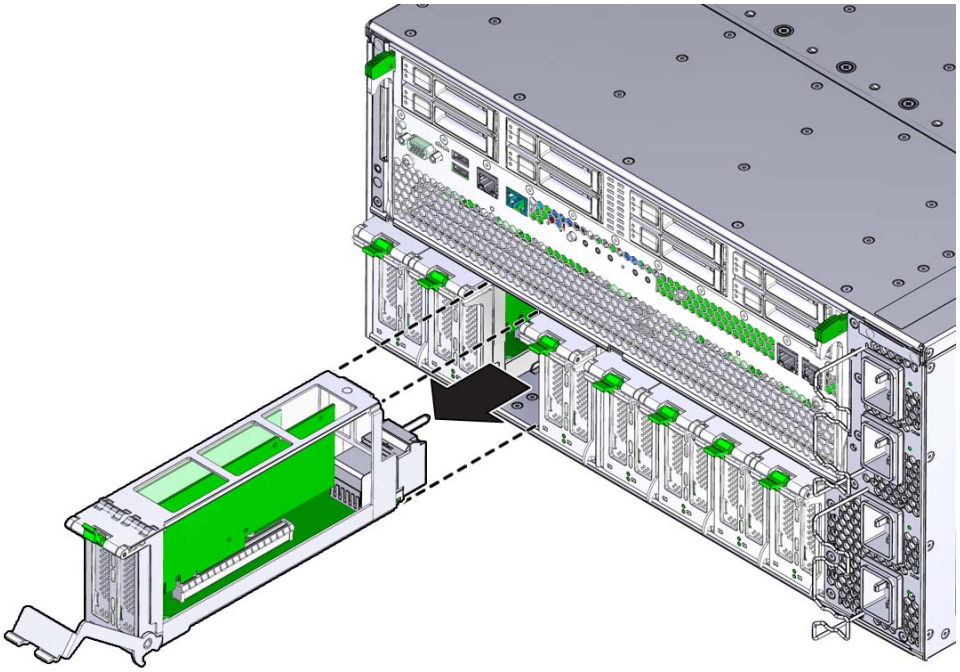
The ATTN buttons alert the system to a request to remove a PCIe card. When the system has acknowledged the request, it takes the device offline and lights both indicators for each slot. When the indicators are lit, it is safe to remove the component.

4. **To unlock the DPCC lever, lift the release latch and pull the lever downward, away from the server.**



This action disengages the PCIe card IO connectors from the connectors on the back of the CMODs.

5. **To remove the DPCC, slide it out of the server.**



Next Steps

- “Remove a PCIe Card” on page 183

▼ Remove a PCIe Card

To access a PCIe card, you must first remove its DPCC (see “Remove a DPCC” on page 180). One or two PCIe cards can be installed in each Dual PCIe Card Carrier (DPCC).

Perform this procedure when replacing a PCIe card or when changing its configuration.

Before You Begin

- For component information, see “About System Components” on page 19.

1. **Prepare the server for hot service. See “Prepare the Server for Hot Service” on page 93.**

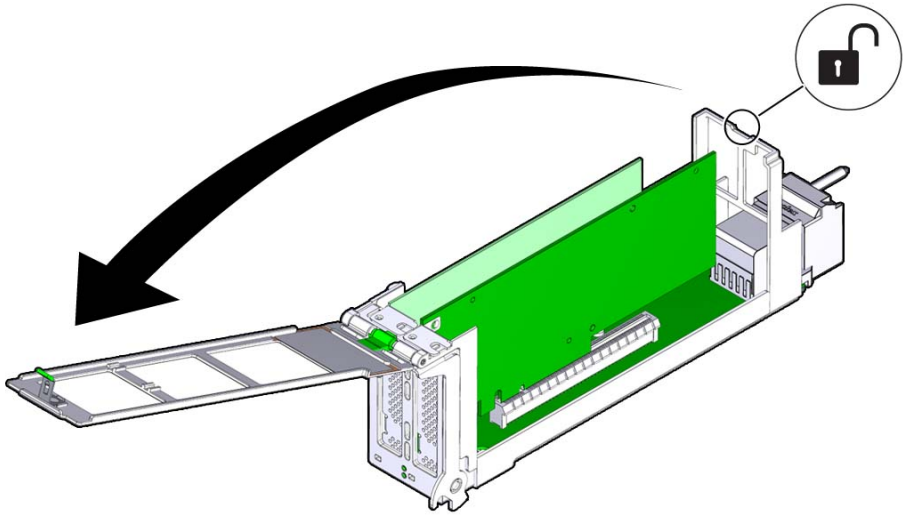
Alternatively, to prepare the server for cold service, see “Prepare the Server for Cold Service” on page 97.

2. **Identify the DPCC containing the PCIe card.**

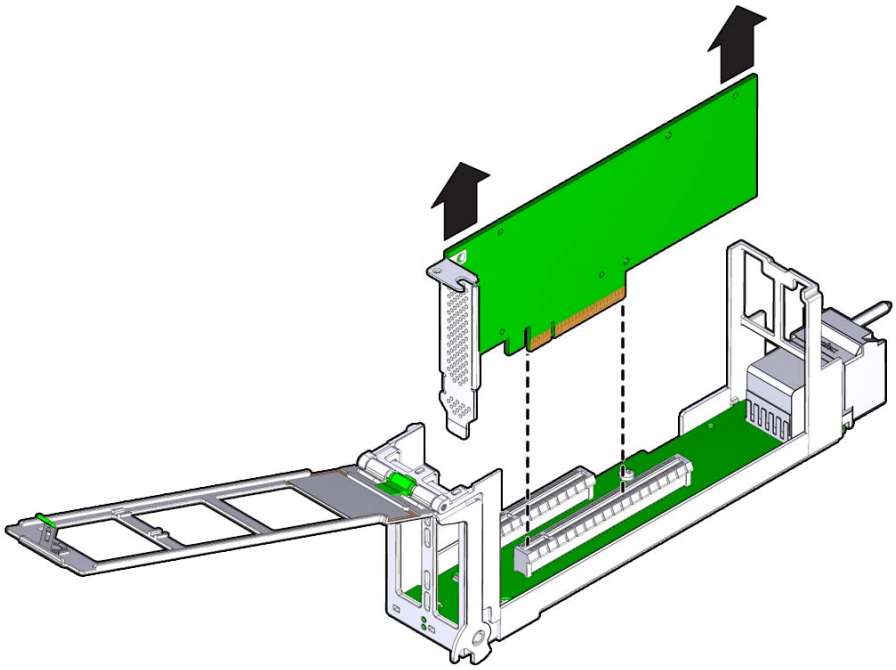
3. **Remove the DPCC. See “Remove a DPCC” on page 180.**

4. **Orient the DPCC so that the hinge is to the left.**

5. **To open the top of the DPCC, lift the release latch at the non-hinged end of the lid and rotate the lid upward and to the left.**



6. **To remove the card, pull it straight up and out of its connector.**



Next Steps

- “Install a PCIe Card” on page 185

See Also

- “Returning the Server to Operation” on page 229.

▼ Install a PCIe Card

To access a PCIe card, you must first remove its DPCC (see “Remove a DPCC” on page 180). One or two PCIe cards can be installed in each Dual PCIe Card Carrier (DPCC).

Perform this procedure when replacing a PCIe card or when changing its configuration.

Before You Begin

- For component information, see “About System Components” on page 19.

1. **Prepare the server for hot service. See “Prepare the Server for Hot Service” on page 93.**

   Alternatively, to prepare the server for cold service, see “Prepare the Server for Cold Service” on page 97.

2. **Identify the DPCC PCIe slot.**

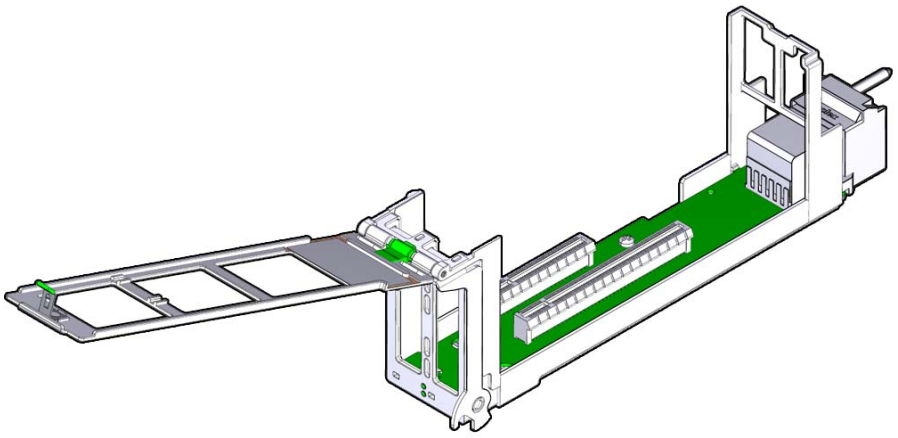
3. **If necessary, remove the DPCC. See “Remove a DPCC” on page 180.**

4. **Orient the DPCC so that the hinge is to the left.**

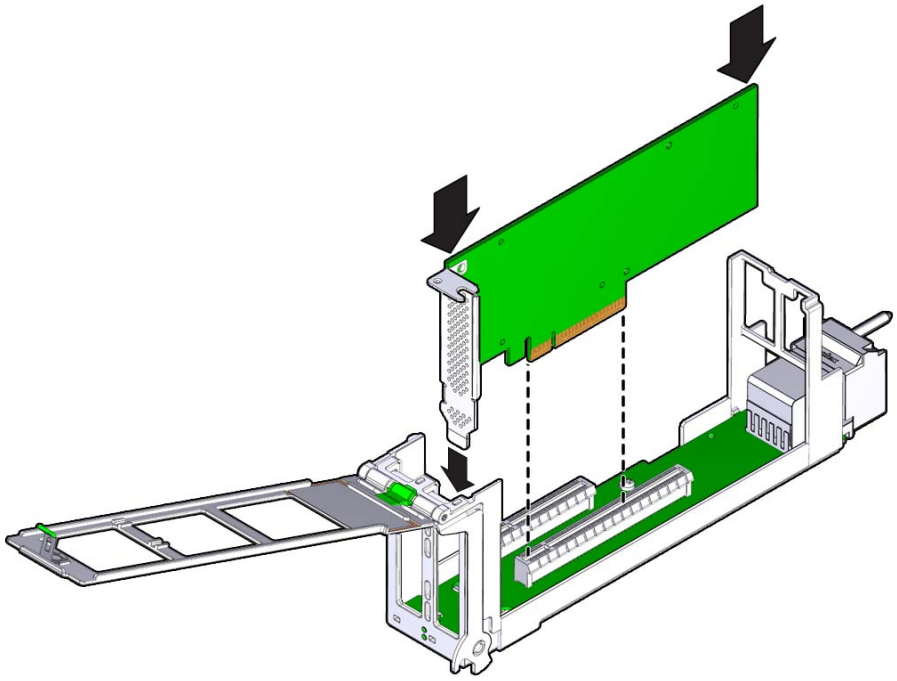
5. **To open the top of the DPCC, lift the release latch at the non-hinged end of the lid and rotate the lid upward and to the left.**

6. **Ensure that the DPCC top cover is open.**

   The top of the DPCC is hinged at one end. To open, lift the tab on the non-hinged end.



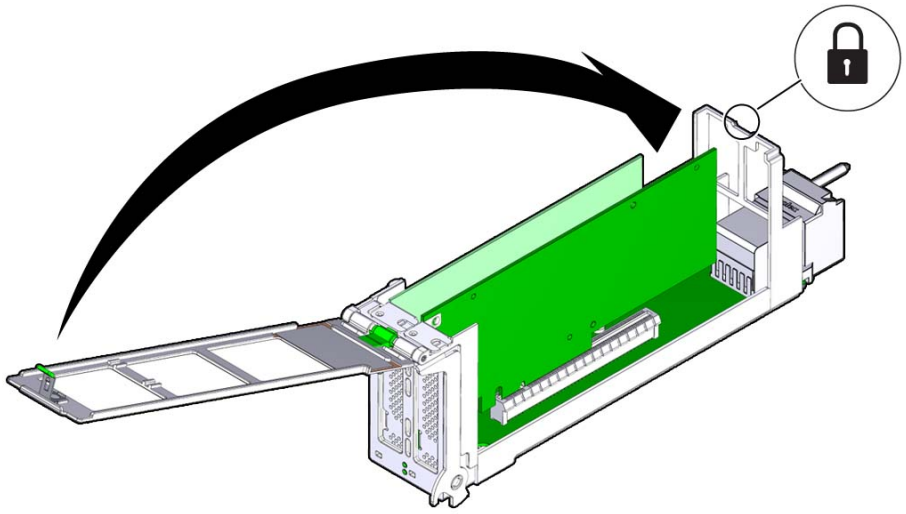
7. **Orient the PCIe card with the edge (or bus) connector facing downward and the IO (or cable connector) facing to the left.**



8. **To install the card, align the edge connector with the slot in the DPCC and push the card downward into the slot.**

9. **To close the top of the DPCC, rotate it to the right ensuring the clip on the edge of the top is secured over the unhinged edge of the DPCC.**

Caution - Pinch point. Keep fingers away from the underside of the top when closing it.



10. **Clear any related component faults. For more information see "Clear Hardware Fault Messages" on page 230.**

Next Steps

- "Install a DPCC" on page 188

Install a DPCC

Perform this procedure as part of a PCIe card replacement or configuration. To remove a DPCC, see "Remove a DPCC" on page 180.

Before You Begin

- For component information, see "About System Components" on page 19.
- Obtain a stylus for activating recessed buttons.

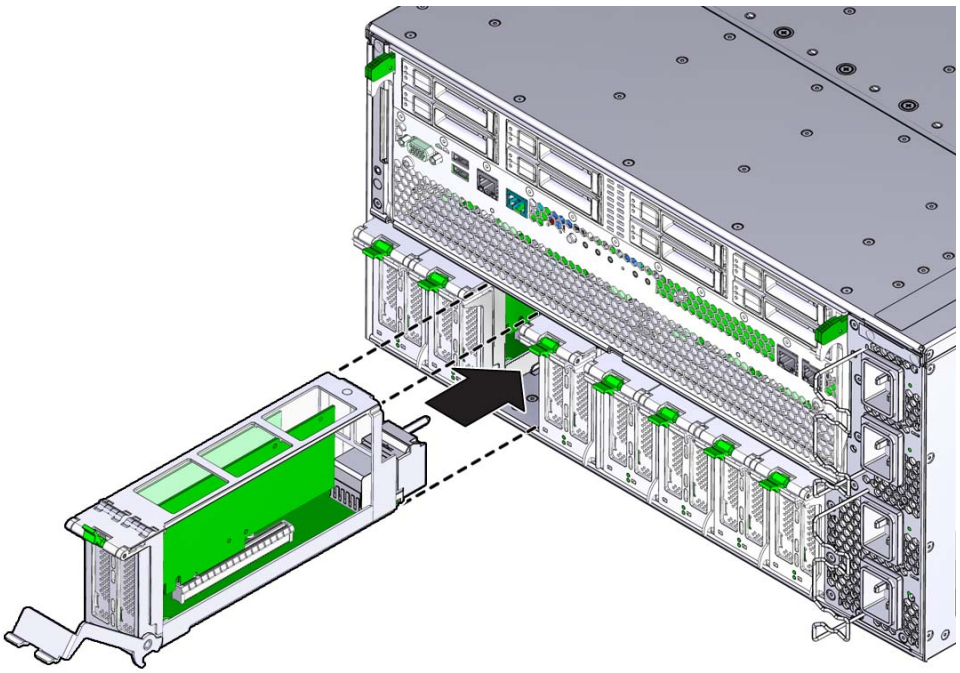
1. **Prepare the server for hot service. See "Prepare the Server for Hot Service" on page 93.**

Alternatively, to prepare the server for cold service, see “Prepare the Server for Cold Service” on page 97.

2. **Ensure the top of the DPCC is closed and secured and the lever on the front of the DPCC is in its fully open position.**

3. **Align the DPCC with the vacant slot.**

   The connector (back) side of the DPCC faces inward toward the server.



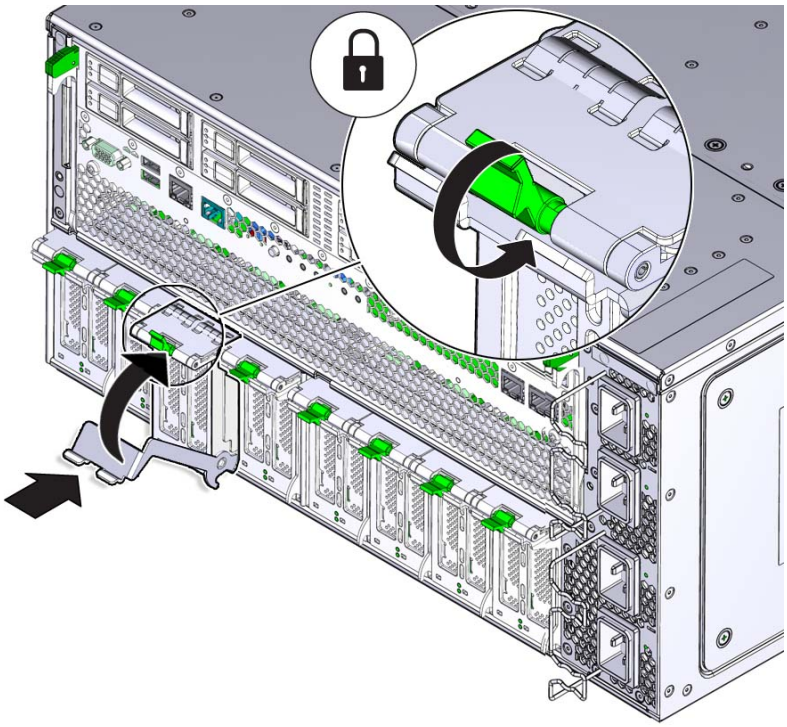
4. **Slide the DPCC into the slot until it stops.**

   This leaves the DPCC protruding slightly from the back of the server. Do not attempt push the DPCC inward beyond this point.

5. **Rotate the lever on the DPCC upward until it locks into place.**

Caution - Pinch point. Keep fingers away from the backside of the lever when closing it.

This action draws the DPCC inward engaging the connectors in the DPCC with the connectors on the server midplane.



6. **Use a stylus to press *both* ATTN buttons on the front of the DPCC.**

Note - If only a single PCIe card is present, press only the corresponding ATTN button. If you are doing cold service, this step is not necessary.

The buttons alert the system to a request to bring the devices online. When the system acknowledges the request, it lights the OK indicators on the DPCC.

7. **Verify that the green OK indicators on the front of the DPCC are on steady.**

See Also ■ "Returning the Server to Operation" on page 229.

▼ Replace a DPCC

Perform this procedure to replace a failed DPCC.

Before You Begin

- For component information, see "About System Components" on page 19.

1. **Remove the DPCC. See "Remove a DPCC" on page 180.**
2. **Remove the PCIe cards. See "Remove a PCIe Card" on page 183.**
3. **Install the PCIe cards in the replacement DPCC. See "Install a PCIe Card" on page 185.**
4. **Install the DPCC into the server. See "Install a DPCC" on page 188.**

Note - The DPCC install procedure includes instructions for using the ATTN buttons on the DPCC to alert the OS.

See Also

- "Returning the Server to Operation" on page 229

PCIe Card and DPCC Reference

This section contains reference information for PCIe cards and DPCCs, including DPCC population rules.

Server PCIe Card Capabilities

The server contains nine low-profile PCIe slots, eight Gen 3 DPCC slots accessible at the rear of the server and one Gen 2 slot, which is located internally (and not directly accessible) on the system module (SMOD). This internal slot is used for server HBA and provides SAS connectivity to the server storage drives.

Dual PCIe Card Carriers (DPCCs)

The server contains eight hot-service PCIe Gen 3 DPCCs. Each DPCC has two low-profile PCIe Gen 3 slots, an 8-lane slot and a 16-lane slot. Each DPCC can contain up to two PCIe cards.

DPCCs connect directly to connectors on the back of the CMODs, so DPCCs and CMODs have a one-to-one relationship with one another. In a four CMOD-configured server, the first four slots (right to left from the back of the server), are active. In an eight CMOD-configured server, all eight slots are active.

DPCC Indicator Panel

Two indicator panels are located on the front of the DPCC. Both panels include an OK indicator, a Service Action Required indicator, and two ATTN buttons. The buttons are used to alert the OS to a request for DPCC/PCIe card removal and to request acknowledgement of a DPCC installation. For a DPCC removal, the OS responds by lighting the indicators on the front of the DPCC. For an installation, the OS lights the green OK indicators.

DPCC Population Rules

- One populated DPCC with at least one PCIe card must be installed for each CMOD (four or eight populated DPCCs).
- All eight DPCCs must be installed in the system regardless of the system configuration and whether the DPCC contains a PCIe card.

Servicing System Module (SMOD) Components

This section contains removal and installation procedures for the SMOD:

- "Remove the SMOD" on page 192
- "Install the SMOD" on page 195
- "Servicing the Host Bus Adapter (HBA) Card" on page 197
- "Servicing the Energy Storage Module and Cables" on page 204
- "Servicing the Internal USB Flash Drives" on page 210
- "Replace the Real Time Clock (System) Battery" on page 214

▼ Remove the SMOD

This is a cold-service component. Power down the system and disconnect the AC power cables from the server before performing this procedure.

Perform this procedure to access internal SMOD components, such as the HBA card, the internal USB ports, the ESM, and the system battery.

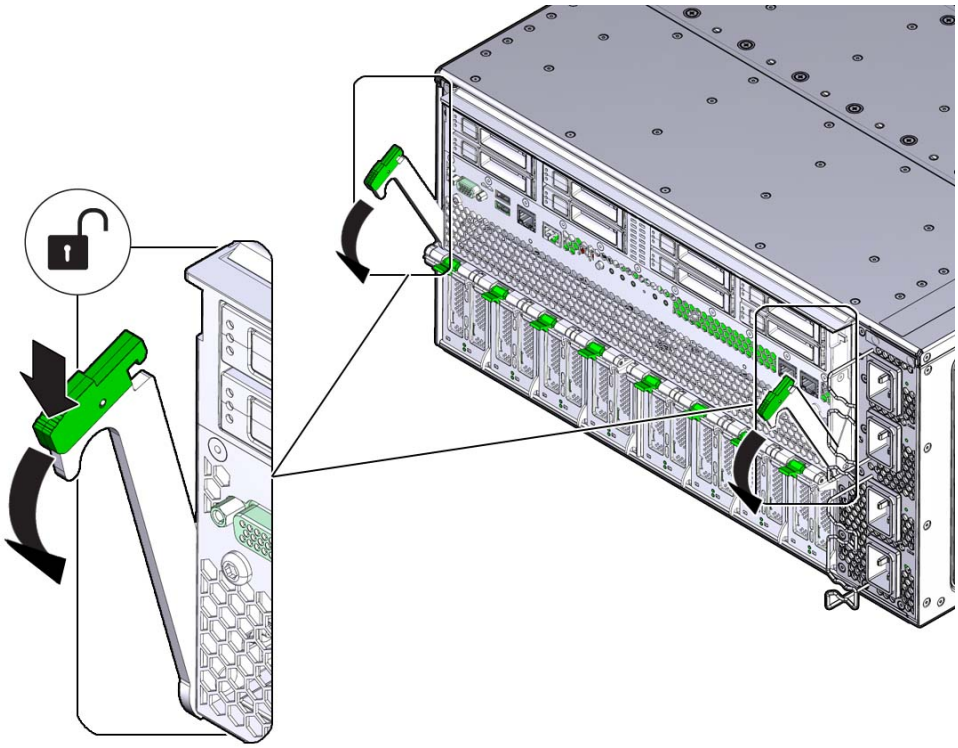
Access this component directly from the rear of the server.

