

Oracle Exadata Database Server X8-8 Service Manual



E96097-03
March 2022



Oracle Exadata Database Server X8-8 Service Manual,

E96097-03

Copyright © 2019, 2022, Oracle and/or its affiliates.

Primary Author: Vonn Moore

Contributing Authors: Mark McGothigan

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, then the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs (including any operating system, integrated software, any programs embedded, installed or activated on delivered hardware, and modifications of such programs) and Oracle computer documentation or other Oracle data delivered to or accessed by U.S. Government end users are "commercial computer software" or "commercial computer software documentation" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, the use, reproduction, duplication, release, display, disclosure, modification, preparation of derivative works, and/or adaptation of i) Oracle programs (including any operating system, integrated software, any programs embedded, installed or activated on delivered hardware, and modifications of such programs), ii) Oracle computer documentation and/or iii) other Oracle data, is subject to the rights and limitations specified in the license contained in the applicable contract. The terms governing the U.S. Government's use of Oracle cloud services are defined by the applicable contract for such services. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

Oracle, Java, and MySQL are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Inside are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Epyc, and the AMD logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

This software or hardware and documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

Contents

Preface

| | |
|-------------------|---|
| Audience | x |
| Related Documents | x |
| Conventions | x |

1 About the Oracle Exadata Database Server X8-8

| | |
|---------------------------------------|------|
| Product Description | 1-1 |
| About Controls and Connectors | 1-3 |
| Front Panel Components | 1-3 |
| Back Panel Components | 1-5 |
| Replaceable Components | 1-7 |
| Illustrated Parts Breakdown | 1-7 |
| Component Serviceability Requirements | 1-9 |
| Customer-Replaceable Units | 1-9 |
| Field-Replaceable Units | 1-10 |
| CPU Module (CMOD) Overview | 1-11 |
| CMOD Components | 1-11 |
| CMOD Processor | 1-12 |
| CMOD Memory | 1-13 |
| CMOD and Fan Module Power | 1-14 |
| System Module (SMOD) Overview | 1-15 |
| SMOD Components | 1-16 |
| SMOD Motherboard | 1-18 |
| Server Chassis Overview | 1-18 |
| Chassis Features | 1-19 |
| Chassis Internal Components | 1-19 |
| Chassis Front Panel Components | 1-20 |
| Chassis Back Panel Components | 1-21 |
| Switches and Buttons Reference | 1-22 |

2 Installation Procedure

| | |
|---------------------------------|-----|
| Installation Procedure Overview | 2-1 |
|---------------------------------|-----|

3 Troubleshooting and Diagnostics

| | |
|--|------|
| Detecting and Managing Server Faults | 3-1 |
| Troubleshooting Server Hardware Faults | 3-2 |
| Basic Troubleshooting Steps | 3-2 |
| Identify Hardware Faults (Oracle ILOM) | 3-3 |
| Managing Server Hardware Faults Using the Oracle ILOM Fault Management Shell | 3-5 |
| Clear Hardware Fault Messages (Oracle ILOM) | 3-5 |
| Troubleshooting Using a CMOD Fault Remind Test Circuit | 3-7 |
| Troubleshooting System Cooling Issues | 3-7 |
| Troubleshooting Power Issues | 3-9 |
| Troubleshooting Using Diagnostic Tools | 3-10 |
| Diagnostic Tools | 3-10 |
| Troubleshooting Using Status Indicators | 3-12 |
| Front Indicator Module (FIM) Panel | 3-12 |
| Fan Module (FM) Indicators | 3-15 |
| Power Supply (PS) Indicators | 3-16 |
| System Module (SMOD) Indicators | 3-17 |
| Dual PCIe Card Carrier (DPCC) Indicators | 3-20 |
| AC Power Block Inlet Indicators | 3-21 |
| About Controls and Indicators | 3-22 |
| Controls and Indicators | 3-22 |
| Back Panel Pinhole Switches | 3-25 |
| Status Indicator Blink Rates | 3-26 |
| Steady On | 3-27 |
| Steady Off | 3-27 |
| Slow Blink Rate | 3-27 |
| Fast Blink Rate | 3-28 |
| Single (Standby) Blink Rate | 3-28 |
| Slow Unison Blink Rate | 3-28 |
| Insertion Blink | 3-28 |
| Unison Steady On | 3-29 |
| Alternating (Invalid FRU) Blink Rate | 3-29 |
| Feedback Flash | 3-29 |
| Data Blink Rate | 3-29 |
| Sequential (Diagnostic) Blink Rate | 3-30 |
| Troubleshooting Server Subsystems | 3-30 |
| Processor Subsystem | 3-30 |

| | |
|---|------|
| Memory Subsystem | 3-30 |
| Power Subsystem | 3-31 |
| Cooling Subsystem | 3-33 |
| Cooling Zones | 3-33 |
| Cooling Fan Power | 3-34 |
| Fan Module Redundancy | 3-35 |
| Networking Subsystem | 3-35 |
| I/O Subsystem | 3-36 |
| PCI Devices Subsystem | 3-36 |
| Dual PCIe Card Carrier (DPCC) | 3-37 |
| Attaching Devices to the Server | 3-37 |
| Attach Devices to the Server | 3-37 |
| Back Panel Connector Locations | 3-38 |
| Configuring Serial Port and Network Port Sharing | 3-39 |
| Assign Serial Port Output (Oracle ILOM CLI) | 3-39 |
| Assign Serial Port Output (Oracle ILOM Web Interface) | 3-40 |
| Ethernet Device Naming | 3-40 |
| Getting Help | 3-41 |
| Contacting Support | 3-41 |
| Locating the Chassis Serial Number | 3-41 |
| Auto Service Requests | 3-42 |

4 Preparing for Service

| | |
|---|-----|
| Electrostatic Discharge and Static Prevention Measures | 4-1 |
| Using an Antistatic Wrist Strap | 4-1 |
| Using an Antistatic Mat | 4-1 |
| Safety Symbols | 4-1 |
| Warning Label | 4-2 |
| FRU Key Identity Properties (KIP) Automated Update | 4-2 |
| Required Tools and Equipment | 4-3 |
| Preparing the Server for Component Replacement | 4-3 |
| Serviceability Overview | 4-3 |
| Hot Service | 4-4 |
| Warm Service | 4-4 |
| Cold Service | 4-4 |
| Powering Down the Server | 4-5 |
| Power Off the Server for Immediate Shutdown (Oracle ILOM CLI) | 4-5 |
| Power Off the Server for Immediate Shutdown (Oracle ILOM Web Interface) | 4-6 |
| Power Off the Server for Immediate Shutdown (Power Button) | 4-7 |
| Power Off the Server Using the Server OS | 4-7 |

| | |
|--|------|
| Remove Power | 4-8 |
| Power Control, Shutdown, and Reset States | 4-8 |
| Managing the Locate Button/LED | 4-9 |
| Turn On the Locate Button/LED Remotely (Oracle ILOM CLI) | 4-10 |
| Turn On the Locate Button/LED Remotely (Oracle ILOM Web Interface) | 4-10 |
| Control the Locate Button/LED Locally | 4-11 |
| Component Filler Panels and Non-Powered Components | 4-11 |

5 Servicing Components

| | |
|--|------|
| Servicing Fan Modules (CRU) and Fan Frames (CRU) | 5-1 |
| Fan Module Locations and Numbering | 5-1 |
| Remove a Fan Module | 5-2 |
| Install a Fan Module | 5-4 |
| Remove a Fan Frame | 5-6 |
| Install a Fan Frame | 5-7 |
| Servicing Power Supplies (CRU) | 5-8 |
| Power Supply Locations and Numbering | 5-8 |
| Power Supply Overview | 5-9 |
| AC Input Power Block Locations | 5-9 |
| Remove a Power Supply | 5-10 |
| Install a Power Supply | 5-13 |
| Servicing PCIe Cards and Carriers (CRU) | 5-14 |
| PCIe Card and DPCC Overview | 5-15 |
| DPCC and PCIe Card Slot Locations and Numbering | 5-15 |
| Server PCIe Card Slots | 5-16 |
| Dual PCIe Card Carriers (DPCCs) | 5-17 |
| DPCC Indicator Panel | 5-17 |
| DPCC Population Rules | 5-17 |
| Remove a DPCC | 5-17 |
| Remove a PCIe Card | 5-19 |
| Install a PCIe Card | 5-20 |
| Install a DPCC | 5-22 |
| Servicing CPU Module (CMOD) Components (FRU) | 5-24 |
| CMOD Slot Locations and Numbering | 5-24 |
| CMOD Population Rules | 5-25 |
| Remove a CMOD | 5-26 |
| Remove the CMOD Cover | 5-28 |
| Install the CMOD Cover | 5-29 |
| Install a CMOD | 5-30 |
| Servicing Processors (FRU) | 5-32 |

| | |
|--|------|
| Identify and Remove a Faulty Processor | 5-33 |
| Install a Processor | 5-37 |
| Prepare a CMOD for Replacement | 5-41 |
| Servicing DIMMs (CRU) | 5-43 |
| DIMM Physical Layout and Numbering | 5-44 |
| DIMM Population Rules | 5-45 |
| DIMM Population Scenarios | 5-45 |
| DIMM Operating Speeds | 5-45 |
| Inconsistencies Between DIMM Fault Indicators and the BIOS Isolation of Faulty DIMMs | 5-46 |
| Identify and Remove a Faulty DIMM | 5-46 |
| Install a DIMM | 5-48 |
| Servicing System Module (SMOD) Components (FRU) | 5-51 |
| SMOD Population Rules | 5-52 |
| Remove an SMOD | 5-52 |
| Install an SMOD | 5-54 |
| Servicing the System Battery (CRU) | 5-55 |
| Remove the System Battery | 5-56 |
| Install the System Battery | 5-57 |
| Prepare an SMOD for Replacement | 5-59 |
| Servicing the Front Indicator Module (FRU) | 5-60 |
| Remove the FIM | 5-60 |
| Install the FIM | 5-61 |
| Servicing the Midplane Assembly (FRU) | 5-63 |
| Remove the Midplane Assembly | 5-63 |
| Install the Midplane Assembly | 5-68 |

6 Returning the Server to Operation

| | |
|----------------------------------|-----|
| Prepare the Server for Operation | 6-1 |
| Power On the Server | 6-2 |

7 Setting Up BIOS Configuration Parameters

| | |
|--|-----|
| Manage the BIOS Configuration | 7-1 |
| Accessing the BIOS Setup Utility | 7-1 |
| BIOS Setup Utility Menus | 7-1 |
| BIOS Key Mappings | 7-2 |
| Access BIOS Setup Utility Menus | 7-2 |
| Navigate BIOS Setup Utility Menus | 7-3 |
| Using UEFI BIOS | 7-4 |
| Configuration Utilities for Add-In Cards | 7-4 |

| | |
|---|------|
| Configure and Manage BIOS Using Oracle ILOM | 7-4 |
| UEFI Secure Boot | 7-5 |
| Trusted Execution Technology | 7-5 |
| Common BIOS Setup Utility Tasks | 7-5 |
| Verify BIOS Factory Default Settings | 7-5 |
| Select a Temporary Boot Device | 7-6 |
| Configure TPM Support | 7-7 |
| Configure UEFI Driver Settings | 7-8 |
| Configure I/O Resource Allocation | 7-10 |
| Configure UEFI Secure Boot | 7-12 |
| Configure Trusted Execution Technology | 7-18 |
| Exit BIOS Setup Utility | 7-19 |

8 BIOS Setup Utility Menu Options

| | |
|---|------|
| BIOS Main Menu Selections | 8-1 |
| BIOS Advanced Menu Selections | 8-4 |
| BIOS Advanced Menu Serial Port Console Redirection Options | 8-6 |
| BIOS Advanced Menu Network Stack Configuration Options | 8-7 |
| BIOS Advanced Menu NVMe Configuration Options | 8-7 |
| BIOS Advanced Menu Primary Video Selection Options | 8-7 |
| BIOS Advanced Menu Trusted Computing 2.0 Options | 8-7 |
| BIOS Advanced Menu Disk Freeze Lock Settings Option | 8-8 |
| BIOS Advanced Menu Processor Configuration Options | 8-9 |
| BIOS Advanced Menu Memory Configuration Options | 8-9 |
| BIOS Advanced Menu CPU Power Management Configuration Options | 8-10 |
| BIOS Advanced Menu USB Ports Options | 8-10 |
| BIOS Advanced Menu Error Injection Settings Option | 8-11 |
| BIOS Advanced Menu UPI General Configuration Options | 8-11 |
| BIOS Advanced Menu T1s Auth Configuration Options | 8-11 |
| BIOS Advanced Menu RAM Disk Configuration Options | 8-12 |
| BIOS Advanced Menu iSCSI Configuration Options | 8-12 |
| BIOS Advanced Menu Intel Virtual RAID on CPU Options | 8-14 |
| BIOS Advanced Menu Gigabit Network Connection Options | 8-14 |
| BIOS Advanced Menu Driver Health Options | 8-15 |
| BIOS IO Menu Selections | 8-15 |
| BIOS IO Menu PCI Subsystem Settings Options | 8-16 |
| BIOS IO Menu IO Virtualization Options | 8-17 |
| BIOS IO Menu IOAT Configuration Options | 8-17 |
| BIOS IO Menu Internal Devices Options | 8-17 |
| BIOS IO Menu Add-in Cards Options | 8-18 |

| | |
|------------------------------------|------|
| BIOS Boot Menu Selections | 8-18 |
| BIOS Save and Exit Menu Selections | 8-19 |

9 Monitoring and Identifying Server Components

| | |
|--|-----|
| Monitoring Component Health and Faults Using Oracle ILOM | 9-1 |
| Monitoring System Components | 9-1 |
| System FRU Component NAC Names | 9-2 |
| System Indicator NAC Names | 9-3 |
| System Sensor NAC Names | 9-5 |

Index

Preface

This document describes how to troubleshoot and maintain Oracle Exadata Database Server X8-8.

Audience

This guide is intended for anyone who configures, maintains, or uses Oracle Server X8-8, including:

- Technicians, administrators, developers, and authorized service providers who need to perform the tasks or learn about the concepts in this document
- Users with advanced experience troubleshooting hardware installations and configuring operating systems

Copyright© 1994, 2022, Oracle et/ou ses affiliés.

Related Documents

Documentation and resources for this product and related products are available at [Oracle Server X8-8 Documentation](#).

Conventions

The following text conventions are used in this document:

| Convention | Meaning |
|-----------------|--|
| boldface | Boldface type indicates graphical user interface elements associated with an action or terms defined in the text. |
| <i>italic</i> | Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values. |
| monospace | Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter. |
| # prompt | The pound (#) prompt indicates a command that is run as the root user. |

1

About the Oracle Exadata Database Server X8-8

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

- [Product Description](#)
- [About Controls and Connectors](#)
- [Replaceable Components](#)
- [CPU Module \(CMOD\) Overview](#)
- [System Module \(SMOD\) Overview](#)
- [Server Chassis Overview](#)

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* in *Oracle Server X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

Product Description

Oracle Exadata Database Server X8-8 is an enterprise-class 5 rack unit (5U) server that is configured as one 8-socket server.

The system supports the following components.

| Feature | System Component |
|------------------------------|---|
| Processors (CPU module/CMOD) | Eight Intel Xeon Platinum 8268, 24-core, 2.9-GHz, 205 W processors are supported. Eight-socket configurations support up to 24-core (shelf 4) processors for total of 192 cores. Six memory controllers are integrated per processor. |
| Memory | Forty-eight 64 GB 2666 MT/sec DDR4 DIMMs (3 TB) Optionally, customers can expand system memory by upgrading to ninety-six 64 GB DDR4 DIMMs (6 TB). |

| Feature | System Component |
|-------------------------------|---|
| 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>The Oracle Exadata Database Server X8-8 does not support SAS3 HDD/SSD storage drives. Storage drive slots are populated with storage drive filler panels.</p> |
| 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 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. • PCIe slots contain the following cards: <ul style="list-style-type: none"> – Slot 1 - Oracle Flash Accelerator F640 PCIe Card – Slot 2 - Empty – Slot 3 - Empty – Slot 4 - Oracle Dual Port 25 Gb Ethernet Adapter – Slot 5 - Oracle Dual Port QDR InfiniBand Adapter M3 – Slot 6 - Oracle Dual Port 25 Gb Ethernet Adapter – Slot 7 - Oracle Dual Port QDR InfiniBand Adapter M3 – Slot 8 - Empty – Slot 9 - Oracle Dual Port QDR InfiniBand Adapter M3 – Slot 10 - Empty – Slot 11 - Oracle Dual Port QDR InfiniBand Adapter M3 – Slot 12 - Oracle Dual Port 25 Gb Ethernet Adapter – Slot 13 - Empty – Slot 14 - Oracle Dual Port 25 Gb Ethernet Adapter – Slot 15 - Oracle Flash Accelerator F640 PCIe Card – Slot 16 - Empty |
| 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). |

| Feature | System Component |
|---------------------|--|
| Management Software | <ul style="list-style-type: none"> • Oracle Integrated Lights Out Management (ILOM). For information, refer to the product information page at: Oracle Integrated Lights Out Manager. For documentation, refer to the Oracle Integrated Lights Out Manager (ILOM) 5.0 Documentation Library at: Systems Management and Diagnostics Documentation. • Oracle Hardware Management Pack, available with the Oracle Solaris OS or as a standalone product with other OS. For information, refer to the product information page at: Oracle Hardware Management Pack. For documentation and OS support matrix, refer to the Oracle Hardware Management Pack Documentation Library at: Systems Management and Diagnostics Documentation • Oracle Enterprise Manager Ops Center, available software to manage multiple systems in a data center. For information, refer to the product information page at: Oracle Enterprise Manager. For documentation, refer to the Oracle Enterprise Manager Cloud Control Documentation Library at: Oracle Enterprise Manager Cloud Control. |
| Operating System | Oracle Linux 7.5 |

For server specification information, see *Server Features and Components* in *Oracle Server X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

For component serviceability, locations, and designations, see [Replaceable Components](#).

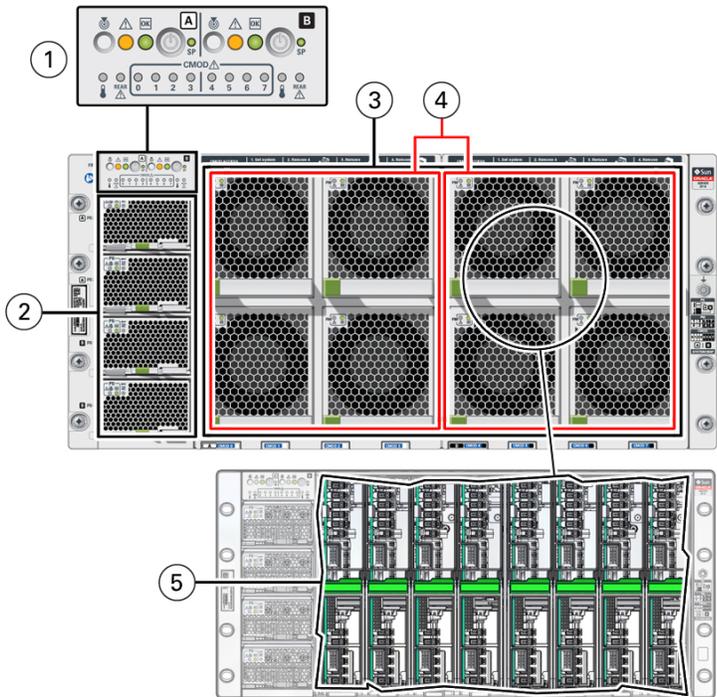
About Controls and Connectors

The following sections describe the controls, indicators, connectors, and drives located on the Oracle Exadata Database Server X8-8 front and back panels.

- [Front Panel Components](#)
- [Back Panel Components](#)

Front Panel Components

The following figure shows the Oracle Exadata Database Server X8-8 chassis front panel components:



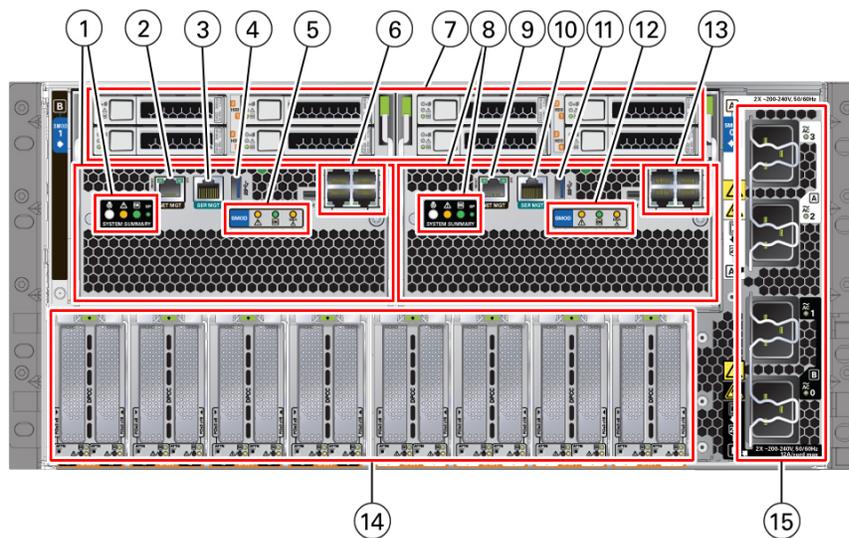
| Call Out | Component | Link |
|----------|---|---|
| 1 | <p>Front indicator module (FIM).</p> <ul style="list-style-type: none"> Chassis/SMOD0 System A controls and indicators: <ul style="list-style-type: none"> Locate Button/LED: white Fault-Service Required LED: amber System OK LED indicator: green On/Standby button, recessed SP OK: green System Overtemperature Warning LED: amber Chassis SMOD0 Rear Fault-Service Required LED: 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 On/Standby button, recessed SP OK: green System Overtemperature Warning LED: amber SMOD1 Rear Fault-Service Required LED: amber CMOD4-7 Fault-Service Required LEDs 4, 5, 6, 7: amber | Front Indicator Module (FIM) Panel Controls and Indicators |
| 2 | <p>Four power supplies (PS)</p> <p>Power supplies 0 (bottom) through 3 (top) labeled PS0, PS1, PS2, PS3</p> <p>PS2 and PS3 power System A. PS0 and PS1 power System B.</p> | Power Supply (PS) Indicators Power Subsystem |

| Call Out | Component | Link |
|----------|---|--|
| 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 Cooling Subsystem |
| 4 | Two fan frames SMOD0 System A: FM 0, 1, 2, 3; SMOD1 System B: FM 4, 5, 6, 7 | Troubleshooting System Cooling Issues Cooling Subsystem |
| 5 | Eight internal CPU Modules (CMODs). CMOD bays are accessible behind the fan frames. 8-socket mode: CMODs 0-7 | CPU Module (CMOD) Overview |

For component serviceability, locations, and designations, see [Replaceable Components](#).

Back Panel Components

The following figure shows the Oracle Exadata Database Server X8-8 chassis back panel components.



The following table lists the server back panel components.

| Call Out | Component | Link |
|----------|---|---|
| 1 | System B SYSTEM SUMMARY status indicator LEDs: <ul style="list-style-type: none"> System B Locate Button/LED: White System B Fault-Service Required: Amber System B OK: Green System B SP OK Service Processor: Green | System Module (SMOD) Overview System Module (SMOD) Indicators Servicing System Module (SMOD) Components (FRU) |

| Call Out | Component | Link |
|----------|--|---|
| 2 | SMOD1 System B NET MGT Oracle ILOM (SP) network management 10/100/1000 GbE Network Ethernet port. | System Module (SMOD) Overview Networking Subsystem Servicing System Module (SMOD) Components (FRU) |
| 3 | SMOD1 System B SER MGT 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). | System Module (SMOD) Overview Servicing System Module (SMOD) Components (FRU) |
| 4 | SMOD1 System B USB The SMOD1 System B USB 3.0 port supports hot-plugging of devices. | System Module (SMOD) Overview Servicing System Module (SMOD) Components (FRU) |
| 5 | SMOD1 System B Status indicators: <ul style="list-style-type: none"> • Fault-Service Required: Amber • SMOD1 System B OK: Green • HBA Host Bus Adapter Fault: Amber | System Module (SMOD) Overview System Module (SMOD) Indicators Servicing System Module (SMOD) Components (FRU) |
| 6 | SMOD1 System B NET0-3 Four 10 GbE Network ports labeled NET0, NET1, NET2, and NET3 | System Module (SMOD) Overview Servicing System Module (SMOD) Components (FRU) |
| 7 | The Oracle Exadata Database Server X8-8 does not support SAS3 HDD/SSD storage drives. Storage drive slots are populated with storage drive filler panels. | |
| 8 | SMOD0 System A SYSTEM SUMMARY status indicators: <ul style="list-style-type: none"> • System A Locate Button/LED: White • Chassis or SMOD0 Fault-Service Required: Amber • SMOD0 System A OK: Green • SP OK: Green | System Module (SMOD) Overview System Module (SMOD) Indicators Servicing System Module (SMOD) Components (FRU) |
| 9 | SMOD0 System A NET MGT Oracle ILOM service processor (SP) network management 10/100/1000 GbE Network Ethernet port. | System Module (SMOD) Overview Networking Subsystem Servicing System Module (SMOD) Components (FRU) |
| 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 Servicing System Module (SMOD) Components (FRU) |

| Call Out | Component | Link |
|----------|---|---|
| 11 | SMOD0 System A USB USB 3.0 port supports hot-plugging of devices. | System Module (SMOD) Overview |
| 12 | SMOD0 System A Status indicators <ul style="list-style-type: none"> SMOD0 System A Fault-Service Required: Amber SMOD0 System A OK: Green SMOD0 System A HBA Host Bus Adapter Fault: Amber | System Module (SMOD) Overview System Module (SMOD) Indicators Servicing System Module (SMOD) Components (FRU) |
| 13 | SMOD0 System A NET0-3 Four 10 GbE Network ports labeled NET0, NET1, NET2, and NET3. | System Module (SMOD) Overview Networking Subsystem Servicing System Module (SMOD) Components (FRU) |
| 14 | PCIe card slots 1 (right) through 16 (left) PCIe card slots 1 (right) through 16 (left): Dual PCIe card carriers (DPCC) contain one or two 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 PCI Devices Subsystem Dual PCIe Card Carrier (DPCC) Indicators |
| 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 Power Subsystem AC Power Block Inlet Indicators |



Note:

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

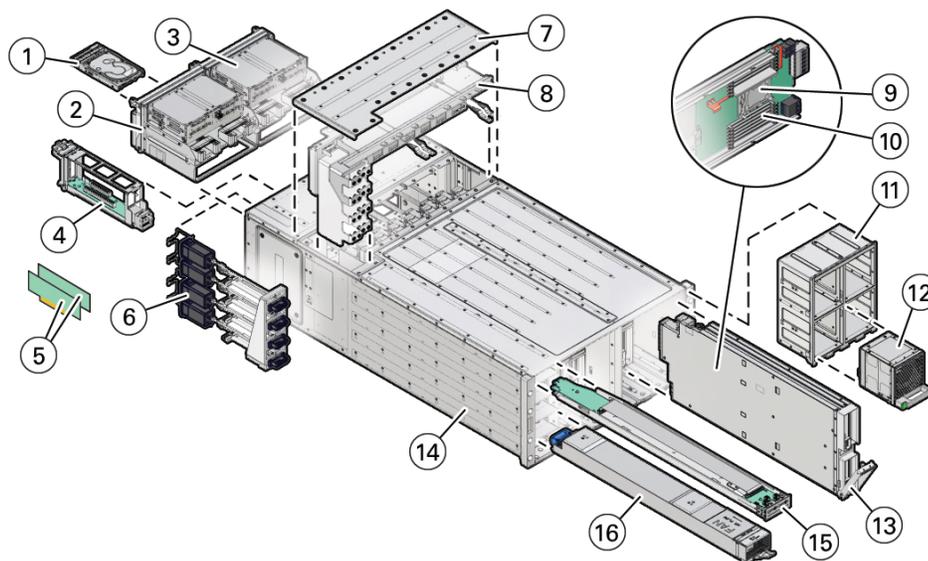
Replaceable Components

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

- [Illustrated Parts Breakdown](#)
- [Component Serviceability Requirements](#)
- [Customer-Replaceable Units](#)
- [Field-Replaceable Units](#)

Illustrated Parts Breakdown

The following illustration identifies the major components of the server.



| Call Out | Description | Links |
|----------|---|--|
| 1 | The Oracle Exadata Database Server X8-8 does not support SAS3 HDD/SSD storage drives. Storage drive slots are populated with storage drive filler panels. | |
| 2 | System Module 0 (SMOD0), back panel accessible | Servicing System Module (SMOD) Components (FRU) |
| 3 | System Module 1 (SMOD1), back panel accessible | Servicing System Module (SMOD) Components (FRU) |
| 4 | Dual PCIe carrier card (DPCC) with PCIe cards (8) | Servicing PCIe Cards and Carriers (CRU) PCI Devices Subsystem |
| 5 | PCIe cards | Servicing PCIe Cards and Carriers (CRU) |
| 6 | AC power block The AC power block is not a removable component. | Servicing Power Supplies (CRU) Power Subsystem |
| 7 | Top access panel | Preparing for Service |
| 8 | Midplane assembly | Servicing the Midplane Assembly (FRU) |
| 9 | Processor, front panel accessible | Servicing CPU Module (CMOD) Components (FRU) |
| 10 | Memory, front panel accessible | Servicing CPU Module (CMOD) Components (FRU) |
| 11 | Fan frame (2), front panel accessible | Servicing Fan Modules (CRU) and Fan Frames (CRU) |

| Call Out | Description | Links |
|----------|--|--|
| 12 | Fan module (FM) (8), front panel accessible | Servicing Fan Modules (CRU) and Fan Frames (CRU) |
| 13 | CPU module (CMOD) (8), front panel accessible | Servicing CPU Module (CMOD) Components (FRU) |
| 14 | Server chassis The server chassis is not a removable component. | Server Chassis Overview |
| 15 | Front indicator module (FIM), front panel accessible | Servicing the Front Indicator Module (FRU) |
| 16 | Power supply (PSU) (4), front panel accessible | Servicing Power Supplies (CRU) |

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](#).

