

Oracle® Server X7-8 Service Manual

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Using This Documentation

- **Overview** – Describes how to troubleshoot and maintain Oracle Server X7-8.
- **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/x7-8/docs>.

Feedback

Provide feedback about this documentation at <https://www.oracle.com/goto/docfeedback>.

About Oracle Server X7-8

These sections list the server's replaceable components and describe the controls, connectors, and status indicator LEDs.

- [“Product Description” on page 15](#)
- [“About Controls and Connectors” on page 17](#)
- [“Replaceable Components” on page 22](#)
- [“CPU Module \(CMOD\) Overview” on page 27](#)
- [“System Module \(SMOD\) Overview” on page 32](#)
- [“Server Chassis Overview” on page 38](#)

Note - Always update the server with the latest firmware, drivers, and other hardware-related software by downloading the latest software release package when you first receive the server, and for every new software release. For information about the software release packages and how to download the software, refer to [“Getting Firmware and Software Updates” in Oracle Server X7-8 Installation Guide](#).

Product Description

Oracle Server X7-8 is an enterprise-class 5 rack unit (5U) server. You can configure the server as one 4-socket server, two independent 4-socket servers, or one 8-socket server.

The system supports the following components.

Feature	System Component
Processors (CPU module/CMOD)	<p>Up to eight Intel Xeon vx processors (shelf 4) are supported.</p> <ul style="list-style-type: none">■ Intel 8168 processor, 24-core, 2.7-GHz, 205W (4-socket servers or 8-socket server)■ Intel 8160 processor, 24-core, 2.1-GHz, 150W (4-socket servers or 8-socket server)■ Intel 6140 processor, 18-core, 2.3-GHz, 150W (4-socket servers)■ Intel 6128 processor, 6-core, 3.4-GHz, 125W (4-socket servers) <p>8-socket configurations support up to 24-core (shelf 4) processors for total of 192 cores.</p>

Product Description

Feature	System Component
	<p>4-socket configurations support up to 24-core (shelf 4) processors for total of 96 cores.</p> <p>Six memory controllers are integrated per processor.</p>
Memory DDR4-2666 DIMMs	<p>Up to 96 (8-socket) or 48 (4-socket) DDR4 DIMM slots.</p> <ul style="list-style-type: none"> ■ RDIMM options: 16 GB, 32 GB ■ LRDIMM option: 64 GB
System Modules (SMODs)	<p>Two SMODs (SMOD0, SMOD1) installed in chassis:</p> <ul style="list-style-type: none"> ■ Includes one internal PCIe Gen3 slot for RAID storage host bus adapter (HBA) per SMOD. Four ports in the HBA are used for SAS connectivity. ■ One external USB 3.0 port per SMOD ■ Four 10BASE-T ports (NET0-3) per SMOD ■ Two I/O ports per SMOD: one serial management port (SER MGT), one network management port (NET MGT)
Storage Drives (SAS3 HDD/SSD)	<p>Up to eight 2.5-inch hard disk drives (HDDs) or solid state drives (SSDs).</p> <ul style="list-style-type: none"> ■ Four hot-pluggable SAS3 storage drives per SMOD: ■ SMOD0: bays 0-3; SMOD1: bays 0-3.
PCIe Slots	<p>Sixteen PCIe 3.0 slots (eight x8 slots, eight x16 slots):</p> <ul style="list-style-type: none"> ■ Each SMOD controls eight PCIe slots. ■ In single 4-socket mode, SMOD0 System A has four x8 and four x16 PCIe slots. ■ In dual 4-socket mode, each side (SMOD0 System A and SMOD1 System B) has four x8 and four x16 PCIe slots. ■ In 8-socket mode, SMOD0 System A has eight x8 and eight x16 PCIe slots. ■ Support for eight dual PCIe card carriers (DPCCs), each with two PCIe card slots.
I/O Ports	<ul style="list-style-type: none"> ■ One external RJ-45 serial management (SER MGT) port per SMOD. ■ One external network management (NET MGT) port per SMOD. ■ Four 10GBASE-T ports (NET0-3) per SMOD.
Power Supplies (PS)	<p>Four 3060W power supplies (PSU0-3)</p> <p>Two PSUs (PSU2 and 3) power SMOD0, CMOD0-3, DPCC0-3, and FM0-3. The other two PSUs (PSU0 and 1) power SMOD1, CMOD4-7, DPCC4-7, and FM4-7.</p>
Fan Modules (FM)	<p>Eight fan modules (FM0-7)</p>
Service Processor (SP)	<p>Two integrated Emulex Pilot 4 SPs, one per SMOD, with:</p> <ul style="list-style-type: none"> ■ IPMI 2.0 compliant remote management capabilities. ■ Oracle Integrated Lights Out Management (ILOM) 4.0 with command-line access using a serial connection (SER MGT port) ■ Support for Ethernet access to the SP through a dedicated management port (NET MGT port) and optionally through one of the host Ethernet ports (sideband management).
Management Software	<ul style="list-style-type: none"> ■ Oracle Integrated Lights Out Management (ILOM). Refer to the Oracle ILOM 4.0 Documentation Library at https://www.oracle.com/goto/ilom/docs ■ Oracle Hardware Management Pack, available with the Oracle Solaris OS or as a standalone product with other OS. Refer to the support matrix for specific information https://www.oracle.com/goto/ohmp/docs

Feature	System Component
	<ul style="list-style-type: none"> ■ Oracle Enterprise Manager Ops Center, available software to manage multiple systems in a data center. Refer to the product information page at: http://www.oracle.com/technetwork/oem/ops-center/index.html
Operating Systems and Virtualization Software	<ul style="list-style-type: none"> ■ Oracle Solaris 11.3 SRU 23 ■ Oracle Linux 7.3 and 6.9 ■ Oracle VM 3.4.4 ■ Microsoft Windows Server 2016 and 2012 R2 ■ VMware ESXi 6.5 <p>For updated operating system information, refer to <i>Oracle Server X7-8 Product Notes</i> at: https://www.oracle.com/goto/x7-8/docs</p>

For server specification information, see “[Server Features and Components](#)” in *Oracle Server X7-8 Installation Guide*.

For component serviceability, locations, and designations, see “[Replaceable Components](#)” on page 22.

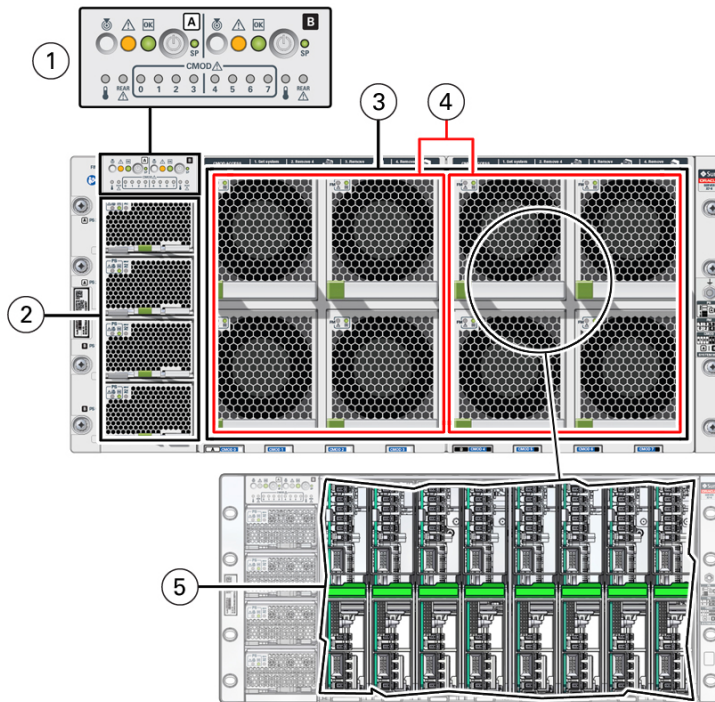
About Controls and Connectors

The following sections describe the controls, indicators, connectors, and drives located on Oracle Server X7-8 front and back panels.

- “[Front Panel Components](#)” on page 17
- “[Back Panel Components](#)” on page 19

Front Panel Components

The following figure shows Oracle Server X7-8 chassis front panel components:



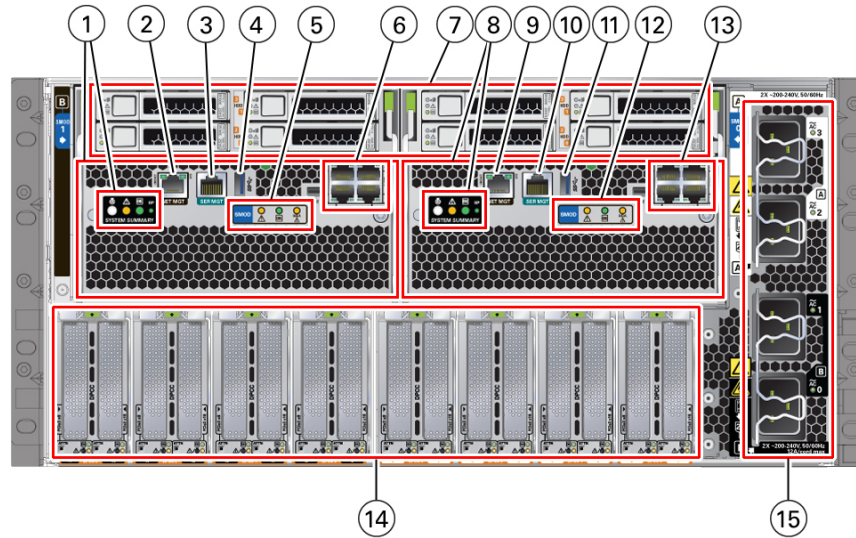
Call Out	Component	Link
1	<p>Front indicator module (FIM). The FIM provides separate controls and system status LED indicators for System A and System B while in 4-socket mode.</p> <ul style="list-style-type: none"> ■ Chassis/SMOD0 System A controls and indicators: <ul style="list-style-type: none"> Locate Button/LED: white Fault-Service Required LED: amber System OK LED indicator: green On/Standby button, recessed SP OK: green System Overtemperature Warning LED: amber Chassis or SMOD0 System A Fault-Service Required: Amber CMOD0-3 Fault-Service Required LEDs 0, 1, 2, 3: amber ■ SMOD1 System B controls and indicators: <ul style="list-style-type: none"> Locate Button/LED: white Fault-Service Required LED: amber System OK indicator: green 	<p>“Front Indicator Module (FIM) Panel” on page 58</p> <p>“Controls and Indicators” on page 70</p>

Call Out	Component	Link
	On/Standby button, recessed SP OK: green System Overtemperature Warning LED: amber Rear Fault-Service Required LED: amber CMOD4-7 Fault-Service Required LEDs 4, 5, 6, 7: amber	
2	Four power supplies (PS) Power supplies 0 (bottom) through 3 (top) labeled PS0, PS1, PS2, PS3 PS2 and PS3 power System A. PS0 and PS1 power System B.	“Power Supply (PS) Indicators” on page 62 “Power Subsystem” on page 82.
3	Eight fan modules (FM) Fan modules FM0 through FM7: Top row: 1, 3, 5, 7 Bottom row: 0, 2, 4, 6 SMOD0 System A: FM 0, 1, 2, 3; SMOD1 System B: FM 4, 5, 6, 7	“Troubleshooting System Cooling Issues” on page 53 “Cooling Subsystem” on page 84
4	Two fan frames SMOD0 System A: FM 0, 1, 2, 3; SMOD1 System B: FM 4, 5, 6, 7	“Troubleshooting System Cooling Issues” on page 53 “Cooling Subsystem” on page 84
5	Eight internal CPU Modules (CMODs). CMOD bays are accessible behind the fan frames. System A: CMODs 0-3; System B: CMODs 4-7. 4-socket mode: CMODs 0-3. 8-socket mode: CMODs 0-7	“CPU Module (CMOD) Overview” on page 27

For component serviceability, locations, and designations, see [“Replaceable Components” on page 22.](#)

Back Panel Components

The following figure shows the Oracle Server X7-8 chassis back panel components.



The following table lists the server back panel components.

Call Out	Component	Link
1	<p>SMOD1 System B SYSTEM SUMMARY status indicator LEDs:</p> <ul style="list-style-type: none"> ■ Locate Button/LED: White ■ Fault-Service Required: Amber ■ OK: Green ■ SP OK Service Processor: Green 	<p>“System Module (SMOD) Overview” on page 32</p> <p>“System Module (SMOD) Indicators” on page 63</p> <p>“Servicing System Module (SMOD) Components (FRU)” on page 201</p>
2	<p>SMOD1 System B NET MGT</p> <p>Oracle ILOM (SP) network management 10/100/1000 GbE Network Ethernet port.</p>	<p>“System Module (SMOD) Overview” on page 32</p> <p>“Networking Subsystem” on page 88</p> <p>“Servicing System Module (SMOD) Components (FRU)” on page 201</p>
3	<p>SMOD1 System B SER MGT</p> <p>The SMOD1 System B serial management port service processor labeled SER MGT port uses an RJ-45 cable and terminal (or emulator) to provide access to the Oracle ILOM command-line interface (CLI).</p>	<p>“System Module (SMOD) Overview” on page 32</p> <p>“Servicing System Module (SMOD) Components (FRU)” on page 201</p>
4	<p>SMOD1 System B USB</p> <p>The SMOD1 System B USB 3.0 port supports hot-plugging of devices.</p>	<p>“System Module (SMOD) Overview” on page 32</p>

Call Out	Component	Link
		“Servicing System Module (SMOD) Components (FRU)” on page 201
5	SMOD1 System B Status indicators: <ul style="list-style-type: none"> ■ Fault-Service Required: Amber ■ OK: Green ■ HBA (Host Bus Adapter) Fault: Amber 	“System Module (SMOD) Overview” on page 32 “System Module (SMOD) Indicators” on page 63 “Servicing System Module (SMOD) Components (FRU)” on page 201
6	SMOD1 System B NET0-3 Four 10 GbE Network ports labeled NET0, NET1, NET2, and NET3	“System Module (SMOD) Overview” on page 32 “Servicing System Module (SMOD) Components (FRU)” on page 201
7	Four server storage drives labeled 0-3 (SAS HDD/SSD) <ul style="list-style-type: none"> ■ SMOD0 System A: Storage drives 0 through 3: Top row: 3, 1 Bottom row: 2, 0 ■ SMOD1 System B: Storage drives 0 through 3: Top row: 3, 1 Bottom row: 2, 0 	“Server Storage Drives” on page 37 “Storage Drive Indicators” on page 67 “Servicing Storage Drives (CRU)” on page 123
8	SMOD0 System A SYSTEM SUMMARY status indicators: <ul style="list-style-type: none"> ■ Locate Button/LED: White ■ Chassis or SMOD0 System A Fault-Service Required: Amber ■ SMOD0 System A OK: Green ■ SP OK: Green 	“System Module (SMOD) Overview” on page 32 “System Module (SMOD) Indicators” on page 63 “Servicing System Module (SMOD) Components (FRU)” on page 201
9	SMOD0 System A NET MGT Oracle ILOM service processor (SP) network management 10/100/1000 GbE Network Ethernet port.	“System Module (SMOD) Overview” on page 32 “Networking Subsystem” on page 88 “Servicing System Module (SMOD) Components (FRU)” on page 201
10	SMOD0 System A SER MGT Serial management port labeled SER MGT uses an RJ-45 cable and terminal (or emulator) to provide access to the Oracle ILOM command-line interface (CLI).	“System Module (SMOD) Overview” on page 32 “Servicing System Module (SMOD) Components (FRU)” on page 201
11	SMOD0 System A USB USB 3.0 port supports hot-plugging of devices.	“System Module (SMOD) Overview” on page 32
12	SMOD0 System A Status indicators <ul style="list-style-type: none"> ■ Fault-Service Required: Amber ■ OK: Green ■ HBA (Host Bus Adapter) Fault: Amber 	“System Module (SMOD) Overview” on page 32 “System Module (SMOD) Indicators” on page 63

Call Out	Component	Link
		“Servicing System Module (SMOD) Components (FRU)” on page 201
13	SMOD0 System A NET0-3 Four 10 GbE Network ports labeled NET0, NET1, NET2, and NET3.	“System Module (SMOD) Overview” on page 32 “Networking Subsystem” on page 88 “Servicing System Module (SMOD) Components (FRU)” on page 201
14	PCIe card slots 1 (right) through 16 (left) PCIe card slots 1 (right) through 16 (left): Dual PCIe card carriers (DPCC) that contain one or two low-profile PCIe cards. One DPCC populates two chassis PCIe card slots. SMOD0 System A: DPCC 0, DPCC 1, DPCC 2, DPCC 3; SMOD1 System B: DPCC 4, DPCC 5, DPCC 6, DPCC 7	“PCIe Card and DPCC Overview” on page 147 “PCI Devices Subsystem” on page 89 “Dual PCIe Card Carrier (DPCC) Indicators” on page 68
15	AC power block AC inputs with cable clips (AC 0 through AC 3): SMOD0 System A: AC 3 , AC 2 (Top pair); SMOD1 System B: AC 1, AC 0 (bottom pair)	“Chassis Back Panel Components” on page 42 “Power Subsystem” on page 82 “AC Power Block Inlet Indicators” on page 69

Note - The server does not provide video display ports on the SMODs. Use Oracle ILOM RKVMS to display video.

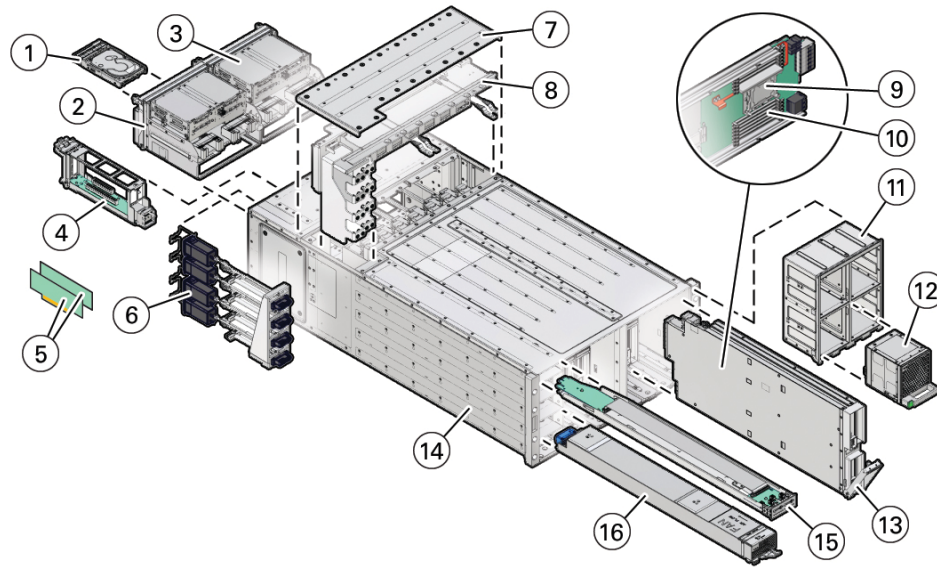
Replaceable Components

These sections describe the components of the server and provide information about identifying and servicing replaceable components.

- [“Illustrated Parts Breakdown” on page 22](#)
- [“Component Serviceability Requirements” on page 24](#)
- [“Customer-Replaceable Units” on page 25](#)
- [“Field-Replaceable Units” on page 26](#)

Illustrated Parts Breakdown

The following illustration identifies the major components of the server.



Call Out	Description	Links
1	Storage drives (8), back panel accessible	“Servicing Storage Drives (CRU)” on page 123
2	System Module 0 (SMOD0), back panel accessible Includes internal battery, HBA RAID SAS PCIe card, SAS cable, ESM extension cable, and ESM energy storage module. Not shown.	“Servicing System Module (SMOD) Components (FRU)” on page 201
3	System Module 1 (SMOD1), back panel accessible Includes internal battery, HBA RAID SAS PCIe card, SAS cable, ESM extension cable, and ESM energy storage module. Not shown.	“Servicing System Module (SMOD) Components (FRU)” on page 201
4	Dual PCIe carrier card (DPCC) with PCIe cards (8)	“Servicing PCIe Cards and Carriers (CRU)” on page 146 “PCI Devices Subsystem” on page 89
5	PCIe cards (DPCC slots 4-7 and PCIe slots 9-16 are nonfunctional in 4-socket systems.)	“Servicing PCIe Cards and Carriers (CRU)” on page 146
6	AC power block The AC power block is not a removable component.	“Servicing Power Supplies (CRU)” on page 139 “Power Subsystem” on page 82
7	Top access panel	“Preparing for Service” on page 97
8	Midplane assembly	“Servicing the Midplane Assembly (FRU)” on page 234
9	Processor, front panel accessible	“Servicing CPU Module (CMOD) Components (FRU)” on page 159

Call Out	Description	Links
10	Memory, front panel accessible	“Servicing CPU Module (CMOD) Components (FRU)” on page 159
11	Fan frame (2), front panel accessible	“Servicing Fan Modules (CRU) and Fan Frames (CRU)” on page 129
12	Fan module (FM) (8), front panel accessible	“Servicing Fan Modules (CRU) and Fan Frames (CRU)” on page 129
13	CPU module (CMOD) (4 or 8), front panel accessible	“Servicing CPU Module (CMOD) Components (FRU)” on page 159
14	Server chassis The server chassis is not a removable component.	“Server Chassis Overview” on page 38
15	Front indicator module (FIM), front panel accessible	“Servicing the Front Indicator Module (FRU)” on page 230
16	Power supply (PSU) (4), front panel accessible	“Servicing Power Supplies (CRU)” on page 139

Component Serviceability Requirements

System components are hot-serviceable, warm-serviceable, or cold-serviceable components, and are customer-replaceable units (CRUs) or field-replaceable units (FRUs). See [“Preparing the Server for Component Replacement” on page 100](#).

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

Hot-serviceable components are also warm-serviceable, or cold-serviceable.

- *Warm service* components can be serviced while the server chassis is in Standby power mode. You can remove and replace CMODs, and CMOD internal components such as DIMMs, processors, and heatsinks without disconnecting the back panel power cords or shutting down Oracle ILOM.

Warm-serviceable components are also cold-serviceable.

- *Cold service* components must be serviced when the server chassis is completely powered off and all four AC power cords are disconnected from the server back panel AC power block.

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

- Customer-replaceable units (CRUs) can be serviced by customers.
- Field-replaceable units (FRUs) must be serviced by qualified Oracle Service personnel.

Customer-Replaceable Units

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

CRU	Description	Replacement Instructions
Battery	Cold-serviceable 3V Lithium Coin Cell Battery that powers the CMOS BIOS and real-time clock located in SMODs.	“Servicing System Module (SMOD) Components (FRU)” on page 201
Memory (DIMMs)	Warm-serviceable Add or replace RDIMM or LRDIMM memory modules located in CMODs.	“Servicing CPU Module (CMOD) Components (FRU)” on page 159
Storage drives	Hot-serviceable Storage drive configurations can comprise both hard disk drives (HDDs) or solid state disk drives (SSDs).	“Servicing Storage Drives (CRU)” on page 123
Fan modules (FM0-7)	Hot-serviceable Eight fan modules for cooling the server components.	“Servicing Fan Modules (CRU) and Fan Frames (CRU)” on page 129
PCIe cards	Hot-serviceable Optional add-in cards that can expand the functionality of the server. Note - The Oracle Storage 12 Gb/s SAS PCIe RAID HBA card is a field replaceable unit (FRU) and should only be serviced by authorized Oracle Service personnel.	“Servicing PCIe Cards and Carriers (CRU)” on page 146
Dual PCIe card carriers (DPCC)	Hot-serviceable Eight dual PCIe card carriers (DPCCs), each with two PCIe card slots.	“Servicing PCIe Cards and Carriers (CRU)” on page 146
Power supplies (PS0-3)	Hot-serviceable Four fully redundant AC-powered power supplies.	“Servicing Power Supplies (CRU)” on page 139
Energy Storage Module and ESM extension cable	Cold-serviceable Provides backup power between the Energy Storage Module (ESM) and the Oracle Storage 12Gb SAS PCIe RAID HBA, Internal 16-Port located in SMODs.	“Servicing the Energy Storage Module and Cables (CRU)” on page 214

Related Information

- [“Field-Replaceable Units” on page 26](#)
- [“Illustrated Parts Breakdown” on page 22](#)

Field-Replaceable Units

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

FRU	Description	Replacement Instructions
CMOD	Warm-serviceable Add or replace CPU module assemblies (CMOD0-7) including a processor and memory.	“Servicing CPU Module (CMOD) Components (FRU)” on page 159
Processor and heatsink	Warm-serviceable Add or replace the processor-heatsink module (PHM) CPU that carries out system instructions located in CMODs.	“Servicing Processors (FRU)” on page 170
SMOD	Cold-serviceable Replace system module assemblies SMOD0 or SMOD1.	“Servicing System Module (SMOD) Components (FRU)” on page 201
Storage drive backplanes	Cold-serviceable Provide power and communications connectors for storage drives located in SMODs.	“Servicing Storage Drives (CRU)” on page 123
SAS cable	Cold-serviceable Provide signals between the SMOD front disk backplane and the Oracle Storage 12Gb SAS PCIe RAID HBA, Internal 16-Port located in SMODs.	“Servicing the SAS Cable (FRU)” on page 219
Oracle Storage 12 Gb SAS PCIe RAID HBA, Internal card	Cold-serviceable Located in SMODs, the Oracle Storage 12Gb SAS PCIe RAID HBA, Internal 16-Port manages SAS storage drives.	“Servicing the Host Bus Adapter (HBA) Card (FRU)” on page 207
Front indicator module (FIM)	Cold-serviceable Contains push-button circuitry and LED indicators that are displayed on the chassis bezel.	“Servicing the Front Indicator Module (FRU)” on page 230
Midplane assembly	Cold-serviceable Internal midplane/busbar assembly in the chassis.	“Servicing the Midplane Assembly (FRU)” on page 234

Related Information

- [“Customer-Replaceable Units” on page 25](#)
- [“Illustrated Parts Breakdown” on page 22](#)

CPU Module (CMOD) Overview

Oracle Server X7-8 contains four or eight CPU modules (CMODs). Each CMOD contains one processor-heatsink module (PHM) and 12 DIMM slots of system memory.

CMODs supply power to the fan modules (FMs) and the DPCCs.

These topics provide information about server CMODs, CMOD 0-7 configuration options, and the internal layout of CMOD components:

- [“CMOD Components” on page 27](#)
- [“CMOD Processor” on page 28](#)
- [“CMOD Memory” on page 29](#)
- [“CMOD and Fan Module Power” on page 31](#)

CMODs are internal warm or cold-service components. CMODs are accessible from the front panel. To access CMODs, you must remove the fan modules (FM0-7) and one or two fan frames (0-1).

Related Information

- [“Product Description” on page 15](#)
- [“Servicing CPU Module \(CMOD\) Components \(FRU\)” on page 159](#)
- [“CMOD Population Rules” on page 161](#)
- [“System Module \(SMOD\) Overview” on page 32](#)

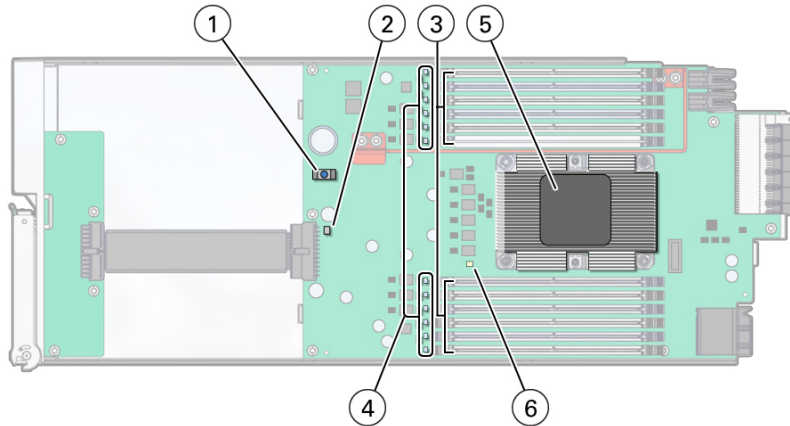
CMOD Components

CMODs include the following processor (CPU) and DIMM memory components:

- The processor-heatsink module (PHM) assembly includes heatsink, processor, thermal interface material (TIM), and carrier.
 - [“CMOD Processor” on page 28](#)
- 12 DIMM slots arranged in two groups of six
 - [“CMOD Memory” on page 29](#)
- Fault Remind Test Circuit, which helps you locate failed DIMMs and verify a failed CPU
 - Fault Remind button
 - 12 DIMM slot fault indicators

- 1 CPU fault indicator

The following illustration shows CMOD component locations.



Call Out	Description
1	CMOD Fault Remind button
2	Circuit Charge Status indicator
3	12 DIMM slots arranged in two groups of six
4	DIMM slot fault indicators (12, one for each slot)
5	Processor-heatsink module (PHM)
6	CPU fault indicator

For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).

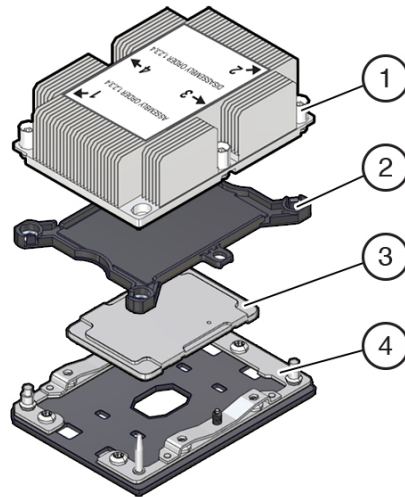
CMOD Processor

Each CMOD contains one Intel Xeon vx processor.

- Four CPU modules installed in slots 0 through 3
- Eight CPU modules installed in slots 0 through 7

- 24 cores per-socket (8-socket = 192 total, 4-socket = 96 total)

The processor-heatsink module (PHM) is a three-part module that is installed above the socket assembly.



Call Out	Description
1	Heatsink with thermal interface material (TIM), part of PHM
2	Carrier, part of PHM
3	Processor, part of PHM
4	Socket assembly

See [“Servicing Processors \(FRU\)”](#) on page 170.

CMOD Memory

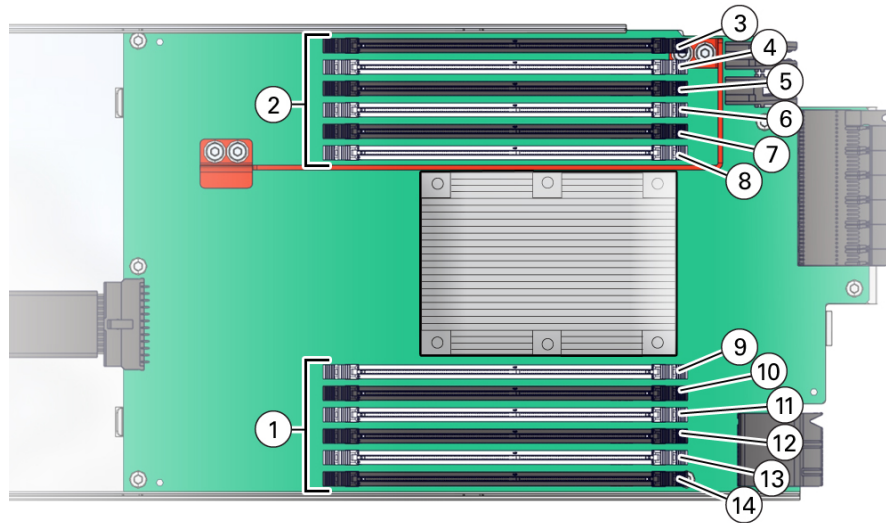
The maximum system memory with DDR4-2666 64 GB LRDIMMs is:

- Four CMODs: 3 TB with 48 installed x 64 GB LRDIMMs

- Eight CMODs: 6 TB with 96 installed x 64 GB LRDIMMs

The maximum system memory with DDR4-2666 32 GB RDIMMs is:

- Four CMODs: 1.5 TB with 48 installed x 64 GB LRDIMMs
- Eight CMODs: 3 TB with 96 installed x 64 GB LRDIMMs



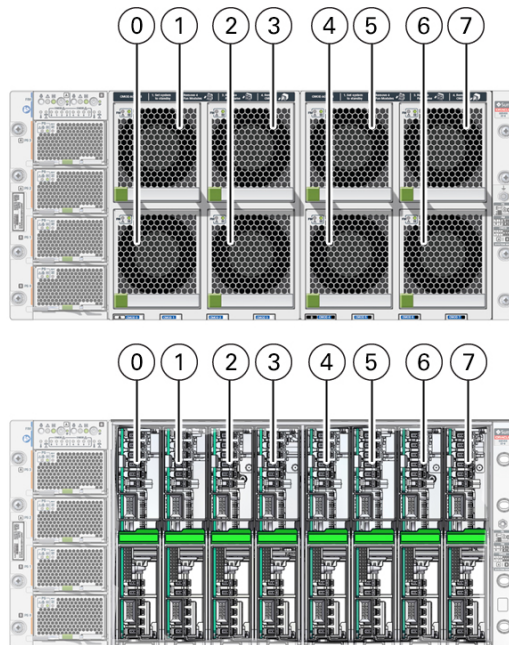
Call Out	Description
1	DIMM Banks A, B, C
2	DIMM Banks D, E, F
3	Channel F, Slot 0, DIMM 0
4	Channel F, Slot 1, DIMM 1
5	Channel E, Slot 0, DIMM 2
6	Channel E, Slot 1, DIMM 3
7	Channel D, Slot 0, DIMM 4
8	Channel D, Slot 1, DIMM 5
9	Channel A, Slot 0, DIMM 6
10	Channel A, Slot 1, DIMM 7
11	Channel B, Slot 0, DIMM 8
12	Channel B, Slot 1, DIMM 9

Call Out	Description
13	Channel C, Slot 0, DIMM 10
14	Channel C, Slot 1, DIMM 11

See [“Servicing DIMMs \(CRU\)”](#) on page 184.

CMOD and Fan Module Power

Only CMODs in even-numbered slots supply power to fan modules (FMs). The following table shows which CMOD slots provide FM power. Four fan modules per SMOD are front panel accessible.



CMOD0-7 Power Slots	FM0-7 Fan Modules Powered
CMOD 0	FM0 and FM1

CMOD0-7 Power Slots	FM0-7 Fan Modules Powered
CMOD 2	FM2 and FM3
CMOD 4	FM4 and FM5
CMOD 6	FM6 and FM7

CMOD1, CMOD3, CMOD5, and CMOD7 in chassis slots 1, 3, 5, and 7 do not supply fan module power.

See [“Servicing Fan Modules \(CRU\) and Fan Frames \(CRU\)” on page 129](#).

System Module (SMOD) Overview

These topics provide information about Oracle Server X7-8 system modules (SMODs) and components.

- [“SMOD Components” on page 34](#)
- [“SMOD Motherboard” on page 36](#)
- [“Server Storage Drives” on page 37](#)

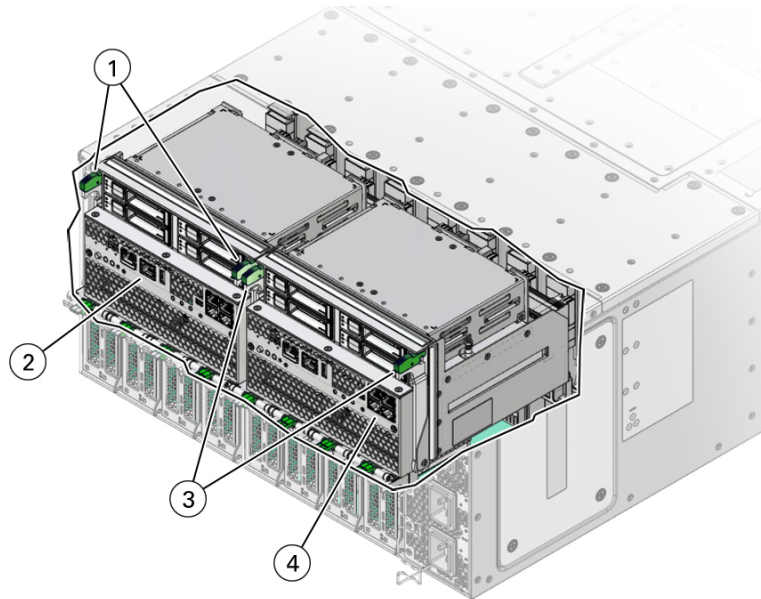
Two SMODs are installed in the chassis: SMOD0 and SMOD1. SMODs are cold-service components. SMODs are accessible from the back panel.

Each SMOD includes:

- One Intel Xeon C624 Chipset Platform Controller Hub (PCH).
- One Internal PCIe slot for RAID storage HBA connectivity to drive bays.
This PCIe slot is populated by one PCIe Gen3 x8 HBA per SMOD (Oracle Storage 12Gb SAS PCIe RAID HBA, Internal 16-Port). Four ports in the card are used for SAS connectivity.
- One service processor (on SMOD): Emulex Pilot 4 service processor (SP).
SP characteristics:
 - Remote keyboard, video, mouse (RKVM) redirection
 - Full remote management through command-line, IPMI, and browser interfaces
 - Remote media capability (DVD, CD, ISO image)
 - Advanced power management and monitoring
 - Active Directory, LDAP, RADIUS support

- Oracle ILOM
- Dual Oracle ILOM image
- Signed Oracle ILOM image
- 512 MB DDR4 memory
- 128 MB of flash memory
- 1 GB of NAND memory
- Baseboard management controller (BMC)
- One RJ-45 serial management port (SER MGT).
- One network management port, 10/100/1000 GbE Network Ethernet port (NET MGT).
- One USB 3.0 port external on each SMOD.
- Four 10GBase-T ports per SMOD (NET0-3).
- Four hot swap capable SAS3 storage drive bays HDD0-3.
- Four drives in each SMOD. SMOD0 0-3 and SMOD1 0-3. Drives can be a total of eight 2.5-inch, hot-swappable SAS3 hard disk drives (HDDs) or eight 2.5-inch SAS3 solid state drives (SSDs).

Both SMODs are accessible from the back panel of the server. The following illustration shows SMOD0 and SMOD1 removal and installation levers with green lock release tabs.



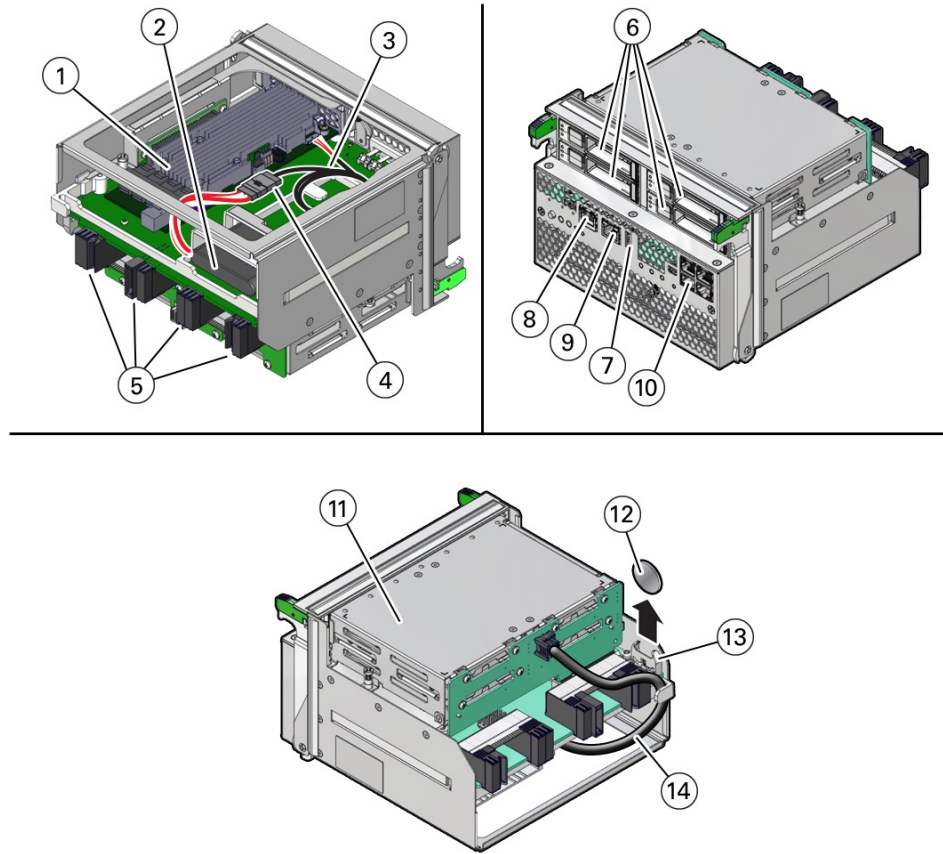
Call Out	Description
1	SMOD1 ejector levers (2)
2	SMOD1 installed in chassis
3	SMOD0 ejector levers (2)
4	SMOD0 installed in chassis

Related Information

- [“System Module \(SMOD\) Indicators” on page 63](#)
- [“CPU Module \(CMOD\) Overview” on page 27](#)
- [“Product Description” on page 15](#)

SMOD Components

The following illustration shows an SMOD (system module) and associated components, including an Oracle Storage 12 Gb SAS PCIe RAID HBA, internal: 16 port and 2 GB memory card installed below the SMOD, one SAS cable that connects the HBA card to the server storage backplane, and an ESM extension cable that connects the energy storage module (ESM) to the HBA card.



Call Out	Description
1	SAS host bus adaptor (HBA): Oracle Storage 12 Gb SAS PCIe RAID HBA, internal: 16 port and 2 GB memory
2	Energy storage module (ESM)
3	Cable from HBA to ESM
4	SMOD motherboard
5	Storage drive SMOD midplane connectors (4)
6	Four server storage drives 0-3 (HDD/SSD), back panel accessible
7	External USB port, back panel accessible
8	NET MGT ILOM service processor (SP) network management 10/100/1000BASE-T Network port, back panel accessible

Call Out	Description
9	Serial management port labeled SER MGT port. IO port, back panel accessible
10	NET 0-3 10 GbE network ports labeled NET0, NET1, NET2, and NET3. Network ports, back panel accessible
11	Service processor (SP) - concealed location
12	Real time clock 3V lithium coin cell battery
13	Real time clock 3V lithium coin cell battery socket
14	SAS storage drive backplane cable

For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).

For replacement procedures, see [“Servicing System Module \(SMOD\) Components \(FRU\)” on page 201](#).

SMOD Motherboard

Each SMOD motherboard contains:

- Two Storage Drive Backplanes (for externally accessible server storage drives)
Externally accessible server storage drives on the SMOD connect to two storage drive backplanes mounted on the SMOD motherboard. One SAS cable connects each backplane to the HBA card that is installed in a riser slot on the underside of the SMOD. Storage drive backplanes are not removable or replaceable.
- Service processor (SP)
The system Emulex Pilot 4 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.
- System real time clock battery, 3V lithium coin cell battery
- Energy storage module (ESM) for the server storage HBA
The ESM provides backup power for the Oracle Storage 12Gb SAS PCIe RAID HBA, Internal 16-Port card. The ESM is located in a holder in the top center of the SMOD. A cable connects the HBA to to the ESM.
- PCIe riser for the server storage HBA, located on the bottom of the SMOD
The server requires one internal HBA (Oracle Storage 12Gb SAS PCIe RAID HBA, Internal 16-Port) 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 one mini-SAS4I connector cable.

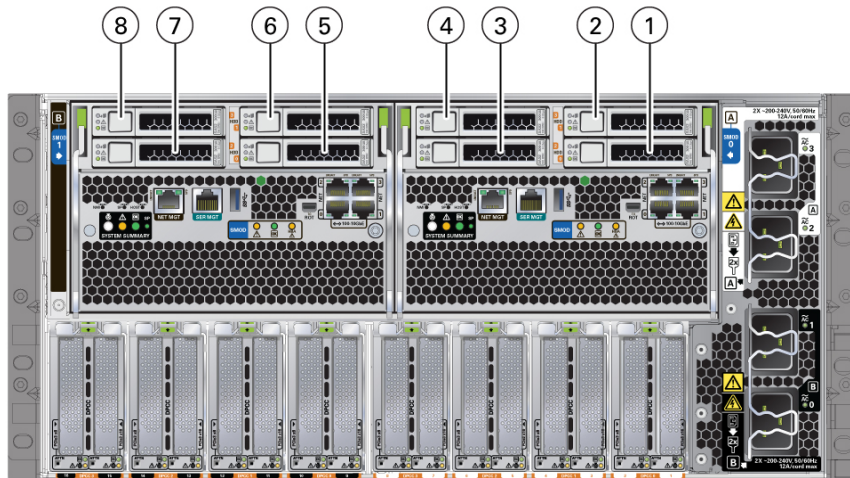
- One internal USB 3.0 port, located on the bottom of the SMOD.
Each SMOD has one unused internal USB 3.0 port that is designated as P0. The port is located on the underside of the SMOD motherboard next to the PCIe card riser slot.

For component serviceability, locations, and designations, see [“Replaceable Components” on page 22.](#)

For replacement procedures, see [“Servicing System Module \(SMOD\) Components \(FRU\)” on page 201.](#)

Server Storage Drives

The following illustration shows the eight storage drive externally-accessible back panel bay locations, which are arranged in two rows of four per SMOD.



Call Out	Description
1	SMOD0 System A storage drive 0 (HDD/SSD)
2	SMOD0 System A storage drive 1 (HDD/SSD)
3	SMOD0 System A storage drive 2 (HDD/SSD)

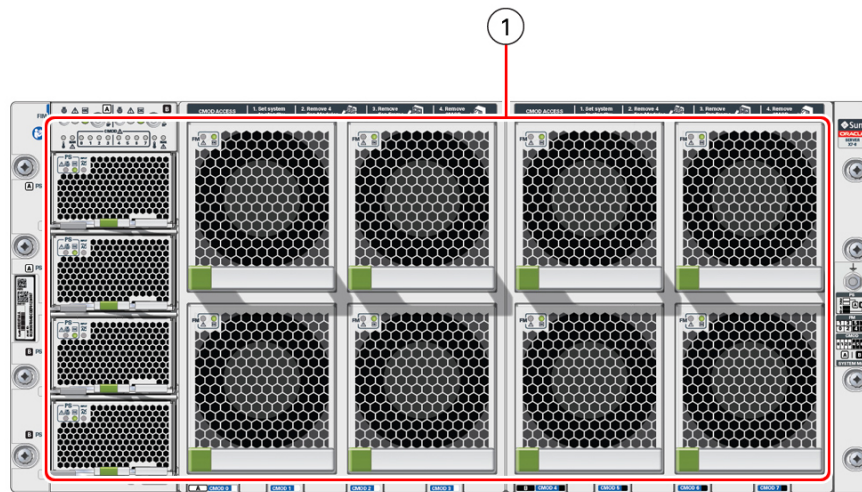
Call Out	Description
4	SMOD0 System A storage drive 3 (HDD/SSD)
5	SMOD1 System B storage drive 0 (HDD/SSD)
6	SMOD1 System B storage drive 1 (HDD/SSD)
7	SMOD1 System B storage drive 2 (HDD/SSD)
8	SMOD1 System B storage drive 3 (HDD/SSD)

Server Chassis Overview

These sections describe the server chassis and internal components.

- [“Chassis Features” on page 39](#)
- [“Chassis Internal Components” on page 39](#)
- [“Chassis Front Panel Components” on page 41](#)
- [“Chassis Back Panel Components” on page 42](#)
- [“Switches and Buttons Reference” on page 43](#)

The server chassis assembly contains front panel, back panel, and internal accessible components. The following figure shows the server chassis front panel (1).



Related Information

- [“CPU Module \(CMOD\) Overview” on page 27](#)
- [“System Module \(SMOD\) Overview” on page 32](#)

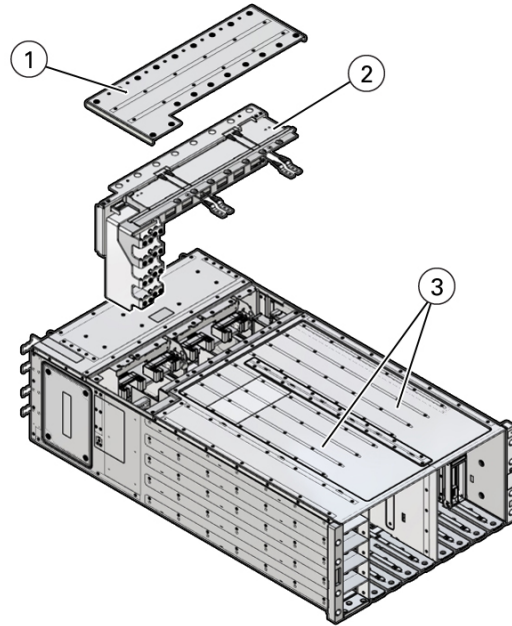
Chassis Features

The Oracle Server X7-8 chassis features include:

- One 5U chassis with central mid-plane.
- One Front Indicator Module (FIM) with controls and indicators.
- Eight front-loaded CMOD assemblies (behind fan module assemblies FM0-7 and fan frame assemblies). Four CMODs are supported per SMOD.
- Two rear-loaded system module assemblies (SMODs).
- Four front-loaded hot-swap power supply units (PSUs) in a two per SMOD 1+1 configuration.
- Expandable IO: Eight 16-lane and eight 8-lane PCIe Gen3 chassis slots. One x8 PCIe Gen 3 HBA SMOD slot.
Eight rear-loaded DPCC slots (each DPCC provides one 16 lane PCIe expansion slot and one eight lane PCIe expansion slot).
- Eight hot-swap redundant 100 watt cooling fan modules.
- Cooling is front to back, using eight variable-speed, dual counter-rotating fan modules FM0-7 mounted in the front of the server.

Chassis Internal Components

The following figure shows the server chassis internal components.

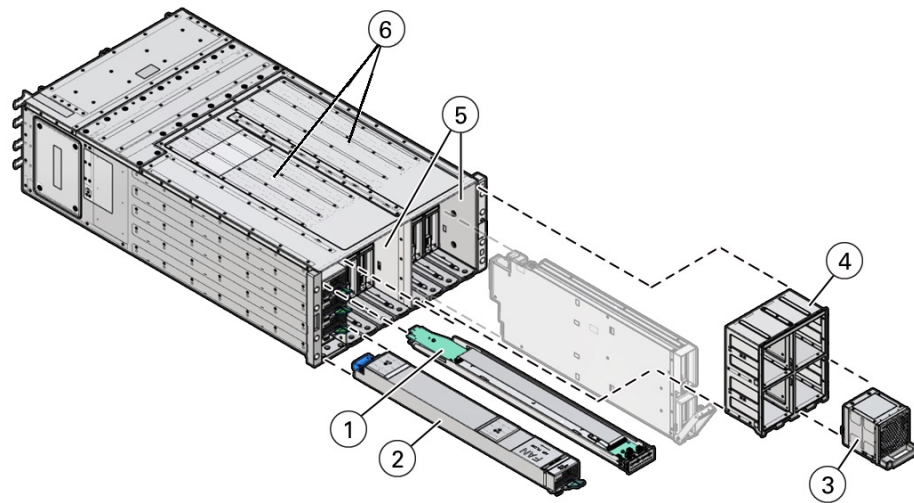


The chassis internal components are described in the following table.

Call Out	Component	Description	Links
1	Top Cover	This component is part of the chassis and is non-replaceable.	“Remove the Midplane Assembly” on page 235.
2	Midplane/ busbar	The midplane assembly provides an interconnect between the back panel components and the front panel components. This component requires cold service.	“Remove the Midplane Assembly” on page 235.
3	Server Chassis CPU module (CMOD) bays	The server chassis is not a removable component. Server chassis CMOD bays can support either four or eight CMODs. Servicing CMODs requires warm or cold service.	“Server Chassis Overview” on page 38 “CPU Module (CMOD) Overview” on page 27. “Servicing CPU Module (CMOD) Components (FRU)” on page 159

Chassis Front Panel Components

The following figure shows the server chassis front panel accessible replaceable components.

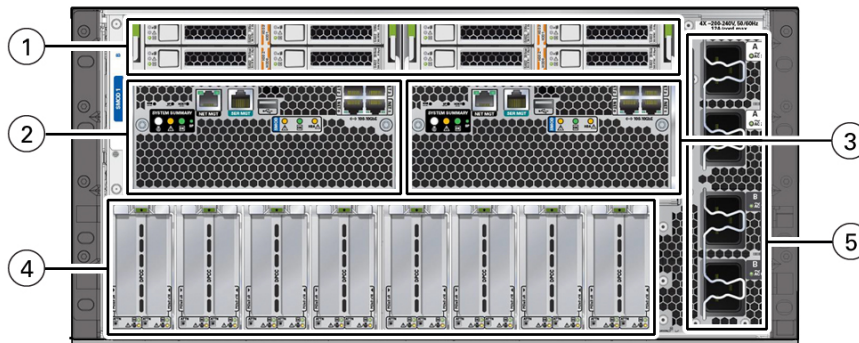


Call Out	Component	Links
1	Front indicator module (FIM)	“Servicing the Front Indicator Module (FRU)” on page 230 “Front Indicator Module (FIM) Panel” on page 58
2	Power supply (PS0-3) (4)	“Servicing Power Supplies (CRU)” on page 139 “Power Supply (PS) Indicators” on page 62
3	Fan module (FM0-7) (8)	“Servicing Fan Modules (CRU) and Fan Frames (CRU)” on page 129 “Fan Module (FM) Indicators” on page 61
4	Fan Frame (2)	“Servicing Fan Modules (CRU) and Fan Frames (CRU)” on page 129
5	Server chassis fan bays The server chassis is not a removable component.	“Server Chassis Overview” on page 38

Call Out	Component	Links
6	<p>Server chassis CPU module (CMOD) bays</p> <p>Chassis CMOD bays can support either four or eight CMODs. Servicing CMODs requires warm or cold service. The server chassis is not a removable component.</p>	<p>“CPU Module (CMOD) Overview” on page 27.</p> <p>“Servicing CPU Module (CMOD) Components (FRU)” on page 159</p>

Chassis Back Panel Components

The following illustration shows the chassis back panel.



Call Out	Component	Description	Links
1	Storage Drives	<p>Left facing back of chassis: SMOD1 HDD/SSD slots 0 through 3:</p> <p>Right facing back of chassis: SMOD0 HDD/SSD slots 0 through 3:</p> <p>Top row : 3, 1</p> <p>Bottom row: 2, 0</p>	<p>“Storage Drive Locations and Numbering” on page 124</p> <p>“Storage Drive Indicators” on page 67</p>
2	System Module A (SMOD0)	SMOD0 System A internal components can only be accessed by removing the SMOD from the server back panel.	<p>“System Module (SMOD) Overview” on page 32</p> <p>“System Module (SMOD) Indicators” on page 63</p>

Call Out	Component	Description	Links
3	System Module B (SMOD1)	SMOD1 System B internal components can only be accessed by removing the SMOD from the server back panel.	“System Module (SMOD) Overview” on page 32 “System Module (SMOD) Indicators” on page 63
4	Dual PCIe card carrier (DPCC) bay	The DPCC bay contains eight DPCCs and up to 16 PCIe cards.	“PCI Devices Subsystem” on page 89 “Dual PCIe Card Carrier (DPCC) Indicators” on page 68
5	AC power block	The AC power block has four AC power inlet connectors, two for each SMOD. The power block is not a removable component.	“Power Subsystem” on page 82 “AC Power Block Inlet Indicators” on page 69

Switches and Buttons Reference

The server front panel and back panels provide access to the following switches and buttons.

Button	Description	Links
Two front panel On/Standby buttons	<p>Press On/Standby button A to control server power on System A SMOD0 while local to (at) the server FIM.</p> <p>Press On/Standby button B to control server power on System B SMOD1 while local to (at) the server FIM.</p> <p>Caution - Exercise caution on dual systems.</p>	“Power On the Server” on page 250 “Powering Down the Server” on page 110
Two front panel Locate Buttons/LEDs	Press the buttons on the server front panel FIM to manage the SMOD0 or SMOD1 Locate Button/LED indicator locally. To deactivate (or activate) the Locate Button/LED, press and release the button.	“Managing the Locate Button/LED” on page 119
Two back panel Locate Buttons/LEDs	Press the buttons on the server back panel SMODs to manage the SMOD0 or SMOD1 Locate Button/LED indicator locally. To deactivate (or activate) the Locate Button/LED, press and release the button.	“Managing the Locate Button/LED” on page 119
SP Reset	<p>Service processor (SP) pinhole reset button located on the server back panel</p> <p>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).</p>	“Back Panel Pinhole Switches” on page 75
Host Warm Reset	Recessed pinhole button located on the server back panel	“Back Panel Pinhole Switches” on page 75

Button	Description	Links
	The Host Warm Reset button allows you to perform an immediate reboot of the server (activating the button requires the use of a stylus).	
NMI pinhole button	<p>Non-maskable Interrupt recessed pinhole button located on the server back panel</p> <p>The NMI button is used by Service personnel only. Do not press.</p>	<p>“Back Panel Pinhole Switches” on page 75</p>
CMOD internal 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. You must remove the CMOD from the front panel to access the button.	<p>“Servicing CPU Module (CMOD) Components (FRU)” on page 159</p> <p>“CPU Module (CMOD) Overview” on page 27</p> <p>“Troubleshooting Using a CMOD Fault Remind Test Circuit” on page 53</p>
Sixteen (16) recessed ATTN (attention) buttons (two on each DPCC)	The ATTN buttons are used to initiate DPCC removal and install. Before removing a DPCC, use a stylus to press <i>both</i> ATTN buttons. After installing a DPCC that contains a PCIe card, press the buttons again.	<p>“Servicing PCIe Cards and Carriers (CRU)” on page 146</p> <p>“Dual PCIe Card Carrier (DPCC) Indicators” on page 68</p> <p>“Back Panel Components” on page 19</p>

Troubleshooting and Diagnostics

This section provides information about troubleshooting hardware component faults for Oracle Server X7-8. The following topics are covered.

- [“Detecting and Managing Server Faults” on page 45](#)
- [“Troubleshooting Using Diagnostic Tools” on page 56](#)
- [“Troubleshooting Using Status Indicators” on page 57](#)
- [“Troubleshooting Server Subsystems” on page 80](#)
- [“Attaching Devices to the Server” on page 90](#)
- [“Getting Help” on page 95](#)
- [“Auto Service Requests” on page 96](#)

For more information about server troubleshooting and diagnostics, refer to the *Oracle x86 Servers Diagnostics and Troubleshooting Guide for Servers With Oracle ILOM 4.0.x* at <https://www.oracle.com/goto/x86admindiag/docs>.

Detecting and Managing Server Faults

When a server encounters a fault, the fault is recorded in a common fault database. The fault is then reported by the server in one of several ways, depending on the type and severity of the fault.

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

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

Description	Section Links
Troubleshooting overview information and procedure	“Troubleshooting Server Hardware Faults” on page 46

Description	Section Links
Information about how to use the CMOD Fault Remind Test Circuit	“Troubleshooting Using a CMOD Fault Remind Test Circuit” on page 53
Information related to the cooling subsystem, including fault causes, actions, and preventative measures	“Troubleshooting System Cooling Issues” on page 53 “Cooling Subsystem” on page 84
Information related to the power subsystem, including fault causes, actions, and preventative measures	“Troubleshooting Power Issues” on page 55 “Power Subsystem” on page 82
Contact technical support if the problem persists.	“Getting Help” on page 95

Troubleshooting Server Hardware Faults

When a server hardware fault event occurs, the system lights the Fault-Service Required LED and captures the event in the Oracle ILOM event log. If you 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, address it immediately.

To investigate a hardware fault, see the following:

- Basic Troubleshooting Process
[“Basic Troubleshooting Steps” on page 46](#)
- Troubleshoot Hardware Faults Using the Oracle ILOM Web Interface
[“Troubleshooting Server Hardware Faults” on page 46](#)
[“Identify Hardware Faults \(Oracle ILOM\)” on page 47](#)

Basic Troubleshooting Steps

When a server encounters a fault, the fault is recorded in a common fault database. The fault is then reported by the server in one of several ways, depending on the type and severity of the fault.

Use the following process to address a suspected hardware fault:

1. **Review the *Oracle Server X7-8 Product Notes* for late-breaking server information, and hardware-related issues.**
Refer to *Oracle Server X7-8 Product Notes* at: <https://www.oracle.com/goto/x7-8/docs>
2. **Investigate the hardware fault. Identify the hardware issue.**
Select one of the following methods to identify the failed component and server subsystem containing the fault.

- Log in to Oracle ILOM. See “[Identify Hardware Faults \(Oracle ILOM\)](#)” on page 47.
- Log in to Oracle Hardware Management Pack. For information, refer to the Oracle Hardware Management Pack documentation at: <https://www.oracle.com/goto/ohmp/docs>.
- Log in to the Oracle Solaris OS and issue the `fmadm faulty` command.
- Log in to the Oracle ILOM service processor from the Oracle ILOM Fault Management Shell and issue the `fmadm faulty` command.

For more information about how to use the Oracle ILOM Fault Management Shell and supported commands, see the *Oracle ILOM User's Guide for System Monitoring and Diagnostics Firmware Release 4.0.x* in the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.

If you determine that the hardware fault requires service, continue.

3. **Prepare the server for service.**

See “[Preparing for Service](#)” on page 97. You can use Oracle ILOM to power off the server, activate the Locate Button/LED, and take the server offline.

Obtain physical access to the server. Before servicing the server, prepare the work space to ensure ESD protection for the server and components.

4. **Service replaceable server components.**

See “[Servicing Components](#)” on page 123 for FRU and CRU 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.

5. **Return the server to service.**

See “[Returning the Server to Operation](#)” on page 249.

6. **Clear the fault in Oracle ILOM (optional).**

Most components include a FRU ID to clear the fault automatically. You might need to clear the fault in Oracle ILOM, depending on the component requirements.

See “[Clear Hardware Fault Messages \(Oracle ILOM\)](#)” on page 51.

▼ Identify Hardware Faults (Oracle ILOM)

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

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

This example procedure provides one method to troubleshoot hardware faults using Oracle ILOM web and CLI interfaces. However, the procedure can be performed using only the Oracle ILOM CLI interface. For more information about Oracle ILOM interfaces, refer to the Oracle ILOM documentation.

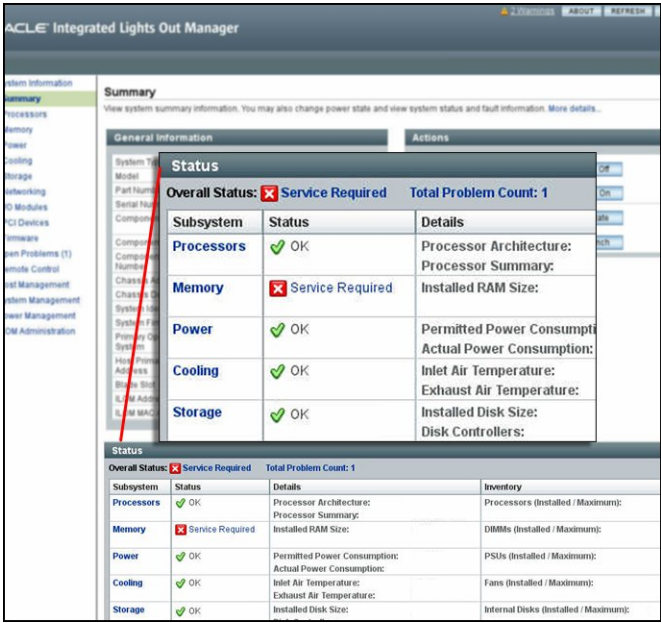
1. **Obtain the latest version of the *Oracle Server X7-8 Product Notes* at: <https://www.oracle.com/goto/x7-8/docs>.**
2. **Log in to the server SP Oracle ILOM web interface.**

Open a browser and type in the IP address of the server SP. Enter a user name (with administrator privileges) and password at the Login screen. The Summary Information page appears.
3. **View the *Status* section of the Summary Information page to identify the server subsystem that requires service.**

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

 - “Processor Subsystem” on page 80
 - “Memory Subsystem” on page 81
 - “Power Subsystem” on page 82
 - “Cooling Subsystem” on page 84
 - “Storage Subsystem” on page 87
 - “Networking Subsystem” on page 88
 - “PCI Devices Subsystem” on page 89

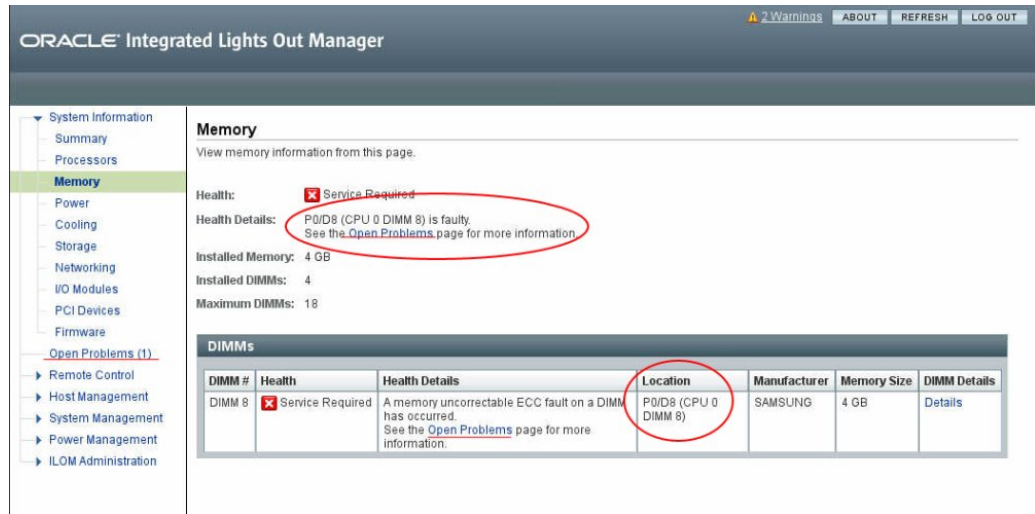
The Status table lists components that require service.