Before You Begin

- For component information, see “About System Components” on page 19.
- Obtain labels and a pen for labeling cables.

1. **Prepare the server for cold service. See “Prepare the Server for Cold Service” on page 97.**
2. **Label and disconnect all cables from the SMOD.**
3. **Disengage the SMOD from the server midplane.**

a. **To unlock the SMOD handles, squeeze together the release latches on the end of both handles.**

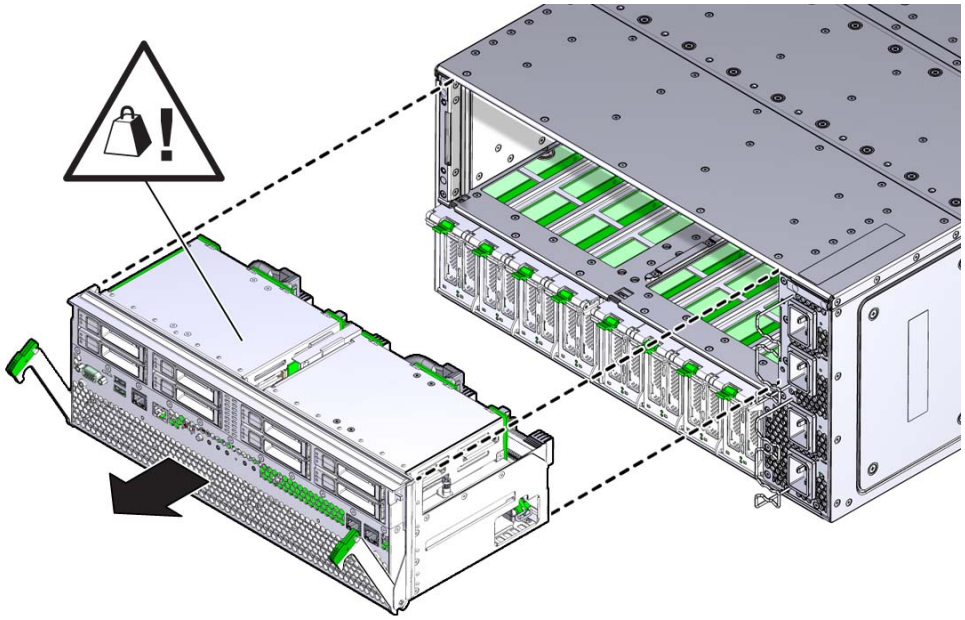


b. **To disengage the SMOD from the server midplane, simultaneously, rotate both handles downward to their fully-open position.**

This action disengages the connectors on the SMOD from the connectors on the server midplane.

Caution - Physical harm or component damage. Do not use the SMOD handles to remove the SMOD from the server.

4. **To remove the SMOD, grab it by its sides and slide it out the server.**



Next Steps

- "Install the SMOD" on page 195

▼ Install the SMOD

This is a cold-service component. Power down the system and disconnect the AC power cables from the server before performing this procedure.

Perform this procedure after servicing internal SMOD components, such as the HBA, the ESM, the internal USB ports, and the system battery.

Access this component directly from the rear of the server.

Before You Begin

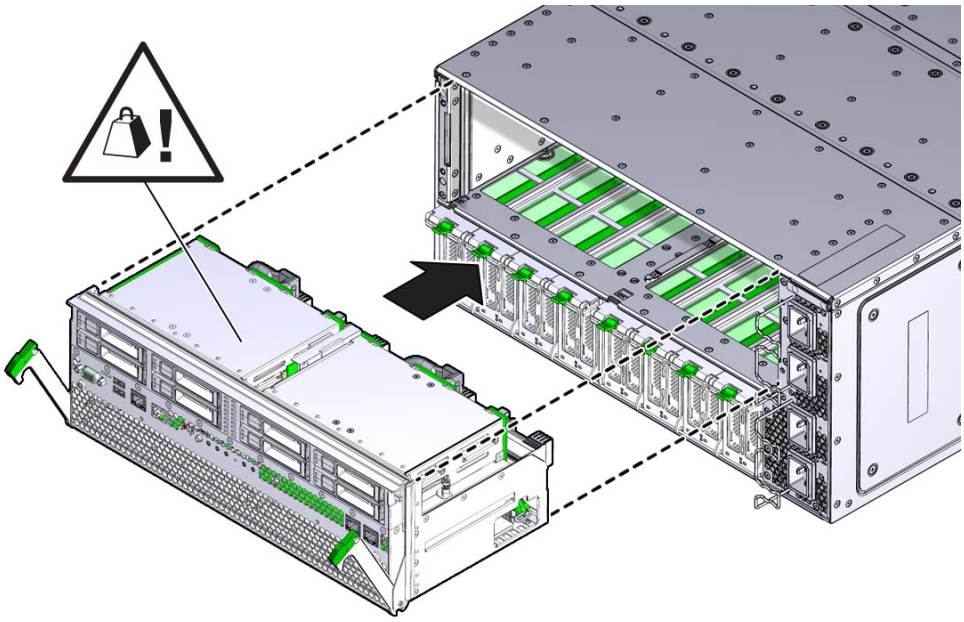
- For component information, see "About System Components" on page 19.
- "Remove the SMOD" on page 192.

1. **Ensure that the handles on the SMOD are in their fully open position.**

a. **To unlock the SMOD handles, squeeze together the release latches on the end of both handles.**

b. **To open, rotate both handles downward to their fully-open position.**

2. **Orient the SMOD with the handles facing away from the server and the connectors facing toward the open slot in the server.**



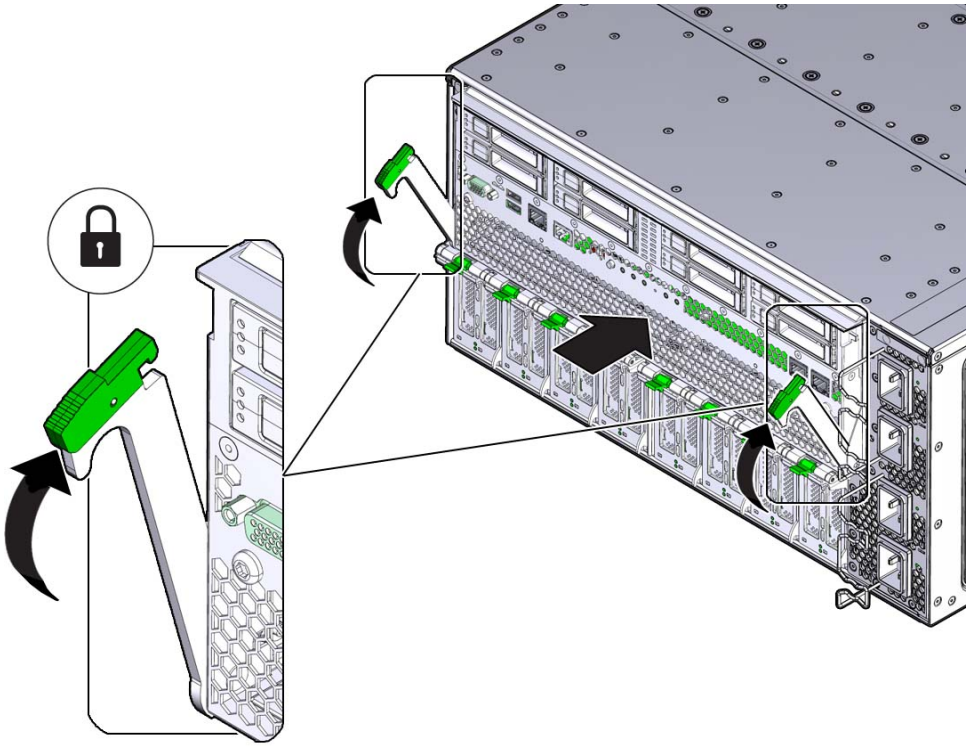
3. **Align the SMOD in the slot.**

4. **Slide the SMOD into the slot until it stops.**
   This leaves the SMOD protruding slightly from the back of the server. Do not attempt push the SMOD inward beyond this point.

5. **To install the SMOD, simultaneously rotate both handles upward until they lock into place.**

Caution - Pinch point. When operating the lever, keep your fingers clear of the back side and hinged end of the lever.

This action draws the SMOD inward engaging the SMOD connectors with the connectors on the server midplane.



6. **Connect the cables to the SMOD.**

Next Steps

- “Returning the Server to Operation” on page 229

Servicing the Host Bus Adapter (HBA) Card

This section contains procedures for servicing the HBA card that is located inside the system module (SMOD):

- “Remove the HBA Card” on page 198
- “Install the HBA Card” on page 201

▼ Remove the HBA Card

This is an internal component that is accessible from the rear of the server by removing the SMOD. The host bus adapter (HBA) card is installed in an internal PCIe slot mounted on the SMOD motherboard. Perform this procedure to replace the HBA card.

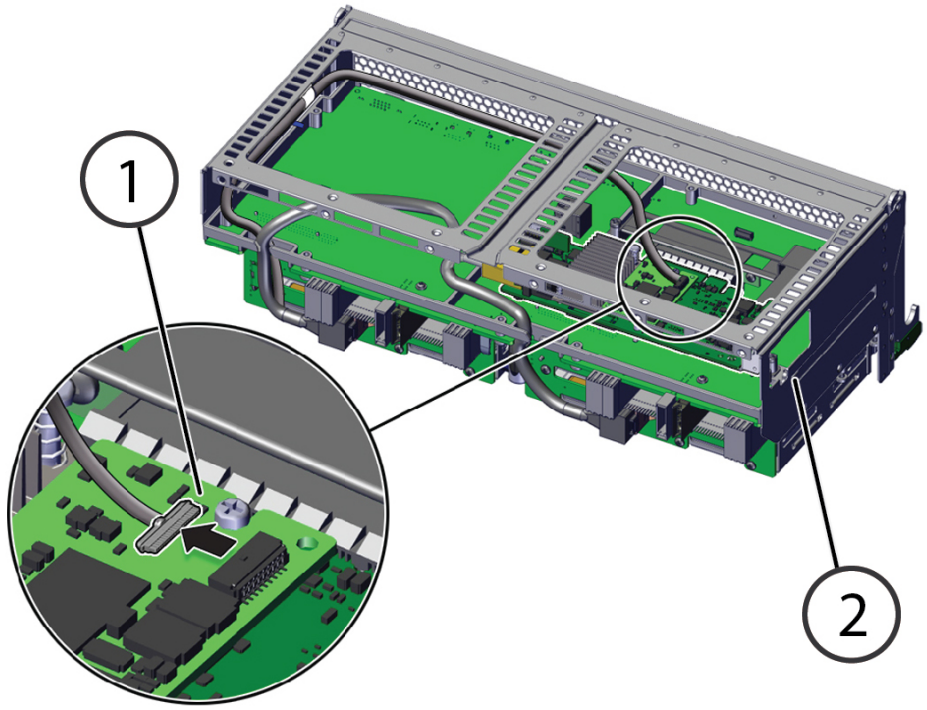
Before You Begin For component information, see "About System Components" on page 19.

1. **Prepare the server for cold service. See "Prepare the Server for Cold Service" on page 97.**
2. **Remove the SMOD. See "Remove the SMOD" on page 192.**
3. **Set the SMOD on a flat surface with the front side facing toward you.**
4. **Close the SMOD handles.**
5. **Rotate the SMOD 180 degrees so the back (connector) side is facing toward you.**
6. **Turn the SMOD upside down and locate the HBA.**

Note - The connector (back) side of the SMOD should still be facing you.

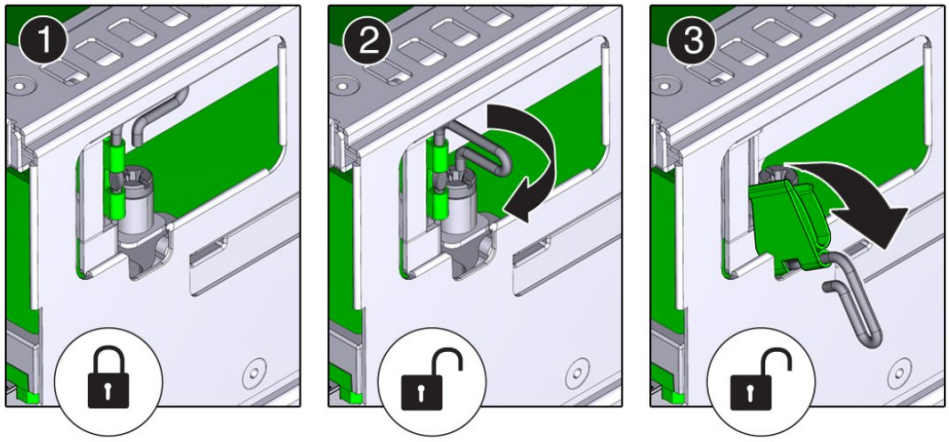
The HBA is located inside the SMOD and is accessible through the an upward-facing opening on the right side. In the following illustration, call out 1 shows the locking lever and callout 2 shows the location of the HBA card.

7. **Disconnect the ESM extension cable from the HBA [1].**



8. **To unlock the HBA card, rotate the green release handle outward and then downward [2].**

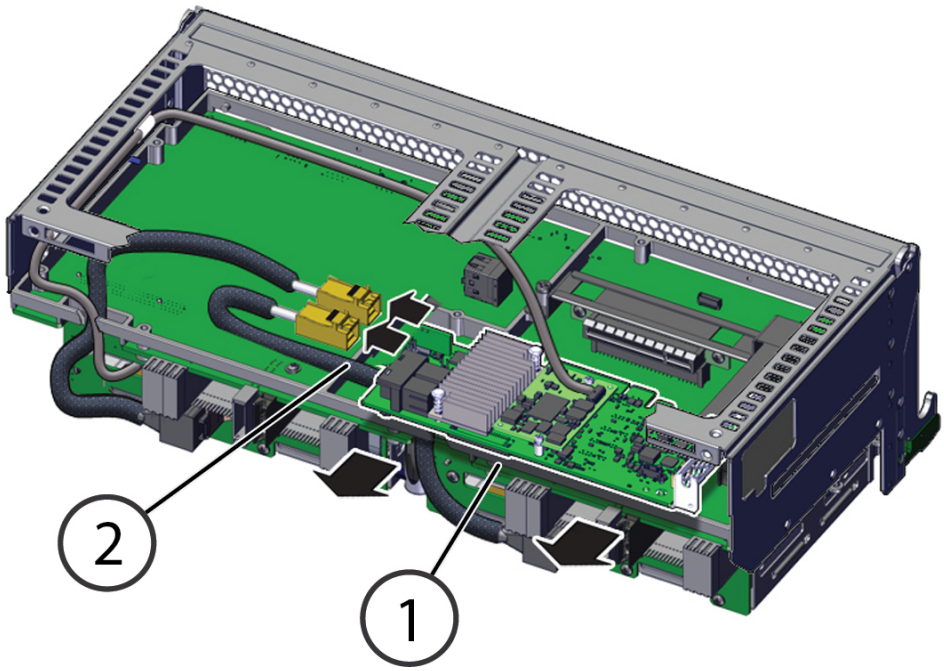
The handle is on the right (vertical) side of the SMOD. To access it, you might need to push it outward from the inside.



9. **To disconnect the HBA card from its connector on the SMOD motherboard, pull the card toward you [1] just far enough so that you can access the SAS cables.**

Note - The two storage drive backplane cables are still attached to the card.

Two cables with mini SAS connectors connect the HBA to the storage drive backplane.



10. **Disconnect the SAS cables from the HBA card [2].**

Note - Do not disconnect the cables from the SMOD.

11. **Remove the HBA card the rest of the way from the SMOD.**

Next Steps

- "Install the HBA Card" on page 201

▼ Install the HBA Card

The host bus adapter (HBA) card is installed in an internal PCIe slot on the SMOD motherboard.

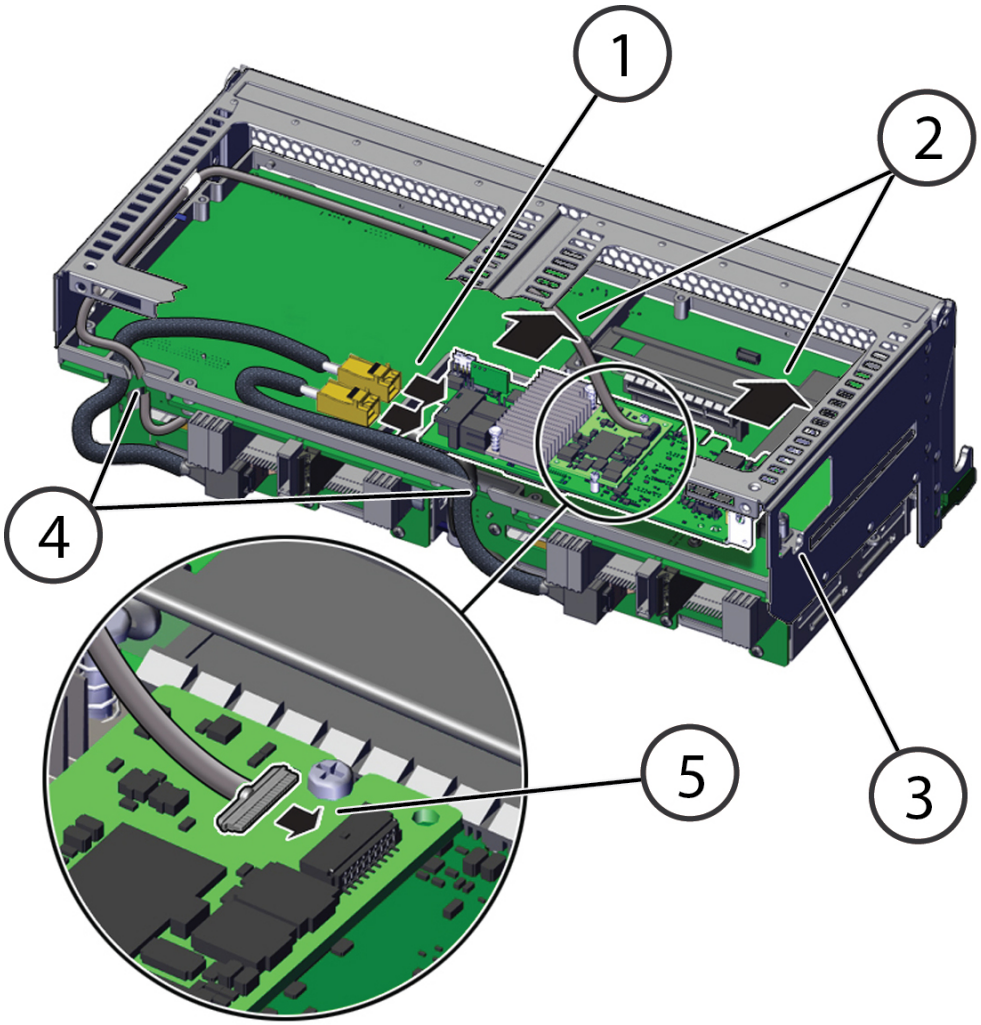
Before You Begin

- "Remove the HBA Card" on page 198

- For component information, see “About System Components” on page 19.

1. **Position the HBA card with the component side facing upward and the edge connector pointed away from you.**

2. **With the SMOD positioned upside down and the back (connector) side facing you, align the HBA card with the opening on the right.**



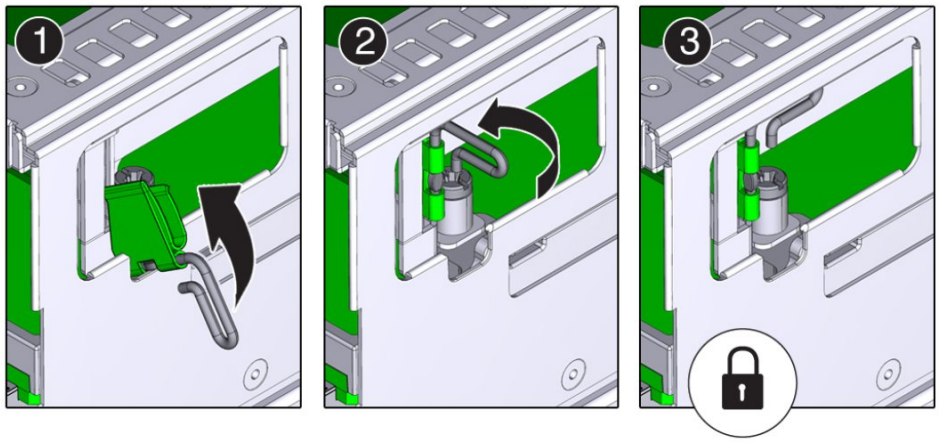
3. **Connect the two backplane cables to the connectors on the HBA card [1].**

4. **Align the connector on the HBA card with the PCIe slot on the SMOD motherboard and then push the HBA card into the slot [2].**

5. **Lock the card and secure the lever (3).**

   a. **To lock the card, rotate the green locking lever upward.**

   b. **Rotate the lever inward so it tucks inside the SMOD frame and does not extend outward.**



6. **Ensure that the cables pass through the cable guides on the edge of the SMOD (4).**

7. **Connect the ESM extension cable to the connector on the HBA (5).**

8. **Install the storage drives. See “Install a Storage Drive” on page 177.**

9. **Clear any related component faults. For more information see “Clear Hardware Fault Messages” on page 230.**

Next Steps

- “Install the SMOD” on page 195

Servicing the Energy Storage Module and Cables

This topic provides instructions for servicing the Energy Storage Module (ESM) and cable. The ESM provides emergency power for the SAS drives.

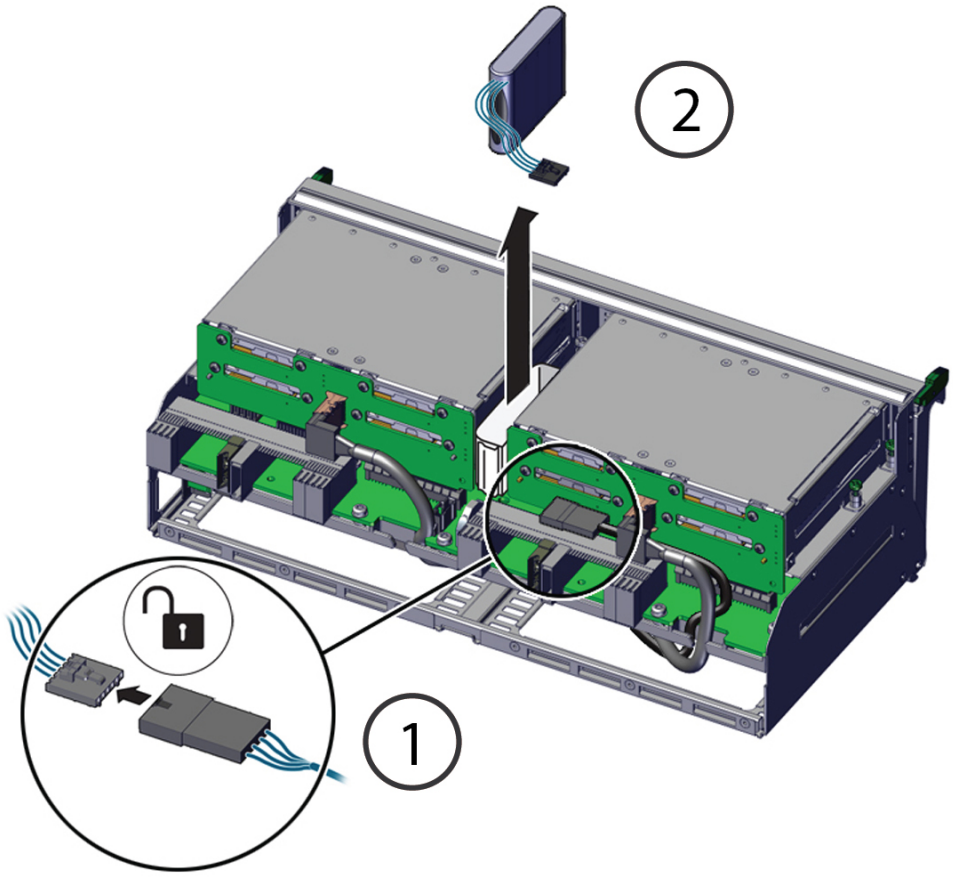
▼ Replace the Energy Storage Module

The Energy Storage Module (ESM) sits in a bracket on the top of the SMOD, between the two disk enclosures.