- *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) |

| CRU | Description | Replacement Instructions |
|--------------------------------|---|--|
| Memory (DIMMs) | Warm-serviceable Add or replace LRDIMM memory modules located in CMODs. | Servicing CPU Module (CMOD) Components (FRU) |
| Storage drives | The Oracle Exadata Database Server X8-8 does not support SAS3 HDD/SSD storage drives. Storage drive slots are populated with storage drive filler panels. | |
| Fan modules (FM0-7) | Hot-serviceable Eight fan modules for cooling the server components. | Servicing Fan Modules (CRU) and Fan Frames (CRU) |
| PCIe cards | Hot-serviceable Optional add-in cards that can expand the functionality of the server. | Servicing PCIe Cards and Carriers (CRU) |
| 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) |
| Power supplies (PS0-3) | Hot-serviceable Four fully redundant AC-powered power supplies. | Servicing Power Supplies (CRU) |

Related Topics

- [Field-Replaceable Units](#)
- [Illustrated Parts Breakdown](#)

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) |
| 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) |
| SMOD | Cold-serviceable Replace system module assemblies SMOD0 or SMOD1. | Servicing System Module (SMOD) Components (FRU) |
| 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) |
| Midplane assembly | Cold-serviceable Internal midplane/busbar assembly in the chassis. | Servicing the Midplane Assembly (FRU) |

Related Topics

- [Customer-Replaceable Units](#)
- [Illustrated Parts Breakdown](#)

CPU Module (CMOD) Overview

The system contains eight CPU modules (CMODs). Each CMOD contains one processor (CPU) 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 0-7, including configuration options, and the internal layout of CMOD components:

- [CMOD Components](#)
- [CMOD Processor](#)
- [CMOD Memory](#)
- [CMOD and Fan Module Power](#)

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 Topics

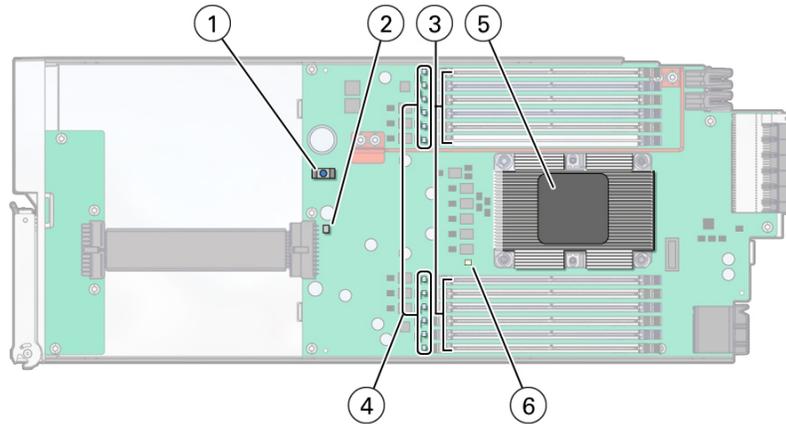
- [Product Description](#)
- [Servicing CPU Module \(CMOD\) Components \(FRU\)](#)
- [CMOD Population Rules](#)
- [System Module \(SMOD\) Overview](#)

CMOD Components

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

- Processor Heatsink Module (PHM) assembly includes heatsink, processor, thermal interface material (TIM), and carrier.
[CMOD Processor](#)
- 12 DIMM slots arranged in two groups of six
[CMOD Memory](#)
- 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 |

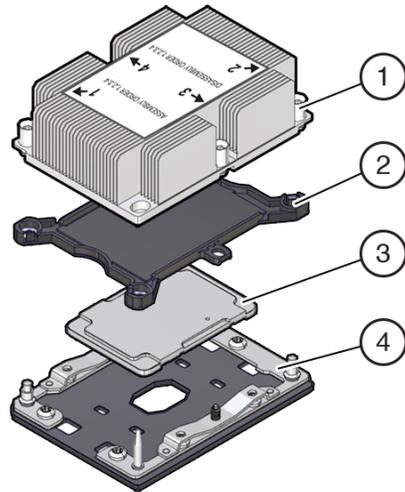
For component serviceability, locations, and designations, see [Replaceable Components](#).

CMOD Processor

Each CMOD contains one Intel Xeon vx processor.

- Eight CPU modules installed in slots 0 through 7
- 24 cores per-socket (8-socket = 192 total)

The Processor Heatsink Module (PHM) is a three-part module that is installed above the socket assembly.

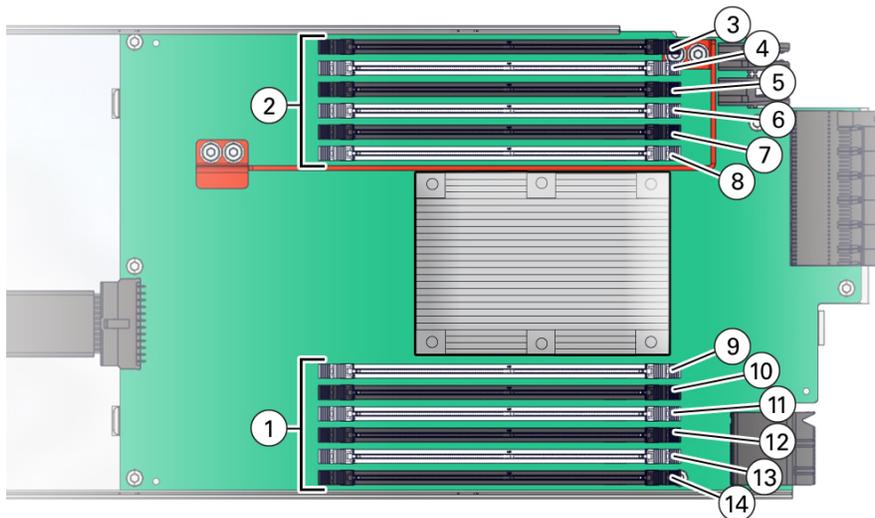


| Call Out | Description |
|----------|---|
| 1 | Heatsink with thermal interface material (TIM), part of PHM |
| 2 | Carrier, part of PHM |
| 3 | Processor, part of PHM |
| 4 | Socket assembly |

See [Servicing Processors \(FRU\)](#).

CMOD Memory

The maximum system memory is 6 TB with 96 DDR4-2666 64 GB LRDIMMs installed on 8 CMODs.

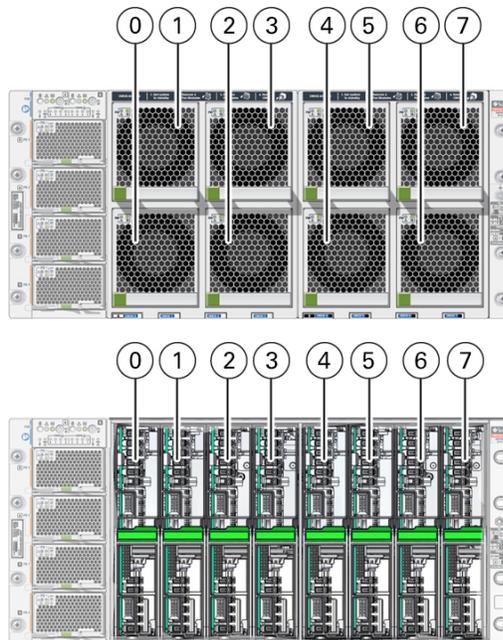


| Call Out | Description |
|----------|----------------------------|
| 1 | DIMM Banks A, B, C |
| 2 | DIMM Banks D, E, F |
| 3 | Channel F, Slot 0, DIMM 0 |
| 4 | Channel F, Slot 1, DIMM 1 |
| 5 | Channel E, Slot 0, DIMM 2 |
| 6 | Channel E, Slot 1, DIMM 3 |
| 7 | Channel D, Slot 0, DIMM 4 |
| 8 | Channel 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 |

See [Servicing DIMMs \(CRU\)](#).

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 |
| 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 \(CRU\)](#).

System Module (SMOD) Overview

These topics provide information about Oracle Exadata Database Server X8-8 system modules (SMODs) and components.

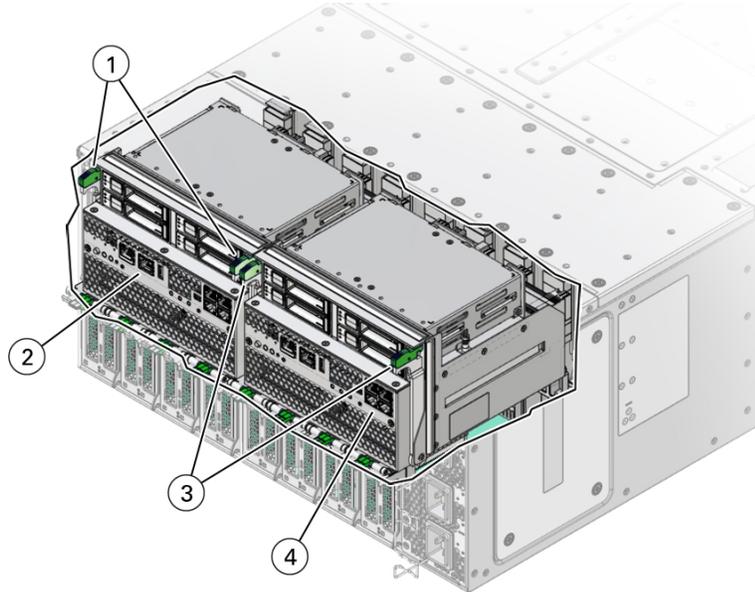
- [SMOD Components](#)
- [SMOD Motherboard](#)

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 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 SAS3 storage drive bays HDD0-3 populated with storage drive filler panels.
- 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.



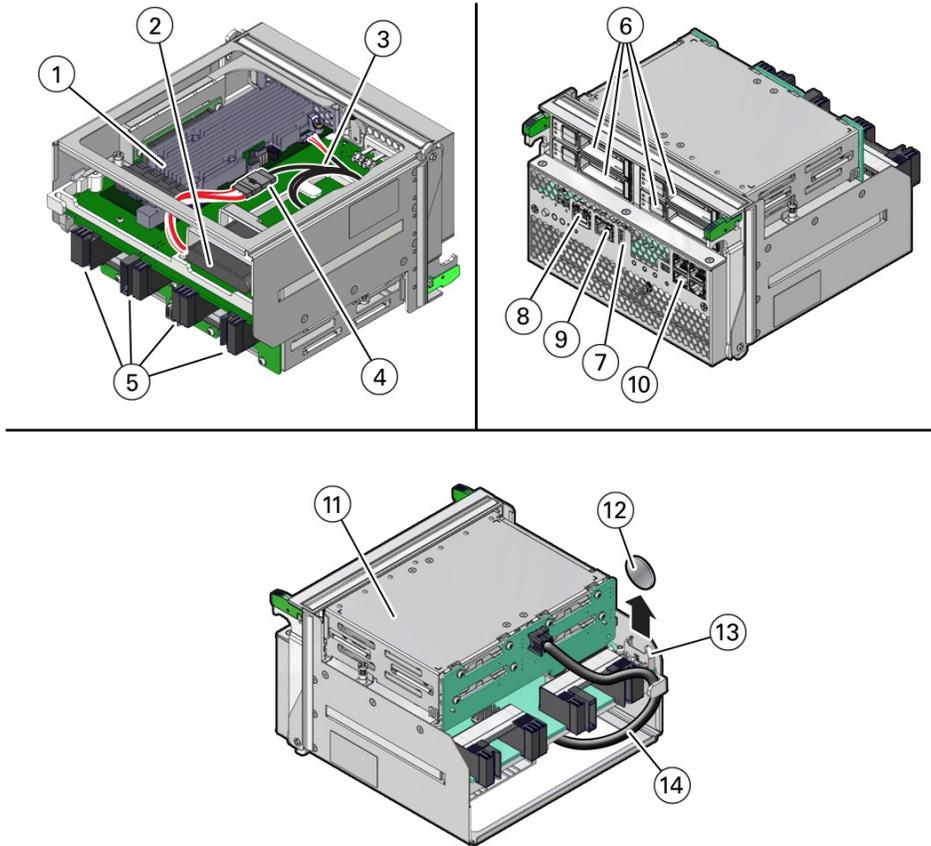
| Call Out | Description |
|----------|----------------------------|
| 1 | SMOD1 ejector levers (2) |
| 2 | SMOD1 installed in chassis |
| 3 | SMOD0 ejector levers (2) |
| 4 | SMOD0 installed in chassis |

Related Topics

- [System Module \(SMOD\) Indicators](#)
- [CPU Module \(CMOD\) Overview](#)
- [Product Description](#)

SMOD Components

The following illustration shows an SMOD (system module) and associated components.



| Call Out | Description |
|----------|---|
| 1 | The Oracle Exadata Database Server X8-8 does not support the SAS host bus adapter. |
| 2 | The Oracle Exadata Database Server X8-8 does not support the Energy storage module (ESM) |
| 3 | The Oracle Exadata Database Server X8-8 does not support the cable from HBA to ESM |
| 4 | SMOD motherboard |
| 5 | Storage drive SMOD midplane connectors (4) |
| 6 | The Oracle Exadata Database Server X8-8 does not support SAS3 HDD/SSD storage drives. Storage drive slots are populated with storage drive filler panels. |
| 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 |
| 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](#).

For replacement procedures, see [Servicing System Module \(SMOD\) Components \(FRU\)](#).

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
- 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](#).

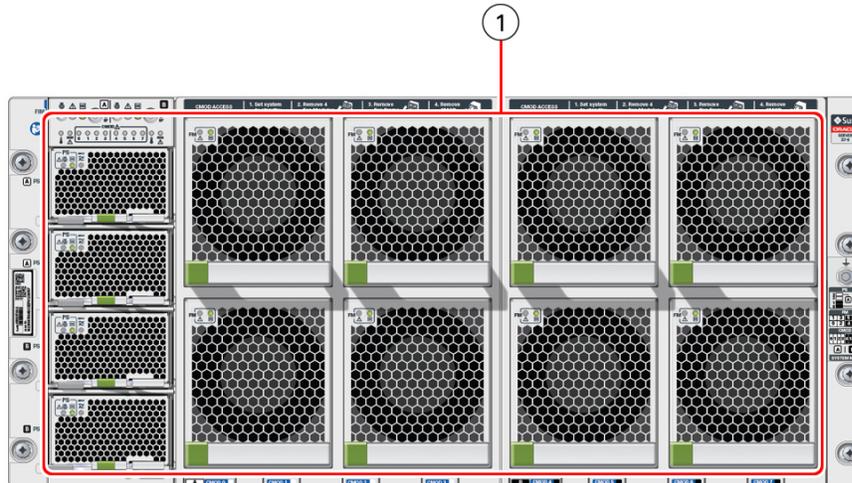
For replacement procedures, see [Servicing System Module \(SMOD\) Components \(FRU\)](#).

Server Chassis Overview

These sections describe the server chassis and internal components.

- [Chassis Features](#)
- [Chassis Internal Components](#)
- [Chassis Front Panel Components](#)
- [Chassis Back Panel Components](#)
- [Switches and Buttons Reference](#)

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



Related Topics

- [CPU Module \(CMOD\) Overview](#)
- [System Module \(SMOD\) Overview](#)

Chassis Features

The Oracle Exadata Database Server X8-8 chassis features include:

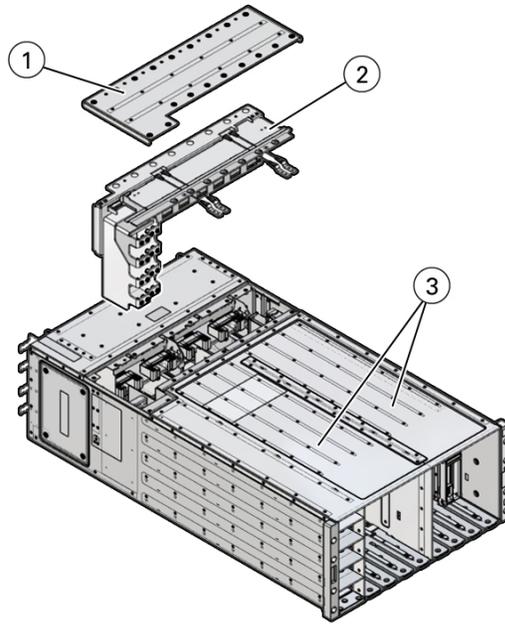
- One 5U chassis with central mid-plane.
- One Front Indicator Module (FIM) with controls and indicators.
- Eight front-loaded CMOD assemblies (behind fan module assemblies FM0-7 and fan frame assemblies). Four CMODs are supported per SMOD.
- Two rear-loaded system module assemblies (SMODs).
- Four front-loaded 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.

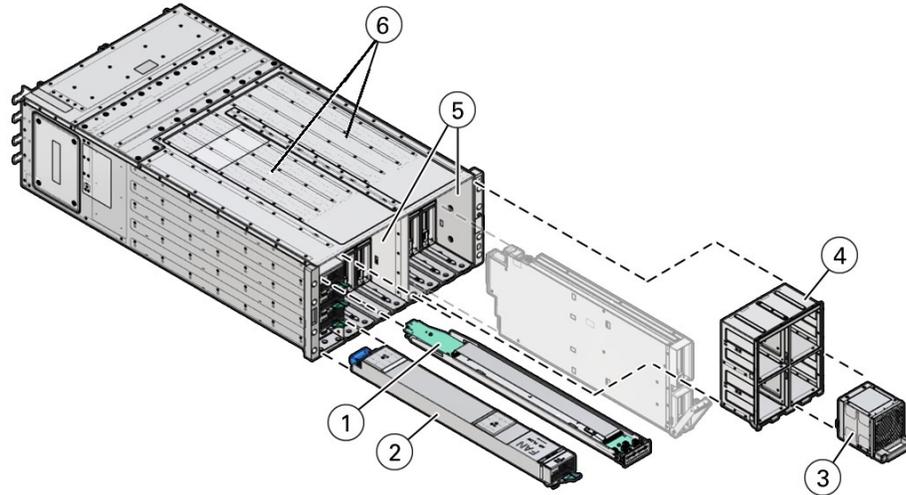


The chassis internal components are described in the following table.

| Call Out | Component | Description | Links |
|----------|---------------------------------------|--|---|
| 1 | Top Cover | This component is part of the chassis and is non-replaceable. | Remove the Midplane Assembly. |
| 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. |
| 3 | Server Chassis CPU module (CMOD) bays | The server chassis is not a removable component. Server chassis CMOD bays can support eight CMODs. Servicing CMODs requires warm or cold service. | CPU Module (CMOD) Overview. Servicing CPU Module (CMOD) Components (FRU) |

Chassis Front Panel Components

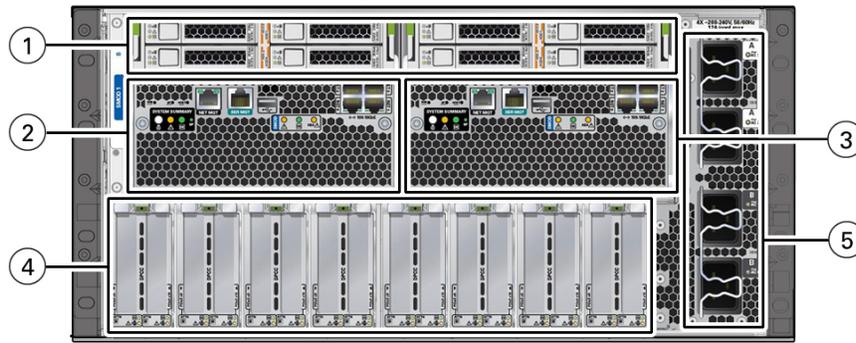
The following figure shows the server chassis front panel accessible replaceable components.



| Call Out | Component | Links |
|----------|--|--|
| 1 | Front indicator module (FIM) | Servicing the Front Indicator Module (FRU) Front Indicator Module (FIM) Panel |
| 2 | Power supply (PS0-3) (4) | Servicing Power Supplies (CRU) Power Supply (PS) Indicators |
| 3 | Fan module (FM0-7) (8) | Servicing Fan Modules (CRU) and Fan Frames (CRU) Fan Module (FM) Indicators |
| 4 | Fan Frame (2) | Servicing Fan Modules (CRU) and Fan Frames (CRU) |
| 5 | Server chassis The server chassis is not a removable component. | Server Chassis Overview |
| 6 | Server chassis CPU module (CMOD) bays 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. | CPU Module (CMOD) Overview. Servicing CPU Module (CMOD) Components (FRU) |

Chassis Back Panel Components

The following illustration shows the chassis back panel.



| Call Out | Component | Description | Links |
|----------|-----------------------------------|---|--|
| 1 | Storage Drives | The Oracle Exadata Database Server X8-8 does not support SAS3 HDD/SSD storage drives. Storage drive slots are populated with storage drive filler panels. | |
| 2 | System Module A (SMOD0) | SMOD0 System A internal components can only be accessed by removing the SMOD from the server back panel. | System Module (SMOD) Overview System Module (SMOD) Indicators |
| 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 System Module (SMOD) Indicators |
| 4 | Dual PCIe card carrier (DPCC) bay | The DPCC bay contains eight DPCCs and up to 16 PCIe cards. | PCI Devices Subsystem Dual PCIe Card Carrier (DPCC) Indicators |
| 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 AC Power Block Inlet Indicators |

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 | Press On/Standby button A to control server power on System A SMOD0 while local to (at) the server FIM. Press On/Standby button B to control server power on System B SMOD1 while local to (at) the server FIM. Caution: Exercise caution on dual systems. | Power On the Server Powering Down the Server |
| 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 |

| Button | Description | Links |
|---|--|--|
| 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 |
| SP Reset | Service processor (SP) pinhole reset button located on the server back panel 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). | Back Panel Pinhole Switches |
| Host Warm Reset | Recessed pinhole button located on the server back panel The Host Warm Reset button allows you to perform an immediate reboot of the server (activating the button requires the use of a stylus). | Back Panel Pinhole Switches |
| NMI pinhole button | Non-maskable Interrupt recessed pinhole button located on the server back panel The NMI button is used by Service personnel only. Do not press. | Back Panel Pinhole Switches |
| 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. | Servicing CPU Module (CMOD) Components (FRU) CPU Module (CMOD) Overview Troubleshooting Using a CMOD Fault Remind Test Circuit |
| 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. | Servicing PCIe Cards and Carriers (CRU) Dual PCIe Card Carrier (DPCC) Indicators Back Panel Components |

2

Installation Procedure

This section provides an overview of the installation procedure for Oracle Exadata Database Server X8-8. Review the entire installation procedure and find links to more information about each step.

- [Installation Procedure Overview](#)

Installation Procedure Overview

The following table lists the tasks you need to complete to install Oracle Exadata Database Server X8-8.

| Step | Description | Links |
|------|---|---|
| 1 | Review the product notes for any late-breaking information about the server. | |
| 2 | <ul style="list-style-type: none">• Review the server site requirements, specifications, and components.• Familiarize yourself with electrostatic discharge (ESD) and safety precautions.• Assemble the required tools and equipment. | <ul style="list-style-type: none">• <i>Preparing for Server Installation</i> in <i>Oracle Server X8-8 Installation Guide</i> at Oracle Server X8-8 Documentation• <i>ESD Precautions</i> in <i>Oracle Server X8-8 Installation Guide</i> at Oracle Server X8-8 Documentation• Electrostatic Discharge and Static Prevention Measures• <i>Tools and Equipment</i> in <i>Oracle Server X8-8 Installation Guide</i> at Oracle Server X8-8 Documentation |
| 3 | <ul style="list-style-type: none">• Review the server features.• Review server physical specifications. | <ul style="list-style-type: none">• About the Oracle Exadata Database Server X8-8• <i>Server Physical Specifications</i> in <i>Oracle Server X8-8 Installation Guide</i> at Oracle Server X8-8 Documentation |
| 4 | Install the server into a rack. | <i>Rackmounting the Server</i> in <i>Oracle Server X8-8 Installation Guide</i> at Oracle Server X8-8 Documentation |
| 5 | <ul style="list-style-type: none">• Attach cables and power cords to the server.• Power on the server. | <i>Connecting Cables and Applying Power</i> in <i>Oracle Server X8-8 Installation Guide</i> at Oracle Server X8-8 Documentation |
| 6 | Troubleshoot installation issues. | <i>Troubleshooting Installation Issues</i> in <i>Oracle Server X8-8 Installation Guide</i> at Oracle Server X8-8 Documentation |

Related Installation Documentation

- *Oracle Server X8-8 Safety and Compliance Guide*
- *Important Safety Information for Oracle's Hardware Systems*

3

Troubleshooting and Diagnostics

This section provides information about troubleshooting hardware component faults for Oracle Exadata Database Server X8-8. The following topics are covered.

- [Detecting and Managing Server Faults](#)
- [Troubleshooting Using Diagnostic Tools](#)
- [Troubleshooting Using Status Indicators](#)
- [Troubleshooting Server Subsystems](#)
- [Attaching Devices to the Server](#)
- [Getting Help](#)
- [Auto Service Requests](#)

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 Systems Management and Diagnostics Documentation*.