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

- 4. To identify the component, click on the subsystem name.

The subsystem information page appears.



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

5. 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.

6. Before going to the server, review the [Oracle Server X7-8 Product Notes](#) for information related to the issue or the component.

For up-to-date information about the server, including hardware-related issues, refer to *Oracle Server X7-8 Product Notes* at: <https://www.oracle.com/goto/x7-8/docs>

7. To prepare the server for service, see [“Preparing for Service” on page 97](#).

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.

Managing Server Hardware Faults Using the Oracle ILOM Fault Management Shell

The Oracle ILOM Fault Management Shell enables you to view and manage fault activity on a managed servers and other types of devices.

For more information about how to use the Oracle ILOM Fault Management Shell, see the *Oracle ILOM User's Guide for System Monitoring and Diagnostics Firmware Release 4.0.x* in the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.

▼ Clear Hardware Fault Messages (Oracle ILOM)

After servicing the following components, you must clear the fault event in Oracle ILOM:

- Processor (CPU)
- PCIe card
- HBA
- Front Indicator Module (FIM)

This procedure uses the Oracle ILOM CLI interface. Use the Oracle ILOM CLI to access the Fault Management Shell, `fmadm`.

For more information about how to use the Oracle ILOM Fault Management Shell and supported commands, see the *Oracle ILOM User's Guide for System Monitoring and Diagnostics Firmware Release 4.0.x* in the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.



Caution - The purpose of the Oracle ILOM Fault Management Shell is to help Oracle Service personnel diagnose system problems. Customers should not launch this shell or run fault management commands in the shell unless requested to do so by Oracle Service personnel.

1. **Log in to the SP Oracle ILOM CLI.**

Log in as a user with root or administrator privileges. For example, open an SSH session, and at the command line type:

```
ssh root@ipaddress
```

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

For more information, see “Using Oracle ILOM” in *Oracle Server X7-8 Installation Guide*.

The Oracle ILOM CLI prompt appears: ->

2. To access `fmadm`, type:

```
->start /SP/faultmgmt/shell
```

The `fmadm` prompt appears: `faultmgmtsp>`

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

```
faultmgmtsp>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 faulty 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. **Type `fmadm` to clear the fault.**
Select `acquit`, `repair`, `replaced`, or `repaired`.
6. **Close the Oracle ILOM session.**

Troubleshooting Using a CMOD Fault Remind Test Circuit

The CMODs have an internal test circuit with indicators 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 LEDs to locate faulty components.

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. You must remove the CMOD from the front panel to access the button.

For more information, see [“Identify and Remove a Faulty DIMM” on page 192](#) and [“Identify and Remove a Faulty Processor” on page 171](#).

Troubleshooting System Cooling Issues

Maintaining the proper internal operating temperature of the server is crucial to the health of the server. To prevent server shutdown and damage to components, address over temperature and hardware-related issues as soon as they occur. If your server has a temperature-related fault, use the information in the following table to troubleshoot the issue.

Cooling Issue	Description	Action	Prevention
External Ambient Temperature Too High	The server fans pull cool air into the server from its external environment. If the ambient temperature is too high, the internal temperature of the server and its components increases. This can cause poor performance and component failure.	Verify 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.	Periodically verify the ambient temperature of the server space to ensure that it is within the required range, especially if you 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	Inspect the server front and back panel vents for blockage from dust	Periodically inspect and clean the server vents using an ESD certified

Clear Hardware Fault Messages (Oracle ILOM)

Cooling Issue	Description	Action	Prevention
	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.	or debris. Additionally, inspect the server interior for improperly installed components or cables that can block the flow of air through the server.	vacuum cleaner. Ensure that all components, such as cards, cables, fans, air baffles and dividers are properly installed. Never operate the server without the top cover installed.
Cooling Areas Compromised	The component filler panels, and server top cover maintain and direct the flow of cool air through the server. These server components must be in place for the server to function as a sealed system. If these components are not installed correctly, the airflow inside the server can become chaotic and non-directional, which can cause server components to overheat and fail.	Inspect the server interior to ensure that the components are properly installed. Ensure that all external-facing slots (storage drive, PCIe) are occupied with either a component or a component filler panel.	When servicing the server, ensure that the components are installed correctly and that the server has no unoccupied external-facing slots.
Hardware Component Failure	<p>Components, such as power supplies and fan modules, are an integral part of the server cooling system. When one of these components fails, the server internal temperature can rise. This rise in temperature can cause other components to enter into an over-temperature state. Additionally, some components, such as processors, might overheat when they are failing, which can also generate an over-temperature event.</p> <p>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 other functioning 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 can maintain both the power and the cooling subsystems.</p>	Investigate the cause of the over-temperature event, and replace failed components <i>immediately</i> . For hardware troubleshooting information, see “Troubleshooting Server Hardware Faults” on page 46.	Component redundancy is provided to allow for component failure in critical subsystems, such as the cooling subsystem. However, once a component in a redundant system fails, the redundancy no longer exists, and the risk for server shutdown and component failures increases. Therefore, it is important to maintain redundant systems and replace failed components <i>immediately</i> .

Troubleshooting Power Issues

If your server does not power on, the cause of the problem might be server AC power connections or power supplies (PS0-3).

In maximally configured systems, it is possible that the worst-case power consumption of the system could exceed the capacity of a single PS. The PSs provide an over-subscription mode, which allows the system to operate with fault-tolerance even with modest excursions beyond the rated capacity of a single PS. This over-subscription support is accomplished using hardware signaling between the PS and motherboard circuitry, which can force the system to throttle processor (CPU) and memory power in the event that a PS is lost. The resulting power savings will be enough to allow the system to continue to run (in a lower-performance state) until the power problem is resolved.

If your server does not power on, use the information in the following table to troubleshoot the issue.

Power Issue	Description	Action	Prevention
AC Power Connection	<p>The AC power cords are the direct connection between the server power supplies and the power sources. The server power supplies need separate stable AC circuits. Insufficient voltage levels or fluctuations in power can cause server power problems. The power supplies are designed to operate at a particular voltage and within an acceptable range of voltage fluctuations.</p> <ul style="list-style-type: none"> ■ AC OK indicators next to the AC inlets on the server back panel are green when the power is connected, and off when it is not connected. ■ The AC OK and DC OK indicators on the PS indicator panels on the front panel are green when the PS is functioning properly. 	<p>Verify that both AC power cords are connected to the server. Verify that the correct power is present at the outlets and monitor the power to verify that it is within the acceptable range. You can verify proper connection and operation by verifying the power supply (PS) indicator panels, which are located at the back of the server on the power supplies. Lit green AC OK indicators show a properly functioning power supply. An amber AC OK indicator indicates that the AC power to the power supply is insufficient.</p>	<p>Use the AC power cord Velcro 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.</p>
Power Supplies (PS0-3)	<p>The server power supplies (PS) provide the necessary server voltages from the AC power outlets. If the power supplies are inoperable, unplugged, or disengaged from the internal connectors, the server cannot power on.</p>	<p>Verify that the AC cables are connected to both power supplies. Verify that the power supplies are operational (the PS indicator panel must have a lit green AC OK indicator). Ensure that the power supply is properly installed. A power</p>	<p>When a power supply fails, replace it immediately. To ensure redundancy, the server SMOD has two power supplies. This redundant configuration prevents server downtime, or an unexpected shutdown, due to a failed power</p>

Power Issue	Description	Action	Prevention
	Note - Use the Velcro straps on the back of the server to secure the power cord connectors to the back of the power supplies. The Velcro retaining straps minimize the risk of accidental disconnection.	supply that is not fully engaged with its internal connector does not have power applied and does not have a lit green AC OK indicator.	supply. The redundancy allows the server to continue to operate if one of the power supplies fails. However, when a server SMOD is being powered by a single power supply, the redundancy no longer exists, and the risk for downtime or an unexpected shutdown increases. When installing a power supply, ensure that it is fully seated and engaged with its connector inside the drive bay. A properly installed power supply has a lit green AC OK indicator.

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

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 have determined the tool to use, you can access it locally, while at the server, or remotely.

Diagnostic Tools

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

Diagnostic Tool	Diagnostic Type	Function	Availability and Access	Links
Oracle ILOM	SP firmware	Monitors environmental condition and component functionality sensors, generates alerts, performs fault isolation, and provides remote access.	Access either in Standby power or Main power mode. OS independent. Local or remote access using CLI or web interface	“Identify Hardware Faults (Oracle ILOM)” on page 47 https://www.oracle.com/goto/ilom/docs

Diagnostic Tool	Diagnostic Type	Function	Availability and Access	Links
Oracle Hardware Management Pack	OS	View Oracle ILOM System Log. View System Log. Monitor environmental conditions and component functionality sensors, view alerts, isolate faults.	Access either in Standby power or Main power mode. OS independent. Local or remote access using CLI or web interface	https://www.oracle.com/goto/ohmp/docs
Status Indicators	Hardware and SP firmware	View status of overall system and particular components, system indicators and sensors	View hardware-based LED indicators when system power is available. Local or remote access. Sensor and status indicators are accessible from Oracle ILOM web interface or CLI.	“Troubleshooting Using Status Indicators” on page 57 “Controls and Indicators” on page 70
UEFI Diagnostics	Suite of diagnostic tests	Manually or automatically run remote UEFI Diagnostics tests from Oracle ILOM to view results onscreen or in log files.	Remote access using Oracle ILOM.	<i>Oracle x86 Servers Diagnostics and Troubleshooting Guide for Servers With Oracle ILOM 4.0.x</i> at https://www.oracle.com/goto/x86admindiag/docs
Oracle VTS	Diagnostic tool standalone software	Exercise and stress the system, run tests in parallel.	Requires operating system. Install Oracle VTS software separately. Local or remote access. View and control over network.	<i>Oracle x86 Servers Diagnostics and Troubleshooting Guide for Servers With Oracle ILOM 4.0.x</i> at https://www.oracle.com/goto/x86admindiag/docs
Oracle Solaris commands	Operating system software	View system information.	Requires Oracle Solaris operating system. Local or remote access over network.	https://docs.oracle.com/en/operating-systems/solaris.html
Power-on Self-Test (POST)	Host firmware	Test core system components including CPUs, memory, and motherboard I/O bridge integrated circuits.	Runs on startup. Available when the operating system is not running. Local or remote access through Oracle ILOM Remote Console.	<i>Oracle x86 Servers Diagnostics and Troubleshooting Guide for Servers With Oracle ILOM 4.0.x</i> at https://www.oracle.com/goto/x86admindiag/docs

Troubleshooting Using Status Indicators

These sections describe the server front panel and back panel status indicators:

- [“Front Indicator Module \(FIM\) Panel” on page 58](#)
- [“Power Supply \(PS\) Indicators” on page 62](#)
- [“Fan Module \(FM\) Indicators” on page 61](#)
- [“System Module \(SMOD\) Indicators” on page 63](#)
- [“Storage Drive Indicators” on page 67](#)
- [“Dual PCIe Card Carrier \(DPCC\) Indicators” on page 68](#)
- [“AC Power Block Inlet Indicators” on page 69](#)

Related Information

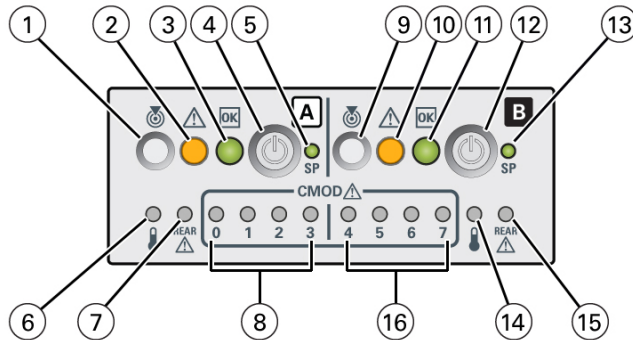
- [“Controls and Indicators” on page 70](#)
- [“Replaceable Components” on page 22](#)





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). Use buttons to control the server. Use indicators to determine server status. The FIM provides controls and indicators for three system configurations.





- **Single 4-socket:** The FIM provides controls and indicators for System A (SMOD0) only. System B (SMOD1) buttons and indicators are not operational.
- **Dual 4-socket:** The FIM provides separate controls and indicators for System A (SMOD0) and System B (SMOD1).
- **8-socket:** The FIM provides controls and indicators for System A (SMOD0) and System B (SMODs 4-7). Other System B (SMOD1) buttons and indicators are not operational.

The following figure shows FIM buttons and indicators.



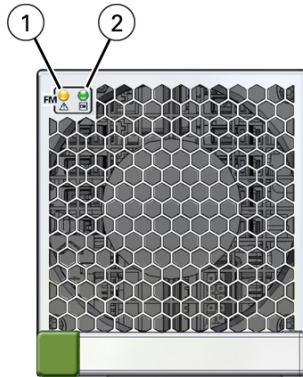
Call Out	Status LED or Button	Icon and Color	Description
1	Locate button/LED (chassis SMOD0 System A)	 White	Indicates the location of the SMOD System A in the server: <ul style="list-style-type: none"> Off – Server is operating normally. Fast blink – Use Oracle ILOM to activate this LED to enable you to locate a system quickly and easily. On when SMOD0 System A Locate Button on the server is pressed. See “Managing the Locate Button/LED” on page 119.
2	Fault-Service Required (chassis SMOD0 System A)	 Amber	Indicates a fault state in SMOD0 System A: <ul style="list-style-type: none"> Off – Server is operating normally. Steady On – A fault is present in chassis SMOD0 System A. See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.
3	System OK (chassis SMOD0 System A)	 Green	Indicates the operational state of the SMOD0 System A: <ul style="list-style-type: none"> Off – AC power is not present or the Oracle ILOM boot is not complete. Flashing – SMOD0 System A is booting. Steady On – OS has booted, power is on and chassis SMOD0 System A is running. See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.
4	On/Standby button (chassis SMOD0 System A) (recessed)	 None	Use to locally control chassis SMOD0 System A system power: <ul style="list-style-type: none"> Four second or less press – Initiates a graceful shutdown. Five seconds or more press – Initiates an immediate shutdown. Control chassis SMOD0 System A power locally, when physically present at the server. The duration of the button press determines the type of power off (graceful or immediate).



Call Out	Status LED or Button	Icon and Color	Description
			See “Powering Down the Server” on page 110 and “Power On the Server” on page 250.
5	SP OK (chassis SMOD0 System A)	 Green	Indicates when SMOD0 System A service processor (SP) is booting: <ul style="list-style-type: none"> ■ Flashing – SP is booting. ■ Steady On – Oracle ILOM is operational. See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.
6	System Overtemperature Warning (chassis SMOD0 System A)	 Amber	Indicates that a fault might have occurred in the cooling subsystem. The system Fault-Service Required LED might also be lit. See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.
7	System A/Chassis rear Fault-Service Required LED (chassis SMOD0 System A)	 Amber	Indicates that a fault might have occurred in SMOD0 System A or the server chassis. Indicates that a fault might have occurred in a DPCC or PCIe card. See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.
8	CMOD Fault-Service Required LEDs 0, 1, 2, 3	 Amber	Indicates that a fault might have occurred in the corresponding CMODs supporting chassis SMOD0 System A. See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.
9	Locate Button/LED (SMOD1 System B)	 White	Indicates the SMOD1 System B location in the server when pressed. <ul style="list-style-type: none"> ■ Off – Server is operating normally, ■ Fast blink – Use Oracle ILOM to activate this LED to enable you to locate a system quickly and easily. See “Managing the Locate Button/LED” on page 119.
10	Fault-Service Required (SMOD1 System B)	 Amber	Indicates a fault state in SMOD1 System B: <ul style="list-style-type: none"> ■ Off – Server is operating normally, ■ Steady On – A fault is present in SMOD1 System B. See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.
11	System OK (SMOD1 System B)	 Green	Indicates the operational state of SMOD0 System B: <ul style="list-style-type: none"> ■ Off – SMOD1 System B AC power is not present or the Oracle ILOM boot is not complete. ■ Flashing – SMOD1 System B is booting. ■ Steady On – OS has booted, power is on and SMOD1 System B is running. See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.

Call Out	Status LED or Button	Icon and Color	Description
12	On/Standby button (SMOD1 System B) (recessed)	 None	Use to locally control SMOD1 System B system power: <ul style="list-style-type: none"> ■ Four seconds or less press – Initiates a graceful shutdown. ■ Five seconds or more press – Initiates an immediate shutdown. See “Powering Down the Server” on page 110 and “Power On the Server” on page 250 .
13	SP OK (SMOD1 System B)	SP Green	Indicates when SMOD1 System B SP service processor (SP) is booting: <ul style="list-style-type: none"> ■ Flashing – SP is booting. ■ Steady On – Oracle ILOM is operational. See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57 .
14	System Overtemperature Warning (SMOD1 System B)	 Amber	Indicates that a fault might have occurred in the SMOD1 system B cooling subsystem. The system Fault-Service Required LED might also be lit. <p>See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.</p>
15	Chassis rear Fault-Service Required LED (SMOD1 System B)	 Amber	Indicates that a fault might have occurred in SMOD1 System B. Indicates that a fault might have occurred in a DPCC or PCIe card. <p>See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.</p>
16	CMOD Fault-Service Required LEDs 4, 5, 6, 7	 Amber	Indicates that a fault might have occurred in the corresponding CMODs supporting SMOD1 System B. <p>See “System Module (SMOD) Indicators” on page 63 and “Troubleshooting Using Status Indicators” on page 57.</p>

Fan Module (FM) Indicators

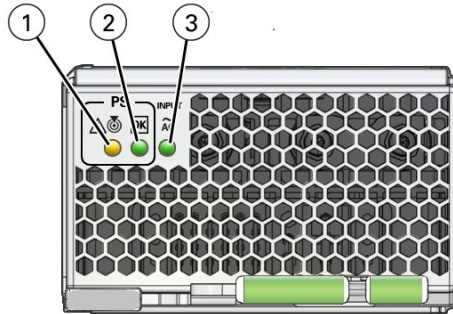
Each fan module (FM) has two indicators arranged in a single row and from left to right as shown in the following figure of the front of the FM.






Call Out	Status LED or Button	Icon and Color	Description
1	Fault-Service Required	 Amber	Indicates a fault state in a fan module: <ul style="list-style-type: none"> ■ Off – Fan module is operating normally, ■ Steady On – A fault is present in the fan module.
2	OK	 Green	Indicates the functional state of the fan module: <ul style="list-style-type: none"> ■ Off – Fan module is powered off or functioning abnormally. ■ Steady On – Fan module is powered on and functioning normally.

Power Supply (PS) Indicators

Each power supply (PS) has three indicators arranged in a single row from left to right. Power supplies for System A are PS2 and PS3. Power supplies for System B are PS0 and PS1.



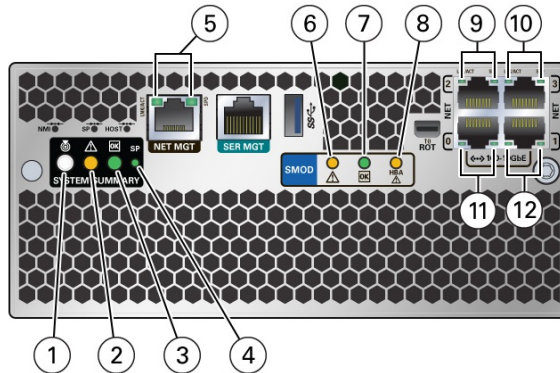
Call Out	Status LED or Button	Icon and Color	Description
1	Locate button/LED Fault-Service Required	  Amber	Indicates the location of the power supply in the server: <ul style="list-style-type: none"> ■ Off – Power supply is operating normally, ■ Fast blink – Use Oracle ILOM to activate this LED to enable you to locate a power supply quickly and easily. ■ Steady On – Lights steady on when the power supply is in a fault state.
2	OK Power Supply OK LED	 Green	Indicates the functional state of the power supply: <ul style="list-style-type: none"> ■ Off – PS is disconnected ■ Steady On – PS is powered on and functioning normally. When this LED is lit, the AC OK LED is also lit. <p>Note - Oracle ILOM signals a fault on any installed power supply that is not connected to an AC power source, since it might indicate a loss of redundancy.</p>
3	AC OK LED	Input ~AC Green	Indicates the operational state of the power supply: <ul style="list-style-type: none"> ■ Off – PS is not connected to an AC power source. ■ Steady On – PS is connected to a properly rated AC power source.




System Module (SMOD) Indicators



The back panel indicators located on the SMOD allow you manage the server and determine server status. The SMOD back panel indicator 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 panel SMOD indicators.



Call Out	Status LED or Button	Icon and Color	Description
1	Locate button/LED	 White	When activated remotely, lighting the SMOD Locate LED helps you find the server and SMOD0 System A or SMOD1 System B. Press this button to prove physical presence at the server chassis, as required for some Oracle ILOM tasks. <ul style="list-style-type: none"> Off – Server is operating normally, Fast blink – Use Oracle ILOM to activate this LED to enable you to locate a system quickly and easily. See “Managing the Locate Button/LED” on page 119.
2	Fault-Service Required	 Amber	Indicates a fault state in SMOD: <ul style="list-style-type: none"> Off – SMOD is operating normally, Steady On – A fault is present in SMOD. Other amber (fault) indicators might also be lit, which can help you isolate the fault to a particular subsystem. See “Troubleshooting Using Status Indicators” on page 57.
3	System OK	 Green	Indicates the operational state of the SMOD: <ul style="list-style-type: none"> Off – AC power is not present or the Oracle ILOM boot is not complete. Flashing – SMOD is booting. Steady On – OS has booted, power is on and chassis SMOD is running.

Call Out	Status LED or Button	Icon and Color	Description
			<p>Along with the SP indicator (below), the System OK LED provides the SMOD power status.</p> <p>See “Troubleshooting Using Status Indicators” on page 57.</p>
4	SP OK	<p>SP</p> <p>Green</p>	<p>Indicates when SMOD service processor (SP) is booting:</p> <ul style="list-style-type: none"> ■ Flashing – SP is booting. ■ Steady On – Oracle ILOM is operational. <p>Along with the System OK indicator (above), the SP OK LED provides the status of the system power.</p> <p>See “Troubleshooting Using Status Indicators” on page 57.</p>
5	NET MGT 10/100/1000 Ethernet port Activity and Speed LEDs	<p>Activity: Top left, Green</p> <p>Link speed: Top right Bi-colored: Amber/ Green</p>	<p>The service processor NET MGT port is the optional connection to the Oracle ILOM service processor. The NET MGT port is configured by default to use Dynamic Host Configuration Protocol (DHCP). The service processor NET MGT port uses an RJ-45 cable for a 10/100/1000BASE-T connection.</p> <p>NET MGT Activity LED: Top left Green</p> <p>Indicates when the Oracle ILOM service processor (SP) network management (NET MGT) RJ-45 10/100/1000BASE-T port is active.</p> <ul style="list-style-type: none"> ■ Steady On – Link up. Lights when the Network (NET) 10/100/1000BASE-T RJ-45 Gigabit Ethernet (GbE) NET0 port is active. Indicates a live network. ■ Off– No activity. No link. Not operational. ■ FLASHING – Packet activity. Blinks with network traffic. <p>NET MGT Link speed LED: Top right Bi-colored: Amber/Green</p> <ul style="list-style-type: none"> ■ Off – 10BASE-T link (if link up) (10 GigabitEthernet 10GBASE-T) ■ Amber ON – 100BASE-T link (Fast Ethernet 100 BASE-TX) ■ Green ON – 1000BASE-T link (GigabitEthernet 1000BASE-T)
6	SMOD Fault-Service Required	 <p>Amber</p>	<p>Indicates a fault state in the tSMOD:</p> <ul style="list-style-type: none"> ■ Off – SMOD is operating normally, ■ Steady On – A fault is present in SMOD. <p>Lights when the SMOD requires service.</p>
7	SMOD System OK	 <p>Green</p>	<p>Indicates the operational state of the SMOD:</p> <ul style="list-style-type: none"> ■ Off – AC power is not present or the Oracle ILOM boot is not complete. ■ Flashing – SMOD is booting. ■ Steady On – OS has booted, power is on, and chassis SMOD is running. <p>Along with the SP indicator (above), the System OK LED provides the SMOD power status.</p> <p>See “Troubleshooting Using Status Indicators” on page 57.</p>

Call Out	Status LED or Button	Icon and Color	Description
8	HBA Fault-Service Required	 Amber	Indicates a fault state in the SMOD internal HBA: <ul style="list-style-type: none"> ■ Off – HBA is operating normally. ■ Steady On – A fault is present in SMOD HBA. Lights when the internal HBA requires service.
9	NET2 10 GbE Ethernet port Activity and Speed LEDs	Activity: Top left, Green Link speed: Top right Bi-colored: Amber/ Green	NET2 Activity LED: Top left Green <ul style="list-style-type: none"> ■ Steady On – Link up. Lights when the Network (NET) 10 GbE Gigabit Ethernet (GbE) RJ-45 NET2 port is active. Indicates a live network. ■ Off– No activity. No link. Not operational. ■ FLASHING – Packet activity. Blinks with network traffic. NET2 Link speed LED: Top right Bi-colored: Amber/Green <ul style="list-style-type: none"> ■ Off – 10BASE-T link (if link up) (10 GigabitEthernet 10GBASE-T) ■ Amber ON – 100BASE-T link (Fast Ethernet 100 BASE-TX) ■ Green ON – 1000BASE-T link (GigabitEthernet 1000BASE-T)
10	NET3 10 GbE Ethernet port Activity and Speed LEDs	Activity: Top left, Green Link speed: Top right Bi-colored: Amber/ Green	NET3 Activity LED: Top left Green <ul style="list-style-type: none"> ■ Steady On – Link up. Lights when the Network (NET) 10 GbE Gigabit Ethernet (GbE) RJ-45 NET3 port is active. Indicates a live network. ■ Off– No activity. No link. Not operational. ■ FLASHING – Packet activity. Blinks with network traffic. NET3 Link speed LED: Top right Bi-colored: Amber/Green <ul style="list-style-type: none"> ■ Off – 10BASE-T link (if link up) (10 GigabitEthernet 10GBASE-T) ■ Amber ON – 100BASE-T link (Fast Ethernet 100 BASE-TX) ■ Green ON – 1000BASE-T link (GigabitEthernet 1000BASE-T)
11	NET0 10 GbE Ethernet port Activity and Speed LEDs	Activity: Top left, Green Link speed: Top right Bi-colored: Amber/ Green	NET0 Activity LED: Top left Green <ul style="list-style-type: none"> ■ Steady On – Link up. Lights when the Network (NET) 10/100/1000BASE-T RJ-45 Gigabit Ethernet (GbE) NET0 port is active. Indicates a live network. ■ Off– No activity. No link. Not operational. ■ FLASHING – Packet activity. Blinks with network traffic. NET0 Link speed LED: Top right Bi-colored: Amber/Green <ul style="list-style-type: none"> ■ Off – 10BASE-T link (if link up) (10 GigabitEthernet 10GBASE-T) ■ Amber ON – 100BASE-T link (Fast Ethernet 100 BASE-TX) ■ Green ON – 1000BASE-T link (GigabitEthernet 1000BASE-T)
12	NET1 10 GbE Ethernet port Activity and Speed LEDs	Activity: Top left, Green Link speed: Top right Bi-colored: Amber/ Green	NET1 Activity LED: Top left Green <ul style="list-style-type: none"> ■ Steady On – Link up. Lights when the Network (NET) 10 GbE Gigabit Ethernet (GbE) RJ-45 NET1 port is active. Indicates a live network. ■ Off– No activity. No link. Not operational. ■ FLASHING – Packet activity. Blinks with network traffic.

Call Out	Status LED or Button	Icon and Color	Description
			NET1 Link speed LED: Top right Bi-colored: Amber/Green <ul style="list-style-type: none"> ■ Off – 10BASE-T link (if link up) (10 GigabitEthernet 10GBASE-T) ■ Amber ON – 100BASE-T link (Fast Ethernet 100 BASE-TX) ■ Green ON – 1000BASE-T link (GigabitEthernet 1000BASE-T)



Note - The server does not provide video ports on the SMODs. Video display is only available using the Oracle ILOM Remote Console Plus interface.


Storage Drive 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.

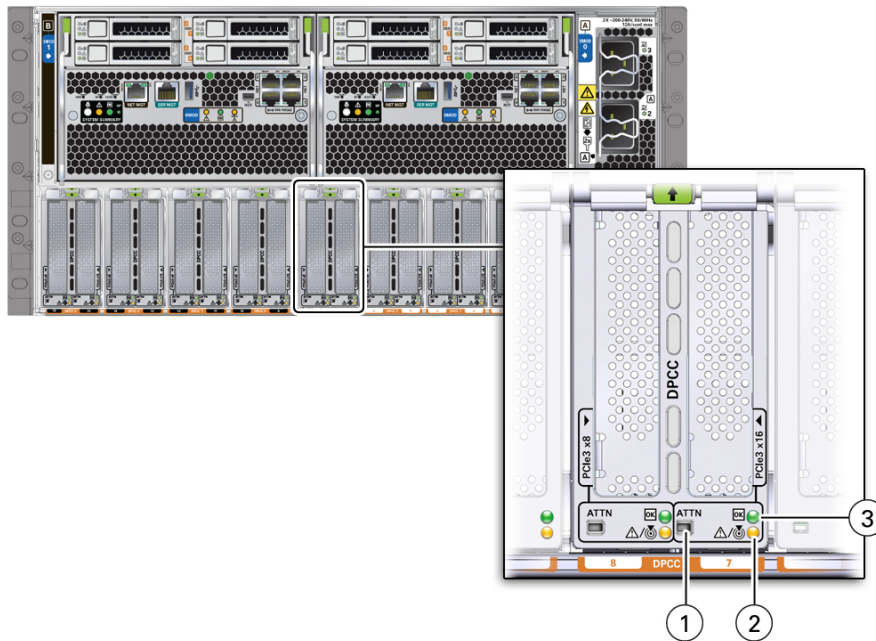





Call Out	Status LED or Button	Icon and Color	Description
1	Ready to Remove	 Blue	Indicates the removal status of the storage drive: <ul style="list-style-type: none"> ■ Off – Server is operating normally, ■ On – Lights when the storage drive is ready to be removed from the server in response to an action initiated from the server OS.
2	Fault-Service Required LED	 Amber	Indicates a fault state has been detected in the storage drive: <ul style="list-style-type: none"> ■ Off – Storage drive is operating normally, ■ Steady On – A fault is present in the storage drive.

Call Out	Status LED or Button	Icon and Color	Description
3	OK/Activity LED	 Green	<p>Indicates the operational state of the storage drive:</p> <ul style="list-style-type: none"> ■ Off – AC power is not present or the Oracle ILOM boot is not complete. ■ Flashing – Blinks to show storage drive activity. Storage drive indicators blink rates vary by activity. See “Status Indicator Blink Rates” on page 76. ■ Steady On – The storage drive is functioning normally.

Dual PCIe Card Carrier (DPCC) Indicators

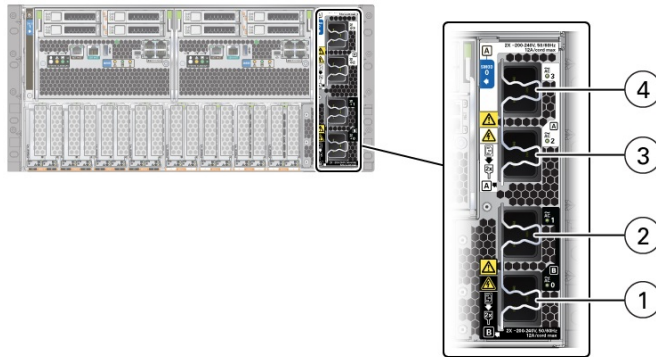
Each DPCC has two indicator panels, one for each PCIe slot inside the server. Each panel contains a green OK indicator, an amber Fault-Service Required LED, and a recessed pinhole Attention (ATTN) button. The ATTN buttons are used to initiate DPCC removal and install. Before removing a DPCC, use a stylus to press both ATTN buttons. After installing a DPCC that contains a PCIe card, press the ATTN buttons again.



Call Out	Status LED/Button	Icon and Color	Description
1	ATTN button	ATTN	Attention (ATTN) DPCC recessed pinhole button to initiate DPCC removal and install
2	Fault-Service Required/ Locate LED	 Amber 	Indicates a fault state in DPCC: <ul style="list-style-type: none"> ■ Off – DPCC is operating normally. ■ Steady On – A fault is present in the DPCC PCIe slot. DPCC Locate LED: <ul style="list-style-type: none"> ■ Off – DPCC is operating normally. ■ Fast blink – Use Oracle ILOM to activate this LED to enable you to locate a DPCC quickly and easily.
3	DPCC OK indicator	 Green	Indicates the operational state of DPCC: <ul style="list-style-type: none"> ■ Off – DPCC power is not present. ■ Flashing – DPCC is booting. ■ Steady On – DPCC power is on and running.

AC Power Block Inlet Indicators

Each power inlet on the AC power block at the server back panel has a single green OK indicator that turns steady on only when the power at the connector is sufficient for the power supply unit. The following figure shows AC inlets 0-3.



The server back panel AC inlets have the following designations.

Call Out	Status LED or Button	Icon and Color	Description
1	AC 0	~AC	AC 0 (SMOD1) System B
2	AC 1	~AC	AC 1 (SMOD1) System B
3	AC 2	~AC	AC 2 (SMOD0) System A
4	AC 3	~AC	AC 3 (SMOD0) System A

Do not attach AC power cables to the AC power inlets until you finish connecting the data cables to the server. The server goes into Standby power mode, and the Oracle ILOM service processor initializes when the AC power cables are connected to the power source. System messages might be lost after 60 seconds if the server is not connected to a terminal, PC, or workstation.

About Controls and Indicators

The following sections describe the controls, indicators, connectors, and drives located on the front and back panels.

- [“Controls and Indicators” on page 70](#)
- [“Back Panel Pinhole Switches” on page 75](#)
- [“Status Indicator Blink Rates” on page 76](#)

Controls and Indicators

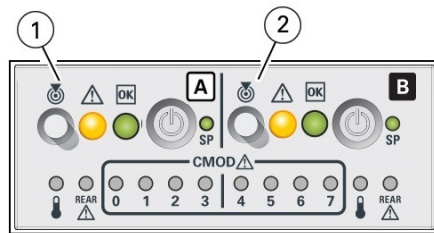
Use the buttons, switches, and status indicators on the front and back of the server, server management software, and Oracle ILOM to troubleshoot the server:

- Server Boot Process and Normal Operating State Indicators
- Locate Button/LED Indicator On
- Over Temperature Condition
- PSU Fault
- Memory Fault
- CPU Fault
- Fan Module Fault
- SP Fault
- Front Panel Lamp Test

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

Server Boot Process and Normal Operating State Indicators

A normal server boot process involves System A (SMOD0) or System B (SMOD1) service processor SP OK indicator and System OK indicator. The following illustration shows SMOD0 System A (callout 1) and SMOD1 System B (callout 2).



Call Out	System	Activity
1	System A SMOD0	<ul style="list-style-type: none"> ■ CMOD 0 - 3 indicates the status of CMODs 0 - 3. The remaining A-system (SMOD0) controls and indicators provide information and control for System A. ■ Single 4 socket: The FIM provides controls and indicators for System A (SMOD0) only. ■ Dual 4 socket: The FIM provides separate controls and indicators for System A (SMOD0) and System B (SMOD1). ■ 8 socket: The FIM provides controls and indicators for System A (SMOD0) and System B CMODs 4-7. Other System B (SMOD1) buttons and indicators are not operational.
2	System B SMOD1	<ul style="list-style-type: none"> ■ CMOD 4 - 7 indicates the status of CMODs 4 - 7. ■ Single 4 socket: System B (SMOD1) buttons and indicators are not operational. ■ Dual 4 socket: The FIM provides separate controls and indicators for System A (SMOD0) and System B (SMOD1). ■ 8 socket: The FIM provides controls and indicators for System A (SMOD0) and System B CMODs 4-7. Other System B (SMOD1) buttons and indicators are not operational.

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

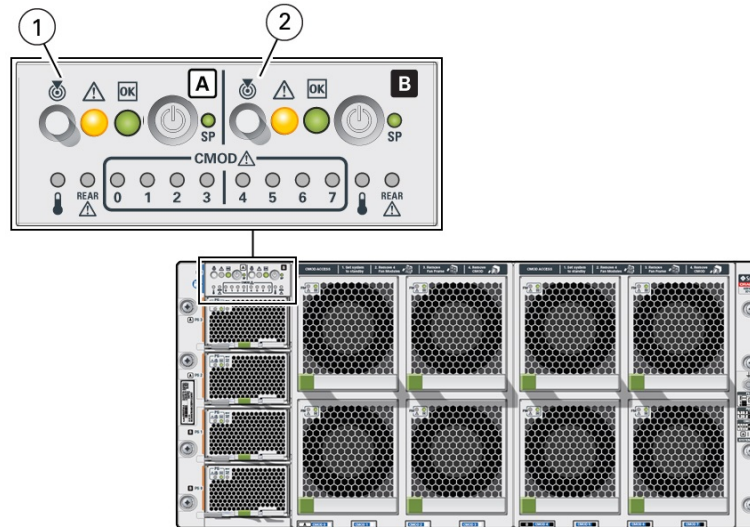
System Condition	SP Indicator	Power OK Indicator
SP is booted and ready to use. Host is off.	Steady On	Blinks at single blink rate (quick flash every 3 seconds)
SP is running. Host is booting.	Steady On	Blinks at fast rate
SP and host are running. This is the normal operating state of the system.	Steady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

Locate Button/LED Indicator On

Locate Button/LEDs are white combination button/indicators that are located on both the front FIM and back panel at SMOD0 and SMOD1. To deactivate (or activate) the Locate Button/LED, press and release the Locate button. When the Locate Button/LED is on, the LED blinks at the fast blink rate. You can turn the Locate Button/LED off remotely from Oracle ILOM, or by pressing a Locate button on the chassis. The buttons on the server front and back allow you to manage System A (SMOD0) and System B (SMOD1) Locate Buttons/LED indicators locally.

- Turn a Locate Button/LED 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 SMOD0 or SMOD1 Locate indicator is lit.
- Press the SMOD0 or SMOD1 Locate Button/LED button to prove physical presence. Some service procedures require you to prove physical presence by pressing the Locate Button/LED.

The following figure shows two Locate Button/LEDs for System A [callout 1] and System B [callout 2] on the server front panel FIM.



Call Out	System	Activity
1	System A SMOD0	<ul style="list-style-type: none"> ■ Single 4 socket: The FIM Locate Button/LED indicator provides controls and indicators for System A (SMOD0) only. ■ Dual 4 socket: The FIM Locate Button/LED indicator provides separate controls and indicators for System A (SMOD0) and System B (SMOD1). ■ 8 socket: The FIM provides controls and indicators for System A (SMOD0) and System B (SMOD1) CMODs 4-7 only. <i>Note: Other System B (SMOD1) buttons and indicators are not operational.</i>
2	System B SMOD1	<ul style="list-style-type: none"> ■ Single 4 socket: System B (SMOD1) Locate Button/LED indicator is not operational. ■ Dual 4 socket: The FIM Locate Button/LED indicator provides separate controls and indicators for System A (SMOD0) and System B (SMOD1). ■ 8 socket: The FIM Locate Button/LED indicator System B (SMOD1) buttons and indicators are not operational.

Over Temperature Condition

For a server in an over-temperature state, the server amber over-temperature indicator and the amber Fault-Service Required LEDs (front and back) are steady on. The states of the front and back green On Standby, System OK, and the green SP indicators depend on the severity of the condition.

PS Fault

For a server with a power supply (PS) in a fault state, the server amber Fault-Service Required LEDs (front and back) and the amber Fault-Service Required indicator on the PS0-3 are steady on. The front and back green On/Standby, System OK, and the green SP indicators are steady on.

Memory Fault

For a server with a fault in the memory subsystem, the server amber Fault-Service Required LEDs (front and back) and an amber CMOD Fault-Service Required LED are steady on. The front and back green On/Standby, System OK, and the green SP indicators are steady on.

CPU Fault

For a server with a fault in the processor subsystem, the server amber Fault-Service Required LEDs (front and back) and an amber CMOD Fault-Service Required LED are steady on. The activity of front and back green On/Standby, System OK, and the green SP indicators vary depending on whether the server can boot successfully. The server might not be able to boot out of Standby power mode.

Fan Module Fault

For a server with a fan module fault, the server amber Fault-Service Required LEDs (front and back) and an amber Fault-Service Required LED on a fan module are steady on. The front and back green On/Standby, System OK indicator, and the green SP indicators are steady on.

Service Processor Fault

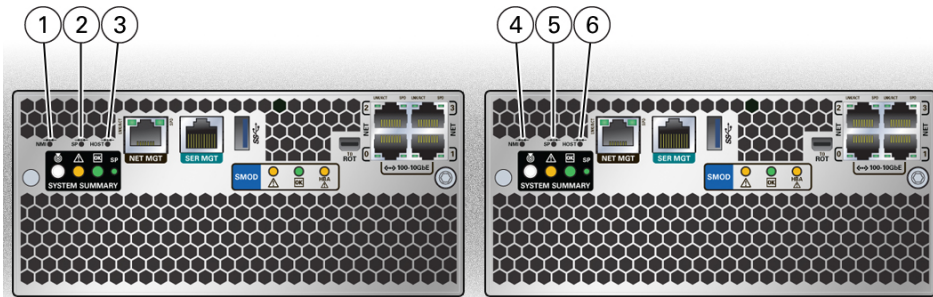
For a server with an SP (service processor) fault, the server amber Fault-Service Required LEDs (front and back) are steady on. The front and back System OK indicators and the SP OK indicator are off.

Front Panel Lamp Test

To perform a lamp test of all front panel indicators, press the Locate Button/LED three times within a five second period. All the front and back indicators light up and remain steady on for 15 seconds (see “Unison Steady On” on page 79).

Back Panel Pinhole Switches

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



Call Out	Button	Label	Description
1	Non-maskable Interrupt (NMI) button (recessed) SMOD0	NMI	Do not press. This button is used by Oracle Service personnel only and requires a stylus.
2	SP Reset button (recessed) SMOD0	SP →→←←	Performs an immediate System A (SMOD0) SP reboot and requires a stylus.
3	Host Warm Reset button (recessed) SMOD0	HOST →→←←	Performs an immediate System A (SMOD0) host reboot and requires a stylus.
4	Non-maskable Interrupt (NMI) button (recessed) SMOD1	NMI	Do not press. This button is used by Oracle Service personnel only and requires a stylus.
5	SP Reset button (recessed) SMOD1	SP →→←←	Performs an immediate System B (SMOD1) SP reboot and requires a stylus.
6	Host Warm Reset button (recessed) SMOD1	HOST →→←←	Performs an immediate System B (SMOD1) host reboot and requires a stylus.

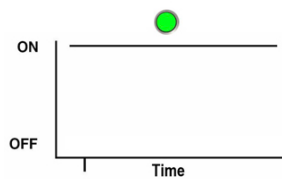
Status Indicator Blink Rates

This section describes the following indicator blink rates:

- Steady On
- Steady Off
- Slow Blink Rate
- Fast Blink Rate
- Single (Standby) Blink Rate
- Slow Unison Blink Rate
- Insertion Blink
- Unison Steady On
- Alternating (Invalid FRU) Blink Rate
- Feedback Flash
- Data Blink Rate
- Sequential (Diagnostic) Blink Rate

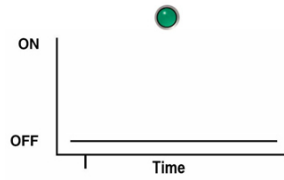
Steady On

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 Fault-Service Required fault state (amber).



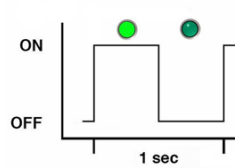
Steady Off

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 OK indicator) or a subsystem not in a fault state (unlit amber Fault-Service Required LED).



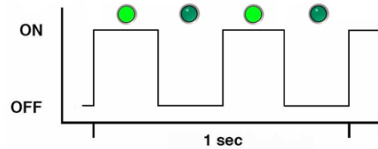
Slow Blink Rate

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.



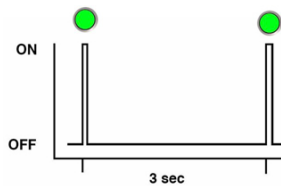
Fast Blink Rate

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.



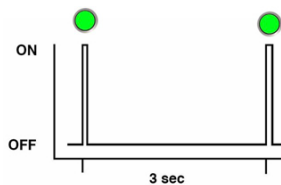
Single (Standby) Blink Rate

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).

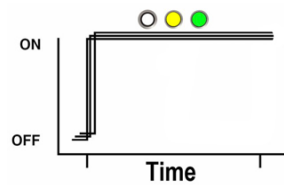


Insertion Blink

The insertion blink is three successive blinks of a hot-swap component's primary status indicator, for example, the green OK indicator. The insertion blink occurs immediately after three successive unison blinks (see [“Slow Unison Blink Rate” on page 78](#)) of all the component indicators.

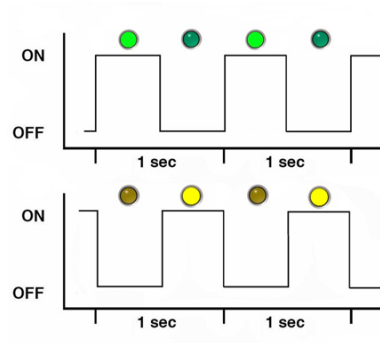
Unison Steady On

For the unison steady on, all indicators are simultaneously steady on (see [“Steady On” on page 76](#)). This occurs during the front panel lamp test (see [“Front Panel Lamp Test” on page 75](#)). This is the only time that the Locate Button/LED indicator is steady on.



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 77](#)).

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 [“Fast Blink Rate” on page 77](#)) 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.

Troubleshooting Server Subsystems

These sections describe the server subsystems:

- [“Processor Subsystem” on page 80](#)
- [“Memory Subsystem” on page 81](#)
- [“Power Subsystem” on page 82](#)
- [“Cooling Subsystem” on page 84](#)
- [“Storage Subsystem” on page 87](#)
- [“Networking Subsystem” on page 88](#)
- [“PCI Devices Subsystem” on page 89](#)

For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).

Processor Subsystem

Use the Oracle Integrated Lights Out Manager (ILOM) Processors page to view the health of the CPUs installed on the CMODs.

The server processor subsystem consists of the following:

On-demand configuration for one 4-socket server, two independent 4-socket servers, or one 8-socket server.

Processors: Up to eight Intel Xeon vx processors.

- Intel 8168 processor, 24-core, 2.7-GHz, 205W (4-socket servers or 8-socket server)
- Intel 8160 processor, 24-core, 2.1-GHz, 150W (4-socket servers or 8-socket server)
- Intel 6140 processor, 18-core, 2.3-GHz, 150W (4-socket servers)
- Intel 6128 processor, 6-core, 3.4-GHz, 125W (4-socket servers)

See [“Product Description” on page 15](#).

Four CMOD configuration:

- Must be in 4-socket mode.
- Must have CMODs in slots 0-3 (slots 4-7 for System B)
- DPCC slots 0-3 are active (slots 4-7 for System B).
- Both fan frames must be installed.
- All 8 fan modules must be installed. Fan modules FM0-3 are active (FM4-7 for System B are inactive).

Eight CMOD configuration:

- Must be in 8-socket mode.
- DPCC slots 0-7 are active.
- Both fan frames must be installed.
- All 8 fan modules must be installed. Fans FM0-7 are active.

Memory Subsystem

Use the Oracle Integrated Lights Out Manager (ILOM) Memory page to view the health of the DIMMs installed on your system.

The server memory subsystem consists of the following:

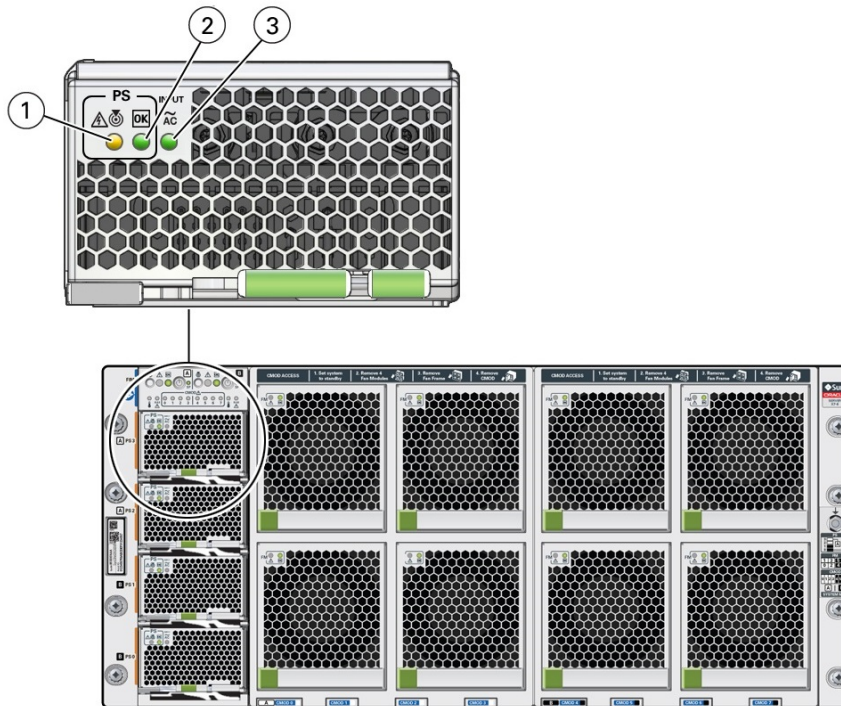
- Memory: Up to 48 (4-socket) or up to 96 (8-socket) DDR4 RDIMM slots.
 - 16 GB RDIMM, 32 GB RDIMM, and 64 GB LRDIMM memory options
 - 8-socket: Up to 6.0 TB DRAM (with 64 GB DIMMs) of DDR4 interface memory
 - 4-socket: Up to 3.0 TB DRAM (with 64 GB DIMMs) of DDR4 interface memory




- 12 DIMMs/6 channels per CMOD. See [“Servicing DIMMs \(CRU\)”](#) on page 184 memory population rules for order of installation.
- DDR4 interface (2666 MT/s)
- 2666 MT/s 2DPC (DIMMs per channel)

Power Subsystem

Use the Oracle Integrated Lights Out Manager (ILOM) Power page to view the overall health and power consumption of the power supplies installed in your system. Review the Power Supplies table for details about the health and location of individual power supplies.

Chassis power is provided by four hot-serviceable front panel accessible power supply units (PSUs). The four PSUs provide dual (1+1) redundancy. Therefore, the minimum PSU configuration is two. To ensure redundancy, at least two separate circuits should supply server power. The following figure shows the indicator panel on the front of the power supplies.



Call Out	Status LED or Button	Icon and Color	Description
1	Fault-Service Required Locate LED	 Amber  White	Indicates the location of the power supply in the server: <ul style="list-style-type: none"> ■ Off – Power supply is operating normally, ■ Fast blink – Use Oracle ILOM to activate this LED to enable you to locate a power supply quickly and easily. Lights steady on when the power supply is in a fault state.
2	OK Power Supply OK LED	 Green	Indicates the functional state of the power supply: <ul style="list-style-type: none"> ■ Off – Power supply is disconnected. ■ Steady On – Power supply is powered on and functioning normally. When this LED is lit, the AC OK LED is also lit. <p>Note - Oracle ILOM signals a fault on any installed power supply that is not connected to an AC power source, since it might indicate a loss of redundancy.</p>
3	AC OK LED	~AC Green	Indicates the operational state of the power supply: <ul style="list-style-type: none"> ■ Off – Power supply is not connected to an AC power source. ■ Steady On – Power supply is connected to a properly rated AC power source.

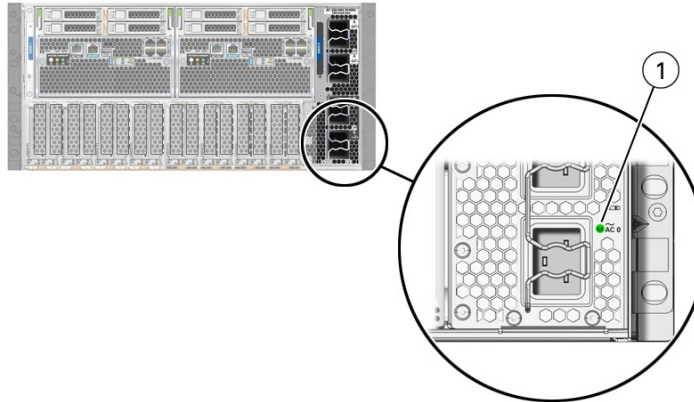
Each power supply is rated for 3060W continuous output. Input is 220V VAC only (50-60Hz). Main output is 12V @244A. Standby output is 12V at 5A. The MAX input line current (200-277 VAC input) is less than 16 Amps RMS. The minimum holdup is 12ms for Main output and 40ms for Standby.

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

Once the SP boots into Standby power, Main power is initiated by pressing and releasing the chassis front panel On/Standby button or by powering on the server remotely from Oracle ILOM.

For more information about power control, see [“Power Control, Shutdown, and Reset States” on page 118](#).

In the following figure, callout 1 shows the AC OK indicator for inlet ~AC 0.



Call Out	Status LED or Button	Icon and Color	Description
1	AC OK LED	~AC Green	Indicates the operational state of the power supply: <ul style="list-style-type: none"> ■ Off – PS is not connected to an AC power source. ■ Steady On – PS is connected to a properly rated AC power source.

Cooling Subsystem

Use the Oracle Integrated Lights Out Manager (ILOM) Cooling page to view the health and number of fans installed in your system. Additionally, you can view the server inlet and exhaust temperatures. Review the Fans table for details about the health and location of individual fans.

System cooling air flows from front to back. Primary cooling is provided by eight redundant front panel accessible 100 watt hot-swappable cooling fan modules.

To maintain the integrity of the chassis cooling system, ensure that:

- Empty slots have filler panels. All necessary fillers ship with the system.
- Each drive bay contains a storage device or a drive slot filler.

- All DPCCs are installed regardless of whether they contain a card or not.
- Both fan frames are populated with fan modules.
- All CMOD processors have a heatsink.
- Each SMOD bay has an SMOD.
- All four power supplies are installed.

Cooling Zones

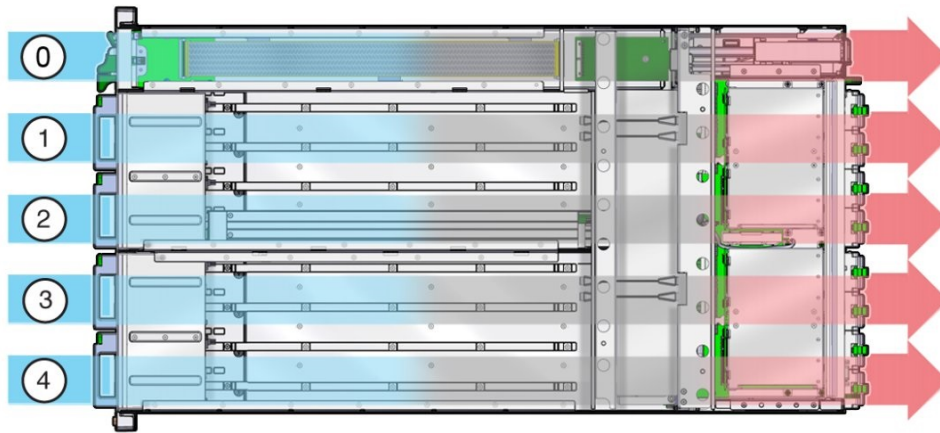
The server has five front-to -back cooling zones. The cooling zones are numbered from left to right (from the front of the server) as zone 0 to zone 4.

The airflow cooling in zone 0 is concentrated through the power supplies (PSs) and is provided by the internal PS fan modules. In a 4-socket configuration, zones 1 and 2 operate independently from zones 3 and 4.

The fan modules (FM0- FM7) provide the airflow for cooling zones 1-4. Each zone has a pair of dedicated FMs:

- Zone 1 airflow cooling is concentrated on the CPU modules (CMODs) CMOD0 and CMOD1 and is provided by FM0 and FM1.
- Zone 2 airflow cooling is concentrated on CMOD2 and CMOD3 and is provided by FM2 and FM3.
- Zone 3 airflow cooling is concentrated on CMOD4 and CMOD5 and is provided by FM4 and FM5.
- Zone 4 airflow is concentrated on CMOD6 and CMOD7 and is provided by FM6 and FM7.

Note - In a four-CMOD server configuration, 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	Cooling provided by:
0	Zone 0: Power supplies	Four power supply fans
1	Zone 1: CMOD0 and CMOD1	FM0 and FM1
2	Zone 2: CMOD2 and CMOD3	FM2 and FM3
3	Zone 3: CMOD4 and CMOD5	FM4 and FM5
4	Zone 4: CMOD6 and CMOD7	FM6 and FM7

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 CMOD0, CMOD2, CMOD4, and CMOD6.

- The chassis cooling fans operate only when the chassis is in Main power mode (see [“Power Control, Shutdown, and Reset States”](#) on page 118).
- The PSU fans operate when the system is in Main power or Standby power mode.

The following table lists the CMODs and the fan modules to which they supply power.

CMOD	Fan Modules Powered
CMOD0	FM0 and FM1
CMOD2	FM2 and FM3
CMOD4	FM4 and FM5

CMOD	Fan Modules Powered
CMOD6	FM6 and FM7

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. Replace a failed fan module 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 Main 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 \(CRU\) and Fan Frames \(CRU\)” on page 129](#).

Storage Subsystem

Use the Oracle Integrated Lights Out Manager (ILOM) Storage page to view tables listing health and inventory information for storage devices detected on your server.

The server storage subsystem consists of the following:

- Storage Drives: 8 hot-swappable SAS3 HDD or SSD SFF drives, four per SMOD.
SMOD0: bays 0-3; SMOD1: bays 0-3.
- Controllers
- Volumes
- Expanders

When a fault occurs on a server drive, the amber Fault-Service Required LED lights on the front of the drive. This amber LED enables you to locate the faulted drive in the system. Additionally, the front and rear panel Fault-Service Required LEDs also light when the server detects a hard drive fault.

Networking Subsystem

Use the Oracle Integrated Lights Out Manager (ILOM) Networking page to view networking information, including the status of Ethernet Controllers and Infiniband Controllers.

The server networking subsystem consists of the following:

- Ethernet Controllers for network ports:
 - SMOD0 System A NET0-3 10 GbE Network ports labeled NET0, NET1, NET2, and NET3
 - SMOD1 System B NET0-3 10 GbE Network ports labeled NET0, NET1, NET2, and NET3
- Infiniband Controllers in PCIe slots:
 - Installation Rules:
 - Oracle Dual Port QDR InfiniBand Host Channel Adapter M3 Infiniband card PCIe slot number order: A: 8, 6, 4, 2, 7, 5, 3, 1 B: 16, 14, 12,10, 15, 13, 11
 - Oracle Dual Port QDR InfiniBand Host Channel Adapter M9 Infiniband card PCIe slot number order: 16, 8, 14, 6, 12, 4, 10, 2, 15, 7, 13, 5, 11,3, 9, 1
- Two 10/100/1000 GbE Network Ethernet ports, one NET MGT port each in SMOD0 and SMOD1
 - Ethernet ports enable you to connect the system to the network. The Ethernet ports use RJ-45 cables for 10/100/1000BASE-T connections.

Ethernet Port Status Indicators are two status indicators (LEDs) that are visible from the back of the server.

Status Indicator Name	Location and Color	State and Meaning
Activity	Top left Green	<ul style="list-style-type: none"> ■ ON – Link up. Lights when the Network (NET) 10/100/1000BASE-T RJ-45 Gigabit Ethernet (GbE) NET0 port is active. Indicates a live network. ■ Off– No activity. No link. Not operational. ■ FLASHING – Packet activity. Blinks with network traffic.
Link speed	Top right Bi-colored: Amber/Green	<ul style="list-style-type: none"> ■ Off – 10BASE-T link (if link up) (10 GigabitEthernet 10GBASE-T) ■ Amber ON – 100BASE-T link (Fast Ethernet 100 BASE-TX) ■ Green ON – 1000BASE-T link (GigabitEthernet 1000BASE-T)

See [“Back Panel Connector Locations”](#) on page 91.

I/O Subsystem

The server input/output I/O subsystem consists of the following:

- 8 or 16 PCIe Gen3 IO slots (up to eight 16-lane and eight 8-lane)
- Two 10/100/1000 GbE Network Ethernet ports, one SER MGT port each in SMOD0 and SMOD1
- 4 USB 3.0 ports (2 external, one each in SMOD0 and SMOD1, 2 internal, one each in SMOD0 and SMOD1)

Note - Internal USB ports are not used.

PCI Devices Subsystem

Use the Oracle Integrated Lights Out Manager (ILOM) PCI Devices page to view inventory properties for the PCIe add-in cards and the built-in devices that are detected on your server. To view the inventory properties for the devices shown on the PCI Devices page, follow these steps:

1. Click the PCI Devices link in the left column under System Information.
2. View the inventory properties appearing in the table. If applicable, mouse-over the Details column to view additional device properties.

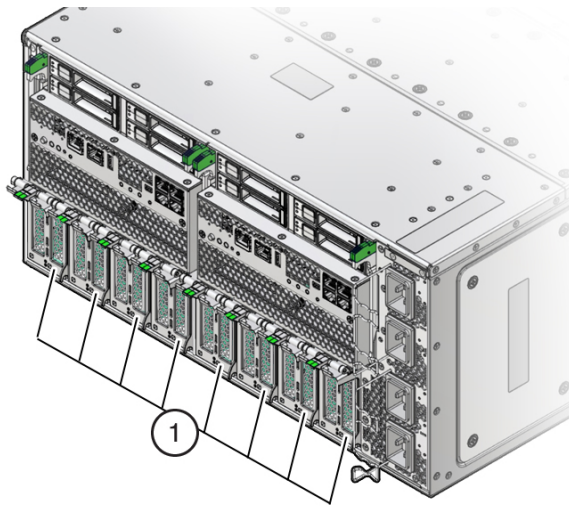
The server PCI devices subsystem consists of the following components:

- Installed add-in cards and devices: PCI Card optional component
- Internal devices: Ethernet Controller NET0-3 (Ethernet NIC 1-4)
- Internal devices: Internal HBAs (SAS controllers) in SMODs

When a fault occurs on a PCIe add-in card, the amber Fault-Service Required LED lights on the DPCC. This amber LED enables you to locate the faulted card in the system. Additionally, the front and rear panel Fault-Service Required LEDs also light when the server detects a PCIe card fault.

Dual PCIe Card Carrier (DPCC)

In the following figure, callout 1 shows the location of the dual PCIe card carrier (DPCC) bays. The eight DPCCs are directly accessible from the server back panel and are located below the SMOD. Each DPCC holds one or two PCIe cards.



Attaching Devices to the Server

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

- [“Attach Devices to the Server” on page 91](#)
- [“Back Panel Connector Locations” on page 91](#)
- [“Configuring Serial Port and Network Port Sharing” on page 93](#)
- [“Ethernet Device Naming” on page 94](#)

▼ Attach Devices to the Server

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

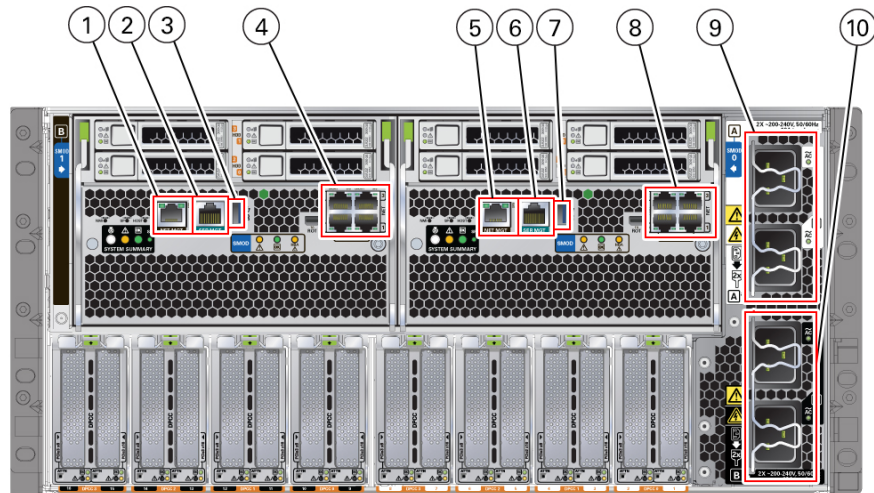
For port and connector information, see [“Back Panel Connector Locations” on page 91](#) and [“Back Panel Components” on page 19](#).

1. **Connect four Ethernet cables 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.**

Back Panel Connector Locations

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

The following figure shows the locations of the server back panel connectors and ports.



Callout	Description	System/SMOD	Available On
1	Net management port (NET MGT)	System B – SMOD1	Dual 4-socket systems only
2	Serial management port (SER MGT)	System B – SMOD1	Dual 4-socket systems only
3	USB 3.0 port	System B – SMOD1	Dual 4-socket systems only
4	<ul style="list-style-type: none"> ■ NET0, NET1, NET2, and NET3 ports on dual 4-socket systems ■ NET0, NET1, NET2, and NET3 ports on single 8-socket systems ■ Unused ports on single 4-socket systems 	System B – SMOD1	Dual 4-socket and single 8-socket systems
5	Net management port (NET MGT)	System A – SMOD0	All systems
6	Serial management port (SER MGT)	System A – SMOD0	All systems
7	USB 3.0 port	System A – SMOD0	All systems
8	NET0, NET1, NET2, and NET3 ports on all systems	System A – SMOD0	All systems
9	Power connectors 2 and 3	System A – SMOD0	Always connect all four power supplies. Connect to 200-240 VAC only.
10	Power connectors 0 and 1	System B –SMOD1	Always connect all four power supplies. Connect to 200-240 VAC only.

Configuring Serial Port and Network Port Sharing

By default, the SER MGT port connects to the Oracle ILOM CLI. 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 (Oracle ILOM CLI)” on page 93
- “Assign Serial Port Output (Oracle ILOM Web Interface)” on page 94

By default, the NET MGT serial port connects to the SP console. Using Oracle ILOM, you can configure the NET MGT serial port 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 from the host console.

For more details about restoring access to the server port on your server, see the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at: <https://www.oracle.com/goto/ilom/docs>.

▼ Assign Serial Port Output (Oracle ILOM CLI)

1. Log in to the System A or System B SP Oracle ILOM CLI.

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