1. **Prepare the server for cold service. See “Prepare the Server for Cold Service” on page 97.**
2. **Remove the SMOD. See “Remove the SMOD” on page 192.**
3. **Set the SMOD on a flat surface with the back side facing toward you.**

   The ESM is located between the two disk drive enclosures.

4. **Disconnect the ESM connector from the ESM extension cable [1].**

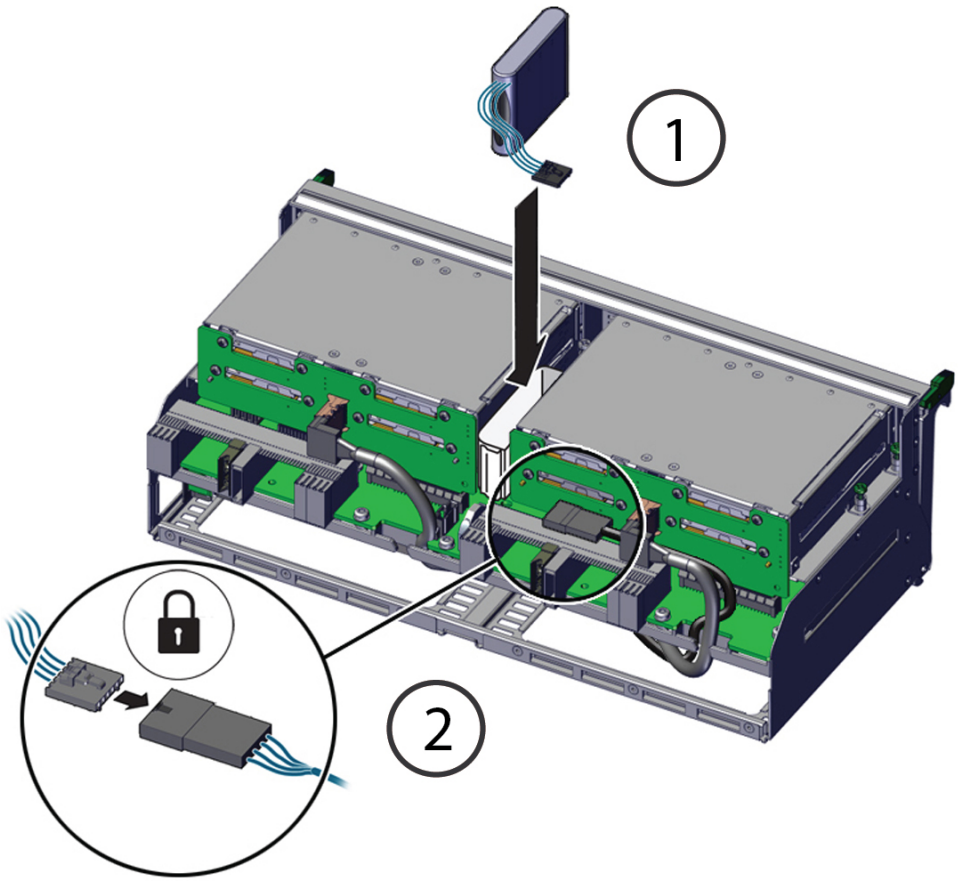


5. **Remove the ESM [2] by lifting it out of position.**

   Lift it straight up and out of position.

6. **Insert the new ESM into the holder so that the cable extends out the top.**

Push it straight down into position..

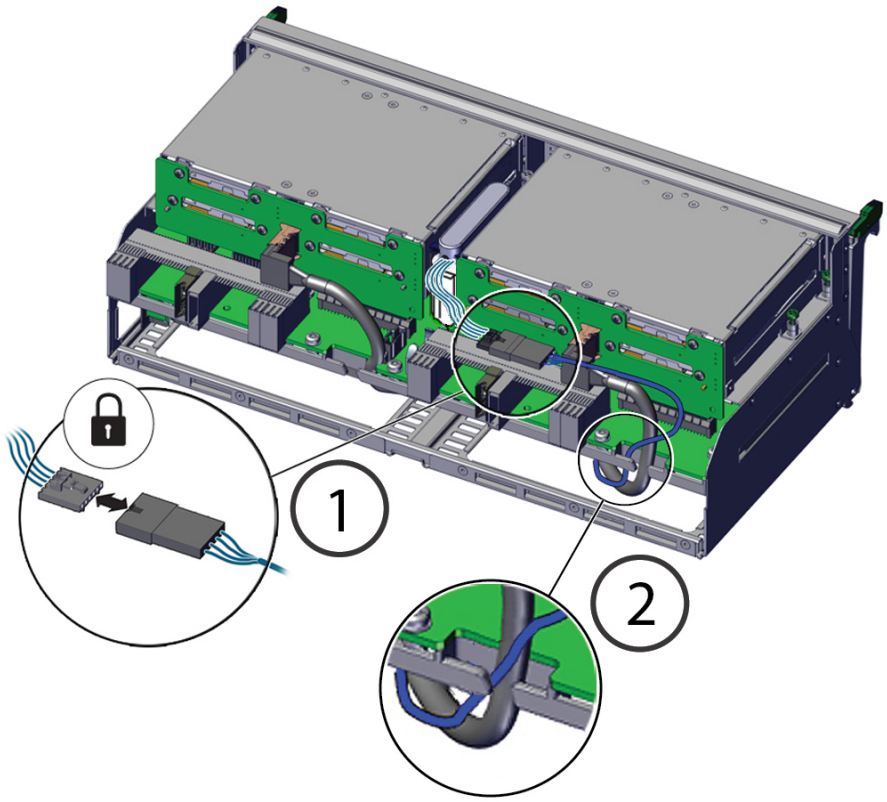


7. **Attach the ESM connector to the ESM extension cable [2].**

▼ Replace the ESM Extension Cable

1. **Prepare the server for cold service. See “Prepare the Server for Cold Service” on page 97.**
2. **Remove the SMOD. See “Remove the SMOD” on page 192.**
3. **Rotate the SMOD 180 degrees so the back (connector) side is facing toward you.**

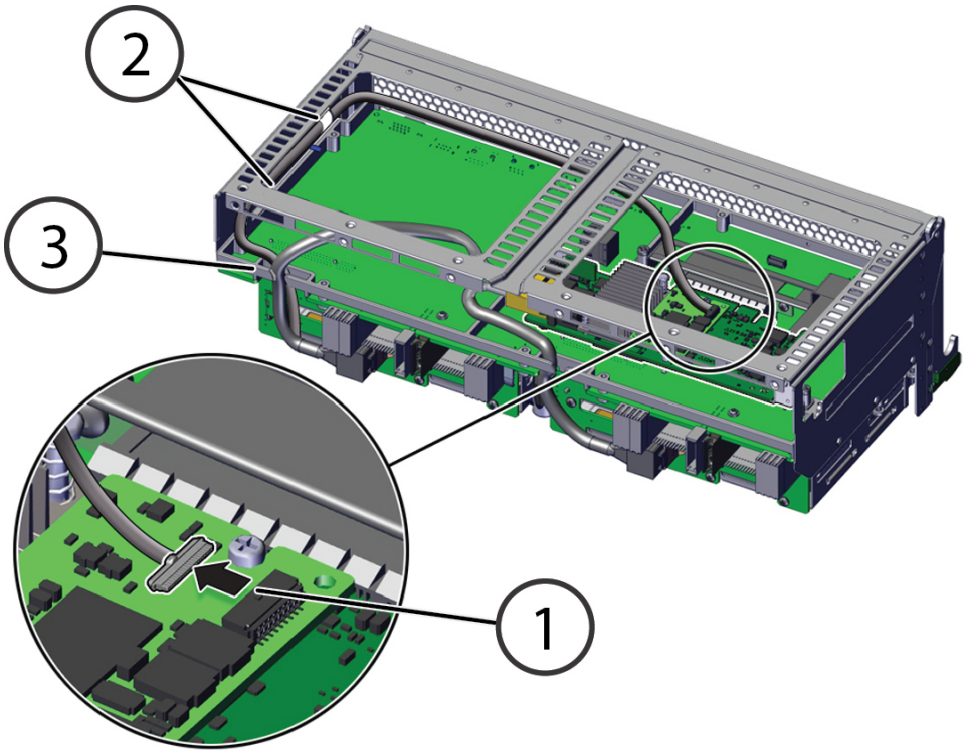
4. **Disconnect the Energy Storage Module (ESM) cable from the ESM extension cable [1].**



5. **Slide the cable out of the slot [2].**

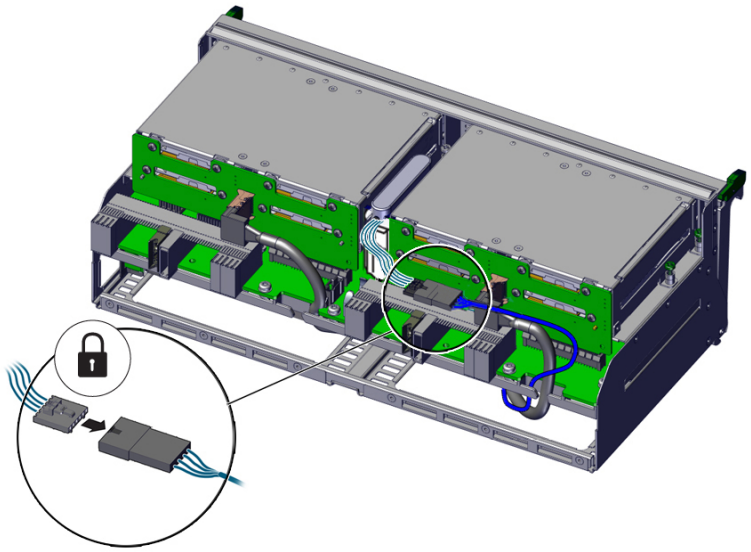
6. **Turn the SMOD over and locate the HBA.**

The connector (back) side of the SMOD should still be facing you.



7. **DIsconnect the ESM extension cable from the HBA [1].**
8. **Disconnect the ESM extension cable from the clips on the enclosure wall [2].**
9. **Remove the old ESM extension cable.**
10. **Route the new ESM extension cable from the HBA, under the support beams, through the clips [2], and through the slot [3].**
11. **Turn the SMOD over.**
12. **Connect the ESM extension cable to the connector on the ESM.**

The connector on the ESM is at the end of a cable that dangles about four inches out of the ESM body.



13. **Inspect the cable to make sure that it is routed correctly and connected to the ESM and the HBA.**

Servicing the SAS Cable

This section contains information about the SAS cables:

- "Replace the SAS Cable" on page 209

▼ Replace the SAS Cable

This is an internal component that is accessible from the rear of the server by removing the SMOD. Perform this procedure to replace the SAS cables on the SMOD.

Before You Begin

- For component information, see "About System Components" on page 19.

1. **Prepare the server for cold service. See “Prepare the Server for Cold Service” on page 97.**
2. **Remove the SMOD. See “Remove the SMOD” on page 192.**
3. **Set the SMOD on a flat surface with the front side facing toward you.**
4. **Close the SMOD handles.**
5. **Rotate the SMOD 180 degrees so the back (connector) side is facing toward you.**
6. **Turn the SMOD upside down and locate the HBA.**

Note - The connector (back) side of the SMOD should still be facing you.

The HBA card is located inside the SMOD and is accessible through the an upward-facing opening on the right side.

7. **Remove the HBA card and disconnect the SAS cables. See “Remove the HBA Card” on page 198.**
8. **Disconnect the SAS cables from the drive backplane.**
9. **Carefully route and remove the SAS cables from the SMOD.**
10. **Connect the replacement cables to the drive backplane.**
11. **Route the replacement SAS cables from the backplane to the SMOD motherboard.**
12. **Ensure that the connectors are routed under the support bracket.**
13. **Install the HBA card. See “Install the HBA Card” on page 201.**

Next Steps

- “Install the SMOD” on page 195

Servicing the Internal USB Flash Drives

This section contains procedures for accessing and servicing a USB flash drive installed in the internal USB ports.

▼ Remove an Internal USB Flash Drive

This is an internal component that is accessible from the rear of the server by removing the SMOD. Perform this procedure to access and remove internal USB flash drives.

Your server might come equipped with a server-specific version of Oracle System Assistant loaded on a USB flash drive and installed (at the factory) in USB port P0. To use Oracle System Assistant, the flash drive must be installed in port P0, and it must contain only files specific to Oracle System Assistant. For more information about Oracle System Assistant, see “Oracle System Assistant” on page 43.

Before You Begin

- For component information, see “About System Components” on page 19.

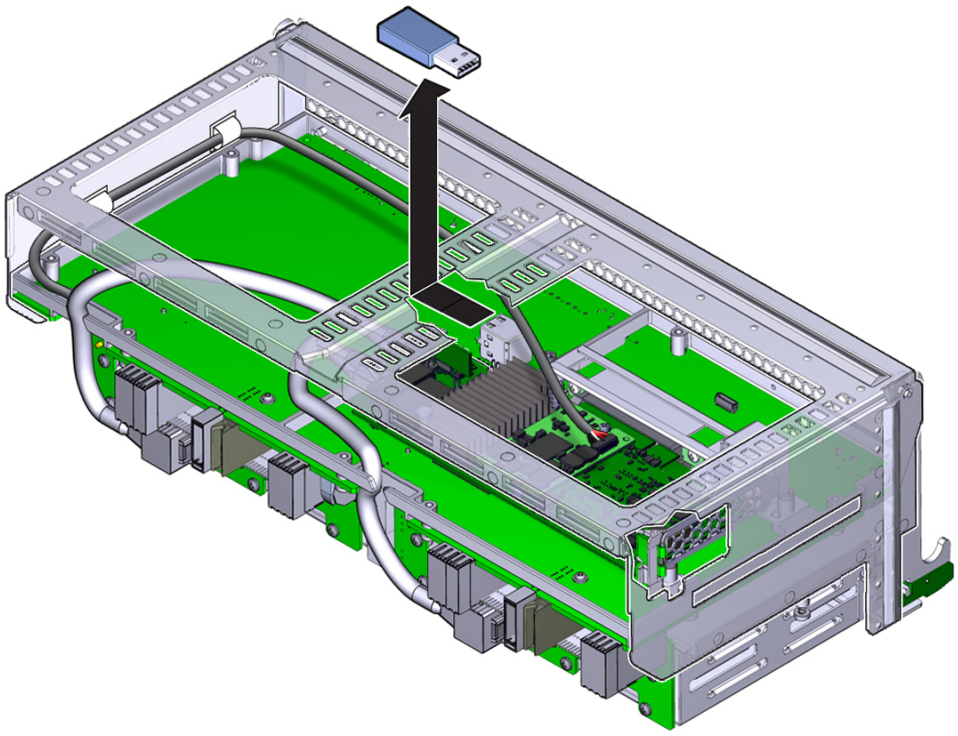
1. **Prepare the server for cold service. See “Prepare the Server for Cold Service” on page 97.**
2. **Remove the SMOD. See “Remove the SMOD” on page 192.**
3. **Set the SMOD on a flat surface with the front side facing toward you.**
4. **Close the SMOD handles.**
5. **Rotate the SMOD 180 degrees so the back (connector) side is facing toward you.**
6. **Turn the SMOD upside down and locate the HBA card.**

Note - The connector (back) side of the SMOD should still be facing you.

The USB flash drive is located inside the SMOD next to the HBA card.

7. **To remove a USB drive, pull it out of its slot.**

Oracle System Assistant, if present, is installed in the upper slot (USB port 0)



Next Steps

- "Install the SMOD" on page 195

▼ Install an Internal USB Drive

Perform this procedure to access and install internal USB flash drives.This is an internal component accessible from the rear of the server by removing the SMOD.

Before You Begin

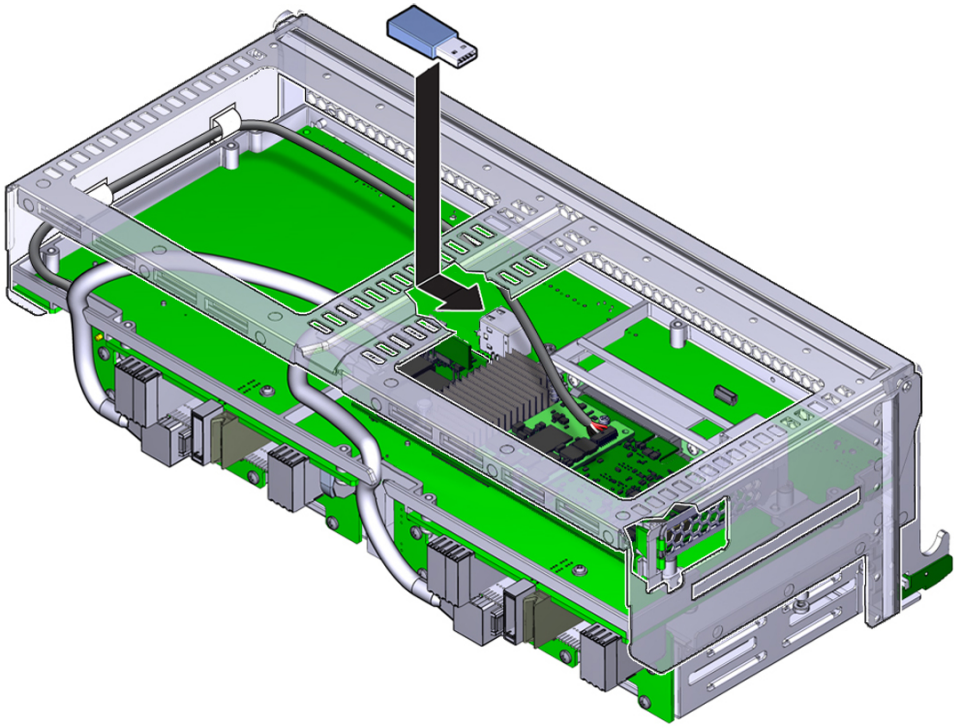
- For component information, see "About System Components" on page 19.

1. **Prepare the server for cold service. See "Prepare the Server for Cold Service" on page 97.**
2. **Remove the SMOD. See "Remove the SMOD" on page 192.**

3. **Set the SMOD on a flat surface with the front side facing toward you.**
4. **Close the SMOD handles.**
5. **Rotate the SMOD 180 degrees so the back (connector) side is facing toward you.**
6. **Turn the SMOD upside down and locate the HBA card.**

Note - The connector (back) side of the SMOD should still be facing you.

The USB flash drive ports are located inside the SMOD next to the HBA card.



7. **To install the USB drive, insert it into its slot.**

   If you are installing Oracle System Assistant, place it in the upper slot (USB port 0).

8. **If you replaced the Oracle System Assistant USB flash drive, reinstall Oracle System Assistant on the new USB flash drive.**

For instructions, see the *Oracle X5 Series Servers Administration Guide* at `https://www.oracle.com/goto/x86admindiag/docs`.

Next Steps

- "Install the SMOD" on page 195

▼ Replace the Real Time Clock (System) Battery

Perform this procedure to replace a failed system battery (also known as an RTC battery).

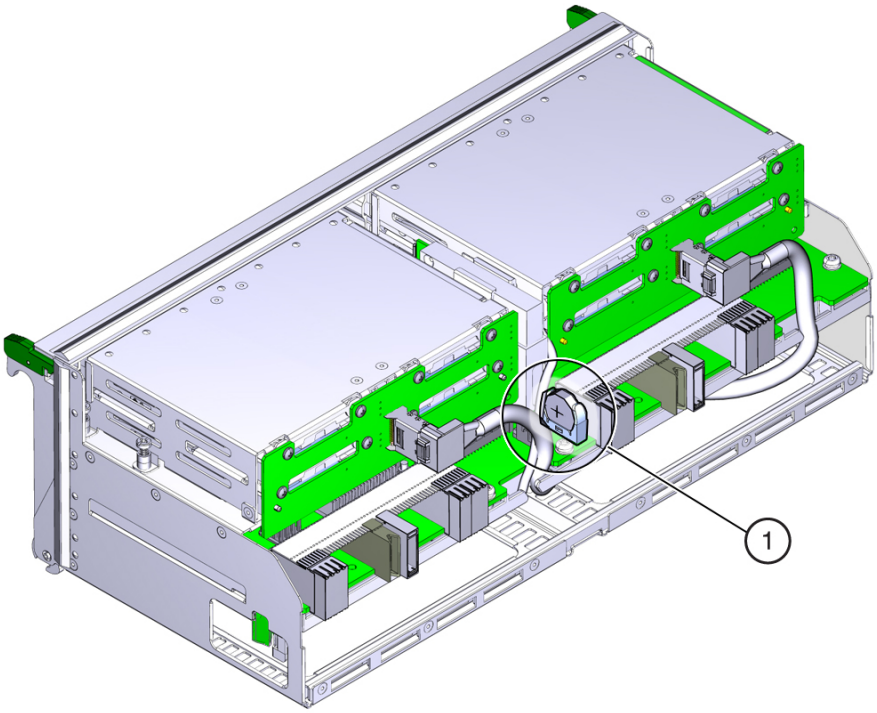
This is an internal component accessed from the rear of the server by removing the SMOD.

Before You Begin

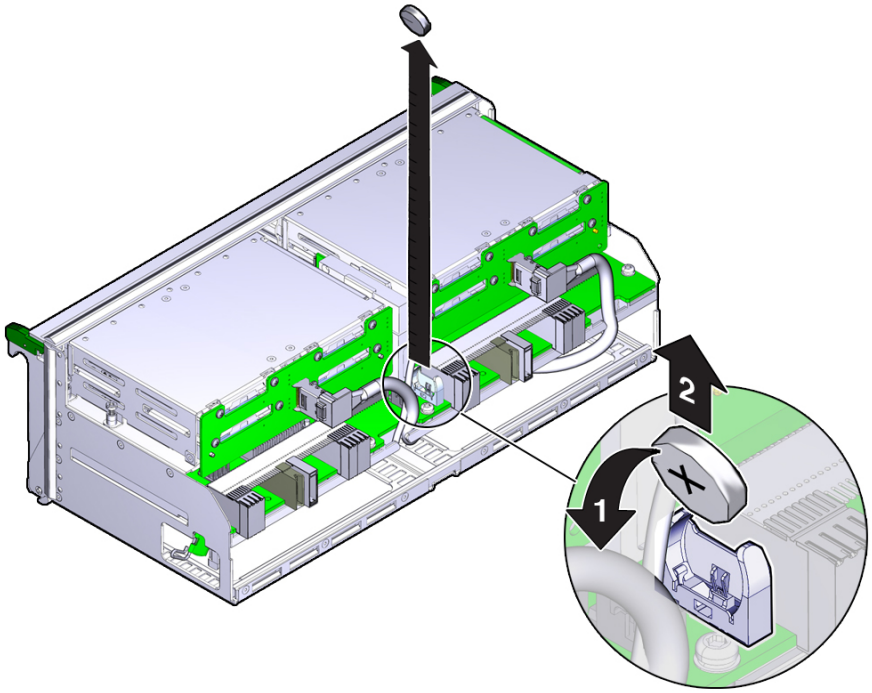
- For component information, see "About System Components" on page 19.
- The system battery type: CR 2032

1. **Prepare the server for cold service. See "Prepare the Server for Cold Service" on page 97.**
2. **Remove the SMOD. See "Remove the SMOD" on page 192.**
3. **Set the SMOD on a flat surface with the back side facing toward you.**

The system battery is located on the SMOD motherboard.