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 |
| Information about how to use the CMOD Fault Remind Test Circuit | Troubleshooting Using a CMOD Fault Remind Test Circuit |
| Information related to the cooling subsystem, including fault causes, actions, and preventative measures | Troubleshooting System Cooling Issues Cooling Subsystem |
| Information related to the power subsystem, including fault causes, actions, and preventative measures | Troubleshooting Power Issues Power Subsystem |
| Contact technical support if the problem persists. | Getting Help |

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](#)
- Troubleshoot Hardware Faults Using the Oracle ILOM Web Interface
[Troubleshooting Server Hardware Faults](#)
[Identify Hardware Faults \(Oracle ILOM\)](#)

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 for late-breaking server information, and hardware-related issues.**

Refer to at: [Oracle Server X8-8 Documentation](#).

- 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 \(Oracle ILOM\)](#).
- 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 [Systems Management and Diagnostics Documentation](#).

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

- 3. Prepare the server for service.**

See [Preparing for Service](#). 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](#) 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](#).

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 \(Oracle ILOM\)](#).

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 your server documentation at [Oracle Server X8-8 Documentation](#).

2. Log in to the server SP Oracle ILOM web interface.

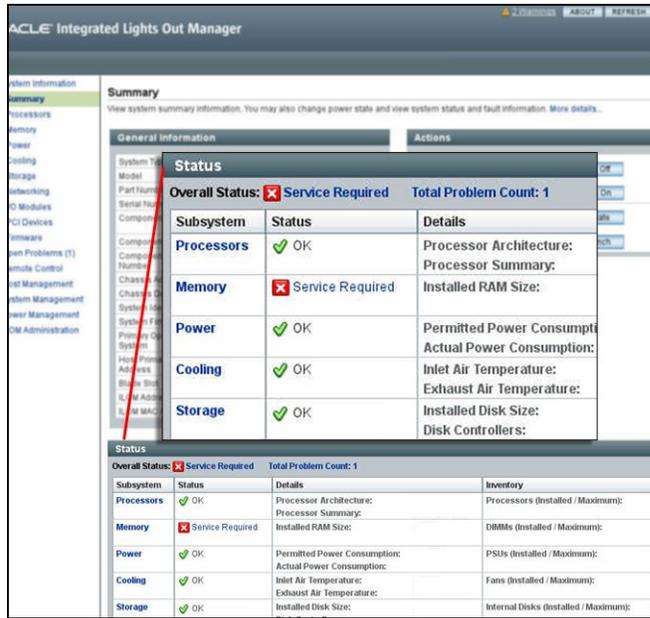
Open a browser and type in the IP address of the server SP. Enter a user name (with administrator privileges) and password at the Login screen. The Summary Information page appears.

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](#)
- [Memory Subsystem](#)
- [Power Subsystem](#)
- [Cooling Subsystem](#)
- [Networking Subsystem](#)
- [PCI Devices Subsystem](#)

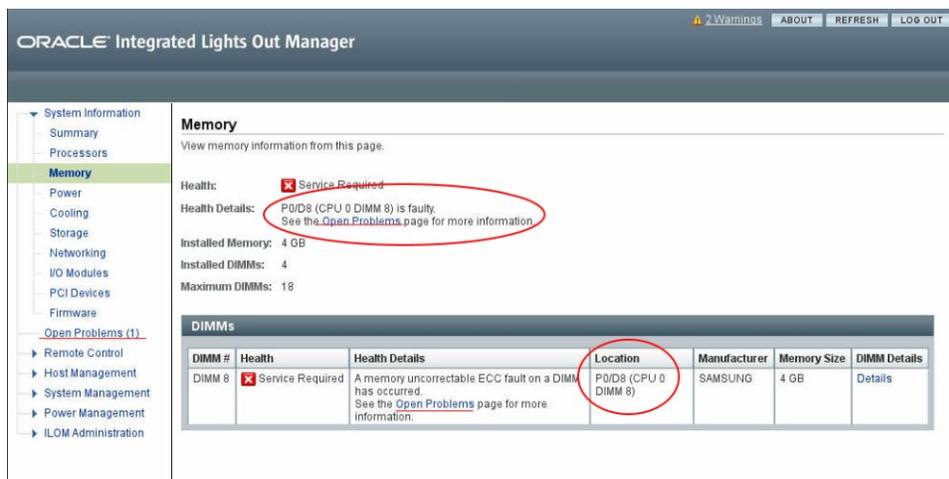
The `Status` table lists components that require service.



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.

- 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.

- 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 for information related to the issue or the component.

For up-to-date information about the server, including hardware-related issues, refer to *Oracle Exadata Database Server X8-8 Product Notes* at: [Oracle Server X8-8 Documentation](#) .

7. To prepare the server for service, see *Preparing for Service*.

 **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 [Systems Management and Diagnostics Documentation](#).

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 [Systems Management and Diagnostics Documentation](#).

▲ 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 Integrated Lights Out Manager (ILOM) in Oracle Server X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

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: [Systems Management and Diagnostics Documentation](#).

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 from 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](#) and [Identify and Remove a Faulty Processor](#).

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 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. | Inspect the server front and back panel vents for blockage from dust or debris. Additionally, inspect the server interior for improperly installed components or cables that can block the flow of air through the server. | Periodically inspect and clean the server vents using an ESD certified 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 Issue | Description | Action | Prevention |
|----------------------------|---|--|---|
| Cooling Areas Compromised | <p>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.</p> | <p>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.</p> | <p>When servicing the server, ensure that the components are installed correctly and that the server has no unoccupied external-facing slots.</p> |
| 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> | <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.</p> | <p>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>.</p> |

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 Issue | Description | Action | Prevention |
|------------------------|---|---|---|
| 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>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.</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 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.</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 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.</p> |

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. The selection of diagnostic tools available for your server includes a chronological event log (Oracle ILOM System Log), standalone software packages, firmware-based tests, and hardware-based LED 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. View Oracle ILOM System Log. | 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) Systems Management and Diagnostics Documentation |
| 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 Controls and Indicators |
| 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. | Oracle x86 Servers Diagnostics and Troubleshooting Guide for Servers With Oracle ILOM 4.0.x at Systems Management and Diagnostics Documentation |
| 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. | Oracle x86 Servers Diagnostics and Troubleshooting Guide for Servers With Oracle ILOM 4.0.x at Systems Management and Diagnostics Documentation |
| HWdiag | SP firmware | The HWdiag utility checks the status of a system and its components. You run the HWdiag utility within the Oracle ILOM Diag shell. | Can function on Standby power and when operating system is not running. | Local, but remote serial access is possible if the SP serial port is connected to a network-accessible terminal server. |
| Oracle Linux commands | Operating system software | Displays various kinds of system information. | Requires operating system. | Local, and over network. |

Troubleshooting Using Status Indicators

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

- [Front Indicator Module \(FIM\) Panel](#)
- [Power Supply \(PS\) Indicators](#)
- [Fan Module \(FM\) Indicators](#)
- [System Module \(SMOD\) Indicators](#)
- [Dual PCIe Card Carrier \(DPCC\) Indicators](#)
- [AC Power Block Inlet Indicators](#)

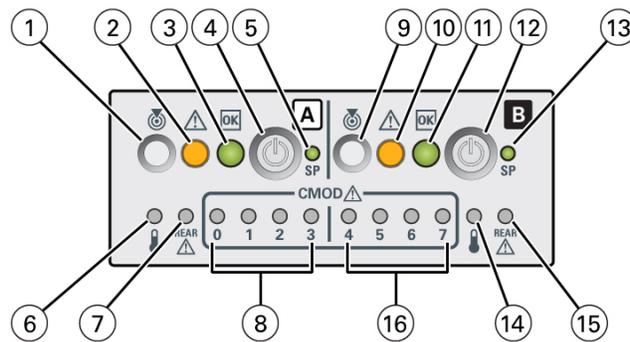
Related Topics

- [Controls and Indicators](#)
- [Replaceable Components](#)

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. In the 8-socket 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 figure shows FIM buttons and indicators.



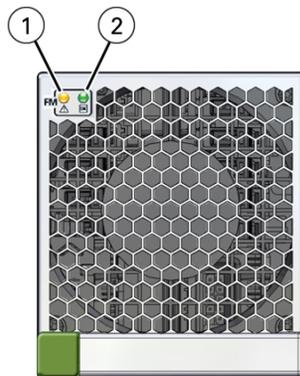
| Call Out | Status LED or Button | Icon and Color | Description |
|----------|---|--|---|
| 1 | Locate button/LED (chassis SMOD0 System A) |  White | Indicates the location of the SMOD System A in the server: <ul style="list-style-type: none"> Off – Server is operating normally. Fast blink – Use Oracle 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 . |
| 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 and Troubleshooting Using Status Indicators . |
| 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 and Troubleshooting Using Status Indicators . |
| 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). See Powering Down the Server and Power On the Server . |
| 5 | SP OK (chassis SMOD0 System A) | SP 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 and Troubleshooting Using Status Indicators . |
| 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 and Troubleshooting Using Status Indicators . |

| Call Out | Status LED or Button | Icon and Color | Description |
|----------|---|--|---|
| 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 and Troubleshooting Using Status Indicators . |
| 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 and Troubleshooting Using Status Indicators . |
| 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 . |
| 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 and Troubleshooting Using Status Indicators . |
| 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 and Troubleshooting Using Status Indicators . |
| 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 and Power On the Server . |
| 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 and Troubleshooting Using Status Indicators . |

| Call Out | Status LED or Button | Icon and Color | Description |
|----------|--|--|---|
| 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. See System Module (SMOD) Indicators and Troubleshooting Using Status Indicators . |
| 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. See System Module (SMOD) Indicators and Troubleshooting Using Status Indicators . |
| 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. See System Module (SMOD) Indicators and Troubleshooting Using Status Indicators . |

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.

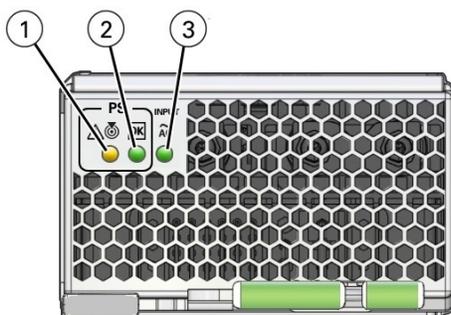


| Call Out | Status LED or Button | Icon and Color | Description |
|----------|------------------------|--|---|
| 1 | Fault-Service Required |  Amber | Indicates a fault state in a fan module: <ul style="list-style-type: none"> Off – Fan module is operating normally. Steady On – A fault is present in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

| 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"> 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.



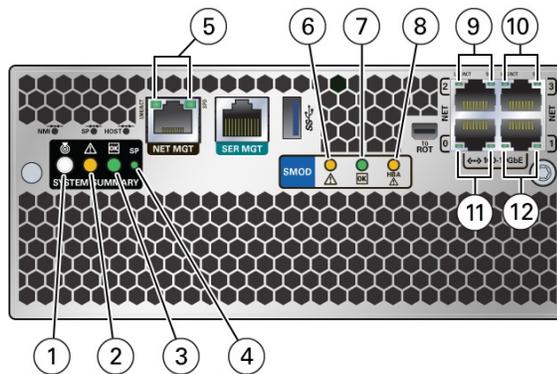
| Call Out | Status LED or Button | Icon and Color | Description |
|----------|---|---|---|
| 1 | Locate button/LED Fault-Service Required |   Amber | Indicates the location of the power supply in the server: <ul style="list-style-type: none"> Off – Power supply is operating normally, Fast blink – Use 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> |

| Call Out | Status LED or Button | Icon and Color | Description |
|----------|----------------------|--------------------|---|
| 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 . |

| Call Out | Status LED or Button | Icon and Color | Description |
|----------|---|--|---|
| 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 . |
| 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. Along with the SP indicator (below), the System OK LED provides the SMOD power status. See Troubleshooting Using Status Indicators . |
| 4 | SP OK |  Green | Indicates when SMOD service processor (SP) is booting: <ul style="list-style-type: none"> Flashing – SP is booting. Steady On – Oracle ILOM is operational. Along with the System OK indicator (above), the SP OK LED provides the status of the system power. See Troubleshooting Using Status Indicators . |
| 5 | NET MGT 10/100/1000 Ethernet port Activity and Speed LEDs | Activity: Top left, Green Link speed: Top right Bi-colored: Amber/ Green | 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. NET MGT Activity LED: Top left Green Indicates when the Oracle ILOM service processor (SP) network management (NET MGT) RJ-45 10/100/1000BASE-T port is active. <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. NET MGT 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) |

| Call Out | Status LED or Button | Icon and Color | Description |
|----------|---|--|---|
| 6 | SMOD Fault-Service Required |  Amber | Indicates a fault state in the SMOD: <ul style="list-style-type: none"> Off – SMOD is operating normally. Steady On – A fault is present in SMOD. Lights when the SMOD requires service. |
| 7 | SMOD 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. Along with the SP indicator (above), the System OK LED provides the SMOD power status. See Troubleshooting Using Status Indicators . |
| 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) |

| Call Out | Status LED or Button | Icon and Color | Description |
|----------|---|---|--|
| 11 | NET0 10 GbE Ethernet port Activity and Speed LEDs | Activity: Top left, Green Link speed: Top right Bi-colored: Amber/ Green | <p>NET0 Activity LED: Top left Green</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>NET0 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) |
| 12 | NET1 10 GbE Ethernet port Activity and Speed LEDs | Activity: Top left, Green Link speed: Top right Bi-colored: Amber/ Green | <p>NET1 Activity LED: Top left Green</p> <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. <p>NET1 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) |

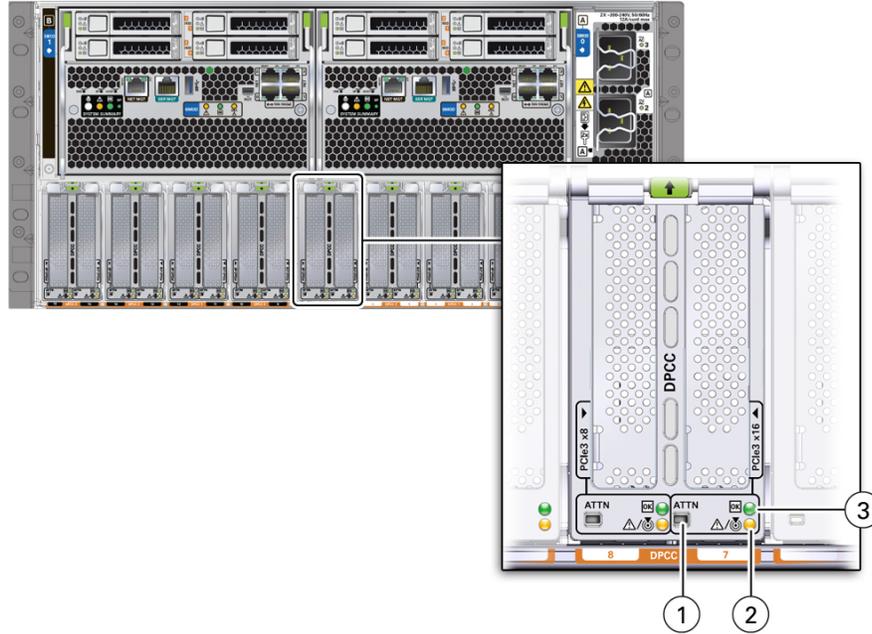


Note:

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

Dual PCIe Card Carrier (DPCC) Indicators

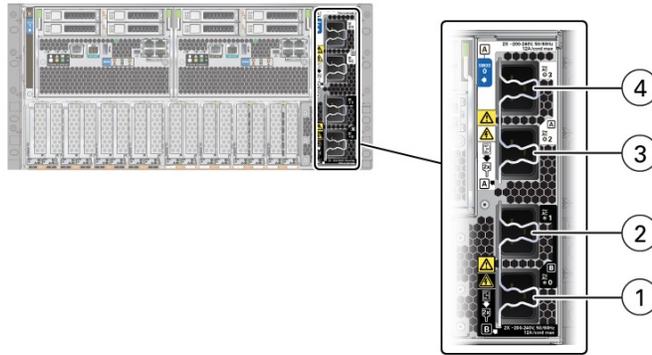
Each DPCC has two indicator panels, one for each PCIe slot inside the server. Each panel contains a green OK indicator, an amber Fault-Service Required LED, and a recessed pinhole Attention (ATTN) button. The ATTN buttons are used to initiate DPCC removal and install. Before removing a DPCC, use a stylus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



| Call Out | Status LED | Icon and Color | Description |
|----------|------------------------------------|---|--|
| 1 | ATTN | 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 – Server 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 Green | AC 0 (SMOD1) System B |
| 2 | AC 1 | ~AC Green | AC 1 (SMOD1) System B |
| 3 | AC 2 | ~AC Green | AC 2 (SMOD0) System A |
| 4 | AC 3 | ~AC Green | 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](#)
- [Back Panel Pinhole Switches](#)
- [Status Indicator Blink Rates](#)

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

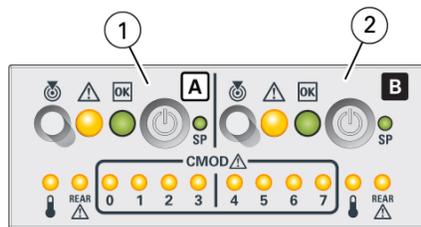


Note:

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. <p>In the 8-socket 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.</p> |
| 2 | System B SMOD1 | <ul style="list-style-type: none"> • CMOD 4 - 7 indicates the status of CMODs 4 - 7. <p>In the 8-socket 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.</p> |

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

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

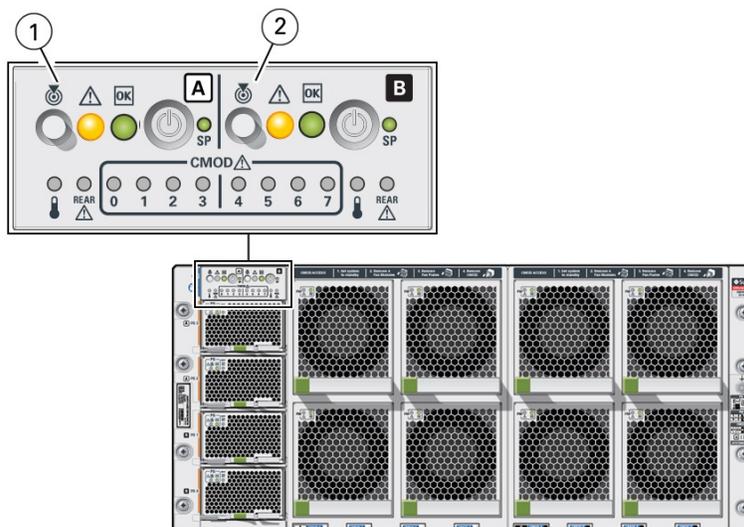
Locate Button/LED Indicator On

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 button.

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

- 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.



| Call Out | System | Activity |
|----------|----------------|--|
| 1 | System A SMOD0 | <ul style="list-style-type: none"> • 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"> • In the 8-socket configuration, 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

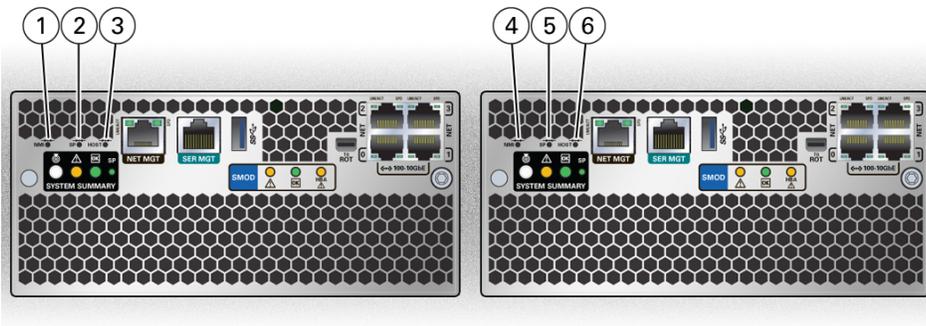
For a server with an SP (service processor) fault, the server amber Fault-Service Required LEDs (front and back) are steady on. The front and back System OK indicators and the SP OK indicator are off.

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](#)).

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

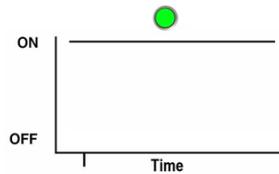
This section describes the following indicator blink rates:

- 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

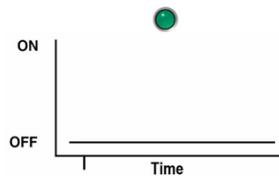
Steady On

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).



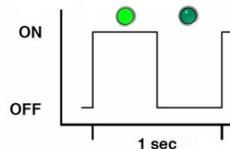
Steady Off

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).



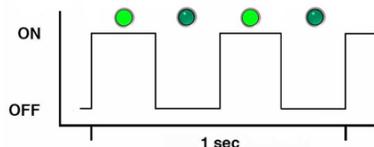
Slow Blink Rate

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.



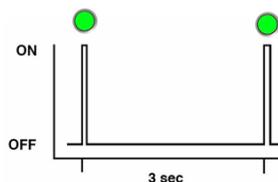
Fast Blink Rate

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.



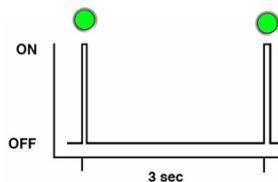
Single (Standby) Blink Rate

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).



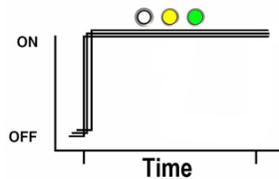
Insertion Blink

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](#)) of all the component indicators.

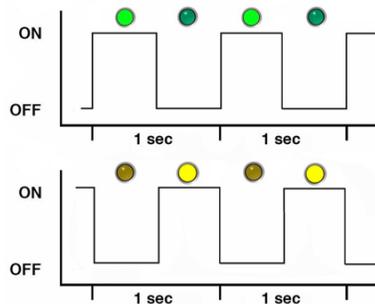
Unison Steady On

For the unison steady on, all indicators are simultaneously steady on (see [Steady On](#)). This occurs during the front panel lamp test (see [Front Panel Lamp Test](#)). 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](#)). 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](#)) 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](#)
- [Memory Subsystem](#)
- [Power Subsystem](#)
- [Cooling Subsystem](#)
- [Networking Subsystem](#)
- [PCI Devices Subsystem](#)

For component serviceability, locations, and designations, see [Replaceable Components](#).

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 8-socket server.

Processors: Eight Intel 8268, 24-core, 2.9-GHz, 205W processors

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:

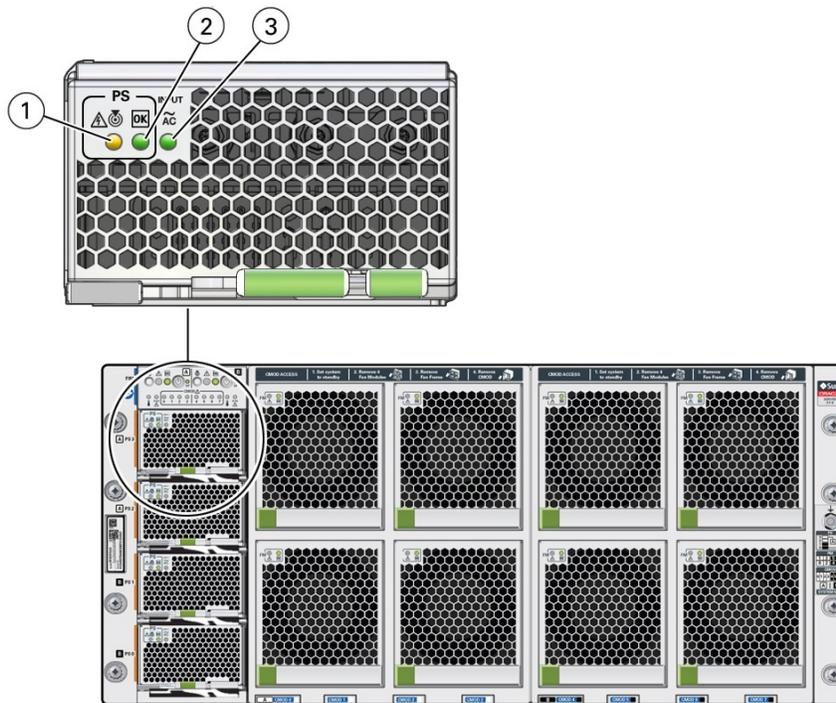
- Memory: 96 DDR4 RDIMM slots
 - 64 GB LRDIMM memory
 - 8-socket: Up to 6.0 TB DRAM (with 64 GB DIMMs) of DDR4 interface memory
 - 12 DIMMs/6 channels per CMOD. See [Servicing DIMMs \(CRU\)](#) memory population rules for order of installation.

- 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. |

| Call Out | Status LED or Button | Icon and Color | Description |
|----------|---------------------------|--|--|
| 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. 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 – Power supply is not connected to an AC power source. • Steady On – Power supply is connected to a properly rated AC power source. |

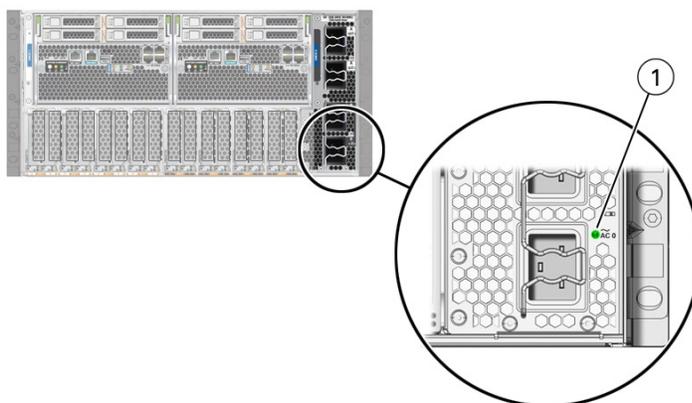
Each power supply is rated for 3060W continuous output. Input is 220V VAC only (50-60Hz). Main output is 12V @244A. Standby output is 12V at 5A. The MAX input line current (200-277 VAC input) is less than 16 Amps RMS. The minimum holdup is 12ms for Main output and 40ms for Standby.

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](#).

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.

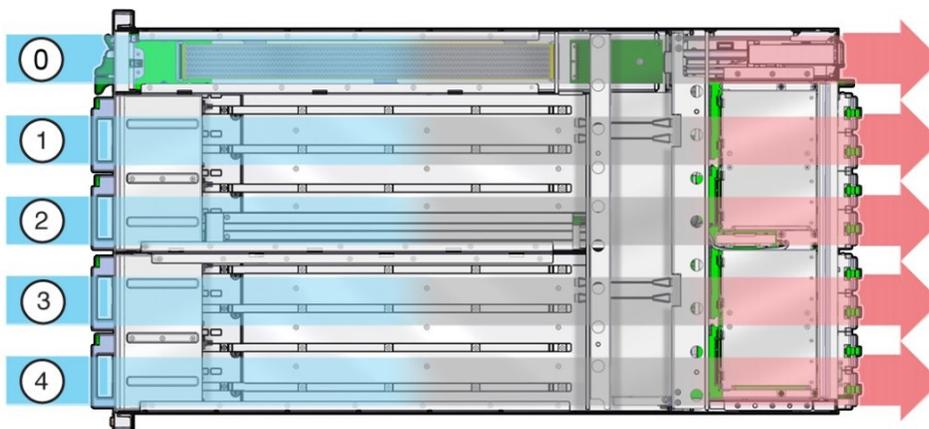
Cooling Zones

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.

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.



| 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](#)).
- 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 |
| 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.