```
ssh root@ipaddress
```

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

The Oracle ILOM CLI prompt appears: ->

For more information, see “Using Oracle ILOM” in *Oracle Server X7-8 Installation Guide*.

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 (Oracle ILOM Web Interface)

- 1. Log in to the SP 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 [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide](#).
The Summary Information page appears.
- 2. 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 Device Naming

This section contains information about the boot order and device naming for the four 10-Gigabit Ethernet ports on the back panel of the server. For location information, see [“Back Panel Components” on page 19](#). From right to left, the ports are numbered NET0 to NET3.

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 table lists 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 3	0703	igb 3	eth 3	net4

Port	BIOS	Oracle Solaris	Linux	Windows
Net 2	0702	igb 2	eth 2	net3
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” on page 95](#)
- [“Locating the Chassis Serial Number” on page 96](#)

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	

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.
- The serial number is recorded on the yellow Customer Information Sheet (CIS). Locate the yellow Customer Information Sheet (CIS) attached to your server packaging.
- Using Oracle ILOM:
 - From the command-line interface (CLI), type the command: `show /SYS`.
 - From the web interface, view the serial number on the System Information screen.

Auto Service Requests

Oracle Auto Service Requests (ASR) is a feature available to customers having Oracle Premier Support and is provided to those customers at no additional cost. Oracle ASR is the fastest way to restore system availability if a hardware fault occurs. Oracle ASR software is secure and customer installable, with the software and documentation downloadable from My Oracle Support at <https://support.oracle.com>. When you log in to My Oracle Support, refer to the "Oracle Auto Service Request" Knowledge Article document (ID 1185493.1) for instructions on downloading the Oracle ASR software.

When a hardware fault is detected, Oracle ASR opens a service request with Oracle and transfers electronic fault telemetry data to help expedite the diagnostic process. Oracle diagnostic capabilities then analyze the telemetry data for known issues and delivers immediate corrective actions. For security, the electronic diagnostic data sent to Oracle includes only what is needed to solve the problem. The software does not use any incoming Internet connections and does not include any remote access mechanisms.

For more information about the Oracle Auto Service Request feature, go to: <https://www.oracle.com/support/premier/auto-service-request.html>.

Preparing for Service

This section describes how to prepare the server for servicing. The topics describe safety considerations and provide prerequisite procedures and information about replacing components within the server.

- [“Electrostatic Discharge and Static Prevention Measures” on page 97](#)
- [“Required Tools and Equipment” on page 100](#)
- [“Preparing the Server for Component Replacement” on page 100](#)
- [“Prepare the Server for Hot Service \(Oracle ILOM CLI\)” on page 102](#)
- [“Prepare the Server for Hot Service \(Oracle ILOM Web Interface\)” on page 103](#)
- [“Prepare the Server for Warm Service \(Oracle ILOM CLI\)” on page 104](#)
- [“Prepare the Server for Warm Service \(Oracle ILOM Web Interface\)” on page 106](#)
- [“Prepare the Server for Cold Service \(Oracle ILOM CLI\)” on page 107](#)
- [“Prepare the Server for Cold Service \(Oracle ILOM Web Interface\)” on page 109](#)
- [“Powering Down the Server” on page 110](#)
- [“Managing the Locate Button/LED” on page 119](#)

Electrostatic Discharge and Static Prevention Measures

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

Using an Antistatic Wrist Strap

Wear an antistatic wrist strap when handling components such as storage drive assemblies, circuit boards, or PCIe cards. When servicing or removing server components, attach an antistatic 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.

Using an Antistatic Mat

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

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

Safety Symbols

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



Caution - Risk of personal injury or equipment damage. To avoid personal injury or equipment damage, follow the instructions.



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



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

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.



Related Information

- [“Electrostatic Discharge and Static Prevention Measures” on page 97](#)

FRU Key Identity Properties (KIP) Automated Update

Oracle ILOM includes a key identity properties (KIP) auto-update feature that ensures product information that is used for service entitlement and warranty coverage is accurately maintained by the server at all times, including during hardware replacement activities.

KIPs include the server product name, product part number (PPN), and product serial number (PSN). KIPs are stored in the FRUID (field-replaceable unit identifiers) container of the three server FRUs that are designated quorum members.

The quorum members include:

- Disk backplane (DBP), designated as a primary quorum member.
- Motherboard (MB), designated as a backup quorum member.
- Power supply (PS), designated as a backup quorum member.

When a server FRU that contains the KIP is removed and a replacement component is installed, the KIP of the replacement component is programmed by Oracle ILOM to contain the same KIP as the other two components.

Only one of the quorum members can be replaced at a time. Automated updates can only be completed when two of the three quorum members contain matching key identity properties.

Related Information

- [“Servicing Components” on page 123](#)

Required Tools and Equipment

The server can be serviced with the following tools:

- ESD mat and grounding strap
- Antistatic wrist strap
- No. 2 Phillips screwdriver or driver with No. 2 Phillips bit
- Non-conducting stylus
- Labels and a pen for labeling cables
- Mechanical lift
- Torx T30 screwdriver or driver with Torx T30 bit (for processor-heatsink module removal)
- 12.0 in-lbs (inch-pounds) torque driver with Torx T30 bit (for processor-heatsink module installation and replacement)

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

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

Related Information

- [“Electrostatic Discharge and Static Prevention Measures” on page 97](#)

Preparing the Server for Component Replacement

This section provides procedures to set up the server for hot, warm, or cold serviceability so you can safely remove, replace, or install components.

Before you can remove and install components that are inside the server, you must perform certain procedures in the following sections:

- [“Prepare the Server for Hot Service \(Oracle ILOM CLI\)” on page 102](#)
- [“Prepare the Server for Hot Service \(Oracle ILOM Web Interface\)” on page 103](#)
- [“Prepare the Server for Warm Service \(Oracle ILOM CLI\)” on page 104](#)
- [“Prepare the Server for Warm Service \(Oracle ILOM Web Interface\)” on page 106](#)
- [“Prepare the Server for Cold Service \(Oracle ILOM CLI\)” on page 107](#)
- [“Prepare the Server for Cold Service \(Oracle ILOM Web Interface\)” on page 109](#)

Serviceability Overview

For detailed information about server component hot, warm, or cold serviceability, see [“Component Serviceability Requirements” on page 24](#).

Review the *Oracle Server X7-8 Product Notes* at: <https://www.oracle.com/goto/x7-8/docs> for hardware-related information before performing removal and installation procedures.

Hot Service

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

The following components can be hot-serviced:

- Storage drives, see [“Servicing Storage Drives \(CRU\)” on page 123](#)
- Fan modules, see [“Servicing Fan Modules \(CRU\) and Fan Frames \(CRU\)” on page 129](#)
- Power supplies, see [“Servicing Power Supplies \(CRU\)” on page 139](#)
- Dual PCIe Card Carriers (DPCCs), see [“Servicing PCIe Cards and Carriers \(CRU\)” on page 146](#)

See [“Prepare the Server for Hot Service \(Oracle ILOM CLI\)” on page 102](#) or [“Prepare the Server for Hot Service \(Oracle ILOM Web Interface\)” on page 103](#).

Warm Service

Warm service components can be serviced while the server is in Standby power mode. You can remove and replace CMODs, DIMMs, and processors and heatsinks without disconnecting the back panel AC power cords or shutting down Oracle ILOM.

The following components can be warm-serviced:

- Fan frames, see [“Servicing Fan Modules \(CRU\) and Fan Frames \(CRU\)” on page 129](#).
- CMOD assembly, see [“Servicing CPU Module \(CMOD\) Components \(FRU\)” on page 159](#)
- Processor (CPU), see [“Servicing Processors \(FRU\)” on page 170](#)
- DIMM memory, see [“Servicing DIMMs \(CRU\)” on page 184](#)

See [“Prepare the Server for Warm Service \(Oracle ILOM CLI\)” on page 104](#) or [“Prepare the Server for Warm Service \(Oracle ILOM Web Interface\)” on page 106](#).

Cold Service

Cold service components must be serviced when the server is completely powered off and all four AC power cords are disconnected from the server back panel AC power block.

The following components can be cold-serviced:

- System module (SMOD), see “[Servicing System Module \(SMOD\) Components \(FRU\)](#)” on page 201
- Host bus adapter (HBA) card, see “[Servicing the Host Bus Adapter \(HBA\) Card \(FRU\)](#)” on page 207
- HBA cable, see “[Servicing the SAS Cable \(FRU\)](#)” on page 219
- Energy Storage Module (ESM), see “[Servicing the Energy Storage Module and Cables \(CRU\)](#)” on page 214
- Energy Storage Module cable, see “[Servicing the Energy Storage Module and Cables \(CRU\)](#)” on page 214
- System clock battery, see “[Servicing the System Battery \(CRU\)](#)” on page 224
- Fan frame, see “[Servicing Fan Modules \(CRU\) and Fan Frames \(CRU\)](#)” on page 129
- Front indicator module, see (FIM) “[Servicing the Front Indicator Module \(FRU\)](#)” on page 230
- Midplane, see “[Remove the Midplane Assembly](#)” on page 235
- Internal USB flash drive (not used)

See “[Prepare the Server for Cold Service \(Oracle ILOM CLI\)](#)” on page 107 or “[Prepare the Server for Cold Service \(Oracle ILOM Web Interface\)](#)” on page 109.

The steps in these remote procedures use the Oracle ILOM CLI interface or web interface. For more information, refer to the Oracle ILOM 4.0 documentation at: <https://www.oracle.com/goto/ilom/docs>.

For additional information, see:

- “[Managing the Locate Button/LED](#)” on page 119
- “[Servicing Components](#)” on page 123

▼ Prepare the Server for Hot Service (Oracle ILOM CLI)

This procedure describes how to prepare the server to remove, replace, or install hot-service components. A hot-service component can be serviced while the server is operating at

Main power mode. For more information about component serviceability, see [“Component Serviceability Requirements” on page 24](#).

1. Log in to the SP Oracle ILOM CLI.

Log in as a user with root or administrator privileges. For example, open an SSH session, and at the command line type:

```
ssh root@ipaddress
```

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

For more information, see [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide](#).

The Oracle ILOM CLI prompt appears: ->

2. Verify that the Power State is OFF:

At the prompt, type the following command:

```
->stop /System
```

3. To turn on the Locate Button/LED, type the following command:

```
->set /System/ locator_indicator=on
```

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

4. Once at the service location, press the Locate Button/LED button to deactivate the indicator.

For more information, see [“Control the Locate Button/LED Locally” on page 121](#).

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

Set up a space where you can place components. See [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

6. Perform hot-service removal and installation procedures on components.

See [“Servicing Components” on page 123](#).

▼ Prepare the Server for Hot Service (Oracle ILOM Web Interface)

This procedure describes how to prepare the server to remove, replace, or install hot-service components. A hot-service component can be serviced while the server is operating at

Main power mode. For more information about component serviceability, see [“Component Serviceability Requirements” on page 24](#).

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. Log in as a user with root or administrator privileges. See [“Accessing Oracle ILOM” in Oracle Server X7-8 Installation Guide](#).

For more information, see [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide](#).

The Summary Information page appears.

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

This action activates the Locate Button/LED on the server front panel. For other options, see [“Managing the Locate Button/LED” on page 119](#).

3. Click OK.

4. Once at the service location, press the Locate Button/LED button to deactivate the indicator.

For more information, see [“Control the Locate Button/LED Locally” on page 121](#).

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

Set up a space where you can place components. See [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

6. Perform hot-service removal and installation procedures on components.

See [“Servicing Components” on page 123](#).

▼ Prepare the Server for Warm Service (Oracle ILOM CLI)

This procedure describes how to prepare the server for warm service. Use warm service to remove and replace CMOD, DIMM, and processor components without accessing the server back panel to disconnect AC 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, the SP 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.

For more information about component serviceability, see [“Component Serviceability Requirements” on page 24.](#)



Caution - Loss of service or component damage. Do not replace any components except for CMODs and internal CMOD 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 Main 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.

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

1. Log in to the SP Oracle ILOM CLI.

Log in as a user with root or administrator privileges. For example, open an SSH session, and at the command line type:

```
ssh root@ipaddress
```

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

For more information, see [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide.](#)

The Oracle ILOM CLI prompt appears: ->

2. Power off the server gracefully to Standby power mode.

At the prompt, type the following command:

```
->stop /System
```

3. To turn on the Locate Button/LED indicator, type the following command.

```
->set /System/ locator_indicator=on
```

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

4. Once at the service location, press the Locate Button/LED button to deactivate the indicator.

For more information, see [“Control the Locate Button/LED Locally” on page 121.](#)

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

Set up a space where you can place components. See [“Electrostatic Discharge and Static Prevention Measures” on page 97.](#)

6. **Perform warm-service removal and installation procedures on components.**

See [“Servicing Components” on page 123.](#)

▼ **Prepare the Server for Warm Service (Oracle ILOM Web Interface)**

This procedure describes how to prepare the server for warm service. Use warm service to remove and replace CMOD, DIMM, and processor components without accessing the server back panel to disconnect AC 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, the SP 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.

For more information about component serviceability, see [“Component Serviceability Requirements” on page 24.](#)



Caution - Loss of service or component damage. Do not replace any components except for CMODs and internal CMOD 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 Main 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.

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

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. Log in as a user with root or administrator privileges. See [“Accessing Oracle ILOM” in Oracle Server X7-8 Installation Guide.](#)

For more information, see [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide.](#)

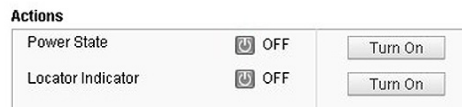
The Summary Information page appears.

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

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

3. **Power off the server. In the Actions section of the Summary Information page, click the Power State Turn Off button.**

This action powers off the server to Standby power mode. For more power off options, see [“Powering Down the Server” on page 110](#).



4. **In the Actions section of the Summary Information page, click the Locator Indicator Turn On button.**

This action activates the Locate Button/LED on the server front panel. For other options, see [“Managing the Locate Button/LED” on page 119](#).

5. **Click OK.**
6. **Once at the service location, press the Locate button to deactivate the indicator.**
For more information, see [“Control the Locate Button/LED Locally” on page 121](#).
7. **Set up an ESD-safe space at the service location.**
Set up a space where you can place components. See [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).
8. **Perform warm-service removal and installation procedures on components.**
See [“Servicing Components” on page 123](#).

▼ Prepare the Server for Cold Service (Oracle ILOM CLI)

This procedure describes how to prepare the server for cold service to remove, replace, or install cold-serviceable components. A cold-service component must be serviced when the

server is completely powered off and AC cords have been removed from the back panel AC power block.

For more information about component serviceability, see [“Component Serviceability Requirements” on page 24](#).

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

1. Log in to the SP Oracle ILOM CLI.

Log in as a user with root or administrator privileges. For example, open an SSH session, and at the command line type:

```
ssh root@ipaddress
```

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

For more information, see [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide](#).

The Oracle ILOM CLI prompt appears: ->

2. To turn on the Locate LED indicator, type the following command.

```
->set /System/ locator_indicator=on
```

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

3. Power off the server gracefully to Standby power mode.

At the prompt, type the following command:

```
->stop /System
```

4. Once at the service location, press the Locate button to deactivate the indicator.

For more information, see [“Control the Locate Button/LED Locally” on page 121](#).

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

Set up a space where you can place components. See [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

6. Disconnect the four server power cords from the AC power block.



Caution - Data loss. Removing the power cords when the server is in Main power mode results in an immediate shut down of the server. Do not remove the power cord if the server is in Main power mode. Power off the server to Standby power mode first.

7. **Perform cold-service removal and installation procedures on components.**

See [“Servicing Components” on page 123](#).

▼ Prepare the Server for Cold Service (Oracle ILOM Web Interface)

This procedure describes how to prepare the server for cold service to remove, replace, or install cold-serviceable components. A cold-service component must be serviced when the server is completely powered off and AC cords have been removed from the back panel AC power block. For more information about component serviceability, see [“Component Serviceability Requirements” on page 24](#).

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

1. **Log in to the System A or System B service processor Oracle ILOM web interface using an Administrator account.**

Direct a web browser to Oracle ILOM using the IP address of the server SP. Log in as a user with root or administrator privileges. See [“Accessing Oracle ILOM” in Oracle Server X7-8 Installation Guide](#).

For more information, see [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide](#).

The Oracle ILOM web interface System Information → Summary Information page appears.

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

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

3. **Power off the server. In the Actions section of the Summary Information page, click the Power State Turn Off button.**

This action powers off the server to Standby power mode. For more power off options, see [“Powering Down the Server” on page 110](#).



4. **In the Actions section of the Summary Information page, click the Locator Indicator Turn On button.**
This action activates the Locate Button/LED on the server front panel. For other options, see [“Managing the Locate Button/LED” on page 119.](#)
5. **Click OK.**
6. **Once at the service location, press the Locate Button/LED to deactivate the indicator.**
For more information, see [“Control the Locate Button/LED Locally” on page 121.](#)
7. **Disconnect the four server power cords from the AC power block.**



Caution - Data loss. Removing the power cords when the server is in Main power mode results in an immediate shut down of the server. Do not remove the power cord if the server is in Main power mode. Power off the server to Standby power mode first.

8. **Set up an ESD-safe space at the service location.**
Set up a space where you can place components. See [“Electrostatic Discharge and Static Prevention Measures” on page 97.](#)
9. **Perform cold-service removal and installation procedures on components.**
See [“Servicing Components” on page 123.](#)

Powering Down the Server

Determine how you want to power off the server by reviewing the options in the following table.

Description	Link
Power off the server gracefully to prevent data from being corrupted. Performing a graceful shutdown ensures that the system is ready for restart.	<ul style="list-style-type: none"> ■ “Power Off the Server Gracefully (Oracle ILOM CLI)” on page 111 ■ “Power Off the Server Gracefully (Oracle ILOM Web Interface)” on page 112 ■ “Power Off the Server Gracefully (Power Button)” on page 113
If the server is not responding, or you must shut down the server quickly, perform an immediate shutdown.	<ul style="list-style-type: none"> ■ “Power Off the Server for Immediate Shutdown (Oracle ILOM CLI)” on page 114 ■ “Power Off the Server for Immediate Shutdown (Oracle ILOM Web Interface)” on page 115

Description	Link
	<ul style="list-style-type: none"> ■ “Power Off the Server for Immediate Shutdown (Power Button)” on page 116

▼ Power Off the Server Gracefully (Oracle ILOM CLI)

Performing a graceful shutdown ensures that all of your data is saved and the system is ready for restart.

1. Review the logs (optional).

Depending on the nature of the problem, you might want to view the system status or the log files or run diagnostics before you shut down the system.

For log file information, refer to the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Collection at <https://www.oracle.com/goto/ilom/docs>.

2. Prepare to shut down the system.

3. Notify affected users that the server will be powered down.

4. Save any open files, and quit all running applications.

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

5. Log in to the SP Oracle ILOM CLI.

Log in as a user with root or administrator privileges. For example, open an SSH session, and at the command line type:

```
ssh root@ipaddress
```

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

For more information, see [“Using Oracle ILOM”](#) in *Oracle Server X7-8 Installation Guide*.

The Oracle ILOM CLI prompt appears: ->

6. At the Oracle ILOM prompt, shut down the operating system. Type:

```
-> stop /System
```

If the system is running the Oracle Solaris OS, refer to the Oracle Solaris system administration documentation for additional information.

7. Disconnect the power and cables from the server.

See “Remove Power” on page 117.



Caution - When you power off the server using Oracle ILOM, the server enters Standby power mode. Power is still directed to the service processor remote management subsystem and power supply fans. To completely power off the server, you must disconnect the power cords from the power supplies.

Related Information

- “Power Off the Server Gracefully (Oracle ILOM Web Interface)” on page 112
- “Power Off the Server Gracefully (Power Button)” on page 113
- “Power Off the Server for Immediate Shutdown (Power Button)” on page 116
- “Power On the Server” on page 250

▼ Power Off the Server Gracefully (Oracle ILOM Web Interface)

Performing a graceful shutdown ensures that all of your data is saved and the system is ready for restart.

1. **Depending on the system condition, you might want to view the system status or the log files or run diagnostics before you shut down the system.**

For log file information, refer to the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Collection at <https://www.oracle.com/goto/ilom/docs>.

2. **Notify affected users that the server will be powered down.**
3. **Save any open files, and quit all running applications.**

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

4. **Log in to the System A or System B service processor Oracle ILOM web interface using an Administrator account.**

Direct a web browser to Oracle ILOM using the IP address of the server SP. Log in as a user with root or administrator privileges. See “Accessing Oracle ILOM” in *Oracle Server X7-8 Installation Guide*.

For more information, see “Using Oracle ILOM” in *Oracle Server X7-8 Installation Guide*.

The Oracle ILOM web interface System Information → Summary Information page appears.

5. **In the left pane, click Host Management → Power Control, and click Graceful Shutdown and Power Off from the Select Action list.**
6. **Click Save, and then click OK.**
The host server performs an orderly power-down.
7. **Disconnect the power cords and data cables from the server.**
See [“Remove Power” on page 117](#).



Caution - When you power off the server using Oracle ILOM, the server enters Standby power mode. Power is still directed to the service processor remote management subsystem and power supply fans. To completely power off the server, you must disconnect the power cords from the power supplies.

Related Information

- [“Power Off the Server Gracefully \(Oracle ILOM CLI\)” on page 111](#)
- [“Power Off the Server Gracefully \(Power Button\)” on page 113](#)
- [“Power Off the Server for Immediate Shutdown \(Power Button\)” on page 116](#)
- [“Power On the Server” on page 250](#)

▼ Power Off the Server Gracefully (Power Button)

1. **Press and quickly release the Power button on the front panel.**
This action causes ACPI-enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems shut down to Standby power mode immediately.
When Main power is off, the Power/OK LED on the front panel begins flashing, indicating that the server is in Standby power mode. See [“About Controls and Indicators” on page 70](#) and [“Controls and Indicators” on page 70](#).
2. **Disconnect the power cords and data cables from the server.**
See [“Remove Power” on page 117](#).



Caution - When you power off the server using the Power button, the server enters Standby power mode. Power is still directed to the service processor remote management subsystem and power supply fans. To completely power off the server, you must disconnect the power cords from the power supplies.

Related Information

- [“Controls and Indicators” on page 70](#)
- [“Power Off the Server Gracefully \(Oracle ILOM CLI\)” on page 111](#)
- [“Power Off the Server for Immediate Shutdown \(Oracle ILOM Web Interface\)” on page 115](#)
- [“Power On the Server” on page 250](#)

▼ Power Off the Server for Immediate Shutdown (Oracle ILOM CLI)



Caution - This procedure quickly forces the server Main power off. You might corrupt your system data during an immediate power-down, so use this procedure to power off the server only after attempting the graceful power-down procedure.

1. Log in to the SP Oracle ILOM CLI.

Log in as a user with root or administrator privileges. For example, open an SSH session, and at the command line type:

```
ssh root@ipaddress
```

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

For more information, see [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide](#).

The Oracle ILOM CLI prompt appears: ->

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

```
-> stop -f /System
```

The server powers down immediately.

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

See [“Remove Power” on page 117](#).



Caution - When you power off the server using Oracle ILOM, the server enters Standby power mode. Power is still directed to the service processor remote management subsystem and power supply fans. To completely power off the server, you must disconnect the power cords from the power supplies.

Related Information

- [“Power Off the Server for Immediate Shutdown \(Power Button\)” on page 116](#)
- [“Power Off the Server for Immediate Shutdown \(Oracle ILOM Web Interface\)” on page 115](#)
- [“Power On the Server” on page 250](#)

▼ Power Off the Server for Immediate Shutdown (Oracle ILOM Web Interface)



Caution - This procedure quickly forces the server Main power off. You might corrupt your system data during an immediate power-down, so use this procedure to power off the server only after attempting the graceful power-down procedure.

1. **Log in to the System A or System B service processor Oracle ILOM web interface using an Administrator account.**

Direct a web browser to Oracle ILOM using the IP address of the server SP. Log in as a user with root or administrator privileges. See [“Accessing Oracle ILOM” in *Oracle Server X7-8 Installation Guide*](#).

For more information, see [“Using Oracle ILOM” in *Oracle Server X7-8 Installation Guide*](#).

The Oracle ILOM web interface System Information → Summary Information page appears.

2. **In the left pane, click Host Management → Power Control, and click Immediate Power Off in the Select Action list.**

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

The server powers down immediately.

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

See [“Remove Power” on page 117](#).



Caution - When you power off the server using Oracle ILOM, the server enters Standby power mode. Power is still directed to the service processor remote management subsystem and power supply fans. To completely power off the server, you must disconnect the power cords from the power supplies.

Related Information

- [“Power Off the Server for Immediate Shutdown \(Power Button\)” on page 116](#)
- [“Power Off the Server Gracefully \(Oracle ILOM CLI\)” on page 111](#)
- [“Power On the Server” on page 250](#)

▼ Power Off the Server for Immediate Shutdown (Power Button)



Caution - This procedure quickly forces the server Main power off. You might corrupt your system data during an immediate power-down, so use this procedure to power off the server only after attempting the graceful power-down procedure.

1. **Press and hold the Power button for four seconds to force the Main power off and to enter Standby power mode.**

When Main power is off, the Standby/OK LED on the front panel begins flashing, indicating that the server is in Standby power mode. See [“About Controls and Indicators” on page 70](#).

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

See [“Remove Power” on page 117](#).



Caution -When you power off the server using the Power button, the server enters Standby power mode. Power is still directed to the service processor remote management subsystem and power supply fans. To completely power off the server, you must disconnect the power cords from the power supplies.

Related Information

- [“Controls and Indicators” on page 70](#)
- [“Power Off the Server for Immediate Shutdown \(Oracle ILOM CLI\)” on page 114](#)
- [“Power Off the Server for Immediate Shutdown \(Oracle ILOM CLI\)” on page 114](#)
- [“Power On the Server” on page 250](#)

▼ 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.

See [“Power Control, Shutdown, and Reset States” on page 118](#).

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

Refer to the OS documentation for instructions.

- 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 System OK indicator blinks at the single blink rate (a quick flash every three seconds). See [“Troubleshooting Using Status Indicators” on page 57](#).

▼ Remove Power

Use this procedure to completely remove power from the server. Changing the server from Main 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.

See [“Power Control, Shutdown, and Reset States” on page 118](#).

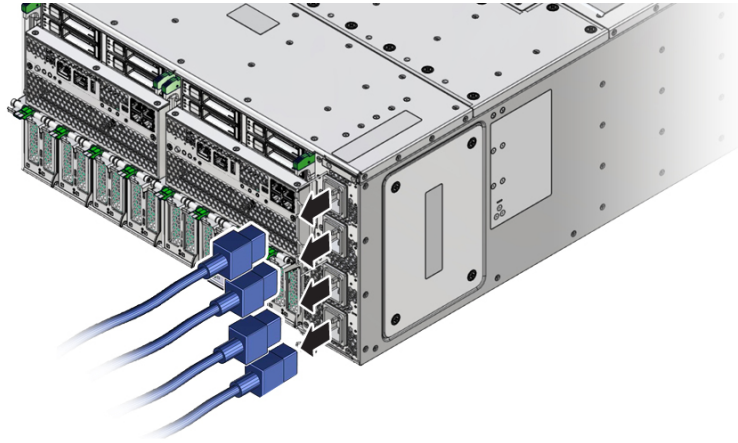
- 1. Place the server in Standby power mode.**

Use one of the power off methods. See [“Powering Down the Server” on page 110](#).

- 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 [“Power Control, Shutdown, and Reset States” on page 118.](#)

Power Control, Shutdown, and Reset States

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

Procedure	Description
Main Power Mode	<p>When the server enters Main 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 System OK and SP OK indicators are steady on.</p> <p>To enter Main power mode, press the On/Standby button on the server front panel when the server is in Standby power mode. You can also enter Main power mode by powering on the server from Oracle ILOM.</p>
Standby Power Mode	<p>In Standby power mode, low-level power is supplied only to the components required to run the SP. The OS does not boot.</p> <p>To enter Standby power mode, either:</p> <ul style="list-style-type: none"> ■ Connect the AC power cables to the back of the server but do not press the Power button.

Procedure	Description
	<ul style="list-style-type: none"> From Main power mode, either press the front panel On/Standby button, or use Oracle ILOM.
Graceful Shutdown	<p>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 System OK indicator flashes briefly every 3 seconds.</p> <p>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. <i>Graceful Shutdown is the safest method of shutting down the server.</i></p> <p>Power off the server gracefully to prevent data from being corrupted. Performing a graceful shutdown ensures that the system is ready for restart.</p> <p>To perform a graceful shutdown use the server OS, Oracle ILOM, or the server front panel Power button.</p>
Immediate Shutdown	<p>An immediate shutdown (also referred to as an emergency shutdown) shuts down the host immediately without closing files or preparing the file system. <i>Immediate Shutdown should be used only in situations when you know that the chance of losing data is nonexistent or acceptable.</i></p>
Complete Power Removal	<p>To completely remove power from the server, remove the power cords.</p> <p>Shutting down the server from Main power mode to Standby power mode does <i>not</i> completely remove power from the server. When the server is in Standby power mode, it is in a low-power state. The low-power state maintains the service processor (SP), which runs Oracle ILOM.</p>
Warm Reset or Reboot	<p>A warm reset is a reboot or restart of the server. It requires cycling the server power from Main power mode to Standby power mode and back to Main power mode. For example, a warm reset might be required after a software or firmware update or to access the BIOS Setup Utility.</p>
Cold Reset	<p>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.</p>

Managing the Locate Button/LED

This section provides procedures for turning the Locate Button/LED indicator on and off remotely (using Oracle ILOM) and locally (using the server Locate Button/LED indicators). The FIM and back panel Locate Button/LED indicators help you identify the server in a rack and system.

- [“Turn On the Locate Button/LED Remotely \(Oracle ILOM CLI\)” on page 120](#)
- [“Turn On the Locate Button/LED Remotely \(Oracle ILOM Web Interface\)” on page 120](#)
- [“Control the Locate Button/LED Locally” on page 121](#)

▼ Turn On the Locate Button/LED Remotely (Oracle ILOM CLI)

Before going to the server, you can activate the server Locate Button/LED to help you identify the server in the rack.

1. Log in to the System A or System B SP Oracle ILOM CLI.

Log in as a user with root or administrator privileges. For example, open an SSH session:

```
ssh root@ipaddress
```

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

For more information, see [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide](#).

The Oracle ILOM CLI prompt appears: ->

2. To *turn on* the Locate Button/LED 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 Locate Button/LED 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 Locate Button/LED Remotely (Oracle ILOM Web Interface)

Before going to the server, you can activate the server Locate Button/LED indicator to help you identify the server in the rack.

1. Log in to the System A or System B service processor Oracle ILOM web interface using an Administrator account.

Direct a web browser to Oracle ILOM using the IP address of the server SP. Log in as a user with root or administrator privileges. See [“Accessing Oracle ILOM” in Oracle Server X7-8 Installation Guide](#).

For more information, see [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide](#). The Oracle ILOM web interface System Information → Summary Information page appears.

2. In the Actions section, verify that the Locate Button/LED indicator is off, and then click the Turn On button.



3. Click OK.

The Locator indicator on the Summary Information page changes to indicate the status of the Locate Button/LED indicator.

▼ Control the Locate Button/LED Locally

If you are physically present at the server, use this procedure to turn off or to turn on the Locate Button/LED indicator. This procedure is performed locally and requires physical access to the server front panel FIM or back panel.

For button and indicator location information, see [“Front Indicator Module \(FIM\) Panel” on page 58](#).

- **To control the Locate Button/LED indicator locally, do one of the following:**
 - **To turn off the blinking Locate Button/LED indicator, press the Locate button.**
 - **To turn on the Locator indicator, press the Locate button.**

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

- **To perform a lamp test of all front panel indicators, press the Locate Button/LED three times within a five-second period.**

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

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 example, DPCCs and fan modules). As with filler panels, these components must remain installed in a fully powered-on server.

Servicing Components

This section includes the following removal and installation procedures for customer-replaceable and field-replaceable components in the Oracle Server X7-8.

- [“Servicing Storage Drives \(CRU\)” on page 123](#)
- [“Servicing Fan Modules \(CRU\) and Fan Frames \(CRU\)” on page 129](#)
- [“Servicing Power Supplies \(CRU\)” on page 139](#)
- [“Servicing PCIe Cards and Carriers \(CRU\)” on page 146](#)
- [“Servicing CPU Module \(CMOD\) Components \(FRU\)” on page 159](#)
- [“Servicing System Module \(SMOD\) Components \(FRU\)” on page 201](#)
- [“Servicing the Front Indicator Module \(FRU\)” on page 230](#)
- [“Servicing the Midplane Assembly \(FRU\)” on page 234](#)

For information about replaceable components, component serviceability, locations, and designations, see:

- [“Replaceable Components” on page 22](#)
- [“Customer-Replaceable Units” on page 25](#)
- [“Field-Replaceable Units” on page 26](#)

Servicing Storage Drives (CRU)

This section describes how to service storage drives. The following topics and procedures provide information to assist you when replacing a storage drive or upgrading storage drives:

- [“Storage Drive Locations and Numbering” on page 124.](#)
- [“Remove a Storage Drive” on page 125](#)
- [“Install a Storage Drive” on page 127](#)

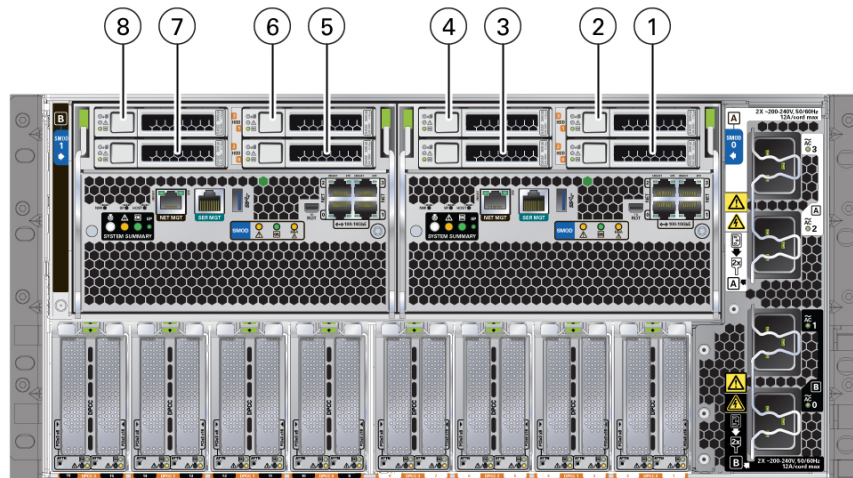
Storage drives are customer-replaceable units (CRUs). For more information about CRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Customer-Replaceable Units” on page 25](#). For server component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).

Storage Drive Locations and Numbering

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

Storage Drive Slot Locations

The eight storage drive slots are in system modules (SMOD0 and SMOD1) and directly accessible from the server back panel. Slots are arranged in two stacked rows of four slots and designated from right to left.



Call Out	Description
1	HDD 0 SMOD0
2	HDD 1 SMOD0
3	HDD 2 SMOD0
4	HDD 3 SMOD0
5	HDD 0 SMOD1
6	HDD 1 SMOD1

Call Out	Description
7	HDD 2 SMOD1
8	HDD 3 SMOD1

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 and 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.

For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).

▼ Remove a Storage Drive

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

See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a warm service or cold service procedure.

2. **Identify the storage drive by its position and designation on the server back panel.**

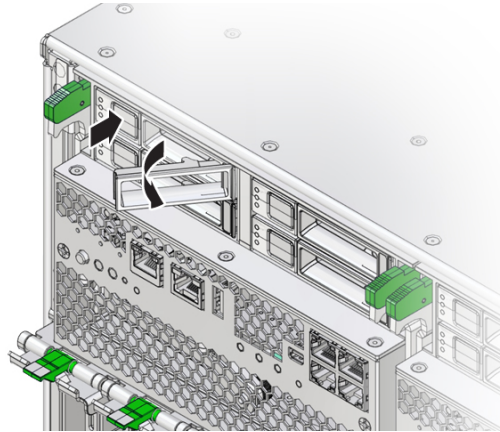
Access this component directly from the back of the server. For storage drive position and designation information, see [“Storage Drive Locations and Numbering” on page 124](#).

3. **Identify the storage drive indicators on drive bracket front panel.**

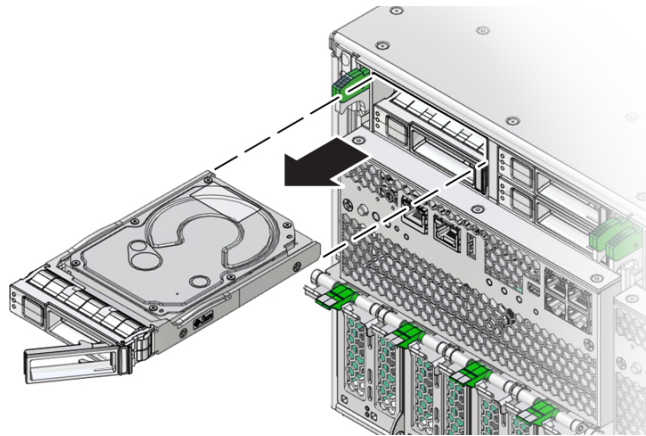
For example, look for the blue steady on Ready to Remove indicator or the amber steady on Fault-Service Required LED. See [“About Controls and Indicators” on page 70](#).

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

The spring-loaded handle pops open.



5. To remove the drive, rotate the handle to its fully open position and pull the drive out of its slot.



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

6. Consider your next steps:
 - If you are replacing the drive, continue to [“Install a Storage Drive” on page 127](#).

- If you are not replacing the drive, install a filler panel in the empty drive slot to maintain proper airflow. Perform administrative tasks to configure the server to operate without the drive.

For information on how to install a storage drive filler panel, see [“Component Filler Panels and Non-Powered Components”](#) on page 122.

Related Information

- [“Install a Storage Drive”](#) on page 127.
- [“Replaceable Components”](#) on page 22.

▼ Install a Storage Drive

For storage drive information, see [“Storage Drive Locations and Numbering”](#) on page 124.

1. Prepare the server for hot service.

See [“Preparing the Server for Component Replacement”](#) on page 100.

Note - This procedure can also be completed as a warm service or cold service procedure.

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

Access this component directly from the back of the server.

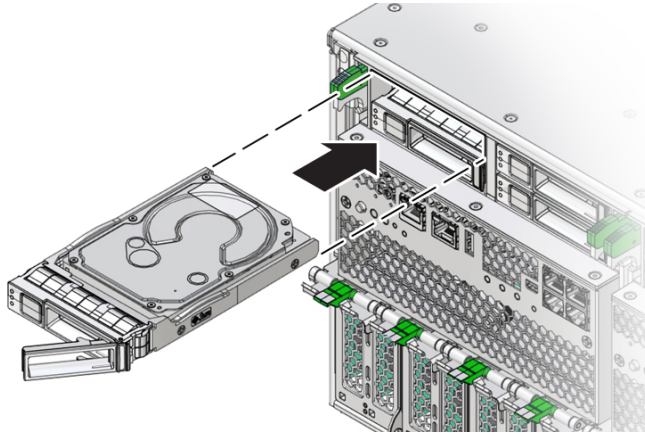
a. Press the handle release button on the front of the filler panel.

The spring-loaded handle pops open.

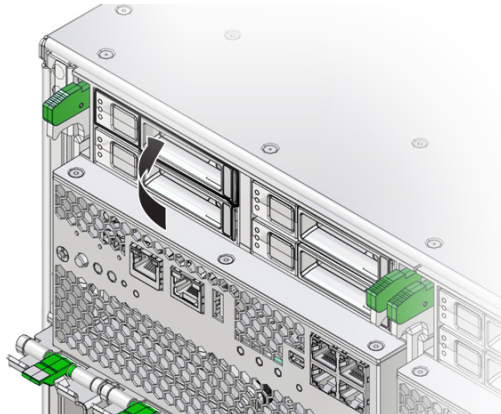
b. To remove the filler panel, use the handle to pull it out of the slot.

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 handle to the closed position.**



Continue pushing the handle until the drive is flush with the front of the SMOD.

7. **Perform administrative procedures to reconfigure the drive.**

The procedures that you perform at this point depend on how your data is configured. You might need to partition the drive, create file systems, load data from backups, or have the drive updated from a RAID configuration.

Servicing Fan Modules (CRU) and Fan Frames (CRU)

This section describes how to service fan modules and fan frames. The fan modules and fan frames are located in the front of the server. The following topics and procedures provide information to assist you when removing and installing fan modules and fan frames:

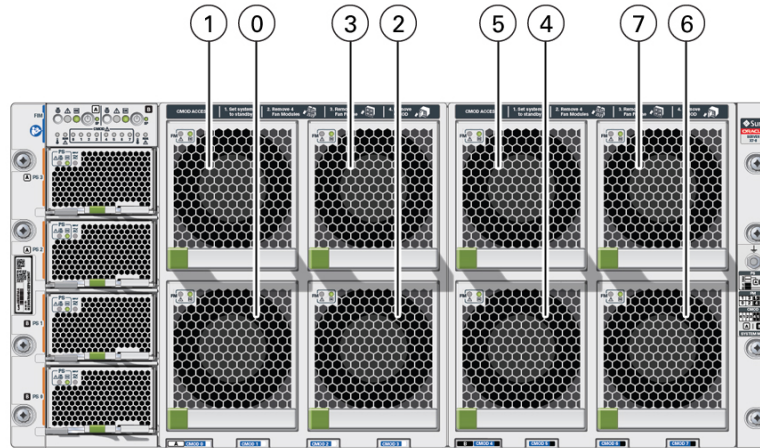
- [“Fan Module Locations and Numbering” on page 129](#)
- [“Remove a Fan Module” on page 131](#)
- [“Install a Fan Module” on page 133](#)
- [“Remove a Fan Frame” on page 135](#)
- [“Install a Fan Frame” on page 137](#)

Fan modules are customer-replaceable units (CRUs) that do not require you to power off the server. Fan frames are customer-replaceable units (CRUs) that require you to power off the server. For more information about CRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Customer-Replaceable Units” on page 25](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).

Fan Module Locations and Numbering

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

- SMOD0 System A: FM 0, 1, 2, 3
- SMOD1 System B: FM 4, 5, 6, 7
- 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
1	SMOD0 System A: FM 0
2	SMOD0 System A: FM 1
3	SMOD0 System A: FM 2
4	SMOD0 System A: FM 3
5	SMOD1 System B: FM 4
6	SMOD1 System B: FM 5
7	SMOD1 System B: FM 6
8	SMOD1 System B: FM 7

The eight fan modules are installed in two fan frames. The left frame contains FM 0, FM 1, FM 2, 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 [“CPU Module \(CMOD\) Overview” on page 27](#).

▼ Remove a Fan Module

Remove fan modules (FMs) to replace a failed FM, or to access CMODs.

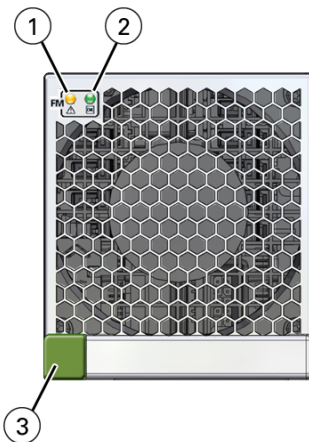
1. Prepare the server for hot service.


See [“Preparing the Server for Component Replacement” on page 100.](#)


Note - This procedure can also be completed as a warm service or cold service procedure, for example, to access CMODs.

2. Identify the fan module that requires removal by its position and designation.

Access fan modules (FMs) from the front of the server. A fan module in a failed state has a lit steady on amber-color Fault-Service Required LED.



Call Out	Status LED or Button	Icon and Color	Description
1	Fault-Service Required	 Amber	Indicates a fault state in a fan module: <ul style="list-style-type: none"> ■ Off – Fan module is operating normally, ■ Steady On – A fault is present in the fan module.

Call Out	Status LED or Button	Icon and Color	Description
2	OK	 Green	Indicates the functional state of the fan module: <ul style="list-style-type: none"> ■ Steady On – Fan module is powered on and functioning normally. ■ Off – Fan module is powered off and not functioning.
3	Release button	None	Press the green button to release and remove the fan module.

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 Main 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-side fan frame.

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

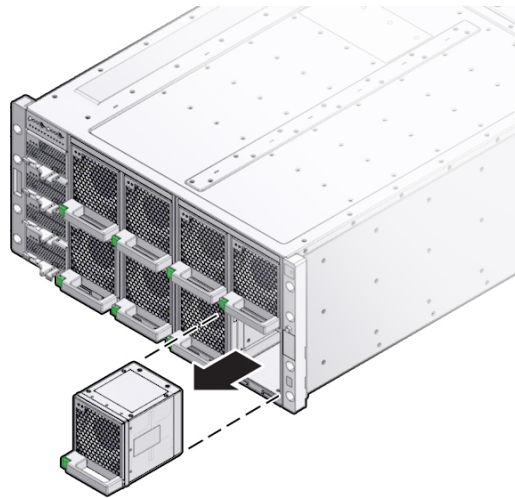


Caution - Electrical hazard. During a hot-service procedure, voltage is present. Do not reach into the vacant fan module slot with your hand or any object. Do not touch the exposed CMOD fan module power connector.

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 overtemperature. 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.



Related Information

- [“Remove a Fan Frame” on page 135](#)
- [“Install a Fan Module” on page 133](#)

▼ Install a Fan Module

Use this procedure after removing a fan module to install a replacement fan module or to install a fan module after accessing the CMODs behind it.

1. Prepare the server for hot service.

See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a warm service or cold service procedure, for example, to access CMODs.

2. Align the fan module with the slot.

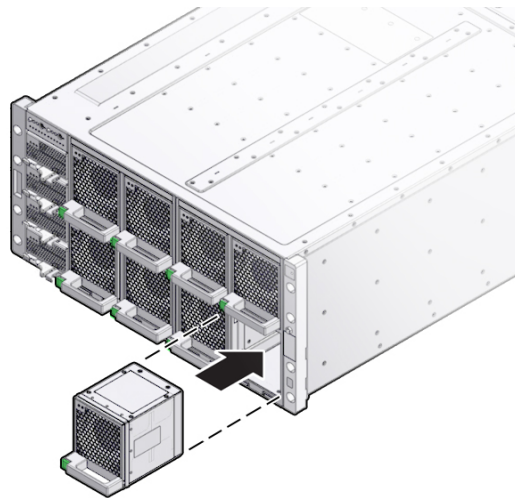
Access this component directly from the front of the server. Ensure the handle is positioned at the bottom of the slot with the green release button to the left and that the air vane for the slot swings freely.



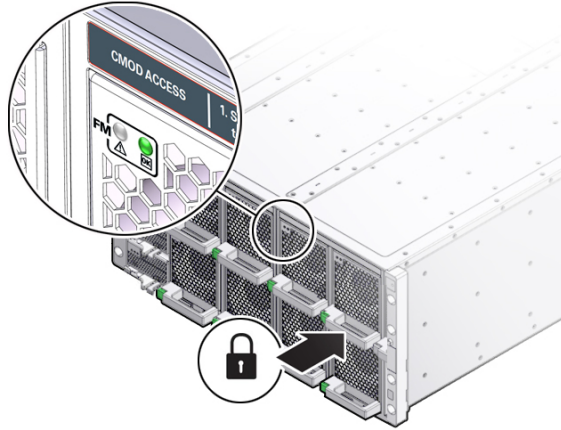
Caution - Component damage. Do not apply excessive force when sliding the fan module into the server. Ensure that the connector on the CMOD and the connector on the fan module are aligned correctly.

3. 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.



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



▼ Remove a Fan Frame

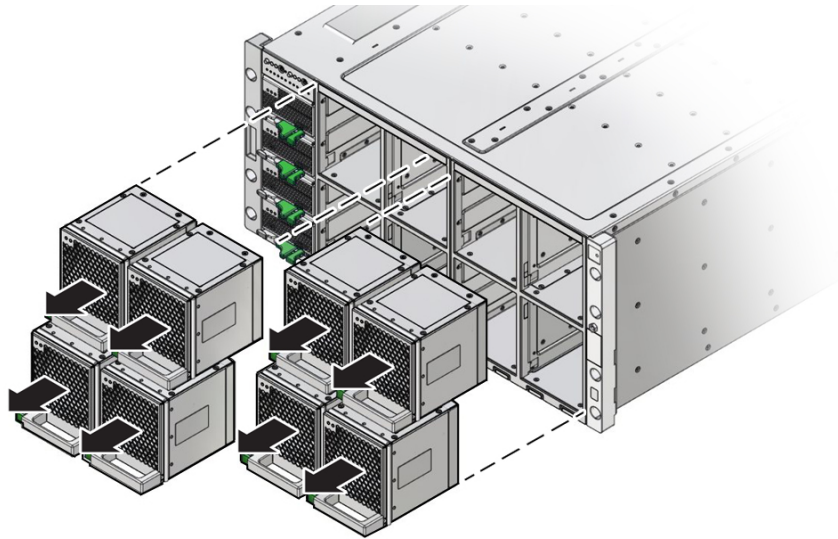
The server has two fan frames which are accessible from the front of the server. Each frame contains four fans. You need to remove the fan frame to access the CMODs behind it.

1. **Prepare the server for warm service.**
See [“Preparing the Server for Component Replacement” on page 100.](#)

Note - This procedure can also be completed as a cold service procedure.

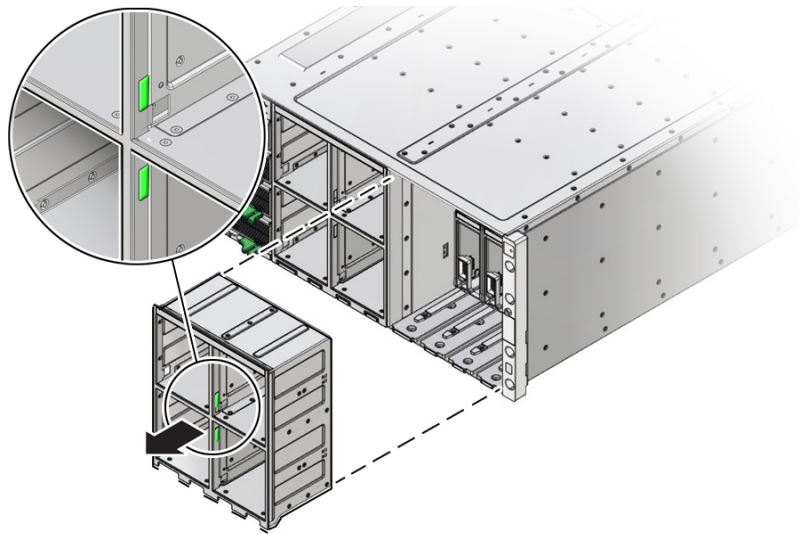
2. **Remove the fan modules associated with the fan frame.**

See [“Remove a Fan Module” on page 131](#).



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.

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.



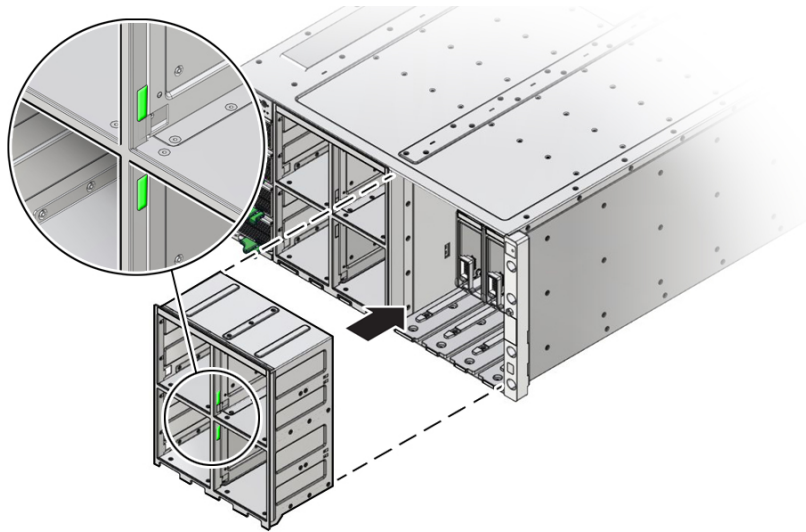
Related Information

- [“Remove a CMOD” on page 162](#)

▼ 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.

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 frame into the server until it stops and is flush with the front of the server.**
3. **Install the four FMs.**
See [“Install a Fan Module” on page 133](#).
4. **Prepare the server for operation.**
See [“Returning the Server to Operation” on page 249](#).

Servicing Power Supplies (CRU)

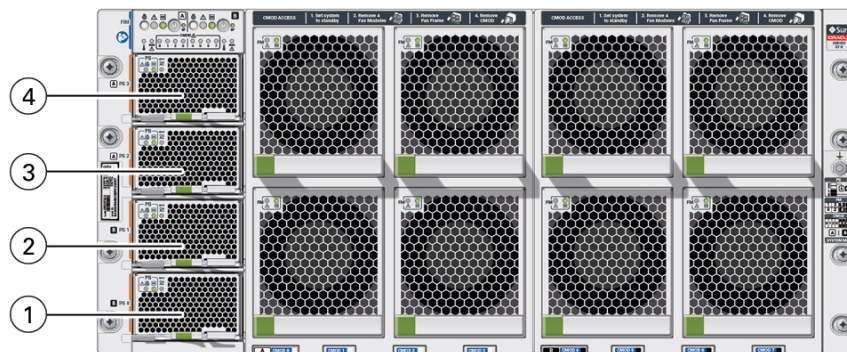
This section describes how to service power supplies (PS). Four power supplies are located at the front of the server. The following topics and procedures provide information to assist you when removing and installing power supplies:

- [“Power Supply Locations and Numbering” on page 139](#)
- [“Power Supply Overview” on page 140](#)
- [“AC Input Power Block Locations” on page 140](#)
- [“Remove a Power Supply” on page 141](#)
- [“Install a Power Supply” on page 144](#)

Power supplies are customer-replaceable units (CRUs) that do not require you to power off the server. For more information about CRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Customer-Replaceable Units” on page 25](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#)

Power Supply Locations and Numbering

The four slots for the power supplies (PS) 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 PS0, PS1, PS2, and PS3. The following illustration shows the arrangement of the power supplies.



Call Out	Description
1	PS 0 System B
2	PS 1 System B
3	PS 2 System A
4	PS 3 System A

Power Supply Overview

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

The server supports four 3060 watt power supplies. The power supply units (PS0 - PS3) provide conversion from the AC lines to the system, accepting ranges from 100-240 volts AC (VAC). These front panel accessible PSs are designed to be hot-pluggable, and in most cases will provide fully redundant “1+1” power to two SMODs (1+1 for each side), allowing the system to suffer the loss of a PSU or an AC feed with no loss to system availability.

The following status indicators (LEDs) are lit when a power supply fault is detected:

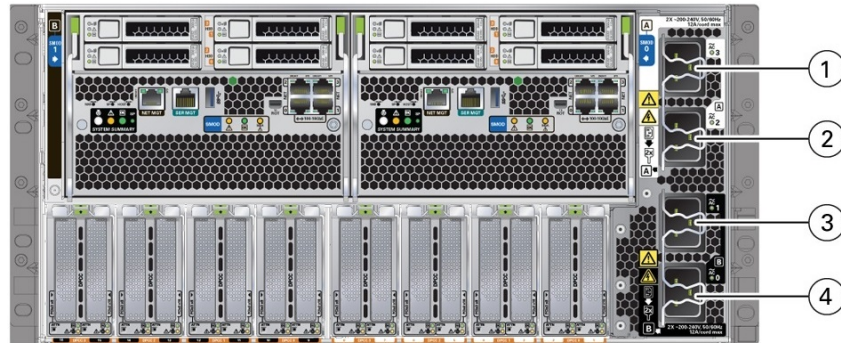
- Front panel Fault-Service Required LEDs: Amber System A or System B Service Required LEDs located at the FIM
- Back panel Fault-Service Required LEDs: Amber System Service Required LEDs located at SMOD0 or SMOD1
- Amber Fault-Service Required LED on the faulty power supply

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

AC Input Power Block Locations

Four AC power block inputs at the server back panel are arranged vertically. Starting at the bottom, AC inputs are designated AC0, AC1, AC2, and AC3. The designations match the corresponding power supplies. The AC power block is not a removable component.

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



Call Out	Description
1	AC3 System A (SMOD0)
2	AC2 System A (SMOD0)
3	AC1 System B (SMOD1)
4	AC0 System B (SMOD1)

▼ Remove a Power Supply

You might need to remove power supplies to replace a PS or to access the release latch for the front indicator module (FIM).

1. Prepare the server for hot service.

See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a warm service or cold service procedure.

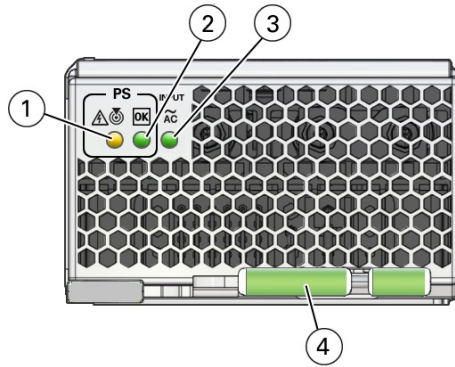
2. Identify the power supply that requires removal.




Access this component directly from the front of the server. View LEDs when the server is in Standby power mode.

The following status indicators (LEDs) are lit when a power supply fault is detected:

- Front and back Fault-Service Required LEDs
- Amber Fault-Service Required LED on the faulty power supply

- Back Power Supply Fault-Service Required LED located on the server front panel FIM



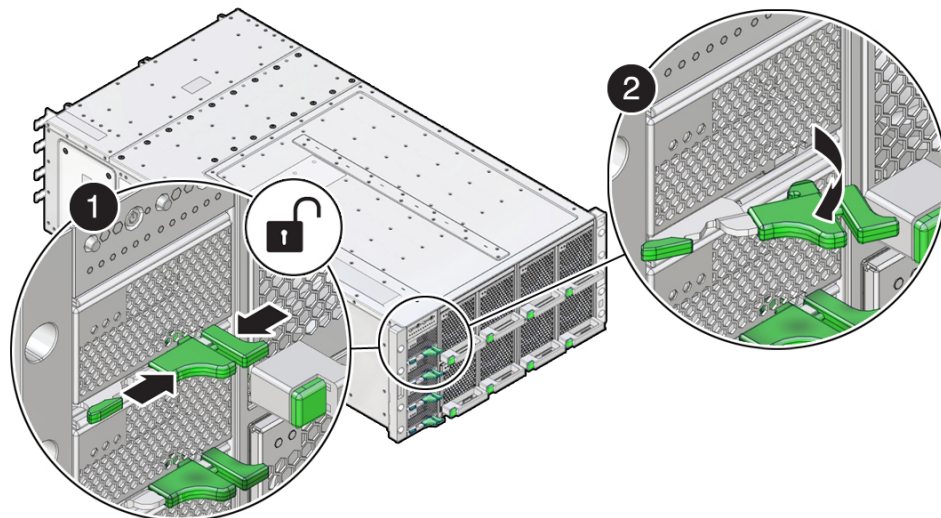
Call Out	Status LED or Button	Icon and Color	Description
1	Fault-Service Required Locate LED	 Amber  White	Indicates the location of the power supply in the server: <ul style="list-style-type: none"> ■ Off – Power supply is operating normally, ■ Fast blink – Use Oracle ILOM to activate this LED to enable you to locate a power supply quickly and easily. Lights steady on when the power supply is in a fault state.
2	OK Power Supply OK LED	 Green	Indicates the functional state of the power supply: <ul style="list-style-type: none"> ■ Off – PS is disconnected ■ Steady On – PS is powered on and functioning normally. When this LED is lit, the AC OK LED is also lit. Note - Oracle ILOM signals a fault on any installed power supply that is not connected to an AC power source, since it might indicate a loss of redundancy.
3	AC OK LED	~AC Green	Indicates the operational state of the power supply: <ul style="list-style-type: none"> ■ Off – PS is not connected to an AC power source.

Call Out	Status LED or Button	Icon and Color	Description
			■ Steady On – PS is connected to a properly rated AC power source.
4	Ejector lever	None	Used to release the power supply from the chassis

Note - To access the FIM release latch, remove the top power supply (PS3).

3. **To unlock the power supply lever, squeeze together the two release latches at the end of the lever (1).**

This action is accompanied by a click sound.



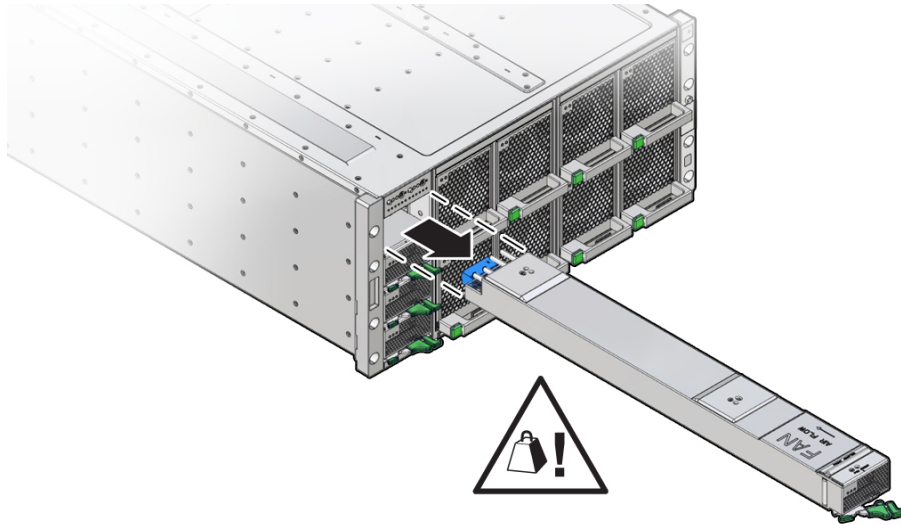
4. **To disengage the power supply from its internal connector, rotate the lever to the left (2).**



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.



Related Information

- [“Install a Power Supply” on page 144](#)
- [“Replaceable Components” on page 22](#)

▼ Install a Power Supply

Use this procedure when replacing a failed power supply or after having serviced the FIM.

1. **Prepare the server for hot service.**
See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a warm service or cold service procedure.

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.

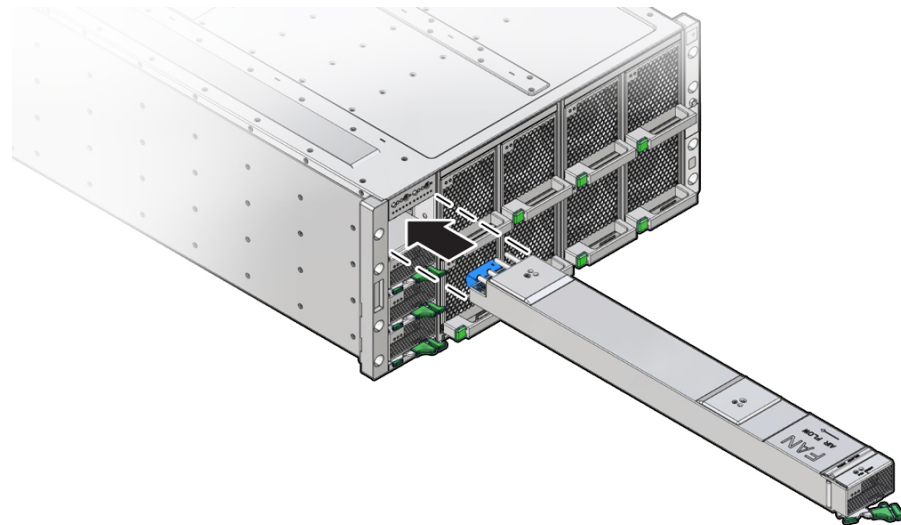
- 3. Open the power supply lever. Squeeze together the two release latches at the end of the lever and rotate the lever to the left.**

Access this component directly from the front of the server. 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 PS is at the opening of the slot and that the open hinge on the front of the PS is at the bottom and to the left.

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

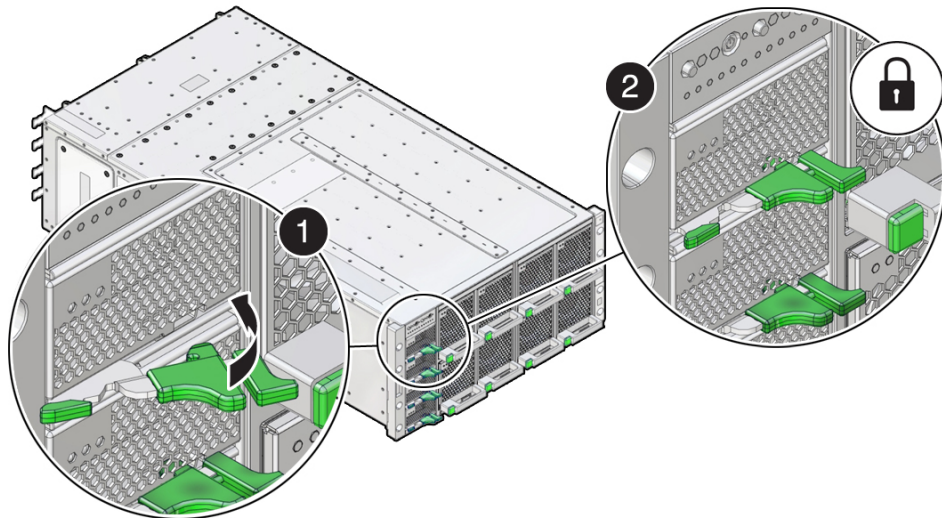


- 6. To install the power supply, rotate the lever to the right (1).**

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. The two release latches at the end of the lever engage to secure the power supply in place (2).



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 steady on and that the amber Fault-Service Required LED is not lit.**
The Fault-Service Required LED lights when the component is in a fault state.
8. **Prepare the server for operation.**
See [“Returning the Server to Operation” on page 249.](#)

Servicing PCIe Cards and Carriers (CRU)

This section describes how to service PCIe cards. The PCIe cards are located at the back of the server. 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). The following topics and procedures provide information to assist you when removing and installing PCIe cards:

- [“PCIe Card and DPCC Overview” on page 147](#)

- “Remove a DPCC” on page 150
- “Remove a PCIe Card” on page 152
- “Install a PCIe Card” on page 154
- “Install a DPCC” on page 157

PCIe cards are customer-replaceable units (CRUs). For more information about CRUs, see “[Illustrated Parts Breakdown](#)” on page 22 and “[Customer-Replaceable Units](#)” on page 25. Refer to your PCIe card documentation for complete software and cabling information about your card. For component serviceability, locations, and designations, see “[Replaceable Components](#)” on page 22.



Caution - Customers should not use the procedures in this section to service the two Oracle Storage 12 Gb SAS PCIe RAID HBA, Internal cards that are located in SMODs. The Oracle Storage 12 Gb SAS PCIe RAID HBA, Internal cards are field-replaceable units (FRUs) and should be serviced only by authorized Oracle Service personnel. See “[Servicing the Host Bus Adapter \(HBA\) Card \(FRU\)](#)” on page 207.



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in “[Electrostatic Discharge and Static Prevention Measures](#)” on page 97.

Note - Exadata X7-8 servers do not require a shut down to replace a PCIe card. Refer to *Performing a Hot-Pluggable Replacement of a Flash Disk* in the *Exadata Database Machine Maintenance Guide* at https://docs.oracle.com/cd/E80920_01/DBMMN/toc.htm.

Note - For a complete list of supported PCIe cards, refer to “[Supported PCIe Cards](#)” in *Oracle Server X7-8 Product Notes* at <https://www.oracle.com/goto/x7-8/docs>.

PCIe Card and DPCC Overview

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

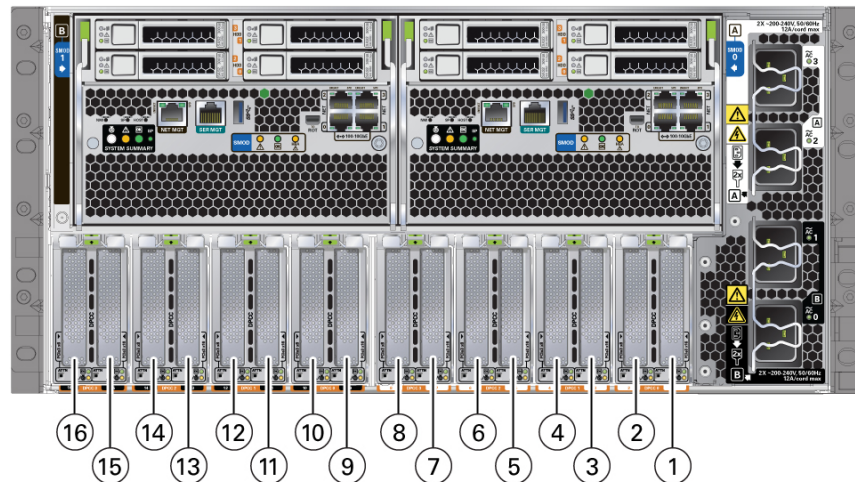
DPCC and PCIe Card Slot Locations and Numbering

The eight Dual PCIe Card Carrier (DPCC) slots are arranged in a single row at the server back panel. The slots are designated from right to left as DPCC 0–DPCC 7.

Each DPCC occupies two PCIe slots, for a total of sixteen slots. Sixteen PCIe chassis slots support eight PCIe carriers. 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 figure shows the PCIe slot numbering.



Call Out	Description	Call Out	Description
1	PCIe Slot 1 in DPCC 0	9	PCIe Slot 9 in DPCC 4

Call Out	Description	Call Out	Description
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
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

Server PCIe Card Slots

The server chassis contains sixteen PCIe 3.0 slots (eight x8 slots, eight x16 slots) accessible at the back of the server that connect to eight PCIe Gen 3 DPCCs, each containing one or two supported PCIe cards. Each system module (SMOD) controls eight PCIe slots (four x8 slots, four x16 slots).

The server also contains two PCIe Gen 3 slots, which are located internally (and not directly accessible) on SMOD0 and SMOD1. These internal PCIe slots are used for the server HBA components and provide 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, one for each slot. Both panels include an OK indicator, a Fault-Service Required LED, and an ATTN button. 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

Follow these DPCC population rules:

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

For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).

▼ Remove a DPCC

Access DPCCs directly from the back 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.

This procedure requires a non-conducting stylus.

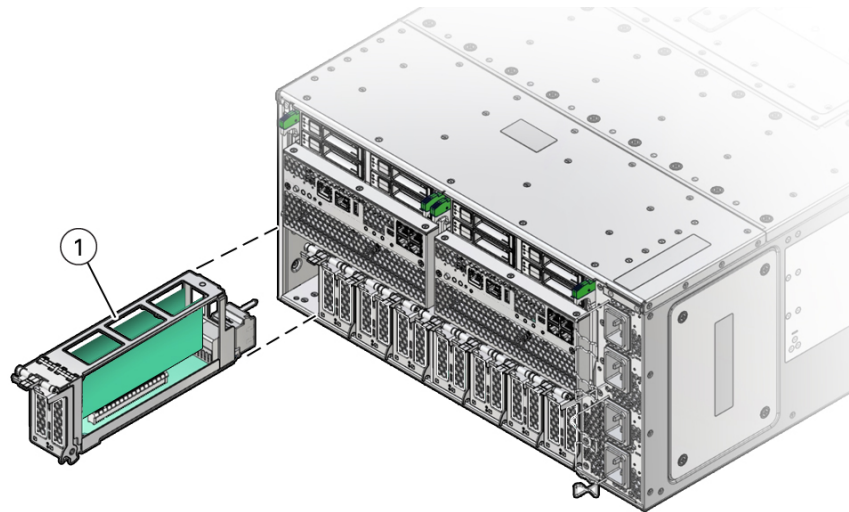
- 1. Prepare the server for hot service.**

See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a cold service procedure.

- 2. Identify the DPCC.**

For example, see callout 1.



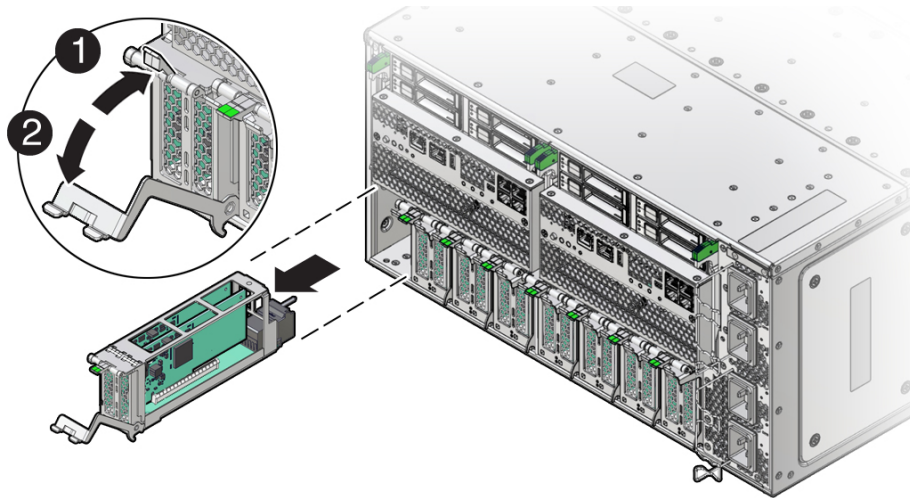
3. Use a stylus to press one or both ATTN buttons on the DPCC front.

The ATTN buttons alert the system to a request to remove a PCIe card. When the system has acknowledged the request, the server takes the device offline and lights indicators for each slot. When the indicators are lit on fast blink, you can safely remove the component.

Note - If only a single PCIe card is present, press only the corresponding ATTN button. For button locations, see [“Dual PCIe Card Carrier \(DPCC\) Indicators”](#) on page 68.

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 the carrier out of the server.

Related Information

- [“Remove a PCIe Card” on page 152](#)

▼ Remove a PCIe Card

To access a PCIe card, you must first remove its DPCC (see [“Remove a DPCC” on page 150](#)). 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.

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

See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a cold service procedure.

2. Identify the DPCC containing the PCIe card.

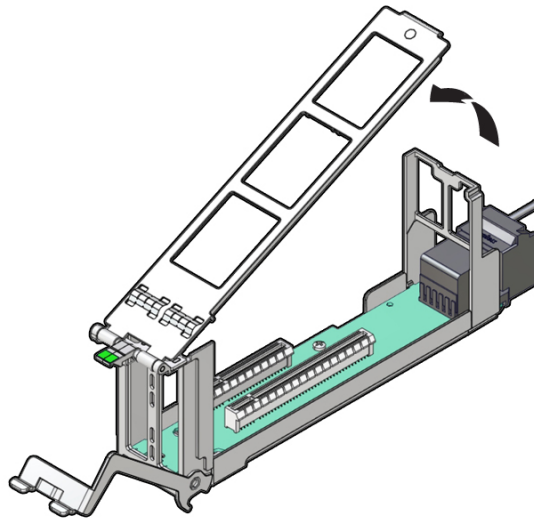
For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).

3. Remove the DPCC.

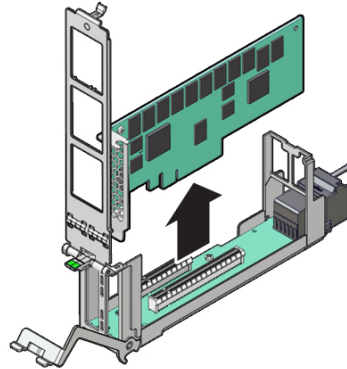
See [“Remove a DPCC” on page 150](#).

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.



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



Related Information

- [“Install a PCIe Card” on page 154](#)
- [“Returning the Server to Operation” on page 249](#)

▼ Install a PCIe Card

To access a PCIe card, you must first remove its DPCC (see [“Remove a DPCC” on page 150](#)). 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.

1. **Prepare the server for hot service.**
See [“Preparing the Server for Component Replacement” on page 100](#).

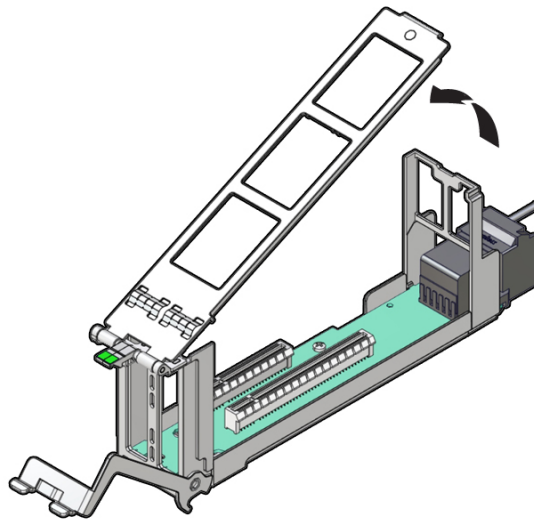
Note - This procedure can also be completed as a cold service procedure.

2. **Identify the DPCC PCIe slot.**
3. **If necessary, remove the DPCC.**

See [“Remove a DPCC” on page 150](#).

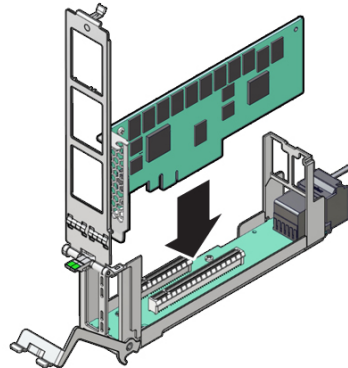
4. **Orient the DPCC so that the hinge is to the left.**
5. **To open the top of the DPCC, lift the release tab at the non-hinged end of the lid and rotate the lid up.**
6. **Ensure that the DPCC top cover is open.**

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



7. **Remove the filler, as required.**

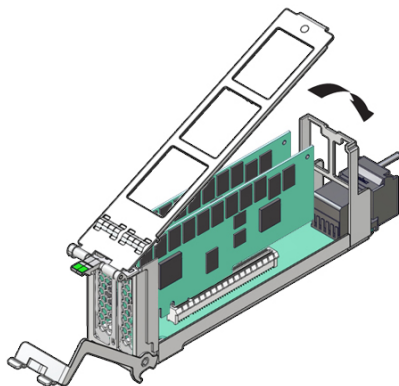
8. Orient the PCIe card with the edge (or bus) connector facing down and the IO (or cable connector) facing to the left.



9. To install the card, align the edge connector with the slot in the DPCC and push the card down into the slot.
10. To close the top of the DPCC, rotate it to the right, ensuring the clip on the edge of the top is secured to the unhinged edge of the DPCC.



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



11. Clear any related component faults.

For more information see [“Clear Hardware Fault Messages \(Oracle ILOM\)” on page 51.](#)

Related Information

- [“Install a DPCC” on page 157](#)

▼ 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 150.](#)

Obtain a stylus for activating recessed buttons.

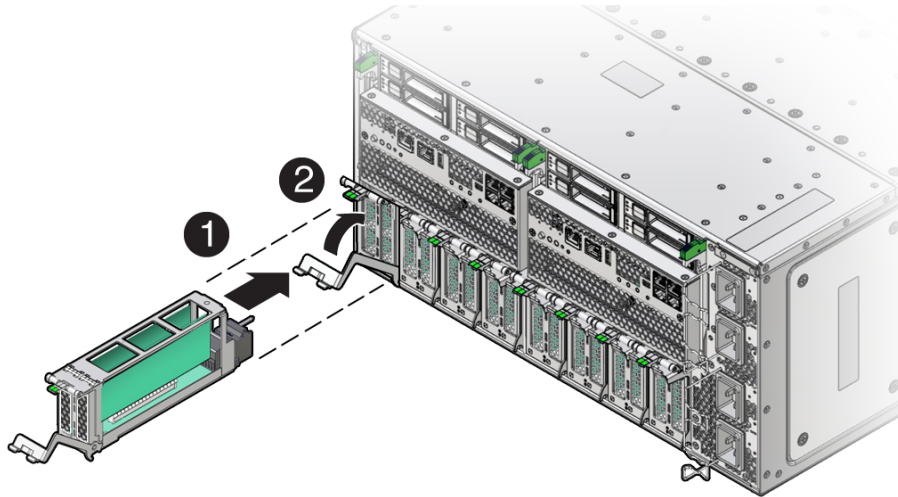
1. Prepare the server for hot service.

See [“Preparing the Server for Component Replacement” on page 100.](#)

Note - This procedure can also be completed as a cold service procedure.

- 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 (1).

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

5. Rotate the lever on the DPCC upward until it locks into place (2).



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 one or 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 DPCC OK indicators on the DPCC.

7. **Verify that one or both green OK indicators on the front of the DPCC are on steady.**
8. **Prepare the server for operation.**
See [“Returning the Server to Operation” on page 249.](#)

Servicing CPU Module (CMOD) Components (FRU)

This section describes how to service CMODs and CMOD components. CMODs are located at the front of the server, in back of the fan modules and fan frames. The following topics and procedures provide information to assist you when removing and installing CMODs and CMOD components:

- [“CMOD Slot Locations and Numbering” on page 160](#)
- [“CMOD Population Rules” on page 161](#)
- [“Remove a CMOD” on page 162](#)
- [“Remove the CMOD Cover” on page 164](#)
- [“Install the CMOD Cover” on page 166](#)
- [“Install a CMOD” on page 167](#)
- [“Servicing Processors \(FRU\)” on page 170](#)
- [“Servicing DIMMs \(CRU\)” on page 184](#)
- [“Upgrade the Server From Four to Eight CMODs \(FRU\)” on page 198](#)

CMODs are field-replaceable units (FRUs). A customer can remove and insert CMODs to access internal components that are designated CRU. For more information about FRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Field-Replaceable Units” on page 26](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#). See [“CPU Module \(CMOD\) Overview” on page 27](#).



Caution - CMODs should be removed and replaced only by authorized Oracle Service personnel. (A CMOD can be removed and re-inserted by customers to access internal CMOD CRU components such as processors and memory.)



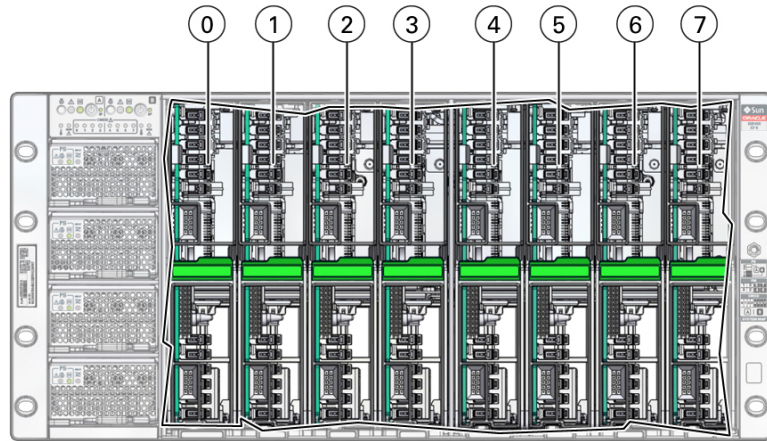
Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

CMOD Slot Locations and Numbering

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

The system is available with four CMODs or eight CMODs. Four-CMOD systems have CMODs in CMOD 0–CMOD 3, and empty slots in CMOD 4–CMOD 7.

For more information, see [“CPU Module \(CMOD\) Overview” on page 27](#).



Call Out	Description
0	CMOD 0, SMOD0 System A
1	CMOD 1, SMOD0 System A
2	CMOD 2, SMOD0 System A
3	CMOD 3, SMOD0 System A
4	CMOD 4, SMOD1 System B
5	CMOD 5, SMOD1 System B
6	CMOD 6, SMOD1 System B
7	CMOD 7, SMOD1 System B

CMOD Population Rules

The Oracle Server X7-8 supports four and eight CMOD configurations. Each CMOD supports a single socket containing a single processor. Each CMOD contains one Intel Xeon vx processor 28-core (shelf 4) processor.

For the single 4-socket (1x4) server configuration:

- System Module (SMOD) SMOD0 System A and SMOD1 System B must be installed, but only SMOD0 is active.
- CPU modules (CMODs) must be installed in slots 0-3. CMOD slots 4-7 are empty.
- All eight dual PCIe card carrier (DPCC) slots must be installed but only DPCC slots 1, 2, 3 and 4 are active.
PCIe slots 5, 6, 7, and 8 are nonfunctional in 4-socket systems.
- All eight fan modules (FMs) must be installed but only FMs 0-3 are active.
- Both fan frames must be installed.
- PS2 and PS3 are installed and active. PS0 and PS1 are also installed, but inactive. PS2 and PS3 power System A. PS0 and PS1 power System B.
All four AC power connectors on the back panel must be attached with grounded AC power cords.
- Storage drive bays in System B may have filler panels installed.

For the dual 4-socket server configuration:

- System Module 0 (SMOD0) System A and SMOD1 System B must be installed.
- CPU Modules (CMODs) must be installed in slots 0-7.
- Dual PCIe card carrier (DPCC) slots 0-3 and DPCC slots 4-7 must be installed and are active.
- All eight fan modules (FMs) must be installed. All FMs must be active in the dual 4-socket configuration.
- Both fan frames must be installed.
- PS2 and PS3 are installed and active. PS0 and PS1 are also installed and active. PS2 and PS3 power System A. PS0 and PS1 power System B.
- All four AC power connectors on the back panel must be attached with grounded AC power cords.

For the single 8-socket (1x8) server configuration:

- System Module 0 (SMOD0) System A and SMOD1 System B must be installed.

- Eight CPU Modules (CMODs) must be installed in slots 0-7.
In an 8-socket configuration, System A must have Intel Xeon 81xx series processors installed, and System A and System B processor SKUs and memory (capacity and number of DIMMs per CMOD) must be identical.
- All eight dual PCIe card carrier (DPCC) slots 0-7 must be installed and must be active.
- All eight fan modules (FMs) must be installed and all FMs must be active.
- Both fan frames must be installed.
- PS2 and PS3 power System A. PS0 and PS1 power System B.
- All four AC power connectors on the back panel must be attached with grounded AC power cords.

Note - During Oracle Server X7-8 reconfiguration, administrators will need to manually clear all existing faults before a 4-socket to 8-socket mode change.

▼ Remove a CMOD

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

1. Prepare the server for warm service.

See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a cold service procedure.

2. Identify the CMOD.

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.

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

For CMODs 0-3 access remove the left FM group. For CMODs 4-7 access remove the right FM group. In a four-CMOD configured server, remove the left FM group.

Tip - If you know the group, then you know which group of four fan modules to remove from the front panel.

4. Remove the fan modules.

See [“Remove a Fan Module” on page 131](#).

5. Remove the fan frame.

See [“Remove a Fan Frame” on page 135](#).

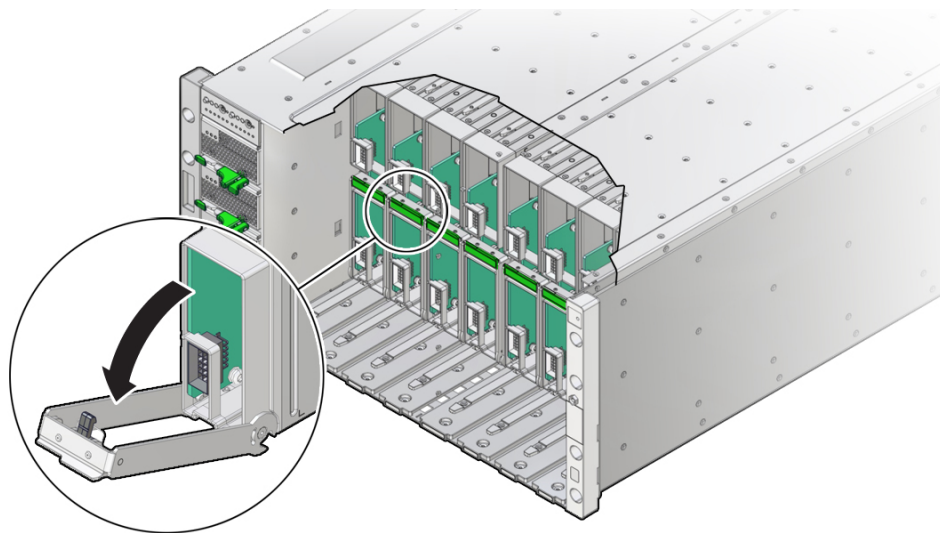
6. To unlock the CMOD, squeeze together the green tabs on the end of the CMOD lever.

7. To disconnect the CMOD from the connector on the midplane, rotate the CMOD lever down 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.

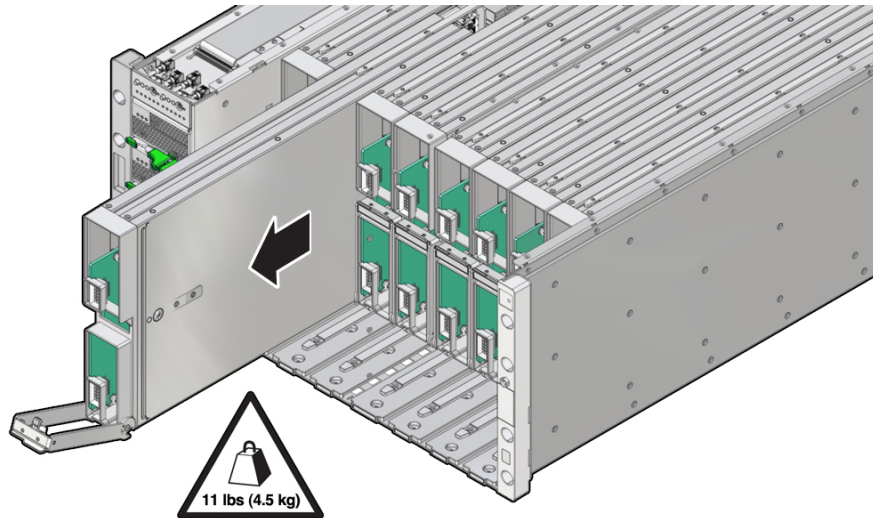


8. Use the lever to slide the CMOD partially out of the server until you can grab the CMOD with two hands.

Close the lever when the CMOD is in a position to hold.



Caution - The CMOD is heavy. Be prepared to hold the CMOD firmly when it is clear of the slot.



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

Place the CMOD on an ESD-safe work surface.

Related Information

- [“Identify and Remove a Faulty DIMM” on page 192](#)
- [“Identify and Remove a Faulty Processor” on page 171](#)
- [“Install a CMOD” on page 167](#)

▼ Remove the CMOD Cover

Remove the CMOD cover to service CMOD internal components.

1. **Remove the CMOD from the server chassis.**

See [“Remove a CMOD”](#) on page 162.

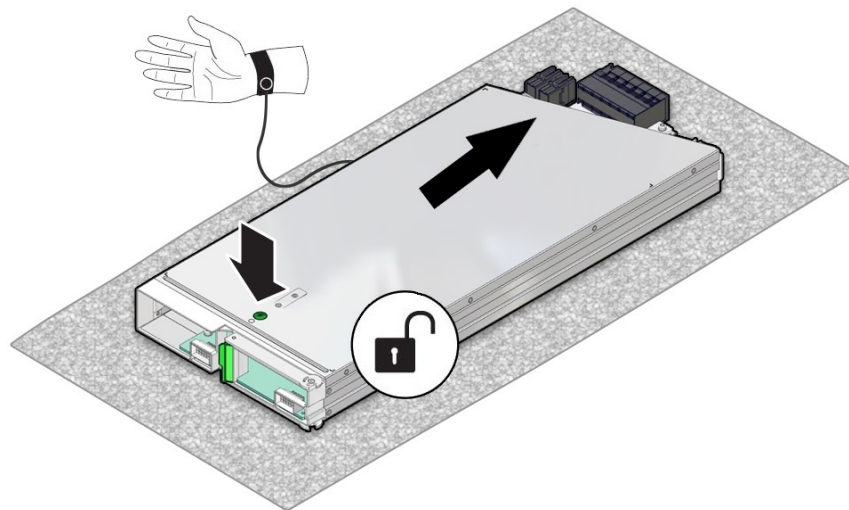
2. Attach an antistatic wrist strap to your wrist and then to a chassis ground.



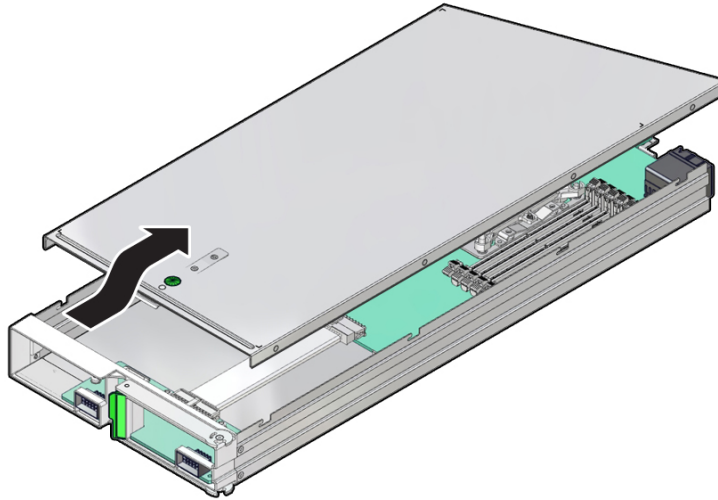
Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures”](#) on page 97.

3. Remove the CMOD top cover.

To remove the CMOD top cover, push the release button, and slide the CMOD cover toward the back of the CMOD.



4. **Lift the CMOD top cover away from the CMOD.**



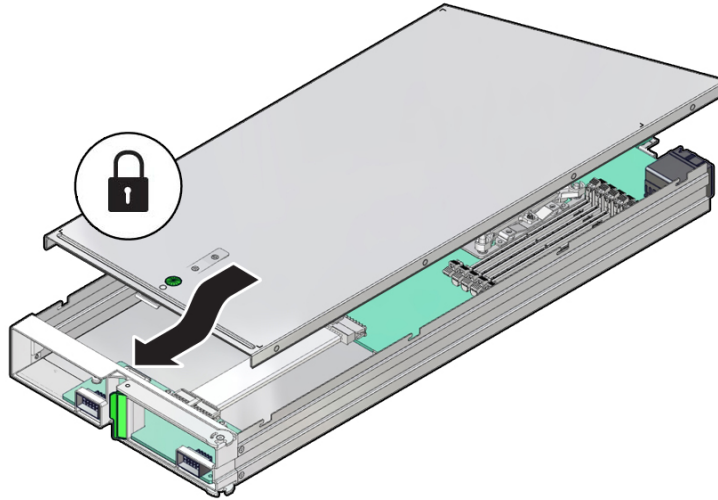
▼ Install the CMOD Cover



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures”](#) on page 97.

1. **To install the CMOD top cover, position it over the CMOD chassis, with the green button at the front.**
2. **Set the cover on the chassis, leaving a gap of approximately 1 inch (25 mm) between the leading edge of the cover and the front of the CMOD.**
3. **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.**

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



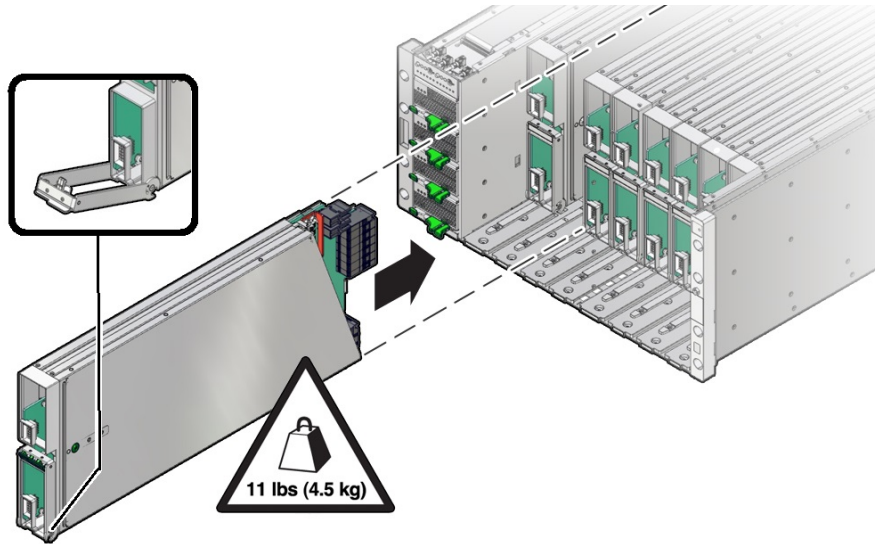
This action is accompanied by a click sound.

▼ Install a CMOD

Use this procedure to install a CMOD after replacing it or after servicing its internal components and replacing the CMOD top cover. See [“Remove a CMOD” on page 162](#).

1. **Ensure that the CMOD lever is in the fully-open position.**
 - a. **Rotate the lever down and away from the CMOD.**
2. **Position the CMOD in the slot.**

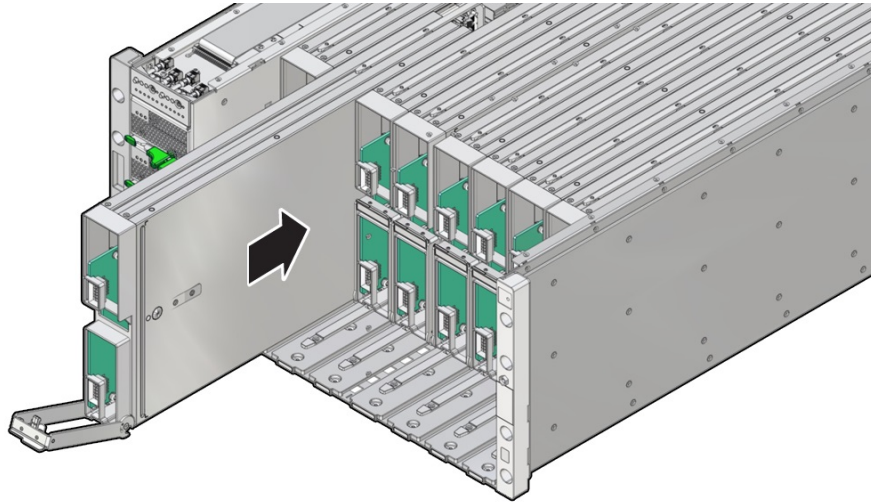
On the front-facing side, ensure that the hinge for the lever is at the bottom.



Caution - The CMOD is heavy. Be prepared to hold it firmly until it is securely supported in its slot.

3. **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.

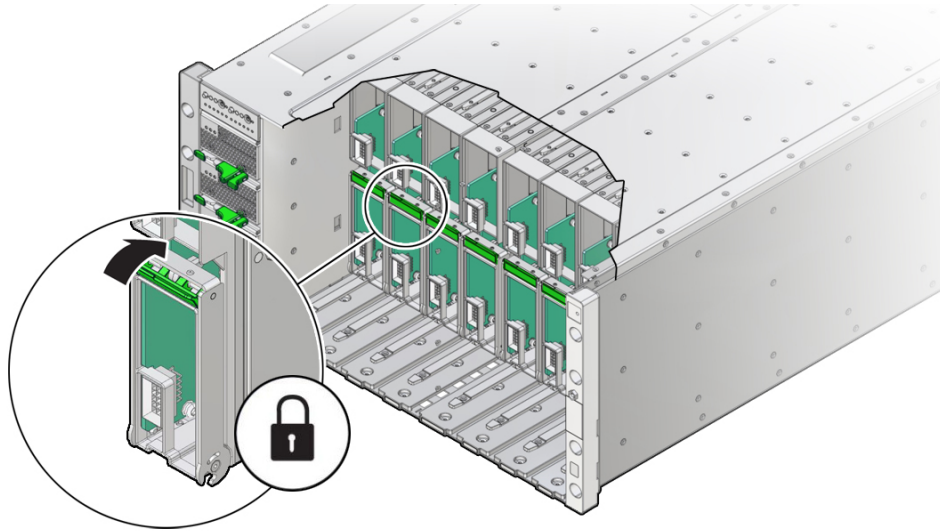


4. To install the CMOD, rotate the lever up until it locks into place and is flush with the front of the CMOD.



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 up draws the CMOD into the slot and engages the CMOD connector with the connector on the midplane.



5. **Install the fan frame.**
See [“Install a Fan Frame” on page 137.](#)
6. **Install the four fan modules.**
See [“Install a Fan Module” on page 133.](#)
7. **Prepare the server for operation.**
See [“Returning the Server to Operation” on page 249.](#)

Servicing Processors (FRU)

This section describes how to service processors. The following topics and procedures provide information to assist you when removing and installing processors:

- [“Identify and Remove a Faulty Processor” on page 171](#)
- [“Install a Processor” on page 177](#)

- [“Prepare a CMOD for Replacement” on page 182](#)

Processors are field-replaceable units (FRUs). For more information about FRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Field-Replaceable Units” on page 26](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).



Caution - Processors should be removed and replaced only by authorized Oracle Service personnel.



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

▼ Identify and Remove a Faulty Processor



Caution - Using an incorrect torque setting or driver bit can damage a processor-heatsink module.



Caution - Pin pads on the socket are easily damaged, do not touch or put pressure on them.



Caution - Do not touch the processor socket pins. The processor socket pins are very fragile. A light touch can bend the processor socket pins beyond repair.



Caution - Do not touch the processor socket pins. The processor socket pins are very fragile. A light touch can bend the processor socket pins beyond repair.



Caution - Whenever you remove a processor, replace it with another processor and reinstall the processor heatsink; otherwise, the server might overheat due to improper airflow. See [“Install a Processor” on page 177](#).

1. Prepare the server for warm service.

See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a cold service procedure.

2. Prepare the server for service.

a. Power off the server.

Disconnect the power cords from the power supplies for cold-service.

See [“Powering Down the Server” on page 110.](#)

b. Attach an antistatic wrist strap to your wrist, and then to a metal area on the chassis.

See [“Electrostatic Discharge and Static Prevention Measures” on page 97.](#)

c. Remove the CMOD from the chassis.

See [“Remove a CMOD” on page 162.](#)

d. Remove the CMOD cover.

See [“Remove the CMOD Cover” on page 164.](#)

See [“Preparing for Service” on page 97.](#)

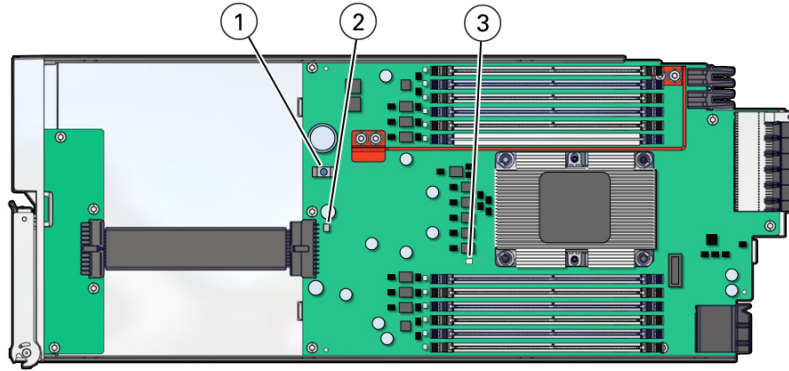
3. Confirm the faulty processor state by pressing the Fault Remind button on the CMOD motherboard.

Note - When you press the Fault Remind button, an LED located next to the Fault Remind button lights green, indicating that there is sufficient voltage in the fault remind circuit to light any fault LEDs that were lit due to a failure. If this circuit test LED fails to light when you press the Fault Remind button, it is likely that the capacitor powering the fault remind circuit lost its charge. Capacitor discharge can happen if you press the Fault Remind button for a long time with the fault LED lit, or if power was removed from the server for more than 15 minutes.

The processor fault LED that is located adjacent to the faulty processor lights:

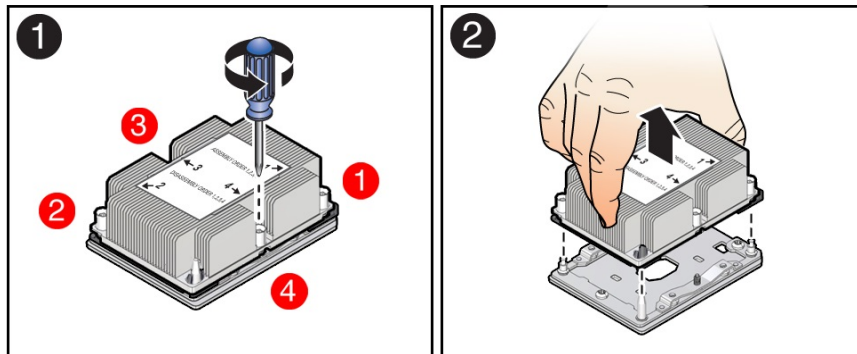
- If the processor fault LED is off, then the processor is operating properly.

- If the processor fault LED is on (amber), then the processor is faulty and must be replaced.



Callout	Description
1	Fault Remind button
2	Fault Remind LED
3	Processor 0 fault LED

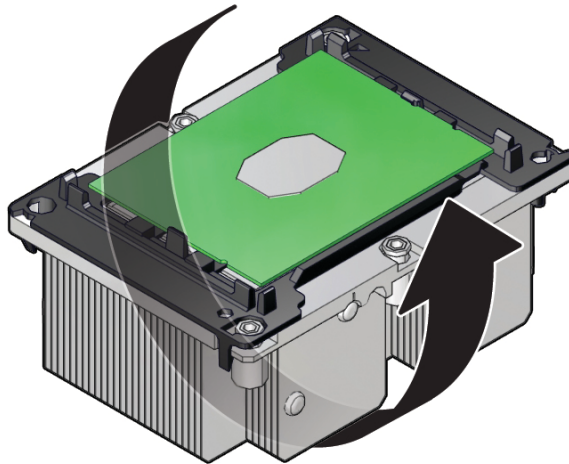
4. Using a Torx T30 screwdriver, loosen the four captive nuts that secure the processor-heatsink module to the socket: fully loosen nut 4, then 3, then 2, then 1. [1]





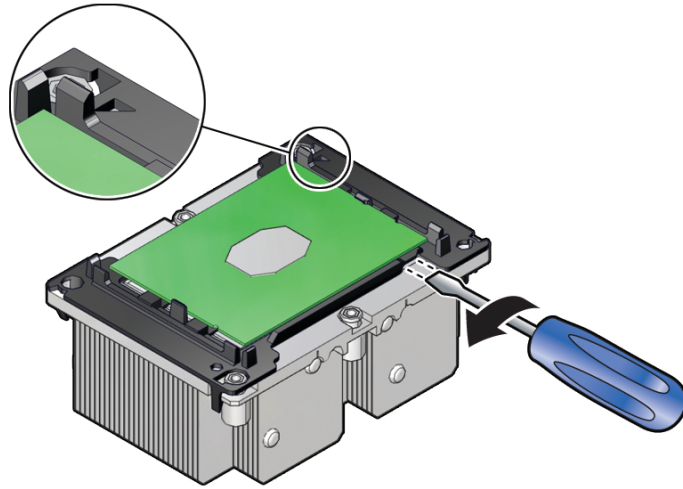
Caution - Using an incorrect driver bit can damage a processor-heatsink module.

5. **Lift the processor-heatsink module from the socket [2].**
Always hold the processor-heatsink module along the axis of the fins to prevent damage.
6. **Separate the processor from the heatsink.**
 - a. **Flip over the processor-heatsink module, place it on a flat surface, and locate the thermal interface material (TIM) breaker slot.**



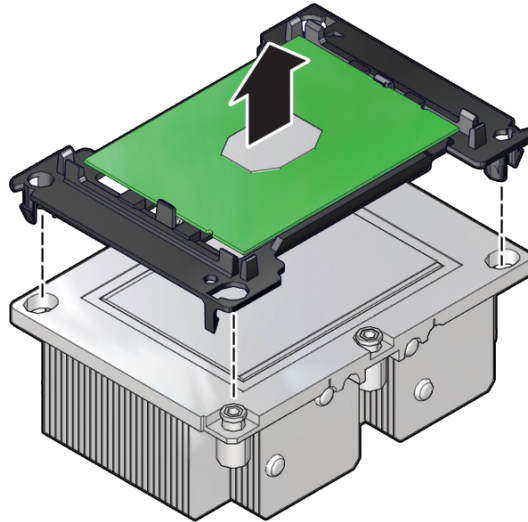
- b. **While holding down the processor-heatsink module by the edges, insert a flat blade screwdriver into the TIM breaker slot.**

The blade of the screwdriver goes into the slot between the heatsink and processor carrier, not between the processor and processor carrier.



- c. **Using a rocking motion, gently pry the corner of the processor carrier away from the heatsink.**

- d. **Remove the processor carrier with processor from the heatsink by prying or pinching the plastic latch tabs that attach the processor to the heatsink.**



Note - A thin layer of thermal grease separates the heatsink and the processor. This grease acts as an adhesive. Do not allow the thermal grease to contaminate the work space or other components.

7. **If you plan on reusing either the heatsink or processor, use an alcohol pad to clean the thermal grease on the underside of the heatsink and on the top of the processor.**



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

Related Information

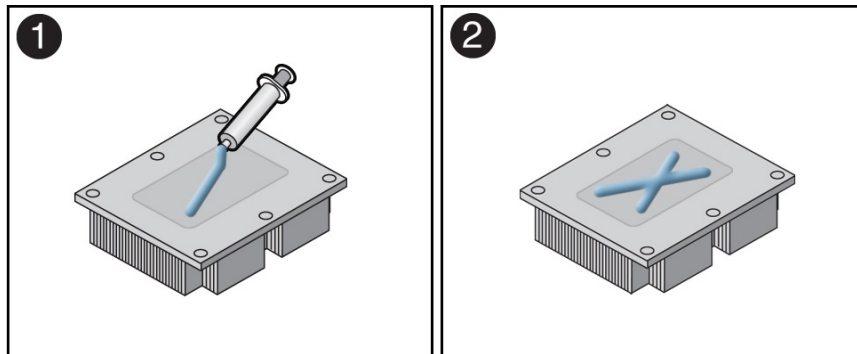
- [“Install a Processor” on page 177](#)

▼ Install a Processor



Caution - Do not touch the processor socket pins. The processor socket pins are very fragile. A light touch can bend the processor socket pins beyond repair.

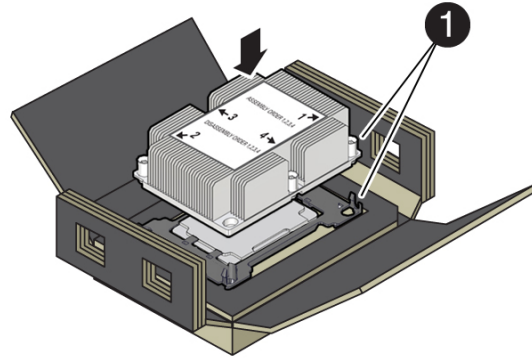
- 1. Attach an antistatic wrist strap to your wrist, and then to a metal area on the chassis.**
See [“Electrostatic Discharge and Static Prevention Measures” on page 97.](#)
- 2. Ensure that the replacement processor is identical to the failed processor that you removed.**
For a description of the processors that are supported by the server, see [“Product Description” on page 15.](#)
- 3. Prepare the new processor for installation.**
Use the syringe supplied with the new or replacement processor [1] to apply 0.3 cc of thermal interface material (TIM) in an "X" pattern to the processor contact area of the heatsink [2].



Note - Do not distribute the TIM; the pressure of the heatsink will do so for you when you install the heatsink.

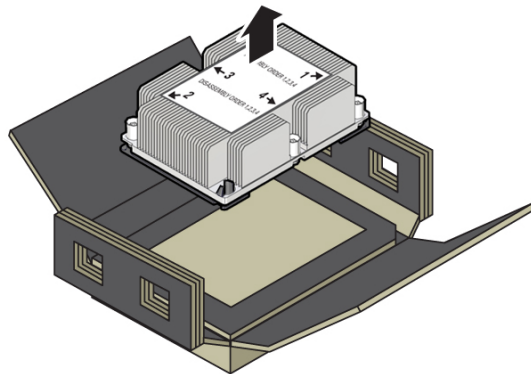
- 4. Install the new processor.**
 - a. Align the pin 1 indicators between the heatsink and processor carrier in the packaging tray, and place the heatsink (thermal side down) onto the processor carrier until it snaps in place and lies flat.**

Note - The processor carrier has latching posts at each corner: two that insert into heatsink holes and two that attach to the edge of the heatsink.

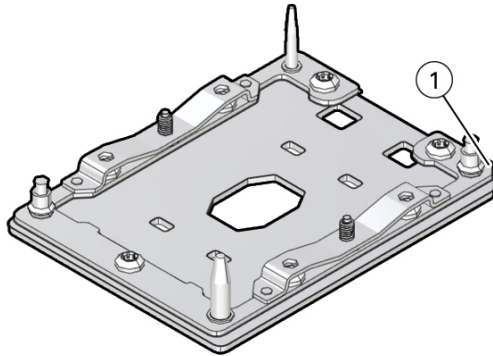


Callout	Description
1	Pin 1 indicator

- b. Lift the processor-heatsink module out of the packaging tray.

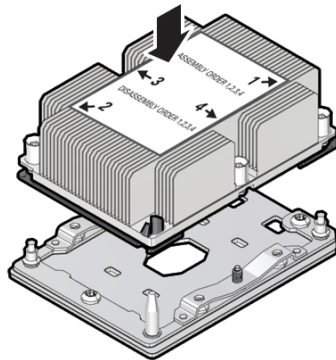


- c. **Align the processor-heatsink module to the processor socket bolster plate on the motherboard, matching the pin 1 location (a triangle indicator).**

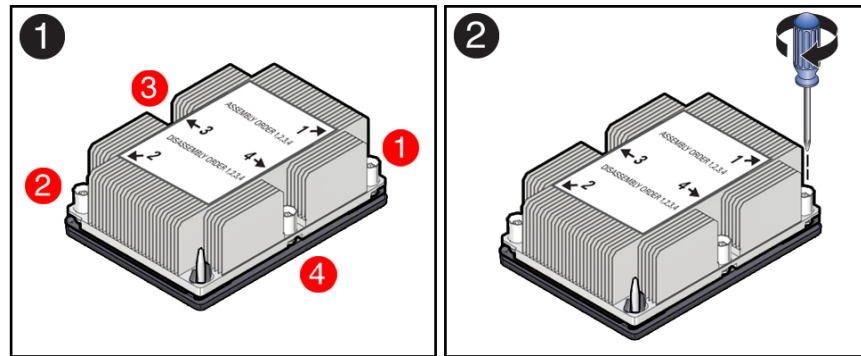


Callout	Description
1	Pin 1 indicator

- d. **Place the processor-heatsink module on the socket on the motherboard.**
 The socket bolster plate has alignment pins that go into holes on the processor-heatsink module to help center the module during installation.



- e. Ensure that the processor-heatsink module lies evenly on the bolster plate and that the captive screws align with the threaded socket posts [1].



- f. Using a 12.0 in-lbs (inch-pounds) torque driver with a Torx T30 bit, tighten the processor-heatsink module to the socket. First, fully tighten captive nuts 1 and 2. Then fully tighten nuts 3 and 4 [2].

As you tighten nuts 3 and 4, some resistance occurs as the bolster leaf spring rises and comes in contact with the heatsink.



Caution - Using an incorrect torque setting or driver bit can damage a processor-heatsink module.

5. **Install the CMOD cover.**
[“Install the CMOD Cover” on page 166](#)
6. **Install the CMOD.**
 See [“Install a CMOD” on page 167](#).
7. **Return the server to operation.**
 Return the server to service after performing warm or cold service.
 - a. **Reconnect the power cords to the AC inlets after performing cold service.**
 Verify that the four power supply AC OK LEDs are lit.
 See [“Prepare the Server for Operation” on page 249](#).

b. Power on the main server power.

See “Power On the Server” on page 250.

8. Use Oracle ILOM to clear server processor faults.

Refer to the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs> for more information about the following steps.

a. To show server faults, log in to the server as root using the Oracle ILOM CLI, and type the following command to list all known faults on the server:

```
-> show /SP/faultmgmt
```

The server lists all known faults, for example:

```
-> show /SP/faultmgmt
Targets:
  shell
  0 (/SYS/MB/P0)
Properties:
Commands:
  cd
  show
```

b. To clear the fault identified in Step 6.a, type the following command:

```
-> set /SYS/MB/P0 clear_fault_action=true
```

For example:

```
-> set /SYS/MB/P0 clear_fault_action=true
Are you sure you want to clear /SYS/MB/P0 (y/n)? y
Set 'clear_fault_action' to 'true'
```

Alternatively, to clear all known faults in the server, log into the Oracle Solaris OS and issue the `fmadm repair` command, or log into the Oracle ILOM service processor from the Oracle ILOM Fault Management Shell and issue the `fmadm repair` command. For more information about how to use the Oracle ILOM Fault Management Shell and supported commands, see the *Oracle ILOM User's Guide for System Monitoring and Diagnostics Firmware Release 4.0.x* in the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.

Related Information

- “Identify and Remove a Faulty Processor” on page 171

▼ Prepare a CMOD for Replacement



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures”](#) on page 97.

To prepare a failed CMOD for return shipment and failure analysis:

1. Use Oracle ILOM to identify the location of the failed CMOD.

See [“Troubleshooting Server Hardware Faults”](#) on page 46.

2. Prepare the server for warm service.

See [“Preparing the Server for Component Replacement”](#) on page 100.

Note - This procedure can also be completed as a cold service procedure.

3. Remove the failed CMOD.

See [“Remove a CMOD”](#) on page 162.

4. Set a replacement CMOD next to the failed CMOD on an antistatic mat.

5. Remove both CMOD top covers.

See [“Remove the CMOD Cover”](#) on page 164.

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

6. Remove the reusable DIMMs from the failed CMOD motherboard and install them onto the replacement CMOD motherboard.

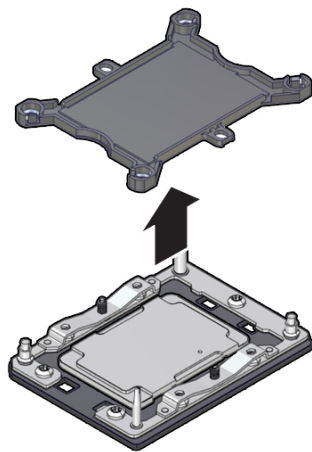
See [“Servicing DIMMs \(CRU\)”](#) on page 184.

Note - Install the DIMMs only in the slots (connectors) that correspond to the slots from which they were removed. Performing a one-to-one replacement of the DIMMs significantly reduces the possibility that the DIMMs will be installed in the wrong slots. If you do not reinstall the DIMMs in the same slots, server performance might suffer and some DIMMs might not be used by the server.

7. Remove the reusable processor-heatsink module from the failed CMOD motherboard.

See [“Identify and Remove a Faulty Processor”](#) on page 171.

8. **Remove the processor socket covers from the replacement CMOD motherboard and install the processors.**
 - a. **Grasp the processor socket cover finger grips (labeled REMOVE) and lift the socket cover up and off the processor socket.**



- b. **Install a processor into the socket from which you removed the processor socket cover.**

See [“Install a Processor”](#) on page 177.

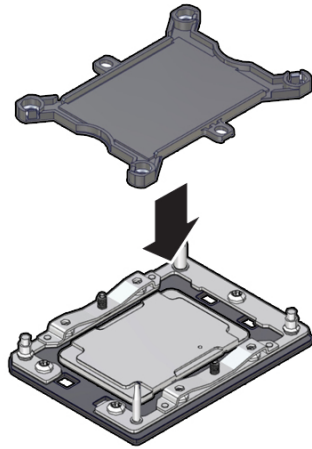
9. **Install the processor socket cover on the faulty CMOD motherboard.**



Caution - The processor socket covers must be installed on the faulty CMOD motherboard; otherwise, damage might result to the processor sockets during handling and shipping.

- a. **Align the processor socket cover over the processor socket alignment posts. Install the processor socket cover by firmly pressing down on all four corners (labeled INSTALL) on the socket cover.**

You will hear an audible click when the processor socket cover is securely attached to the processor socket.



10. **Install both CMOD socket covers.**
See [“Install the CMOD Cover” on page 166.](#)
11. **Place the failed CMOD in a shipping package.**
12. **Return the replacement CMOD to service.**

Servicing DIMMs (CRU)

This section describes how to service memory modules (DIMMs). The Oracle Server X7-8 supports 64-GB quad-rank (QR) Load-Reduced DIMMs (LRDIMMs) and 32-GB dual-rank (DR) and 16-GB DR Registered DIMMs (RDIMMs). The following topics and procedures provide information to assist you when replacing a DIMM or upgrading DIMMs:

- [“DIMM Physical Layout” on page 185](#)
- [“DIMM Population Rules” on page 186](#)
- [“DIMM Population Scenarios” on page 190](#)
- [“DIMM Operating Speeds” on page 191](#)

- [“DIMM Rank Classification Labels” on page 191](#)
- [“Inconsistencies Between DIMM Fault Indicators and the BIOS Isolation of Faulty DIMMs” on page 191](#)
- [“Identify and Remove a Faulty DIMM” on page 192](#)
- [“Install a DIMM” on page 195](#)

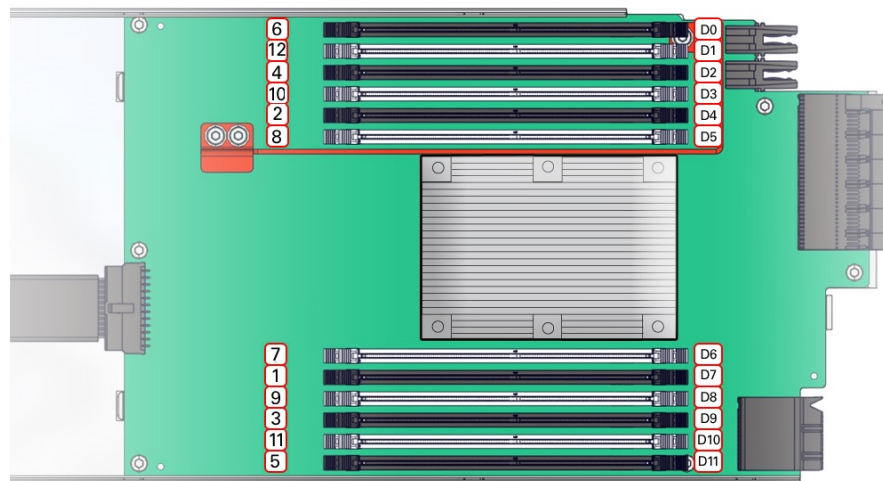
DIMMs are customer-replaceable units (CRUs). For more information about CRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Customer-Replaceable Units” on page 25](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

DIMM Physical Layout

The physical layout of the CMOD memory DIMMs and DIMM installation order is shown in the following figure.



DIMM Slot Numbering and Color Coding

Each CMOD contains 12 DIMM slots arranged in two groups of six slots. Each group of slots is controlled by one of the four memory buffers. Each buffer has two independent memory channels, Ch A and Ch B (six memory channels per CMOD). Each channel supports 1-6 DIMMs and has six assigned DIMM slots.

Channels 0, 1, and 2 are located on one side of the processor, and channels 3, 4 and 5 are on the other side of the processor. To differentiate the two memory channels within a group of slots, and to assist in DIMM population order, the six DIMM slots assigned to each channel have color-coded black slots with black levers, or white slots with white levers.

For slot numbering information see [“Replaceable Components” on page 22](#).

Related Information

- [“DIMM Physical Layout” on page 185](#)
- [“DIMM Population Rules” on page 186](#)
- [“DIMM Population Scenarios” on page 190](#)
- [“DIMM Operating Speeds” on page 191](#)
- [“DIMM Rank Classification Labels” on page 191](#)
- [“Inconsistencies Between DIMM Fault Indicators and the BIOS Isolation of Faulty DIMMs” on page 191](#)

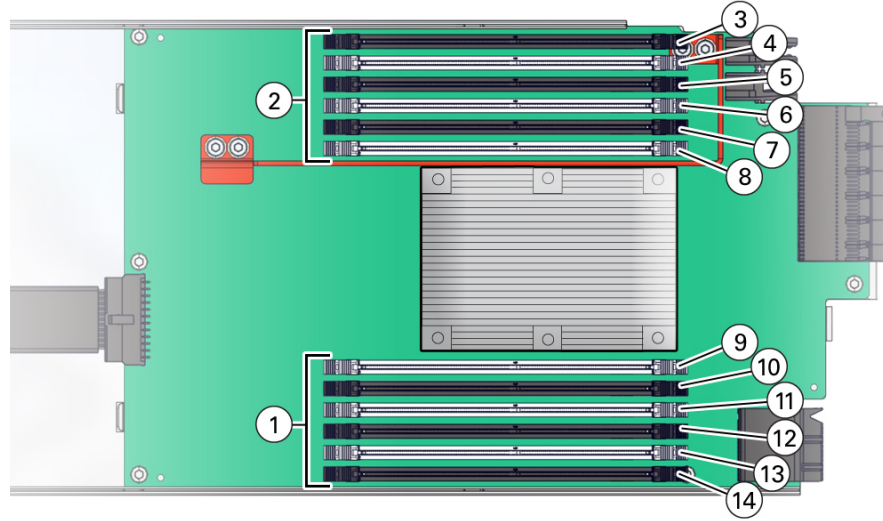
DIMM Population Rules

The population rules for adding DIMMs to the server are as follows:

- The server supports 64 GB quad-rank (QR) Load-Reduced DIMMs (LRDIMMs), 32-GB dual-rank (DR), and 16-GB DR Registered DIMMs (RDIMMs).
- Do not mix 64-GB LRDIMMs and 16-GB or 32-GB RDIMMs in the same server. If the server has 64-GB LRDIMMs installed, you cannot install 16 GB or 32 GB RDIMMs and vice versa.
- Within a memory channel, DIMMs must be populated in the black sockets first, and then in the white sockets.
- If you are installing a mix of RDIMM sizes (for example, 16-GB and 32-GB), install the larger size RDIMMs first, then the smaller RDIMMs, until all of the RDIMMs are installed.

- The server will operate properly with a minimum of one DIMM installed per processor.

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	DIMM Banks A, B, C
2	DIMM Banks D, E, F
3	Channel F, Slot 0, DIMM 0
4	Channel F, Slot 1, DIMM 1
5	Channel E, Slot 0, DIMM 2
6	Channel E, Slot 1, DIMM 3
7	Channel D, Slot 0, DIMM 4
8	Channel D, Slot 1, DIMM 5
9	Channel A, Slot 0, DIMM 6
10	Channel A, Slot 1, DIMM 7
11	Channel B, Slot 0, DIMM 8
12	Channel B, Slot 1, DIMM 9
13	Channel C, Slot 0, DIMM 10
14	Channel C, Slot 1, DIMM 11

DIMM Slot Population Order

The DIMM slot population order is as follows:

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

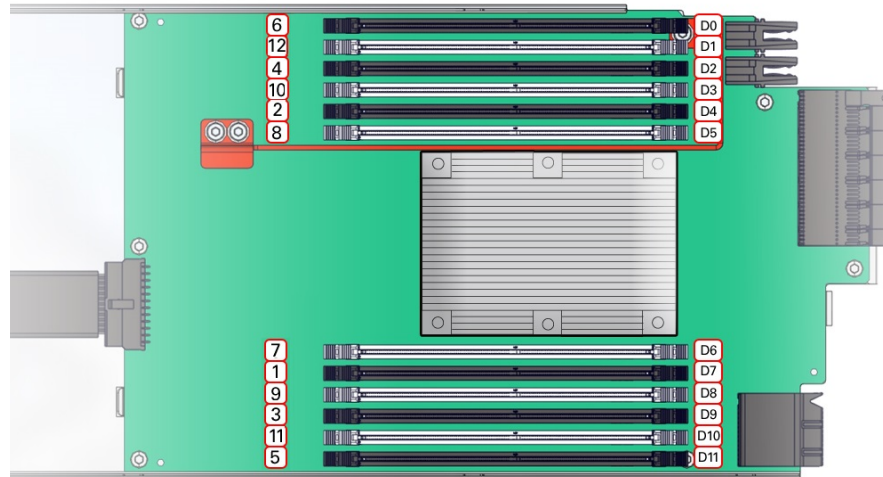
1. Installation Order DIMM: 1 D7, 2 D4, 3 D9, 4 D2, 5 D11, 6 D0, 7 D6, 8 D5, 9 D8, 10 D3, 11 D10, 12 D1
2. Populate the slots with black slots and black levers: D0 D3 D6 D9 D12 D15 D18 D21
The slot population for the minimum DIMM configuration is D0/D6/D12/D18 per CMOD
3. Populate the white slot, white lever slots: D2 D5 D8 D11 D14 D17 D20 D23

The following table describes the proper order in which to populate DIMMs in a CMOD using the numbered callouts in the above figure, and the DIMM socket labels (D0 through D11).

TABLE 1 DIMM Population Order for CMODs

Population Order	DIMMs Sockets for Processor 0 (P0)
Fill the black sockets first	
1	D7
2	D4
3	D9
4	D2
5	D11
6	D0
Then fill the white sockets	
7	D6
8	D5
9	D8
10	D3
11	D10
12	D1

The physical layout of the CMOD memory DIMMs and DIMM installation order is shown in the following figure.



For component serviceability, locations, and designations, see [“Replaceable Components”](#) on page 22.

DIMM Rules

The DIMM installation rules aim to maximize the memory bandwidth available by spreading the memory across all six memory channels.

When installing DIMMs, consider the following rules:

- When two DIMMs are in a channel, the channel speed defaults to the maximum supported speed (listed in the DIMM's SPD and read by BIOS) of the slowest DIMM in the channel. For example: if an 1866 MT/s-compliant DIMM is installed in a channel with a 2133 MT/s-compliant DIMM, the channel speed is limited to 1866 MT/s.
- A maximum of 8 logical ranks (ranks seen by the host) per channel is allowed.
- When one DIMM is used, it must be populated in DIMM slot 0 (farthest away from the CPU) of a given channel.
- When single-rank or dual-rank RDIMMs are populated for 2DPC (two DIMMs per channel), always populate the higher quantity rank DIMM first (starting from the farthest slot). For a 2SPC (two slots per channel) example, first populate a dual-rank DIMM in the DIMM0 slot. Then a single-rank DIMM may be populated in the DIMM1 slot.
- All CMODs should be populated identically.

- Memory quantity needs to be equal across all CMODs.
- All DIMMs in a system should be the same type and size.
- The minimum DIMM configuration as shipped from the factory is four 16-GB DIMMs in each CMOD, installed in 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 CMOD0 and ending with CMOD3 (four-CMOD configuration) or CMOD7 (eight-CMOD configuration). After all CMODs are populated, go back to CMOD0 and repeat the sequence adding the next set of eight DIMMs to each CMOD.

For example: CMOD0 gets the initial eight DIMMs, followed by CMOD1 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 CMOD0 for the next set of eight DIMMs 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. Size mixing between CMODs is not allowed.
- Mixing of LVDIMM and LRDIMM in the same chassis is not allowed.

DIMM Population Scenarios

There are three scenarios in which you are required to populate DIMMs:

- A DIMM fails and needs to be replaced.
In this scenario, you can use the Fault Remind button to identify the failed DIMM, then remove the failed DIMM and replace it. To ensure that system performance is maintained, you must replace the failed DIMM with a DIMM of the same size (in gigabytes) and type 64-GB quad-rank (QR) Load-Reduced DIMMs (LRDIMMs) and 32-GB dual-rank (DR) and 16-GB DR Registered DIMMs (RDIMMs). In this scenario, you should not change the DIMM configuration.
- You have purchased new DIMMs and you want to use them to upgrade the server's memory.
In this scenario, you should adhere to DIMM population rules and follow the recommended DIMM population order for optimal system performance.
- You are changing the server configuration mode and need to change DIMMs to maintain CMOD consistency.
In this scenario, you should adhere to DIMM population rules and follow the recommended DIMM population order for optimal system performance.

Related Information

- [“DIMM Physical Layout” on page 185](#)
- [“DIMM Population Rules” on page 186](#)
- [“DIMM Population Scenarios” on page 190](#)
- [“DIMM Operating Speeds” on page 191](#)
- [“DIMM Rank Classification Labels” on page 191](#)
- [“Inconsistencies Between DIMM Fault Indicators and the BIOS Isolation of Faulty DIMMs” on page 191](#)

DIMM Operating Speeds

The maximum supported memory speed is 2667 MT/s. However, not all system configurations support operation at this speed. The maximum attainable memory speed is limited by the maximum speed supported by the specific type of processor and the specific memory population. All memory installed in the system operates at the same speed, or frequency.

DIMM Rank Classification Labels

DIMMs come in a variety of ranks: dual or quad. The server supports 64-GB quad-rank (QR) Load-Reduced DIMMs (LRDIMMs) and 32-GB dual-rank (DR) and 16-GB DR Registered DIMMs (RDIMMs). Each DIMM is shipped with a label identifying its rank classification. The following table identifies the label corresponding to each DIMM rank classification:

- Quad-rank LRDIMM: 4Rx4
- Dual-rank RDIMM: 2Rx4

Inconsistencies Between DIMM Fault Indicators and the BIOS Isolation of Faulty DIMMs

When a single DIMM is marked as failed by Oracle ILOM (for example, `fault.memory.intel.dimm.training-failed` is listed in the service processor Oracle ILOM system log), BIOS might disable the entire memory channel that contains the failed DIMM, up to two DIMMs. As a result, none of the memory installed in the disabled channel will be available to

the operating system. However, when the Fault Remind button is pressed, only the fault status indicator (LED) associated with the failed DIMM lights. The fault LEDs for the other DIMMs in the memory channel remain off. Therefore, you can correctly identify the failed DIMM using the lit LED.

▼ Identify and Remove a Faulty DIMM

1. **Use Oracle ILOM to identify the location of the failed DIMM and obtain CMOD designation information.**

See [“Troubleshooting Server Hardware Faults” on page 46](#).

2. **Prepare the server for warm service.**

See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a cold service procedure.

3. **Remove the CMOD that contains the failed DIMM.**

See [“Remove a CMOD” on page 162](#).

4. **Remove the CMOD top cover.**

See [“Remove the CMOD Cover” on page 164](#).

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

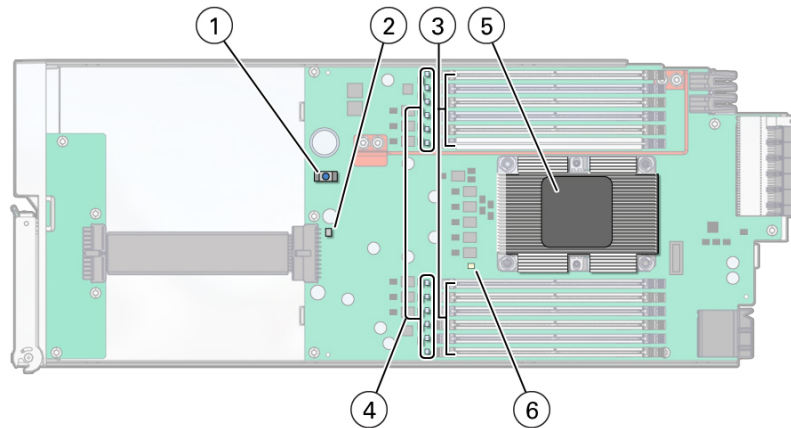
5. **Identify and note the location of the faulty DDR4 DIMM by pressing the Fault Remind button on the motherboard.**

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

- If the DIMM Fault LED is off, then the DIMM is operating properly.
- If the DIMM Fault LED is on (amber), then the DIMM is faulty and should be replaced [4].

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

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 for troubleshooting.



Call Out	Description
1	Fault Remind button. To locate a failed DIMM, press and hold.
2	Fault Remind Power LED Charge Status indicator
3	DIMM slots
4	DIMM slot fault LED indicators (one for each slot)
5	Processor
6	Processor fault LED indicator

6. Verify that the green Fault Remind Power LED indicator [1] is lit.

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

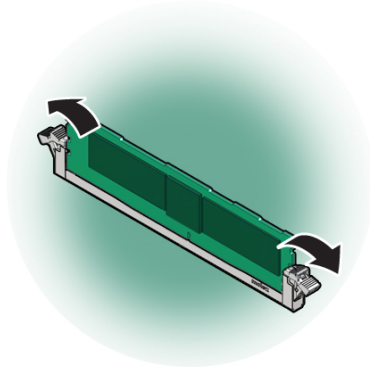
The Fault Remind circuit remains charged for about 10 minutes after power is removed from the CMOD, either by disconnecting power from the server, or by removing the CMOD from the chassis. When you press the Fault Remind button, the Charge Status indicator lights if there is enough power to use the fault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

7. With the Fault Remind button pressed, look for a lit DIMM fault LED indicator [4].

Each DIMM slot has a fault indicator. Twelve DIMM fault LED indicators are located next to the DIMM slots.

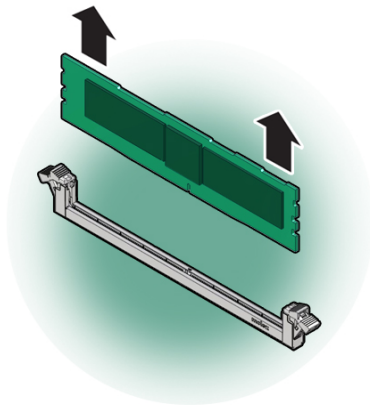
8. Rotate both DIMM socket ejectors outward as far as they will go.

The DIMM is partially ejected from the socket. This action extracts the DIMM from its connector.



9. Remove the faulty DIMM from the CMOD.

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



10. Replace each faulty DIMM with either another DIMM of the same rank size (quad-rank or dual-rank) or leave the socket empty.

For DIMM replacement instructions, see [“Install a DIMM” on page 195](#).

Related Information

- [“DIMM Physical Layout” on page 185](#)
- [“DIMM Population Rules” on page 186](#)
- [“Install a DIMM” on page 195](#)

▼ 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).

- 1. Unpack the replacement DDR4 DIMM and place it on an antistatic mat.**
- 2. Ensure that the replacement DDR4 DIMM matches the size of the DIMM it is replacing.**

You must not replace a dual-rank DIMM with a quad-rank DIMM and vice versa. If you violate this rule, the performance of the server might be adversely affected. For DIMM socket population rules, see [“DIMM Population Rules” on page 186](#).
- 3. Prepare the server for warm service.**

See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a cold service procedure.

- 4. Access DIMMs as required.**
 - **Remove the CMOD.**

See [“Remove a CMOD” on page 162](#).
 - **Remove the CMOD top cover.**

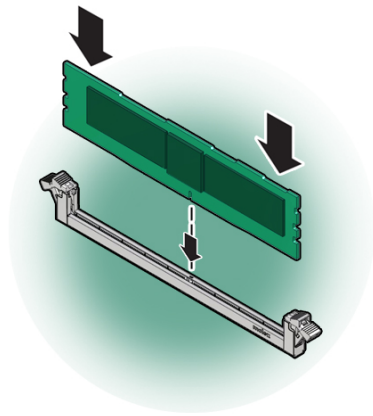
See [“Remove the CMOD Cover” on page 164](#).
To remove the CMOD top cover, push the release button, slide the CMOD cover toward the back of the CMOD, and lift it away.
 - **Remove DIMMs.**

See [“Identify and Remove a Faulty DIMM” on page 192](#).

Note - If you are changing or adding DIMMs as part of an upgrade, ignore the fault identification instructions.

5. **Locate the DIMM slot.**
6. **Install a DIMM.**
 - a. **Ensure that the ejector tabs are in the open position.**
 - b. **Align the notch in the replacement DIMM with the connector key in the connector socket.**

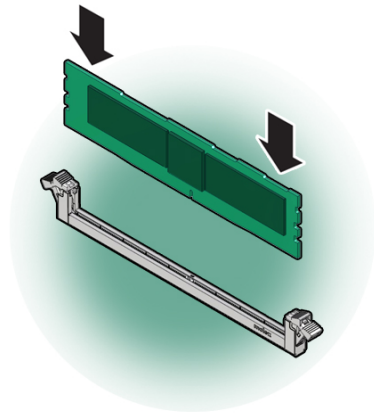
The notch ensures that the DIMM is oriented correctly.
 - c. **To align the DIMM in the slot, ensure that the notch on the DIMM connector lines up with the key in the DIMM slot.**



- d. **Push the DDR4 DIMM into the connector socket until the ejector tabs lock the DIMM in place.**

If the DIMM does not easily seat into the connector socket, verify that the notch in the DIMM is aligned with the connector key in the connector socket. If the notch is not aligned, damage to the DIMM might occur.
7. **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.



8. 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.

9. Install the CMOD cover.

See “[Install the CMOD Cover](#)” on page 166.

10. Install the CMOD.

See “[Install a CMOD](#)” on page 167.

11. (Optional) Use Oracle ILOM to clear server DDR4 DIMM faults.

DDR4 DIMM faults are automatically cleared after a new DIMM has been installed. If you need to manually clear DDR4 DIMM faults, refer to the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.

Note - If you want to move a faulty DDR4 DIMM to a new DIMM socket or re-seat a DIMM for troubleshooting, you must first manually clear the associated DIMM fault. Otherwise, the DIMM fault might follow the DIMM to the new socket location or reoccur on the current socket location, causing a false DIMM fault condition.

Related Information

- [“Install a CMOD” on page 167](#)

▼ Upgrade the Server From Four to Eight CMODs (FRU)

Perform this procedure to add CMODs to System B.

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. Obtain the Four CPU Module Package. The package contains the components required to upgrade the server. Contact your sales representative for information about ordering the CPU module packages.

For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).



Caution - CMODs should be removed and replaced only by authorized Oracle Service personnel.

1. Prepare the server for warm service.

See [“Preparing the Server for Component Replacement” on page 100](#).

Note - This procedure can also be completed as a cold service procedure.

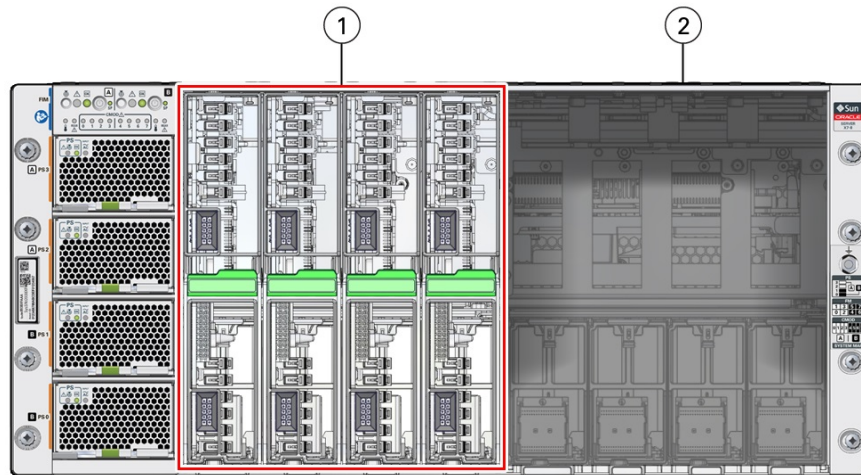
2. Remove all eight fan modules.

See [“Remove a Fan Module” on page 131](#).

3. Remove both fan frames.

See [“Remove a Fan Frame” on page 135](#).

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



Call Out	Description
1	Four CMODs installed in left bay (System A)
2	Empty right-side bay (System B)

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



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

- a. **Remove the CMOD cover.**

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

See [“Remove the CMOD Cover” on page 164](#).

- b. **Ensure that all DIMMs are installed in their slots.**

Ensure that that all DIMM levers are in the fully upright and locked position.

c. Ensure that the processor configuration matches the installed CMODs.

For processor configuration information, see [“Product Description” on page 15](#).

d. Ensure that the DIMM configuration matches the installed CMODs.

For DIMM configuration information, see [“DIMM Population Rules” on page 186](#).

e. Replace the CMOD cover.

Lower the cover onto the CMOD. To install the CMOD cover, align the standoffs on the inside of the cover with the slots in the CMOD chassis. This position leaves a gap between the lead edge of the cover and the front edge of the CMOD.

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

See [“Install the CMOD Cover” on page 166](#).

5. To upgrade the server, do the following:

a. Install a CMOD in the first vacant slot at the farthest left position.

See [“Install a CMOD” on page 167](#).

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

6. Install both fan frames.

See [“Install a Fan Frame” on page 137](#).

7. Install all eight fan modules.

See [“Install a Fan Module” on page 133](#).

8. Prepare the server for operation.

See [“Returning the Server to Operation” on page 249](#).

9. Configure the new CMODs.

See [“Configuring the System Socket Modes” on page 251](#).

Servicing System Module (SMOD) Components (FRU)

This section describes how to service System Modules (SMODs) and SMOD components. Two SMODs are located at the back of the server. The following topics and procedures provide information to assist you when removing and installing SMODs and SMOD components:

- [“SMOD Population Rules” on page 201](#)
- [“Remove an SMOD” on page 202](#)
- [“Install an SMOD” on page 204](#)
- [“Servicing the Host Bus Adapter \(HBA\) Card \(FRU\)” on page 207](#)
- [“Servicing the Energy Storage Module and Cables \(CRU\)” on page 214](#)
- [“Servicing the SAS Cable \(FRU\)” on page 219](#)
- [“Servicing Internal USB Flash Drives \(FRU\)” on page 221](#)
- [“Servicing the System Battery \(CRU\)” on page 224](#)
- [“Prepare an SMOD for Replacement” on page 229](#)

SMODs are field-replaceable units (FRUs). A customer can remove and insert SMODs to access internal components that are designated CRUs. For more information about FRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Field-Replaceable Units” on page 26](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#). See [“System Module \(SMOD\) Overview” on page 32](#).



Caution - SMODs should be removed and replaced only by authorized Oracle Service personnel.



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

SMOD Population Rules

The Oracle Server X7-8 supports two installed SMODs. Both SMOD0 System A and SMOD1 System B are accessible from the back panel.

See [“System Module \(SMOD\) Overview” on page 32](#).

▼ Remove an SMOD

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

Note - Internal USB ports are not used.

For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).

Obtain labels and a pen for labeling cables.

1. Prepare the server for cold service.

This is a cold-service component. Do the following before performing this procedure.

- 8 Socket SMOD0 removal: Power down the system and disconnect all AC power cables from the back of the server.
- 8 Socket SMOD1 removal: Power down the system and disconnect all AC power cables from the back of the server.

Note - SMOD1 System Summary LEDs/buttons, recessed reset buttons, NET Management ports, Serial Management ports, and USB ports do not function.

- 4 Socket SMOD0 removal: Power down the system (Side A) and disconnect the SMOD0 AC power cables AC2 and AC3 from the back of the server.
- 4 Socket SMOD1 removal: Power down the system (Side B) and disconnect the SMOD0 AC power cables AC0 and AC1 from the back of the server.

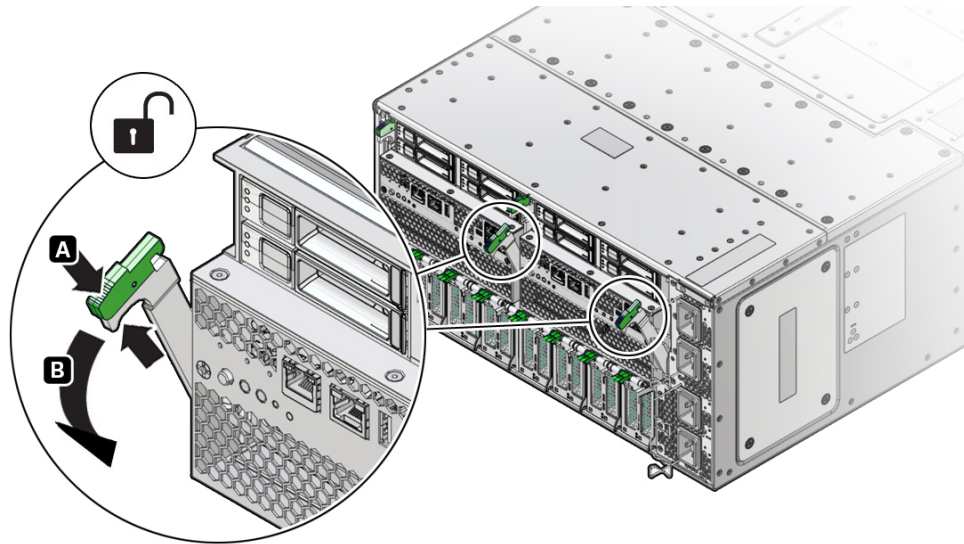
See [“Preparing the Server for Component Replacement” on page 100](#).

2. Label and disconnect all cables from the SMOD panel.

Access this component directly from the back of the server.

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.



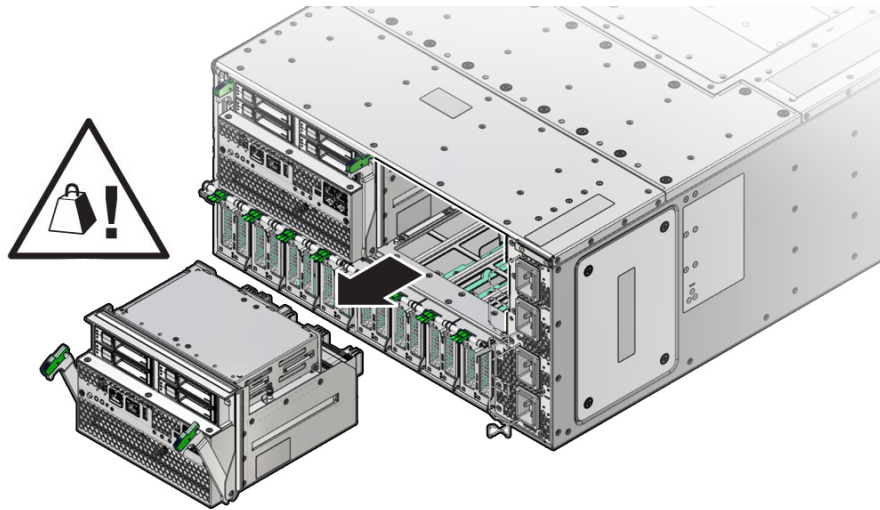
- b. To disengage the SMOD from the server midplane, simultaneously rotate both handles downward to their fully open position.

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, hold the SMOD by its sides and slide it out of the server.



Caution - The SMOD is heavy. Be prepared to hold it firmly when it is clear of the slot.

Related Information

- [“Install an SMOD” on page 204](#)

▼ Install an SMOD

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

For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).

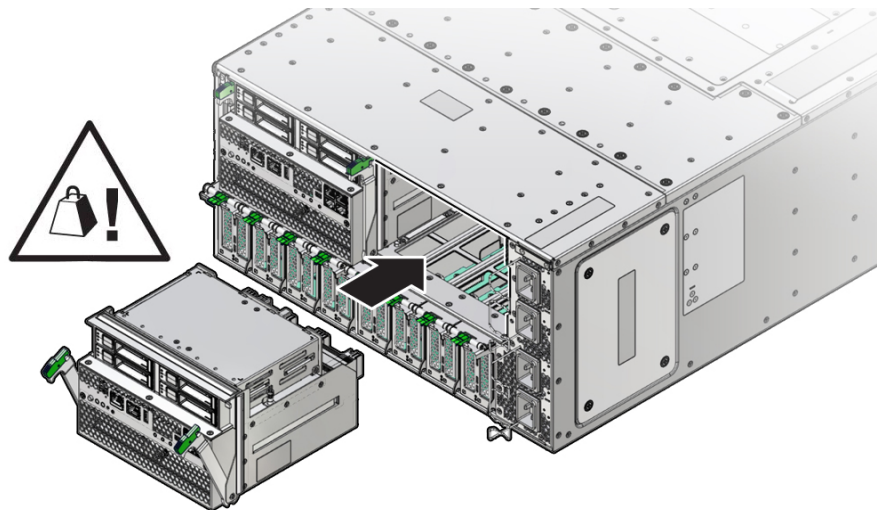
1. **Prepare the server for cold service.**

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

See [“Preparing the Server for Component Replacement”](#) on page 100.

2. **If you are replacing the SMOD, transfer the RAID HBA, ESM, and USB flash drive (if present) to the new replacement SMOD.**
3. **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.**
4. **Orient the SMOD with the handles facing away from the server and the connectors facing toward the open slot in the server.**

Access the SMOD directly from the back of the server.



Caution - The SMOD is heavy. Hold it firmly until it is inserted into its slot.

5. **Align the SMOD in the slot.**
6. **Slide the SMOD into the slot until it stops.**

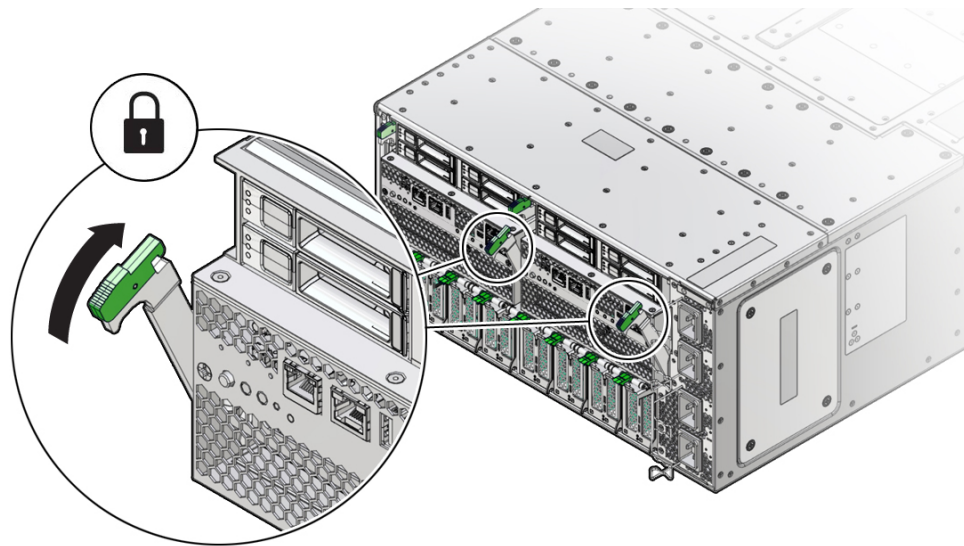
This leaves the SMOD protruding slightly from the back of the server. Do not attempt push the SMOD in beyond this point.

7. **To install the SMOD, simultaneously rotate both handles up 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.



8. **Connect the cables to the SMOD.**
9. **Prepare the server for operation.**
See [“Returning the Server to Operation”](#) on page 249.

Related Information

- [“System Module \(SMOD\) Overview”](#) on page 32

Servicing the Host Bus Adapter (HBA) Card (FRU)

This section describes how to service the HBA card (Oracle Storage 12 Gb SAS PCIe RAID Host Bus Adapter, Internal 16-Port) that is located inside the system module (SMOD). The following topics and procedures provide information to assist you when removing and installing the HBA card:

- [“Remove the HBA Card” on page 207](#)
- [“Install the HBA Card” on page 210](#)

HBA cards are field-replaceable units (FRUs). For more information about FRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Field-Replaceable Units” on page 26](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#). See [“System Module \(SMOD\) Overview” on page 32](#).



Caution - HBA cards should be removed and replaced only by authorized Oracle Service personnel.



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

▼ Remove the HBA Card

Perform this procedure to replace the HBA card. This is an internal component that is accessible from the back 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.

1. Prepare the server for cold service.

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

See [“Preparing the Server for Component Replacement” on page 100](#).

2. Remove the SMOD.

See [“Remove an SMOD” on page 202](#).

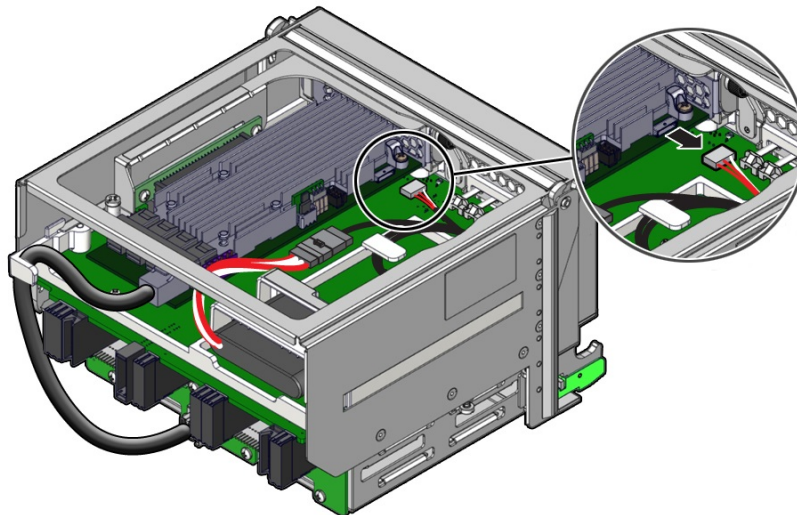
3. Set the SMOD on an ESD-safe flat surface with the front side facing toward you.

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 PCIe card.**

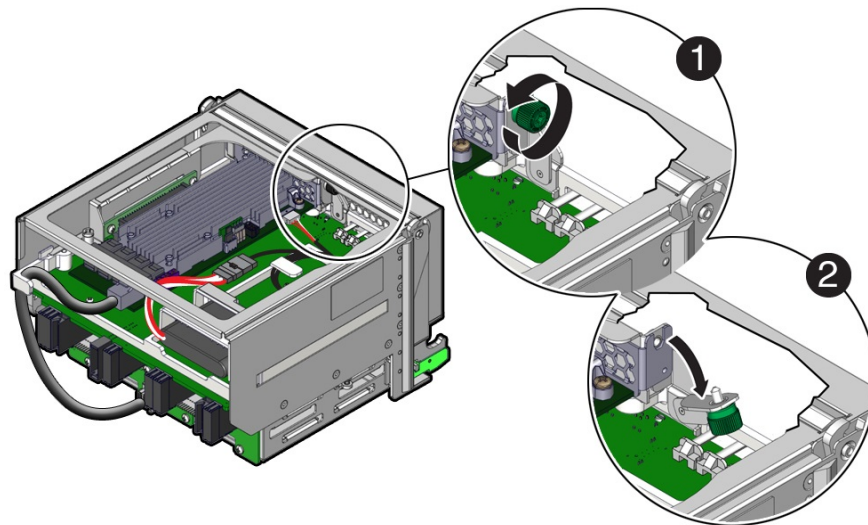
Note - The connector (back) side of the SMOD should still be facing you.

The HBA is located inside the SMOD enclosure and is accessible through the an upward-facing opening.

7. **Disconnect the Energy Storage Module (ESM) extension cable connector from the HBA connector.**



8. Rotate the green thumbscrew that secures the release handle [1], then pull the release handle out away from the HBA card and down to unlock the HBA card [2].

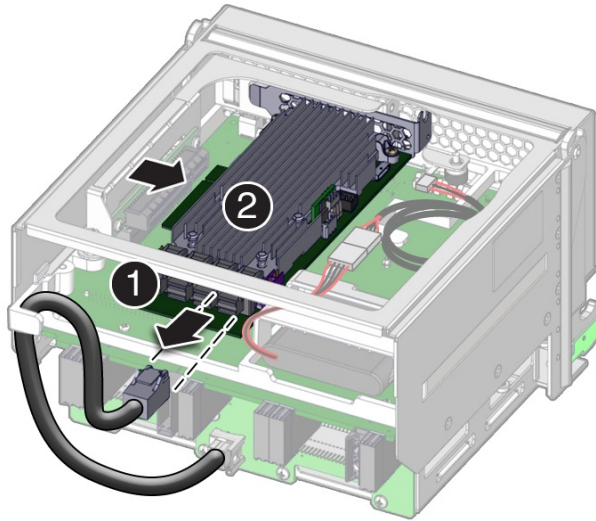


9. Disconnect the SAS storage drive backplane cable from the HBA card connector labeled C0 [1].

One cable with mini SAS connectors connects the HBA to the storage drive backplane.

Note - Do not disconnect the SAS storage drive backplane cable from the SMOD drive backplane connector.

10. **Disconnect the HBA card from its connector on the SMOD motherboard riser [2].**



11. **Remove the HBA card from the SMOD.**

Place it on an anti-static mat.

Related Information

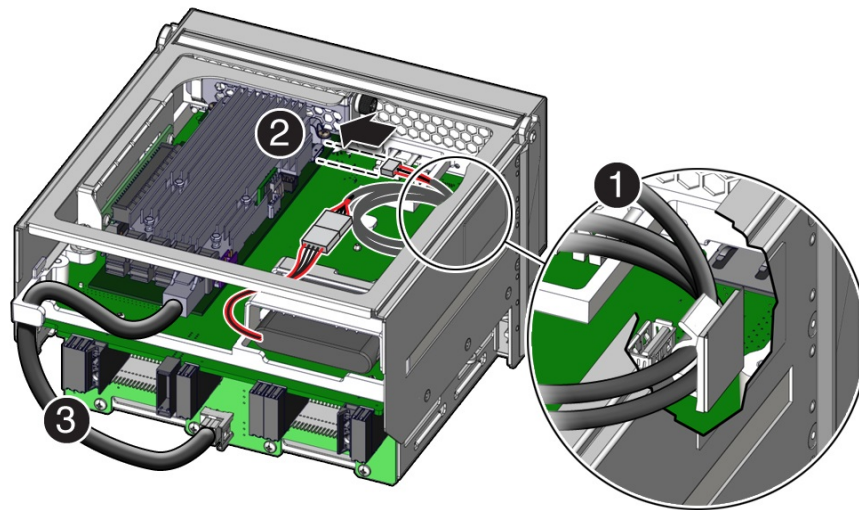
- [“Install the HBA Card” on page 210](#)

▼ Install the HBA Card

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

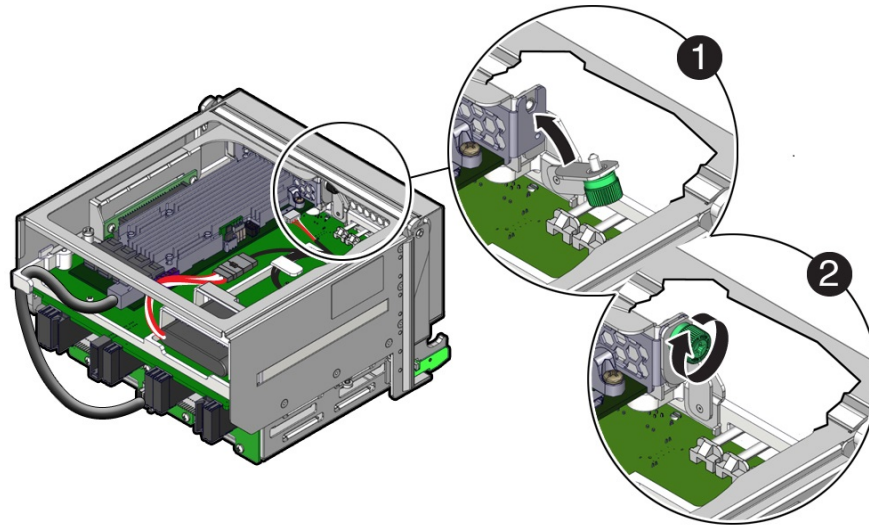
1. **Position the HBA card with the component side facing up and the edge connector pointed away from you.**
2. **With the SMOD positioned upside down and the back (connector) side facing you, align the HBA card with the SMOD motherboard riser slot.**
3. **Connect the storage drive SAS backplane cable to the HBA card connector labeled C0 [1].**

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



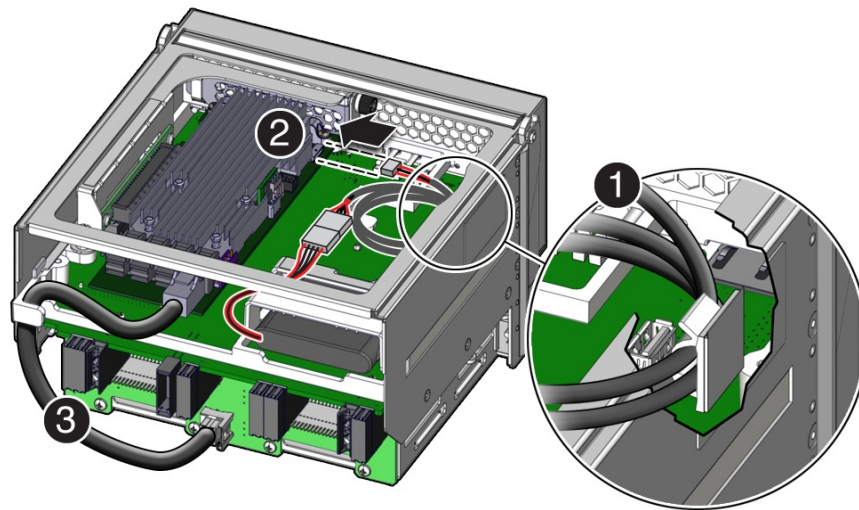
5. **Lock the card and secure the thumbscrew.**
 - a. **Rotate the release locking lever up [1].**

- b. Carefully rotate the thumbscrew to tighten the release lever [2].



6. Ensure that the ESM extension cable passes through the cable guide on the SMOD motherboard [1].
7. Connect the Energy Storage Module (ESM) extension cable connector to the connector on the HBA [2].

8. **Ensure that the storage drive SAS cable passes through the cable guide on the backplane connector side of the SMOD [3].**



9. **Install the four storage drives or fillers as required.**
See [“Install a Storage Drive” on page 127.](#)
10. **Install the SMOD.**
See [“Install an SMOD” on page 204.](#)
11. **Prepare the server for operation.**
See [“Returning the Server to Operation” on page 249.](#)
12. **Clear any related component faults.**
For more information see [“Clear Hardware Fault Messages \(Oracle ILOM\)” on page 51.](#)

Related Information

- [“Install an SMOD” on page 204](#)

Servicing the Energy Storage Module and Cables (CRU)

This section describes how to service the Energy Storage Module (ESM) and ESM extension cable that is located inside the system module (SMOD). The ESM provides emergency power for the SAS drives. The following topics and procedures provide information to assist you when removing and installing the ESM and ESM extension cable:

- [“Replace the Energy Storage Module” on page 214](#)
- [“Replace the ESM Extension Cable” on page 216](#)

ESM and ESM extension cables are field-replaceable units (CRUs). For more information about CRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Customer-Replaceable Units” on page 25](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#). See [“System Module \(SMOD\) Overview” on page 32](#).



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

▼ 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.

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

See [“Preparing the Server for Component Replacement” on page 100](#).

2. Remove the SMOD.

See [“Remove an SMOD” on page 202](#).

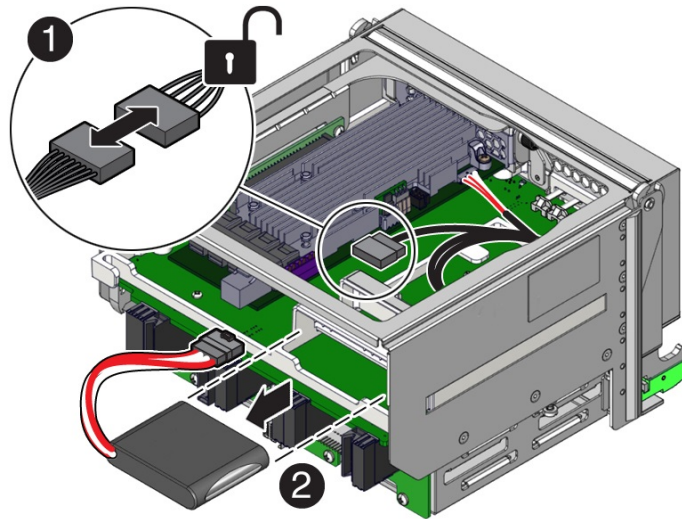
3. Turn the SMOD upside down on a flat surface with the back side facing toward you.

The ESM is located adjacent to the HBA card.

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

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

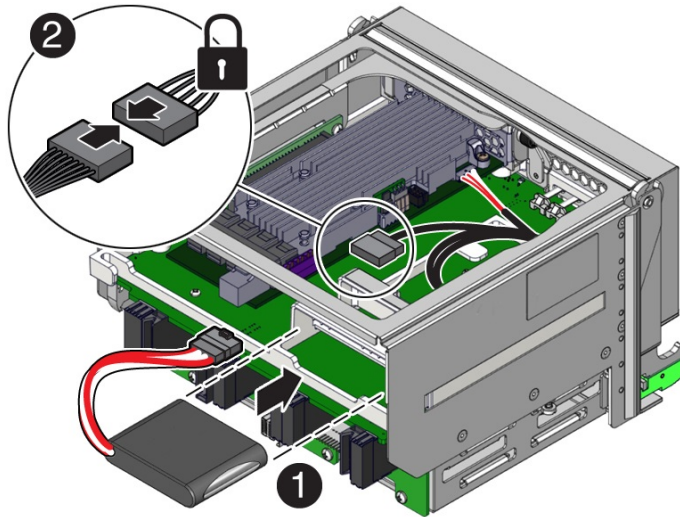
The ESM is pushed to the back, through the cage and then pulled the rest of the way out of position.



6. **Insert the new ESM into the holder so that the cable extends out the top [1].**

Push it completely into position.

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

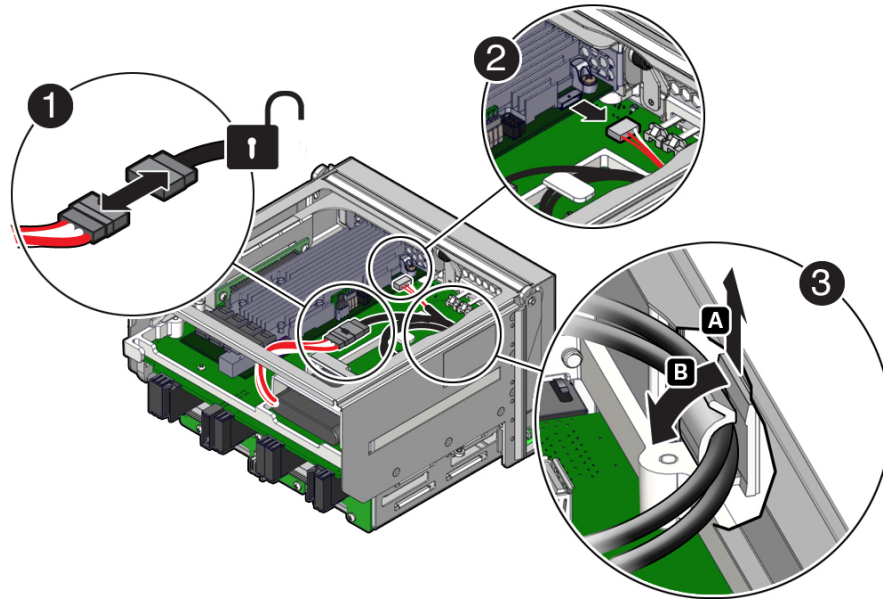


8. **Install the SMOD.**
See [“Install an SMOD” on page 204.](#)
9. **Prepare the server for operation.**
See [“Returning the Server to Operation” on page 249.](#)

▼ Replace the ESM Extension Cable

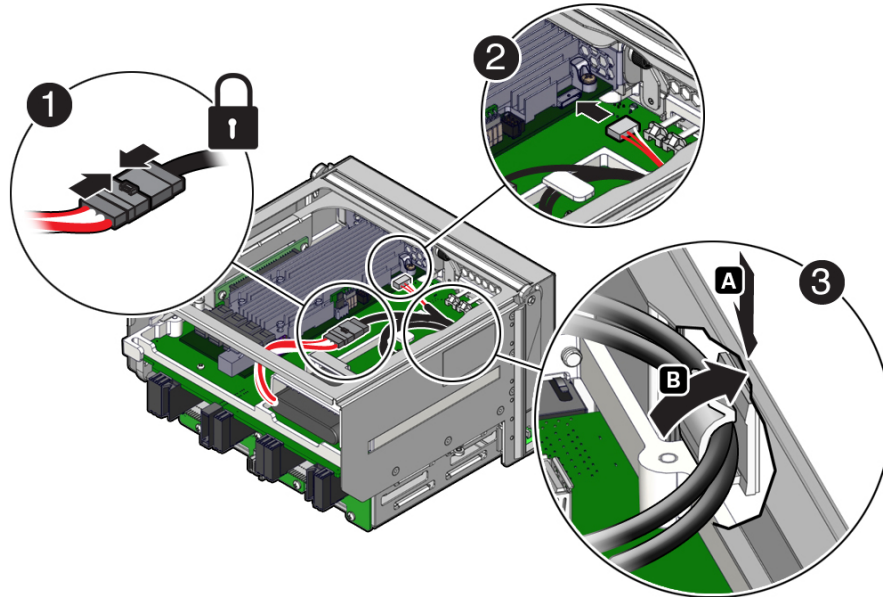
1. **Prepare the server for cold service.**
This is a cold-service component. Power down the system and disconnect the AC power cables from the server before performing this procedure.
See [“Preparing the Server for Component Replacement” on page 100.](#)
2. **Remove the SMOD.**
See [“Remove an SMOD” on page 202.](#)
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. **Disconnect the ESM extension cable from the HBA [2].**
6. **Disconnect the ESM extension cable from the clip on the enclosure wall [3].**
 - Open the clip [A].
 - Slide the cable out of the guide [B].
7. **Remove the old ESM extension cable.**
8. **Route the new ESM extension cable from the HBA, through the clip on the side wall, and through the cable guide.**
9. **Connect the ESM extension cable to the connector on the ESM [1].**

The connector on the ESM is at the end of a cable that extends out of the ESM.



10. **Connect the ESM extension cable to the HBA [2].**
11. **Connect the ESM extension cable to the clip on the enclosure wall [3].**
 - Open the clip [A].
 - Slide the cable into the guide [B].
12. **Inspect the ESM extension cable to make sure that it is routed correctly and connected to the ESM and the HBA.**
13. **Install the SMOD.**
See [“Install an SMOD” on page 204.](#)
14. **Prepare the server for operation.**
See [“Returning the Server to Operation” on page 249.](#)

Servicing the SAS Cable (FRU)

This section describes how to service the Mini-SAS4I cable that is located inside the system module (SMOD). The following topics and procedures provide information to assist you when removing and installing the SAS cable:

- [“Replace the SAS Cable” on page 219](#)

SAS cables are field-replaceable units (FRUs). For more information about FRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Field-Replaceable Units” on page 26](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#). See [“System Module \(SMOD\) Overview” on page 32](#).



Caution - SAS cables should be removed and replaced only by authorized Oracle Service personnel.



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

▼ Replace the SAS Cable

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

1. Prepare the server for cold service.

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

See [“Preparing the Server for Component Replacement” on page 100](#).

2. Remove the SMOD.

See [“Remove an SMOD” on page 202](#).

3. Set the SMOD on a flat surface with the front side facing toward you.

4. Close the SMOD handles.

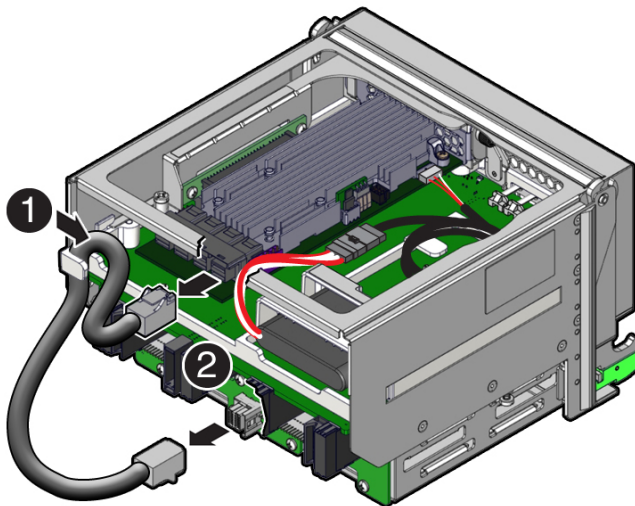
5. Rotate the SMOD 180 degrees so the back (connector) side is facing toward you.

6. Turn the SMOD upside down and locate the HBA.

The HBA card is located inside the SMOD.

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

7. Disconnect the SAS cable from the HBA port [1].
8. Disconnect the SAS cable from the drive backplane [2].



9. Carefully route the SAS cable away from the guide.
10. Remove the SAS cable from the SMOD.
11. Connect the replacement Mini-SAS4I cable end labeled "TO DBP" to the drive backplane.
12. Route the replacement SAS cable from the drive backplane to the HBA card connector.
13. Ensure that the cable is routed under the support bracket.
14. Connect the replacement Mini-SAS4I cable end labeled "TO HBA" to the HBA card connector.

15. **Install the SMOD.**
See [“Install an SMOD” on page 204](#).
16. **Prepare the server for operation.**
See [“Returning the Server to Operation” on page 249](#).

Related Information

- [“Install an SMOD” on page 204](#)

Servicing Internal USB Flash Drives (FRU)

This section describes how to service internal USB flash drives installed in the SMOD0 or SMOD1 USB ports that are located inside the system modules (SMODs). The following topics and procedures provide information to assist you when removing and installing internal USB flash drives:

- [“Remove the Internal USB Flash Drive” on page 221](#)
- [“Install the Internal USB Drive” on page 223](#)

Internal USB flash drives are field-replaceable units (FRUs). For more information about FRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Field-Replaceable Units” on page 26](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#). See [“System Module \(SMOD\) Overview” on page 32](#).



Caution - Internal USB flash drives should be removed and replaced only by authorized Oracle Service personnel.



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

Note - Internal USB ports are not used.

▼ Remove the Internal USB Flash Drive

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

1. Prepare the server for cold service.

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

See [“Preparing the Server for Component Replacement” on page 100.](#)

2. Remove SMOD0 or SMOD1.

See [“Remove an SMOD” on page 202.](#)

3. Set the SMOD on a flat surface with the front side facing toward you.

4. Close the SMOD handles.

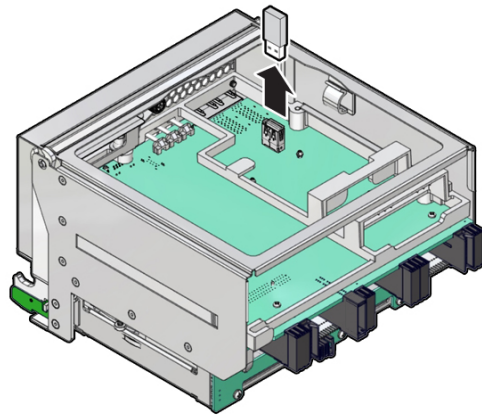
5. Rotate the SMOD 180 degrees so the back (connector) side is facing toward you.

6. Turn the SMOD upside down and locate the HBA card.

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

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

The USB flash drive slot is located inside SMOD0 or SMOD1 next to the HBA card.



Related Information

- [“Install an SMOD” on page 204](#)

▼ Install the Internal USB Drive

Perform this procedure to access and install the internal USB flash drive when instructed by service personnel. This is an internal component accessible from the back of the server by removing SMOD0 and SMOD1.

1. Prepare the server for cold service.

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

See [“Preparing the Server for Component Replacement” on page 100](#).

2. Remove the SMOD.

See [“Remove an SMOD” on page 202](#).

3. Set the SMOD on a flat surface with the front side facing toward you.

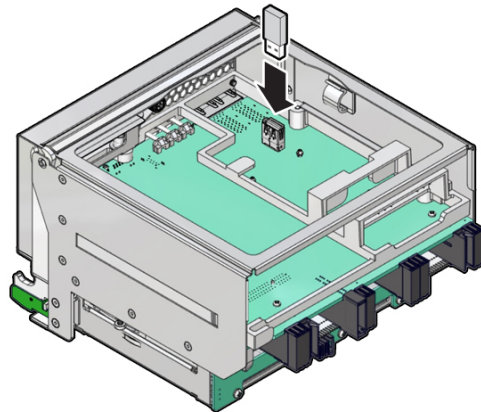
4. Close the SMOD handles.

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 internal USB flash drive port is located inside SMOD0 or SMOD1 next to the HBA card.



7. **Insert the drive into the USB slot.**
8. **Install the SMOD.**
See [“Install an SMOD” on page 204](#).
9. **Repeat these steps for another SMOD as required.**
10. **Prepare the server for operation.**
See [“Returning the Server to Operation” on page 249](#).

Related Information

- [“Install an SMOD” on page 204](#)

Servicing the System Battery (CRU)

This section describes how to service the Real Time Clock system battery, 3V Lithium Coin Cell Battery CR 2032 that is located inside the system module (SMOD). Perform this procedure to replace a failed system battery (also known as an RTC battery) installed in SMOD0 or

SMOD1. This is an internal component accessed from the back of the server by removing the SMOD.

The system battery maintains system time when the server is powered off and a time server is unavailable. If the server fails to maintain the proper time when the system is powered off and not connected to a network, replace the battery. The following topics and procedures provide information to assist you when removing and installing the system battery:

- [“Remove the System Battery” on page 225](#)
- [“Install the System Battery” on page 227](#)

System batteries are field-replaceable units (CRUs). For more information about CRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Customer-Replaceable Units” on page 25](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#). See [“System Module \(SMOD\) Overview” on page 32](#).



Caution - Ensure that all power is removed from the server before removing or installing the battery. You must disconnect the power cables from the system before performing this procedure.



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

▼ Remove the System Battery

This is an internal component that is accessible from the back of the server by removing the SMOD. Perform this procedure to access and remove the battery.

1. Prepare the server for cold service.

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

See [“Preparing the Server for Component Replacement” on page 100](#).

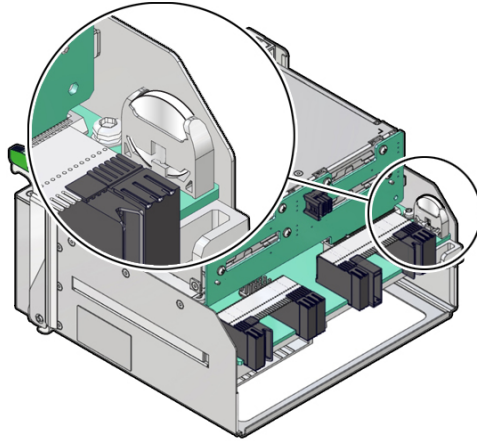
2. Remove SMOD0 or SMOD1.

See [“Remove an SMOD” on page 202](#).

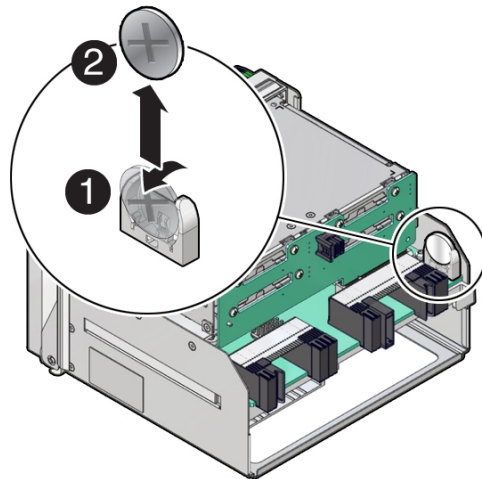
3. Close the SMOD handles.

4. Set the SMOD on a flat surface with the back side facing toward you.

The system battery is located on the SMOD motherboard.



- 5. To remove the battery, pull it up and out of its holder.**
Tilt the battery out, away from wall, and then lift the battery up.



Related Information

- [“Install an SMOD” on page 204](#)

▼ Install the System Battery

Perform this procedure to access and install the battery when instructed by service personnel. This is an internal component accessible from the back of the server by removing SMOD0 and SMOD1.

1. Prepare the server for cold service.

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

See [“Preparing the Server for Component Replacement” on page 100](#).

2. Remove the SMOD.

See [“Remove an SMOD” on page 202](#).

3. Set the SMOD on a flat surface with the front side facing toward you.

4. Close the SMOD handles.

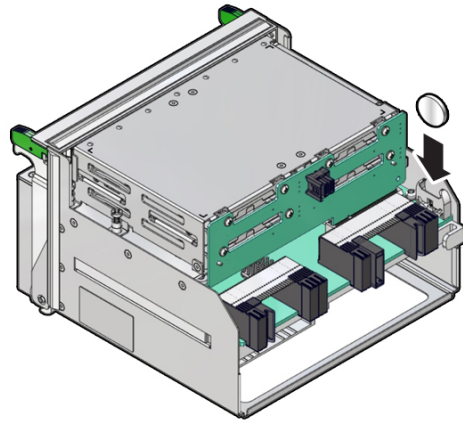
5. Unpack the replacement battery.

6. To orient the replacement battery, ensure that the positive (+) side of the battery is facing toward the inside of the SMOD.

Make sure the positive pole (+) is facing toward the inside of the SMOD.

7. Press the new battery into the battery retainer.

To install the battery, set it in the holder and push it in until the battery snaps into place.



Note - If disconnected during battery removal, reconnect the auxiliary signal cable to the disk backplane and the SAS cables to the Internal HBA.

8. **Ensure that the battery is properly seated in its holder and the polarity is correct.**
9. **Install the SMOD.**
See [“Install an SMOD” on page 204.](#)
10. **Repeat these steps for another SMOD as required.**
11. **Prepare the server for operation.**
Verify that the power supply AC OK LEDs are lit.
See [“Returning the Server to Operation” on page 249.](#)
12. **If necessary, once the server is operational, access the BIOS Setup Utility to set the clock.**
See [“Setting Up BIOS Configuration Parameters” on page 283.](#)
13. **If the service processor is not configured to use NTP, you must do one of the following:**

- Reset the Oracle ILOM SP clock using the Oracle ILOM CLI or the web interface.
Refer to the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.
- Use the BIOS Setup Utility to reprogram the host clock.
Refer to the *Oracle X7 Series Servers Administration Guide* at <https://www.oracle.com/goto/x86admindiag/docs>.

Note - If the service processor is configured to synchronize with a network time server using the Network Time Protocol (NTP), the Oracle ILOM SP clock will be reset as soon as the server is powered on and connected to the network; otherwise, proceed to the next step.

Related Information

- “Install an SMOD” on page 204

▼ Prepare an SMOD for Replacement



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in “[Electrostatic Discharge and Static Prevention Measures](#)” on page 97.

To prepare a failed SMOD for return shipment and failure analysis:

1. **Use Oracle ILOM to identify the location of the failed SMOD.**
See “[Troubleshooting Server Hardware Faults](#)” on page 46.
2. **Prepare the server for cold service.**
This is a cold-service component. Power down the system and disconnect the AC power cables from the server before performing this procedure.
See “[Preparing the Server for Component Replacement](#)” on page 100.
3. **Remove the failed SMOD.**
See “[Remove an SMOD](#)” on page 202.
4. **Set a replacement SMOD next to the failed SMOD on an antistatic mat.**
5. **Remove the following reusable components from the SMOD and install them onto the replacement SMOD.**

- Host Bus Adapter (HBA) Card: [“Servicing the Host Bus Adapter \(HBA\) Card \(FRU\)” on page 207](#)
- SAS Cable: [“Servicing the SAS Cable \(FRU\)” on page 219](#)
- ESM and ESM cable: [“Servicing the Energy Storage Module and Cables \(CRU\)” on page 214](#)
- Internal USB Flash Drive: [“Servicing Internal USB Flash Drives \(FRU\)” on page 221](#)

For more information, see [“SMOD Motherboard” on page 36](#).

6. **Place the failed SMOD in a shipping package.**
7. **Return the replacement SMOD to service.**

Servicing the Front Indicator Module (FRU)

This section describes how to service the server front indicator module (FIM). The FIM is located at the front of the server. The following topics and procedures provide information to assist you when removing and installing the FIM:

- [“Remove the FIM” on page 230](#)
- [“Install the FIM” on page 232](#)

The FIM is a field-replaceable unit (FRU). For more information about FRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Field-Replaceable Units” on page 26](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#).



Caution - The FIM should be removed and replaced only by authorized Oracle Service personnel.



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

▼ Remove the FIM

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

- 1. Prepare the server for cold service.**

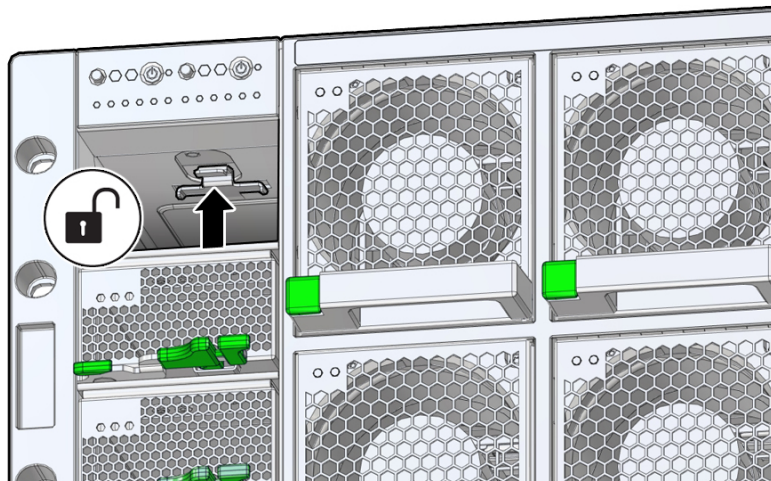
This is a cold-service component. Power down the system and disconnect the AC power cables from the server before performing this procedure.

See [“Preparing the Server for Component Replacement” on page 100.](#)

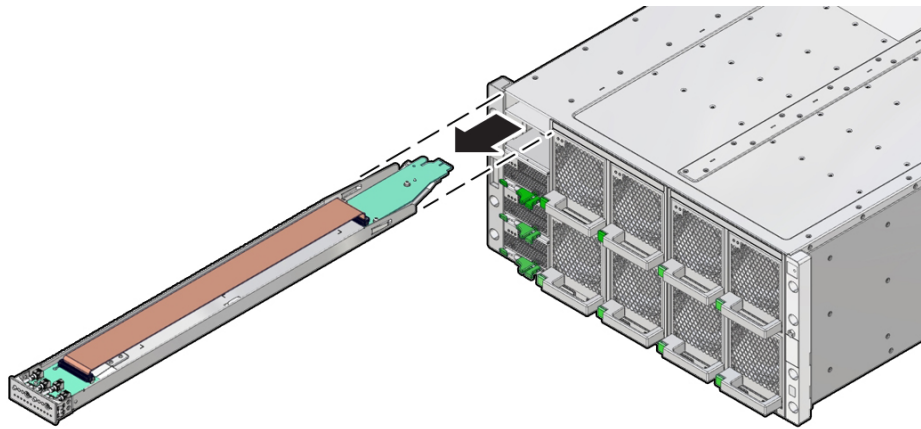
- 2. Remove the top power supply (PS3).**

See [“Remove a Power Supply” on page 141.](#)

- 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 up.**



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



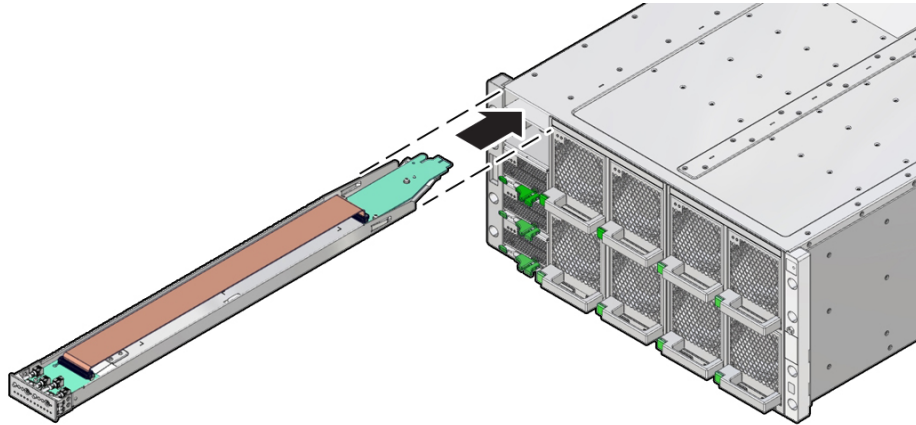
Related Information

- [“Install the FIM” on page 232](#)

▼ Install the FIM

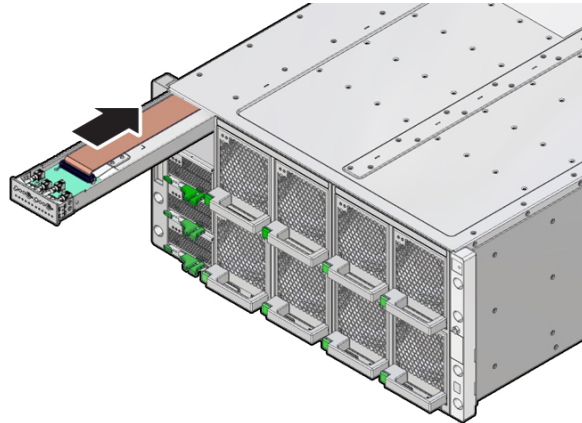
1. **Align the connector end of the FIM with the opening of the slot.**
Access this component directly from the front of the server.

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



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 PS3.**
See [“Install a Power Supply”](#) on page 144.
4. **Prepare the server for operation.**
See [“Returning the Server to Operation”](#) on page 249.
5. **Verify that the Power OK indicator on the PS indicator panel turns on steady after power is supplied to the server and the server is in Main power mode.**
6. **Clear any related component faults.**

Related Information

- [“Clear Hardware Fault Messages \(Oracle ILOM\)”](#) on page 51

Servicing the Midplane Assembly (FRU)

This section describes how to service the server midplane assembly. Use this procedure to remove and replace a failed bus bar midplane assembly. The following topics and procedures provide information to assist you when removing and installing the midplane assembly:

- [“Remove the Midplane Assembly” on page 235](#)
- [“Install the Midplane Assembly” on page 243](#)

The midplane assembly is a field-replaceable unit (FRU). For more information about FRUs, see [“Illustrated Parts Breakdown” on page 22](#) and [“Field-Replaceable Units” on page 26](#). For component serviceability, locations, and designations, see [“Replaceable Components” on page 22](#). See [“Server Chassis Overview” on page 38](#).



Caution - The midplane assembly should be removed and replaced only by authorized Oracle Service personnel.



Caution - These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [“Electrostatic Discharge and Static Prevention Measures” on page 97](#).

▼ Remove the Midplane Assembly

Use this procedure to remove the midplane assembly.

This procedure requires removing the server from the rack. Removing all front and back components lessens the weight of the server.

This is a cold-service procedure. Power down the system and disconnect all power cables before removing the server access panels.



Caution - Hazardous voltage. Possibility of electrical shock if the power cables are connected to the server when accessing the midplane and bus bar assembly.



Caution - The midplane assembly should be removed and replaced only by authorized Oracle Service personnel.

Since the midplane contains both A- and B-side Primary FRU containers, when the midplane needs to be replaced, Oracle Service personnel need to manually reprogram the FRU containers into FRUPROM0 and FRUPROM1.

This procedure requires a Phillips screwdriver and a mechanical lift. Do not lift the server manually. Use a mechanical lift instead.

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

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

See [“Preparing the Server for Component Replacement” on page 100](#).

2. Label the server front panel accessible components.

a. Label all eight fan modules FM0-7. Note the fan frame locations.

See [“Fan Module Locations and Numbering” on page 129](#).

For fan designations, see and [“Replaceable Components” on page 22](#).

b. Label all CMODs.

Before removing CMODs, label each module and module slot. Your server might have four CMODs, or it might have eight.

c. Label all server power supplies, PS0-3.

Before removing power supplies, note the AC inlet number.

3. Remove the server front accessible components.

a. Remove all eight fan modules FM0-7.

See [“Remove a Fan Module” on page 131](#).

b. Remove both fan frames.

See [“Remove a Fan Frame” on page 135](#).

c. Remove all CMODs.

See [“Remove a CMOD” on page 162](#).

d. Remove four power supplies, PS0-3.

See [“Remove a Power Supply” on page 141](#).

e. Remove the FIM.

See [“Remove the FIM” on page 230](#).

4. Label the server back panel accessible cables and components.

a. Label all server back panel accessible cables.

Before removing cables, label each cable, noting the cable connection point.

Label the four AC power cables.

- b. Label each DPCC that is populated with PCIe cards, noting the DPCC slot location.**

For slot designations, see [“PCIe Card and DPCC Overview” on page 147](#) and [“Replaceable Components” on page 22](#).

- c. Label both SMODs.**

Label the SMODs SMOD0 and SMOD1 to ensure that SMOD0 and SMOD1 are returned to their original locations.

- 5. Remove the server back panel accessible cables and components.**

- a. Remove any cables attached to the back of the server.**

- b. Remove both SMODs.**

See [“Remove an SMOD” on page 202](#).

- c. Remove all eight DPCCs.**

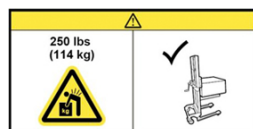
See [“Remove a DPCC” on page 150](#).

- 6. Remove the eight screws that secure the server to the rack at the front of the server.**

- 7. Slowly slide the server off the shelf rails and onto the lift.**



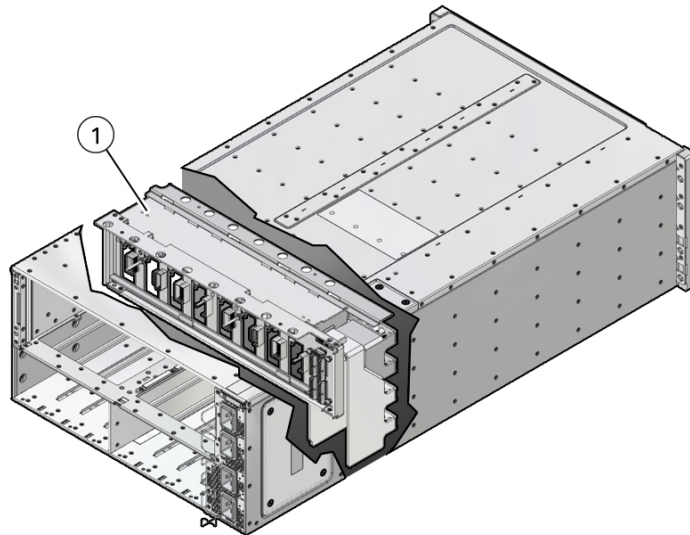
Caution - Lifting equipment: Oracle Server X7-8 weighs 114 kg (250 lbs). Only use a mechanical lift to lift and mount the server into the rack enclosure



Refer to [“Installing the Server Into a Rack” in Oracle Server X7-8 Installation Guide](#).

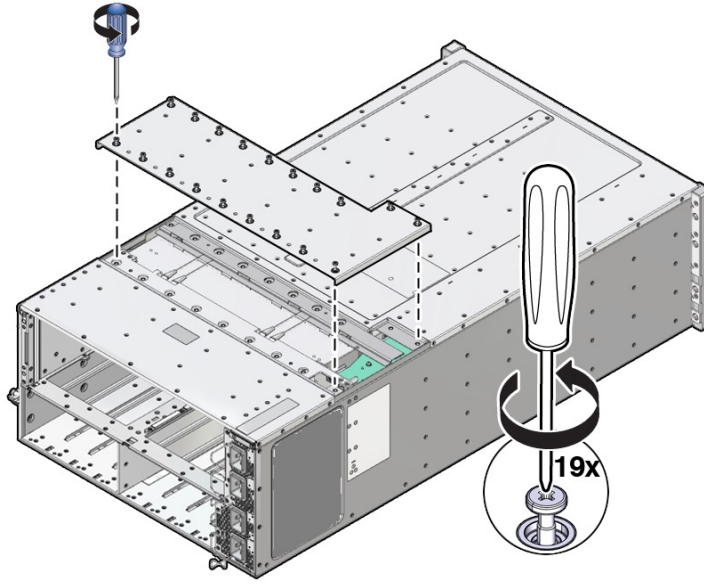
- 8. Set the server on an ESD-safe work surface.**

The midplane assembly is located inside the server. In the following illustration, call out 1 shows the location of the midplane assembly.



9. Loosen the 19 captive screws on the top access panel and remove the panel.

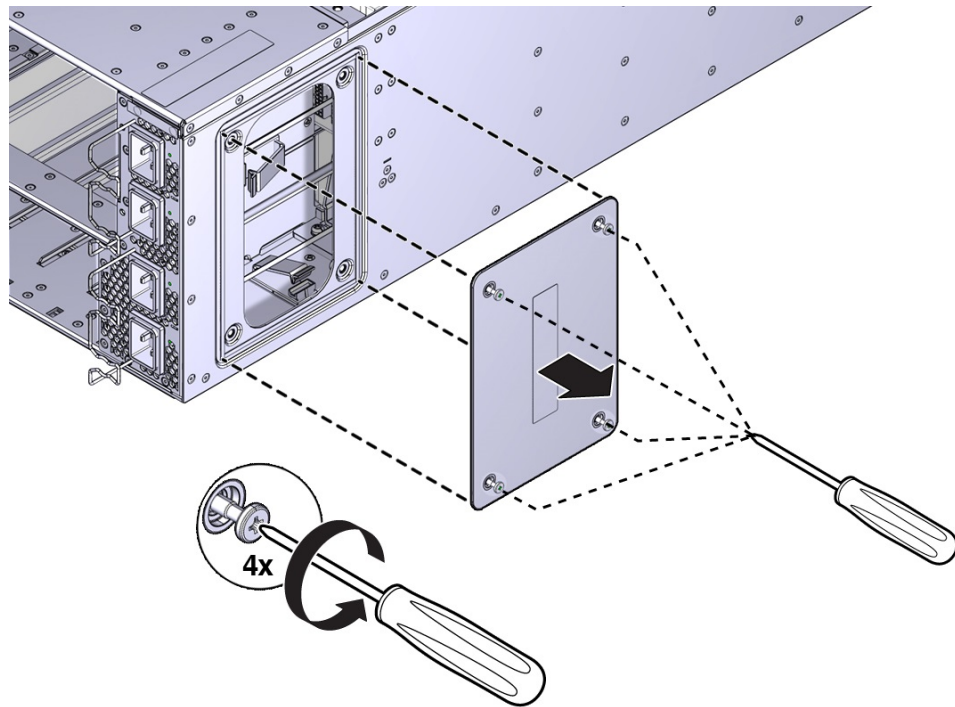
Use a No. 2 Phillips screwdriver or driver with No. 2 Phillips bit.



- 10. Carefully remove and retain the protective black plastic insert that covers the top of the midplane assembly.**

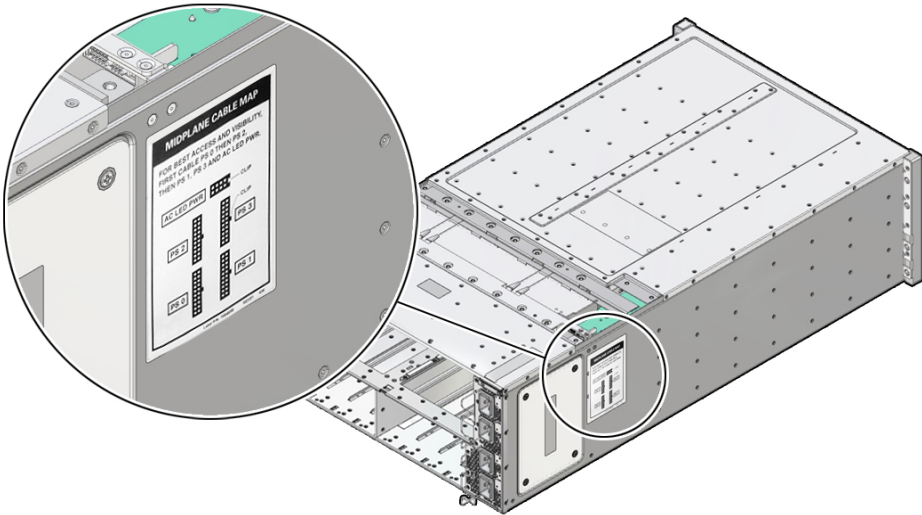
Note the orientation of the insert with respect to the opening. The insert is fitted to the opening using tabs and flaps.

11. Loosen the four captive screws that secure the left side (from the front) access panel and remove the panel.

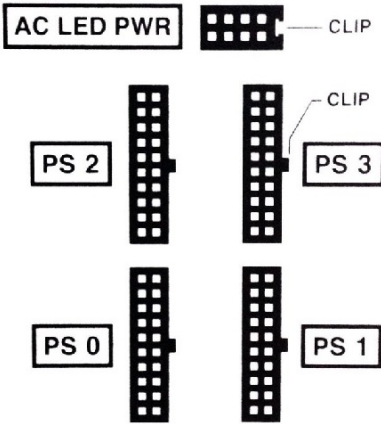


The opening behind the access panel provides access to five cables (four 20-pin PS cables and one 8-pin cable for the AC power indicator LEDs) that are routed through the server and are connected to the backside of the midplane assembly. To remove the midplane assembly, disconnect these connectors. As 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.



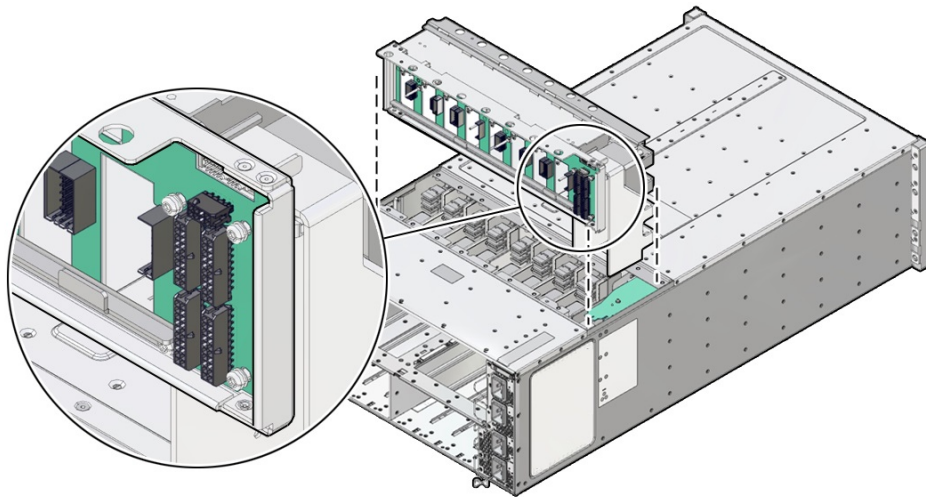
The following illustration shows the label.



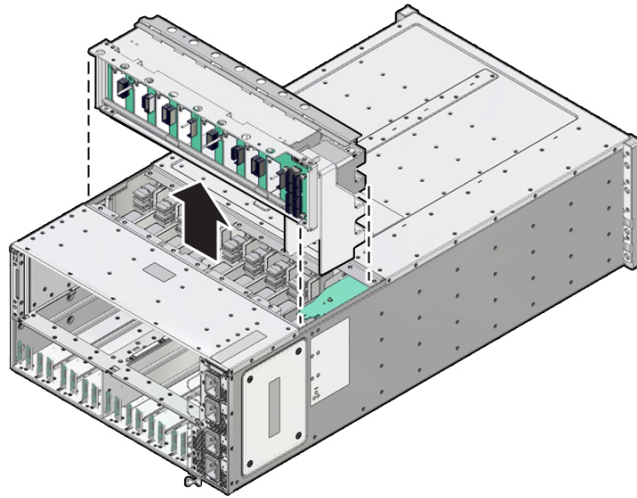
12. **Reach into the side access opening and disconnect the five connectors from the back of the midplane assembly.**

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.



13. **Lift the midplane assembly out of the server chassis from the top access opening.**



14. **Position the cables so the connectors are hanging outside of the server chassis' side access opening.**

The cables inside the chassis should lie flat, so they are not damaged during the installation of the replacement midplane assembly.

▼ Install the Midplane Assembly

Use this procedure to install the midplane assembly.

This procedure requires removing the server from the rack. Removing all front and back components lessens the weight of the server.

This is a cold-service procedure. Power down the system and disconnect all power cables before removing the server access panels.



Caution - Hazardous voltage. Possibility of electrical shock if the power cables are connected to the server when accessing the midplane and bus bar assembly.



Caution - The midplane assembly should be removed and replaced only by authorized Oracle Service personnel.

Since the midplane contains both A- and B-side Primary FRU containers, when the midplane needs to be replaced, Oracle Service personnel need to manually reprogram the FRU containers into FRUPROM0 and FRUPROM1.

This procedure requires a Phillips screwdriver and a mechanical lift. Do not lift the server manually. Use a mechanical lift instead.

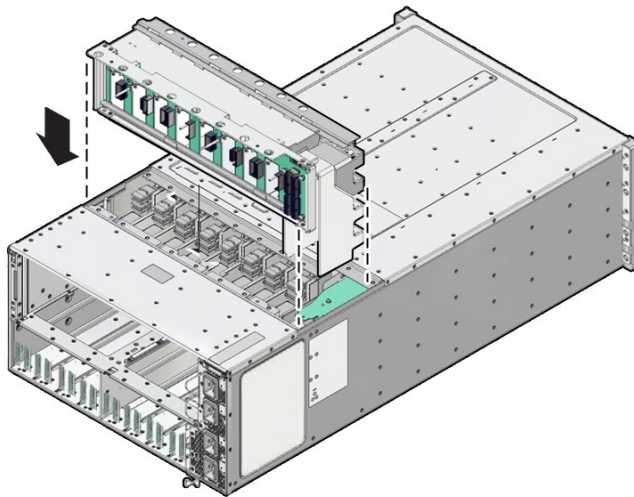
- 1. Position the cables so the connectors are hanging outside of the server chassis' side access opening.**

The cables inside the chassis should lie flat, so they are not damaged during the installation of the replacement midplane assembly.

- 2. Align and position the replacement midplane assembly in the opening in the top of the server.**

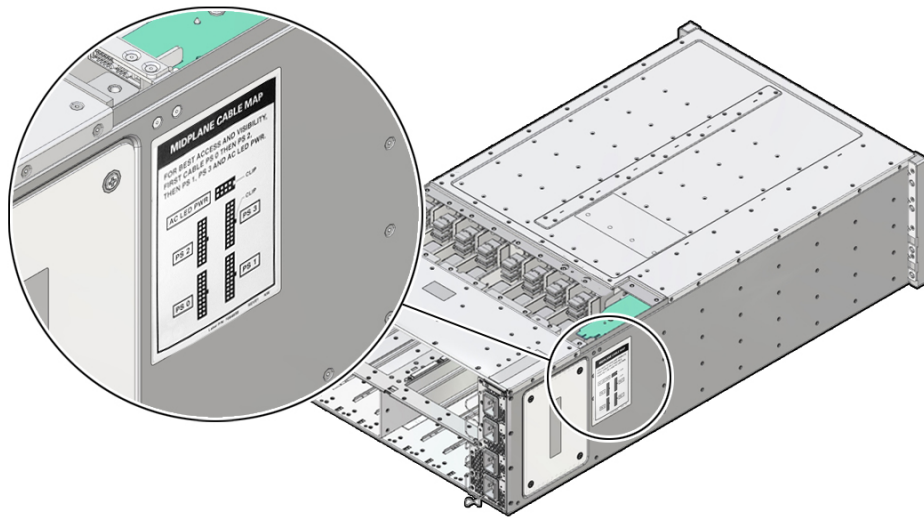
- 3. Carefully lower the midplane assembly into the server until the top of the assembly is flush with the top of the server.**

Take care not to damage the cables and connectors when lowering the midplane assembly into the server.

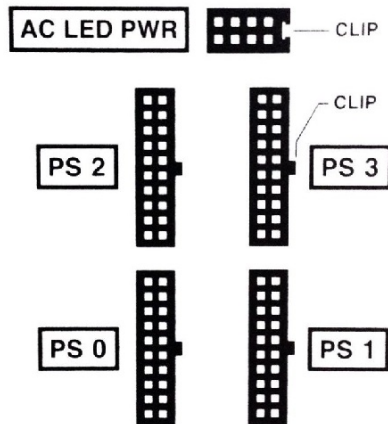


4. Connect the five cables to the connectors on the back of the midplane assembly.

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.

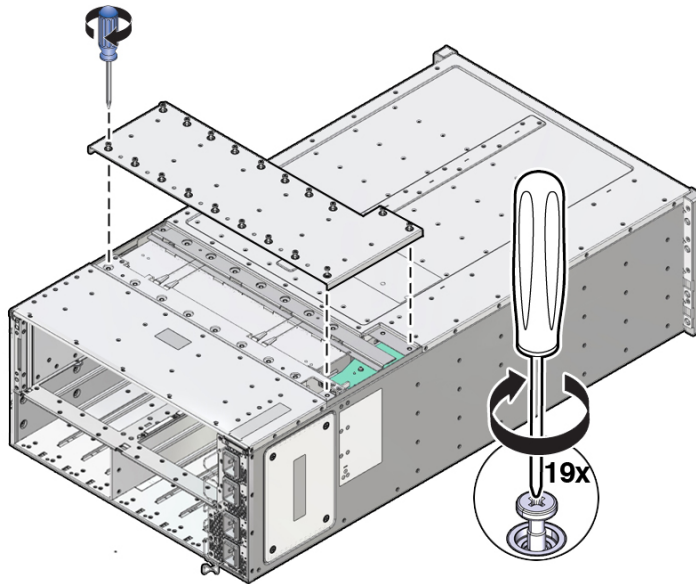


The following illustration shows the label.



5. **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.**
6. **To secure the side access cover to the chassis, tighten the four captive screws.**
7. **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.
8. **Align the top access cover with the opening in the top of the chassis.**

9. To secure the top cover to the chassis, tighten the 19 captive screws.



10. **Install the server chassis in the rack.**
Refer to [“Installing the Server Into a Rack”](#) in *Oracle Server X7-8 Installation Guide*.
11. **Replace components at the front of the server:**
 - a. **Install the CMODs.**
See [“Install a CMOD”](#) on page 167.
Your server might have four CMODs, or it might have eight.
 - b. **Install both fan frames.**
See [“Install a Fan Frame”](#) on page 137.
 - c. **Install all eight fan modules FM0-7.**
See [“Install a Fan Module”](#) on page 133.
 - d. **Install the FIM.**
See [“Install the FIM”](#) on page 232.

Returning the Server to Operation

This section describes how to return the server to service after performing cold service.

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

- [“Prepare the Server for Operation” on page 249](#)
- [“Power On the Server” on page 250](#)

▼ Prepare the Server for Operation

Use this procedure to return the server to an operational state after performing cold service.

- 1. Remove antistatic measures.**
 - Remove any antistatic straps or conductors from the server chassis.
 - Remove the antistatic wrist strap from yourself.
- 2. Ensure that all external front and back components are fully installed.**
- 3. Ensure that all cables are connected to the back of the server.**
- 4. Connect all AC power cables to their inlets on the back 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 four separate circuits.
- 5. If necessary, connect the other end of the AC power cables to the supply outlet.**
- 6. 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](#).

7. **Verify that none of the server Fault-Service Required indicators on externally facing indicator panels are lit.**

Note - After replacing some components, you must clear the fault in Oracle ILOM to clear fault indicators. For details, see [“Clear Hardware Fault Messages \(Oracle ILOM\)” on page 51.](#)

8. **Power on the server.**

▼ Power On the Server

When AC power is applied to the server power inlets, the System A or System B 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 System A or System B 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 Information page, 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.

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

Verify that the two power supply AC OK LEDs are lit.

Configuring the System Socket Modes

This section describes how to configure Oracle Server X7-8 socket modes. The following topics are covered:

- [“System Socket Mode Configurations” on page 251](#)
- [“Oracle X7-8 CPU Packages” on page 261](#)
- [“Configure Single 4-Socket Server to Dual 4-Socket Servers \(FRU\)” on page 262](#)
- [“Configure Dual 4-Socket Server to Single 8-Socket Server \(CRU\)” on page 265](#)
- [“Configure Single 8-Socket Server to Dual 4-Socket Server \(CRU\)” on page 267](#)
- [“Configure Single 4-Socket Server to Single 8-Socket Server \(FRU\)” on page 270](#)
- [“Verify the Current Socket Mode Configuration” on page 270](#)
- [“Verify the CMOD Configuration” on page 276](#)

System Socket Mode Configurations

This section provides information about Oracle Server X7-8 single 4-socket systems, dual 4-socket systems, and single 8-socket systems.

- [“Single 4-Socket \(1x4\) Server” on page 252](#)
- [“Dual 4-Socket \(2x4\) Servers” on page 255](#)
- [“Single 8-Socket \(1x8\) Server” on page 258](#)

Oracle Server X7-8 is divided into two sides, System A and System B, that you can configure into two 4-socket servers, or one 8-socket server. The two sides can operate together as one 8-socket server, or can be configured as independent systems to operate as two 4-socket servers (System A and System B). In both server configurations, Oracle Server X7-8 includes four power supplies PS0-3, eight fan modules (FM0-7), and eight dual PCIe card carriers (DPCCs).

Fan modules and DPCCs receive power from the CPU Modules (CMODs), so in a four-CMOD configuration, only fan modules FM0-3 and DPCCs 0-3 are active. Fan modules FM4-FM7 and DPCCs 4-7 are not powered and are not active. For server component information, see [“Product Description” on page 15](#).

The Oracle Server X7-8 supports four-CMOD and eight-CMOD configurations. Server upgrades from single 4-socket server to dual 4-socket servers require four CPU module upgrade kits with processor modules to upgrade from four CMODS to eight CMODS. Use the additional four CMODs to configure Oracle Server X7-8 with increased processing capabilities. See [“Oracle X7-8 CPU Packages” on page 261](#).

Customers can configure single 8-socket (1x8) servers for dual 4-socket (2x4) mode or dual 4-socket (2x4) servers for single 8-socket (1x8) mode, as required. Service engineers can configure single 4-socket (1x4) servers for dual 4-socket (2x4) mode or single 8-socket (1x8) mode operation, as required. The configuration changes are categorized as customer-replaceable units (CRU) or field-replaceable units (FRU) as follows:

- Configure a single 4-socket server to a dual 4-socket server (FRU)
- Configure a dual 4-socket server to a single 8-socket server (CRU)
- Configure a single 8-socket server to a dual 4-socket server (CRU)
- Configure a single 4-socket server to a single 8-socket server (FRU)

Note - During Oracle Server X7-8 reconfiguration, administrators must manually clear all existing faults before a 4-socket mode to 8-socket mode change.

Oracle Server X7-8 systems that were ordered as single 4-socket (1x4) servers can be upgraded to dual 4-socket (2x4) or single 8-socket (1x8) servers by service engineers. Since identity information for B-side is preprogrammed as Midplane FRUPROM#1 and SMOD1, when the System B side is booted for the first time after the hardware upgrade (adding CMOD4-7), Oracle ILOM will automatically program the top-level indicator (TLI) information to CMOD4 (Backup Container 2). No manual intervention is required.

The single 4-socket Oracle Server X7-8 system is factory-configured as (2x4) mode, with all System B components installed, except for the CMODs, which service engineers need to install in the empty CMOD bays 4-7. The System B System Module (SMOD1), power supplies, fans, dual PCIe card carriers, and midplane are all pre-tested in the factory when Oracle Server X7-8 system is shipped. Storage drives are included.

For information about server modes, refer to [“Server Components” in Oracle Server X7-8 Installation Guide](#).

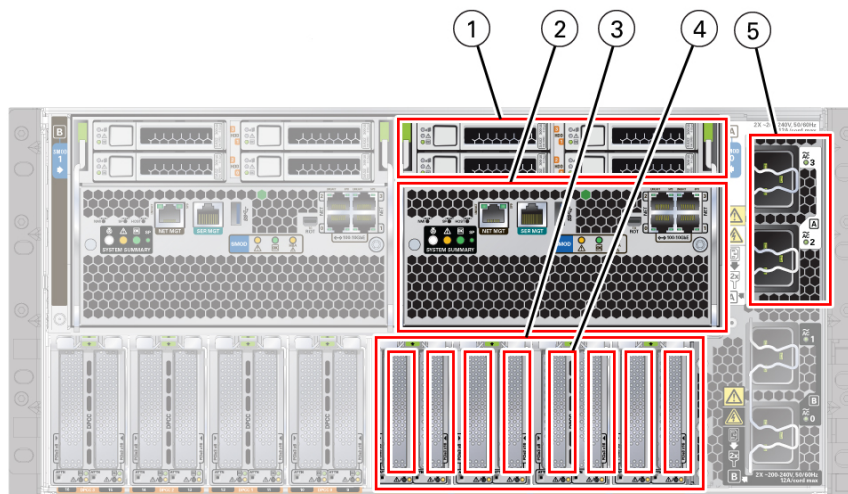
Single 4-Socket (1x4) Server

For the single 4-socket (1x4) server configuration:

- System Module (SMOD) SMOD0 System A and SMOD1 System B must be installed, but only SMOD0 is active.

- CPU modules (CMODs) must be installed in slots 0-3. CMOD slots 4-7 are empty.
 - All eight dual PCIe card carrier (DPCC) slots must be installed but only DPCC slots 1, 2, 3 and 4 are active.
PCIe slots 5, 6, 7, and 8 are nonfunctional in 4-socket systems.
 - All eight fan modules (FMs) must be installed but only FMs 0-3 are active.
 - Both fan frames must be installed.
 - PS2 and PS3 are installed and active. PS0 and PS1 are also installed, but inactive. PS2 and PS3 power System A. PS0 and PS1 power System B.
- All four AC power connectors on the back panel must be attached with grounded AC power cords.
- Storage drive bays in System B may have filler panels installed.

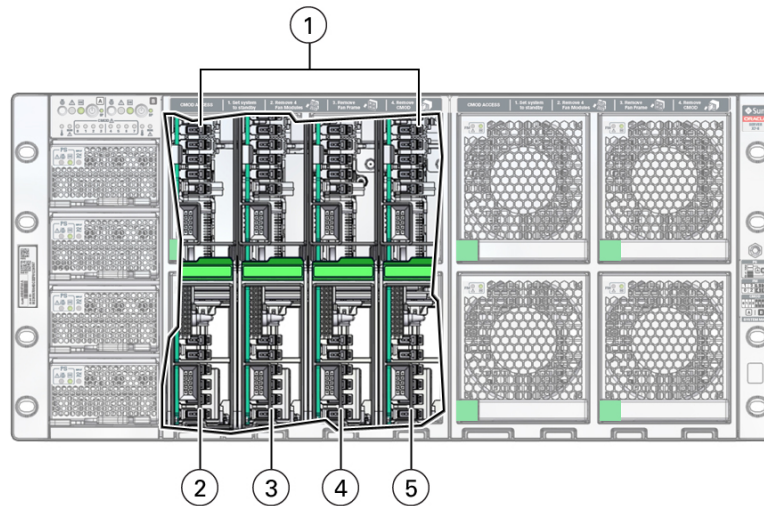
The following illustration shows an Oracle Server X7-8 back panel with a single 4-socket (1x4) server four-CMOD configuration.



Call Out	Description
1	HDD0-3 four storage drives, back panel accessible
2	SMOD0 System A
3	PCIE1-8 System A
4	DPCC0-3 System A

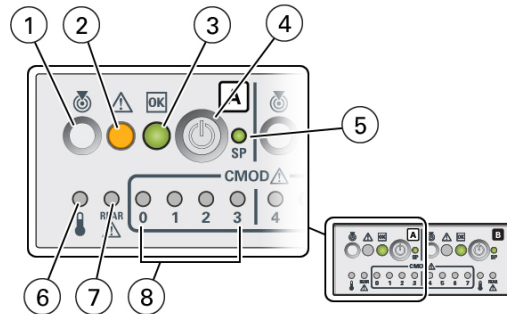
Call Out	Description
5	AC Inlets 2, 3 System A

The following illustration shows an Oracle Server X7-8 front panel with a single 4-socket (1x4) server four-CMOD configuration. 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. In the illustration, the front panel left-side fan modules and fan frame have been removed to show the four active CMODs behind the fan frame. Call out 1 identifies the group of four active CMODs.



Call Out	Description
1	System A: four active CMODs behind fan frame, front panel accessible
2	CMOD0 System A
3	CMOD1 System A
4	CMOD2 System A
5	CMOD3 System A

For servers with a single 4-socket (1x4) server configuration, the FIM provides controls and indicators for System A (SMOD0) only. The following illustration shows an Oracle Server X7-8 front panel FIM with a single 4-socket (1x4) server configuration.



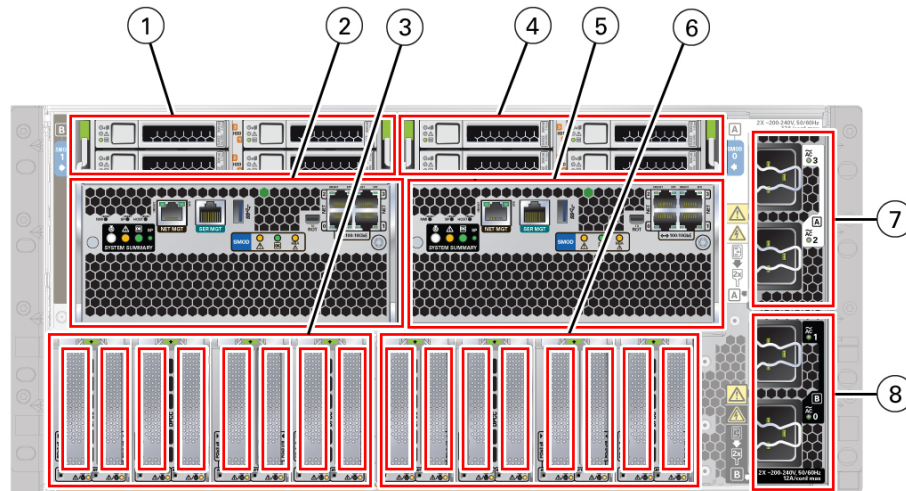
Call Out	Description
1	Locate button/LED (chassis SMOD0 System A)
2	Fault-Service Required (chassis SMOD0 System A)
3	System OK (chassis SMOD0 System A)
4	On/Standby button chassis SMOD0 System A (recessed)
5	SP OK (chassis SMOD0 System A)
6	System Overtemperature Warning (chassis SMOD0 System A)
7	Rear Fault-Service Required LED (chassis SMOD0 System A)
8	CMOD Fault-Service Required LEDs 0, 1, 2, 3

Dual 4-Socket (2x4) Servers

For the dual 4-socket server configuration:

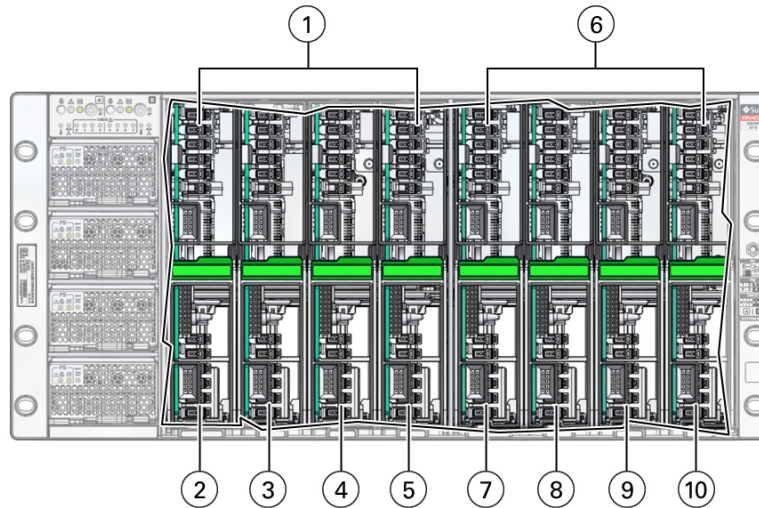
- System Module 0 (SMOD0) System A and SMOD1 System B must be installed.
- CPU Modules (CMODs) must be installed in slots 0-7.
- Dual PCIe card carrier (DPCC) slots 0-3 and DPCC slots 4-7 must be installed and are active.
- All eight fan modules (FMs) must be installed. All FMs must be active in the dual 4-socket configuration.
- Both fan frames must be installed.
- PS2 and PS3 are installed and active. PS0 and PS1 are also installed and active. PS2 and PS3 power System A. PS0 and PS1 power System B.
- All four AC power connectors on the back panel must be attached with grounded AC power cords.

The following illustration shows an Oracle Server X7-8 back panel with a dual 4-socket configuration.



Call Out	Description
1	HDD0-3 System B
2	SMOD1 System B
3	PCIe Slots 9-16 System B
4	HDD0-3 System A
5	SMOD0 System A
6	PCIe Slots 1-8 System A
7	AC Power System A: 3, 2
8	AC Power System B: 1, 0

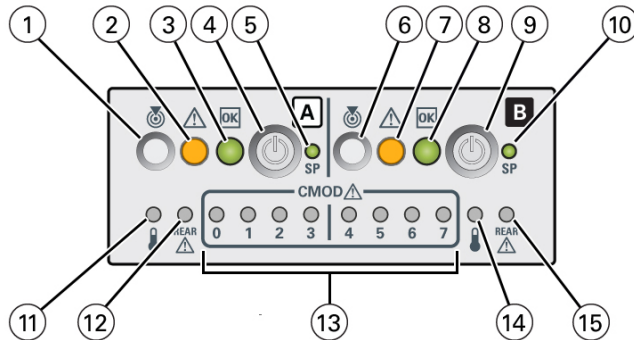
The following illustration shows an Oracle Server X7-8 front panel with a dual 4-socket configuration.



Call Out	Description
1	System A
2	CMOD0 System A
3	CMOD1 System A
4	CMOD2 System A
5	CMOD3 System A
6	System B
7	CMOD4 System B
8	CMOD5 System B
9	CMOD6 System B
10	CMOD7 System B

For servers with a dual 4-socket configuration, the FIM provides separate controls and indicators for System A (SMOD0) and System B (SMOD1).

The following illustration shows an Oracle Server X7-8 front panel FIM with a dual 4-socket configuration.



Call Out	Description
1	Locate button/LED (chassis SMOD0 System A)
2	Fault-Service Required (chassis SMOD0 System A)
3	System OK (chassis SMOD0 System A)
4	On/Standby button (chassis SMOD0 System A) (recessed)
5	SP OK (chassis SMOD0 System A)
6	Locate button/LED (SMOD1 System B)
7	Fault-Service Required (SMOD1 System B)
8	System OK (SMOD1 System B)
9	On/Standby button SMOD1 System B (recessed)
10	SP OK (SMOD1 System B)
11	System Overtemperature Warning (SMOD0 System A)
12	Rear Fault-Service Required LED (SMOD0 System A)
13	CMOD Fault-Service Required LEDs (chassis SMOD0 System A: 0, 1, 2, 3, and SMOD1 System B: 4, 5, 6, 7)
14	System Overtemperature Warning (SMOD1 System B)
15	Rear Fault-Service Required LED (SMOD1 System B)

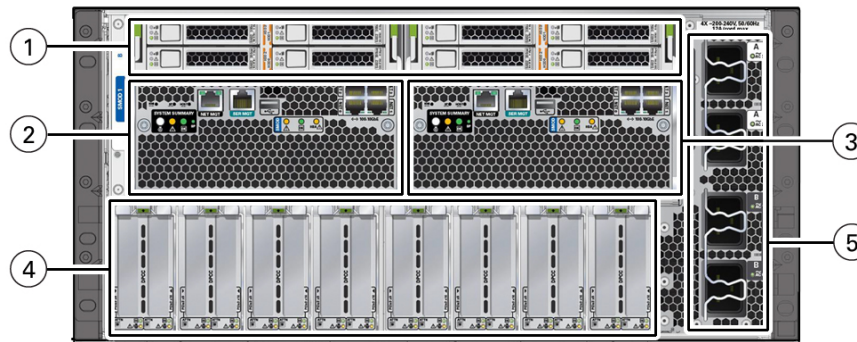
Single 8-Socket (1x8) Server

For the single 8-socket (1x8) server configuration:

- System Module 0 (SMOD0) System A and SMOD1 System B must be installed.

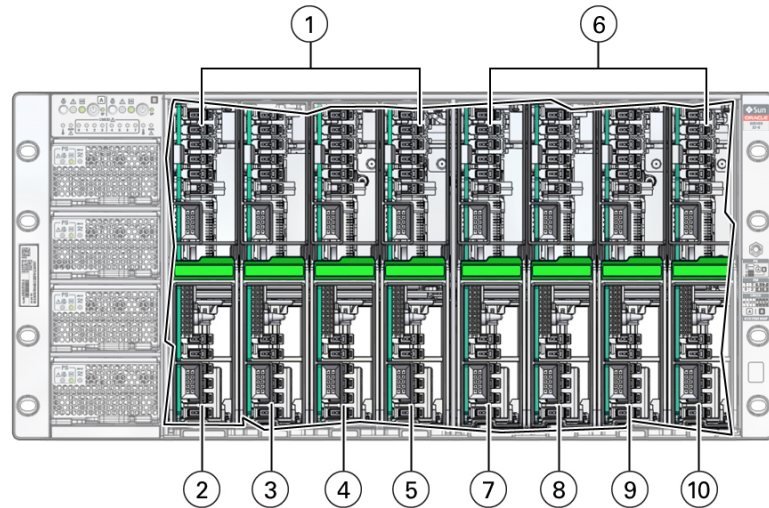
- Eight CPU Modules (CMODs) must be installed in slots 0-7.
In an 8-socket configuration, System A must have Intel Xeon 81xx series processors installed, and System A and System B processor SKUs and memory (capacity and number of DIMMs per CMOD) must be identical.
- All eight dual PCIe card carrier (DPCC) slots 0-7 must be installed and must be active.
- All eight fan modules (FM)s must be installed and all FM)s must be active.
- Both fan frames must be installed.
- PS2 and PS3 power System A. PS0 and PS1 power System B.
- All four AC power connectors on the back panel must be attached with grounded AC power cords.

The following illustration shows a server back panel with an single 8-socket (1x8) server configuration.



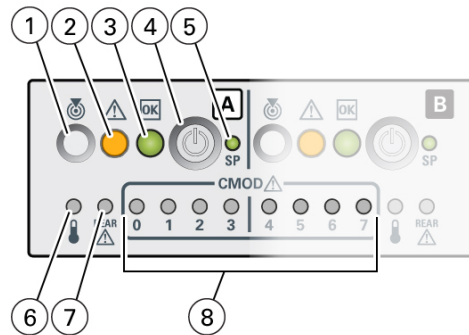
Call Out	Description
1	HDD0-7 System A
2	SMOD0 System A: Active
3	SMOD1 System B: Inactive
4	PCIe Slots 1-16: System A
5	AC Power: Four AC inlets connected to AC power cords: System A 2, 3 and System B 1, 0

The following illustration shows a server front panel 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.



Call Out	Description
1	System A
2	CMOD0 System A
3	CMOD1 System A
4	CMOD2 System A
5	CMOD3 System A
6	System B
7	CMOD4 System B
8	CMOD5 System B
9	CMOD6 System B
10	CMOD7 System B

For servers with a single 8-socket (1x8) server configuration, the FIM provides controls and indicators for System A (SMOD0) and System B CMODs 4-7. Other System B (SMOD1) buttons and indicators are not operational. The following illustration shows an Oracle Server X7-8 front panel FIM with a single 8-socket (1x8) server configuration.



Call Out	Description
1	Locate button/LED (chassis SMOD0 System A)
2	Fault-Service Required (chassis SMOD0 System A)
3	System OK (chassis SMOD0 System A)
4	On/Standby button (chassis SMOD0 System A) (recessed)
5	SP OK (chassis SMOD0 System A)
6	System Overtemperature Warning (chassis SMOD0 System A)
7	Rear Fault-Service Required LED (chassis SMOD0 System A back panel)
8	CMOD Eight Fault-Service Required LEDs 0-7

Oracle X7-8 CPU Packages

Before you can configure different socket modes for Oracle Server X7-8, you need to obtain the required Oracle X7-8 CPU Module Packages from Oracle. Contact your sales representative for information about ordering the CPU module packages.

Oracle Server X7-8 CPU Module package includes one CMOD. Each CMOD supports one processor (CPU). To produce a dual 4-socket server or a single 8-socket server, you need to order four CPU module packages. In a dual 4-socket configuration, the two sides of the system can support either identical or different processor SKUs and memory. In an 8-socket configuration, System A must have Intel Xeon 81xx series processors installed, and System A and System B processor SKUs and memory (capacity and number of DIMMs per CMOD) must be identical.

Processor and memory options for each CPU module package include the following:

- Processors (CPUs):
 - One Intel Xeon Platinum 8168 Processor, 24-core, 2.7-GHz (single 8-socket (1x8) server)
 - One Intel Xeon Platinum 8160 Processor, 24-core, 2.1-GHz (single 8-socket (1x8) server)
 - One Intel Xeon Gold 6140 processor, 18-core, 2.3-GHz
 - One Intel Xeon Gold 6128 Processor, 6-core, 3.4-GHz
- Memory (DIMMs): (DDR4-2666) 6 or 12 DIMMs of each capacity supported, 12 DIMMs maximum
 - 16-GB RDIMMs
 - 32-GB RDIMMs
 - 64-GB LRDIMMs

Note - The currently supported components are subject to change. For updated information, refer to *Oracle Server X7-8 Product Notes* at: <https://www.oracle.com/goto/x7-8/docs>

▼ Configure Single 4-Socket Server to Dual 4-Socket Servers (FRU)

The following procedure describes how to configure an Oracle Server X7-8 single 4-socket system (1x4) to a dual 4-socket system (2x4).



Caution - CPU modules must be removed and replaced only by authorized Oracle Service personnel.



Caution - This procedure requires that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow electrostatic discharge safety measures and antistatic practices. See “[Electrostatic Discharge and Static Prevention Measures](#)” on page 97.

- Before You Begin**
- Prepare to set up and configure two servers (System A and System B) for independent operation.
 - Determine Oracle Server X7-8 CMOD CPU module processor and memory population.

Note - In a dual 4-socket configuration, the two sides of the system can support either identical or different processor SKUs and memory.

In an Oracle Server X7-8 dual 4-socket system (2x4), the System A and System B CMOD processor and memory populations can be dissimilar. Conversion to a single 8-socket system (1x8) may require additional CMOD processor and memory removal and replacement to match all CMODs.

- Obtain Oracle Server X7-8 CPU Modules packages: 4 CMOD CPU module kits with processor modules
- Obtain System B server optional components such as PCIe cards and storage drives, as required. See [“Replaceable Components” on page 22](#).
- Resolve all open problems in the server, server components, and chassis.

1. Clear all server faults.

See [“Troubleshooting and Diagnostics” on page 45](#).

2. Verify the System A server single 4-Socket (1x4) mode.

- System B is not active.
- Fans FM4-7 are installed but are not running.
- CMODs 4-7 are not installed.
- Inspect the AC power block on the back panel.

Power cords to AC inlets 0, 1, 2, and 3 must be connected. All four AC power connectors on the back panel must be attached using grounded AC power cords. See [“Back Panel Components” on page 19](#).

See [“Verify the Current Socket Mode Configuration” on page 270](#).

3. Connect the System B management ports on SMOD1 on the back panel.

- Connect a serial cable between the SP and a terminal device or PC, used for the initial configuration. Attach the serial cable to the System B serial management port SER MGT.
- Connect an Ethernet cable for the SP to the administration network. Attach an Ethernet cable to the System B SP management port NET MGT.
- Connect an Ethernet cable for the host's primary interface to the main network. Attach Ethernet cables to the System B four network ports NET0-3.

See [“Attaching Devices to the Server” on page 90](#) and [“Back Panel Components” on page 19](#).

4. Prepare the server for cold service.

See [“Preparing the Server for Component Replacement” on page 100](#).

5. Unpack the new Oracle Server X7-8 4 CPU Modules package components.

Before starting this step, confirm that you have obtained the correct CPU Module packages. See [“Oracle X7-8 CPU Packages” on page 261](#).

Place the CPU modules and components on an ESD safety mat.

Note - If the CMODs in System B side slots 4, 5, 6 and 7 processor and memory configurations are not identical, the server will not power on. System A can use different processor and memory configurations.

6. Install four CMODs in System B-side slots 4, 5, 6 and 7.

See [“Upgrade the Server From Four to Eight CMODs \(FRU\)” on page 198](#). See [“Install a CMOD” on page 167](#).

7. Add System B server optional components as required.

Optional components include PCIe cards and storage drives. See [“Replaceable Components” on page 22](#) and [“Servicing Components” on page 123](#).

8. Return the System A server to operation.

Verify that the two power supply AC OK LEDs are lit.

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

See [“Returning the Server to Operation” on page 249](#).

9. Return the System B server to operation.

Verify that the two power supply AC OK LEDs are lit.

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

See [“Returning the Server to Operation” on page 249](#).

10. Verify the System B server dual 4-socket (2x4) server mode.

See [“Verify the Current Socket Mode Configuration” on page 270](#).

11. Update the System B server Oracle ILOM and BIOS firmware.

A System Firmware (SysFW) image contains both the SP and BIOS firmware. An upgrade takes about five to seven minutes to complete. No other tasks can be performed using the SP until the firmware upgrade is complete and Oracle ILOM is reset.

Refer to [“Getting Firmware and Software Updates”](#) in *Oracle Server X7-8 Installation Guide*.

12. Run UEFI diagnostics for System A and System B.

See [“Troubleshooting and Diagnostics”](#) on page 45.

13. Configure the operating systems for System A and System B.

Refer to the *Oracle Server X7-8 Operating Systems Installation Guide*.

▼ Configure Dual 4-Socket Server to Single 8-Socket Server (CRU)

The following procedure describes how to configure a dual 4-socket system (2x4) to a single 8-socket system (1x8).

- Before You Begin**
- Ensure that all eight CMODs have identical processors and memory installed. The system will not power on if CMODs have different configurations. See [“Oracle X7-8 CPU Packages”](#) on page 261.

In an 8-socket configuration, System A must have Intel Xeon 81xx series processors installed, and System A and System B processor SKUs and memory (capacity and number of DIMMs per CMOD) must be identical.

- Resolve all open problems in the server, server components, and chassis.

1. Clear all server faults.

Refer to [“Troubleshooting and Diagnostics”](#) on page 45.

2. Verify the CMOD Configuration.

The system will not power on if CMODs have different configurations.

- Confirm that CMODs 0-3 match CMODs 4-7 to ensure all eight CMODs have identical processors installed.
- Confirm that CMODs 0-3 match CMODs 4-7 to ensure CMODs have identical memory (DIMMs) installed.

See [“Verify the CMOD Configuration”](#) on page 276.

3. Verify the System A server dual 4-socket (2x4) server mode.

- System A is active.
- System B is active.
- Fans FM4-7 are installed and running.
- CMODs 4-7 are installed.
- Inspect the AC power block on the back panel.
Power cords to AC inlets 0, 1, 2, and 3 must be connected. All four AC power connectors on the back panel must be attached using grounded AC power cords. See [“Back Panel Components” on page 19.](#)

See [“Verify the Current Socket Mode Configuration” on page 270.](#)

4. Prepare the System A server for warm service.

Log in to the System A Oracle ILOM CLI, and type the following command at the Oracle ILOM prompt to gracefully shut down the server:

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

See [“Preparing the Server for Component Replacement” on page 100.](#)

5. Prepare the System B server for warm service.

Log in to the System B Oracle ILOM CLI, and type the following command at the Oracle ILOM prompt to gracefully shut down the server:

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

See [“Preparing the Server for Component Replacement” on page 100.](#)

6. Configure the server for single 8-Socket (1x8) server operation.

Log in to the System A Oracle ILOM CLI, and type the following commands at the Oracle ILOM prompt:

```
-> show /SP/policy ENABLE_8_SOCKET_MODE
```

```
/SP/policy
  Properties:
    ENABLE_8_SOCKET_MODE = disabled
```

```
-> set /SP/policy ENABLE_8_SOCKET_MODE=enabled
```

NOTE: Changing socket mode may take several minutes to complete. The SP will be immediately restarted and complete chassis power cycle will take place.

Before proceeding, please make sure:

- 1) Host power is turned off at both sides of the chassis.
- 2) No other management task or reconfiguration is happening.

Are you sure you want to set ENABLE_8_SOCKET_MODE=enabled (y/n)? y

The system resets. No message is displayed. Wait for the SP to come back online.



Caution - Do not perform any server actions during the system reset.

7. Return the System A server to operation.

Verify that the two System A power supply AC OK LEDs are lit.

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

See [“Returning the Server to Operation” on page 249](#).

8. Verify the single 8-socket (1x8) server mode.

In single 8-socket (1x8) mode, the back panel SMOD1 OK LED is off.

See [“Verify the Current Socket Mode Configuration” on page 270](#).

9. Update the System A server Oracle ILOM and BIOS firmware, as required.

A System Firmware (SysFW) image contains both the SP and BIOS firmware. An upgrade takes about five to seven minutes to complete. No other tasks can be performed using the SP until the firmware upgrade is complete and Oracle ILOM is reset.

See [“Getting Firmware and Software Updates” in Oracle Server X7-8 Installation Guide](#).

10. Run UEFI diagnostics for System A.

Refer to [“Troubleshooting and Diagnostics” on page 45](#).

11. Configure the operating system.

Refer to the [Oracle Server X7-8 Operating Systems Installation Guide](#).

▼ **Configure Single 8-Socket Server to Dual 4-Socket Server (CRU)**

The following procedure describes how to configure a single 8-socket system (1x8) to a dual 4-socket system (2x4).

- Before You Begin**
- Prepare to set up and configure two servers (System A and System B) for independent operation.
 - Determine Oracle Server X7-8 dual 4-socket system (2x4) CMOD CPU module processor and memory population.

Note - In a dual 4-socket configuration, the two sides of the system can support either identical or different processor SKUs and memory.

In an Oracle Server X7-8 dual 4-socket system (2x4), the System A and System B CMOD processor and memory populations can be dissimilar. Conversion to a single 8-socket system (1x8) may require additional CMOD processor and memory removal and replacement to match all CMODs.

- Resolve all open problems in the server, server components, and chassis.
 - Verify the System B management ports connectivity on SMOD1 on the back panel, as required.
 - Connect a serial cable between the SP and a terminal device or PC, used for the initial configuration. Attach the serial cable to the System B serial management port SER MGT.
 - Connect an Ethernet cable for the SP to the administration network. Attach an Ethernet cable to the System B SP management port NET MGT.
 - Prepare the System B host's network ports.

Connect four Ethernet cables for the host's primary interface to the main network. Attach Ethernet cables to the System B four network ports NET0-3.
1. **Clear all server faults.**

See [“Troubleshooting and Diagnostics” on page 45.](#)
 2. **Verify the System A server single 8-socket (1x8) server mode.**

See [“Verify the Current Socket Mode Configuration” on page 270.](#)
 3. **Prepare the server for warm service.**

Log in to the System A Oracle ILOM command-line interface (CLI), and type the following command at the Oracle ILOM prompt:
To gracefully shut down the server, type:

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

See [“Preparing the Server for Component Replacement” on page 100.](#)

4. Configure the server for dual 4-socket (2x4) server operation.

Log in to the System A Oracle ILOM CLI, and type the following commands at the Oracle ILOM prompt:

```
-> show /SP/policy ENABLE_8_SOCKET_MODE
```

```
/SP/policy
Properties:
  ENABLE_8_SOCKET_MODE = enabled
```

```
-> set /SP/policy ENABLE_8_SOCKET_MODE=disabled
```

NOTE: Changing socket mode may take several minutes to complete. The SP will be immediately restarted and complete chassis power cycle will take place.

Before proceeding, please make sure:

- 1) Host power is turned off at both sides of the chassis.
- 2) No other management task or reconfiguration is happening.

```
Are you sure you want to set ENABLE_8_SOCKET_MODE=disabled (y/n)? y
```

The system resets. No message is displayed. Wait for the SP to come back online.

5. Add System B server optional components, as required.

Optional components include PCIe cards and storage drives. See [“Replaceable Components” on page 22](#) and [“Servicing Components” on page 123](#).

6. Update the System B server Oracle ILOM and BIOS firmware. This step is required.

A System Firmware (SysFW) image contains both the SP and BIOS firmware. An upgrade takes about five to seven minutes to complete. No other tasks can be performed using the SP until the firmware upgrade is complete and Oracle ILOM is reset.

Refer to [“Getting Firmware and Software Updates” in Oracle Server X7-8 Installation Guide](#).



Caution - Follow software update best practices for servers. Firmware can be different on System A and System B in dual 4-socket (2x4) server mode.

7. Verify the System B server dual 4-socket (2x4) server mode.

- System A is active.
- System B is active.

See [“Verify the Current Socket Mode Configuration” on page 270](#).

8. Run UEFI diagnostics for System A and System B.

See [“Troubleshooting and Diagnostics” on page 45](#).

9. **Configure the operating systems for System A and System B.**

Refer to the [Oracle Server X7-8 Operating Systems Installation Guide](#).

▼ **Configure Single 4-Socket Server to Single 8-Socket Server (FRU)**

The following procedure describes how to configure a single 4-socket (1x4) to a single 8-socket system (1x8).

1. **Configure single 4-socket (1x4) server to dual 4-socket (2x4) servers.**

See [“Configure Single 4-Socket Server to Dual 4-Socket Servers \(FRU\)”](#) on page 262.

2. **Configure dual 4-socket (2x4) servers to single 8-socket (1x8) server.**

See [“Configure Dual 4-Socket Server to Single 8-Socket Server \(CRU\)”](#) on page 265.

Note - During Oracle Server X7-8 reconfiguration, administrators must manually clear all existing faults before a 4-socket to 8-socket mode change.

▼ **Verify the Current Socket Mode Configuration**

● **Verify that the server socket mode is operational using one of the following methods:**

■ **System A or System B SP Oracle ILOM CLI**

a. **Display the socket mode configuration using Oracle ILOM CLI.**

For more information, see [“Using Oracle ILOM”](#) in [Oracle Server X7-8 Installation Guide](#).

i **Log in to the System A or System B SP Oracle ILOM CLI.**

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

```
ssh root@ipaddress
```

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

The Oracle ILOM CLI prompt appears: ->

- ii **Log in to the System A Oracle ILOM command-line interface (CLI), and type the following command at the Oracle ILOM prompt:**

```
-> show /SP/Policy ENABLE_8_SOCKET_MODE

/SP/policy
  Properties:
    ENABLE_8_SOCKET_MODE = disabled
```

- **System A or System B Oracle ILOM Diag shell using hwdiag commands**

- a. **Display the current system configuration using the hwdiag command.**

The hwdiag commands are accessed from the Oracle ILOM Diag shell. For information about the Diag shell and how to use the hwdiag commands, see [“Troubleshooting Using Diagnostic Tools” on page 56](#).

- i **Enter the Oracle ILOM Diag shell. From the Oracle ILOM command-line interface (CLI), type:**

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

- ii **Display system summary information. Type:**

```
diag> hwdiag system summary
```

The system returns summary information. For example, for a server configured in single 4-socket server mode, output similar to the following is displayed:

```
diag> hwdiag system summary
HWdiag (Diag Shell) - Build Number 121981 (Oct 17 2017, 16:37:05)
  Current Date/Time: Oct 25 2017, 10:08:53
This is a X7-8A.

Platform ORACLE SERVER X7-8

ILOM   Firmware Date: Tue Oct 17 16:51:34 PDT 2017, Version: 4.0.2.0
(r121981)
SP     Pilot4 Revision: A2
CPLD   SMOD0 Version - 38.28
        CMOD0 Version - 38.28
        CMOD1 Version - 38.28
        CMOD2 Version - 38.28
        CMOD3 Version - 38.28
BIOS   Version - 47020200
```

```

MRC Version - 147.52.015
CPUs 4 Intel(R) Xeon(R) Platinum 8160 CPU @ 2.10GHz, H Stepping
Memory 48 DIMM(s), Total Size: 3072.00 GB
Fans FM0 FM1 FM2 FM3 PS2 PS3
PSUs PSU2 PSU3
Disks HDD0 HDD1 HDD2
PCIE
SMOD0 DMI : x4 @ 8.0GT/s Vendor: 8086 (Intel Corporation), Device:
2020
PCIE slot2: x8 @ 8.0GT/s Vendor: 8086 (Intel Corporation), Device:
1589 (Oracle Quad Port 10GBase-T Adapter)
SMOD0 HBA : x8 @ 8.0GT/s Vendor: 1000 (LSI Logic / Symbios Logic),
Device: 00CE (Oracle Storage 12 Gb SAS PCIe HBA, 16 port, RAID, internal)
PCIE slot1: x8 @ 8.0GT/s Vendor: 8086 (Intel Corporation), Device:
1589 (Oracle Quad Port 10GBase-T Adapter)
PCIE slot4: x8 @ 8.0GT/s Vendor: 8086 (Intel Corporation), Device:
1583 (Oracle Quad 10 Gb or Dual 40 Gb Ethernet Adapter)
SMOD0 PCH : x8 @ 8.0GT/s Vendor: 8086 (Intel Corporation), Device:
37C0
PCIE slot3: x8 @ 8.0GT/s Vendor: 14E4 (Broadcom Corporation),
Device: 16D7 (Oracle Dual Port 25 Gb Ethernet Adapter)
PCIE slot6: x8 @ 8.0GT/s Vendor: 1077 (QLogic Corp.), Device: 2261
(Oracle Storage Dual-Port 32Gb Fibre Channel PCIe Low Profile HBA, Qlogic)
PCIE slot5: x8 @ 8.0GT/s Vendor: 8086 (Intel Corporation), Device:
1583 (Oracle Quad 10 Gb or Dual 40 Gb Ethernet Adapter)
PCIE slot8: x8 @ 8.0GT/s Vendor: 10B5 (PLX Technology, Inc.),
Device: 8718 (Oracle Flash Accelerator F640 PCIe Card: 6.4 TB, NVMe PCIe
3.0)
PCIE slot7: x8 @ 8.0GT/s Vendor: 15B3 (Mellanox Technologies),
Device: 1003 (Oracle Dual Port QDR InfiniBand Adapter M3)
SP : x1 @ 2.5GT/s Vendor: 19A2 (Emulex Corporation),
Device: 0120 (ILOM Embedded Processor)
diag>

```

iii To display detailed system configuration information, type:

```
diag> hwdiag system info
```

For a server configured in single 4-socket server mode, output similar to the following is displayed:

```

diag> hwdiag system info
HWdiag - Build Number 121771 (Oct 07 2017, 08:56:11)
Current Date/Time: Nov 02 2017, 01:15:18
This is a X7-8A.