4. **To remove the battery, pull it up and out of its holder.**

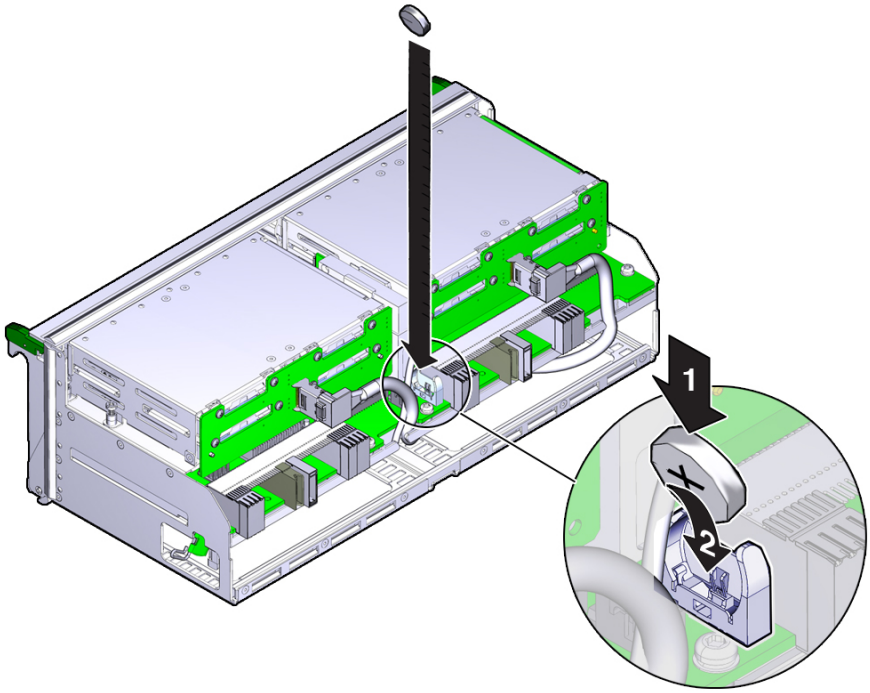


5. **To orient the replacement battery, ensure that the positive (+) side of the battery is facing away from the holder.**

6. **To install the battery, set it in the holder and push it inward.**

   The battery snaps into place.

Make sure the positive pole (+) is facing outward.



7. **Ensure that the battery is properly seated in its holder.**

   The battery must be square in the holder.

Note - If necessary, once the server is operational, access the BIOS Setup Utility to set the clock.

Next Steps

- "Install the SMOD" on page 195

Replace the Midplane Assembly

Caution - Hazardous voltage. Possibility of electrical shock if the power cables are connected to the server when accessing the midplane and bus bar assembly. This is a cold-service procedure. Power down the system and disconnect all power cables before removing the server access panels.

This procedure requires that the server is removed from the rack. Removing all front-side and back-side components lessens the weight of the server.

Use this procedure to replace a failed bus bar midplane assembly.

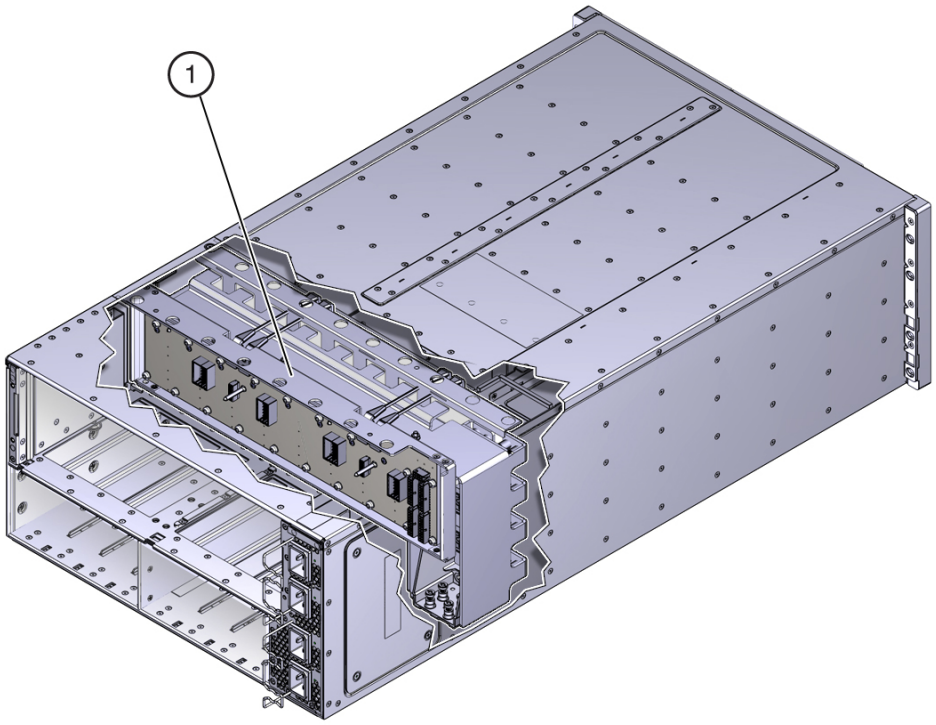
Before You Begin This procedure requires a Phillips screwdriver.

1. **Prepare the server for cold service. See "Prepare the Server for Cold Service" on page 97.**
2. **At the front of the server:**
   a. **Remove all eight fan modules. See "Remove a Fan Module" on page 115.**
   b. **Remove both fan frames. See "Remove a Fan Frame" on page 120.**
   c. **Remove the CMODs. See "Remove a CMOD" on page 135.**
   d. **Remove the four PSUs. See "Remove a PSU" on page 124.**
   e. **Remove the FIM. See "Remove the FIM" on page 131.**
3. **At the rear of the server:**
   a. **Remove any cables attached to the rear of the server.**
      Before removing cables, label each one, noting its connection point.
   b. **Remove the SMOD. See "Remove the SMOD" on page 192.**
   c. **Remove all eight DPCCs. See "Remove a DPCC" on page 180.**
      Before removing the DPCCs, label each one populated with PCIe cards, noting its slot location. For slot designations, see "DPCC and PCIe Card Slot Designations" on page 28.

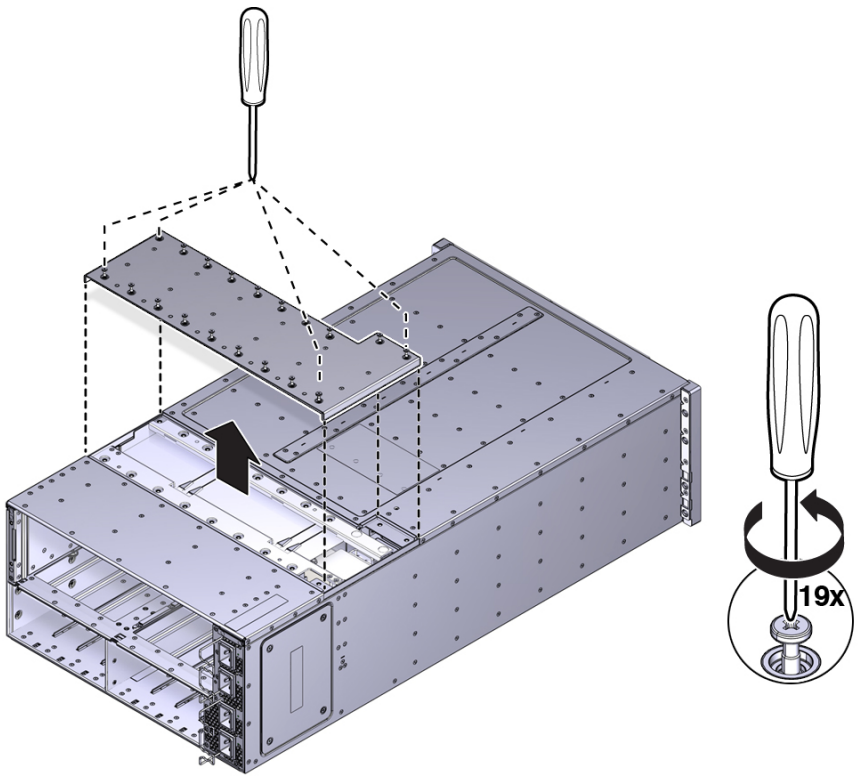
4. **Remove the eight screws that secure the server to the rack at the front of the server.**

5. **Use a lift to remove the server from the rack.**

   The midplane assembly is located inside the server. In the following illustration, call out 1 shows the location of the midplane assembly.



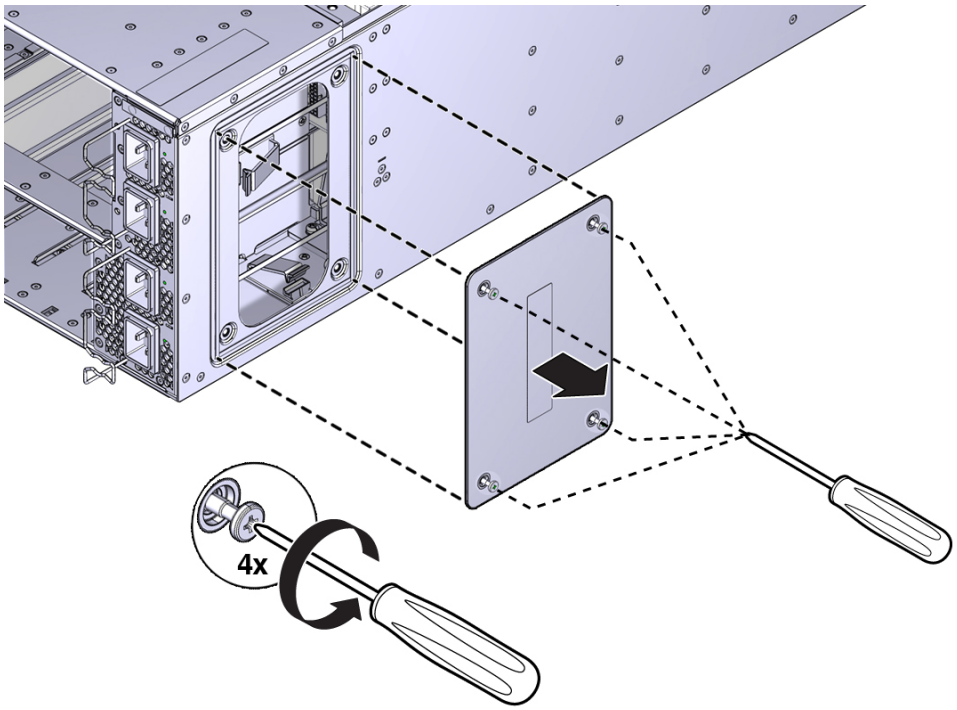
6. **Loosen the 19 captive screws on the top access panel and remove the panel.**



7. **Carefully remove and retain the protective black plastic insert that covers the top of the midplane assembly.**

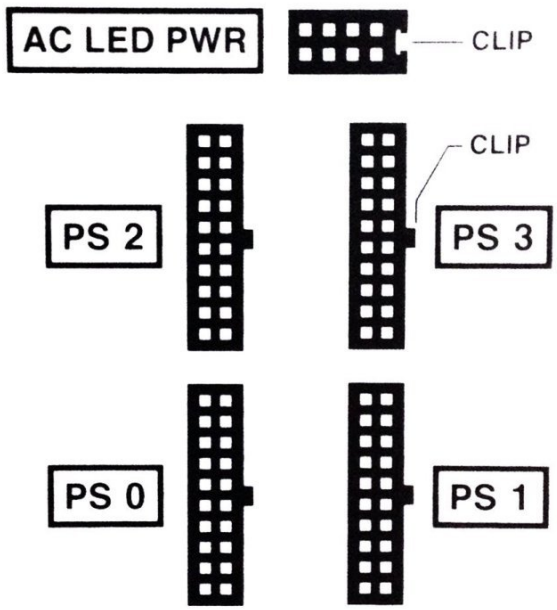
   Note the orientation of the insert with respect to the opening. The insert is fitted to the opening using tabs and flaps.

8. **Loosen the four captive screws that secure the left side (from the front) access panel and remove the panel.**



The opening behind the access panel provides access to five cables (four 20-pin PSU cables and one 8-pin cable for the AC power indicator LEDs) that are routed through the server and are connected to the backside of the midplane assembly. To remove the midplane assembly, disconnect these connectors. As an aid, a label on the side of the chassis shows the arrangement and labeling of the five connectors.

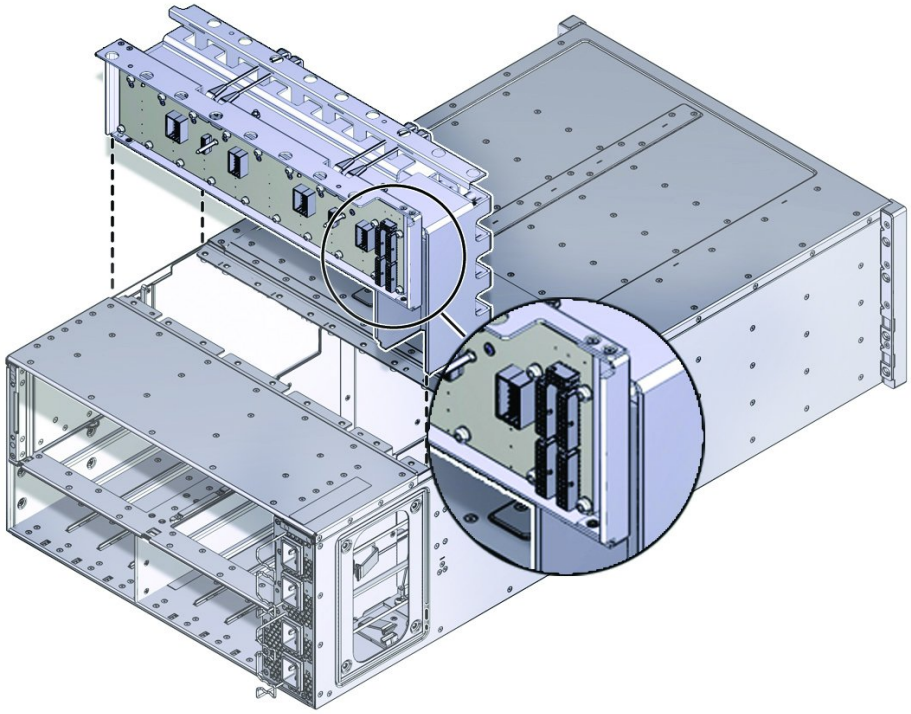
The following illustration shows a portion of the label.



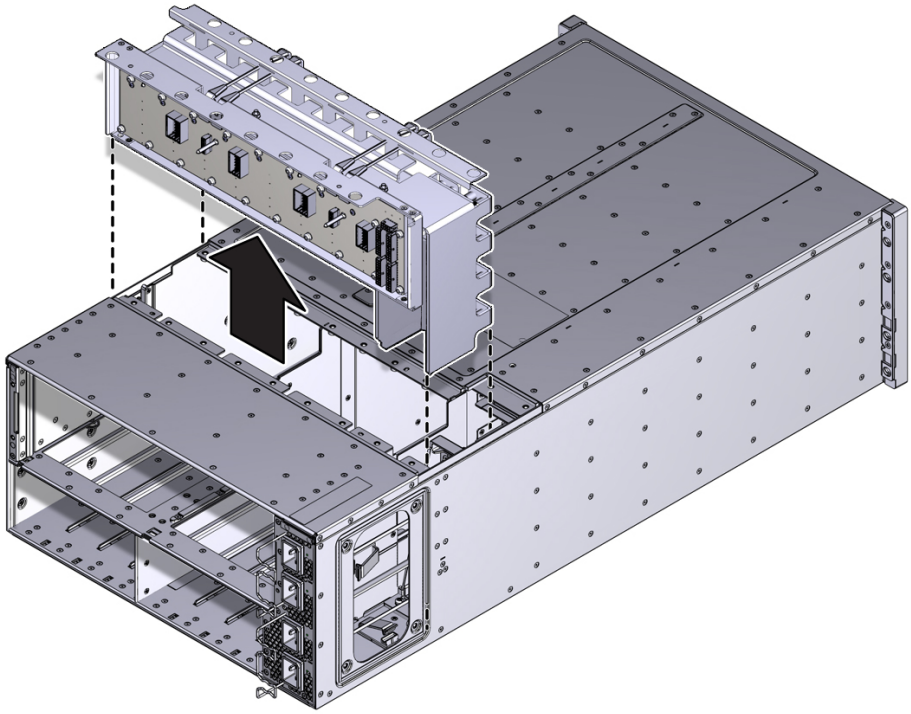
9. **Reach into the side access opening and disconnect the five connectors from the back of the midplane assembly.**

Tip - To see the connectors, direct the light from a flashlight through the small opening in the top access just above the cable connect points.

The following illustration shows the location and arrangement of the connectors on the back of the midplane.



10. **Lift the midplane assembly out of the server chassis from the top access opening.**



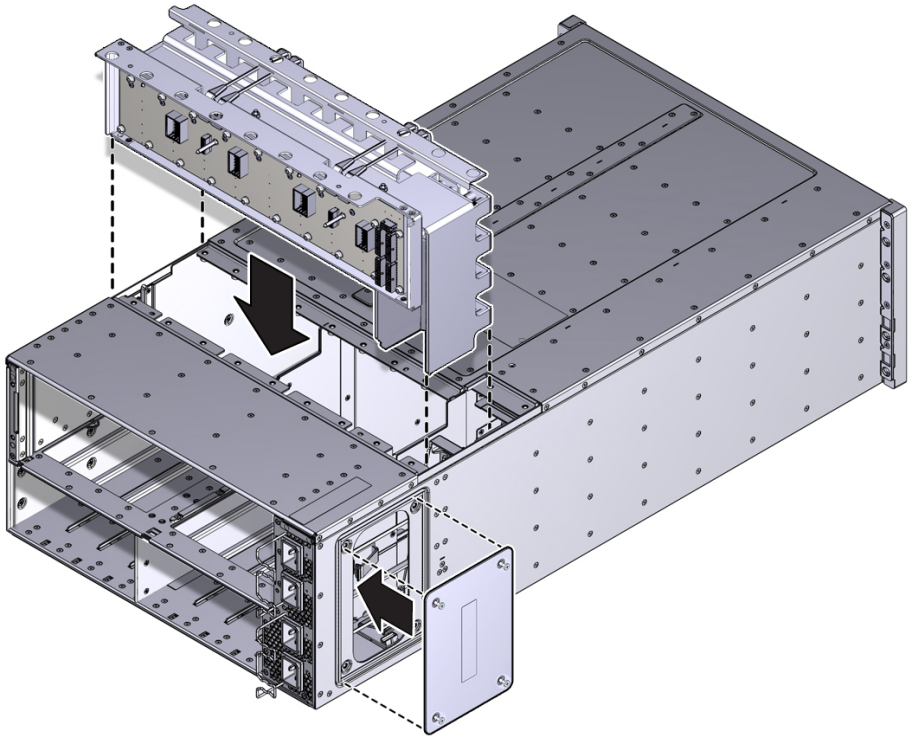
11. **Position the cables so the connectors are hanging outside of the server chassis's side access opening.**

    The cables inside the chassis should lie flat, so they are not damaged during the installation of the replacement midplane assembly.

12. **Align and position the replacement midplane assembly in the opening in the top of the server.**

13. **Carefully lower the midplane assembly into the server until the top of the assembly is flush with the top of the server.**

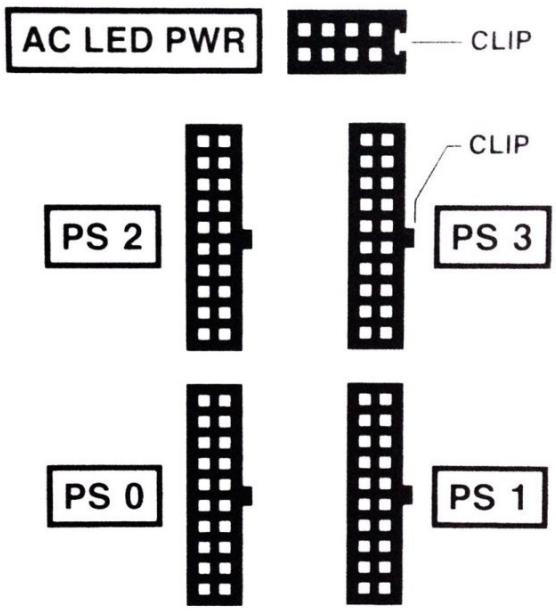
Take care not to damage the cables and connectors when lowering the midplane assembly into the server.



14. Connect the five cables to the connectors on the back of the midplane assembly.

Ensure that the connectors are positioned correctly, so the key (protrusion) on the side of the connector is aligned with the notch in the connector on the midplane assembly. For best access

and visibility, first attach the cable labeled PS 0, then PS 2, followed by PS 1, and finally PS 3. Attach the cable for the AC power indicator board last.



15. **Position the side access cover at the access opening, ensuring that the four captive screws are aligned with the holes in the side of the chassis.**

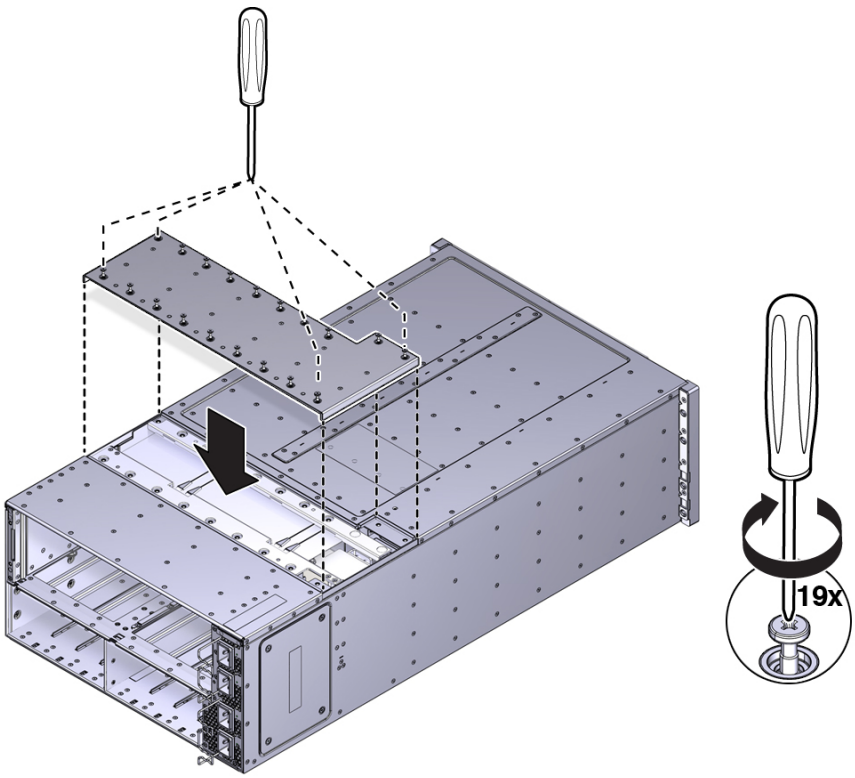
16. **To secure the access cover to the chassis, tighten the four captive screws.**

17. **Install the black plastic insert over the top of the midplane assembly.**

    Ensure that the orientation of the insert is correct. The insert is fitted to the opening using tabs and flaps.