For FM reference and servicing information, see [Servicing Fan Modules \(CRU\) and Fan Frames \(CRU\)](#).

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: 5, 7, 9, and 11
- 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. |

| Status Indicator Name | Location and Color | State and Meaning |
|-----------------------|-----------------------------------|---|
| Link speed | Top right Bi-colored: Amber/Green | <ul style="list-style-type: none"> Off – 10BASE-T link (if link up) (10 Gigabit Ethernet 10GBASE-T) Amber ON – 100BASE-T link (Fast Ethernet 100 BASE-TX) Green ON – 1000BASE-T link (Gigabit Ethernet 1000BASE-T) |

See [Back Panel Connector Locations](#).

I/O Subsystem

The server Input/Output (I/O) subsystem consists of the following:

- 8 or 16 PCIe Gen3 I/O 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.

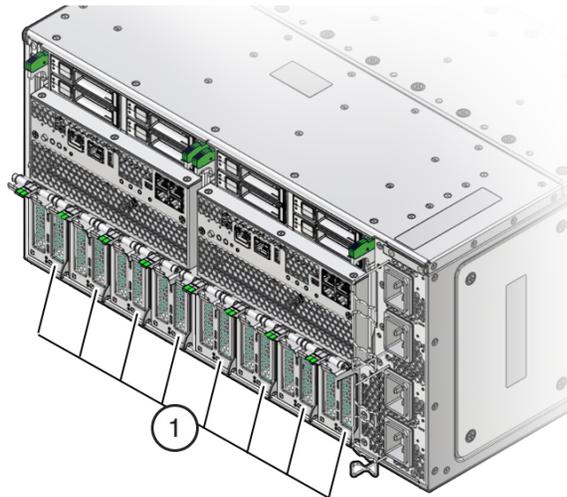
The server PCI devices subsystem consists of the following components:

- 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](#)
- [Back Panel Connector Locations](#)
- [Configuring Serial Port and Network Port Sharing](#)
- [Ethernet Device Naming](#)

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.

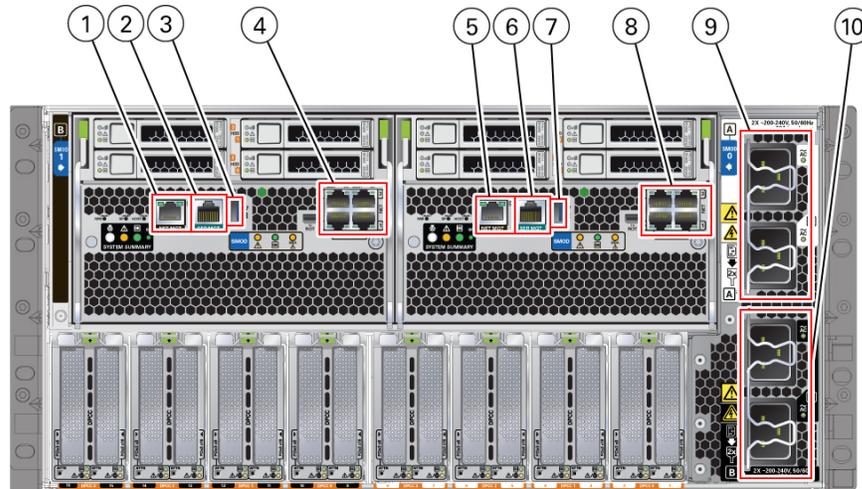
For port and connector information, see [Back Panel Connector Locations](#) and [Back Panel Components](#).

1. Connect an Ethernet cable to the Gigabit Ethernet (NET 0) port 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 |

| Callout | Description | System/SMOD | Available On |
|---------|--------------------------|------------------|--|
| 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 \(Oracle ILOM CLI\)](#)
- [Assign Serial Port Output \(Oracle ILOM Web Interface\)](#)

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: [Systems Management and Diagnostics Documentation](#).

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 Integrated Lights Out Manager (ILOM) in Oracle Server X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

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 Integrated Lights Out Manager (ILOM) in Oracle Server X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).
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](#). From right to left, the ports are numbered NET0 to NET3.

 **Note:**

The Oracle Exadata Database Server X8-8 supports only the NET0 Ethernet interface and the Linux operating 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 | Linux |
|-------|------|-------|
| Net 0 | 0700 | eth 0 |

Getting Help

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

- [Contacting Support](#)
- [Locating the Chassis Serial Number](#)

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 [My Oracle Support](#). 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: [Oracle Premier Support](#).

4

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](#)
- [Required Tools and Equipment](#)
- [Preparing the Server for Component Replacement](#)
- [Powering Down the Server](#)
- [Managing the Locate Button/LED](#)

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.



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.

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 (Processor-heatsink module removal)
- 12.0 in-lbs (inch-pounds) torque driver with Torx T30 bit (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

Preparing the Server for Component Replacement

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

- [Serviceability Overview](#)
- [Powering Down the Server](#)
- [Power Control, Shutdown, and Reset States](#)

Serviceability Overview

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

Review the *Oracle Server Safety and Compliance Guide* at: [Oracle Server X8-8 Documentation](#) 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:

- Fan modules, see [Servicing Fan Modules \(CRU\) and Fan Frames \(CRU\)](#)
- Power supplies, see [Servicing Power Supplies \(CRU\)](#)
- Dual PCIe Card Carriers (DPCCs), see [Servicing PCIe Cards and Carriers \(CRU\)](#)

See the Oracle Linux operating system documentation for procedures and other instructions for shutting down the server. See also [Power Off the Server Using the Server OS](#).

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 \(CRU\)](#).
- CMOD assembly, see [Servicing CPU Module \(CMOD\) Components \(FRU\)](#)
- Processor (CPU), see [Servicing Processors \(FRU\)](#)
- DIMM memory, see [Servicing DIMMs \(CRU\)](#)

See the Oracle Linux operating system documentation for procedures and other instructions for shutting down the server. See also [Power Off the Server Using the Server OS](#).

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 \(FRU\)](#)
- System clock battery, see [Servicing the System Battery \(CRU\)](#)
- Fan frame, see [Servicing Fan Modules \(CRU\) and Fan Frames \(CRU\)](#)
- Front indicator module, see [\(FIM\) Servicing the Front Indicator Module \(FRU\)](#)
- Midplane, see [Remove the Midplane Assembly](#)
- Internal USB flash drive (not used)

See the Oracle Linux operating system documentation for procedures and other instructions for shutting down the server. See also [Power Off the Server Using the Server OS](#).

- [Servicing Components](#)

Powering Down the Server

Note:

Some server components are hot-serviceable, such as power supplies, fan modules, and the Dual PCIe Card Carriers (DPCCs). Components that are hot-serviceable do not require the server to be powered down when performing service procedures.

These sections describe how to power down the server:

- [Power Off the Server for Immediate Shutdown \(Oracle ILOM CLI\)](#)
- [Power Off the Server for Immediate Shutdown \(Oracle ILOM Web Interface\)](#)
- [Power Off the Server for Immediate Shutdown \(Power Button\)](#)

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 Integrated Lights Out Manager (ILOM) in Oracle Server X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

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](#).

▲ 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 Topics

- [Power Off the Server for Immediate Shutdown \(Power Button\)](#)
- [Power Off the Server for Immediate Shutdown \(Oracle ILOM Web Interface\)](#)
- [Power On the Server](#)

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 X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

For more information, see *Using Oracle Integrated Lights Out Manager (ILOM)* in *Oracle Server X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

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](#).

▲ 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 Topics

- [Power Off the Server for Immediate Shutdown \(Power Button\)](#)
- [Power On the Server](#)

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](#).

2. Disconnect the power cords and data cables from the server.
See [Remove Power](#).

▲ 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 Topics

- [Controls and Indicators](#)
- [Power Off the Server for Immediate Shutdown \(Oracle ILOM Web Interface\)](#)
- [Power Off the Server for Immediate Shutdown \(Oracle ILOM CLI\)](#)
- [Power On the Server](#)

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](#).

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](#).

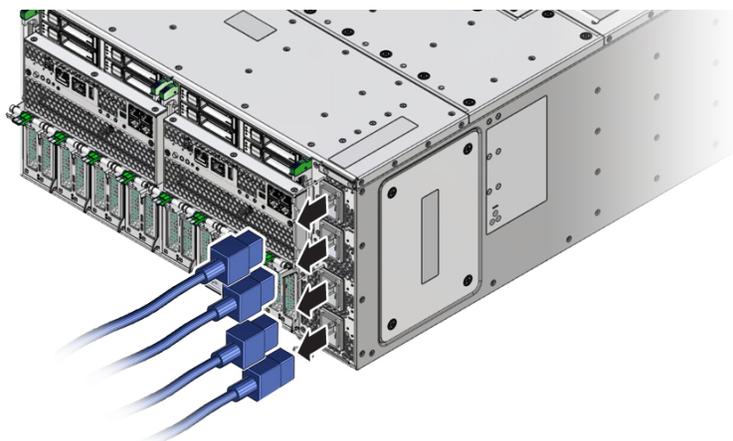
Remove Power

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](#).

1. Place the server in Standby power mode.
Use one of the power off methods. See [Powering Down the Server](#).
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](#).

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. • From Main power mode, either press the front panel On/Standby button, or use Oracle ILOM. <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> |
| Graceful Shutdown | <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.</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 \(Oracle ILOM CLI\)](#)
- [Turn On the Locate Button/LED Remotely \(Oracle ILOM Web Interface\)](#)

- [Control the Locate Button/LED Locally](#)

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 Integrated Lights Out Manager (ILOM) in Oracle Server X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

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 X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

For more information, see *Using Oracle Integrated Lights Out Manager (ILOM) in Oracle Server X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

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](#).

- 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/LED button.
 - To turn on the Locator indicator, press the Locate Button/LED 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.

5

Servicing Components

This section includes the following removal and installation procedures for customer-replaceable and field-replaceable components in the Oracle Server X8-8.

- [Servicing Fan Modules \(CRU\) and Fan Frames \(CRU\)](#)
- [Servicing Power Supplies \(CRU\)](#)
- [Servicing PCIe Cards and Carriers \(CRU\)](#)
- [Servicing CPU Module \(CMOD\) Components \(FRU\)](#)
- [Servicing System Module \(SMOD\) Components \(FRU\)](#)
- [Servicing the Front Indicator Module \(FRU\)](#)
- [Servicing the Midplane Assembly \(FRU\)](#)

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

- [Replaceable Components](#)
- [Customer-Replaceable Units](#)
- [Field-Replaceable Units](#)

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](#)
- [Remove a Fan Module](#)
- [Install a Fan Module](#)
- [Remove a Fan Frame](#)
- [Install a Fan Frame](#)

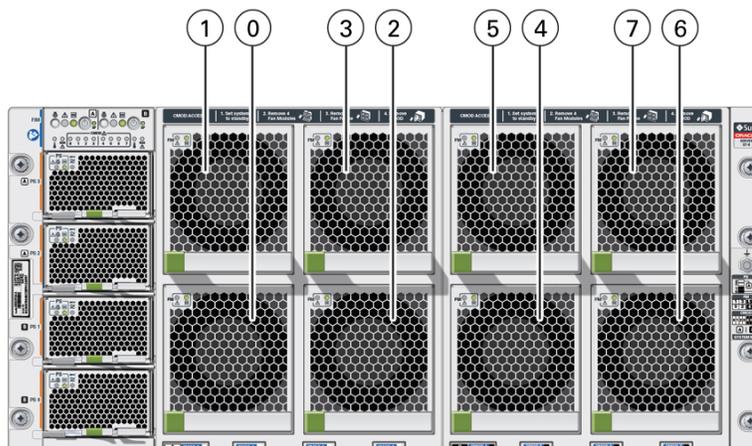
Fan modules are customer-replaceable units (CRUs) that do not require you to power off the server. Fan frames are customer-replaceable units (CRUs) that require you to power off the server. For more information about CRUs, see [Illustrated Parts Breakdown](#) and [Customer-Replaceable Units](#). For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

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, FM1, FM2, and FM 3. The right frame contains FM 4, FM 5, FM 6, and FM 7.

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

For CMOD designations, see [CPU Module \(CMOD\) Overview](#).

Remove a Fan Module

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

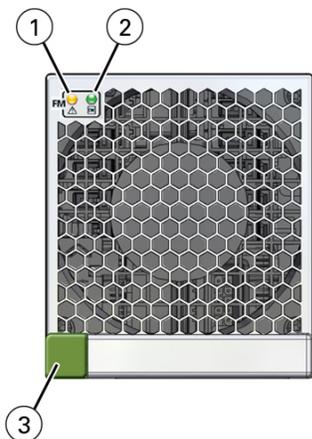
1. Prepare the server for hot service.
 See [Preparing the Server for Component Replacement](#).

 **Note:**

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

- 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. |
| 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. |

- 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.

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

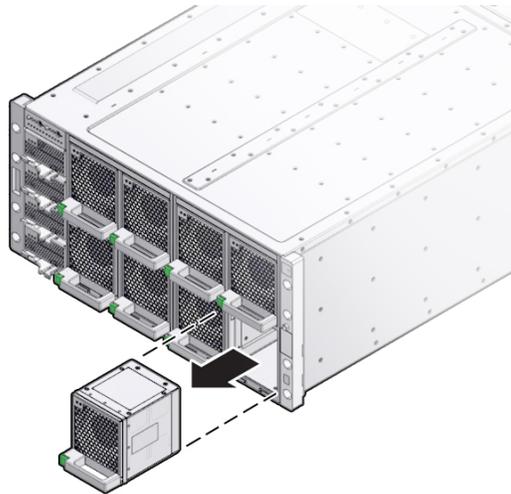
▲ Caution:

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 Topics

- [Remove a Fan Frame](#)
- [Install a Fan Module](#)

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](#).

 **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.

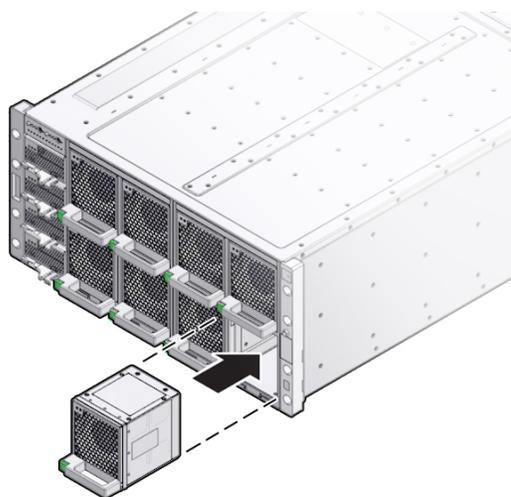
Access this component directly from the front of the server. Ensure the handle is positioned at the bottom of the slot with the green release button to the left and that the air vane for the slot swings freely.

 **Caution:**

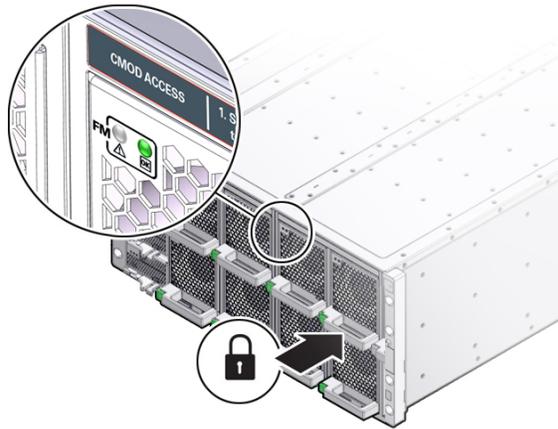
Component damage. Do not apply excessive force when sliding the fan module into the server. Ensure that the connector on the CMOD and the connector on the fan module are aligned correctly.

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

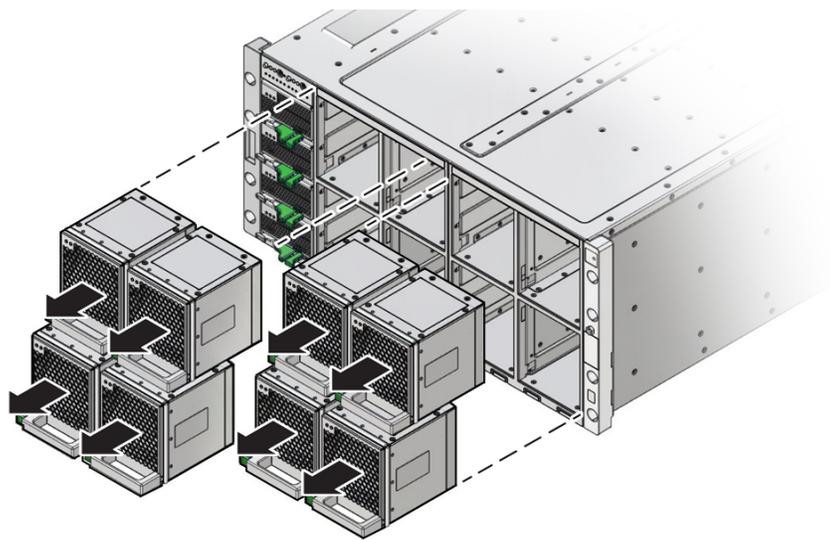
The server has two fan frames which are accessible from the front of the server. Each frame contains four fans. You need to remove the fan frame to access the CMODs behind it.

1. Prepare the server for warm service.
See [Preparing the Server for Component Replacement](#).

 **Note:**

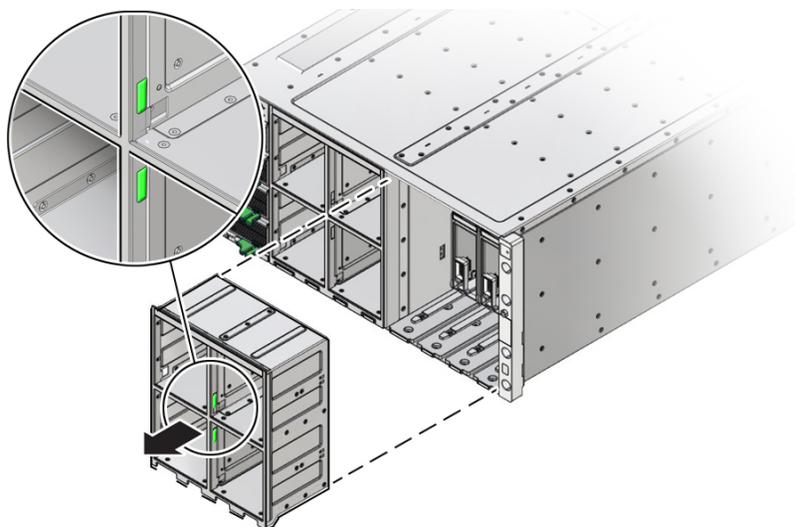
This procedure can also be completed as a cold service procedure.

2. Remove the fan modules associated with the fan frame.
See [Remove a Fan Module](#).



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.



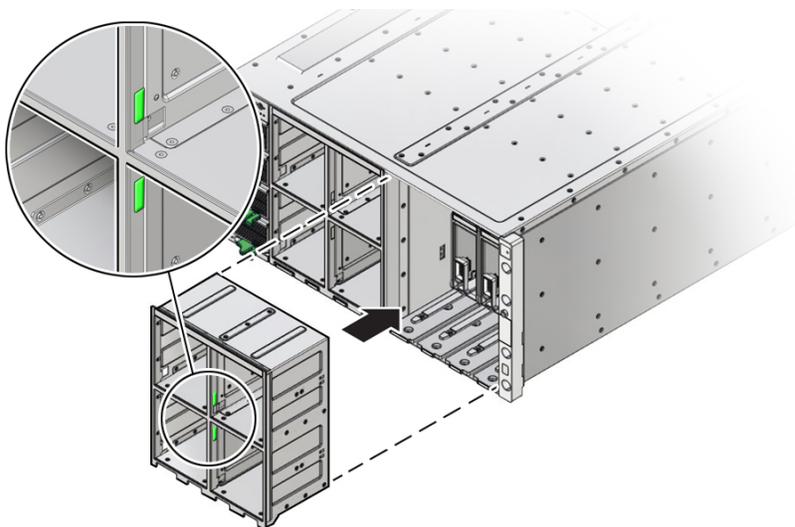
Related Topics

- [Remove a CMOD](#)

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 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](#).
4. Prepare the server for operation.
See [Returning the Server to Operation](#).

Servicing Power Supplies (CRU)

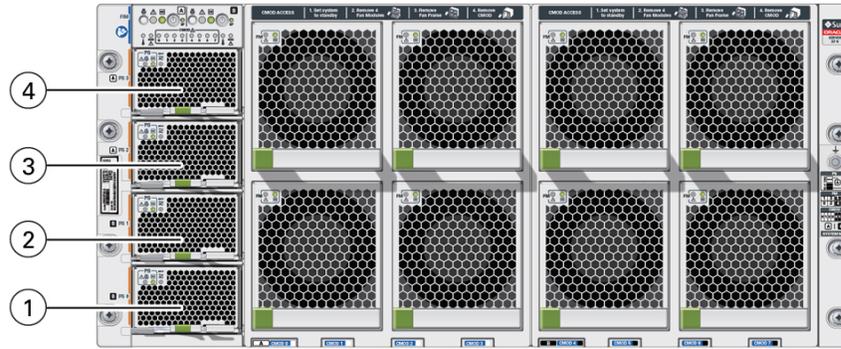
This section describes how to service power supplies (PS). Four power supplies are located at the front of the server. The following topics and procedures provide information to assist you when removing and installing power supplies:

- [Power Supply Locations and Numbering](#)
- [Power Supply Overview](#)
- [AC Input Power Block Locations](#)
- [Remove a Power Supply](#)
- [Install a Power Supply](#)

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](#) and [Customer-Replaceable Units](#). For component serviceability, locations, and designations, see [Replaceable Components](#).

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:

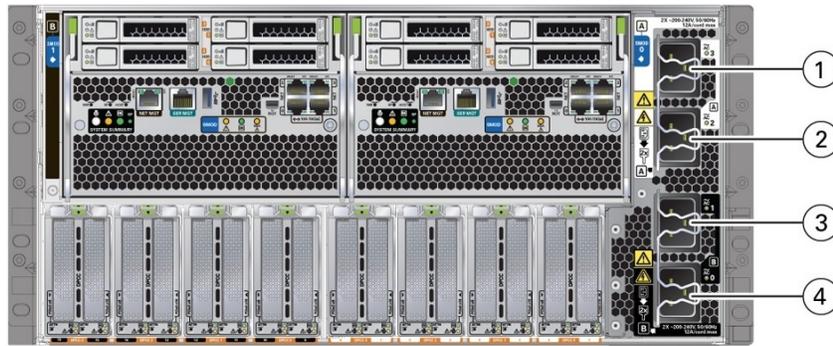
- Front panel Fault-Service Required LEDs: Amber System A or System B Service Required LEDs located at the FIM
- Back panel Fault-Service Required LEDs: Amber System Service Required LEDs located at SMOD0 or SMOD1
- Amber Fault-Service Required LED on the faulty power supply

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

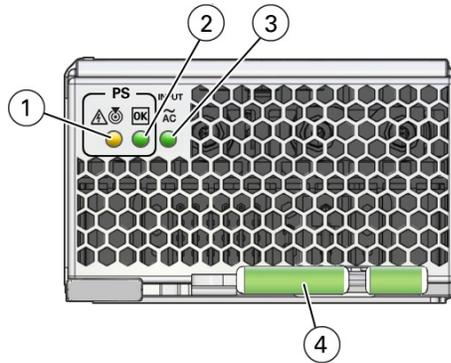
You might need to remove power supplies to replace a PS or to access the release latch for the front indicator module (FIM).

1. Prepare the server for hot service.
See [Preparing the Server for Component Replacement](#).

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



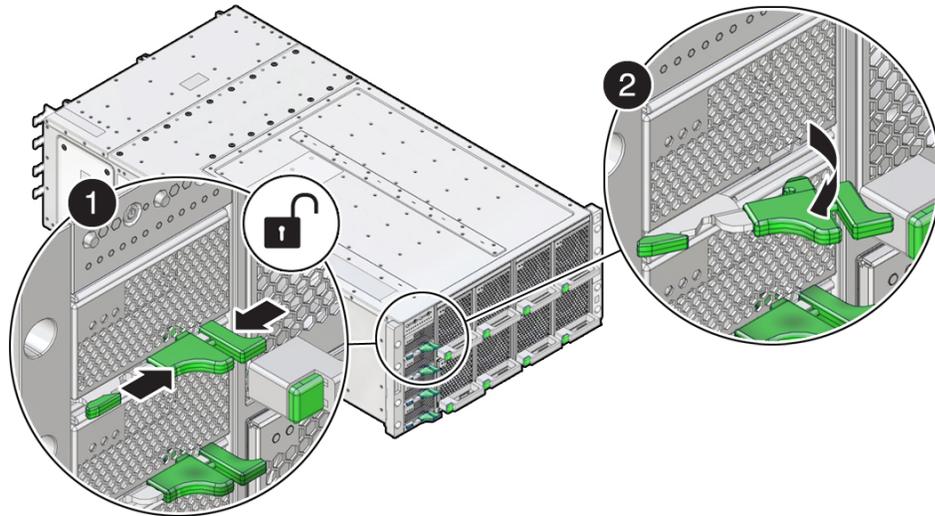
| Call Out | Status LED or Button | Icon and Color | Description |
|----------|--|--|---|
| 1 | Fault-Service Required Locate LED |  Amber  White | Indicates the location of the power supply in the server: <ul style="list-style-type: none"> Off – Power supply is operating normally, Fast blink – Use Oracle 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. 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 green release latches at the end of the lever (1).

This action is accompanied by a click sound.



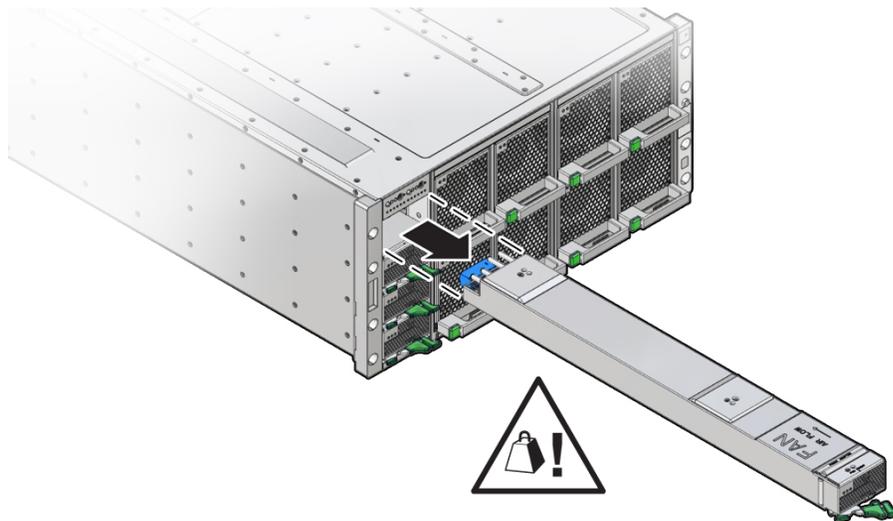
4. To disengage the power supply from its internal connector, rotate the lever to the left (2).

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 Topics

- [Install a Power Supply](#)
- [Replaceable Components](#)

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](#).

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.