Platform ORACLE SERVER X7-8

```

```

ILOM   Firmware Date: Fri Oct  6 18:09:53 PDT 2017, Version:
        4.0.0.31(r121771)
SP     Pilot4 Revision: A2
SMOD   SMOD0 Revision - P1.L
        SP Debug Jumper: Installed
CMOD   Revisions - P1.L
        CMODs Present: 0 1 2 3
        PCIe Slots Populated: 5 6 7 8
        PCIe Slots Disabled:
        PCIe Slots with ROT Devices:
        Lockdown Mode: Disabled
        ROT Cable: Not Installed
CPLD   SMOD0 Version - 38.28
        CMOD0 Version - 38.28
        CMOD1 Version - 38.28
        CMOD2 Version - 38.28
        CMOD3 Version - 38.28
BIOS   Version - 47017600
        MRC Version - This selection requires HOST Power to be ON ...
        Microcode Version - This selection requires HOST Power to be ON ...
        Last known port80 code: 2017-11-01 20:09:16.672769: 000000B7 AMI:
    
```

Config

```

uration Reset (reset of NVRAM settings) | Intel: STS_CHANNEL_TRAINING
CPU 0   This selection requires HOST Power to be ON ...
CPU 1   This selection requires HOST Power to be ON ...
CPU 2   This selection requires HOST Power to be ON ...
CPU 3   This selection requires HOST Power to be ON ...
PCH     This selection requires HOST Power to be ON ...
    
```

Memory

CPU 0 Memory Devices

Location	Mfg	Size(GB)	Rank	Width	Speed(MT/s)	Chan
Dimm Ena						
bled-Ranks						
/SYS/CMOD0/P0/D0	Samsung	64.00	Quad	x4	*	* *
/SYS/CMOD0/P0/D2	Samsung	64.00	Quad	x4	*	* *
/SYS/CMOD0/P0/D4	Samsung	64.00	Quad	x4	*	* *
/SYS/CMOD0/P0/D7	Samsung	64.00	Quad	x4	*	* *
/SYS/CMOD0/P0/D9	Samsung	64.00	Quad	x4	*	* *
/SYS/CMOD0/P0/D11	Samsung	64.00	Quad	x4	*	* *

Total memory populated on CPU 0: 384.00 GB

CPU 1 Memory Devices

Location	Mfg	Size(GB)	Rank	Width	Speed(MT/s)	Chan
Dimm Ena						
bled-Ranks						
/SYS/CMOD1/P1/D0	Samsung	64.00	Quad	x4	*	* *
/SYS/CMOD1/P1/D2	Samsung	64.00	Quad	x4	*	* *

Verify the Current Socket Mode Configuration

```

/SYS/CMOD1/P1/D4  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD1/P1/D7  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD1/P1/D9  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD1/P1/D11 Samsung  64.00  Quad  x4  *      *  *

```

Total memory populated on CPU 1: 384.00 GB

CPU 2 Memory Devices

```

Location          Mfg      Size(GB) Rank  Width Speed(MT/s) Chan
Dimm Ena
bled-Ranks
/SYS/CMOD2/P2/D0  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD2/P2/D2  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD2/P2/D4  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD2/P2/D7  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD2/P2/D9  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD2/P2/D11 Samsung  64.00  Quad  x4  *      *  *

```

Total memory populated on CPU 2: 384.00 GB

CPU 3 Memory Devices

```

Location          Mfg      Size(GB) Rank  Width Speed(MT/s) Chan
Dimm Ena
bled-Ranks
/SYS/CMOD3/P3/D0  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD3/P3/D2  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD3/P3/D4  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD3/P3/D7  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD3/P3/D9  Samsung  64.00  Quad  x4  *      *  *
/SYS/CMOD3/P3/D11 Samsung  64.00  Quad  x4  *      *  *
*

```

Total memory populated on CPU 3: 384.00 GB

Total memory populated in system: 1536.00 GB

Fans FM0 FM1 FM2 FM3 PS2 PS3

PSUs PSU2 PSU3

Disks HDD0 HDD1 HDD2 HDD3

PCIe

This selection requires HOST Power to be ON ...

This selection requires HOST Power to be ON ...

Host Network Ports SMOD0

Net0 status: UP, speed: 1000BASE-T, duplex: full

Net1 status: DOWN

Net2 status: UP, speed: 1000BASE-T, duplex: full

Net3 status: UP, speed: 1000BASE-T, duplex: full

diag>

- **System A or System B SP Oracle ILOM web interface**

- a. **Verify the System A or System B server components, firmware version, and system status using the Oracle ILOM Summary Information page.**

- i **Log in to the System A or System B 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 Login screen. The Summary Information page appears.

- ii **View system details, as required.**

On the Summary Information page, you can view general system information and identify system status. The Status table lists server components that require service.

The screenshot shows the Oracle ILOM v4.0.2.0 Summary Information page. The left sidebar contains a navigation menu with options like Chassis View, System Information, Summary, Processors, Memory, Power, Cooling, Storage, Networking, PCI Devices, Firmware, Open Problems (0), System Log, Remote Control, Host Management, System Management, Power Management, ILOM Administration, and Site Map. The main content area is divided into General Information, Actions, and Status.

General Information

System Type	Rock Mount
Model	ORACLE SERVER X7-9
QPart ID	Q13015
Part Number	7336848-C
Serial Number	1715XC4009B
RFID Serial Number	341A583DE5000000004009B
System Identifier	
System Firmware Version	4.0.2.0
Primary Operating System	Oracle Linux Server release 7.4
Host Primary MAC Address	
ILOM Address	
ILOM MAC Address	

Actions

Power State: ON

Locator Indicator: OFF

System Firmware Update:

Remote Console:

Status

Overall Status: OK Total Problem Count: 0

Subsystem	Status	Details	Inventory
Processors	<input checked="" type="checkbox"/> OK	Processor Architecture: x86 64-bit Processor Summary: Four Intel Xeon Processor Scalable Family	Processors: 4 / 4 (installed / Maximum)
Memory	<input checked="" type="checkbox"/> OK	Installed RAM Size: 3072 GB	DIMMs: 48 / 48 (installed / Maximum)
Power	<input checked="" type="checkbox"/> OK	Permitted Power Consumption: 2174 watts Actual Power Consumption: 572 watts	PSUs: 2 / 2 (installed / Maximum)
Cooling	<input checked="" type="checkbox"/> OK	Inlet Air Temperature: 26 °C Exhaust Air Temperature: 37 °C	Chassis Fans: 8 / 8 (installed / Maximum) PSU Fans: Not Supported
Storage	<input checked="" type="checkbox"/> OK	Installed Disk Size: 2235 GB Disk Controllers: 4	Internal Disks: 3 / 4 (installed / Maximum)
Networking	<input checked="" type="checkbox"/> OK		Ethernet NICs: 4 (installed) Infiniband HCAs: 3 (installed)

- **LED indicators on the front panel indicator module (FIM)**

- a. **Verify the server status using the LED indicators on the front panel indicator module (FIM).**

The FIM is located at the top left corner of the server, as viewed from the front of the server.

- **For single 4-socket mode: The FIM provides controls and indicators for System A (SMOD0) only. System B (SMOD1) buttons and indicators are not operational.**

For single 4-socket mode FIM controls and indicators, see [“Single 4-Socket \(1x4\) Server” on page 252.](#)

- **For dual 4-socket (2x4) mode: The FIM provides controls and indicators for System A (SMOD0) and System B (SMOD1).**

For dual 4-socket (2x4) FIM controls and indicators, see [“Dual 4-Socket \(2x4\) Servers” on page 255.](#)

- **For single 8-socket mode: The FIM provides controls and indicators for System A (SMOD0) only. System B (SMOD1) buttons and indicators are not operational.**

For single 8-socket mode FIM controls and indicators, see [“Single 8-Socket \(1x8\) Server” on page 258.](#)

For information about how to interpret the FIM LED indicators, see [“Front Indicator Module \(FIM\) Panel” on page 58.](#)

▼ Verify the CMOD Configuration

Before or after you change the socket mode configuration of the system, verify that the current socket mode is configured correctly.

1. **Log in to the System A or System B SP Oracle ILOM CLI.**

Log in as a user with root or administrator privileges. For example, open an SSH session:

```
ssh root@ipaddress
```

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

For more information, see [“Using Oracle ILOM” in Oracle Server X7-8 Installation Guide.](#)

The Oracle ILOM CLI prompt appears: ->

2. **Display the current system configuration using the `hwdiag` command.**

The hwdiag commands are accessed from the Oracle ILOM Diag shell. For information about the Diag shell and how to use the hwdiag commands, see [“Troubleshooting Using Diagnostic Tools” on page 56](#).

Enter the Oracle ILOM Diag shell. From the Oracle ILOM command-line interface (CLI), type:

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

3. Confirm that CMODs 0-3 match CMODs 4-7 to ensure all eight CMODs have identical processors installed.

a. At the Diag shell prompt, type:

```
diag> hwdiag cpu info all
HWdiag (Diag Shell) - Build Number 121981 (Oct 17 2017, 16:37:05)
Current Date/Time: Oct 25 2017, 10:15:53
This is a X7-8A.

CPU0
CPUID: 50654 (H Stepping)
RAS Availability: Advanced RAS
S-spec/QDF Number: QMRV
Thermal Design Power: 150 Watts
Number of SKU enabled cores: 24
Number of cores: 24
Number of threads: 2
Current cores enabled: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23
Current threads enabled: 0 1
DIMM Voltage Setting: 1.20V
Link 0 status: Enabled
Link Rate Setting 10.4 GT/s
Link State Initialization done
Type 0
Active 0
TxWidth 20
RxWidth 20
Link Clock Speed Full Speed
Tx Lanes dropped none
Tx Lanes disabled none
Rx Lanes dropped none
Rx Lanes disabled none
Link 1 status: Enabled
Link Rate Setting 10.4 GT/s
Link State Initialization done
Type 0
Active 0
```

```

TxWidth          20
RxWidth          20
Link Clock Speed Full Speed
Tx Lanes dropped none
Tx Lanes disabled none
Rx Lanes dropped none
Rx Lanes disabled none
Link 2 status:   Disabled

```

CPU1

```

CPUID: 50654 (H Stepping)
RAS Availability: Advanced RAS
S-spec/QDF Number: QMRV
Thermal Design Power: 150 Watts
Number of SKU enabled cores: 24
Number of cores: 24
Number of threads: 2
Current cores enabled: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

```

21 22 23

```

Current threads enabled: 0 1
DIMM Voltage Setting: 1.20V
Link 0 status:           Enabled
  Link Rate Setting 10.4 GT/s
  Link State         Initialization done
  Type               0
  Active             0
  TxWidth           20
  RxWidth           20
  Link Clock Speed  Full Speed
  Tx Lanes dropped  none
  Tx Lanes disabled none
  Rx Lanes dropped  none
  Rx Lanes disabled none
Link 1 status:           Enabled
  Link Rate Setting 10.4 GT/s
  Link State         Initialization done
  Type               0
  Active             0
  TxWidth           20
  RxWidth           20
  Link Clock Speed  Full Speed
  Tx Lanes dropped  none
  Tx Lanes disabled none
  Rx Lanes dropped  none
  Rx Lanes disabled none
Link 2 status:           Disabled

```

CPU2

```

CPUID: 50654 (H Stepping)
RAS Availability: Advanced RAS
S-spec/QDF Number: QMRV
Thermal Design Power: 150 Watts
Number of SKU enabled cores: 24
Number of cores: 24
Number of threads: 2
Current cores enabled: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23
Current threads enabled: 0 1
DIMM Voltage Setting: 1.20V
Link 0 status:           Enabled
    Link Rate Setting 10.4 GT/s
    Link State         Initialization done
    Type               0
    Active             0
    TxWidth            20
    RxWidth            20
    Link Clock Speed  Full Speed
    Tx Lanes dropped  none
    Tx Lanes disabled none
    Rx Lanes dropped  none
    Rx Lanes disabled none
Link 1 status:           Enabled
    Link Rate Setting 10.4 GT/s
    Link State         Initialization done
    Type               0
    Active             0
    TxWidth            20
    RxWidth            20
    Link Clock Speed  Full Speed
    Tx Lanes dropped  none
    Tx Lanes disabled none
    Rx Lanes dropped  none
    Rx Lanes disabled none
Link 2 status:           Disabled

CPU3
CPUID: 50654 (H Stepping)
RAS Availability: Advanced RAS
S-spec/QDF Number: QMRV
Thermal Design Power: 150 Watts
Number of SKU enabled cores: 24
Number of cores: 24
Number of threads: 2
Current cores enabled: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23
Current threads enabled: 0 1

```

```

DIMM Voltage Setting: 1.20V
Link 0 status:           Enabled
    Link Rate Setting 10.4 GT/s
    Link State         Initialization done
    Type               0
    Active             0
    TxWidth            20
    RxWidth            20
    Link Clock Speed   Full Speed
    Tx Lanes dropped   none
    Tx Lanes disabled none
    Rx Lanes dropped   none
    Rx Lanes disabled none
Link 1 status:           Enabled
    Link Rate Setting 10.4 GT/s
    Link State         Initialization done
    Type               0
    Active             0
    TxWidth            20
    RxWidth            20
    Link Clock Speed   Full Speed
    Tx Lanes dropped   none
    Tx Lanes disabled none
    Rx Lanes dropped   none
    Rx Lanes disabled none
Link 2 status:           Disabled
diag>

```

4. Confirm that CMODs 0-3 match CMODs 4-7 to ensure CMODs have identical memory (DIMMs) installed.

a. At the Diag shell prompt, type:

```

diag> hwdiag mem info all

diag> hwdiag mem info all
HWdiag (Diag Shell) - Build Number 121981 (Oct 17 2017, 16:37:05)
    Current Date/Time: Oct 25 2017, 10:18:01
This is a X7-8A.
CPU 0 Memory Devices
  Location      Mfg      Size(GB)  Rank  Width  Speed(MT/s)  Chan Dimm
Enabled-Ranks
/SYS/CMOD0/P0/D0 Samsung  64.00    Quad  x4    2666      5  0    4/4
/SYS/CMOD0/P0/D1 Samsung  64.00    Quad  x4    2666      5  1    4/4
/SYS/CMOD0/P0/D2 Samsung  64.00    Quad  x4    2666      4  0    4/4
/SYS/CMOD0/P0/D3 Samsung  64.00    Quad  x4    2666      4  1    4/4
/SYS/CMOD0/P0/D4 Samsung  64.00    Quad  x4    2666      3  0    4/4
/SYS/CMOD0/P0/D5 Samsung  64.00    Quad  x4    2666      3  1    4/4

```

/SYS/CMOD0/P0/D6	Samsung	64.00	Quad	x4	2666	0	1	4/4
/SYS/CMOD0/P0/D7	Samsung	64.00	Quad	x4	2666	0	0	4/4
/SYS/CMOD0/P0/D8	Samsung	64.00	Quad	x4	2666	1	1	4/4
/SYS/CMOD0/P0/D9	Samsung	64.00	Quad	x4	2666	1	0	4/4
/SYS/CMOD0/P0/D10	Samsung	64.00	Quad	x4	2666	2	1	4/4
/SYS/CMOD0/P0/D11	Samsung	64.00	Quad	x4	2666	2	0	4/4

Total memory populated on CPU 0: 768.00 GB

CPU 1 Memory Devices

Location	Mfg	Size(GB)	Rank	Width	Speed(MT/s)	Chan	Dimm	
Enabled-Ranks								
/SYS/CMOD1/P1/D0	Samsung	64.00	Quad	x4	2666	5	0	4/4
/SYS/CMOD1/P1/D1	Samsung	64.00	Quad	x4	2666	5	1	4/4
/SYS/CMOD1/P1/D2	Samsung	64.00	Quad	x4	2666	4	0	4/4
/SYS/CMOD1/P1/D3	Samsung	64.00	Quad	x4	2666	4	1	4/4
/SYS/CMOD1/P1/D4	Samsung	64.00	Quad	x4	2666	3	0	4/4
/SYS/CMOD1/P1/D5	Samsung	64.00	Quad	x4	2666	3	1	4/4
/SYS/CMOD1/P1/D6	Samsung	64.00	Quad	x4	2666	0	1	4/4
/SYS/CMOD1/P1/D7	Samsung	64.00	Quad	x4	2666	0	0	4/4
/SYS/CMOD1/P1/D8	Samsung	64.00	Quad	x4	2666	1	1	4/4
/SYS/CMOD1/P1/D9	Samsung	64.00	Quad	x4	2666	1	0	4/4
/SYS/CMOD1/P1/D10	Samsung	64.00	Quad	x4	2666	2	1	4/4
/SYS/CMOD1/P1/D11	Samsung	64.00	Quad	x4	2666	2	0	4/4

Total memory populated on CPU 1: 768.00 GB

CPU 2 Memory Devices

Location	Mfg	Size(GB)	Rank	Width	Speed(MT/s)	Chan	Dimm	
Enabled-Ranks								
/SYS/CMOD2/P2/D0	Samsung	64.00	Quad	x4	2666	5	0	4/4
/SYS/CMOD2/P2/D1	Samsung	64.00	Quad	x4	2666	5	1	4/4
/SYS/CMOD2/P2/D2	Samsung	64.00	Quad	x4	2666	4	0	4/4
/SYS/CMOD2/P2/D3	Samsung	64.00	Quad	x4	2666	4	1	4/4
/SYS/CMOD2/P2/D4	Samsung	64.00	Quad	x4	2666	3	0	4/4
/SYS/CMOD2/P2/D5	Samsung	64.00	Quad	x4	2666	3	1	4/4
/SYS/CMOD2/P2/D6	Samsung	64.00	Quad	x4	2666	0	1	4/4
/SYS/CMOD2/P2/D7	Samsung	64.00	Quad	x4	2666	0	0	4/4
/SYS/CMOD2/P2/D8	Samsung	64.00	Quad	x4	2666	1	1	4/4
/SYS/CMOD2/P2/D9	Samsung	64.00	Quad	x4	2666	1	0	4/4
/SYS/CMOD2/P2/D10	Samsung	64.00	Quad	x4	2666	2	1	4/4
/SYS/CMOD2/P2/D11	Samsung	64.00	Quad	x4	2666	2	0	4/4

Total memory populated on CPU 2: 768.00 GB

CPU 3 Memory Devices

Location	Mfg	Size(GB)	Rank	Width	Speed(MT/s)	Chan	Dimm	
Enabled-Ranks								

Verify the CMOD Configuration

/SYS/CMOD3/P3/D0	Samsung	64.00	Quad	x4	2666	5	0	4/4
/SYS/CMOD3/P3/D1	Samsung	64.00	Quad	x4	2666	5	1	4/4
/SYS/CMOD3/P3/D2	Samsung	64.00	Quad	x4	2666	4	0	4/4
/SYS/CMOD3/P3/D3	Samsung	64.00	Quad	x4	2666	4	1	4/4
/SYS/CMOD3/P3/D4	Samsung	64.00	Quad	x4	2666	3	0	4/4
/SYS/CMOD3/P3/D5	Samsung	64.00	Quad	x4	2666	3	1	4/4
/SYS/CMOD3/P3/D6	Samsung	64.00	Quad	x4	2666	0	1	4/4
/SYS/CMOD3/P3/D7	Samsung	64.00	Quad	x4	2666	0	0	4/4
/SYS/CMOD3/P3/D8	Samsung	64.00	Quad	x4	2666	1	1	4/4
/SYS/CMOD3/P3/D9	Samsung	64.00	Quad	x4	2666	1	0	4/4
/SYS/CMOD3/P3/D10	Samsung	64.00	Quad	x4	2666	2	1	4/4
/SYS/CMOD3/P3/D11	Samsung	64.00	Quad	x4	2666	2	0	4/4

Total memory populated on CPU 3: 768.00 GB

Total memory populated in system: 3072.00 GB

diag>

Setting Up BIOS Configuration Parameters

This section provides an overview of BIOS configuration management, UEFI BIOS, and the BIOS Setup Utility:

- “Manage the BIOS Configuration” on page 283
- “Accessing the BIOS Setup Utility” on page 283
- “Using UEFI BIOS” on page 287
- “Common BIOS Setup Utility Tasks” on page 289

Related Information

- “BIOS Setup Utility Menu Options” on page 313

Manage the BIOS Configuration

The BIOS configuration parameters on an Oracle x86 server are manageable from the BIOS Setup Utility and Oracle ILOM. For information about using these tools to manage the BIOS configuration, refer to:

- **Oracle ILOM** – “Maintaining x86 BIOS Configuration Parameters” in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 4.0* in the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.
- **BIOS Setup Utility** – “Common BIOS Setup Utility Tasks” on page 289

Accessing the BIOS Setup Utility

The BIOS Setup Utility provides five main menus that you can use to view product information, and to configure, enable, and disable, or manage system components.

This section provides the following information:

- [“BIOS Setup Utility Menus” on page 284](#)
- [“BIOS Key Mappings” on page 284](#)
- [“Access BIOS Setup Utility Menus” on page 285](#)
- [“Navigate BIOS Setup Utility Menus” on page 286](#)

BIOS Setup Utility Menus

The following table provides descriptions for the top-level BIOS Setup Utility menus.

Menu	Description
Main	General product information, including memory, time/date, security settings, system serial number, and CPU and DIMM information.
Advanced	Configuration information for the CPU, trusted computing, USB, and other information. Set the IP address for the server SP.
IO	Manage configuration settings for I/O devices, such as I/O virtualization settings, and enable and disable Option ROMs.
Boot	Configure the boot device priority.
Save & Exit	Save changes and exit, discard changes and exit, discard changes, or restore the default BIOS settings.

See [“BIOS Setup Utility Menu Options” on page 313](#) for examples of each of these screens.

Related Information

- [“Navigate BIOS Setup Utility Menus” on page 286](#)

BIOS Key Mappings

When viewing the BIOS output from a terminal using the serial console redirection feature, some terminals do not support function keys. BIOS supports the mapping of function keys to Control key sequences when serial redirection is enabled. The following table provides a description of the function key to Control key sequence mappings.

Function Key	Control Key Sequence	BIOS Setup Function
F2	Ctrl+E	Activate the Setup Utility Help menu.
F8	Ctrl+P	Activate the BIOS Boot Menu.
F10	Ctrl+S	Save and Exit changes.
F12	Ctrl+N	Activate Network boot.

Related Information

- [“Access BIOS Setup Utility Menus” on page 285](#)
- [“Navigate BIOS Setup Utility Menus” on page 286](#)

▼ Access BIOS Setup Utility Menus

You can access the BIOS Setup Utility screens from the following interfaces:

- Use a terminal (or terminal emulator connected to a computer) through the serial port on the back panel of the server.
- Connect to the server using the Oracle ILOM Remote System Console Plus application.

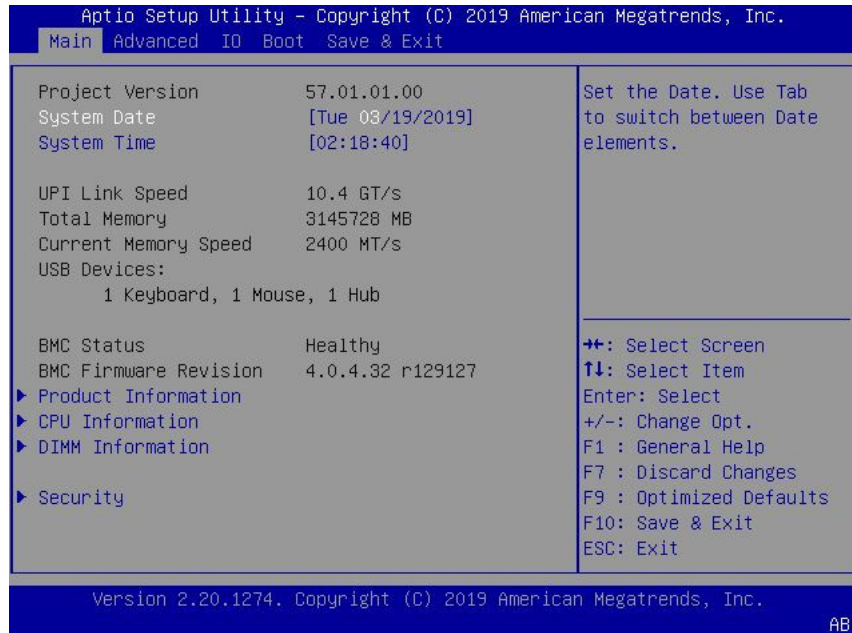
1. Reset or power on the server.

For example, to reset the server:

- **From the local server**, press the On/Standby button on the front panel of the server to power off the server, and then press the On/Standby button again to power on the server.
- **From the Oracle ILOM web interface**, click Host Management → Power Control and select Reset from the Select Action list. Click Save, and then click OK.
- **From the Oracle ILOM CLI**, type `reset /System`

2. After the server resets, to enter the BIOS Setup Utility, press the F2 key (Ctrl +E from a serial connection) when prompted and while the BIOS is running the power-on self-tests (POST).

The BIOS Setup Utility Main Menu screen appears.



Related Information

- [“BIOS Key Mappings” on page 284](#)
- [“BIOS Setup Utility Menu Options” on page 313](#)

▼ Navigate BIOS Setup Utility Menus

To navigate the menus or options listed on a menu, use the arrow keys. The currently selected option or sub-menu is highlighted. For further instructions on how to navigate and change settings in the BIOS Setup Utility, refer to the online information provided on the menu.

1. **Access the BIOS Setup Utility.**
See [“Access BIOS Setup Utility Menus” on page 285](#).
2. **Use the left and right arrow keys to select the different primary menu options.**

As you select each menu option, the top-level screen for that menu option appears.

3. To navigate options presented on a top-level screen, use the up and down arrow keys.

Only options that can be modified are highlighted when you press the up and down arrow keys.

- **If an option can be modified, as you select the option, user instructions for modifying the option appear in the right column of the screen.**
- **If an option is a link to a sub-screen, a description of the sub-menu content appears in the right column.**

4. Modify an option by pressing the + or - (plus or minus) keys or by pressing Enter and selecting the desired option from the pop-up menus.

5. Press the Esc key to return from a sub-menu screen to the previous menu screen.

Pressing Esc from a top-level menu is equivalent to selecting the Discard Changes and Exit option from the Save & Exit Menu.

6. Modify parameters as needed.

7. Press the F10 key to save your changes and exit the BIOS Setup Utility.

Note - After modifying any BIOS settings, the subsequent reboot might take longer than a typical reboot where no settings were modified. The additional delay is required to ensure that changes to the BIOS settings are synchronized with Oracle ILOM.

Related Information

- [“BIOS Key Mappings” on page 284](#)
- [“BIOS Setup Utility Menu Options” on page 313](#)

Using UEFI BIOS

Oracle Server X7-8 is equipped with a Unified Extensible Firmware Interface (UEFI)-compatible BIOS, which runs with all operating systems that are supported on the server. The BIOS firmware controls the system from power-on until an operating system is booted and allows you to configure, enable, disable, or manage system components.

This section includes the following information:

- [“Configuration Utilities for Add-In Cards” on page 288](#)
- [“Configure and Manage BIOS Using Oracle ILOM” on page 288](#)
- [“UEFI Secure Boot” on page 288](#)
- [“Trusted Execution Technology” on page 289](#)

Configuration Utilities for Add-In Cards

In UEFI BIOS, the configuration screens for the add-in cards will appear as menu items in the BIOS Advanced Menu as part of the standard BIOS Setup Utility screens. For example, if the Oracle Storage 12 Gb SAS PCIe RAID HBA, Internal card is installed in the server, the configuration utility for the HBA appears as a menu selection.

Configure and Manage BIOS Using Oracle ILOM

Oracle Integrated Lights Out Manager (ILOM) includes BIOS configuration and management tools. You can perform the following BIOS configuration tasks using Oracle ILOM:

- View the BIOS configuration synchronization status and synchronize the configuration parameters
- Reset the factory defaults for the service processor (SP) and Oracle ILOM BIOS
- Backup or restore the BIOS configuration
- Enable UEFI diagnostics to run at system boot

For more information about Oracle ILOM BIOS configuration and management tools, refer to the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.

UEFI Secure Boot

Oracle Server X7-8 UEFI BIOS supports UEFI Secure Boot. UEFI Secure Boot defines how platform firmware can authenticate a digitally signed UEFI image, such as an operating system loader or a UEFI driver.

When enabled, UEFI Secure Boot provides a policy-based invocation of various UEFI executable images, using cryptographic signatures to identify the software publishers. UEFI Secure Boot also requires all third-party UEFI drivers and operating system boot loaders to be signed by Microsoft or with Key Exchange Key (KEK) by using BIOS setup.

UEFI Secure Boot is disabled by default. For configuration information, see [“Configure UEFI Secure Boot” on page 300](#).

Trusted Execution Technology

Oracle Server X7-8 uses Trusted Execution Technology (TXT), which provides authenticity of a platform and its operating system.

When enabled, TXT ensures that the operating system (OS) starts in a trusted environment, and provides the OS with additional security capabilities not available to an untrusted OS. Using cryptographic techniques, TXT provides measurements of software and platform components so that system software as well as local and remote management applications may use those measurements to make trust decisions. Trusted Execution Technology defends against software-based attacks aimed at stealing sensitive information by corrupting system or BIOS code, or modifying a platform's configuration.

Trusted Execution Technology is disabled by default. For configuration information, see [“Configure Trusted Execution Technology” on page 309](#).

Common BIOS Setup Utility Tasks

This section presents the procedures for some of the BIOS setup tasks that you will typically perform when setting up and managing the server.

- [“Verify BIOS Factory Default Settings” on page 290](#)
- [“Select a Temporary Boot Device” on page 290](#)
- [“Configure TPM Support” on page 292](#)
- [“Configure UEFI Driver Settings” on page 294](#)
- [“Configure I/O Resource Allocation” on page 297](#)
- [“Configure UEFI Secure Boot” on page 300](#)
- [“Configure Trusted Execution Technology” on page 309](#)
- [“Exit BIOS Setup Utility” on page 311](#)

▼ Verify BIOS Factory Default Settings

In the BIOS Setup Utility, you can return the BIOS settings to the optimal factory default values, as well as view and edit settings as needed. Any changes that you make in the BIOS Setup Utility (using the F2 key) persist until the next time you change the settings.

Before you begin, ensure that a console connection is established to the server.

1. Reset or power on the server.

For example, to reset the server:

- **From the local server**, press the On/Standby button on the front panel of the server to power off the server, and then press the On/Standby button again to power on the server.
- **From the Oracle ILOM web interface**, click Host Management → Power Control and select Reset from the Select Action list. Click Save, and then click OK.
- **From the Oracle ILOM CLI**, type `reset /System`

2. After the server resets, when prompted, press the F2 key to access the BIOS Setup Utility.

3. To ensure that the factory defaults are set, do the following:

- Press the F9 key to automatically load the optimal factory default settings.
- In responses to the confirmation message to continue, highlight OK, and then press Enter.

4. Press the F10 key to save the changes and exit the BIOS Setup Utility.

Related Information

- [“Accessing the BIOS Setup Utility” on page 283](#)
- [“BIOS Setup Utility Menu Options” on page 313](#)
- [“BIOS Key Mappings” on page 284](#)
- [“Exit BIOS Setup Utility” on page 311](#)

▼ Select a Temporary Boot Device

The Boot Options Priority list displays the boot device candidates for the system.

In addition to using the F2 key to view or edit the system BIOS settings, you can use the F8 key during the BIOS startup to specify a temporary boot device. This selected boot device is in effect only for the current system boot. The permanent boot device specified using the F2 key will be in effect after booting from the temporary boot device.

1. Reset or power on the server.

For example, to reset the server:

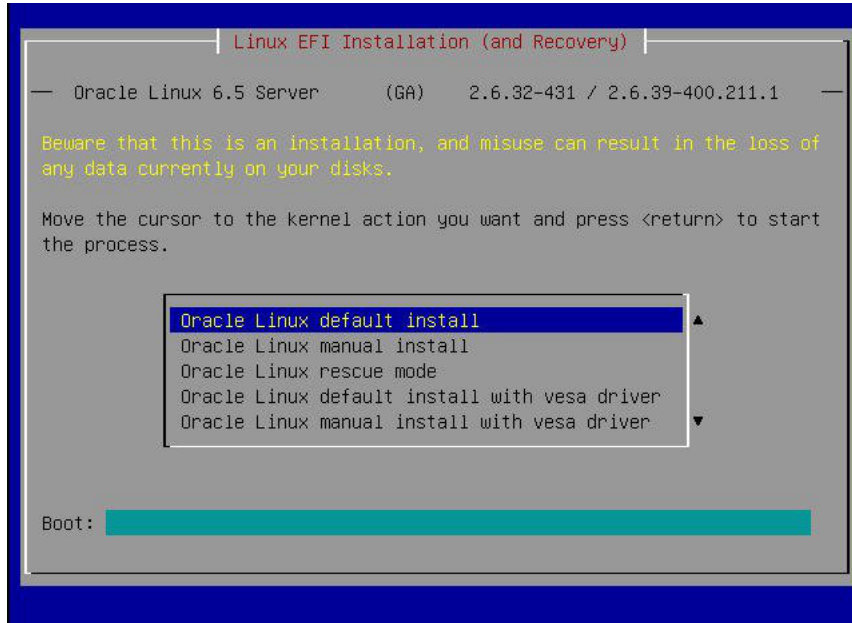
- **From the local server**, press the On/Standby button on the front panel of the server to power off the server, and then press the On/Standby button again to power on the server.
- **From the Oracle ILOM web interface**, click Host Management → Power Control and select Reset from the Select Action list. Click Save, and then click OK
- **From the Oracle ILOM CLI**, type `reset /System`

2. After the server resets, press the F8 key (or Ctrl+P from a serial connection) when prompted while the UEFI BIOS is running the power-on self-test (POST).

```
Please select boot device:
[UEFI]PXE:NET0:IP4 Intel(R) Ethernet Controller X540-AT2
[UEFI]PXE:NET1:IP4 Intel(R) Ethernet Controller X540-AT2
[UEFI]PXE:NET2:IP4 Intel(R) Ethernet Controller X540-AT2
[UEFI]PXE:NET3:IP4 Intel(R) Ethernet Controller X540-AT2
Enter Setup