18. **Align the top access cover with the opening in the top of the chassis.**

19. **To secure the cover to the chassis, tighten the 19 captive screws.**



20. **Install the chassis in the rack.**

21. **At the front of the server:**

    a. **Install the CMODs. See “Install a CMOD” on page 140.**
    Your server might have four CMODs, or it might have eight.

    b. **Install both fan frames. See “Install a Fan Frame” on page 122.**

    c. **Install all eight fan modules. See “Install a Fan Module” on page 118.**

    d. **Install the FIM. See “Install the FIM” on page 132.**

e. **Install the four PSUs. See “Install a PSU” on page 127.**

22. **At the rear of the server:**

    a. **Install the SMOD. See “Install the SMOD” on page 195.**

    b. **Install all eight DPCCs. See “Install a DPCC” on page 188.**

       For slot designations, see “DPCC and PCIe Card Slot Designations” on page 28.

    c. **Attach cables to their respective connectors and ports at back side of the server.**

23. **Prepare the server for operation. See “Returning the Server to Operation” on page 229.**

Returning the Server to Operation

This section describes how to return the server to service after performing cold service.

Description	Link
Steps for returning the server to operation after cold service.	“Prepare the Server for Operation” on page 229
Steps for server power-on options.	“Power On the Server” on page 230
Clear hardware fault messages.	“Clear Hardware Fault Messages” on page 230

▼ Prepare the Server for Operation

Use this procedure to return the server to an operational state after performing cold service.

1. **Ensure that all external front and rear components are fully installed.**
2. **Ensure that all cables are connected to the rear of the server.**
3. **Connect all AC power cables to their inlets on the rear of the server and verify that they are locked.**

   The retaining clips lock the power cables and prevent accidental disconnect.

   To ensure redundancy, power for the server should come from at least two separate circuits.
4. **If necessary, connect the other end of the AC power cables to the supply outlet.**
5. **Ensure that the server is powering into standby power mode.**

   When AC power is applied to the server power inlets, the server boots into standby power mode. For information, see “Server Boot Process and Normal Operating State Indicators” on page 71.
6. **Verify that none of the server Service Action Required indicators on externally facing indicator panels are lit.**

Note - After replacing some components, you must clear their fault in Oracle ILOM to clear their fault indicators. For details, see "Clear Hardware Fault Messages" on page 230

7. **Power on the server.**

Next Steps

- "Power On the Server" on page 230

Power On the Server

When AC power is applied to the server power inlets, the server boots into standby power mode. For information, see "Server Boot Process and Normal Operating State Indicators" on page 71.

Use the following procedure to reapply main power for all server components.

1. **Ensure that the server is in standby power mode.**
2. **To power on the server, do one of the following:**
   - **From the front of the server, press and immediately release the Power button on the server front panel.**
   - **From the Oracle ILOM web interface Summary (home) screen, click Power State Turn On button.**
   - **From the Oracle ILOM command-line interface (CLI), type:**

     ```
     start /System
     ```

Note - When the server powers on, the power-on self-test (POST) can take several minutes to complete.

Clear Hardware Fault Messages

After servicing the following components, you must clear the fault event in Oracle ILOM:

- PCIe card
- HBA

- Front Indicator Module (FIM)
- Processor (CPU)

Use the Oracle ILOM CLI to access the Fault Management shell, fmadm. For details, see https://www.oracle.com/goto/ilom/docs.

Before You Begin

- This procedure uses 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 X5 Series Servers Administration Guide*.

   The Oracle ILOM CLI prompt appears:

   ```
   ->
   ```

2. **To access fmadm, type:**

   start /SP/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 documentation at: `https://www.oracle.com/goto/ilom/docs`

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.**

BIOS Setup Utility

This section provides instructions for using the BIOS setup utility, which includes a menu-driven user interface used to change BIOS settings. It includes:

▼ 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 234.

3. **Use the direction arrows to navigate through the selections.**

BIOS Setup Utility Screens

Each tab on the main BIOS Setup utility screen opens one of the top level screens. The following table lists and describes the tabs and the corresponding screens.

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 or UEFI), Oracle System Assistant Configuration, and boot option priority.
Exit	Saves or discards changes.

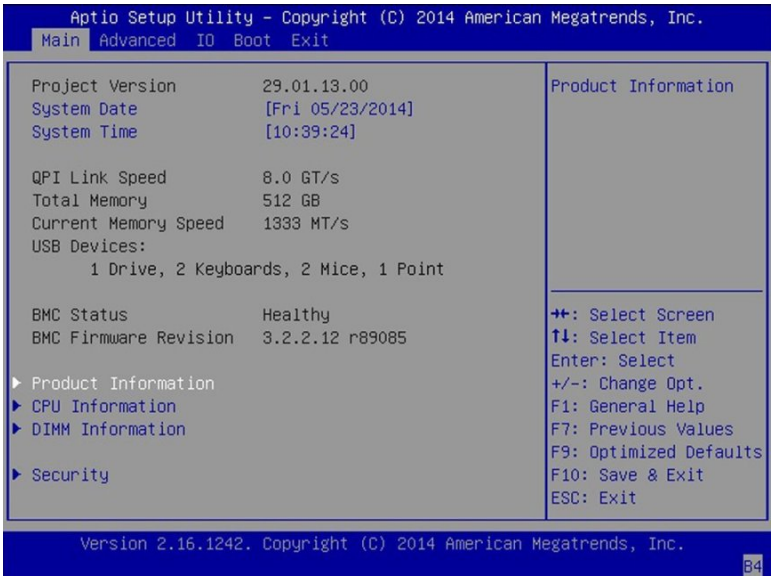
This section contains screen captures of BIOS Setup utility screens. To access the BIOS Setup utility, see “Access the BIOS Setup Utility” on page 233.

The following sections describe each of the top-level BIOS screens. Each section includes a picture of the screen and a table describing the selectable items on the screen.

Other items on the screen either provide additional information, or open another screen.

Main Screen (Legacy)

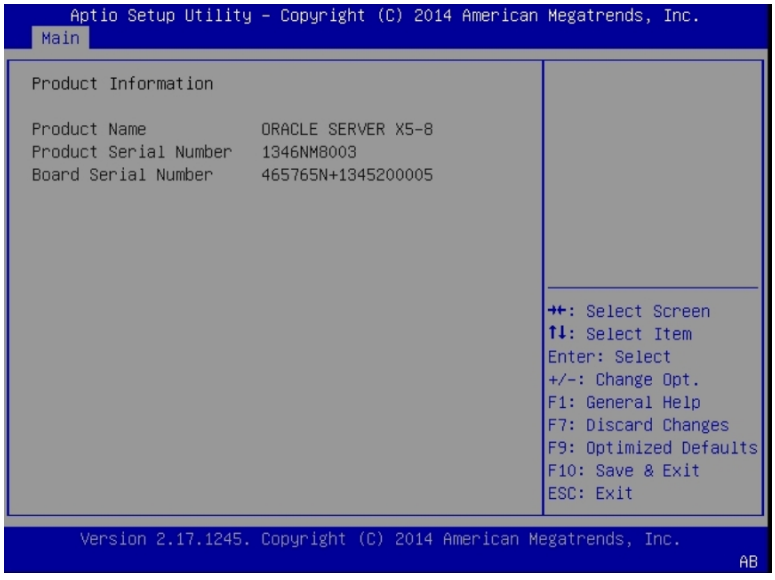
The following table describes the selections on the BIOS Main screen.

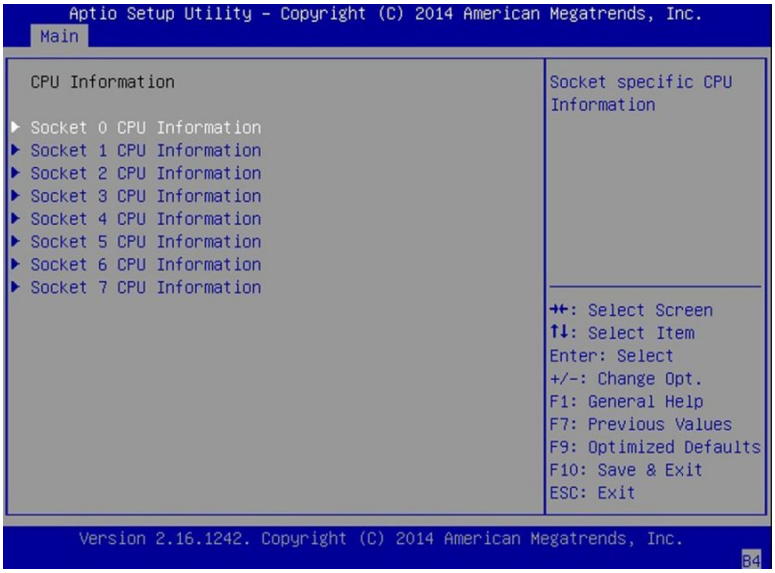


Main Setup Options	Options	Description
Project Version (R/O)		BIOS version. This string is a unique identifier used to reference a specific BIOS release. Format is XXYYZZPP, which indicates: XX - Unique project/platform code. YY - BIOS major release. ZZ - BIOS minor release. PP - Build number. Example: 18.01.04.01 System Date
System Date		Current date. You can change the date setting. Example: [Thu 03/05/2013]
System Time		Current time. You can change the time setting. Example: [13:38:27]
QPI Link Speed (R/O)	SLOW, 6.4 GT/s 7.2 GT/s 8.0 GT/s	Intel Quick Path Interconnect (QPI) operational speed.
Total Memory (R/O)		Memory in gigabytes. Example: 64 GB (DDR3)
Current Memory Speed (R/O)		Memory speed. Example: 1333 MHz
USB Devices (R/O)		Detected USB devices. Example: 1 drive, 2 keyboards, 2 mice, 1 point

Main Setup Options	Options	Description
BMC Status (R/O)		Normally "Healthy"
BMC Firmware Revision (R/O)		The service processor firmware version. Example: 3.3.2.0 r85361
Product Information (R/O)		Product information.
Product Name		Product name. Example: Oracle Server X5-8
Product Serial Number		Product serial number. Example: a12345b12345
Board Serial Number		Board serial number. Example: 489089M+11280W0041
CPU Information (R/O)		Attributes of a single processor (CPU) are defined. A separate information structure is provided for each processor supported in the system. Most of the values are dependent on the processor.
Socket 0 CPU Information		If CPU socket 0 is populated, the following options are listed. Otherwise, displays “Not Present.”
Intel CPU @ 2.80 GHz		Processor ID brand.
CPU Signature		Processor (CPU) information. Example: 306E7
Microcode Patch		Software update (microcode patch) information. Example: 704
Max CPU Speed		Maximum non-turbo speed of the processor. Example: 2800 MHz
Min CPU Speed		Minimum speed of the processor.
Processor Cores		Number of available processor cores. Example: 15
Intel HT Technology		Indicates whether Intel Hyper Threading is supported.
Intel VT-x Technology		Indicates whether Intel Virtualization Technology is supported.
L1 Data Cache		Example: 32 KB x 15
L1 Code Cache		Example: 32 KB x 15
L2 Cache		Example: 256 KB x 15
L3 Cache		Example: 38400 KB
DIMM Information (R/O)		Memory module (DIMM) presence and size information are displayed.
Processor X DIMMs		If DIMM is present, memory size in gigabytes. Otherwise, displays “Not Present.”
D0...D23		Shows where DIMM is installed and memory size in gigabytes. Example: Processor 0 DIMMs D0 – 32 GB D1 – 32 GB D2 – 32 GB D3 – 32 GB D4 – 32 GB D5 – 32 GB

Main Setup Options	Options	Description
		D6 – 32 GB D7 – 32 GB D8 – 32 GB D9 – 32 GB D10 – 32 GB D11 – Not present D12 – 32 GB D13 – Not present D14 – Not present D15 – Not present D16 – Not present …
Security Setting		Configure the security setting.
Administrator Password		Set the Administrator password.




Aptio Setup Utility – Copyright (C) 2014 American Megatrends, Inc.
Main
CPU Information
Socket 0 CPU Information
Socket 1 CPU Information
Socket 2 CPU Information
Socket 3 CPU Information
Socket 4 CPU Information
Socket 5 CPU Information
Socket 6 CPU Information
Socket 7 CPU Information
Socket specific CPU Information
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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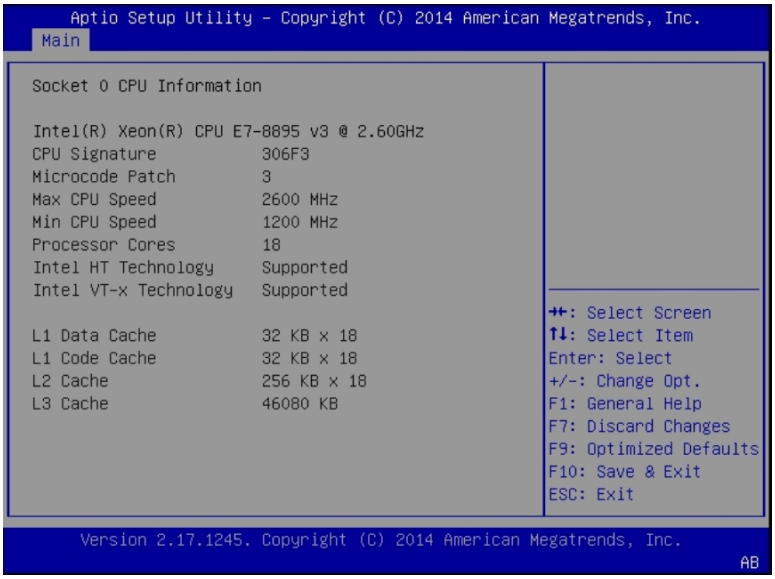
B4


Aptio Setup Utility – Copyright (C) 2014 American Megatrends, Inc.
Main
Socket 0 CPU Information
Intel(R) Xeon(R) CPU E7-8895 v3 @ 2.60GHz
CPU Signature 306F3
Microcode Patch 3
Max CPU Speed 2600 MHz
Min CPU Speed 1200 MHz
Processor Cores 18
Intel HT Technology Supported
Intel VT-x Technology Supported
L1 Data Cache 32 KB x 18
L1 Code Cache 32 KB x 18
L2 Cache 256 KB x 18
L3 Cache 46080 KB
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Discard Changes
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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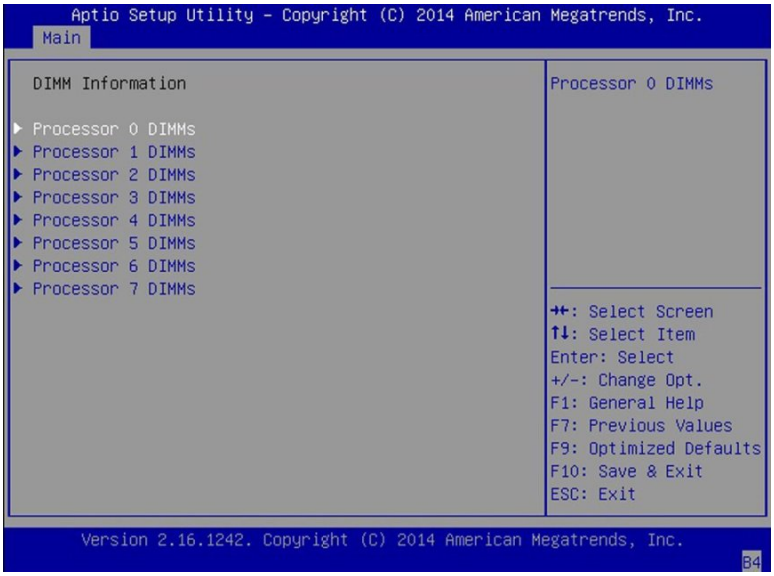
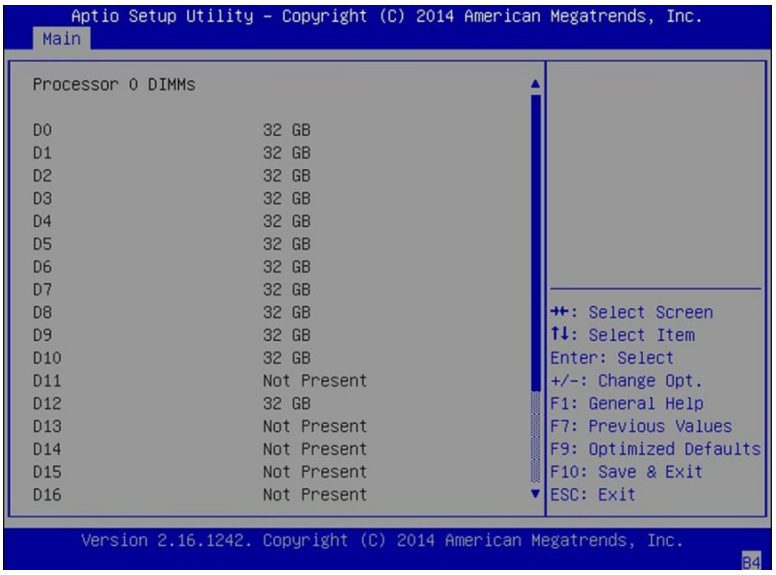
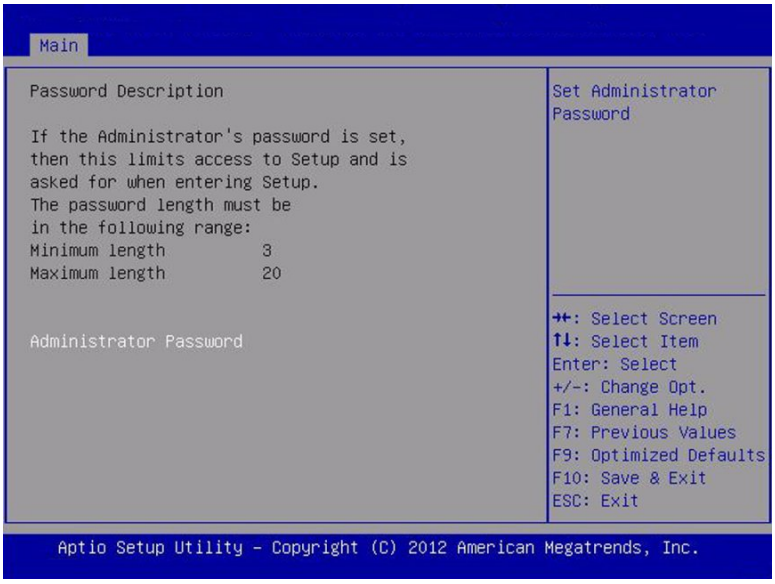
AB


Aptio Setup Utility – Copyright (C) 2014 American Megatrends, Inc.
Main
DIMM Information
Processor 0 DIMMs
Processor 1 DIMMs
Processor 2 DIMMs
Processor 3 DIMMs
Processor 4 DIMMs
Processor 5 DIMMs
Processor 6 DIMMs
Processor 7 DIMMs
Processor 0 DIMMs
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2014 American Megatrends, Inc.
B4

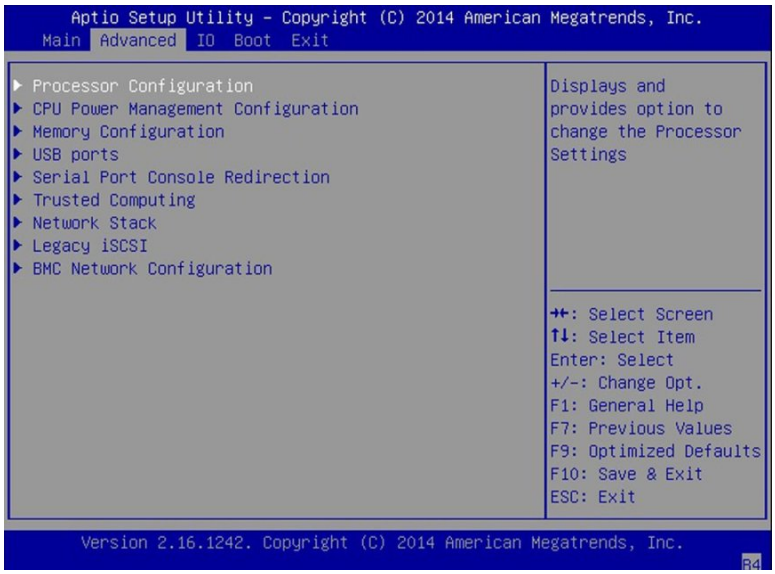

Aptio Setup Utility – Copyright (C) 2014 American Megatrends, Inc.
Main
Processor 0 DIMMs
D0 32 GB
D1 32 GB
D2 32 GB
D3 32 GB
D4 32 GB
D5 32 GB
D6 32 GB
D7 32 GB
D8 32 GB
D9 32 GB
D10 32 GB
D11 Not Present
D12 32 GB
D13 Not Present
D14 Not Present
D15 Not Present
D16 Not Present
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
Version 2.16.1242. Copyright (C) 2014 American Megatrends, Inc.
B4



Advanced Screen (Legacy)

The following sections show the sub-selections on the Advanced screen.

Advanced - Processor Configuration



Advanced Setup Options	Options	Defaults	Description
Processors			Enable or disable processor (CPU) features.
Hyper-threading	Disabled/Enabled	Enabled	When enabled, two threads are available per enabled core. When disabled, only one thread per enabled core is available.
Execute Disable Bit	Disabled/ Enabled	Enabled	When enabled, execute disable bit can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Oracle Solaris, Oracle VM, Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, and VMware ESXi).
Hardware Prefetcher	Disabled/ Enabled	Enabled	Enable the mid-level cache (L2) streamer prefetcher.
Adjacent Cache Line Prefetch	Disabled/ Enabled	Enabled	Enable the mid-level cache (L2) prefetching of adjacent cache lines.
DCU Streamer Prefetcher	Disabled/ Enabled	Enabled	Enable prefetching of next L1 data line based on multiple loads in same cache line.
DCP IP Prefetcher	Disabled/ Enabled	Enabled	Enable prefetching of next L1 line based on sequential load history.