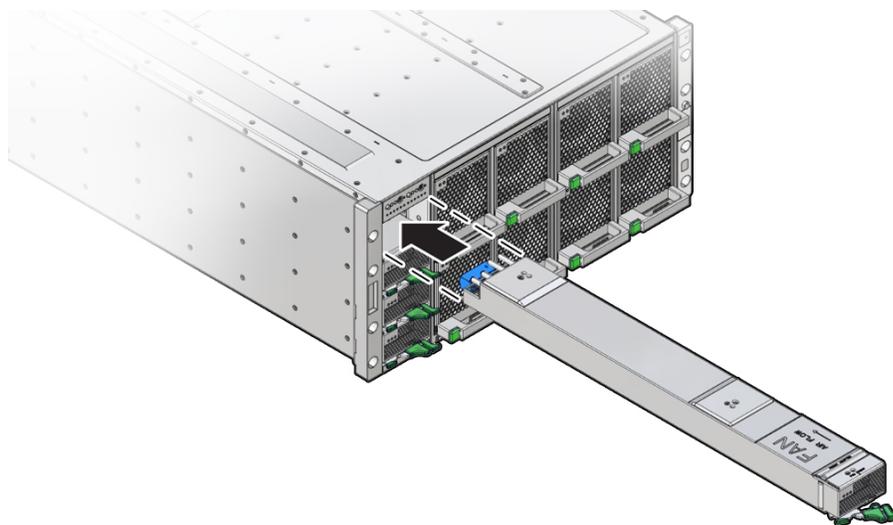
3. Open the power supply lever. Squeeze together the two green release latches at the end of the lever and rotate the lever to the left.

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.

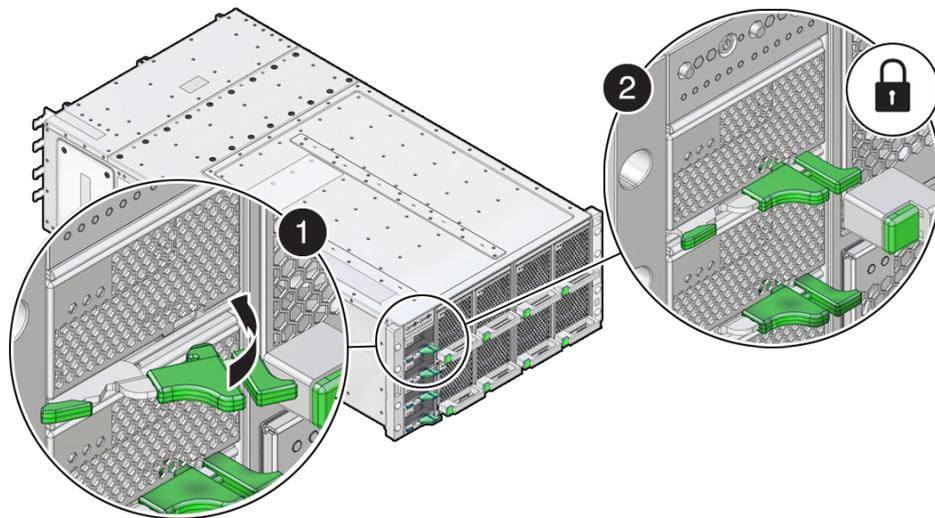


6. To install the power supply, rotate the lever to the right (1).

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](#).

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](#)
- [Remove a DPCC](#)
- [Remove a PCIe Card](#)
- [Install a PCIe Card](#)
- [Install a DPCC](#)

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

 **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](#).

 **Note:**

Exadata X8-8 servers do not require a shut down to replace a PCIe card. Refer to *Performing a Hot-Pluggable Replacement of a Flash Disk* in *Exadata Database Machine Maintenance Guide* at [Oracle Database Machine Maintenance Guide](#).

 **Note:**

For a complete list of supported PCIe cards, refer to *Supported PCIe Cards* in *Oracle Server X8-8 Product Notes* at [Oracle Server X8-8 Documentation](#).

PCIe Card and DPCC Overview

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

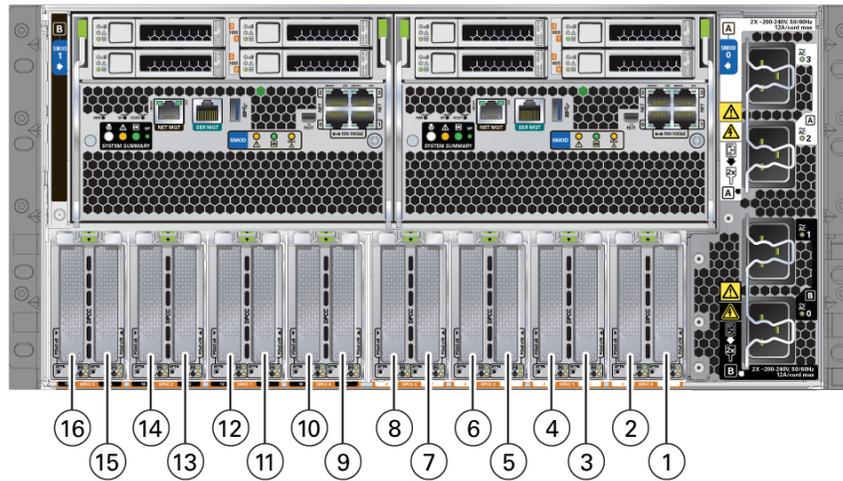
DPCC and PCIe Card Slot Locations and Numbering

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 |
| 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 |

 **Note:**

See [Product Description](#) for a complete list of supported PCIe cards in the Oracle Exadata Database Server X8-8.

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.

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](#).

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.

Caution:

When removing an Oracle Flash Accelerator F640 PCIe Card v2 additional steps may need to be performed within the Exadata MS software on that Exadata Database server. Follow the instructions in *Performing a Hot-Pluggable Replacement of a Flash Disk* in *Oracle Exadata Database Server X8-8 Service Manual* at [Performing a Hot-Pluggable Replacement of a Flash Disk](#). Do not follow the instructions in *Oracle Exadata Database Server X8-8 Service Manual* section *Remove a DPCC*. The illustrations can be used for reference; however, following these instructions on an Exadata Database Server may cause a system reset.

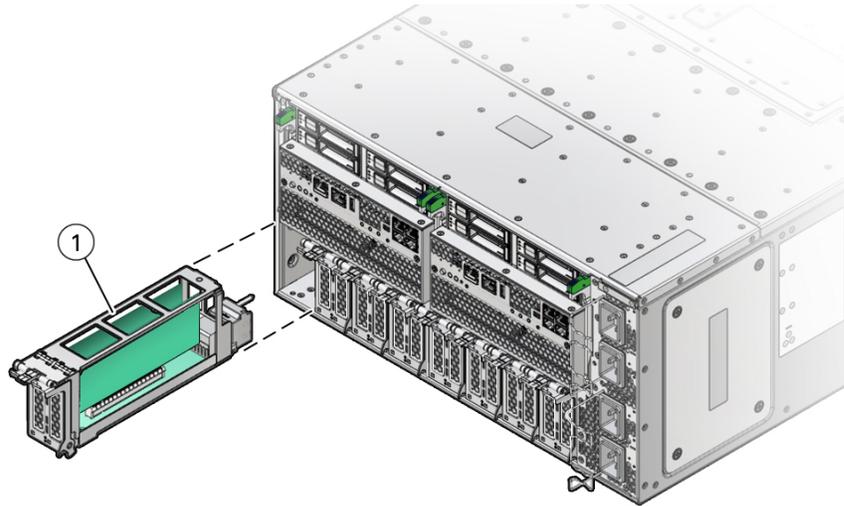
This procedure requires a non-conducting stylus.

1. Prepare the server for hot service.
See [Preparing the Server for Component Replacement](#).

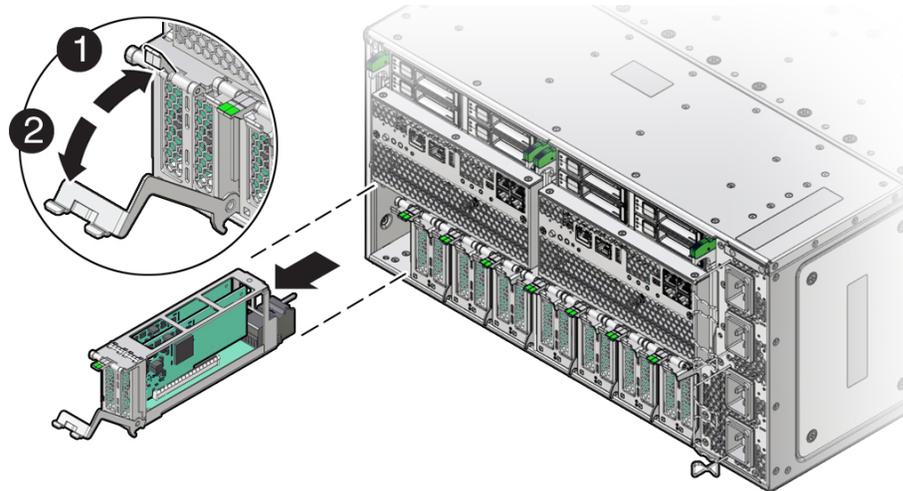
 **Note:**

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.
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 Topics

- [Remove a PCIe Card](#)

Remove a PCIe Card

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

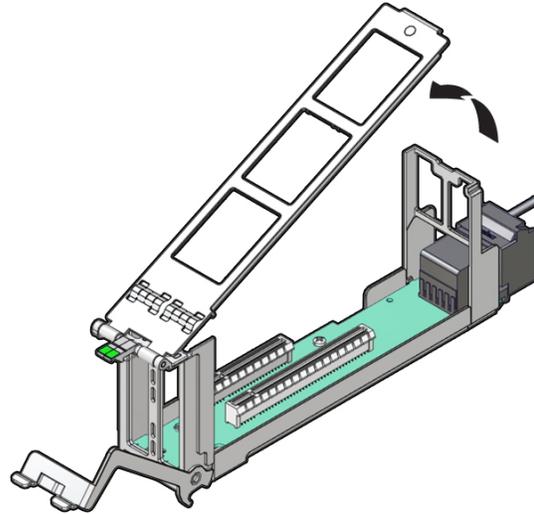
1. Prepare the server for hot service.

See [Preparing the Server for Component Replacement](#).

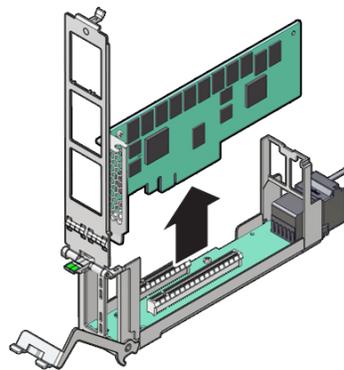
Note:

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](#).
3. Remove the DPCC.
See [Remove a DPCC](#).
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 Topics

- [Install a PCIe Card](#)
- [Returning the Server to Operation](#)

Install a PCIe Card

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

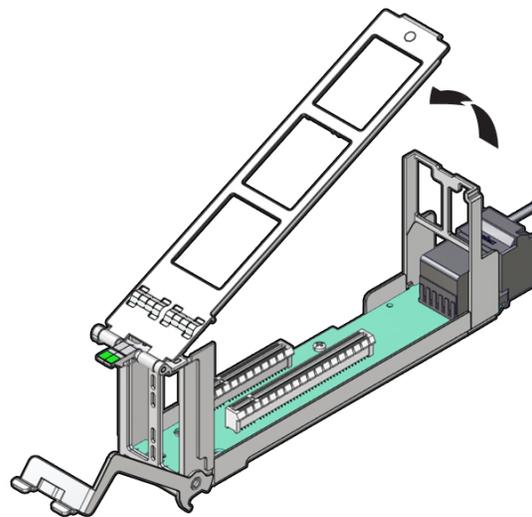
1. Prepare the server for hot service.
See [Preparing the Server for Component Replacement](#).

 **Note:**

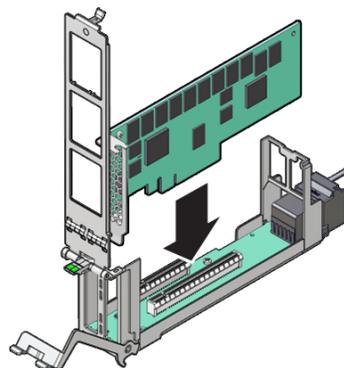
This procedure can also be completed as a cold service procedure.

2. Identify the DPCC PCIe slot.
3. If necessary, remove the DPCC.
See [Remove a DPCC](#).
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.



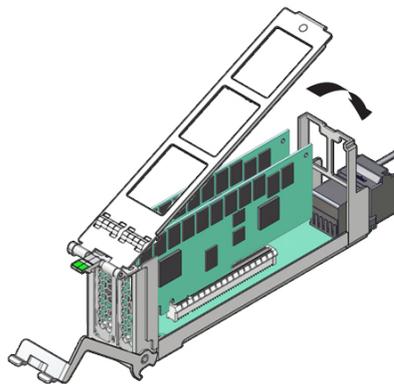
7. Remove the filler, as required.
8. Orient the PCIe card with the edge (or bus) connector facing down and the IO (or cable connector) facing to the left.



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 \(Oracle ILOM\)](#).

Related Topics

- [Install a DPCC](#)

Install a DPCC

Perform this procedure as part of a PCIe card replacement or configuration. To remove a DPCC, see [Remove a DPCC](#).

Obtain a stylus for activating recessed buttons.

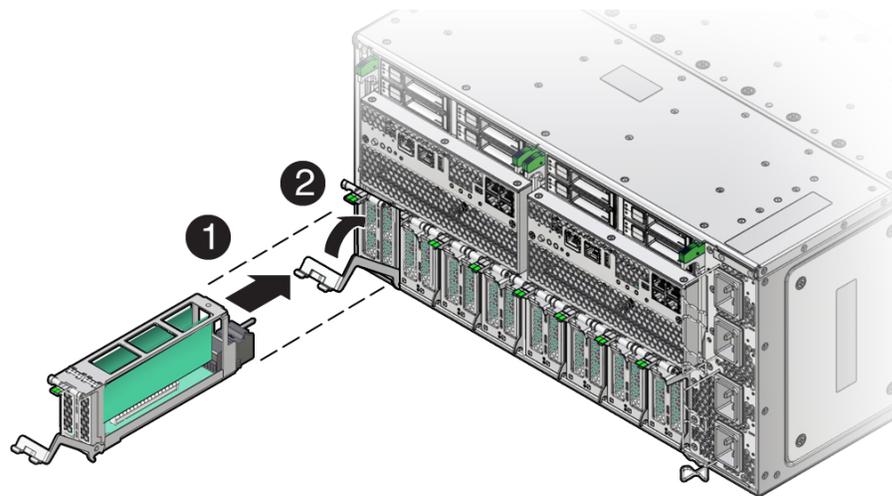
1. Prepare the server for hot service.
See [Preparing the Server for Component Replacement](#).

✎ 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](#).

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](#)
- [CMOD Population Rules](#)
- [Remove a CMOD](#)
- [Remove the CMOD Cover](#)
- [Install the CMOD Cover](#)
- [Install a CMOD](#)
- [Servicing Processors \(FRU\)](#)
- [Servicing DIMMs \(CRU\)](#)

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](#) and [Field-Replaceable Units](#). For component serviceability, locations, and designations, see [Replaceable Components](#). See [CPU Module \(CMOD\) Overview](#).

▲ Caution:

CMODs should be removed and replaced only by authorized Oracle Service personnel.

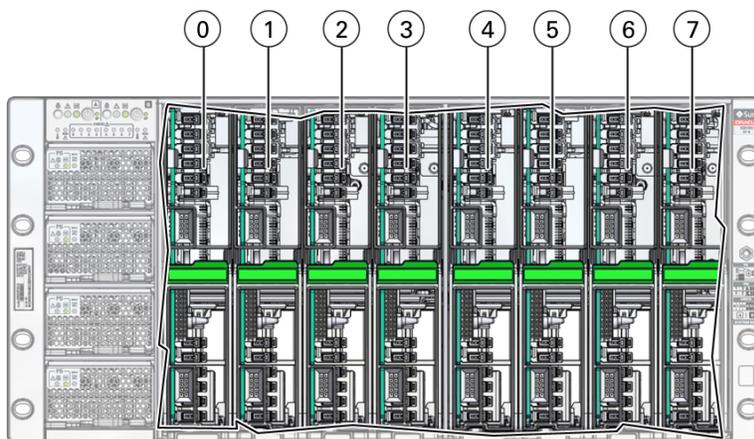
▲ Caution:

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](#).

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 eight CMODs. For more information, see [CPU Module \(CMOD\) Overview](#).



| 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 Exadata Database Server X8-8 supports eight CMOD configurations. Each CMOD supports a single socket containing a single processor.

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.
 - System A must have Intel Xeon Platinum 8268, 24-core, 2.9-GHz, 205 W 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.

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](#).

 **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.

 **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](#).

5. Remove the fan frame.

See [Remove a Fan Frame](#).

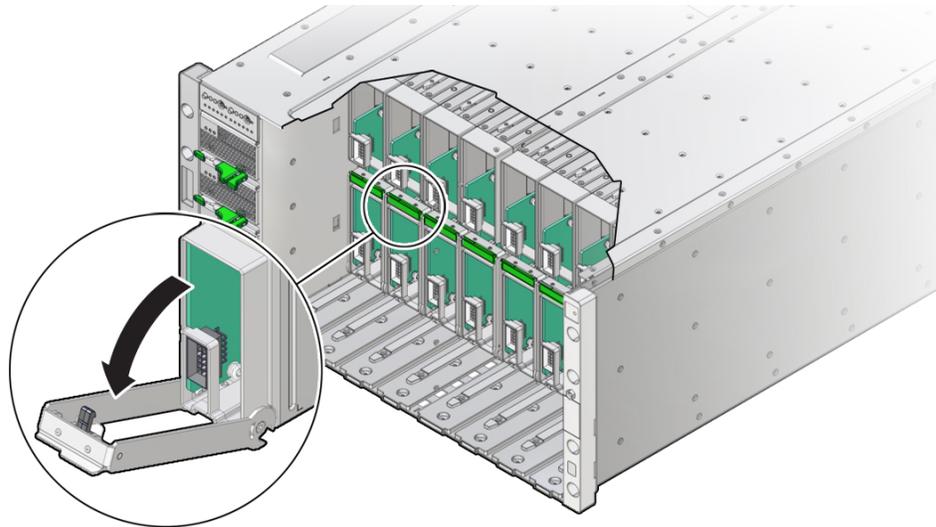
6. To unlock the CMOD, squeeze together the green tabs on the end of the CMOD lever.

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.

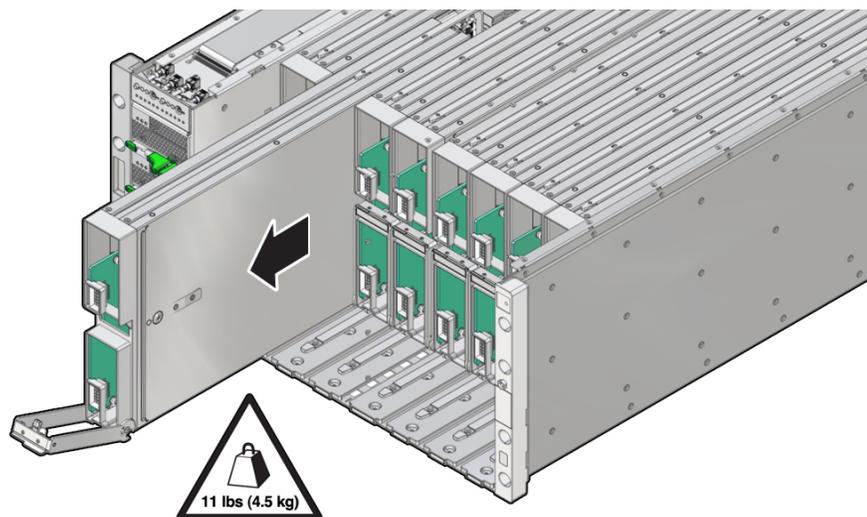


8. Use the lever to slide the CMOD partially out of the server until you can grab the CMOD with two hands.

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

▲ Caution:

The CMOD is heavy. Be prepared to hold it 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 Topics

- [Identify and Remove a Faulty DIMM](#)

- [Identify and Remove a Faulty Processor](#)
- [Install a CMOD](#)

Remove the CMOD Cover

Remove the CMOD cover to service CMOD internal components.

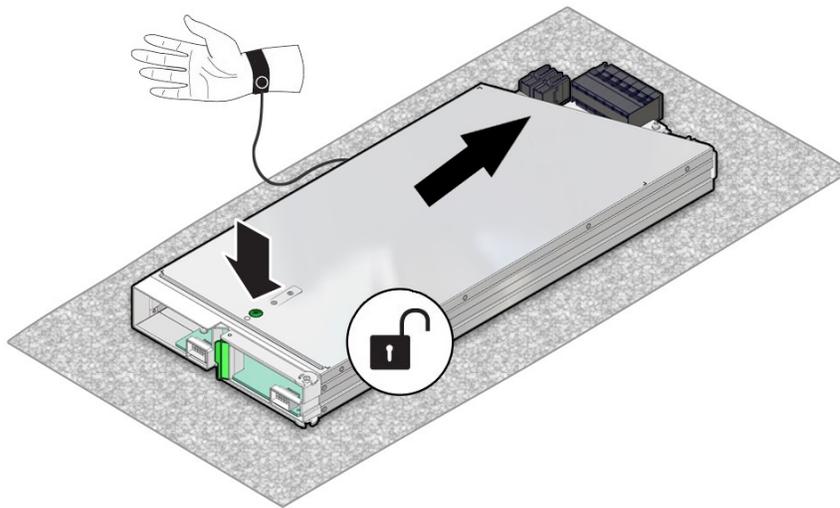
1. Remove the CMOD from the server chassis.
See [Remove a CMOD](#).
2. Attach an antistatic wrist strap to your wrist and then to a chassis ground.

Caution:

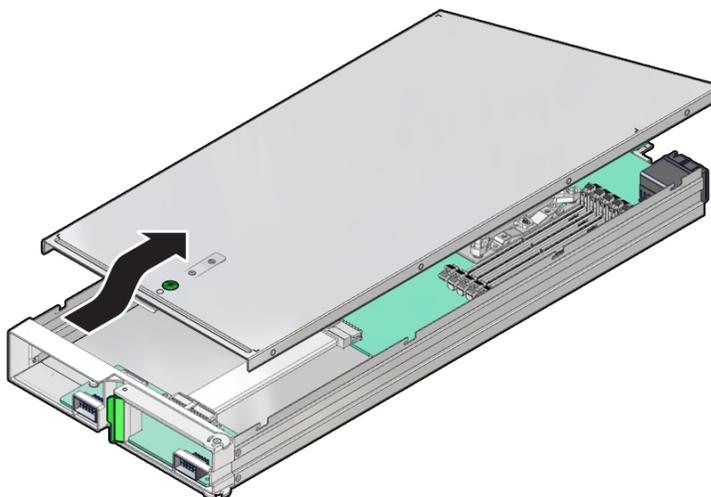
These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [Electrostatic Discharge and Static Prevention Measures](#).

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.

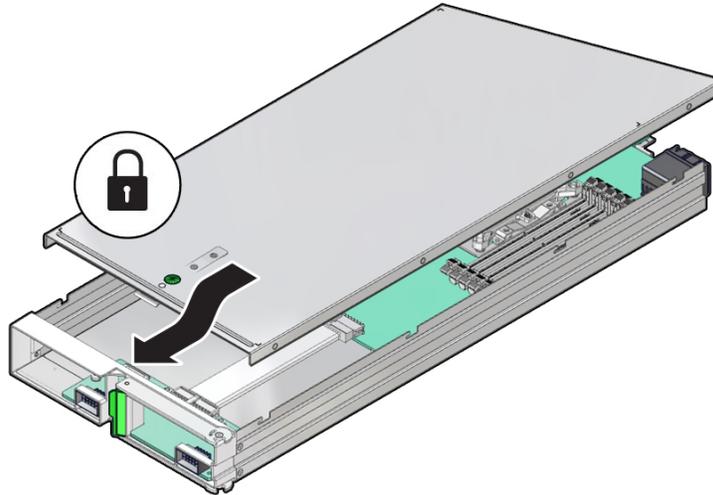


Install the CMOD Cover

▲ 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](#).

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.



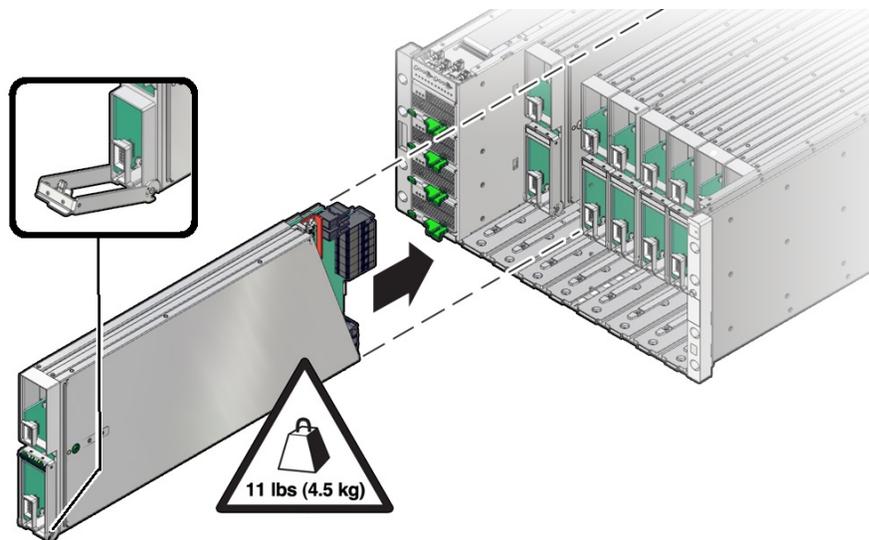
This action is accompanied by a click sound.

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](#).

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

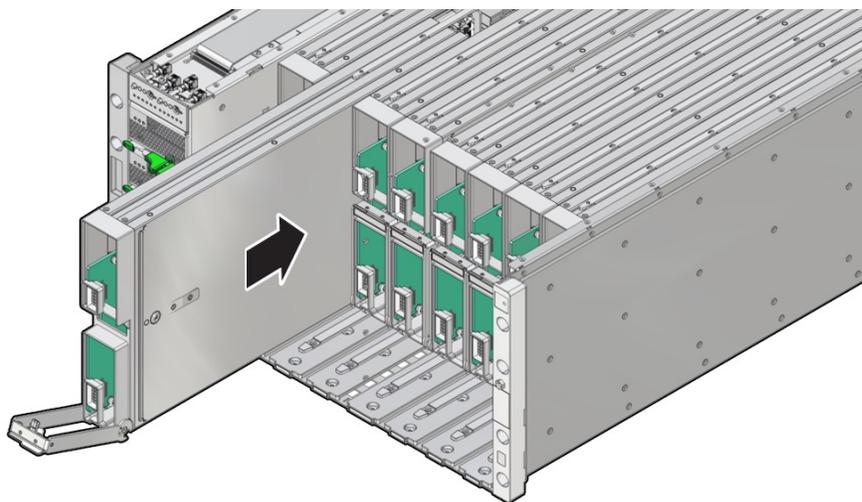


▲ Caution:

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.