↑ and ↓ to move selection
ENTER to select boot device
ESC to boot using defaults
```

3. In the Please Select Boot Device dialog box, select the boot device according to the operating system you elected to use, and then press Enter.



4. Follow the on-screen instructions to install the operating system from the selected boot device.

Related Information

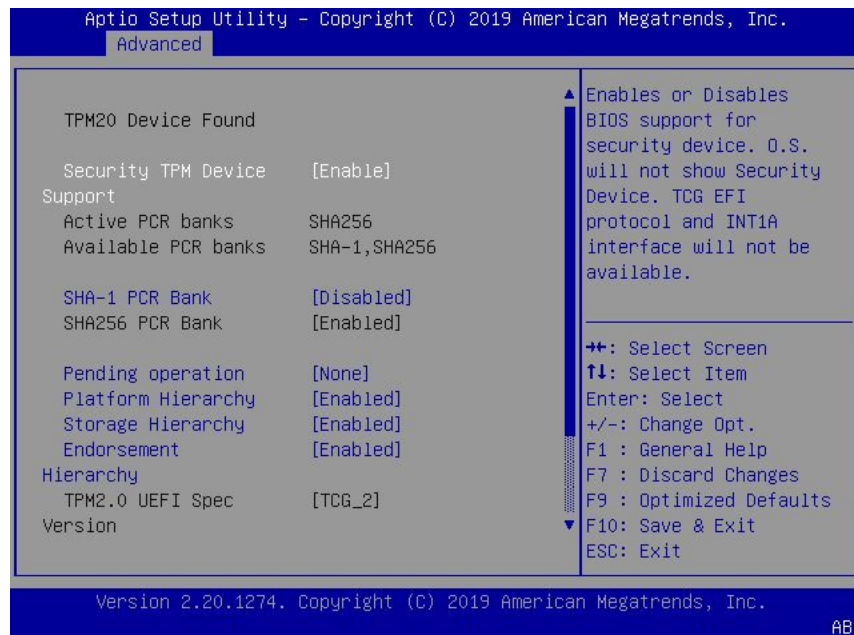
- [“Accessing the BIOS Setup Utility” on page 283](#)
- [“BIOS Setup Utility Menu Options” on page 313](#)
- [“BIOS Key Mappings” on page 284](#)
- [“Exit BIOS Setup Utility” on page 311](#)

▼ Configure TPM Support

If you intend to use the Trusted Platform Module (TPM) feature set, you must configure the server to support this feature. TPM support is enabled by default on Oracle Server X7-8. Perform the procedure in this section to disable or enable TPM support.

Note - TPM enables you to administer the TPM security hardware in your server. For additional information about implementing this feature, refer to the Windows Trusted Platform Module Management documentation provided by your operating system or third-party software vendor.

1. **Access the BIOS Setup Utility menus.**
See [“Access BIOS Setup Utility Menus”](#) on page 285.
2. **In the BIOS Setup Utility menus, navigate to the Advanced Menu.**
3. **On the Advanced Menu screen, select Trusted Computing 2.0.**



4. **On the Trusted Computing 2.0 Configuration screen, select Security TPM Device Support and press Enter. Do one of the following:**
 - **Select Disable to disable Security TPM Device Support.**
 - **Select Enable to enable Security TPM Device Support.**

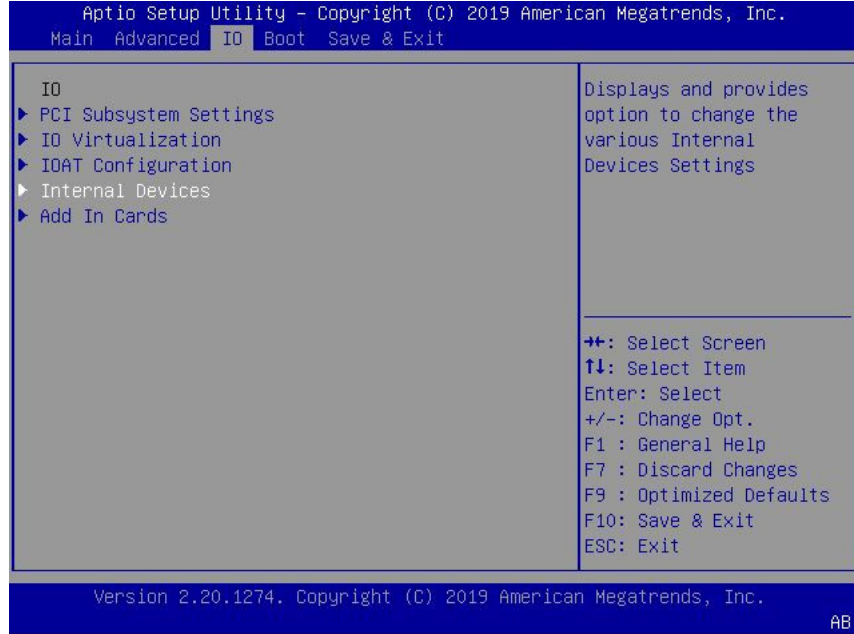
5. Press the F10 key to save the changes and exit the BIOS Setup Utility.

Related Information

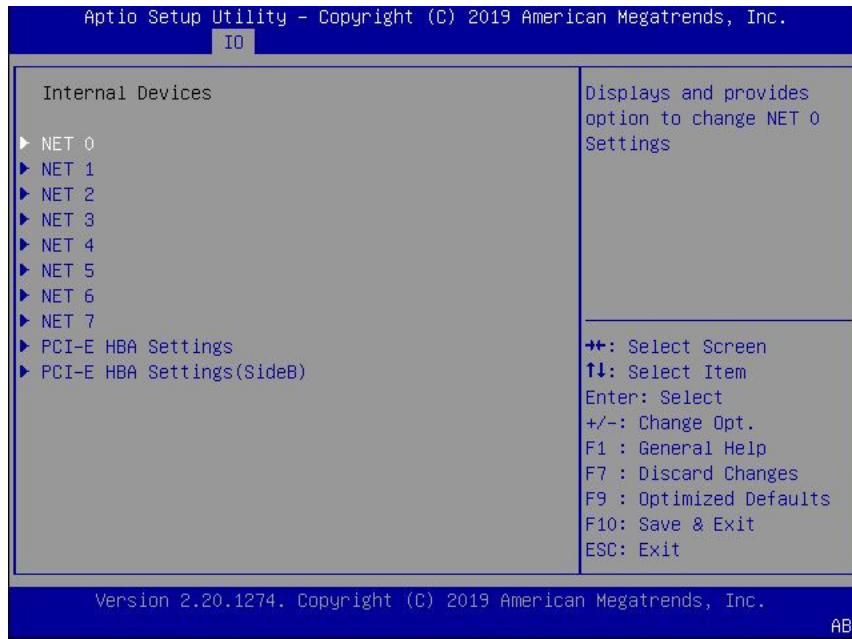
- [“Accessing the BIOS Setup Utility” on page 283](#)
- [“BIOS Setup Utility Menu Options” on page 313](#)
- [“Exit BIOS Setup Utility” on page 311](#)
- Microsoft's Windows Trusted Platform Module Management documentation

▼ Configure UEFI Driver Settings

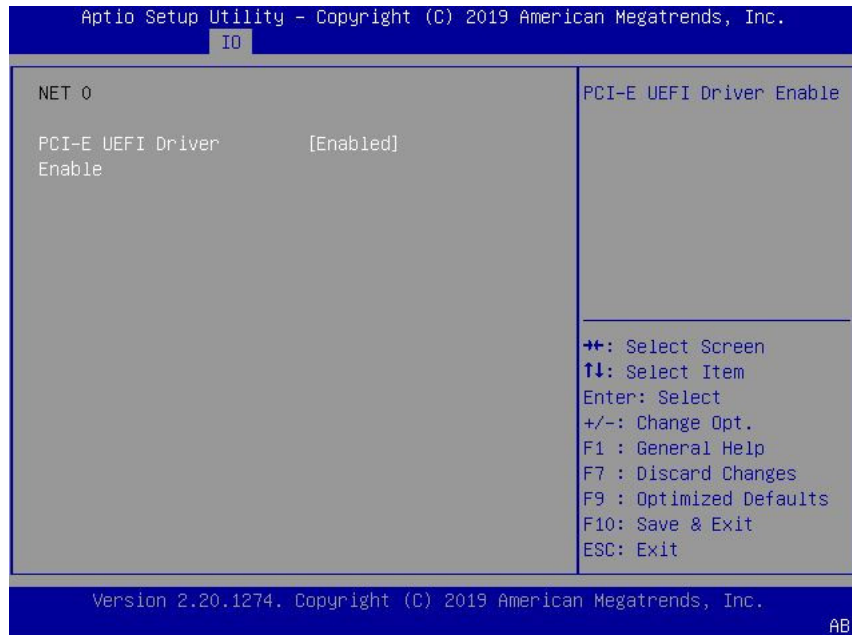
1. Access the BIOS Setup Utility menus.
See [“Access BIOS Setup Utility Menus” on page 285](#).
2. In the BIOS Setup Utility menus, navigate to the IO Menu.



3. On the IO Menu screen, select either Internal Devices or Add In Cards and press Enter to display the internal device or add-in card slot for which you want to enable or disable the PCI-E UEFI Driver.



4. On the Internal Devices screen, select the internal device or add In card slot that you want to configure.



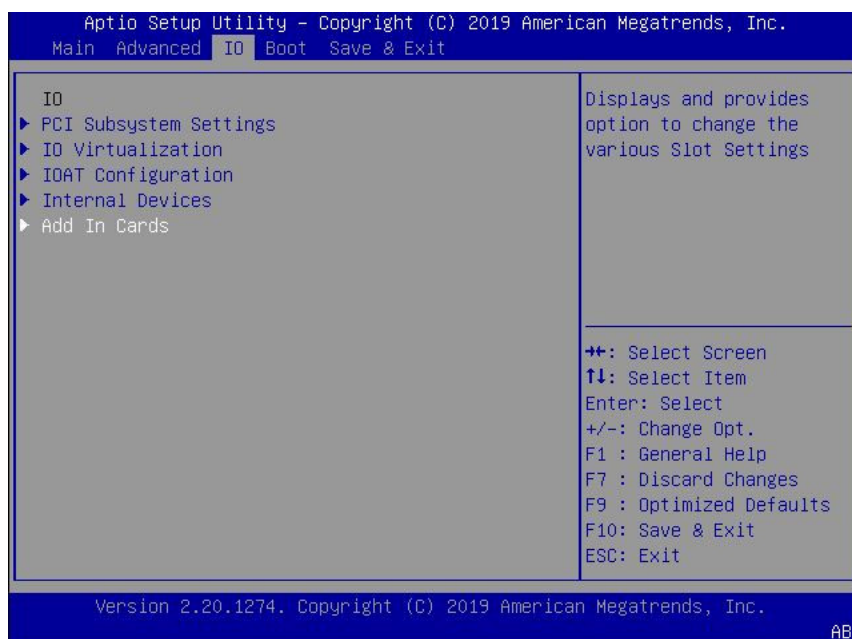
5. On the PCI-E UEFI Driver Enable screen, select PCI-E UEFI Driver Enable and press Enter. Do one of the following:
 - Select Enabled to enable the PCI-E UEFI Driver setting.
 - Select Disabled to disable the PCI-E UEFI Driver setting.
6. Press the F10 key to save the changes and exit the BIOS Setup Utility.

Related Information

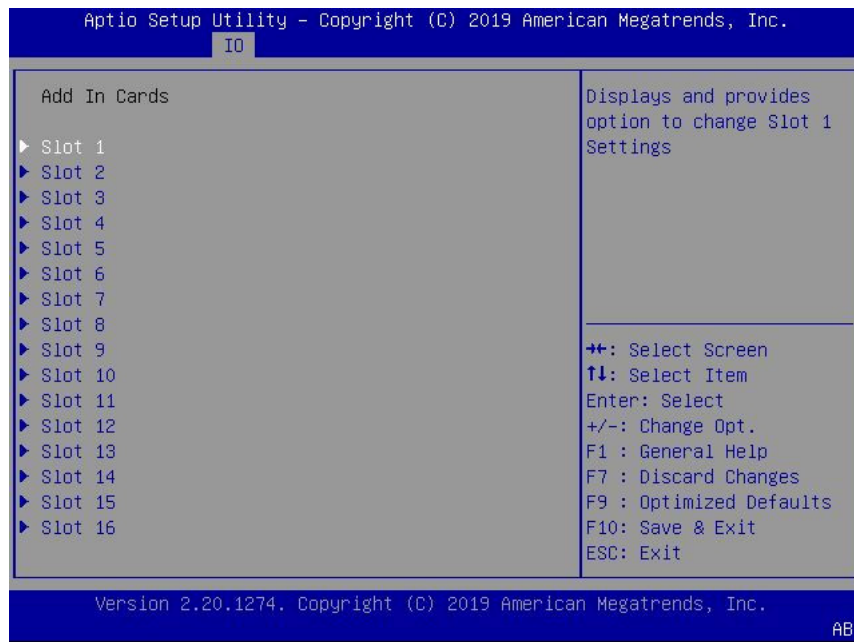
- [“Accessing the BIOS Setup Utility” on page 283](#)
- [“BIOS Setup Utility Menu Options” on page 313](#)
- [“Exit BIOS Setup Utility” on page 311](#)

▼ Configure I/O Resource Allocation

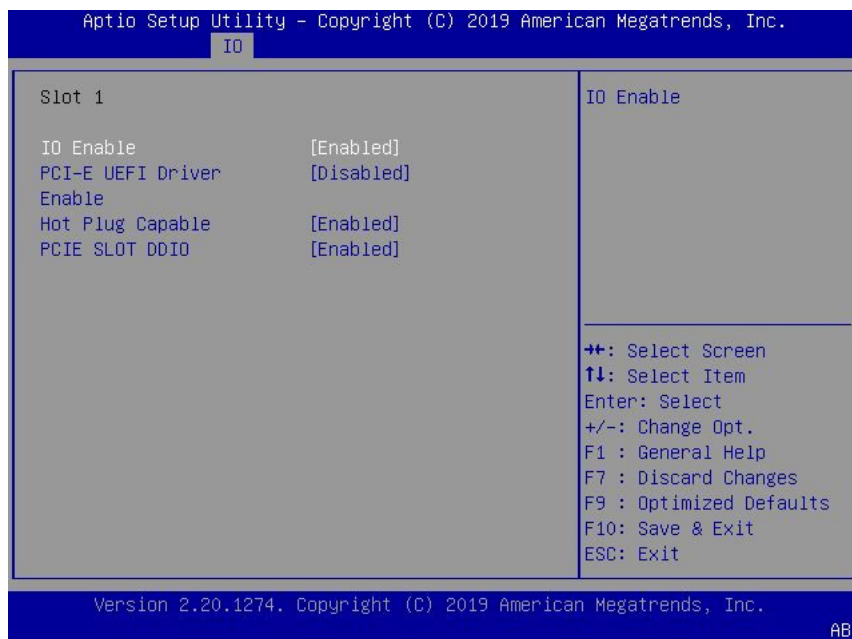
1. **Access the BIOS Setup Utility menus.**
See [“Access BIOS Setup Utility Menus”](#) on page 285.
2. **In the BIOS Setup Utility menus, navigate to the IO Menu.**



3. On the IO Menu screen, select Add In Cards and press Enter to display the add-in card slots.



4. On the Add In Cards screen, select the slot in which you want to configure the card and press Enter.



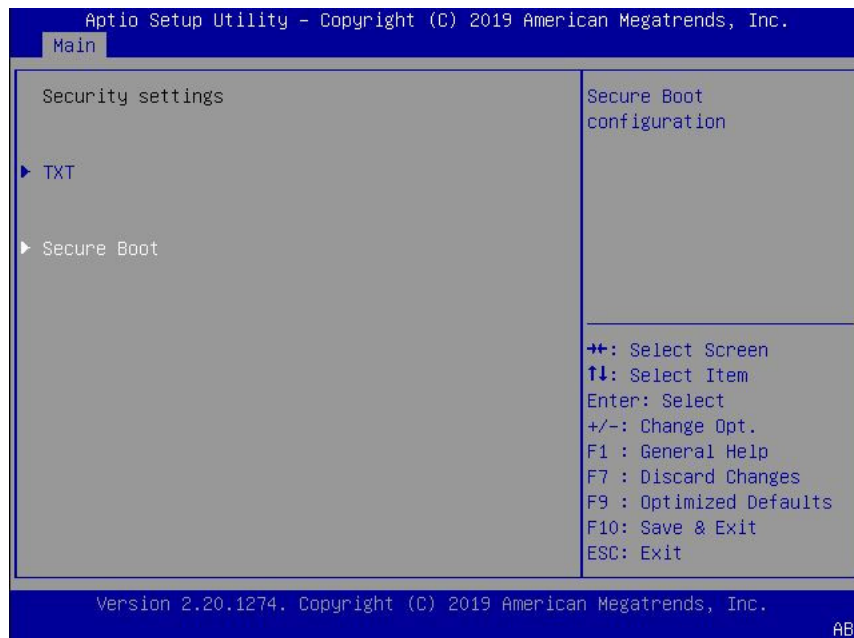
5. On the IO resource allocation screen for that card, select **IO Enable** and press Enter. Do one of the following:
 - Select **Enabled** to enable I/O resource allocation for the I/O card.
 - Select **Disabled** to disable I/O resource allocation for the I/O card.
6. Press the **F10** key to save the changes and exit the BIOS Setup Utility.

Related Information

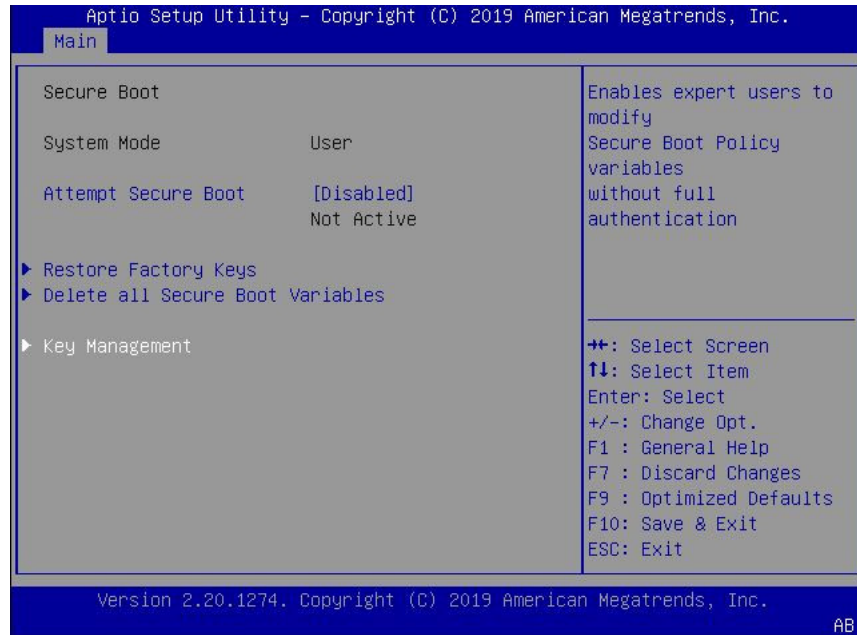
- [“Accessing the BIOS Setup Utility” on page 283](#)
- [“BIOS Setup Utility Menu Options” on page 313](#)
- [“Exit BIOS Setup Utility” on page 311](#)

▼ Configure UEFI Secure Boot

1. **Access the BIOS Setup Utility menus.**
See [“Access BIOS Setup Utility Menus”](#) on page 285.
2. **On the Main Menu screen, select Security and press Enter.**



3. On the Security Settings screen, select **Secure Boot** and press **Enter**.



4. On the **Secure Boot** screen, select **Secure Boot** and press **Enter**. Do one of the following:

- Select **Enabled** to enable UEFI Secure Boot. Continue with the next step to manage policy variables.
- Select **Disabled** to disable UEFI Secure Boot. Continue with [Step 8](#) to save changes and exit from the BIOS Setup Utility.

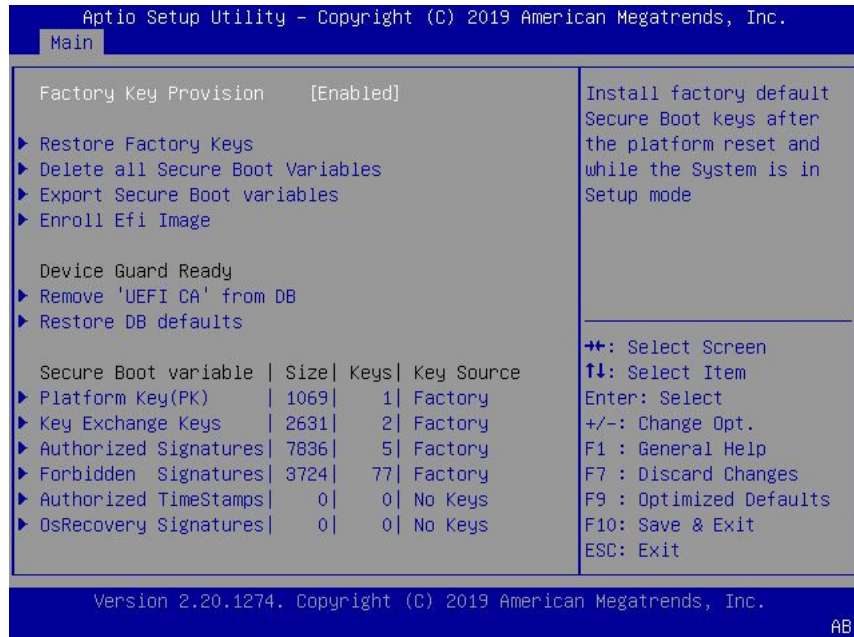
When enabled, Secure Boot allows you to manage Secure Boot policy variables.

5. To manage Secure Boot policy variables, select **Key Management** and press **Enter**.

The Key Management screen provides options to provision factory default Secure Boot keys or to enroll an Extensible Firmware Interface (EFI) image.

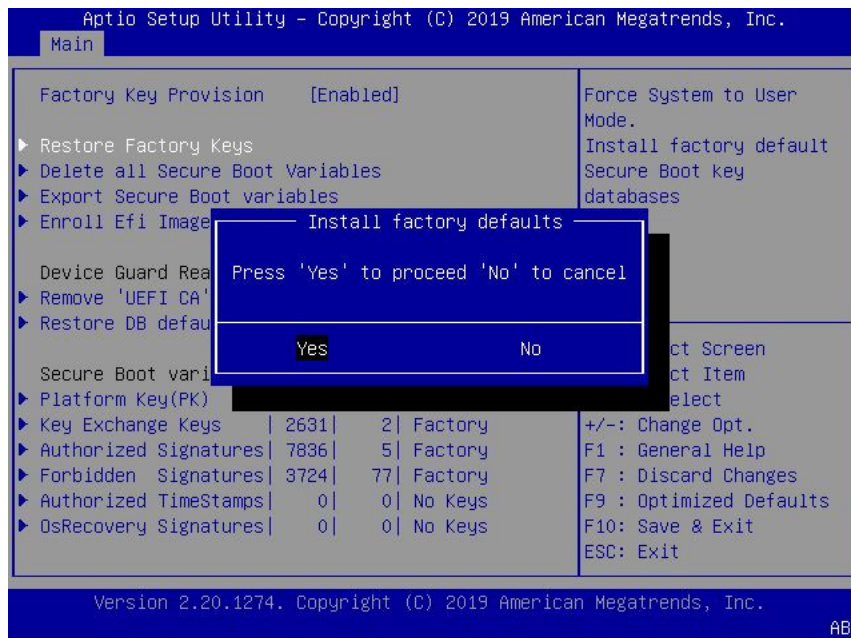
- To provision factory default keys – See [Step 6](#).

- To enroll an EFI image – See [Step 7](#).



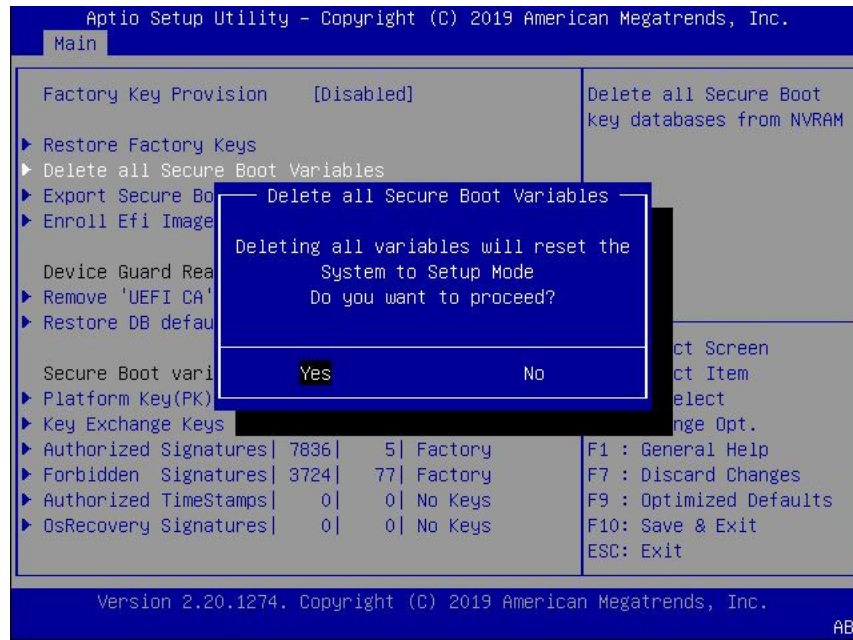
6. **If you want to provision factory default keys, select Provision Factory Defaults and press Enter. Do one of the following:**
 - **Select Enabled to allow the provisioning of factory default Secure Boot keys when the system is in Setup Mode. When enabled, you can select Install**

Factory Default Keys to force the system to User Mode and install all the factory default Secure Boot keys.

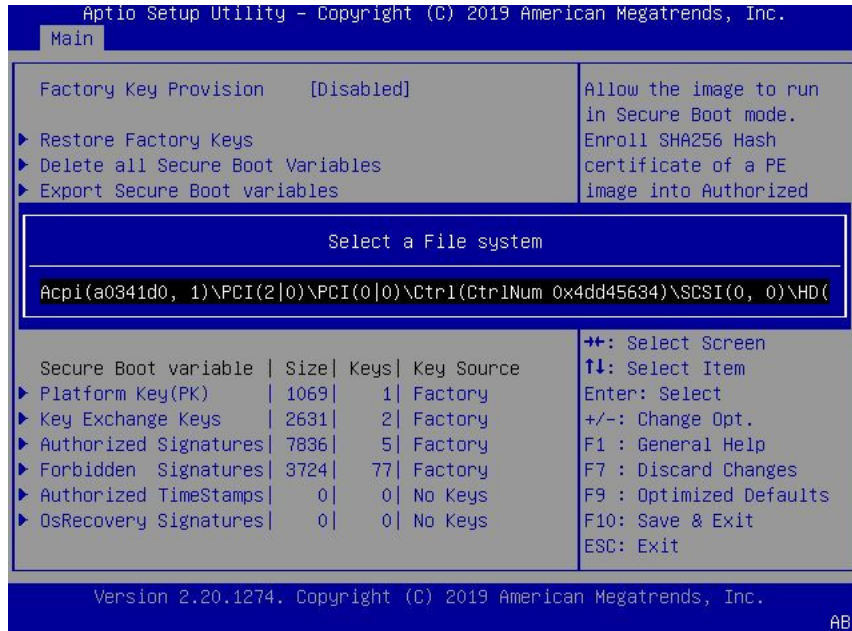


- **Select Disabled to disable the provisioning of factory default Secure Boot keys. When disabled, you can select Delete all Secure Boot Variables to**

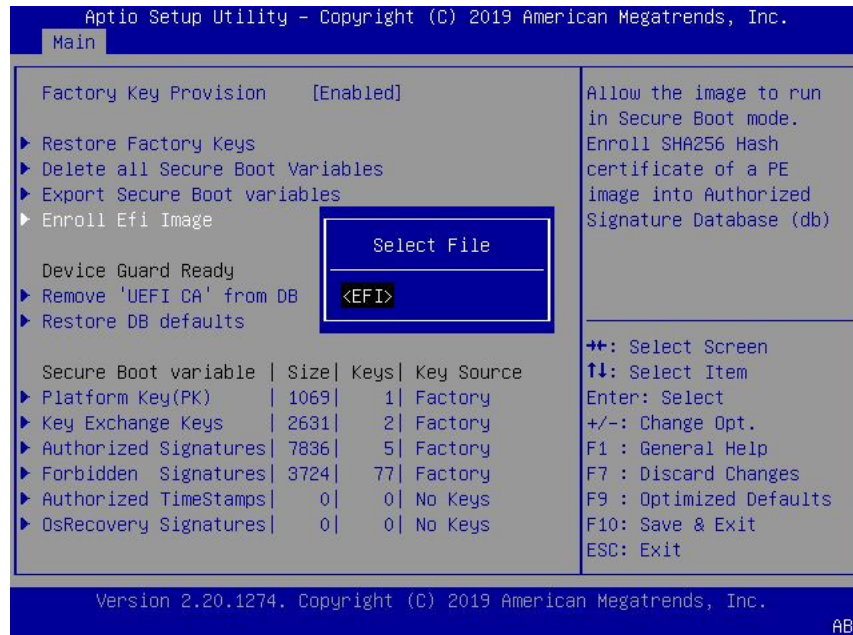
remove all Secure Boot keys from the system. Selecting this option also resets the system to Setup Mode.



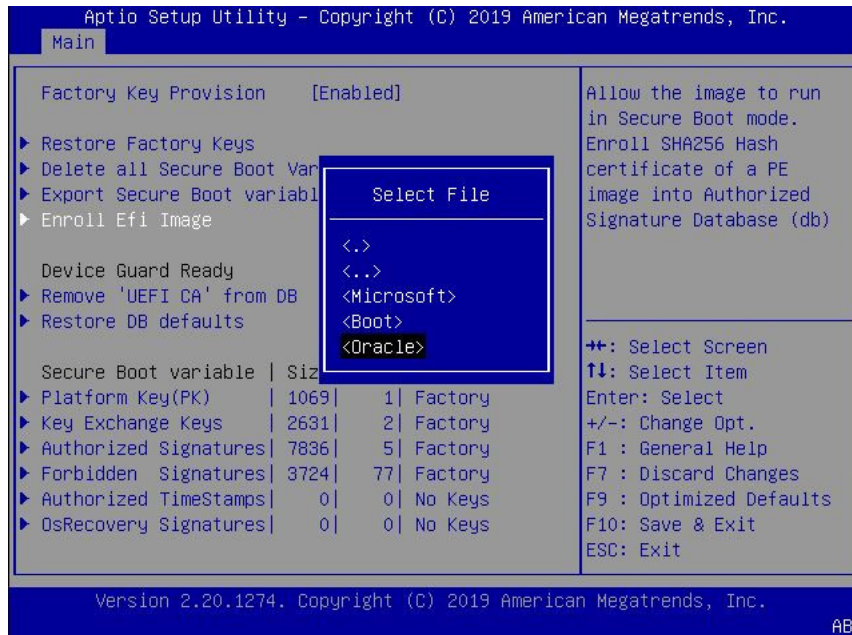
7. If you want to enroll an EFI image, select **Enroll Efi Image** and press **Enter**.



- a. On the Select a File System screen, Scroll through the list and select the file system that contains the EFI file and press Enter.

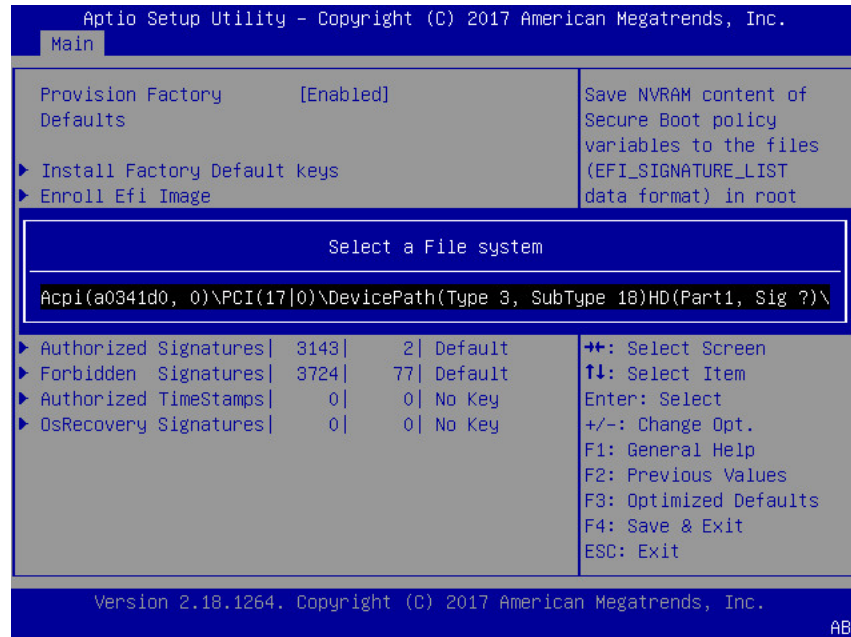


- b. On the Select File screen, scroll through the list and select the EFI file (or another available file) and press Enter.



- c. On the next Select File screen, scroll through the list and select the image file that you want to run in Secure Boot mode and press Enter.

- d. To save all Secure Boot policy variables, select Save all Secure Boot variables and press Enter.



- e. On the Select a File System screen, select the file system where you want to save the EFI file and press Enter.

The Secure Boot policy variables are saved to the root folder in the target file system.

8. Press the F10 key to save the changes and exit the BIOS Setup Utility.

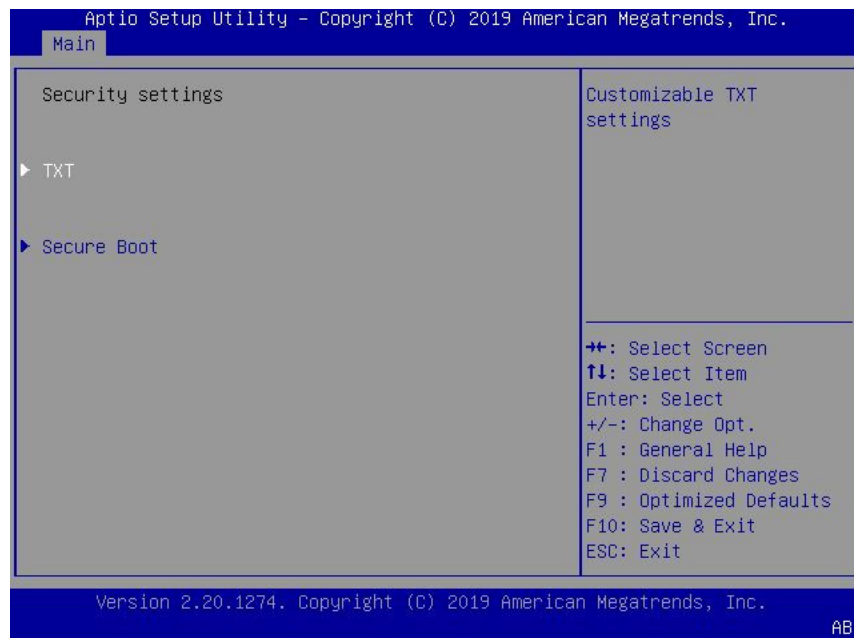
Related Information

- [“Accessing the BIOS Setup Utility” on page 283](#)
- [“BIOS Setup Utility Menu Options” on page 313](#)
- [“UEFI Secure Boot” on page 288](#)
- [“Exit BIOS Setup Utility” on page 311](#)

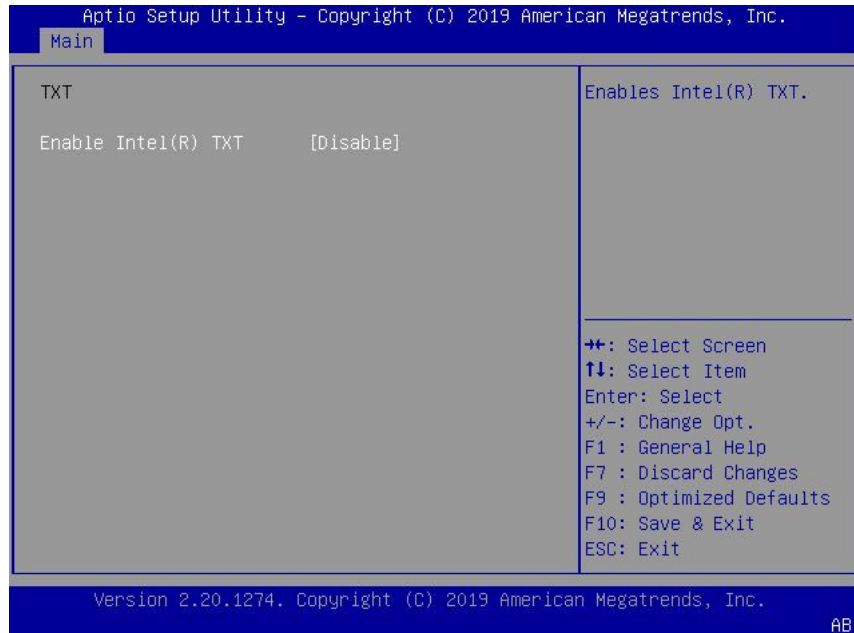
▼ Configure Trusted Execution Technology

The Trusted Platform Module (TPM) feature must be enabled on your server before enabling Trusted Execution Technology (TXT). See [“Configure TPM Support” on page 292](#).

1. **Access the BIOS Setup Utility menus.**
See [“Access BIOS Setup Utility Menus” on page 285](#).
2. **On the Main Menu screen, select security and press Enter.**



3. On the Security Settings screen, select TXT and press Enter.



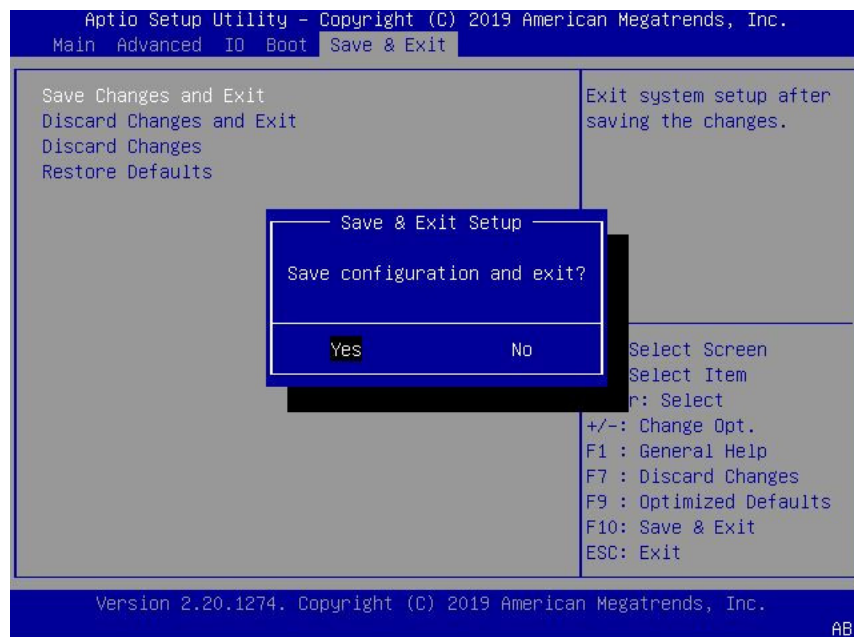
4. On the TXT screen, select **Enable Intel(R) TXT** and press Enter. Do one of the following:
 - Select **Enabled** to enable TXT.
 - Select **Disabled** to disable TXT.
5. Press the **F10** key to save the changes and exit the BIOS Setup Utility.

Related Information

- [“Accessing the BIOS Setup Utility” on page 283](#)
- [“BIOS Setup Utility Menu Options” on page 313](#)
- [“Trusted Execution Technology” on page 289](#)
- [“Configure Trusted Execution Technology” on page 309](#)
- [“Exit BIOS Setup Utility” on page 311](#)

▼ Exit BIOS Setup Utility

1. Use the left and right arrow keys to navigate to the top-level Save & Exit Menu.
2. Use the up and down arrow keys to select the desired action.
3. Press Enter to select the option.



4. In the confirmation screen, select Yes to proceed and exit the BIOS Setup Utility, or select No to stop the exit process.

Note - After modifying any BIOS settings, the subsequent reboot might take longer than a typical reboot where no settings were modified. The additional delay is required to ensure that changes to the BIOS settings are synchronized with Oracle ILOM.

Related Information

- [“Accessing the BIOS Setup Utility” on page 283](#)
- [“BIOS Setup Utility Menu Options” on page 313](#)

BIOS Setup Utility Menu Options

This section includes screens of the main menus in the BIOS Setup Utility for Oracle Server X7-8. Following the screen for each menu is a table of the options available from that menu.

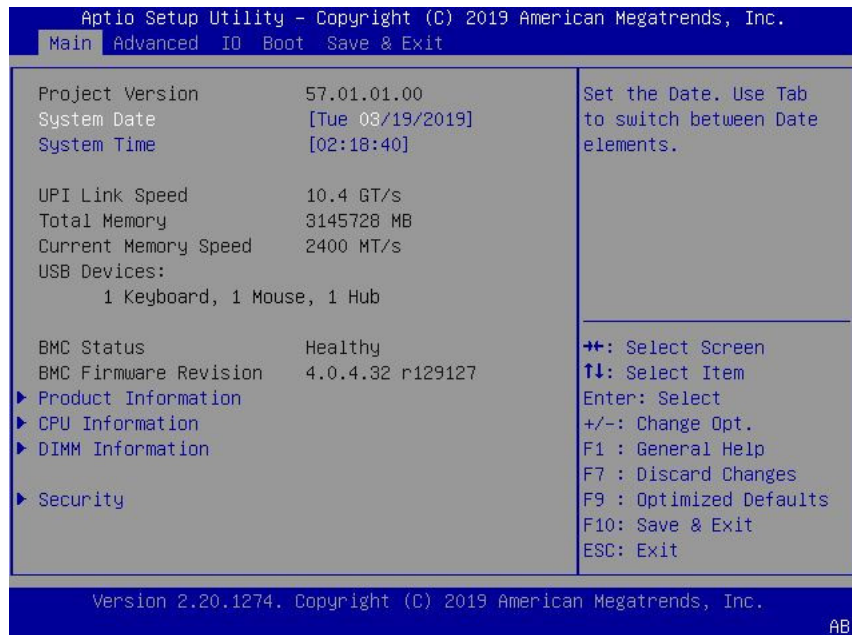
- “BIOS Main Menu Selections” on page 313
- “BIOS Advanced Menu Selections” on page 318
- “BIOS IO Menu Selections” on page 330
- “BIOS Boot Menu Selections” on page 334
- “BIOS Save and Exit Menu Selections” on page 336

Related Information

- *Oracle X7 Series Servers Administration Guide* at: <https://www.oracle.com/goto/x86admindiag/docs>
- “Setting Up BIOS Configuration Parameters” on page 283

BIOS Main Menu Selections

This section includes a screen of the BIOS Main Menu. The options that are available from the Main Menu are described in the table that follows. Options in the table that are marked as “(R/O)” are read-only information and cannot be changed.



The following table describes the options provided by the BIOS Main menu and sub-menus.

Setup Options	Options	Defaults	Description
Project Version (R/O)			<p>BIOS version is displayed. This string is a unique identifier used to reference a specific BIOS release. Format is XXYYZZPP, which indicates:</p> <ul style="list-style-type: none"> ■ XX - Unique project/platform code. ■ YY - BIOS major release. ■ ZZ - BIOS minor release. ■ PP - Build number. <p>Example: 42.01.04.01</p>
System Date			<p>Current date is displayed. You can change the date setting.</p> <p>Example: [Thu 06/20/2017]</p>
System Time			<p>Current time is displayed. You can change the time setting.</p> <p>Example: 13:38:27</p>
UPI Link Speed (R/O)	SLOW/		<p>Intel UltraPath Interconnect (UPI) operational speed is displayed. The</p>

Setup Options	Options	Defaults	Description
	9.6 GT/s 10.4 GT/s		SLOW option displays as unknown in single-processor systems.
Total Memory (R/O)			Memory in gigabytes is displayed. Example: 224 GB
Current Memory Speed (R/O)			Memory speed is displayed. Example: 2400 MT/s
USB Devices (R/O)			Detected USB devices are displayed. Example: 1 Keyboard, 1 Mouse, 1 Hub
BMC Status (R/O)			Detected condition of the service processor. Example: Healthy
BMC Firmware Revision (R/O)			The service processor firmware version is displayed. Example: 4.0.0.0 r115197
PRODUCT INFORMATION (R/O)			Product information is displayed.
Product Name			Product name is displayed. Example: Oracle Server X7-8
Product Serial Number			Product serial number is displayed. Example: 1134FML00V
Board Serial Number			Board serial number is displayed. Example: 489089M+1637E2002E
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 (R/O)			If CPU socket 0 is populated, the following options are listed. Otherwise, displays "Not Present."
Intel CPU @ 2.10GHz			Processor ID brand is displayed.
CPU Signature			Processor information is displayed. Example: 50654
Microcode Patch			Software update (microcode patch) information is displayed. Example: 2000026

BIOS Main Menu Selections

Setup Options	Options	Defaults	Description
Max CPU Speed			Maximum non-turbo speed of the processor is displayed. Example: 2100 MHz
Min CPU Speed			Minimum speed of the processor is displayed. Example: 1000 MHz
Max Processor Cores			Number of available processor cores is displayed. Example: 28
Active Cores			Number of active processor cores is displayed.
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 28
L1 Code Cache			Example: 32 KB x 28
L2 Cache			Example: 1024 KB x 28
L3 Cache			Example: 39424 KB
Socket 1 through Socket 7 CPU Information (R/O)			If populated, the same options as Socket 0 CPU Information are displayed. Otherwise, displays "Not Present."
DIMM INFORMATION (R/O)			Memory module (DIMM) presence and size information are displayed.
Processor 0 DIMMs (R/O)			For D0...D11, if a DIMM is present, memory size (in gigabytes) is displayed. Otherwise, displays "Not Present."
Processor 1 through Processor 7 DIMMs (R/O)			Same as Processor 0.
SECURITY			Configure the security settings.
TXT	Enable Intel TXT Disable/ Enable	Disabled	Enables Intel TXT.
HDD Security Configuration	Set User Password		Set an HDD user password for the selected drive.
Secure Boot			Customize Secure Boot settings.
Attempt Secure Boot	Disabled/Enabled	Disabled	Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.

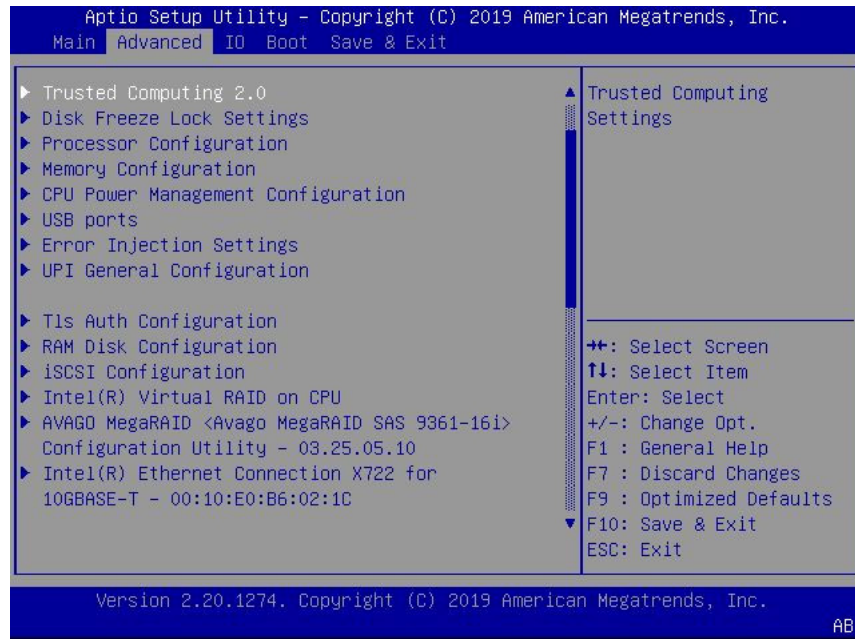
Setup Options	Options	Defaults	Description
Key Management			Enables expert users to modify Secure Boot Policy variables without full authentication.
Provision Factory Defaults	Disabled/Enabled	Disabled	Allows the provisioning of factory default Secure Boot keys when the system is in Setup Mode.
Install Factory Default keys	Yes/No		Forces system to User Mode and installs Factory Default keys. Note - Displays only when Provision Factory Defaults is Enabled.
Delete all Secure Boot variables	Yes/No		Removes all Secure Boot keys from the system. Also resets the system to Setup Mode. Note - Displays only when Provision Factory Defaults is Disabled.
Enroll Efi Image			Enrolls an EFI image to run in Secure Boot mode.
Save all Secure Boot variables			Saves all Secure Boot variables to the root folder in the chosen file system.
Platform Key (PK)	Save to File/Set New/Eraser		Enroll factory defaults or load certificates from a file.
Key Exchange Keys	Save to File/Set New/Append/Eraser		Enroll factory defaults or load certificates from a file.
Authorized Signatures	Save to File/Set New/Append/Eraser		Enroll factory defaults or load certificates from a file.
Forbidden Signatures	Save to File/Set New/Append/Eraser		Enroll factory defaults or load certificates from a file.
Authorized TimeStamps	Set New/Append		Enroll factory defaults or load certificates from a file.
OsRecovery Signatures	Save to File/Set New/Append/Eraser		Enroll factory defaults or load certificates from a file.

Related Information

- [“BIOS Advanced Menu Selections” on page 318](#)
- [“BIOS IO Menu Selections” on page 330](#)
- [“BIOS Boot Menu Selections” on page 334](#)
- [“BIOS Save and Exit Menu Selections” on page 336](#)

BIOS Advanced Menu Selections

This section includes a screen of the BIOS Advanced Menu. The options that are available from the Advanced Menu are described in the sections that follow. Options in the tables that are marked as “(R/O)” are read-only information and cannot be changed.



The following sections describe the BIOS Advanced Menu options:

- [“BIOS Advanced Menu iSCSI Configuration Options” on page 319](#)
- [“BIOS Advanced Menu Gigabit Network Connection Options” on page 321](#)
- [“BIOS Advanced Menu Driver Health Options” on page 322](#)
- [“BIOS Advanced Menu Serial Port Console Redirection Options” on page 322](#)
- [“BIOS Advanced Menu Network Stack Configuration Options” on page 324](#)
- [“BIOS Advanced Menu NVMe Configuration Options” on page 325](#)
- [“BIOS Advanced Menu Primary Video Selection Options” on page 325](#)
- [“BIOS Advanced Menu Trusted Computing 2.0 Options” on page 325](#)
- [“BIOS Advanced Menu Processor Configuration Options” on page 326](#)
- [“BIOS Advanced Menu Memory Configuration Options” on page 327](#)

- [“BIOS Advanced Menu CPU Power Management Configuration Options” on page 328](#)
- [“BIOS Advanced Menu USB Ports Options” on page 329](#)
- [“BIOS Advanced Menu Error Injection Settings Option” on page 329](#)
- [“BIOS Advanced Menu Disk Freeze Lock Settings Option” on page 329](#)

BIOS Advanced Menu iSCSI Configuration Options

The following table describes the BIOS Advanced Menu iSCSI configuration options.

Setup Options	Options	Defaults	Description
iSCSI Initiator Name	NA (must be specified)	None	The worldwide unique name of the iSCSI Initiator. Only IQN format is accepted.
Add an Attempt			
iSCSI Attempt Name	NA (must be specified)	None	The human-readable name that you assigned to this attempt.
iSCSI Mode	Disabled/Enabled/Enabled for MPIO	Disabled	Set to Enabled for multipath I/O (MPIO). MPIO can boost the performance of an application by load-balancing traffic across multiple ports.
Internet Protocol	IP4/IP6/Autoconfigure	IP4	Can be set to IP4, IP6, or Autoconfigure. The initiator IP address is assigned by the system to IP6. In Autoconfigure mode, the iSCSI driver attempts to connect to the iSCSI target using the IPv4 stack. If this fails, then the iSCSI driver attempt to connect using the IPv6 stack.
Connection Retry Count	0 to 16	0	The count range is 0 to 16. If set to 0, there are no retries.
Connection Establishing Timeout	NA	1,000	The timeout value in milliseconds. The minimum value is 100 milliseconds and the maximum is 20 seconds.
Configure ISID	Derived from the MAC address	The default value is derived from the Mac Address	The OUI-format ISID is 6 bytes. The default value is derived from the MAC address. Only the last 3 bytes are configurable. Example: Update 0ABBCCDDEEFF to

BIOS Advanced Menu Selections

Setup Options	Options	Defaults	Description
			0ABBCCF07901 by inputting F07901
Enable DHCP	Disabled/Enabled	Disabled	Enable or disable DHCP.
Initiator IP Address	NA	0.0.0.0	Use to set initiator IP address in dotted-decimal notation.
Initiator Subnet Mask	NA	0.0.0.0	Use to set initiator subnet mask IP address in dotted-decimal notation.
Gateway	NA	0.0.0.0	Use to set initiator gateway IP address in dotted-decimal notation.
Target Name	NA	NA	The worldwide unique name of the target. Only IQN format is accepted.
Target IP address	0.0.0.0	None	Use to set target IP address in dotted-decimal notation.
Target Port		3260	Use to change target port number.
Boot LUN		0	Use to set the hexadecimal representation of the boot logical unit number (LUN). Example: 4752-3A4F-6b7e-2F99
Authentication Type	CHAP/None	CHAP	Define the Challenge-Handshake Authentication Protocol (CHAP). Available settings are CHAP, Kerberos, and None.
CHAP Type	One Way/Mutual	One Way	Use to set CHAP type to either One Way or Mutual.
CHAP Name	NA	None	Use to set CHAP name.
CHAP Secret	NA	None	Use to set the CHAP secret password. The secret length range is 12 to 16 bytes.
Delete Attempts	NA	NA	Use to delete one or more attempts.
Change Attempt Order	NA	NA	Use to change the order of attempts. Use arrow keys to select the attempt, then press plus or minus (+/-) keys to move the attempt up/down in the attempt order list.

BIOS Advanced Menu Gigabit Network Connection Options

The following table describes the BIOS Advanced Menu Gigabit network connection options.

Setup Options	Options	Defaults	Description
NIC configuration			Use to configure the network interface controller.
Link Speed	Auto Negotiated 10 Mbs Half 10 Mbs Full 100 Mbs Half 100 Mbs Full	NA	Specifies the port speed used for the selected boot protocol.
Wake on LAN	Disable/Enabled	NA	Use this option to enable or disable wake on LAN.
Blink LEDs	0/1/2/3	0	Use to identify the physical network port by blinking the associated LED.
UEFI Driver (R/O)	NA	NA	Identifies the UEFI driver.
Adapter PBA (R/O)	NA	NA	Product board adapter (PBA) number. You can use the Intel Network Adapter PBA number to search for the adapter's model number. The PBA number is a nine digit number that is the last part of the adapter board serial number. The PBA number is presented in this format: xxxxxx-xxx, for example, C80222-001.
Device Name (R/O)	NA	NA	Device name.
Chip Type (R/O)	NA	NA	Manufacturer and model number.
PCI Device ID (R/O)	NA	1533	Device identifier.
PCI Address (R/O)	NA	NA	Bus device function identifier. Example format: Bus:Device: Function
Link Status (R/O)	NA	Connected	Specifies the link status of the network port.

Setup Options	Options	Defaults	Description
MAC Address (R/O)	NA	NA	Lists the MAC address of the network interface controller (NIC).
Virtual MAC Address (R/O)	NA	NA	Lists the Virtual MAC address of the network interface controller (NIC).

BIOS Advanced Menu Driver Health Options

The following table describes the BIOS Advanced Menu driver health options.

Note - Depending on the devices that are populating your PCIe slots, you will see different entries if the devices are publishing their driver health status.

Setup Options	Options	Defaults	Description
Intel PRO/1000 PCI-E (R/O)		Healthy	Lists the health status of drivers/controllers.
Apache Pass Driver (R/O)		Healthy	Lists the health status of drivers/controllers.
Intel 40GbE		Healthy	Lists the health status of drivers/controllers.
Controller Child 0 (R/O)		Healthy	
Intel Ethernet Connection for X722 for 10GBASE-T		Healthy	
AVAGO EFI SAS Driver (R/O)		Healthy	Lists the health status of drivers/controllers.

BIOS Advanced Menu Serial Port Console Redirection Options

The following table describes the BIOS Advanced Menu serial port console redirection options.

Setup Options	Options	Defaults	Description
EMS Console Redirection	Disabled/Enabled	Disabled	Use this option to enable or disable console redirection for Windows Emergency Management Service (EMS) administration.

Setup Options	Options	Defaults	Description
Console Redirection	Disabled/Enabled	Enabled	Use this option to enable or disable console redirection.
Terminal Type	VT100/VT100+/VT-UTF8/ ANSI	VT100+	Select the emulation for the terminal: <ul style="list-style-type: none"> ■ 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 19200 38400 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	7/8	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. <ul style="list-style-type: none"> ■ 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	1/2	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 1 stop bit. Communication with slow

Setup Options	Options	Defaults	Description
			devices may require more than 1 stop bit.
Flow Control	None, Hardware RTS/CTS, Software Xon/Xoff	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/stop signals.

BIOS Advanced Menu Network Stack Configuration Options

The following table describes the BIOS Advanced Menu network stack options.

Setup Options	Options	Defaults	Description
Network Stack	Disabled/Enabled	Enabled	Enable or disable the UEFI network stack.
Ipv4 PXE Support	Disabled/Enabled	Enabled	Enable or disable IPv4 PXE Boot support. If disable, the IPv4 PXE Boot Option will not be created.
Ipv4 HTTP Support	Disabled/Enabled	Disabled	Enable or disable IPv4 HTTP Boot support. If disable, the IPv4 HTTP Boot Option will not be created.
Ipv6 PXE Support	Disabled/Enabled	Disabled	Enable or disable IPv6 PXE Boot support. If disable, the IPv6 PXE Boot Option will not be created.
Ipv6 HTTP Support	Disabled/Enabled	Disabled	Enable or disable IPv6 HTTP Boot support. If disable, the IPv6 HTTP Boot Option will not be created.
PXE boot wait time	0	0	Wait time to press ESC key to abort the PXE boot.
Media detect count	1	1	Number of times the presence of media will be checked.

BIOS Advanced Menu NVMe Configuration Options

The following table describes the BIOS Advanced Menu NVMe configuration options.

Setup Options	Options	Defaults	Description
Bus:5E Dev:0 Func:0 (R/O)		N/A	Displays the PCIe Bus, Device, and Function for the NVMe controller.
NVMe Size (R/O)		N/A	Displays the size of the NVMe device.

BIOS Advanced Menu Primary Video Selection Options

The following table describes the BIOS Advanced Menu primary video selection options.

Setup Options	Options	Defaults	Description
Add-in Video Card support	Disabled/Enabled	Enabled	Use this option to enable or disable video card support.

BIOS Advanced Menu Trusted Computing 2.0 Options

The following table describes the BIOS Advanced Menu trusted computing 2.0 options.

Note - The options in this section are available only when the Security TPM Device Support option is set to Enabled.

Setup Options	Options	Defaults	Description
Security TPM Device Support	Disabled/Enabled	Disabled	Use this option to enable or disable Trusted Platform Module (TPM) support. If disabled, the OS will not show TPM. Reset of the platform is required.

BIOS Advanced Menu Selections

Setup Options	Options	Defaults	Description
Active PCR banks (R/O)	N/A	N/A	Displays active Platform Configuration Register (PCR) banks.
Available PCR banks (R/O)	N/A	N/A	Displays available Platform PCR banks.
SHA-1 PCR Bank (R/O)	N/A	N/A	Displays if the SHA-1 PCR bank is enabled/disabled.
SHA256 Bank (R/O)	N/A	N/A	Displays if the SHA256 PCR bank is enabled/disabled.
Pending Operation	None/TPM Clear	None	Use this option to schedule an operation for the security device. Note - Your computer will reboot during restart in order to change the state of a security device.
Platform Hierarchy	Disabled/Enabled		Use this option to enable or disable platform hierarchy.
Storage Hierarchy	Disabled/Enabled		Use this option to enable or disable storage hierarchy.
Endorsement Hierarchy	Disabled/Enabled		Use this option to enable or disable endorsement hierarchy.
TPM 2.0 UEFI Spec Version (R/O)	N/A	N/A	Displays the TPM 2.0 UEFI spec version.
Physical Presence Spec Version	1.2/1.3	1.3	Use this option to select the physical presence spec version.
TPM 20 InterfaceType (R/O)	N/A	N/A	Displays the TPM 20 interface type.
Device Select (R/O)	N/A	N/A	Displays the TPM device.

BIOS Advanced Menu Processor Configuration Options

The following table describes the BIOS Advanced Menu processor configuration options.

Setup Options	Options	Defaults	Description
Hyper-threading ALL	Disabled/Enabled	Enabled	Use to enable Hyper Threading. When enabled, two threads are available per enabled core. When disabled, only one thread per enabled core is available.

Setup Options	Options	Defaults	Description
Active Processor Cores	A minimum of one up to the maximum number of cores available in the processor package.	All	The number of cores to enable in each processor package.
SNC	Disable/Enable/Auto	Disable	Enable, disable, or set SNC to auto.
Hardware Prefetcher	Disabled/Enabled	Enabled	Enable the mid-level cache (MLC) streamer prefetcher (MSR 1A4h bit [0]).
Adjacent Cache Prefetcher	Disabled/Enabled	Enabled	Enable the mid-level cache (MLC) streamer prefetcher (MSR 1A4h bit [1]).
DCU Streamer Prefetcher	Disabled/Enabled	Enabled	Enable DCU streamer prefetcher, which is a L1 data cache prefetcher (MSR 1A4h [2]).
DCP IP Prefetcher	Disabled/Enabled	Enabled	Enable DCU IP prefetcher, which is a L1 data cache prefetcher (MSR 1A4h [3]).
Intel Virtualization Technology	Disabled/Enabled	Enabled	When enabled, a Virtual Machine Manager (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology.
Stale AtoS	Disabled/Enabled/Auto	Disabled	Enable or disable stale A to S Dir optimization.
LLC dead line alloc	Disabled/Enabled/Auto	Enabled	Enable to opportunistically fill dead lines in LLC.
XPT Prefetch	Disable/Enable	Enable	Enable or disable XPT Prefetch.

BIOS Advanced Menu Memory Configuration Options

The following table describes the BIOS Advanced Menu memory configuration option.

Setup Option	Options	Defaults	Description
Numa	Enabled/Disabled	Enabled	Enable or disable Non Uniform Memory Access (NUMA).
MMIO High Granularity Size	1G/4G/16G/64G/256G/1024G	64G	Selects the allocation size used to assign memory-mapped I/O (MMIO) resources. Total

Setup Option	Options	Defaults	Description
			MMIO space can be up to 32x granularity.

BIOS Advanced Menu CPU Power Management Configuration Options

The following table describes the BIOS Advanced Menu CPU power management configuration options.

Setup Options	Options	Defaults	Description
Power Technology	Disabled/Energy Efficient/ Custom	Custom	Enables the power management features.
EIST (GV3)	Enabled/Disabled	Enabled	Enable or disable Enhanced Intel SpeedStep Technology (EIST).
Turbo Mode	Enabled/Disabled	Enabled	Enabled mode is supported only if Turbo Mode is supported in the CPU. Enabled mode also requires that Enhanced Multi Threaded Thermal Monitoring (EMTTM) be enabled on the CPU.
CPU C3 report	Enabled/Disabled	Disabled	Enable/disable the CPU C3 (ACPI C3) report to the operating system.
CPU C6 report	Enabled/Disabled	Enabled	Enable/disable the CPU C6 (ACPI C3) report to the operating system.
Package C State limit	Enabled/Disabled	Enabled	Enable/disable Package C State limit.
Energy Performance	Performance Balanced Performance Balanced Energy Energy Efficiency	Balanced Performance	Use this option to select the Energy Performance mode.
Uncore Frequency Scaling	Enabled/Disabled	Disabled	Enable/disable Uncore Frequency Scaling (USF).

BIOS Advanced Menu USB Ports Options

The following table describes the BIOS Advanced Menu USB ports options.

Setup Options	Options	Defaults	Description
EHCI Hand-off	Disabled/Enabled	Disabled	Enable or disable Enhanced Host Controller Interface (EHCI) hand-off support. This is a workaround for operating systems without EHCI hand-off support. The EHCI change of ownership should be claimed by the EHCI driver.
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	Disabled/Enabled	Enabled	Enable or disable USB Rear Port.
Internal Port #0	Disabled/Enabled	Enabled	Enable or disable USB Internal Port 0.

BIOS Advanced Menu Error Injection Settings Option

The following table describes the BIOS Advanced Menu error injection settings options.

Setup Options	Options	Defaults	Description
WHEA Error Injection Support	Disable/Enable	Disable	Enables WHEA Hardware Error Event Processing Applications.

BIOS Advanced Menu Disk Freeze Lock Settings Option

The following table describes the BIOS Advanced Menu disk freeze lock settings options.

Setup Options	Options	Defaults	Description
Disk Freeze Lock	Disable/Enable	Disable	Enables or disables disk freeze lock. Enabling this setting prevents disks from being sanitized. Disk types include NVMe.

Related Information

- [“BIOS Main Menu Selections” on page 313](#)
- [“BIOS IO Menu Selections” on page 330](#)
- [“BIOS Boot Menu Selections” on page 334](#)
- [“BIOS Save and Exit Menu Selections” on page 336](#)

BIOS IO Menu Selections

This section includes a screen of the BIOS IO Menu. The options that are available from the IO Menu are described in the sections that follow.



The following sections describe the BIOS IO Menu options.

- [“BIOS IO Menu PCI Subsystem Settings Options” on page 331](#)
- [“BIOS IO Menu IO Virtualization Options” on page 332](#)
- [“BIOS IO Menu IOAT Configuration Options” on page 333](#)
- [“BIOS IO Menu Internal Devices Options” on page 333](#)
- [“BIOS IO Menu Add-in Cards Options” on page 334](#)

BIOS IO Menu PCI Subsystem Settings Options

The following table describes the BIOS IO Menu PCI subsystem settings options.

Setup Options	Options	Defaults	Description
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.

BIOS IO Menu Selections

Setup Options	Options	Defaults	Description
Maximum Payload	Auto/128 Bytes/256 Bytes/512 Bytes/1024 Bytes/2048 Bytes/4096 Bytes	Auto	Set the Maximum Payload of the PCI Express device or allow the System BIOS to select the value.
Maximum Read Request	Auto/128 Bytes/256 Bytes/512 Bytes/1024 Bytes/2048 Bytes/4096 Bytes	Auto	Set the Maximum Read Request of the PCI Express device or allow the System BIOS to select the value.
PCIe Hot-Plug Support	Disabled/Enabled	Enabled	If enabled, allows the OS to support PCIe Hot-Plug. If disabled, it does not allow the OS to support PCIe Hot-Plug.

BIOS IO Menu IO Virtualization Options

The following table describes the BIOS IO Menu IO virtualization options.

Setup Options	Options	Defaults	Description
VT-d	Disabled/Enabled	Enabled	Enable or disable Intel Virtualization Technology for directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMA remapping reporting (DMAR) Advance Configuration Power Interface (ACPI) tables.
ACS	Disabled/Enabled	Disabled	If disabled, programs ACS only to Chipset PCIe Root Port Bridges. If enabled, programs ACS to all PCIe Root Port Bridges.
SR-IOV Support	Disabled/Enabled	Enabled	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 resources are allocated to the device as normal. If set to disabled, I/O resources are not allocated to the device.
ARI	Disabled/Enabled	Enabled	If Alternate Routing ID (ARI) is supported by the hardware

Setup Options	Options	Defaults	Description
			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.

BIOS IO Menu IOAT Configuration Options

The following table describes the BIOS IO Menu IOAT configuration options.

Setup Options	Options	Defaults	Description
Intel IOAT	Disabled/Enabled	Enabled	Enable or disable Intel IOAT.
DCA Support	Disabled/Enabled	Enabled	Enable or disable direct cache access (DCA) support.

BIOS IO Menu Internal Devices Options

The following table describes the BIOS IO Menu internal devices options.

Setup Options	Options	Defaults	Description
NET 0			Displays and provides options to change the internal device settings.
PCI-E UEFI Driver Enable	Disabled/Enabled	Enabled	Enable or disable PCI-E UEFI Driver. If set to enabled, UEFI Driver for the card executes as normal. If set to disabled, UEFI Driver for the card is not copied into memory and the execution of the UEFI Driver is inhibited.
NET 1 through NET 7			Same description as NET 0
PCI-E HBA Settings			Displays and provides options to change PCIe HBA settings.
PCI-E HBA Settings (SideB)			Displays and provides options to change PCIe HBA settings.

BIOS IO Menu Add-in Cards Options

The following table describes the BIOS IO Menu add-in cards options.

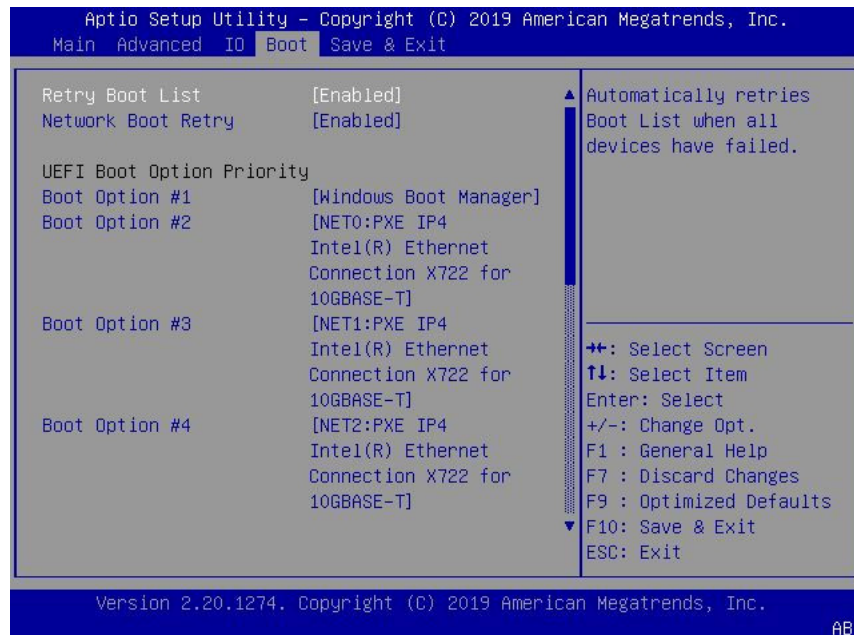
Setup Options	Options	Defaults	Description
Slot 1			Displays and provides options to change the settings of the devices in PCIe HBA slots.
IO Enable	Disabled/Enabled	Enabled	IO Enable
PCI-E UEFI Driver Enable	Disabled/Enabled	Enabled	Enable or disable PCI-E UEFI Driver. If set to enabled, UEFI Driver for the card executes as normal. If set to disabled, UEFI Driver for the card is not copied into memory and the execution of the UEFI Driver is inhibited.
Hot Plug Capable	Disabled/Enabled	Enabled	Specifies if the link is Hot-Plug capable.
Slot 2 through Slot 16			Same description as Slot 1.

Related Information

- [“BIOS Main Menu Selections” on page 313](#)
- [“BIOS Advanced Menu Selections” on page 318](#)
- [“BIOS Boot Menu Selections” on page 334](#)
- [“BIOS Save and Exit Menu Selections” on page 336](#)

BIOS Boot Menu Selections

This section includes a screen of the BIOS Boot Menu. The options that are available from the Boot Menu are described in the table that follows.



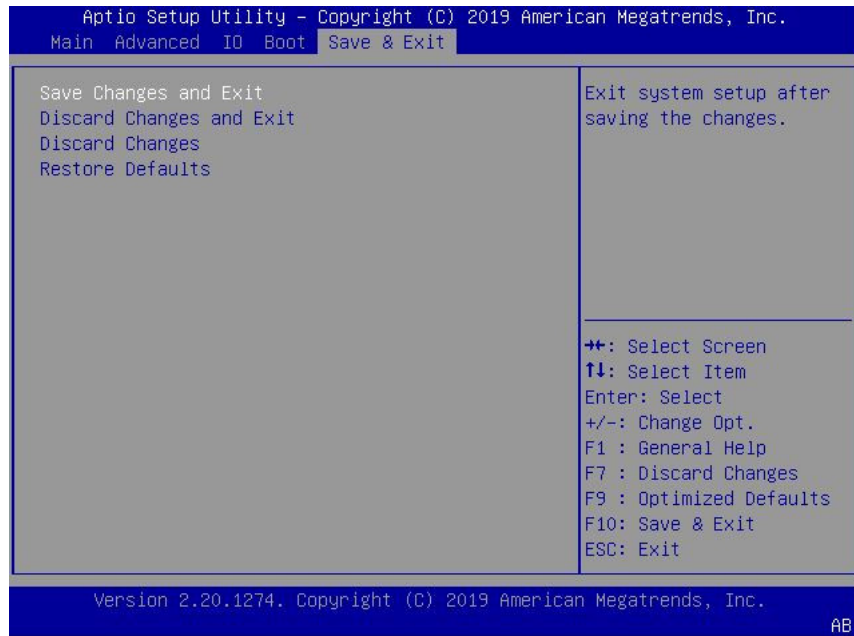
Setup Options	Options	Defaults	Description
Retry Boot List	Disabled/Enabled	Enabled	Automatically retries Boot List when all devices have failed.
Network Boot Retry	Disabled/Enabled/Boot List	Enabled	If enabled, BIOS automatically retries the PXE list present in the system when all PXE attempts have failed. If set to 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.
UEFI Boot Option Priority			Displays and sets the system boot order.

Related Information

- [“BIOS Main Menu Selections” on page 313](#)
- [“BIOS Advanced Menu Selections” on page 318](#)
- [“BIOS IO Menu Selections” on page 330](#)
- [“BIOS Save and Exit Menu Selections” on page 336](#)

BIOS Save and Exit Menu Selections

This section includes a screen of the BIOS Exit Menu. The options that are available from the Exit Menu are described in the table that follows.



Setup Options	Description
Save Changes and Exit	Save changes and exit the BIOS Setup Utility.
Discard Changes and Exit	Exit the BIOS Setup Utility without saving changes.
Discard Changes	Discard any changes made to the setup options.
Restore Defaults	Restore/load the optimal default values for all of the setup options.

Related Information

- [“BIOS Main Menu Selections” on page 313](#)
- [“BIOS Advanced Menu Selections” on page 318](#)
- [“BIOS IO Menu Selections” on page 330](#)

- [“BIOS Boot Menu Selections” on page 334](#)

Monitoring and Identifying Server Components

This section includes information about monitoring and identifying components for the Oracle Server X7-8.

- “Monitoring Component Health and Faults Using Oracle ILOM” on page 339
- “Monitoring System Components” on page 340
- “System Components (FRUs) Network Access Control (NAC) Names” on page 341
- “System Indicators Network Access Control (NAC) Names” on page 342
- “System Sensors Network Access Control (NAC) Names” on page 345

Related Information

- Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at: <https://www.oracle.com/goto/ilom/docs>

Monitoring Component Health and Faults Using Oracle ILOM

The Oracle ILOM 4.0 interfaces provide easy-to-view information about the health status of system components. From the Oracle ILOM web interface or in the Oracle ILOM command-line interface (CLI), you can collect system-specific information about the server, determine the health state of discrete components, and view any open problems on the server. Oracle ILOM automatically detects system hardware faults and environmental conditions on the server. If a problem occurs on the server, Oracle ILOM will automatically do the following:

- Illuminate the Service Required status indicator (LED) on the server front and back panels. See “Troubleshooting Using Status Indicators” on page 57 and “System Indicators Network Access Control (NAC) Names” on page 342.
- Identify the faulted component in the Open Problems table. Open problems detected on a host server or system chassis are viewable from either the Open Problems web page or the `/System/Open_problems` CLI target. Refer to *View Open Problems Detected on a Managed Device* in the *Oracle ILOM User's Guide for System Monitoring and Diagnostics Firmware*

Release 4.0.x in the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.

- Record system information about the faulted component or condition in the Oracle ILOM event log. Refer to *Managing ILOM Log Entries* in the *Oracle ILOM User's Guide for System Monitoring and Diagnostics Firmware Release 4.0.x* in the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.

For further information about administering open problems that are detected and reported by Oracle ILOM, refer to “Administering Open Problems” in the *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 4.0.x* in the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.

Monitoring System Components

This section includes information for the following server components:

- “System Components (FRUs) Network Access Control (NAC) Names” on page 341
- “System Indicators Network Access Control (NAC) Names” on page 342
- “System Sensors Network Access Control (NAC) Names” on page 345

Component Names are displayed by Diagnostic Software. The tables in this section identify the system components and describe the naming conventions applied to the components of the Oracle Server X7-8.

Each section corresponds to an IPMI entity ID and lists sensors, indicators, and field-replaceable units (FRUs) related to that entity. The tables contain the following fields:

- **Component Name** – Shows the user-visible component name used in management interfaces to refer to a specific sensor, indicator, or FRU. The IPMI name is a shortened form of the component name, and is indicated by the **boldface** portion of the component name.
- **IPMI Type** – Indicates the type of sensor, indicator, or FRU represented.
- **Description** – Describes the particular component name reference.
- **Values** – Defines the states of the sensor, indicator, or FRU entity, and any specific units or values that are expected, if applicable.

Note - Some component names are hidden in the Oracle ILOM user interfaces. These names are marked as hidden in the tables. See the ILOM 4.0 Documentation Library at <https://www.oracle.com/goto/ilom/docs>.

System Components (FRUs) Network Access Control (NAC) Names

This table lists and describes the System Components (FRUs) NAC names, and identifies the IPMI type and values.

Name (8-Socket 1x8)	System A Name (Dual 4-Socket 2x4-A Side)	System B Name (Dual 4-Socket 2x4-B Side)	Description
/SYS	/SYS	/SYS	System FRU
/SYS/UUID	/SYS/UUID	/SYS/UUID (unique, different from A side)	Unique System ID (hidden)
/SYS/PS[0-3]	/SYS/PS[2-3]	/SYS/PS[0-1]	Power Supplies (Static FRUID)
/SYS/FM[0-7]	/SYS/FM[0-3]	/SYS/FM[4-7]	Fan Modules (No FRUID)
/SYS/SMOD[0-1]/HDD[0-3]	/SYS/SMOD0/HDD[0-3]	/SYS/SMOD1/HDD[0-3]	Hard Disk Drives
/SYS/MIDPLANE	/SYS/MIDPLANE	/SYS/MIDPLANE	System Chassis Midplane (Dynamic FRUID)
/SYS/SMOD[0-1]	/SYS/SMOD0	/SYS/SMOD1	System Module
/SYS/SMOD[0-1]/DBP	/SYS/SMOD0/DBP	/SYS/SMOD1/DBP	Disk Backplanes (Dynamic FRUID)
/SYS/SMOD[0-1]/MB	/SYS/SMOD0/MB	/SYS/SMOD1/MB	System Module (Dynamic FRUID)
/SYS/SMOD[0-1]/MB/NET[0-3]	/SYS/SMOD0/MB/NET[0-3]	/SYS/SMOD1/MB/NET[0-3]	System Host Network Interfaces (Static FRUID)
/SYS/SMOD[0-1]/MB/BIOS	/SYS/SMOD0/MB/BIOS	/SYS/SMOD1/MB/BIOS	System BIOS
/SYS/SMOD[0-1]/MB/CPLD	/SYS/SMOD0/MB/CPLD	/SYS/SMOD1/MB/CPLD	CPLD on System Module
/SYS/SMOD[0-1]/HBA	/SYS/SMOD0/HBA	/SYS/SMOD1/HBA	HBA
/SYS/SMOD[0-1]/MB/SP	/SYS/SMOD0/MB/SP	/SYS/SMOD1/MB/SP	Embedded Service Processor on System Module (Dynamic FRUID)
/SYS/SMOD[0-1]/MB/SP/NET[0-1]	/SYS/SMOD0/MB/SP/NET[0-1]	/SYS/SMOD1/MB/SP/NET[0-1]	Service Processor network interfaces
/SYS/CMOD[0-7]	/SYS/CMOD[0-3]	/SYS/CMOD[4-7]	CPU Module. 8 CMODs per chassis (Dynamic FRUID)
/SYS/CMOD[0-7]/P[0-7]	/SYS/CMOD[0-3]/P[0-3]	/SYS/CMOD[4-7]/P[4-7]	CPU on CPU Module Motherboard (Static FRUID)
/SYS/CMOD[0-7]/P[0-7]/D[0-11]	/SYS/CMOD[0-3]/P[0-3]/D[0-11]	/SYS/CMOD[4-7]/P[4-7]/D[0-11]	DIMMs on CPU Module Motherboard (Dynamic FRUID)
/SYS/CMOD[0-7]/CPLD	/SYS/CMOD[0-3]/CPLD	/SYS/CMOD[4-7]/CPLD	CPLD on CPU Module

System Indicators Network Access Control (NAC) Names

Name (8-Socket 1x8)	System A Name (Dual 4-Socket 2x4-A Side)	System B Name (Dual 4-Socket 2x4-B Side)	Description
/SYS/DPCC[0-7]	/SYS/DPCC[0-3]	/SYS/DPCC[4-7]	Dual PCIe Card Carrier
/SYS/DPCC[0-7]/PCIE[1-16]	/SYS/DPCC[0-3]/PCIE[1-8]	/SYS/DPCC[4-7]/PCIE[9-16]	PCIe Cards 1-16
/SYS/FIM	/SYS/FIM	/SYS/FIM	Front Indicator Module. not exposed by ILOM

System Indicators Network Access Control (NAC) Names

This section includes information for System Indicators.

Name (1x8)	System A Name (2x4-A Side)	System B Name (2x4-B Side)	Description
/SYS/OK (A-Side; B-side disabled)	/SYS/OK	/SYS/OK	System OK Color: Green Location: FIM Front Panel and SMOD Rear Panel Standby Blink: power is off Slow Blink: BIOS post On Host OS booting or booted
/SYS/SERVICE (A-Side; B-side disabled)	/SYS/SERVICE	/SYS/SERVICE	Service Summary Color: Amber Location: FIM Front Panel and SMOD Rear Panel On: System has fault. Off: System has no fault.
/SYS/LOCATE (A-Side; B-side disabled)	/SYS/LOCATE	/SYS/LOCATE	System Locate LED/Button Color: White Location: FIM Front Panel and SMOD Rear Panel Fast Blink: Locate function activated. Off: Normal.
/SYS/TEMP_FAULT (A-Side; B-side disabled)	/SYS/TEMP_FAULT	/SYS/TEMP_FAULT	System Temperature Fault Color: Amber

System Indicators Network Access Control (NAC) Names

Name (1x8)	System A Name (2x4-A Side)	System B Name (2x4-B Side)	Description
			Location: FIM Front Panel On: System temperature fault. Off: No system temperature fault.
/SYS/REAR_FAULT (A-Side; B-side disabled)	/SYS/REAR_FAULT	/SYS/REAR_FAULT	System Rear Panel Fault Color: Amber Location: FIM Front Panel On: Rear FRU has a fault. Off: Rear FRU has no fault.
/SYS/SMOD0/MB/SP/OK (A-Side; B-side disabled)	/SYS/SMOD0/MB/SP/OK	/SYS/SMOD1/MB/SP/OK	SP OK Color: Green Location: FIM Front Panel and SMOD rear panel On: SP is normal. Fast Blink: SP is booting. Off: SP has no power.
/SYS/CMOD[0-7]/SERVICE	/SYS/CMOD[0-3]/SERVICE	/SYS/CMOD[4-7]/SERVICE	CMOD Service Color: Amber Location: FIM Front Panel On: CMOD has fault. Off: CMOD has no fault.
/SYS/CMOD[0-7]/P[0-7]/SERVICE IPMI short name: CMODx/P[0-7]/SVC	/SYS/CMOD[0-3]/P[0-3]/SERVICE IPMI short name: CMODx/P[0-3]/SVC	/SYS/CMOD[4-7]/P[4-7]/SERVICE IPMI short name: CMODx/P[0-3]/SVC	Processor Service Color: Amber Location: CMOD board. On: Processor has fault. Off: Processor has no fault.
/SYS/CMOD[0-7]/P[0-7]/D[0-11]/SERVICE IPMI short name: CMODx/P[0-7]/Dxx/SVC	/SYS/CMOD[0-3]/P[0-3]/D[0-11]/SERVICE IPMI short name: CMODx/P[0-3]/Dxx/SVC	/SYS/CMOD[4-7]/P[4-7]/D[0-11]/SERVICE IPMI short name: CMODx/P[4-7]/Dxx/SVC	Memory Service Color: Amber Location: CMOD board. On: DIMM has fault. Off: DIMM has no fault.

System Indicators Network Access Control (NAC) Names

Name (1x8)	System A Name (2x4-A Side)	System B Name (2x4-B Side)	Description
/SYS/SMOD[0-1]/SERVICE	/SYS/SMOD0/SERVICE	/SYS/SMOD1/ SERVICE	SMOD Fault Color: Amber Location: SMOD Back Panel On: SMOD has fault. Off: SMOD has no fault.
/SYS/SMOD[0-1]/OK	/SYS/SMOD0/OK	/SYS/SMOD1/OK	SMOD OK Color: Green Location: SMOD Back Panel On: SMOD is functional. Off: SMOD not working or not active. In 1x8 mode, SMOD1 OK LED is off.
/SYS/SMOD[0-1]/HBA/SERVICE	/SYS/SMOD0/HBA/SERVICE	/SYS/SMOD1/HBA/ SERVICE	HBA Fault Color: Amber Location: SMOD Back Panel On: HBA has fault. Off: HBA has no fault.
/SYS/DPCC[0-7]/PCIE[1-16]/OK	/SYS/DPCC[0-3]/PCIE[1-8]/OK	/SYS/DPCC[4-7]/ PCIE[9-16]/OK	PCIe OK Color: Green Location: DPCC PCIe On: PCIe is in use. Blink: PCIe is in transition. Off: Ready to be removed (conditional).
/SYS/DPCC[0-7]/PCIE[1-16]/ SERVICE	/SYS/DPCC[0-3]/PCIE[1-8]/ SERVICE	/SYS/DPCC[4-7]/ PCIE[9-16]/SERVICE	PCIe Service Color: Amber Location: DPCC PCIe On: PCIe has fault. Off: PCIe has no fault. Fast Blink: Locate
/SYS/SMOD[0-1]/HDD[0-3]/ OK2RM	/SYS/SMOD0/HDD[0-3]/ OK2RM	/SYS/SMOD1/ HDD[0-3]/OK2RM	Hard Drive Ready to be removed Color: Blue

System Sensors Network Access Control (NAC) Names

Name (1x8)	System A Name (2x4-A Side)	System B Name (2x4-B Side)	Description
			Location: HDD On: HDD is ready to be removed. Off: HDD is not ready to be removed.
/SYS/SMOD[0-1]/HDD[0-3]/SERVICE	/SYS/SMOD0/HDD[0-3]/SERVICE	/SYS/SMOD1/HDD[0-3]/SERVICE	Hard Disk Service Color: Amber Location: HDD On: HDD has fault. Off: HDD has no fault.
/SYS/FM[0-7]/OK	/SYS/FM[0-3]/OK	/SYS/FM[4-7]/OK FM	Fan Module (Fan) OK Color: Green Location: Fan Module Front Panel On: FM good/has power. (On only if host has power) Off: FM has no power.
/SYS/FM[0-7]/SERVICE	/SYS/FM[0-3]/SERVICE(Fan)	/SYS/FM[4-7]/SERVICE	Service fan module Color: Amber Location: Fan Module Front Panel On: Fan module has fault. Off: Fan module has no fault.

System Sensors Network Access Control (NAC) Names

This section includes information for system sensors:

Name (1x8)	System A Name (2x4-A Side)	System B Name (2x4-B Side)	Description
/SYS/ACPI	/SYS/ACPI	/SYS/ACPI	Discrete Host power state (hidden) 01h: host is on. 20h: host is off.
/SYS/PS_REDUNDANCY	/SYS/PS_REDUNDANCY	/SYS/PS_REDUNDANCY	Discrete PS Redundancy status

System Sensors Network Access Control (NAC) Names

Name (1x8)	System A Name (2x4-A Side)	System B Name (2x4-B Side)	Description
			00h: fully redundant 02h: degraded redundancy 03h: non-redundant 05h: insufficient power
/SYS/VPS	/SYS/VPS	/SYS/VPS	Threshold Chassis power consumption sensor Watts
/SYS/VPS_MEMORY	/SYS/VPS_MEMORY	/SYS/VPS_MEMORY	Threshold Memory power consumption Watts
/SYS/VPS_FANS	/SYS/VPS_FANS	/SYS/VPS_FANS	Threshold Fan power consumption Watts
/SYS/T_AMB	/SYS/T_AMB	/SYS/T_AMB	Threshold Chassis ambient temperature Degree in C
/SYS/HOST_ERR	/SYS/HOST_ERR	/SYS/HOST_ERR	Discrete Host fault sensor 01h: No Fault 02h: Fault
/SYS/FM[0-7]/PRSNT	/SYS/FM[0-3]/PRSNT	/SYS/FM[4-7]/PRSNT	Discrete Fan module presence 01h: Absent 02h: Present
/SYS/FM[0-7]/F[0/1]/TACH	/SYS/FM[0-3]/F[0/1]/TACHThreshold	/SYS/FM[4-7]/F[0/1]/TACH	Fan speed. RPM
/SYS/DPCC[0-7]/PRSNT	/SYS/DPCC[0-3]/PRSNT	/SYS/DPCC[4-7]/PRSNT	Discrete DPCC Carrier presence. 01h: Absent 02h: Present
/SYS/DPCC[0-7]/PRSNT	/SYS/DPCC[0-3]/PRSNT	/SYS/DPCC[4-7]/PRSNT	Discrete DPCC Carrier presence. 01h: Absent 02h: Present
/SYS/DPCC[0-7]/PCIE[1-16]/PRSNT	/SYS/DPCC[0-3]/PCIE[1-8]/PRSNT	/SYS/DPCC[4-7]/PCIE[9-16]/PRSNT	Discrete PCIE card presence. 01h: Absent 02h: Present
/SYS/CMOD[0-7]/P[0-7]/PRSNT	/SYS/CMOD[0-3]/P[0-3]/PRSNT	/SYS/CMOD[4-7]/P[4-7]/PRSNT	Discrete Processor presence. 01h: Absent 02h: Present
/SYS/CMOD[0-7]/PRSNT	/SYS/CMOD[0-3]/PRSNT	/SYS/CMOD[4-7]/PRSNT	Discrete CPU module motherboard presence.

System Sensors Network Access Control (NAC) Names

Name (1x8)	System A Name (2x4-A Side)	System B Name (2x4-B Side)	Description
			01h: Absent
			02h: Present
/SYS/CMOD[0-7]/P[0-7]/D[0-11]/PRSNT	/SYS/CMOD[0-3]/P[0-3]/D[0-11]/PRSNT	/SYS/CMOD[4-7]/P[4-7]/D[0-11]/PRSNT	Discrete DIMM presence (hidden)
			01h: Absent
			02h: Present
/SYS/CMOD[0-7]/T_IN	/SYS/CMOD[0-3]/T_IN	/SYS/CMOD[4-7]/T_IN	Threshold CMOD inlet ambient temperature Degree in C
/SYS/CMOD[0-7]/T_IN_DPCC	/SYS/CMOD[0-3]/T_IN_DPCC	/SYS/CMOD[4-7]/T_IN_DPCC	Threshold Inlet air temperature to the DPCC connector. Degree in C
/SYS/CMOD[0-7]/T_IN_HDD	/SYS/CMOD[0-3]/T_IN_HDD	/SYS/CMOD[4-7]/T_IN_HDD	Threshold Inlet air temperature to the HDD Disk Riser. Degree in C
/SYS/CMOD[0-7]/T_OUT_CPU	/SYS/CMOD[0-3]/T_OUT_CPU	/SYS/CMOD[4-7]/T_OUT_CPU	Threshold CMOD temperature behind CPU Degree in C
/SYS/SMOD[0-1]/MB/T_IN	/SYS/SMOD0/MB/T_IN	/SYS/SMOD1/MB/T_IN	Threshold SMOD Inlet air temperature near midplane connectors. Degree in C
/SYS/SMOD[0-1]/MB/T_HBA	/SYS/SMOD0/MB/T_HBA	/SYS/SMOD1/MB/T_HBA	Threshold SMOD temperature on bottomside HBA location. Degree in C
/SYS/SMOD[0-1]/MB/T_PHY	/SYS/SMOD0/MB/T_PHY	/SYS/SMOD1/MB/T_PHY	Threshold SMOD temperature on topside network PHY chip. Degree in C
/SYS/SMOD[0-1]/MB/T_OUT	/SYS/SMOD0/MB/T_OUT	/SYS/SMOD1/MB/T_OUT	Threshold SMOD temperature on topside rear outlet. Degree in C
/SYS/PS[0-3]/PRSNT	/SYS/PS[2-3]/PRSNT	/SYS/PS[0-1]/PRSNT	Discrete Power supply presence
			01h: Absent
			02h: Present
/SYS/PS[0-3]/P_IN/	SYS/PS[2-3]/P_IN	/SYS/PS[0-1]/P_IN	Threshold PS input power consumption Watts
/SYS/PS[0-3]/P_OUT	/SYS/PS[2-3]/P_OUT	/SYS/PS[0-1]/P_OUT	Threshold PS output power Watts
/SYS/PS[0-3]/STATE	/SYS/PS[2-3]/STATE	/SYS/PS[0-1]/STATE	Discrete IPMI Standard Power Supply Sensor
			01h: No Fault
			02h: Fault
/SYS/PS[0-3]/T_AMB	/SYS/PS[2-3]/T_AMB	/SYS/PS[0-1]/T_AMB	Threshold PS inlet temperature Volts
/SYS/PS[0-3]/V_12V	/SYS/PS[2-3]/V_12V	/SYS/PS[0-1]/V_12V	Threshold PS main output voltage Volts
/SYS/PS[0-3]/V_12V_STBY	/SYS/PS[2-3]/V_12V_STBY	/SYS/PS[0-1]/V_12V_STBY	Threshold PS standby output voltage Volts
/SYS/PS[0-3]/V_IN	/SYS/PS[2-3]/V_IN	/SYS/PS[0-1]/V_IN	Threshold PS input voltage Volts

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