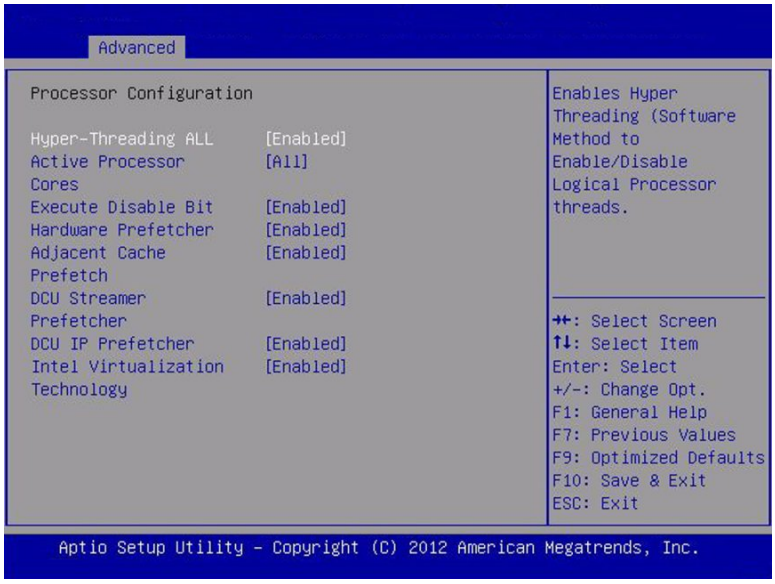
Advanced Setup Options	Options	Defaults	Description
Intel Virtualization Technology	Disabled/ Enabled	Enabled	When enabled, a Virtual Machine Manager (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology.
CPU Power Management Configuration			Displays processor (CPU) information. BIOS provides C-states, P-states, and T-states support in order for the OS to manage the power utilization of the system. Power management is also controlled by the service processor based on system policies.
Power Technology	Disabled/ Enabled/ Efficient/ Custom	Efficient	Enable the power management features. The following options are not displayed if Power Technology is set to Disabled.
Intel SpeedStep	Disabled/ Enabled	Enabled	Displays only if Power Technology is set to Custom. Enable or disable Intel SpeedStep. The Intel technology used to support P-state transitions is referred to as Intel SpeedStep.
CPU C3 Report	Disabled/ Enabled	Enabled	Displays only if Power Technology is set to Custom and power state (C3) is supported by the CPU. Enable or disable CPU C3 (ACPI C2) report to the operating system.
Turbo Mode	Disabled/ Enabled		Displays only if Power Technology is set to Custom, Intel SpeedStep is set to enabled, and TurboMode is supported in the CPU.
Energy Performance	Performance/ Balanced Performance	Balanced Performance	Optimize between performance and power savings. Windows 2008 and later operating systems override this value according to its power plan.
Uncore Frequency Scaling	Disabled/ Enabled	Disabled	Frequency scaling for the uncore portion of the CPU. When Enabled allows uncore portions (I/O) of the CPU to change frequencies along with CPU cores when P-States are changed. If Disabled, uncore portions are not affected by P-State changes.
USB Ports			Set USB port configuration parameters.
EHCI Hand-off	Disabled/ Enabled	Disabled	Enable or disable Enhanced Host Controller Interface (EHCI) hand-off support.
Port 60/64 Emulation	Disabled/ Enabled	Enabled	Enable I/O port 60h/64h emulation support. Enable this setting for the complete USB keyboard legacy support for non-USB aware operating systems.
Rear Port 0	Disabled/ Enabled	Enabled	Enable or disable rear USB Port 0.
Rear Port 1	Disabled/ Enabled	Enabled	Enable or disable rear USB Port 1.

Advanced Setup Options	Options	Defaults	Description
Internal Port 0	Disabled/ Enabled	Enabled	Enable or disable internal USB Port 0. By default, internal port 0 is reserved for Oracle System Assistant.
Internal Port 1	Disabled/ Enabled	Enabled	Enable or disable internal USB Port 1.
Serial Port Console Redirection			Provides the capability to redirect console output/input to the serial port. Graphic output is not redirected. BIOS serial console redirection lets you monitor BIOS POST messages and navigate the BIOS Setup utility menus and Option ROMs from a terminal connected to the server using a serial connection.
EMS Console Redirection	Disabled/ Enabled	Disabled	Enable or disable console redirection for Windows Emergency Management Service (EMS) administration.
Console Redirection	Disabled/ Enabled	Enabled	Enable or disable console redirection.
Terminal Type	VT100/ VT100+/ VT-UTF8/ ANSI	VT100+	Select the emulation for the terminal: VT100: ASCII character set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode characters onto one or more bytes. ANSI: Extended ASCII character set.
Bits per Second	9600/ 10200 / 57600/ 115200	9600	Select the serial port transmission speed. The speed must be matched on the connecting serial device. Long or noisy lines require lower speeds.
Data Bits	07/08/11	8	Select the data bits.
Parity	None/ Even/ Odd/ Mark/ Space	None	A parity bit can be sent with the data bits to detect some transmission errors. None: No parity bits are sent. Even: Parity bit is 0 if the number of 1s in the data bits is even. Odd: Parity bit is 0 if the number of 1s in the data bits is odd. Mark: Parity bit is always 1. Space: Parity bit is always 0. Mark and Space parity do not allow for error detection. They can be used as an additional data bit.
Stop Bits	01/02/11	1	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning of a serial data packet.) The standard setting is

Advanced Setup Options	Options	Defaults	Description
			1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	None/ Hardware/ RTS/ CTS	None	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to restart the flow. Hardware flow control uses two wires to send start and stop RTS (request to send) and CTS (clear to send) signals.
Trusted Computing			If you intend to use the Trusted Platform Module (TPM) feature set, you must configure the server to support TPM. The TPM feature is used by the OS for proof that BIOS code has not been tampered with. For details on modifying TPM, refer to *Oracle X5 Series Servers Administration Guide* at: https://www.oracle.com/goto/x86admindiag/docs
TPM Support	Disabled/ Enabled	Enabled	Enable or disable TPM support. Only UEFI BIOS implements this setup option. If disabled, the OS does not show TPM.
TPM State	Disabled/ Enabled	Disabled	Displays whether TPM Support is enabled.
Current TPM Status Information (R/O)			If TPM Support is disabled, Current TPM Status displays "TPM SUPPORT OFF." If TPM Support is enabled, Current TPM Status displays: TPM Enabled
Network Stack			Configure network stack settings.
Network Stack	Disabled/ Enabled	Enabled	Enable or disable the UEFI network stack.
Legacy iSCSI			Enabled allows booting to iSCSI in Legacy Boot Mode.
BMC Network			Configure Baseboard Management Controller (BMC) network parameters.
BMC Network: Current Active Management Port (R/O)	Disabled/ Enabled	Enabled	Active management port settings are displayed.
Refresh			Refresh current BMC network information with the latest information from the service processor.
Active Management Port	NETMGT/ NET0/ NET1/ NET2/		Change the management port that is currently active.

Advanced Setup Options	Options	Defaults	Description
	NET3		
Commit			Commit the current BMC network information.
IPv4 Configuration (R/O)			Current configuration of the IPv4 settings.
Channel Number (R/O)			Current channel number.
IPv4 Assignment (R/O)	Static/Dynamic	Static	View whether the service processor is assigned a static IPv4 address or assigned a dynamic IPv4 address using Dynamic Host Control Protocol (DHCP).
Current IPv4 Address in BMC (R/O)			Current IPv4 address of the service processor. Example: 172.31.255.255
Current IPv4 MAC Address in BMC (R/O)			Current IPv4 MAC address for the service processor. Example: 00:12:46:BE:0A:02
Current IPv4 Subnet Mask in BMC (R/O)			Current IPv4 subnet mask address for the service processor. Example: 255.255.255.0
Refresh			Select Refresh to update to the current settings.
IPv4 Address			If IPv4 Assignment is set to Static, set the IPv4 address for the service processor.
IPv4 Subnet Mask			If the IPv4 Assignment is set to Static, set the IPv4 subnet mask. Example: 255.255.255.0
IPv4 Default Gateway			If the IPv4 Assignment is set to Static, set the IPv4 default gateway. Example: 129.144.82.254
Commit			Commit the IPv4 configuration settings.
IPv6 Configuration (R/O)	Static/Dynamic	Dynamic	Current configuration of the IPv6 settings. IPv6 addresses are written with hexadecimal digits and colon separators. For example: 2001:0db0:000:82a1:0000:0000:1234:abcd. IPv6 addresses are composed of two parts: a 64-bit subnet prefix and a 64-bit host interface ID. To shorten the IPv6 address, you can (1) omit all leading zeros, and (2) replace one consecutive group of zeros with a double colon (::). For example: 2001:db0:0:82a1::1234:abcd
Channel Number (R/O)		1	Current channel number.
Current IPv6 State (R/O)			Current IPv6 state.
Current IPv6 Auto Configuration (R/O)			Current IPv6 autoconfiguration parameters are displayed.
Link Local IPv6 Address (R/O)			Current link local IPv6 address. Example: fe80::214:4fff:feca:5f7e/64
Static IPv6 Address (R/O)			Current static IPv6 address. Example: 2001:0db0:000:82a1:0000:0000:1234:abcd

Advanced Setup Options	Options	Defaults	Description
IPv6 Gateway (R/O)			Current IPv6 gateway address. Example: fe80::211:5dff:febe:5000/128
Dynamic IPv6 Address 1 – (R/O)			Current dynamic IPv6 address. Example: fec0:a:8:b7:214:4fff:feca:5f7e/64
Refresh			Select Refresh to update to the current settings.
IPv6 State (R/O)	Disabled/ Enabled		View whether the IPv6 state is enabled or disabled.
Auto IPv6 Configuration	Disabled/ Stateless/ Dhcpv6_ stateless/ Dhcpv6_ stateful	Disabled	Autoconfiguration options are: Disabled: When autoconfiguration is disabled, only the Link Local address is set. None of the autoconfiguration options to configure an IPv6 address are run. Stateless: When enabled, the IPv6 Stateless autoconfiguration is run to learn the IPv6 addresses for the device. Dhcpv6_stateless: When enabled, the Dhcpv6_stateless autoconfiguration is run to learn the DNS and domain information for the device. Dhcpv6_stateful: When enabled, the Dhcpv6_stateful autoconfiguration is run to learn the IP addresses and DNS information for the device.
Static IPv6 Address			Set the static IPv6 address. Example: 2001: 0db0:000.82a1:0000:0000:1234:abcd
Commit			Commit the IPv6 configuration settings.


Advanced
Processor Configuration
Hyper-Threading ALL [Enabled]
Active Processor Cores [All]
Execute Disable Bit [Enabled]
Hardware Prefetcher [Enabled]
Adjacent Cache Prefetch [Enabled]
DCU Streamer Prefetcher [Enabled]
DCU IP Prefetcher [Enabled]
Intel Virtualization Technology [Enabled]
Enables Hyper Threading (Software Method to Enable/Disable Logical Processor threads.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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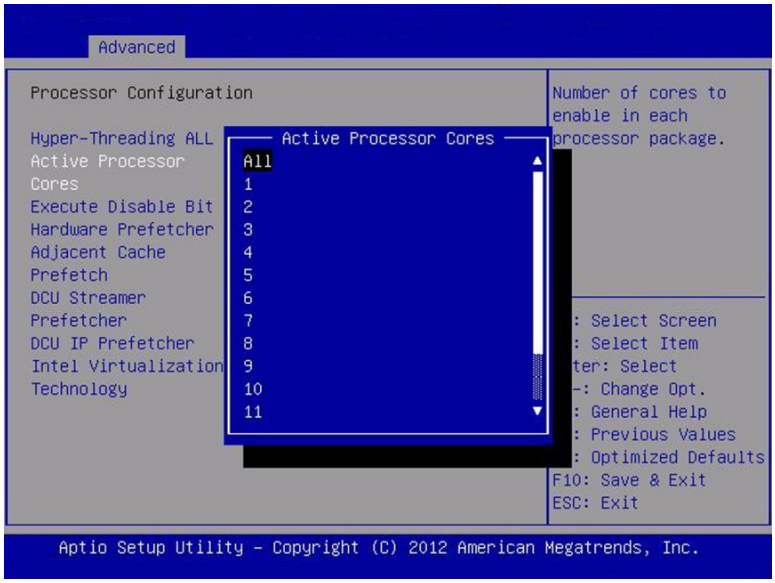
Advanced
Processor Configuration
Hyper-Threading ALL
Active Processor Cores
Execute Disable Bit
Hardware Prefetcher
Adjacent Cache Prefetch
DCU Streamer Prefetcher
DCU IP Prefetcher
Intel Virtualization Technology
Active Processor Cores
All
1
2
3
4
5
6
7
8
9
10
11
Number of cores to enable in each processor package.
F10: Save & Exit
ESC: Exit
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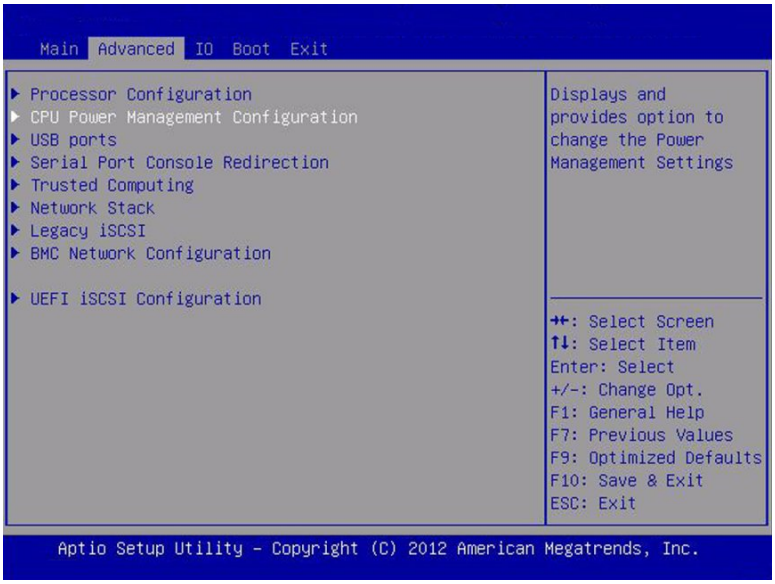
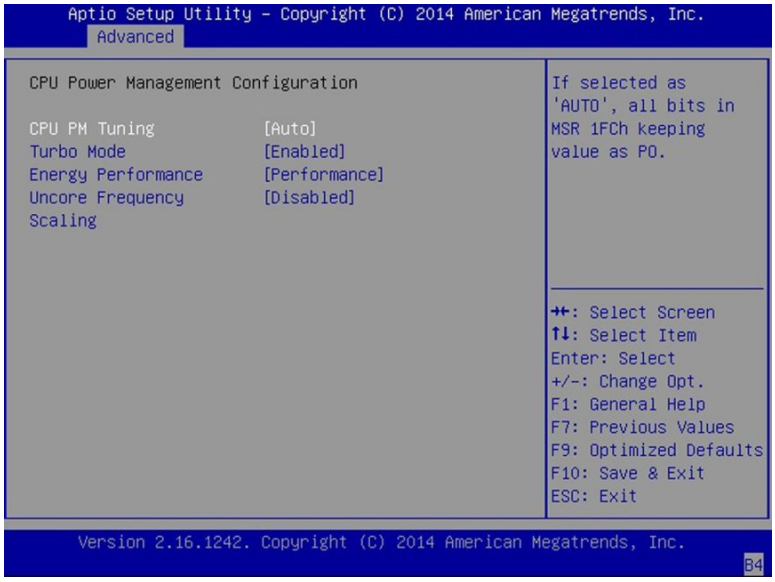
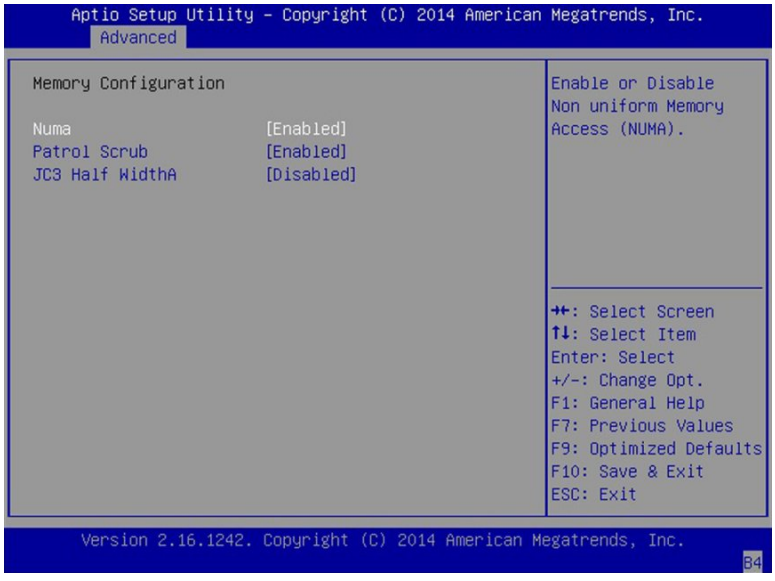
Advanced - CPU Power Management Configuration