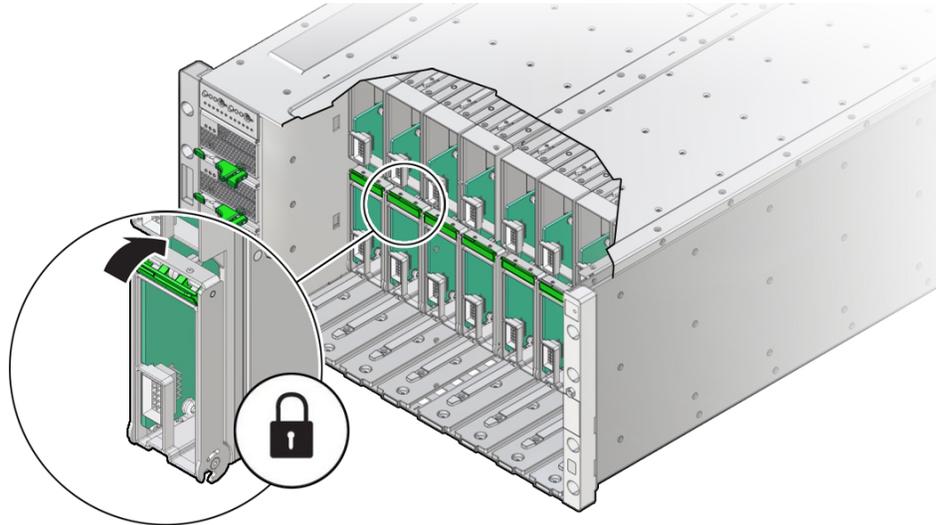


4. To install the CMOD, rotate the lever up until it locks into place and is flush with the front of the CMOD.

▲ 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](#).
6. Install the four fan modules.
See [Install a Fan Module](#).
7. Prepare the server for operation.
See [Returning the Server to Operation](#).

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](#)
- [Install a Processor](#)
- [Prepare a CMOD for Replacement](#)

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

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](#).

Identify and Remove a Faulty 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.

 **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](#).

1. Prepare the server for warm service.
See [Preparing the Server for Component Replacement](#).

 **Note:**

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

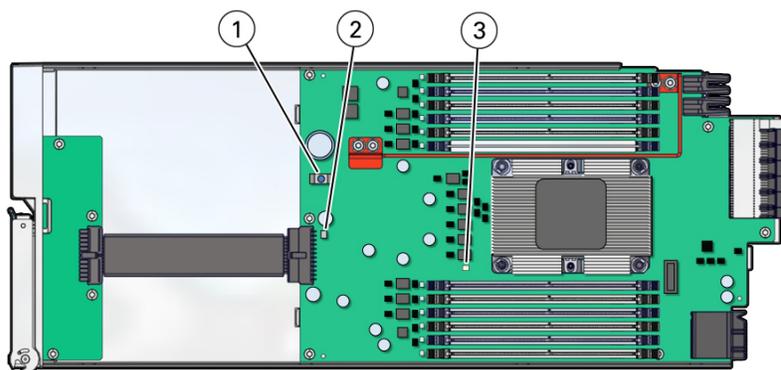
2. Prepare the server for service.
 - a. Power off the server.
Disconnect the power cords from the power supplies for cold-service.
See [Powering Down the Server](#).
 - b. Attach an antistatic wrist strap to your wrist, and then to a metal area on the chassis.
See [Electrostatic Discharge and Static Prevention Measures](#).
 - c. Remove the CMOD from the chassis.
See [Remove a CMOD](#).
 - d. Remove the CMOD cover.
See [Remove the CMOD Cover](#).See [Preparing for Service](#).
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, indicates that there is sufficient voltage in the fault remind circuit to light any fault LEDs that were lit due to a failure. If this LED fails to light when you press the Fault Remind button, it is likely that the capacitor powering the fault remind circuit lost its charge. This 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.

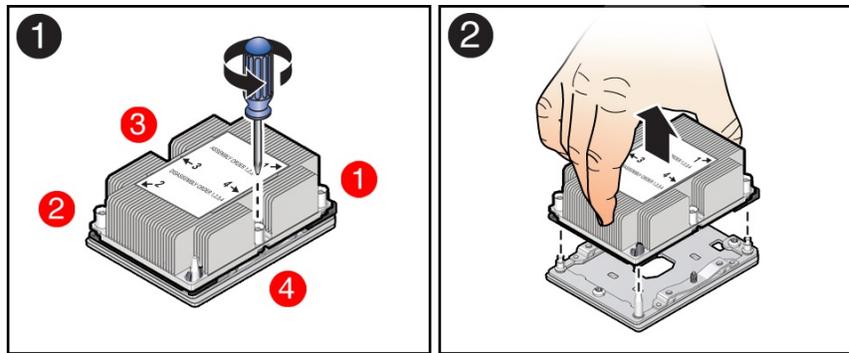
The processor fault LED that is located adjacent to the faulty processor lights:

- 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.

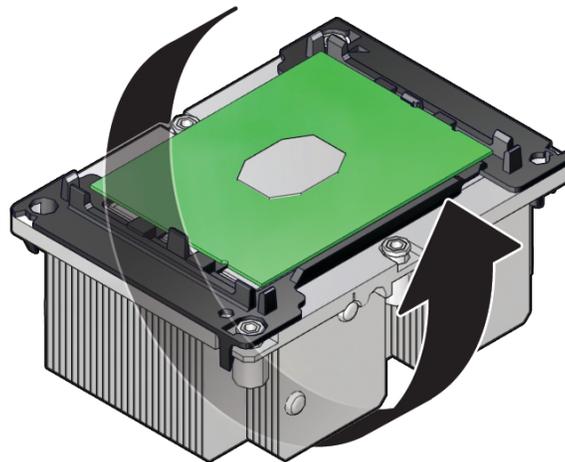


| Callout | Description |
|---------|-----------------------|
| 1 | Fault Remind button |
| 2 | Fault Remind LED |
| 3 | Processor 0 fault LED |

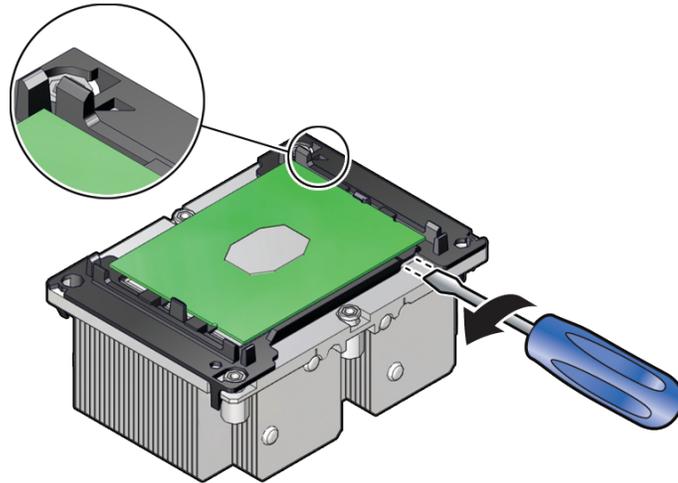
4. Using a Torx T30 screwdriver, loosen the four captive nuts that secure the processor-heatsink module to the socket: fully loosen nut 4, then 3, then 2, then 1. [1]



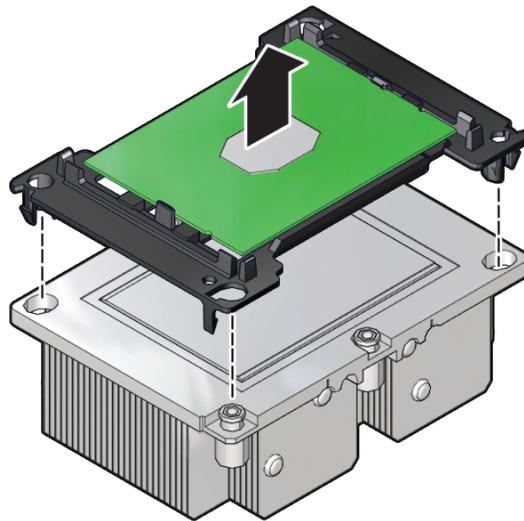
5. Lift the processor-heatsink module from the socket [2].
Always hold the processor-heatsink module along the axis of the fins to prevent damage.
6. Separate the processor from the heatsink.
 - a. Flip over the processor-heatsink module, place it on a flat surface, and locate the thermal interface material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

- [Install a Processor](#)

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.

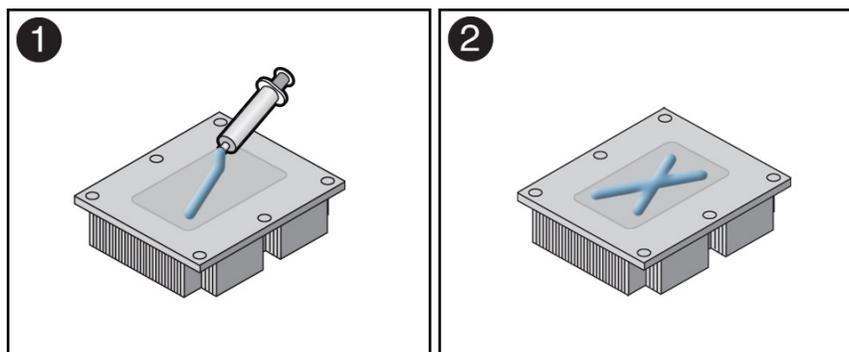
1. Attach an antistatic wrist strap to your wrist, and then to a metal area on the chassis. See [Electrostatic Discharge and Static Prevention Measures](#).

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](#).

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].



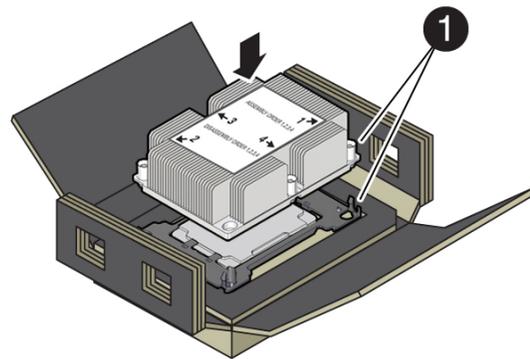
✎ Note:

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.

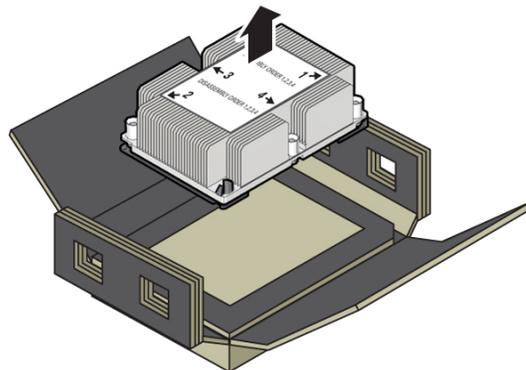
 **Note:**

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.

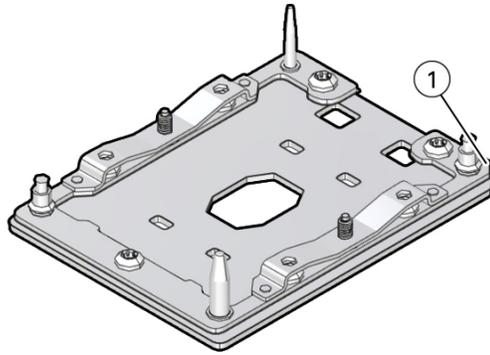


| Callout | Description |
|---------|-----------------|
| 1 | Pin 1 indicator |

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

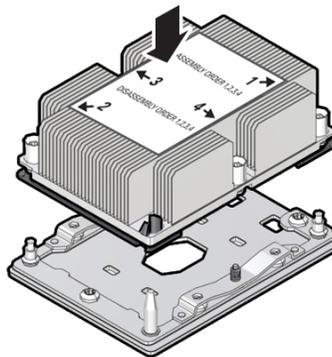


- c. Align the processor-heatsink module to the processor socket bolster plate on the motherboard, matching the pin 1 location (a triangle indicator).

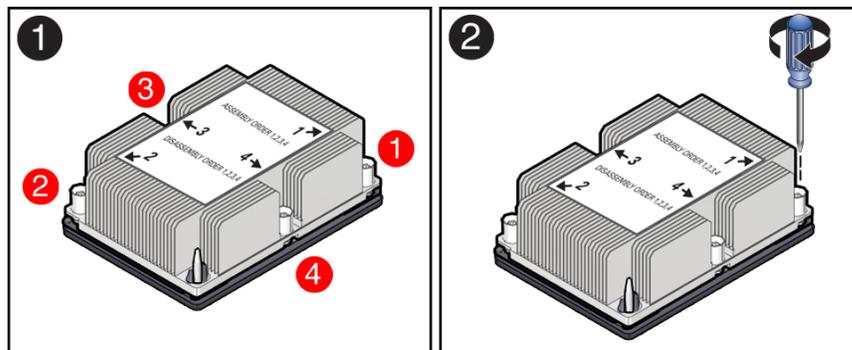


| Callout | Description |
|---------|-----------------|
| 1 | Pin 1 indicator |

- 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.

5. Install the CMOD cover.

[Install the CMOD Cover](#)

6. Install the CMOD.

See [Install a CMOD](#).

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](#).

- b. Power on the main server power.

See [Power On the Server](#).

8. Use Oracle ILOM to clear server processor faults.

Refer to the Oracle Integrated Lights Out Manager (ILOM) 4.0 Documentation Library at [Systems Management and Diagnostics Documentation](#) 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 command

```
-> 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 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 [Systems Management and Diagnostics Documentation](#).

Related Topics

- [Identify and Remove a Faulty Processor](#)

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](#).

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](#).
2. Prepare the server for warm service.
See [Preparing the Server for Component Replacement](#).

Note:

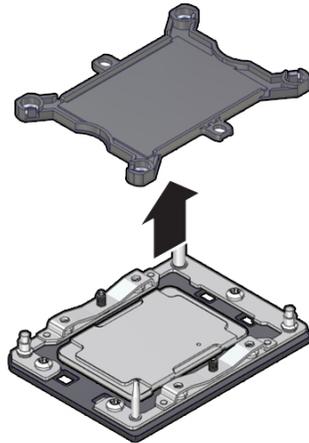
This procedure can also be completed as a cold service procedure.

3. Remove the failed CMOD.
See [Remove a CMOD](#).
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](#).
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 \(CRU\)](#).

 **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](#).
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.



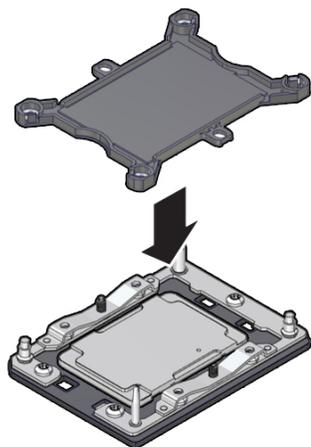
- b. Install a processor into the socket from which you removed the processor socket cover.
See [Install a Processor](#).
9. Install the processor socket cover on the faulty CMOD motherboard.

 **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.

- 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](#).
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 Exadata Database Server X8-8 supports a fixed base configuration of forty-eight 64 GB quad-rank (QR) Load-Reduced (LR) DIMMs. Optionally, customers can expand system memory by upgrading to ninety-six 64 GB DIMMs

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

- [DIMM Physical Layout and Numbering](#)
- [DIMM Population Rules](#)
- [DIMM Population Scenarios](#)
- [DIMM Operating Speeds](#)
- [Inconsistencies Between DIMM Fault Indicators and the BIOS Isolation of Faulty DIMMs](#)
- [Identify and Remove a Faulty DIMM](#)
- [Install a DIMM](#)

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

▲ Caution:

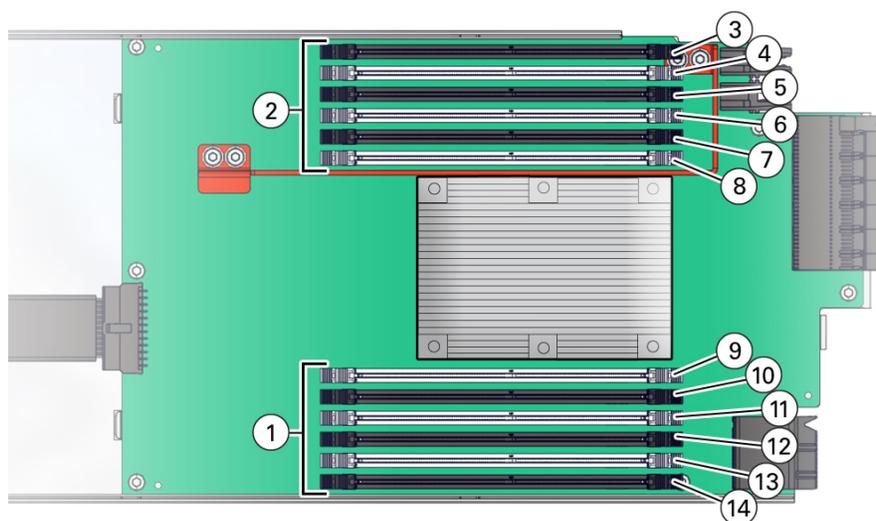
These procedures require that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the components to fail. To avoid damage, ensure that you follow antistatic practices as described in [Electrostatic Discharge and Static Prevention Measures](#).

DIMM Physical Layout and Numbering

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, the six DIMM slots assigned to each channel have color-coded black slots with black levers, or white slots with white levers.

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 |

| Call Out | Description |
|----------|----------------------------|
| 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 Population Rules

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

- The server supports a fixed configuration of forty-eight 64 GB (3 TB) quad-rank (QR) Load-Reduced DIMMs (LRDIMMs). Do not attempt to install any other DIMM sizes or DIMM types in the server unless you are upgrading the memory to 6 TB with an optional Exadata memory expansion kit.
- All CMODs in a server should be populated identically.
 - If your server is configured with forty-eight memory DIMMs (3 TB), only black DIMM slots are populated with memory DIMMs.
 - If your server is configured with ninety-six memory DIMMs (6 TB), all black DIMM slots and white DIMM slots are populated with memory DIMMs.

DIMM Population Scenarios

There are two 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). 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. See [DIMM Population Rules](#).

DIMM Operating Speeds

The maximum supported memory speed is 2666 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.

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](#).
2. Prepare the server for warm service.
See [Preparing the Server for Component Replacement](#).

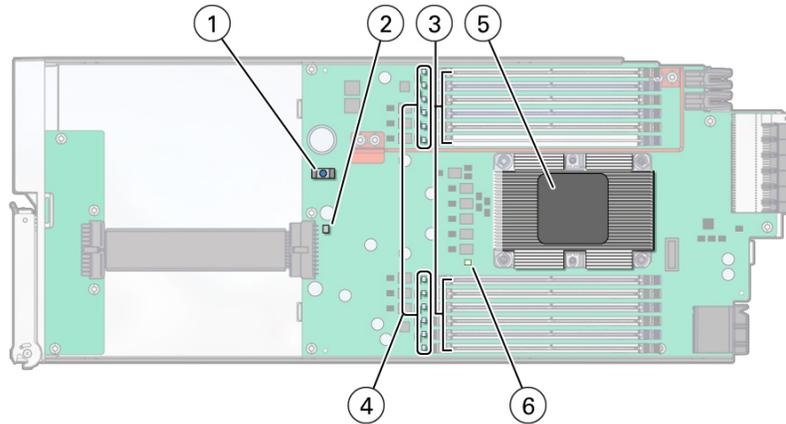
 **Note:**

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

3. Remove the CMOD that contains the failed DIMM.
See [Remove a CMOD](#).
4. Remove the CMOD top cover.
See [Remove the CMOD Cover](#).
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 |

- 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.

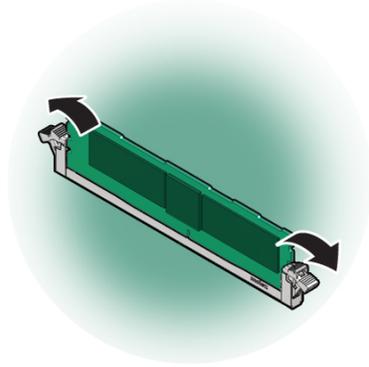
The Fault Remind circuit remains charged for about 10 minutes after power is removed from the CMOD, either by disconnecting power from the server, or by removing the CMOD from the chassis. When you press the Fault Remind button, the Charge Status indicator lights if there is enough power to use the fault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

- With the Fault Remind button pressed, look for a lit DIMM fault LED indicator [4].

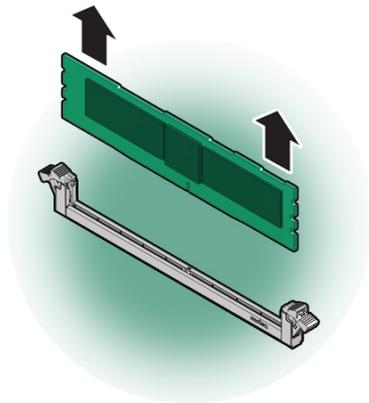
Each DIMM slot has a fault indicator. Twelve DIMM fault LED indicators are located next to the DIMM slots.

- 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](#).

Related Topics

- [DIMM Physical Layout and Numbering](#)
- [DIMM Population Rules](#)
- [Install a DIMM](#)

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](#).

3. Prepare the server for warm service.

See [Preparing the Server for Component Replacement](#).

 **Note:**

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

4. Access DIMMs as required.

- Remove the CMOD.
See [Remove a CMOD](#).
- Remove the CMOD top cover.
See [Remove the CMOD Cover](#).

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](#).

 **Note:**

If you are changing or adding DIMMs as part of an upgrade, ignore the fault identification instructions.

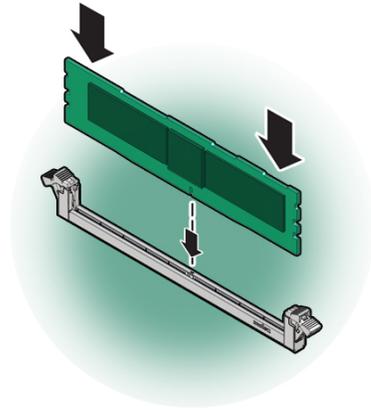
5. Locate the DIMM slot.

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.

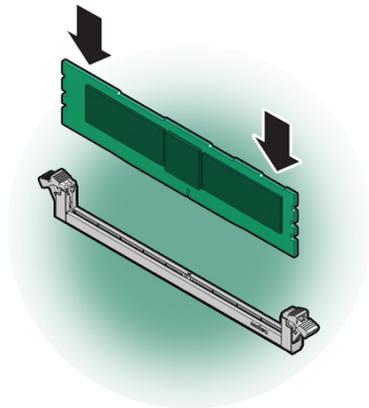


- d. Push the DDR4 DIMM into the connector socket until the ejector tabs lock the DIMM in place.

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](#).
10. Install the CMOD.
See [Install a CMOD](#).
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 [Systems Management and Diagnostics Documentation](#).

 **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 Topics

- [Install a CMOD](#)

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](#)
- [Remove an SMOD](#)
- [Install an SMOD](#)
- [Servicing the System Battery \(CRU\)](#)
- [Prepare an SMOD for Replacement](#)

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](#) and [Field-Replaceable Units](#). For component serviceability, locations, and designations, see [Replaceable Components](#). See [System Module \(SMOD\) Overview](#).

 **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](#).

SMOD Population Rules

The Oracle Exadata Database Server X8-8 supports two installed SMODs. Both SMOD0 System A and SMOD1 System B are accessible from the back panel.

See [System Module \(SMOD\) Overview](#).

Remove an SMOD

Perform this procedure to access internal SMOD components, such as the system battery.



Note:

Internal USB ports are not used.

For component serviceability, locations, and designations, see [Replaceable Components](#).

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.

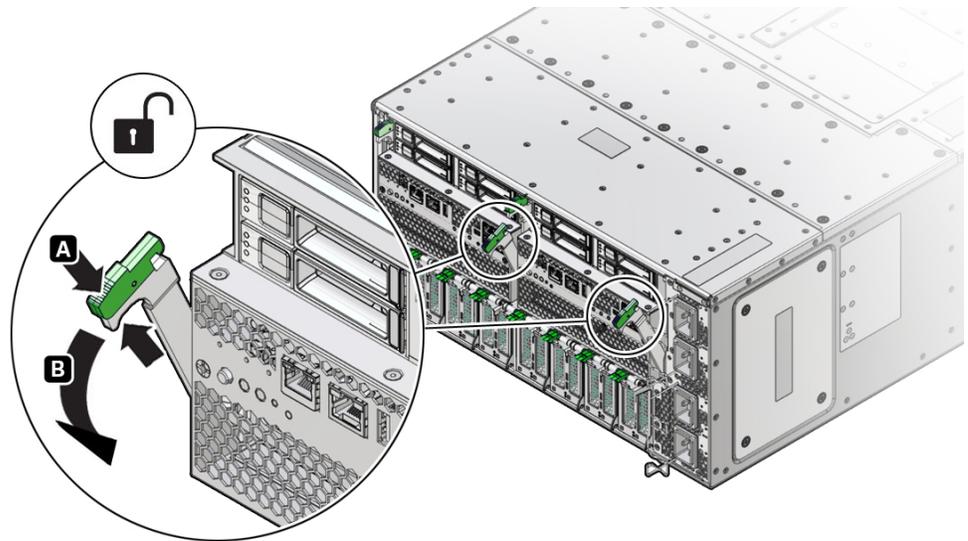


Note:

SMOD1 System Summary LEDs/buttons, recessed reset buttons, NET Management ports, Serial Management ports, and USB ports do not function.

See [Preparing the Server for Component Replacement](#).

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.



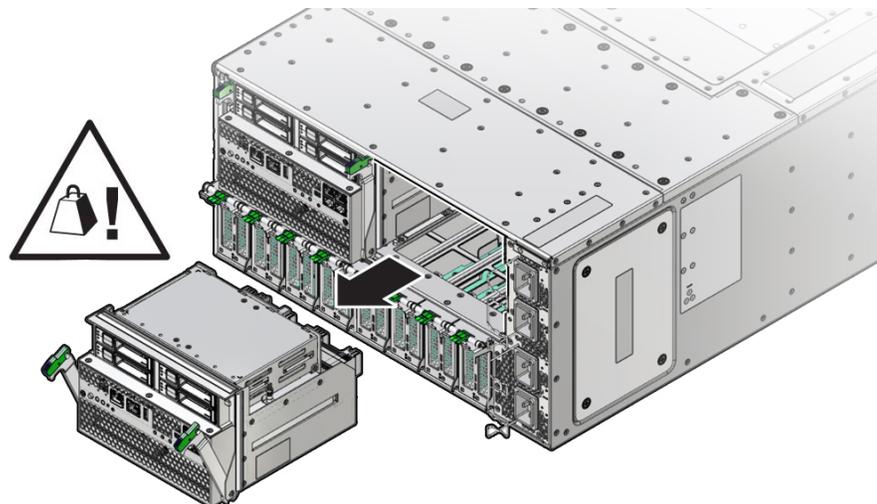
- b. To disengage the SMOD from the server midplane, simultaneously rotate both handles downward to their fully open position.

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 Topics

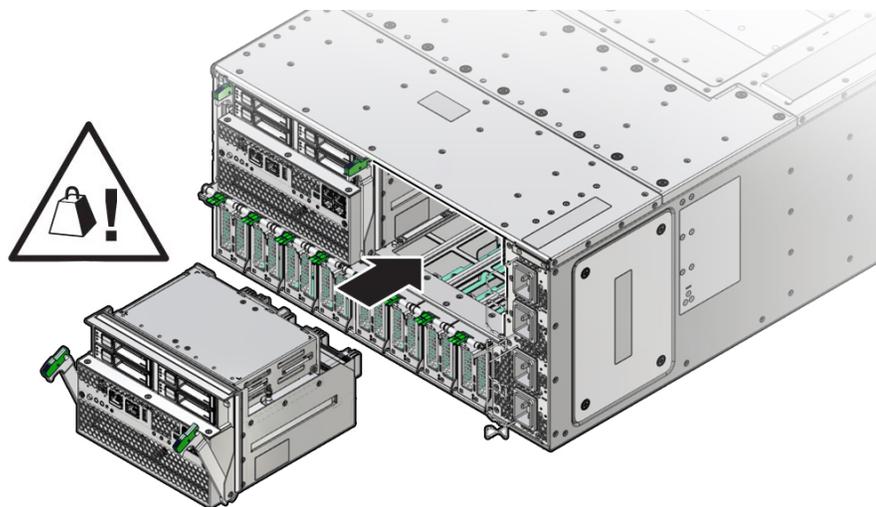
- [Install an SMOD](#)

Install an SMOD

Perform this procedure after servicing internal SMOD components, such as the system battery.

For component serviceability, locations, and designations, see [Replaceable Components](#).

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](#).
2. 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.
3. 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.

4. Align the SMOD in the slot.
5. Slide the SMOD into the slot until it stops.

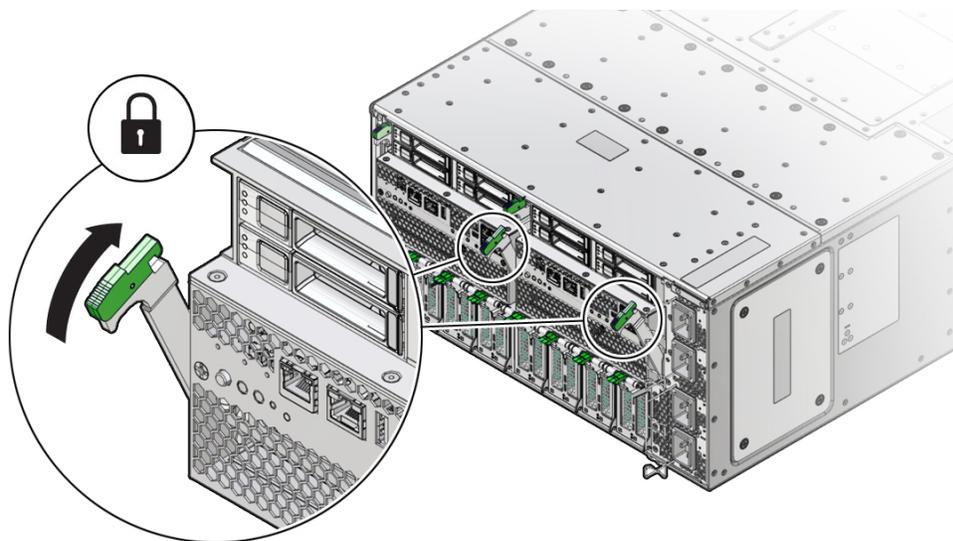
This leaves the SMOD protruding slightly from the back of the server. Do not attempt push the SMOD in beyond this point.

6. 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.



7. Connect the cables to the SMOD.
8. Prepare the server for operation.
See [Returning the Server to Operation](#).

Related Topics

- [System Module \(SMOD\) Overview](#)

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](#)
- [Install the System Battery](#)

System batteries are field-replaceable units (CRUs). For more information about CRUs, see [Illustrated Parts Breakdown](#) and [Customer-Replaceable Units](#). For component serviceability, locations, and designations, see [Replaceable Components](#). See [System Module \(SMOD\) Overview](#).

▲ 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](#).

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](#).

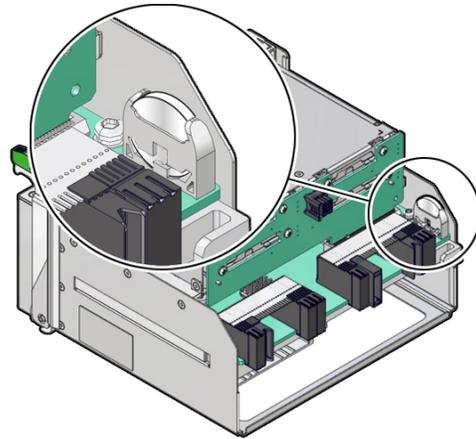
2. Remove SMOD0 or SMOD1.

See [Remove an SMOD](#).

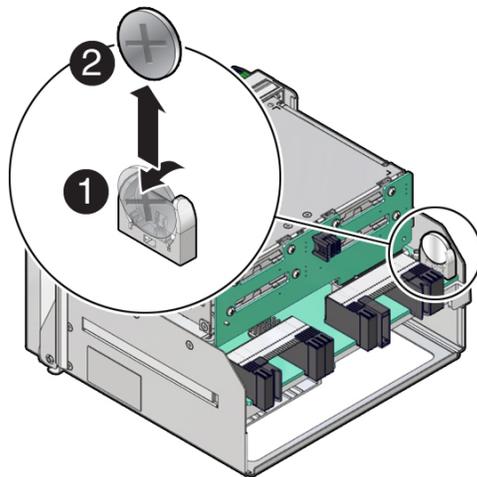
3. Close the SMOD handles.

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 Topics

- [Install an SMOD](#)

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.

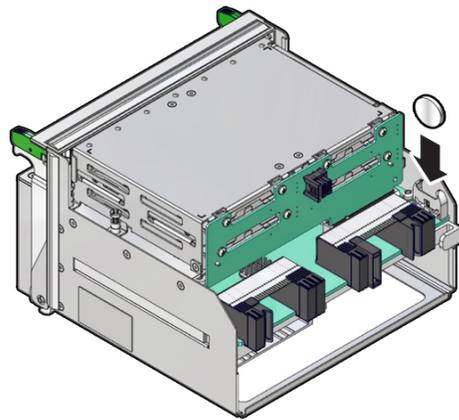
See [Preparing the Server for Component Replacement](#).

2. Remove the SMOD.
See [Remove an SMOD](#).
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](#).
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](#).
12. If necessary, once the server is operational, access the BIOS Setup Utility to set the clock.
See [Setting Up BIOS Configuration Parameters](#).

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 [Systems Management and Diagnostics Documentation](#).
 - Use the BIOS Setup Utility to reprogram the host clock.
Refer to the *Oracle X7 Series Servers Administration Guide* at [Oracle x86 Servers Administration, Diagnostics, and Applications Documentation](#).

 **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 Topics

- [Install an SMOD](#)

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](#).

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](#).
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](#).
3. Remove the failed SMOD.
See [Remove an SMOD](#).
4. Place the failed SMOD in a shipping package.
5. 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](#)
- [Install the FIM](#)

The FIM is a field-replaceable unit (FRU). For more information about FRUs, see [Illustrated Parts Breakdown](#) and [Field-Replaceable Units](#). For component serviceability, locations, and designations, see [Replaceable Components](#).

▲ Caution:

The FIM should be removed and replaced only by authorized Oracle Service personnel.

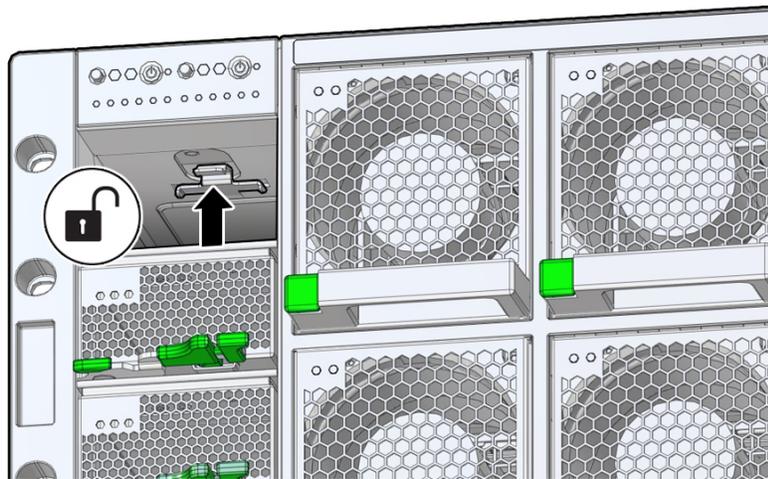
▲ Caution:

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](#).

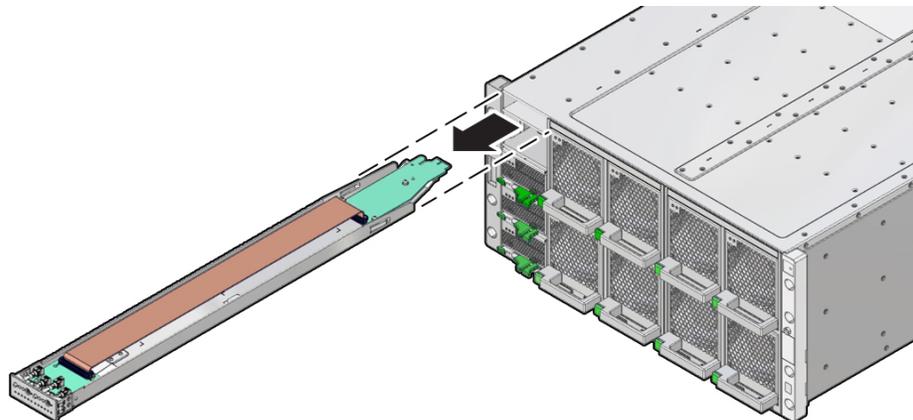
Remove the FIM

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](#).
2. Remove the top power supply (PS3).
See [Remove a Power Supply](#).
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.

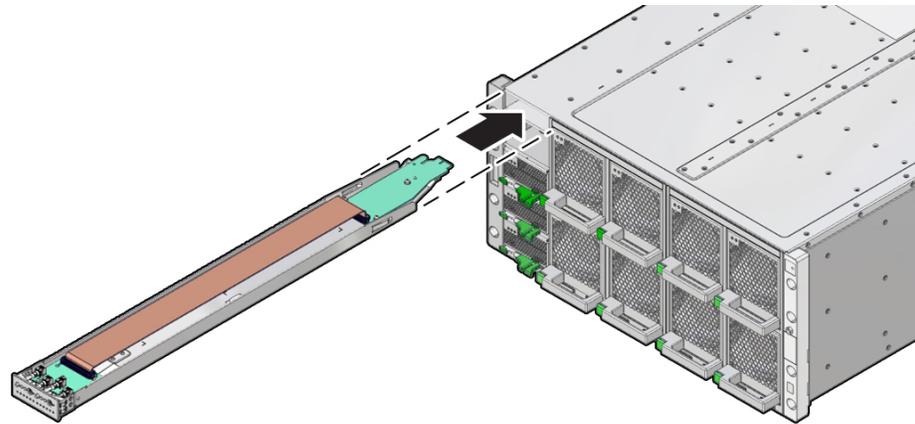


Related Topics

- [Install the FIM](#)

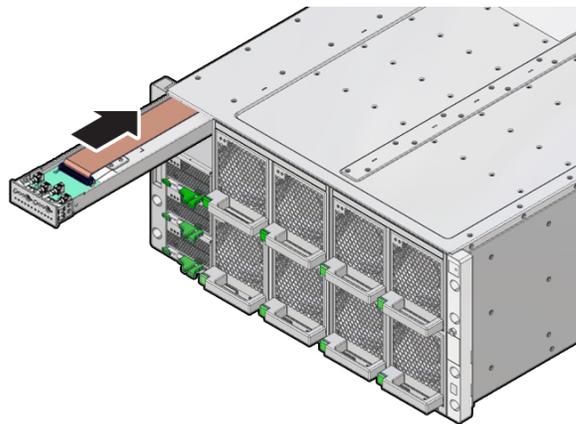
Install the FIM

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](#).
4. Prepare the server for operation.
See [Returning the Server to Operation](#).