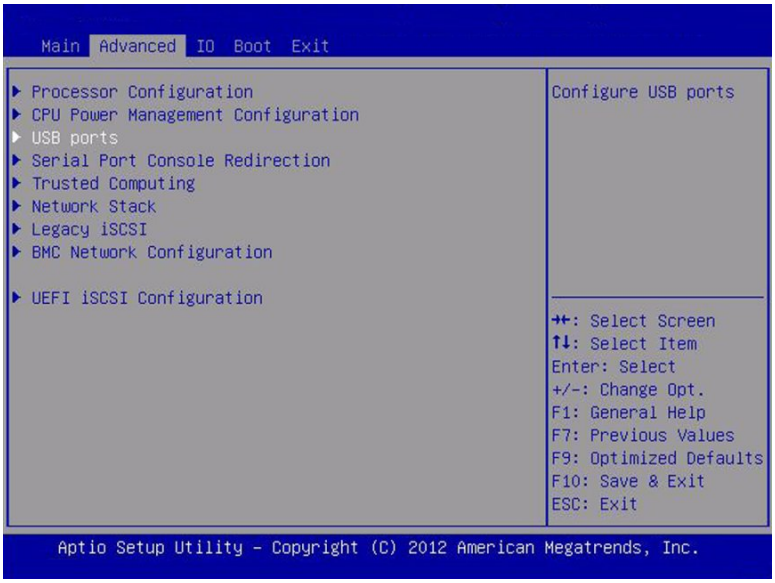


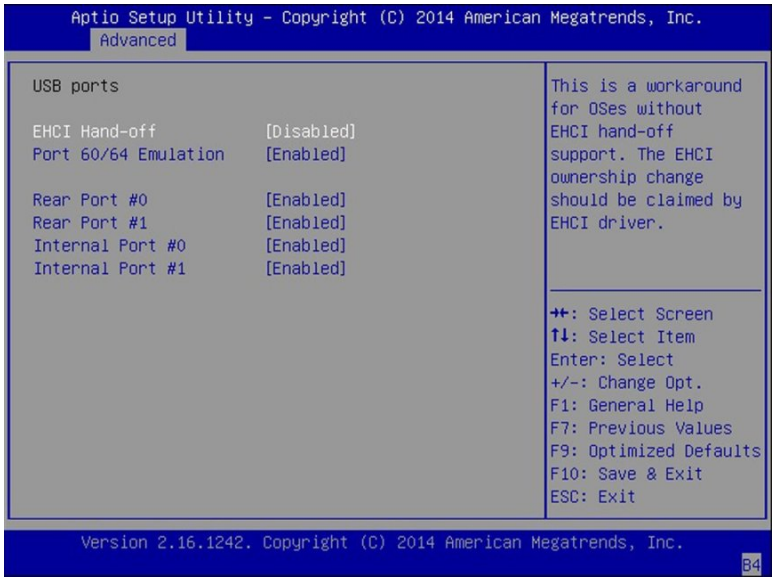


Memory Configuration

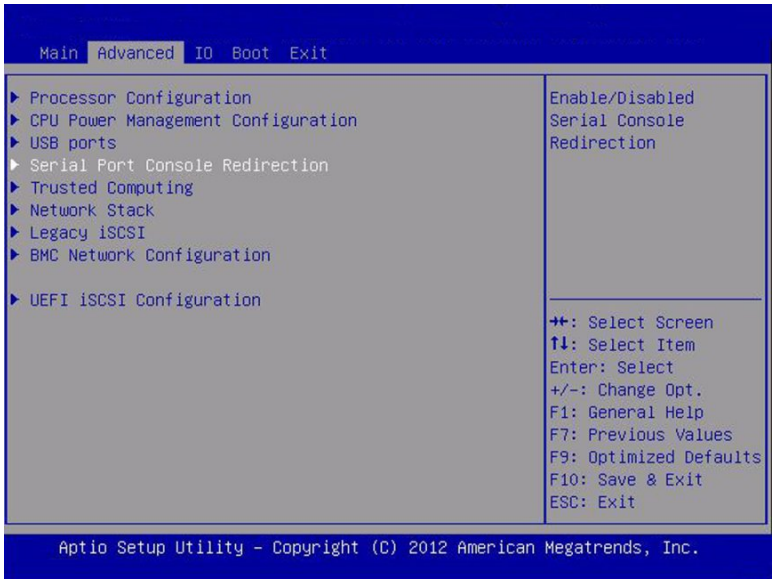


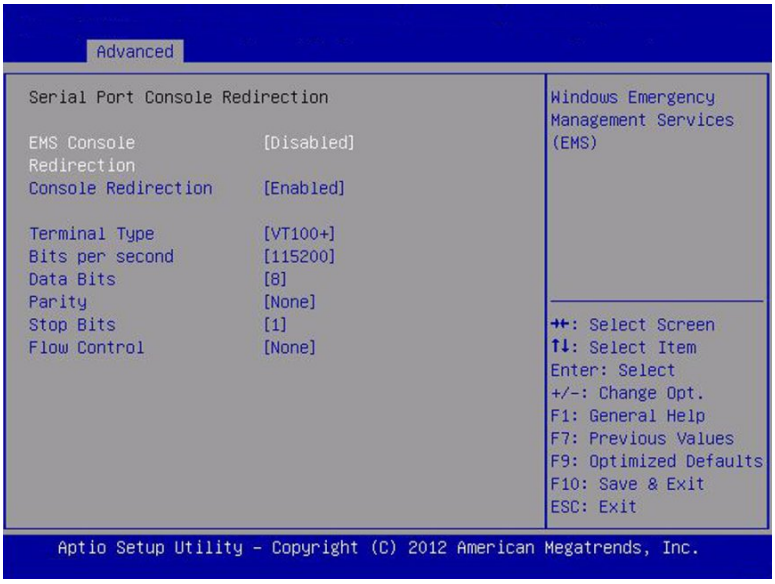
Advanced - USB Ports





Advanced - Serial Port Console Redirection




Advanced
Serial Port Console Redirection
EMS Console Redirection [Disabled]
Console Redirection [Enabled]
Terminal Type [VT100+]
Bits per second [115200]
Data Bits [8]
Parity [None]
Stop Bits [1]
Flow Control [None]
Windows Emergency Management Services (EMS)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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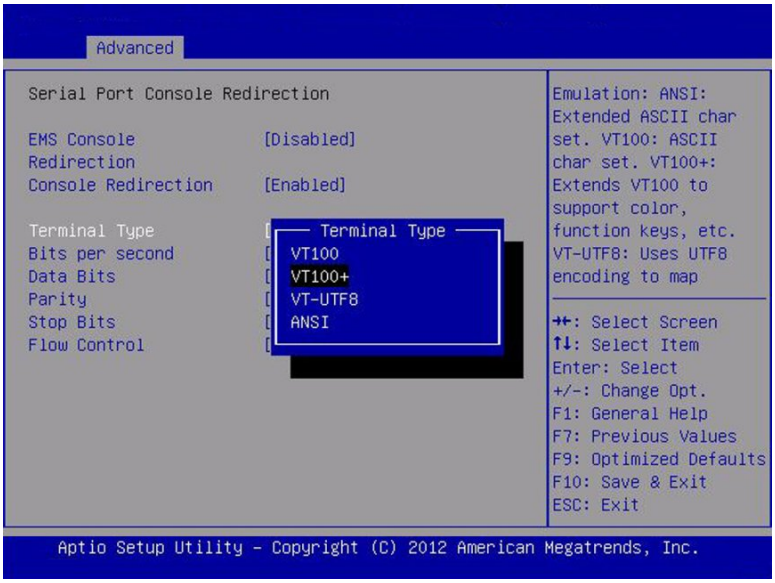
Advanced
Serial Port Console Redirection
EMS Console Redirection [Disabled]
Console Redirection [Enabled]
Terminal Type
Bits per second
Data Bits
Parity
Stop Bits
Flow Control
Terminal Type
VT100
VT100+
VT-UTF8
ANSI
Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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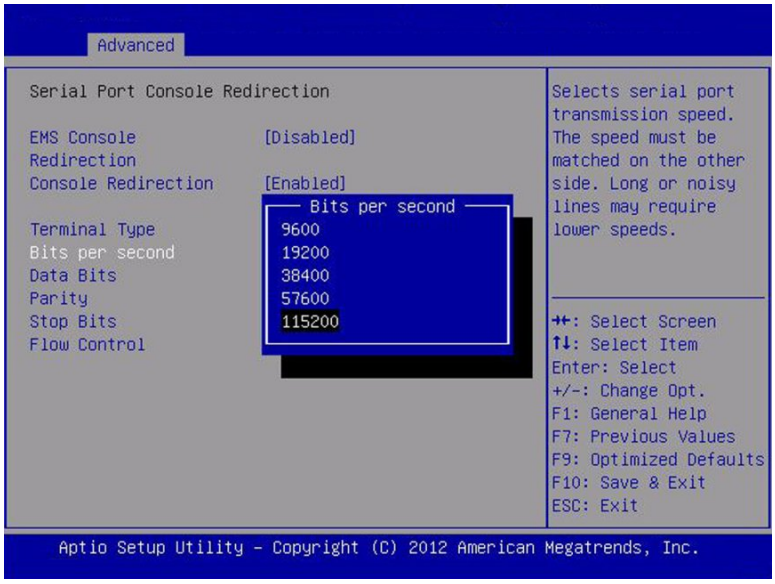
Advanced
Serial Port Console Redirection
EMS Console Redirection [Disabled]
Console Redirection [Enabled]
Terminal Type
Bits per second
Data Bits
Parity
Stop Bits
Flow Control
Bits per second
9600
19200
38400
57600
115200
Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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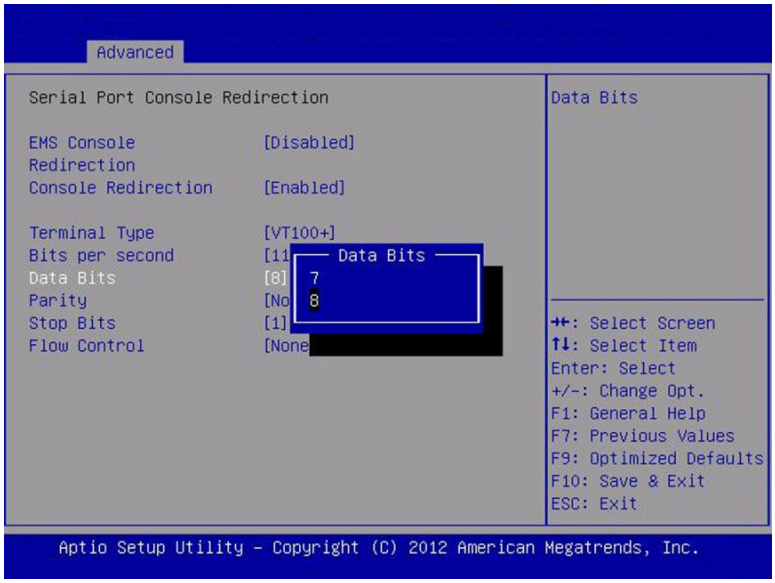
Advanced
Serial Port Console Redirection
EMS Console Redirection [Disabled]
Console Redirection [Enabled]
Terminal Type [VT100+]
Bits per second [11
Data Bits [8]
Parity [No
Stop Bits [1]
Flow Control [None
Data Bits
7
8
Data Bits
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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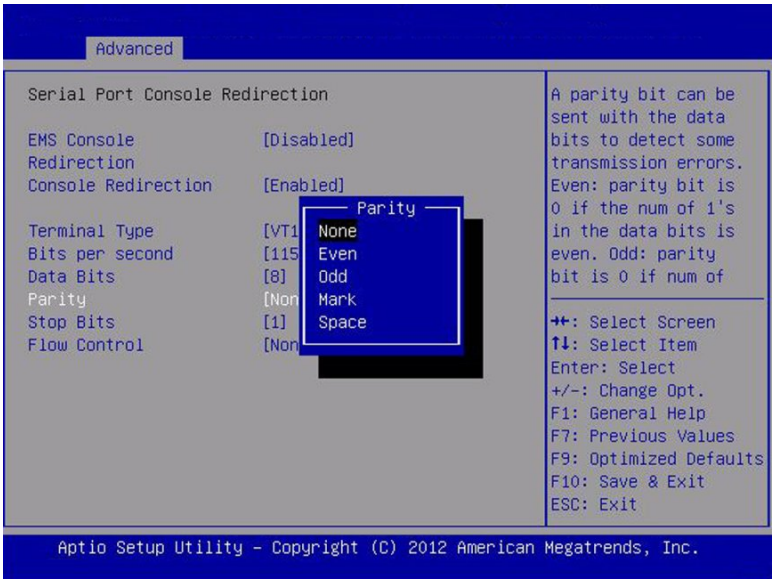
Advanced
Serial Port Console Redirection
EMS Console [Disabled]
Redirection
Console Redirection [Enabled]
Terminal Type [VT1
Bits per second [115
Data Bits [8]
Parity [Non
Stop Bits [1]
Flow Control [Non
Parity
None
Even
Odd
Mark
Space
A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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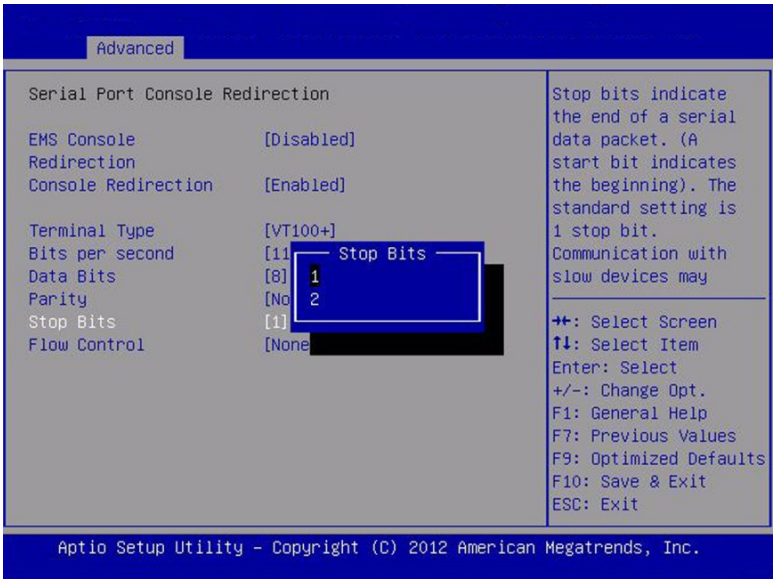
Advanced
Serial Port Console Redirection
EMS Console [Disabled]
Redirection
Console Redirection [Enabled]
Terminal Type [VT100+]
Bits per second [11
Data Bits [8]
Parity [No
Stop Bits [1]
Flow Control [None
Stop Bits
1
2
Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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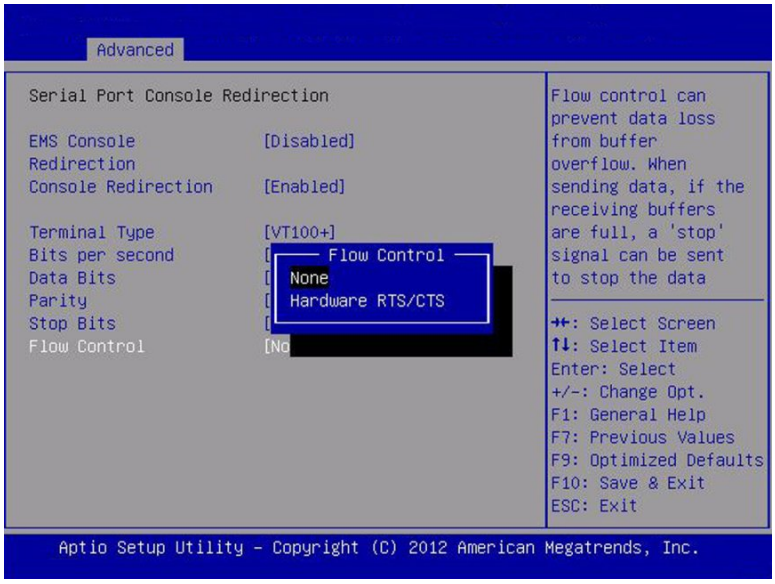
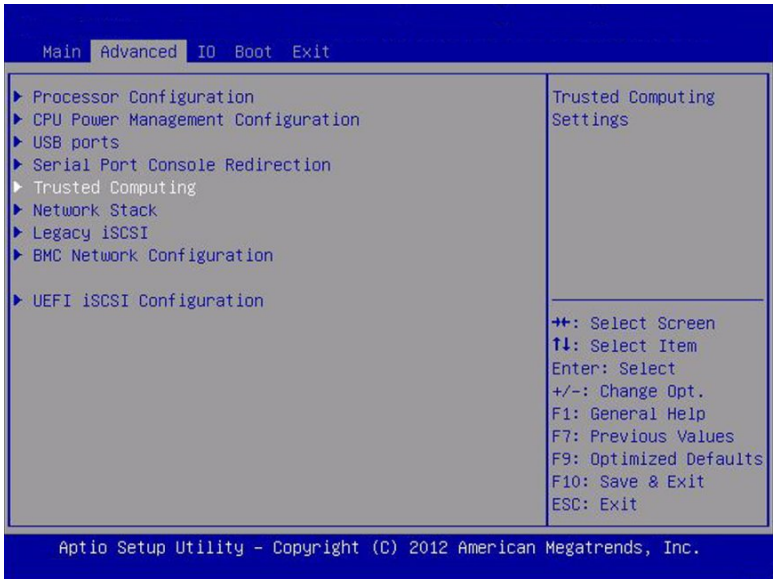
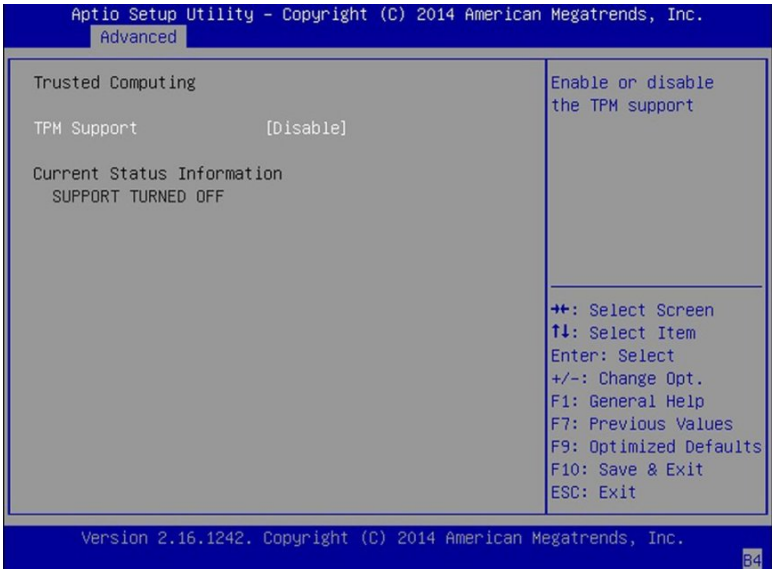


Advanced - Trusted Computing

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Advanced
Trusted Computing
TPM Support [Disable]
Current Status Information
SUPPORT TURNED OFF
Enable or disable the TPM support
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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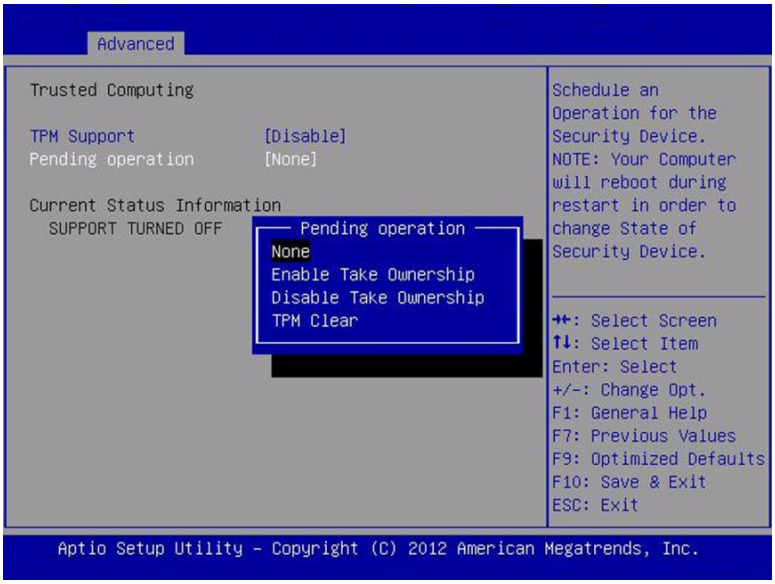
Advanced
Trusted Computing
TPM Support [Disable]
Pending operation [None]
Current Status Information
SUPPORT TURNED OFF
Pending operation
None
Enable Take Ownership
Disable Take Ownership
TPM Clear
Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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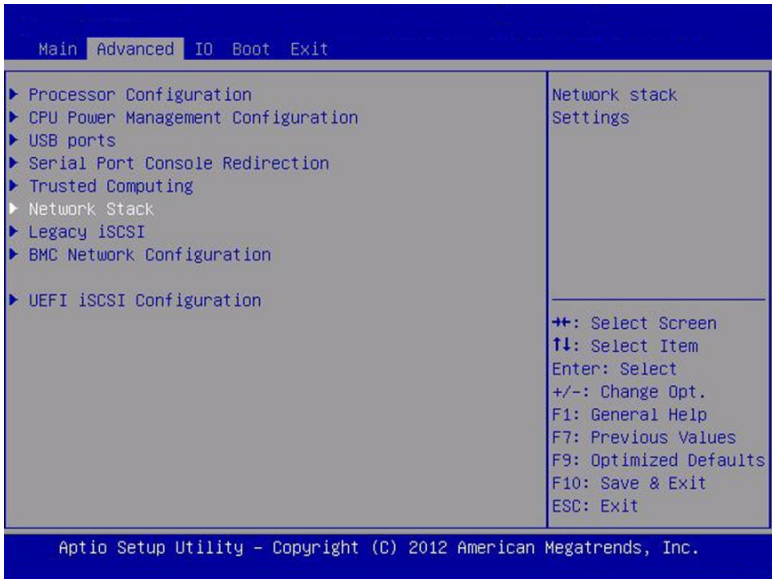
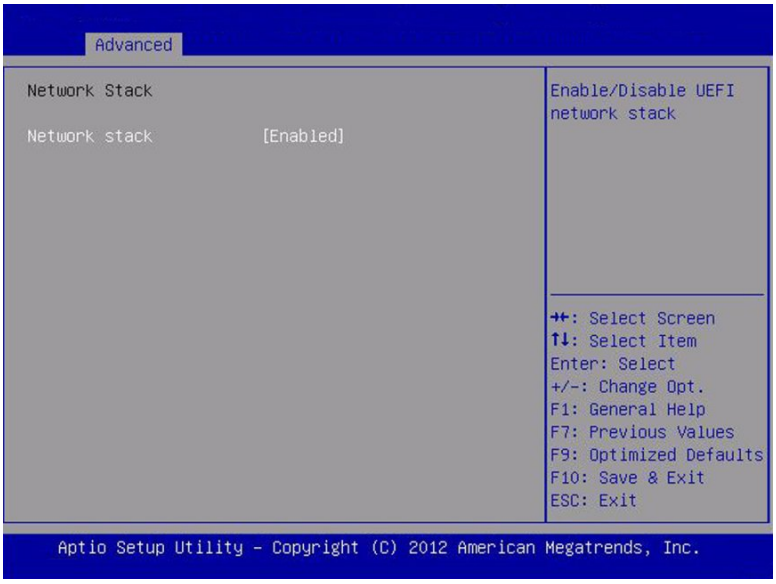
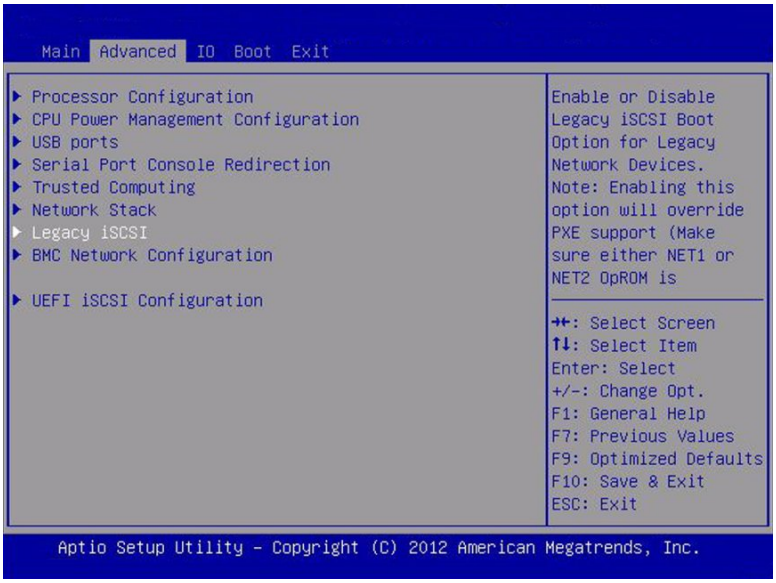
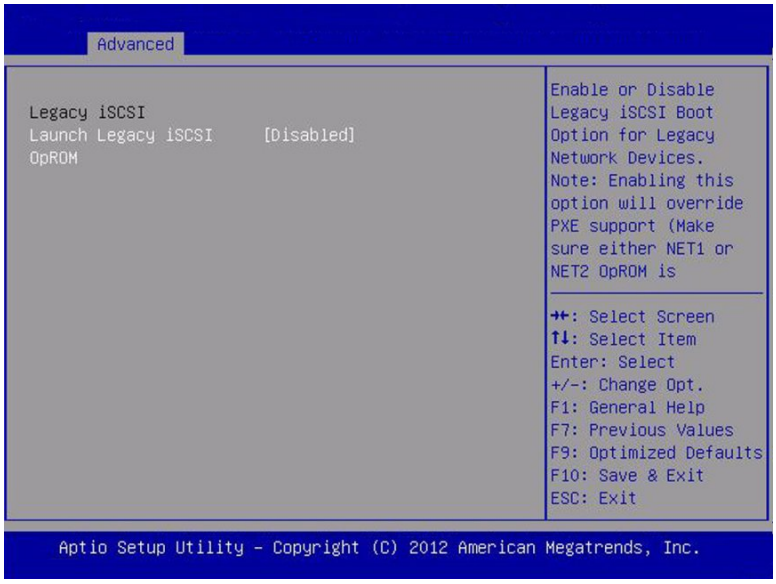
Advanced - Network Stack



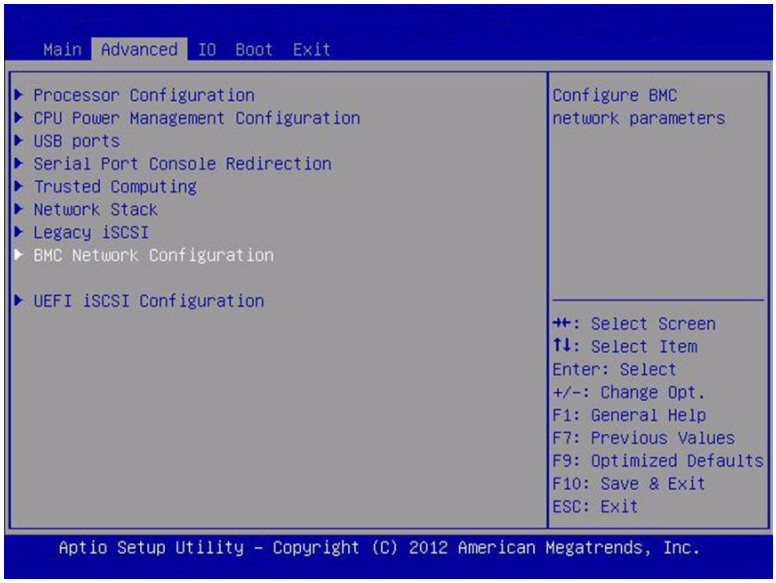


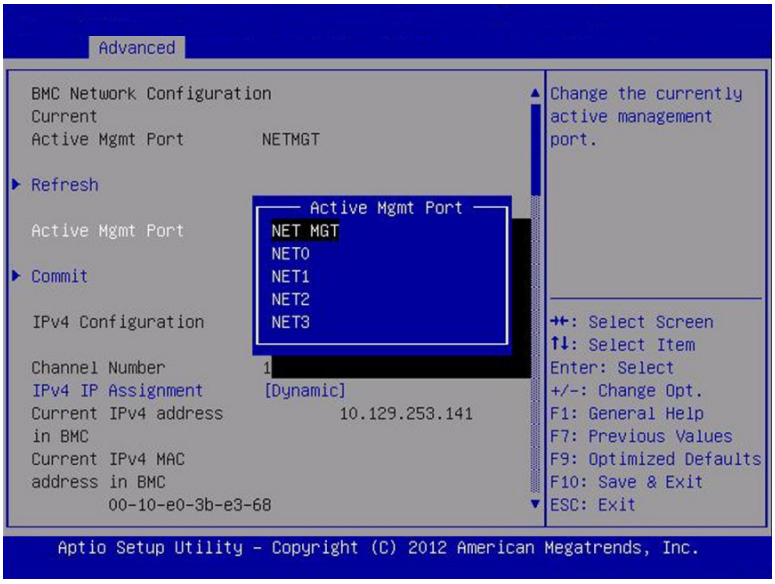
Advanced - Legacy iSCSI





Advanced - BMC Network Configuration




Advanced
BMC Network Configuration
Current
Active Mgmt Port NETMGT
Refresh
Active Mgmt Port
Commit
IPv4 Configuration
Channel Number 1
IPv4 IP Assignment [Dynamic]
Current IPv4 address in BMC 10.129.253.141
Current IPv4 MAC address in BMC
00-10-e0-3b-e3-68
Active Mgmt Port
NET MGT
NET0
NET1
NET2
NET3
Change the currently active management port.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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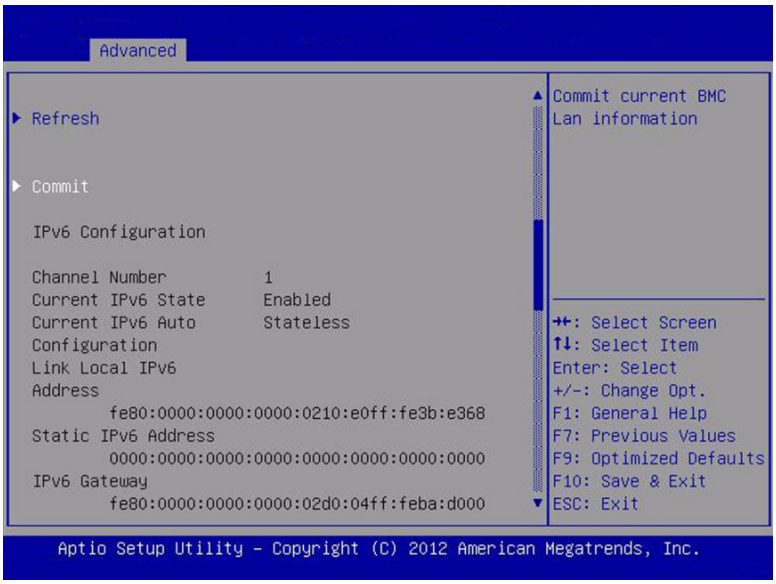
Advanced
Refresh
Commit
IPv6 Configuration
Channel Number 1
Current IPv6 State Enabled
Current IPv6 Auto Configuration Stateless
Link Local IPv6 Address
fe80:0000:0000:0000:0210:e0ff:fe3b:e368
Static IPv6 Address
0000:0000:0000:0000:0000:0000:0000:0000
IPv6 Gateway
fe80:0000:0000:0000:02d0:04ff:feba:d000
Commit current BMC Lan information
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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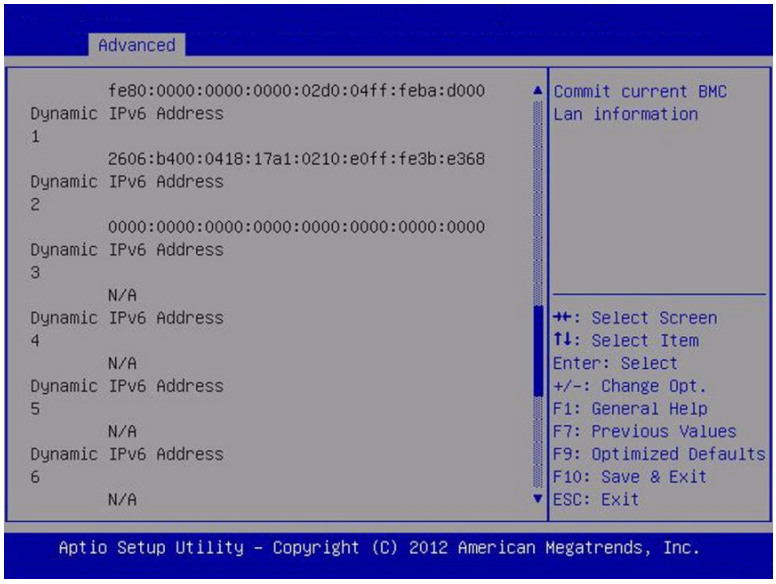
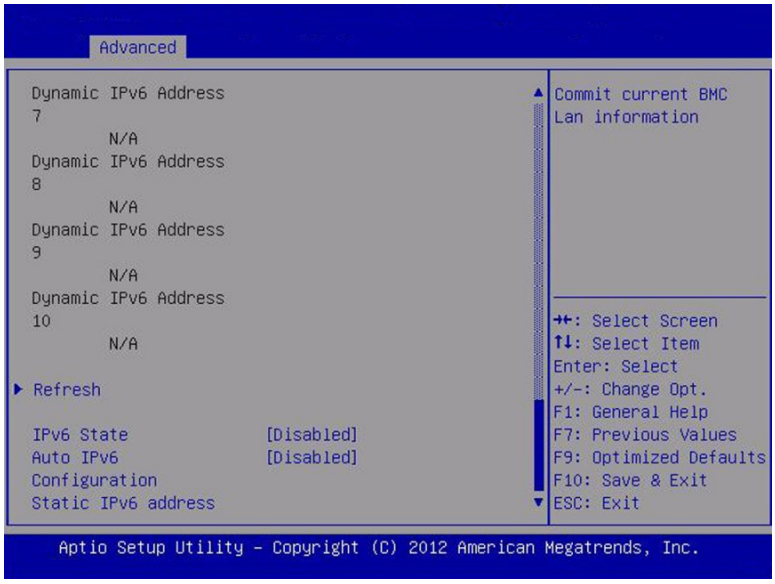

Advanced
fe80:0000:0000:0000:02d0:04ff:feba:d000
Dynamic IPv6 Address
1
2606:b400:0418:17a1:0210:e0ff:fe3b:e368
Dynamic IPv6 Address
2
0000:0000:0000:0000:0000:0000:0000:0000
Dynamic IPv6 Address
3
N/A
Dynamic IPv6 Address
4
N/A
Dynamic IPv6 Address
5
N/A
Dynamic IPv6 Address
6
N/A
Commit current BMC Lan information
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.


Advanced
Dynamic IPv6 Address
7
N/A
Dynamic IPv6 Address
8
N/A
Dynamic IPv6 Address
9
N/A
Dynamic IPv6 Address
10
N/A
Refresh
IPv6 State [Disabled]
Auto IPv6 [Disabled]
Configuration
Static IPv6 address
Commit current BMC Lan information
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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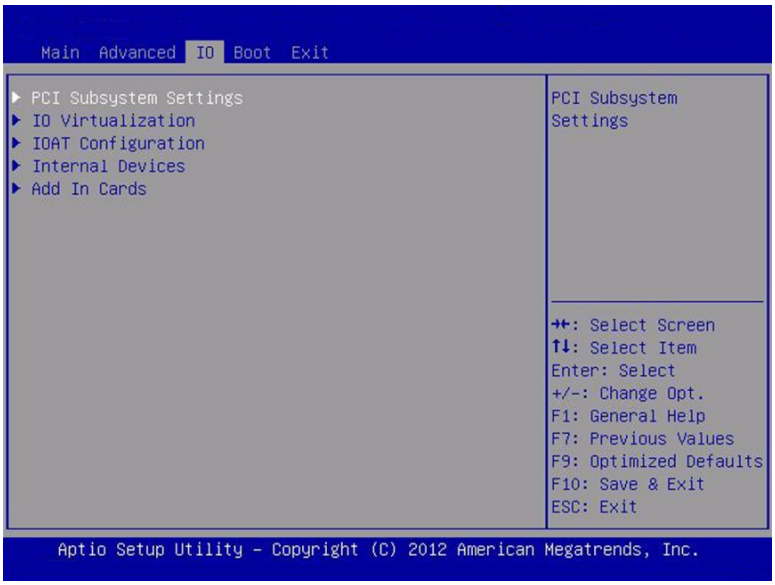
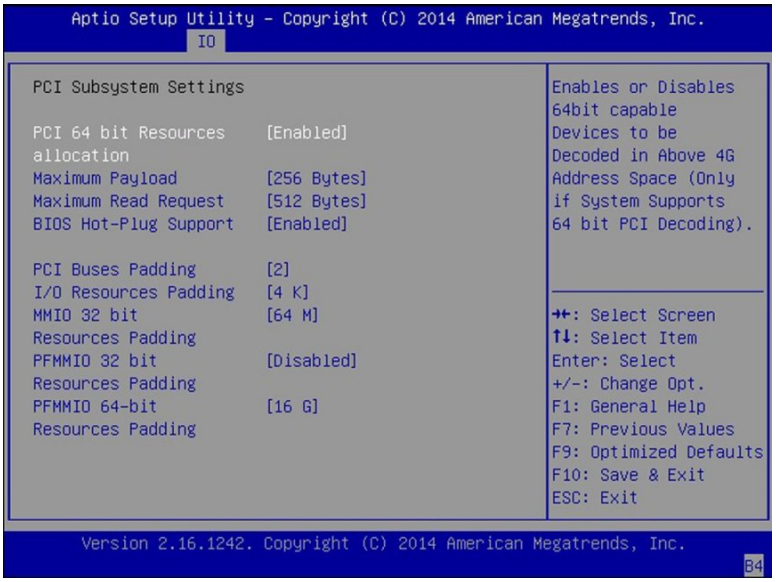
IO Screen

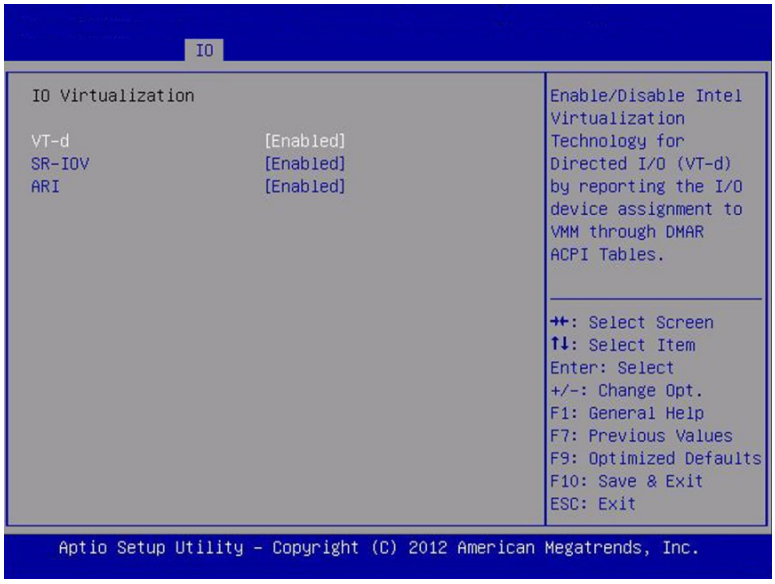


IO Setup Options	Options	Defaults	Description
PCI Subsystem Settings			Configure PCI, PCI-X, and PCI Express settings.
PCI 64 Bit Resources Allocation	Disabled/Enabled	Enabled	Enable or disable 64-bit capable devices to be decoded in above 4G address space. This setting is available only if the system supports 64-bit decoding.
IO Virtualization			Configure single root I/O virtualization settings.
VT-d	Disabled/Enabled	Enabled	Enable or disable Intel Virtualization Technology for directed I/O (VT-d). If enabled, ensures improved isolation of I/O resources for greater reliability, security, and availability.
SR-IOV	Disabled/Enabled	Disabled	Single Root I/O Virtualization (SR-IOV) is used to configure devices into multiple virtual devices that can be used on virtual OS installations. If supported by the hardware and set to enabled, all devices within the system that are SR-IOV capable are configured to support SR-IOV and I/O

IO Setup Options	Options	Defaults	Description
			resources are allocated to the device as normal. If set to disabled, I/O resources are not allocated to the device.
ARI	Disabled/Enabled	Disable	If Alternate Routing ID (ARI) is supported by the hardware and set to enabled, devices are permitted to locate virtual functions (VFs) in function numbers 8 to 255 of the captured bus number, instead of normal function numbers 0 to 7.
I/OAT			Configure settings for the Intel I/O Acceleration Technology (I/OAT).
Intel I/OAT	Disabled/Enabled	Enabled	Enable or disable Intel I/OAT.
DCA Support	Disabled/Enabled	Enabled	Enable or disable direct cache access (DCA) support.
Internal Devices			Configure settings for the embedded network controller.
Net 0/1 OpROM Enable	Disabled/Enabled	Enabled	Enable or disable Option ROM. If set to enabled, Option ROM for the card executes as normal. If set to disabled, Option ROM for the card is not copied into memory and the execution of the Option ROM is inhibited.
Net 2 and Net 3 OpROM Enable	Disabled/Enabled	Enabled	Enable or disable Option ROM. If set to enabled, Option ROM for the card executes as normal. If set to disabled, Option ROM for the card is not copied into memory and the execution of the Option ROM is inhibited.
Add-in Cards			Enable or disable the add-in cards.
Slot 1			
IO Enable	Disabled/Enabled	Enabled	Enable or disable I/O for the add-in card.
OpROM Enable	Disabled/Enabled	Enabled	Enable or disable Option ROM for add-in card.
Slot 2			
IO Enable	Disabled/Enabled	Enabled	Enable or disable I/O for the add-in card.
OpROM Enable	Disabled/Enabled	Enabled	Enable or disable Option ROM for add-in card.
Slot 3			
IO Enable	Disabled/Enabled	Enabled	Enable or disable I/O for the add-in card.
OpROM Enable	Disabled/Enabled	Enabled	Enable or disable Option ROM for add-in card.
Slot Internal	Disabled/Enabled	Enabled	
IO Enable	Disabled/Enabled	Enabled	Enable or disable the I/O for the internal host bus adapter (HBA) card.

IO Setup Options	Options	Defaults	Description
OpROM Enable	Disabled/Enabled	Enabled	Enable or disable Option ROM for the internal host bus adapter (HBA) card.




IO
IO Virtualization
VT-d [Enabled]
SR-IOV [Enabled]
ARI [Enabled]
Enable/Disable Intel Virtualization Technology for Directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMAR ACPI Tables.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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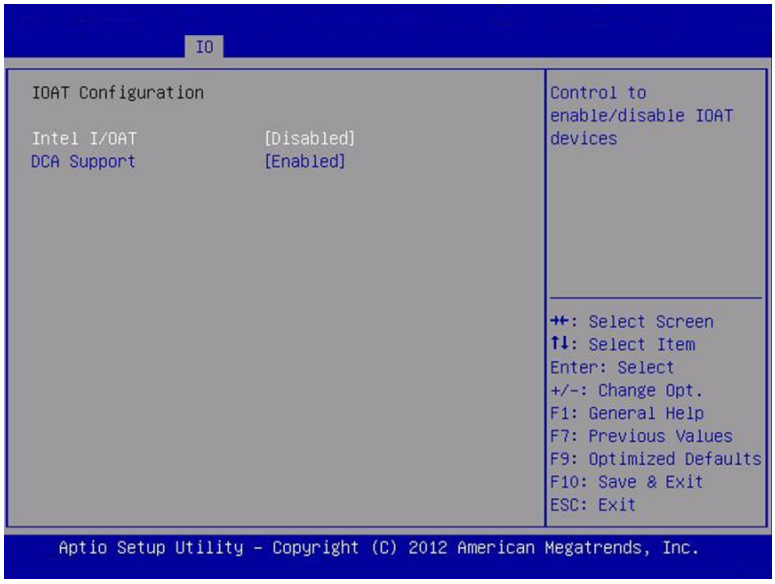
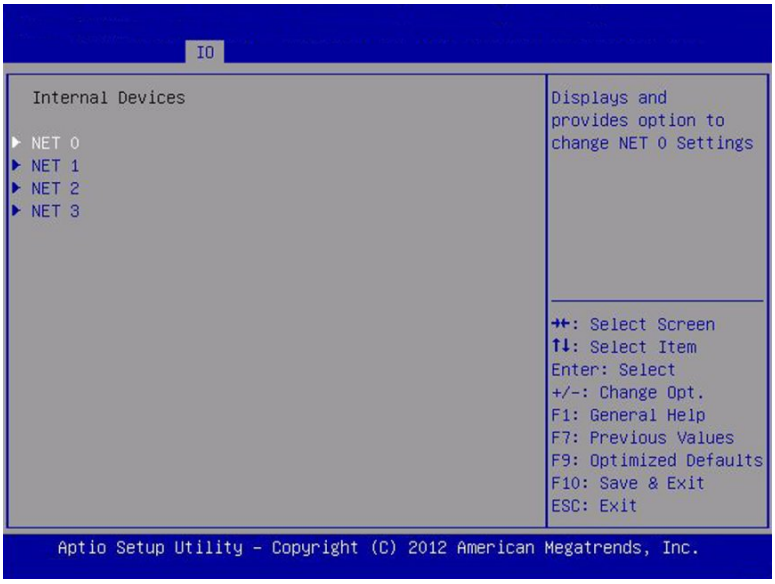

IO
IOAT Configuration
Intel I/OAT [Disabled]
DCA Support [Enabled]
Control to enable/disable IOAT devices
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.


IO
Internal Devices
NET 0
NET 1
NET 2
NET 3
Displays and provides option to change NET 0 Settings
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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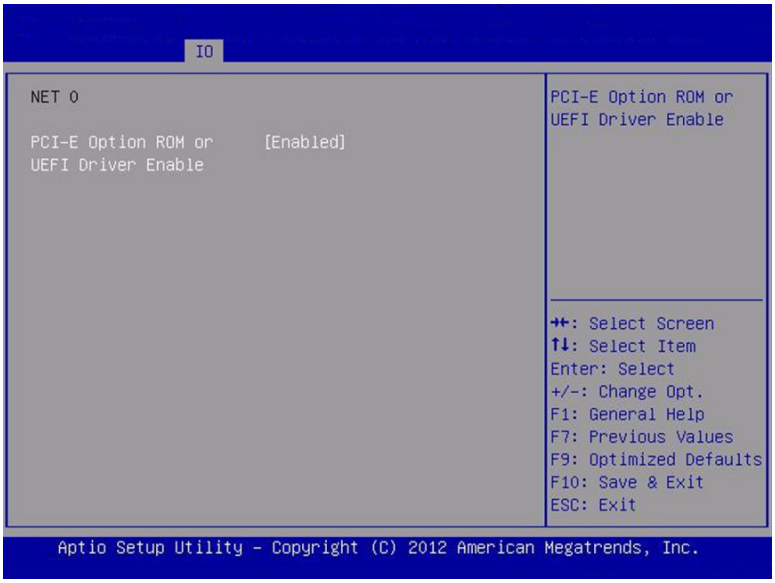
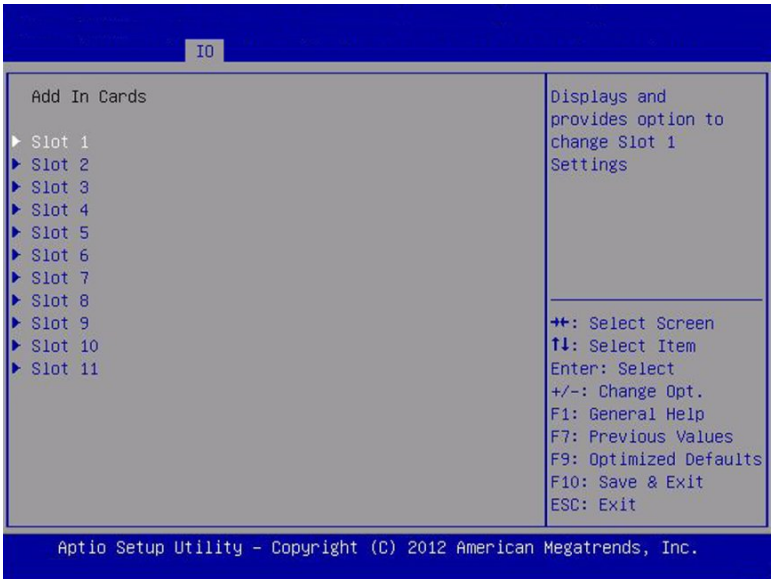

IO
NET 0
PCI-E Option ROM or UEFI Driver Enable
[Enabled]
PCI-E Option ROM or UEFI Driver Enable
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.


IO
Add In Cards
Slot 1
Slot 2
Slot 3
Slot 4
Slot 5
Slot 6
Slot 7
Slot 8
Slot 9
Slot 10
Slot 11
Displays and provides option to change Slot 1 Settings
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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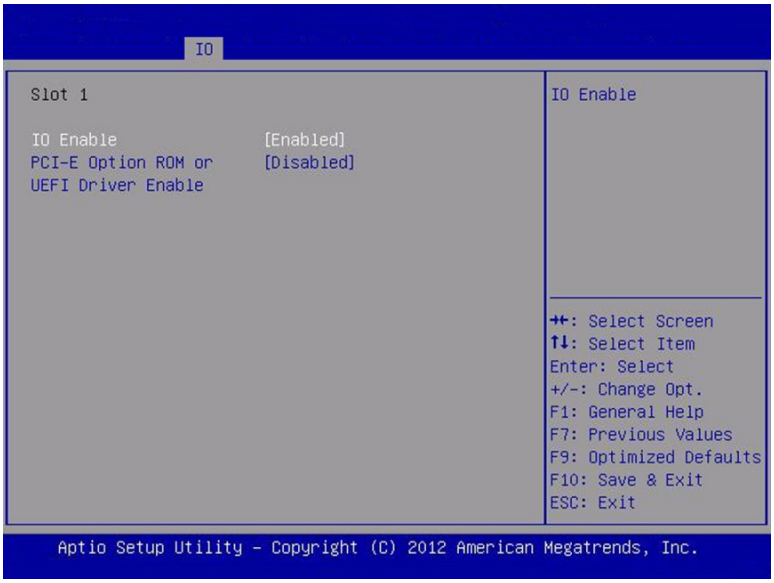
IO
Slot 1
IO Enable [Enabled]
PCI-E Option ROM or UEFI Driver Enable [Disabled]
IO Enable
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Previous Values
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
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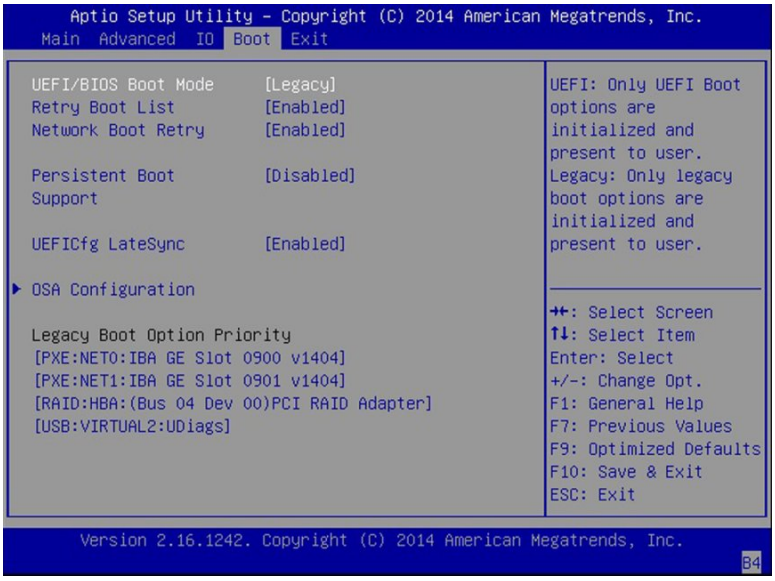
Boot Screens

The boot screen differs depending on whether the server is in UEFI boot mode or in legacy boot mode. The following subsections show the boot screen in legacy mode and in UEFI mode.

Boot Screen in Legacy Boot Mode



Option	Default	Description
UEFI/BIOS Boot Mode	Legacy	Select Legacy or UEFI boot mode.
Retry boot list	Enabled	If enabled, BIOS automatically retries to boot from the top of the Boot Options Priority list when all devices have been attempted and failed.
Network Boot Retry	Enabled	■ If enabled, BIOS automatically retries the PXE list present in the system when all PXE attempts have failed. ■ If disabled, the system halts and displays the error message “Network Boot Failed” when all PXE boots failed. ■ If set to Boot List, fail over to the main Boot Options Priority list.

Option	Default	Description
Persistent Boot Support	Disabled	Allows devices to maintain a position in the boot priority list even after removal so that, if the device is returned, it is not assigned to a lower priority position.
UEFIcfg LateSync	Enabled	Allows synchronization to occur immediately after a BIOS configuration change by automatically rebooting the system.
OSA Configuration > OSA Internal Support	Enabled	Open OSA Configuration screen and toggle OSA Internal Support to enable or disable booting OSA from the internal USB port.
Boot Option Priority	Order of discovery by BIOS	Move items up and down the list to change the boot priority order in legacy boot mode. This list changes when the boot mode changes.

Index

E

F

G

H

I