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 Topics

- [Clear Hardware Fault Messages \(Oracle ILOM\)](#)

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](#)
- [Install the Midplane Assembly](#)

The midplane assembly is a field-replaceable unit (FRU). For more information about FRUs, see [Illustrated Parts Breakdown](#) and [Field-Replaceable Units](#). For component serviceability, locations, and designations, see [Replaceable Components](#). See [Server Chassis Overview](#).

▲ 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](#).

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](#).

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](#).

For fan designations, see [Replaceable Components](#).

b. Label all CMODs.

Before removing CMODs, label each module and module slot.

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](#).

b. Remove both fan frames.

See [Remove a Fan Frame](#).

c. Remove all CMODs.

See [Remove a CMOD](#).

d. Remove four power supplies, PS0-3.

See [Remove a Power Supply](#).

e. Remove the FIM.

See [Remove the FIM](#).

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](#) and [Replaceable Components](#).

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](#).
 - c. Remove all eight DPCCs.
See [Remove a DPCC](#).
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:

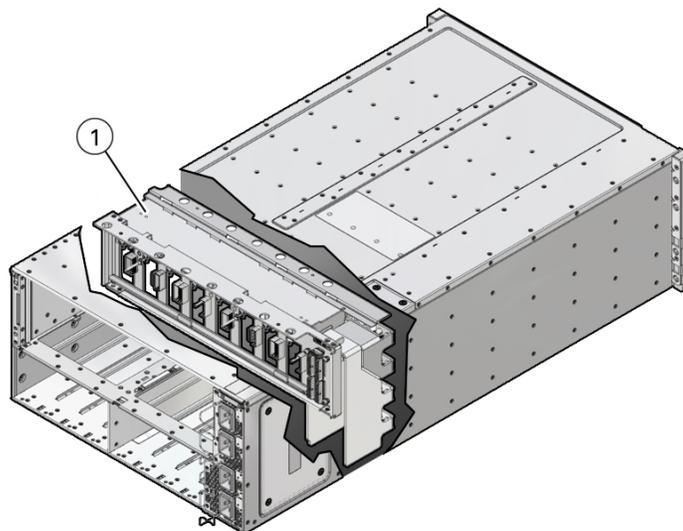
Lifting equipment: Oracle Exadata Database Server X8-8 weighs 114 kg (250 lbs). Only use a mechanical lift to lift and mount the server into the rack enclosure



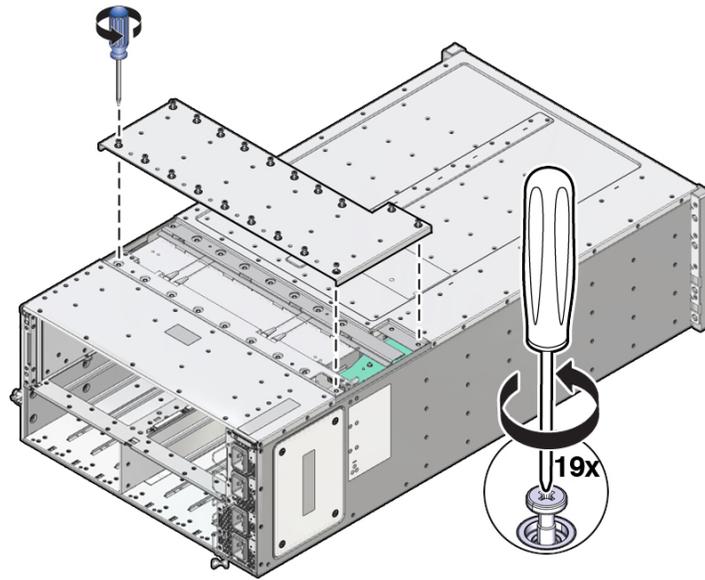
Refer to *Installing the Server Into a Rack* in *Oracle Server X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

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.



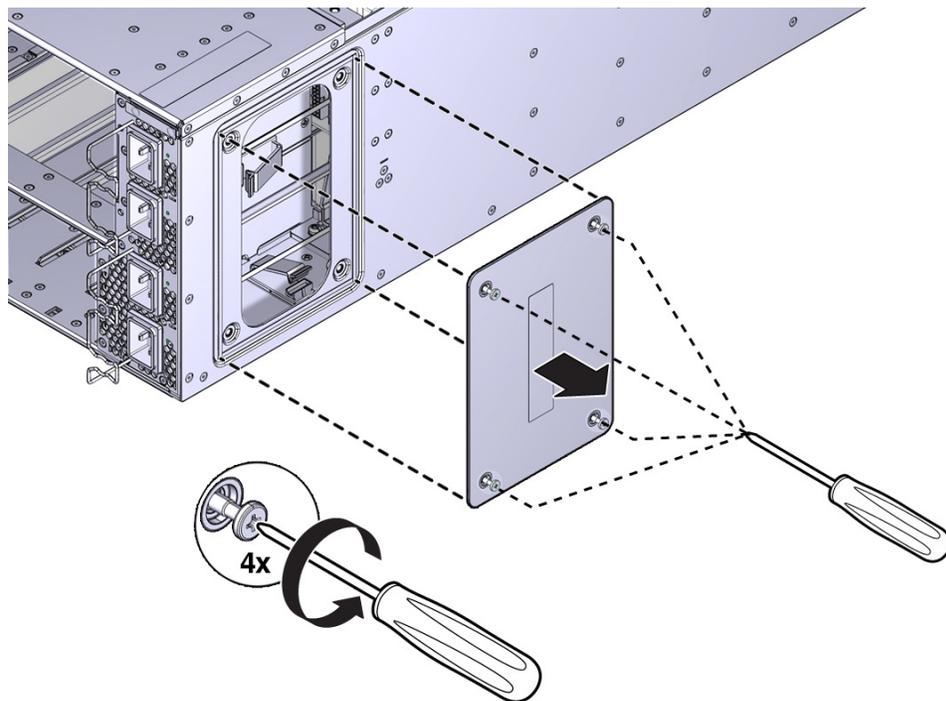
9. Loosen the 19 captive screws on the top access panel and remove the panel.
Use a No. 2 Phillips screwdriver or driver with No. 2 Phillips bit.



10. Carefully remove and retain the protective black plastic insert that covers the top of the midplane assembly.

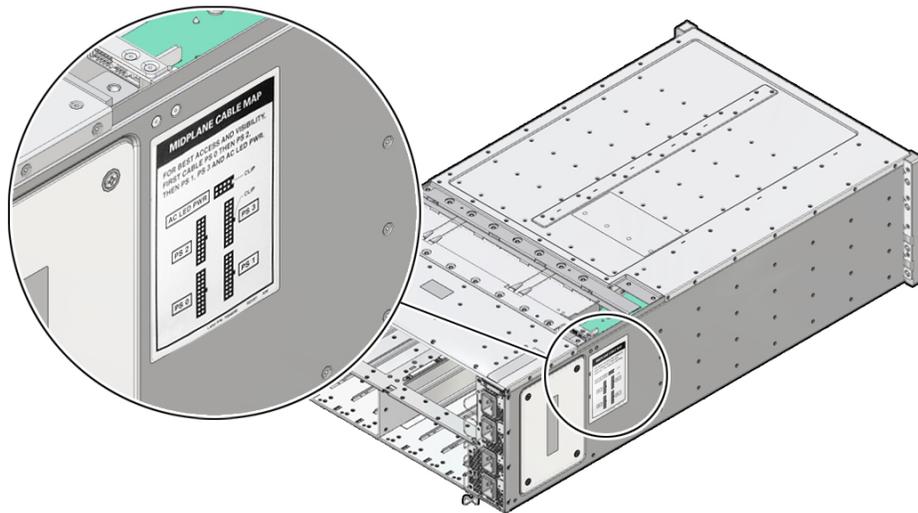
Note the orientation of the insert with respect to the opening. The insert is fitted to the opening using tabs and flaps.

11. Loosen the four captive screws that secure the left side (from the front) access panel and remove the panel.

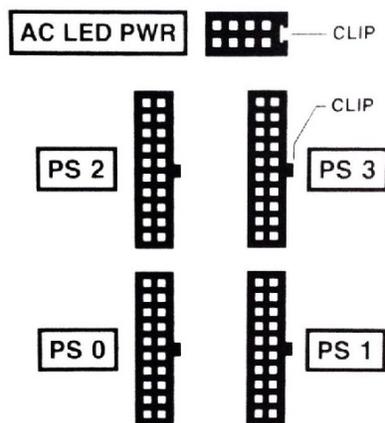


The opening behind the access panel provides access to five cables (four 20-pin PS cables and one 8-pin cable for the AC power indicator LEDs) that are routed through the server and are connected to the backside of the midplane assembly. To remove the midplane assembly, disconnect these connectors. As 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.

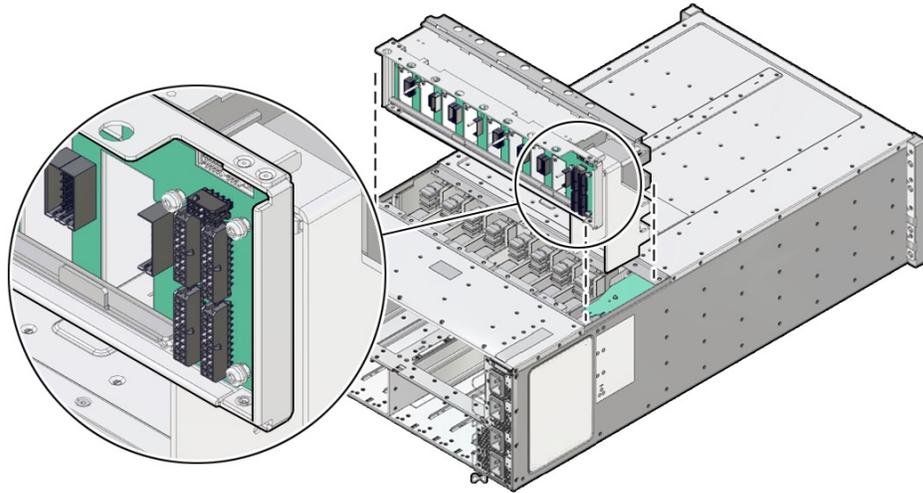


12. Reach into the side access opening and disconnect the five connectors from the back of the midplane assembly.

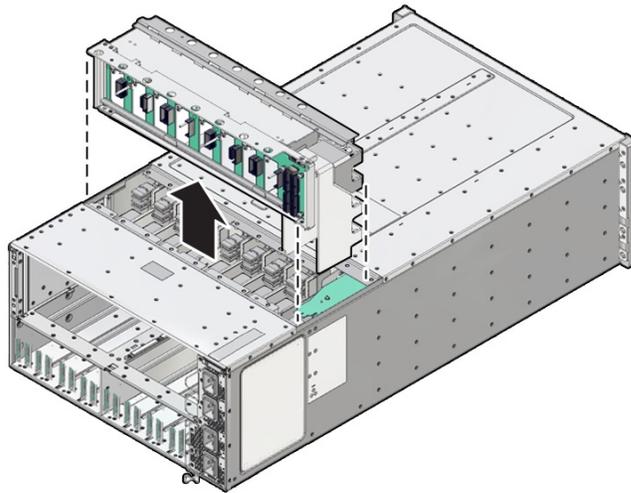
Tip:

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.

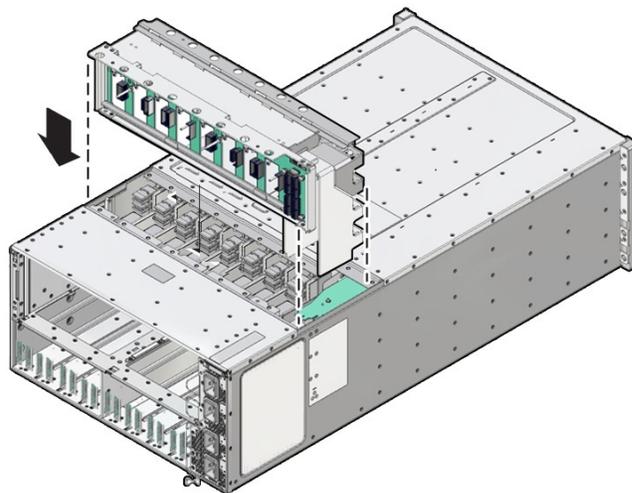
This procedure requires a Phillips screwdriver and a mechanical lift. Do not lift the server manually. Use a mechanical lift instead.

1. Position the cables so the connectors are hanging outside of the server chassis' side access opening.

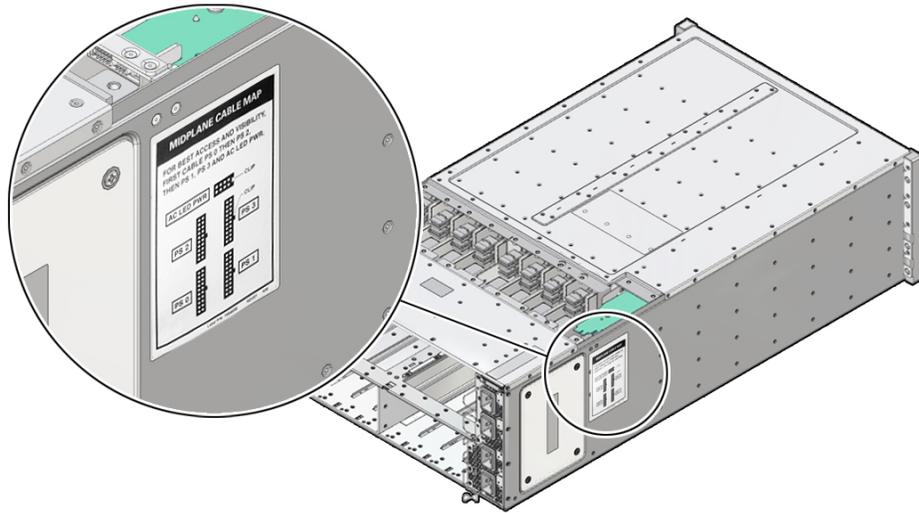
The cables inside the chassis should lie flat, so they are not damaged during the installation of the replacement midplane assembly.

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.

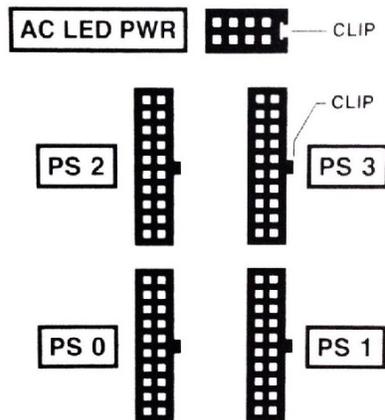
Take care not to damage the cables and connectors when lowering the midplane assembly into the server.



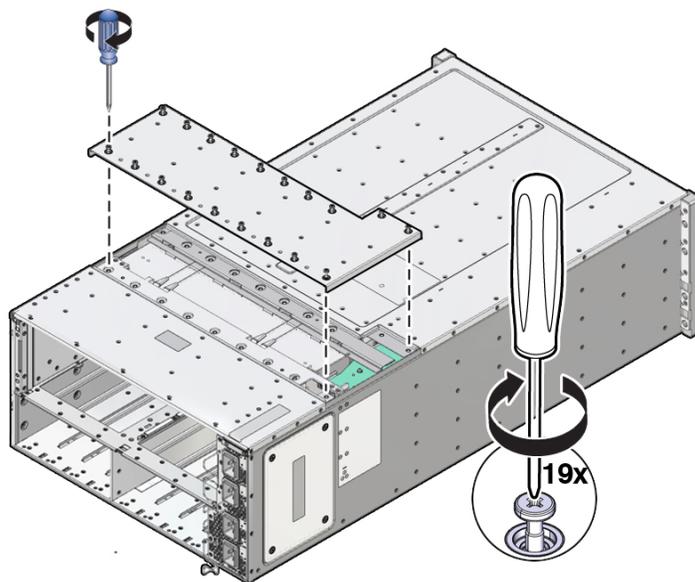
4. Connect the five cables to the connectors on the back of the midplane assembly.
 Ensure that the connectors are positioned correctly, so the key (protrusion) on the side of the connector is aligned with the notch in the connector on the midplane assembly. For best access and visibility, first attach 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 access 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 X8-8 Installation Guide* at [Oracle Server X8-8 Documentation](#).

11. Replace components at the front of the server:

- a. Install the CMODs.
See [Install a CMOD](#).
- b. Install both fan frames.
See [Install a Fan Frame](#).
- c. Install all eight fan modules FM0-7.
See [Install a Fan Module](#).
- d. Install the FIM.
See [Install the FIM](#).
- e. Install the four power supplies PS0-3.
See [Install a Power Supply](#).

12. Replace components at the back of the server:

- a. Install both SMODs.
See [Install an SMOD](#).
- b. Install all eight DPCCs.
See [Install a DPCC](#).
For slot designations, see [Replaceable Components](#).
- c. Attach cables to their respective connectors and ports at back panel of the server.
Install data cables (DPCC and SMOD) before attaching AC power cables to the AC inlets.

13. Prepare the server for operation.

See [Returning the Server to Operation](#).

14. Update the TLI FRUPROM data containers.

Oracle service personnel needs to manually reprogram the FRU containers into FRUPROM0 and FRUPROM1.

6

Returning the Server to Operation

This section provides instructions for returning 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](#)
- [Power On the Server](#)

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](#).

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 \(Oracle ILOM\)](#).

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](#).

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.

7

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](#)
- [Accessing the BIOS Setup Utility](#)
- [Using UEFI BIOS](#)
- [Common BIOS Setup Utility Tasks](#)

Related Topics

- [BIOS Setup Utility Menu Options](#)

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 *Oracle ILOM Administrator's Guide for Configuration and Maintenance Firmware Release 4.0* at [Systems Management and Diagnostics Documentation](#).
- **BIOS Setup Utility** – [Common BIOS Setup Utility Tasks](#)

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](#)
- [BIOS Key Mappings](#)
- [Access BIOS Setup Utility Menus](#)
- [Navigate BIOS Setup Utility Menus](#)

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. |

| Menu | Description |
|-------------|---|
| 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](#) for examples of each of these screens.

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. |

Access BIOS Setup Utility Menus

You can access the BIOS Setup Utility screens from the following interfaces:

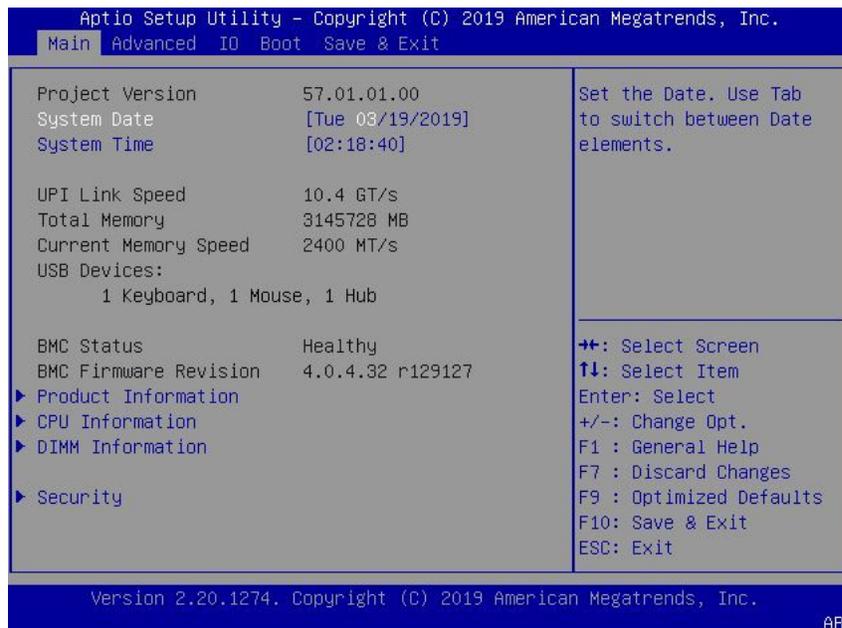
- Use a terminal (or terminal emulator connected to a computer) through the serial port on the back panel of the server.
- Connect to the server using the Oracle ILOM Remote System Console Plus application.

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.



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](#).

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.

Using UEFI BIOS

Oracle Exadata Database Server X8-8 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](#)
- [Configure and Manage BIOS Using Oracle ILOM](#)
- [UEFI Secure Boot](#)
- [Trusted Execution Technology](#)

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 [Systems Management and Diagnostics Documentation](#).

UEFI Secure Boot

Oracle Exadata Database Server X8-8 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](#).

Trusted Execution Technology

Oracle Exadata Database Server X8-8 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](#).

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](#)
- [Select a Temporary Boot Device](#)
- [Configure TPM Support](#)
- [Configure UEFI Driver Settings](#)
- [Configure I/O Resource Allocation](#)
- [Configure UEFI Secure Boot](#)
- [Configure Trusted Execution Technology](#)
- [Exit BIOS Setup Utility](#)

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.

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.

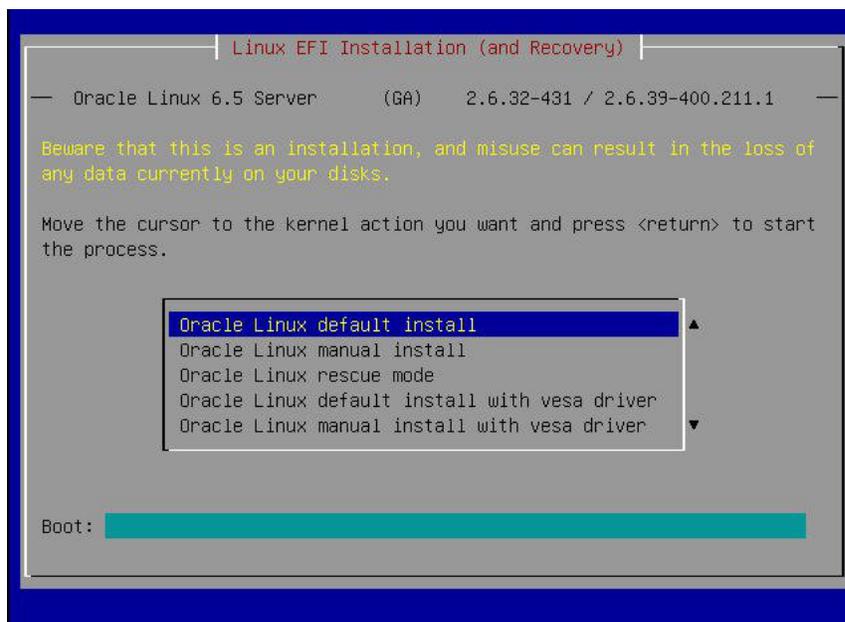
1. Reset or power on the server.

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).



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.

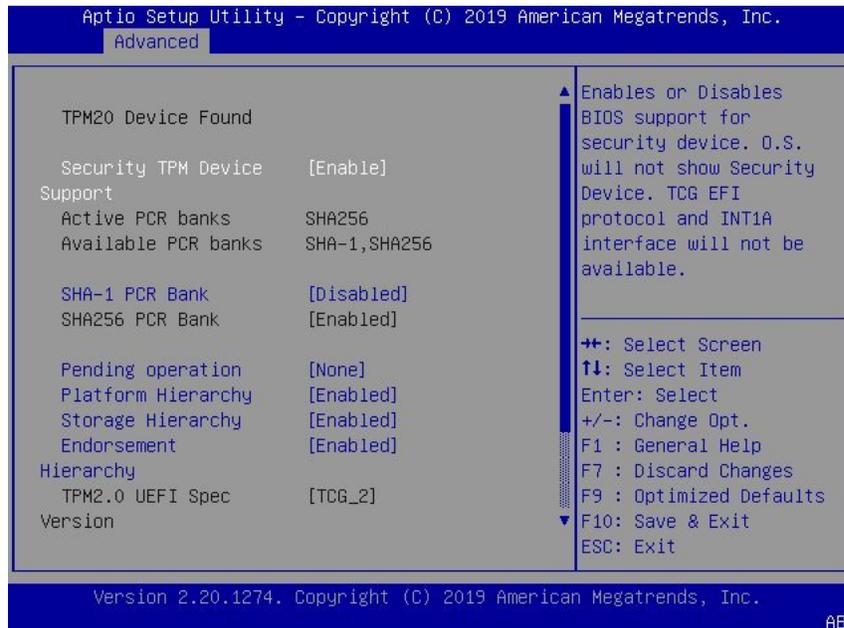
Configure TPM Support

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 Exadata Database Server X8-8. 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.

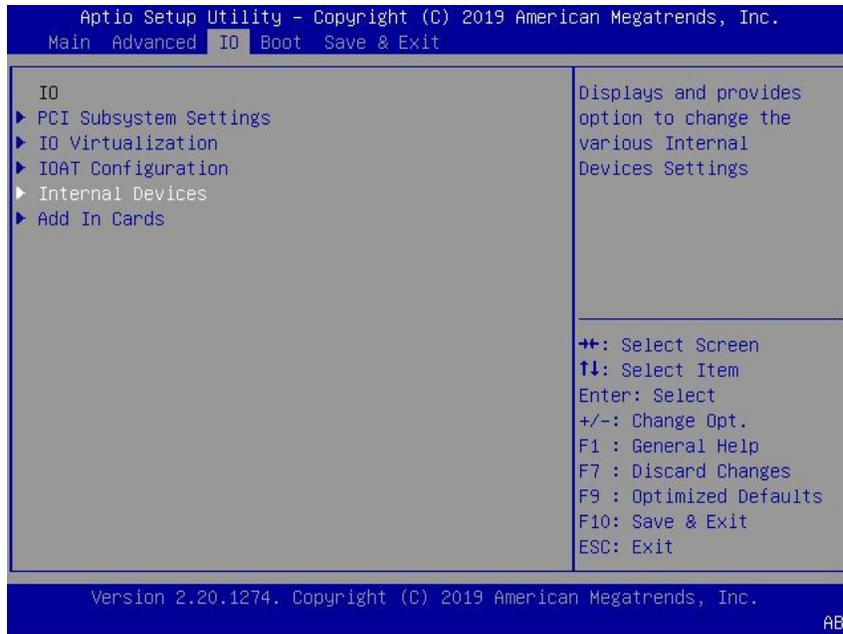
1. Access the BIOS Setup Utility menus.
See [Access BIOS Setup Utility Menus](#).
2. In the BIOS Setup Utility menus, navigate to the Advanced Menu.
3. On the Advanced Menu screen, select Trusted Computing 2.0.



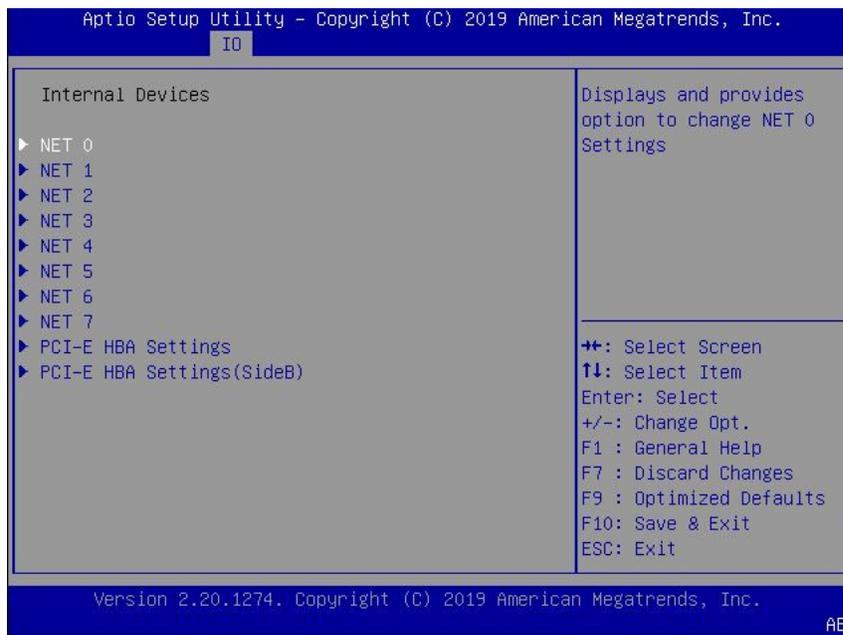
4. On the Trusted Computing 2.0 Configuration screen, select Security TPM Device Support and press Enter. Do one of the following:
 - Select `Disable` to disable Security TPM Device Support.
 - Select `Enable` to enable Security TPM Device Support.
5. Press the F10 key to save the changes and exit the BIOS Setup Utility.

Configure UEFI Driver Settings

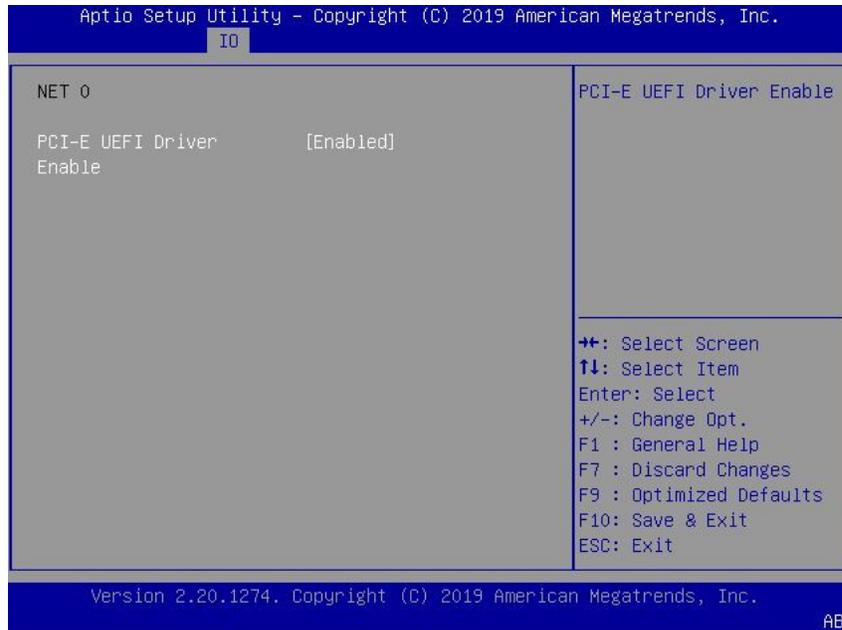
1. Access the BIOS Setup Utility menus.
See [Access BIOS Setup Utility Menus](#).
2. In the BIOS Setup Utility menus, navigate to the IO Menu.



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.



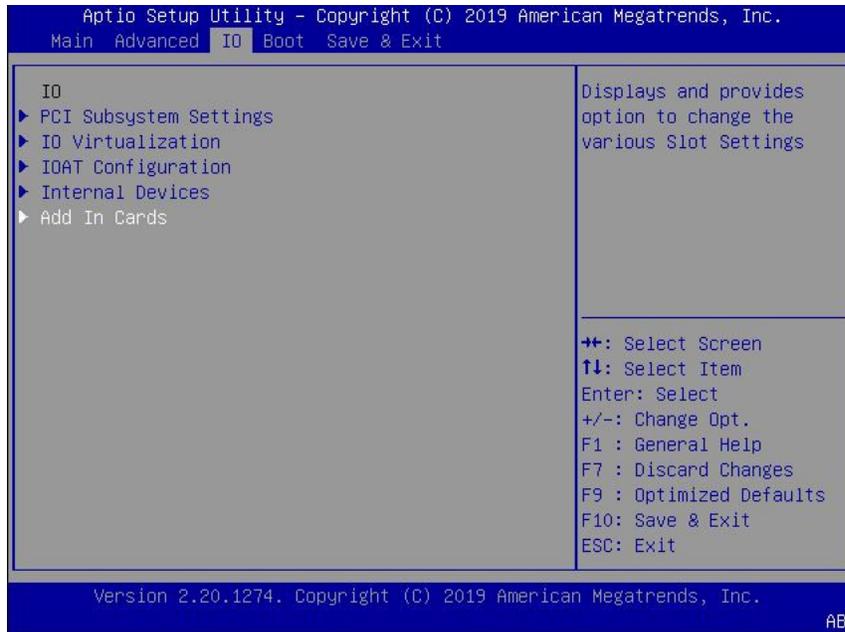
4. On the Internal Devices screen, select the internal device or add In card slot that you want to configure.



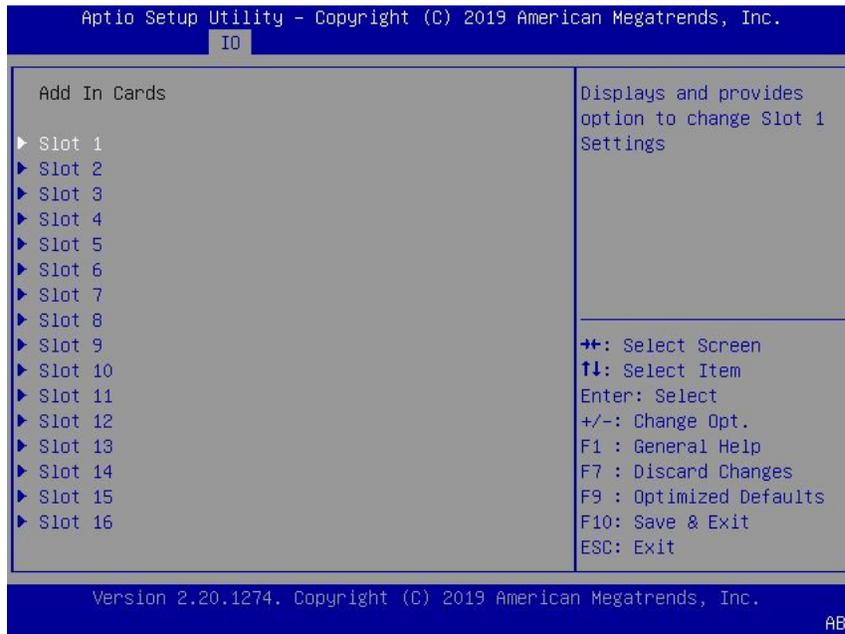
5. On the PCI-E UEFI Driver Enable screen, select PCI-E UEFI Driver Enable and press Enter. Do one of the following:
 - Select Enabled to enable the PCI-E UEFI Driver setting.
 - Select Disabled to disable the PCI-E UEFI Driver setting.
6. Press the F10 key to save the changes and exit the BIOS Setup Utility.

Configure I/O Resource Allocation

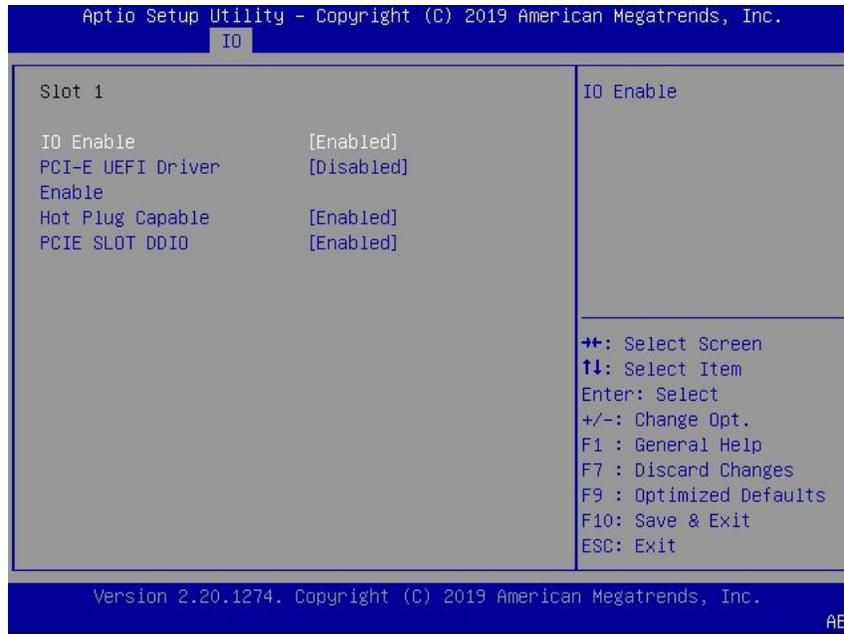
1. Access the BIOS Setup Utility menus.
See [Access BIOS Setup Utility Menus](#).
2. In the BIOS Setup Utility menus, navigate to the IO Menu.



3. On the IO Menu screen, select Add In Cards and press Enter to display the add-in card slots.



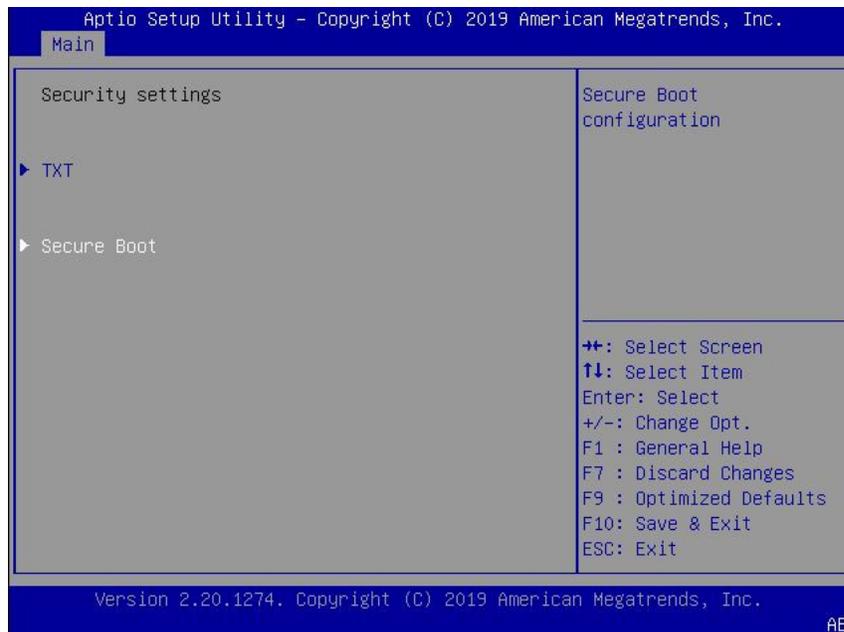
4. On the Add In Cards screen, select the slot in which you want to configure the card and press Enter.



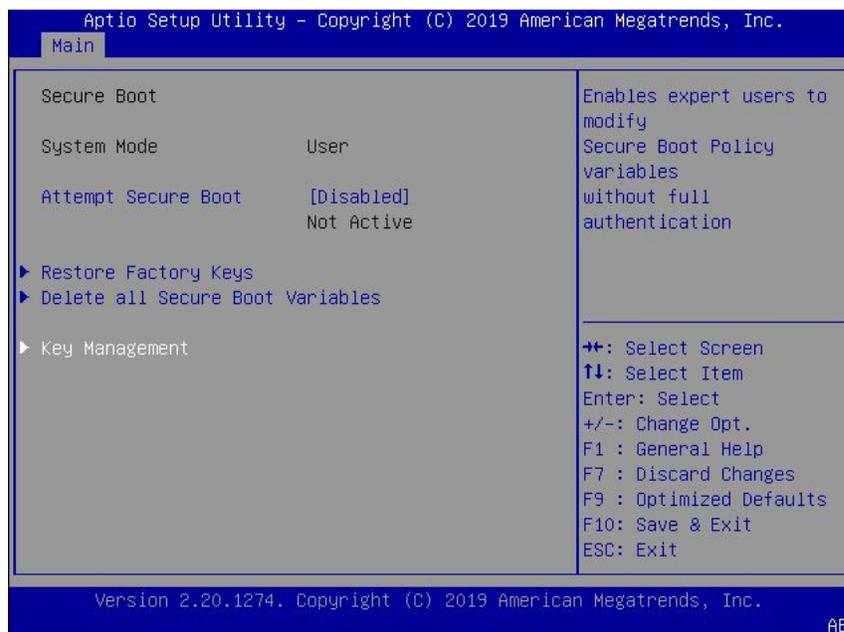
5. On the IO resource allocation screen for that card, select IO Enable and press Enter. Do one of the following:
 - Select Enabled to enable I/O resource allocation for the I/O card.
 - Select Disabled to disable I/O resource allocation for the I/O card.
6. Press the F10 key to save the changes and exit the BIOS Setup Utility.

Configure UEFI Secure Boot

1. Access the BIOS Setup Utility menus.
See [Access BIOS Setup Utility Menus](#).
2. On the Main Menu screen, select Security and press Enter.



3. On the Security Settings screen, select Attempt Secure Boot and press Enter.



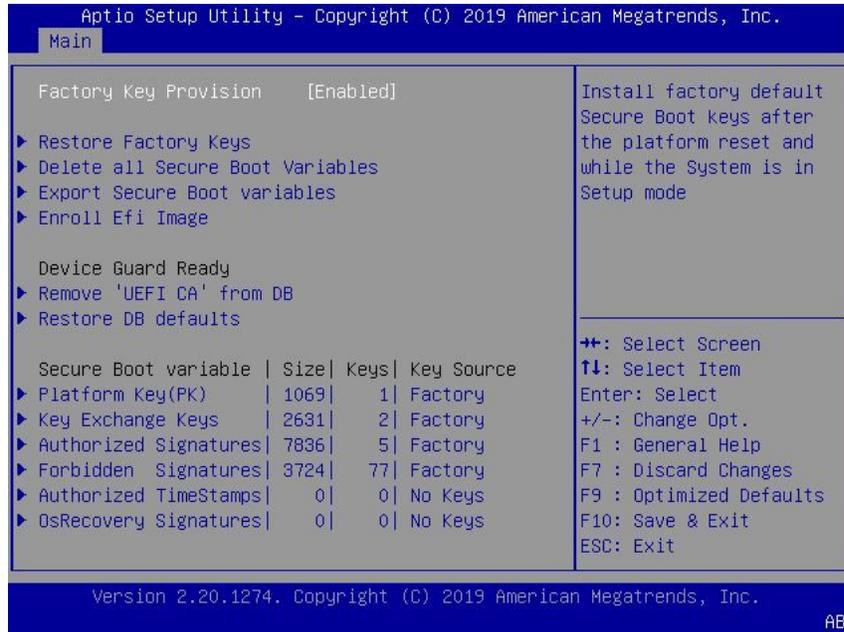
4. On the Secure Boot screen, select Secure Boot and press Enter. Do one of the following:
 - Select **Enabled** to enable UEFI Secure Boot. Continue with the next step to manage policy variables.
 - Select **Disabled** to disable UEFI Secure Boot. Continue with [Step 8](#) to save changes and exit from the BIOS Setup Utility.

When enabled, Secure Boot allows you to manage Secure Boot policy variables.

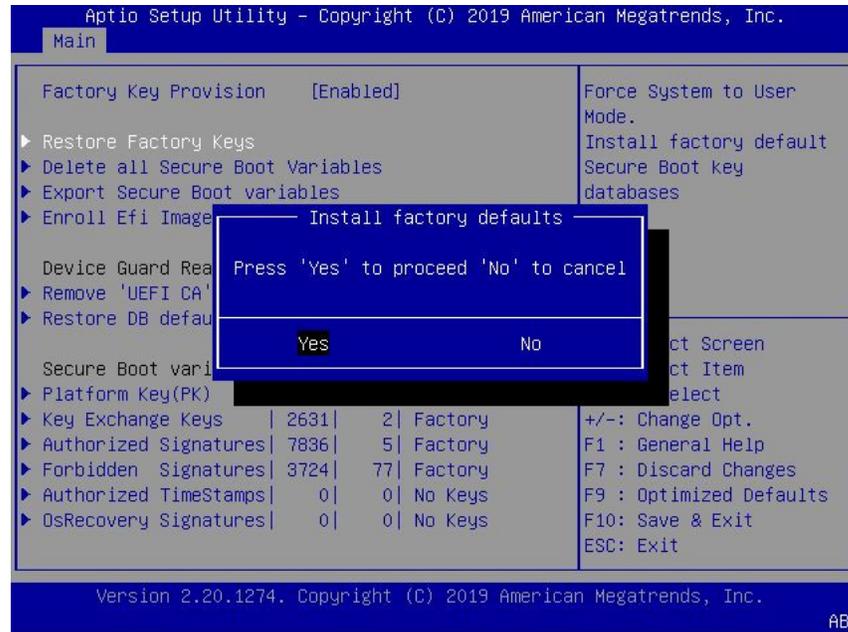
5. To manage Secure Boot policy variables, select Key Management and press Enter.

The Key Management screen provides options to provision factory default Secure Boot keys or to enroll an Extensible Firmware Interface (EFI) image.

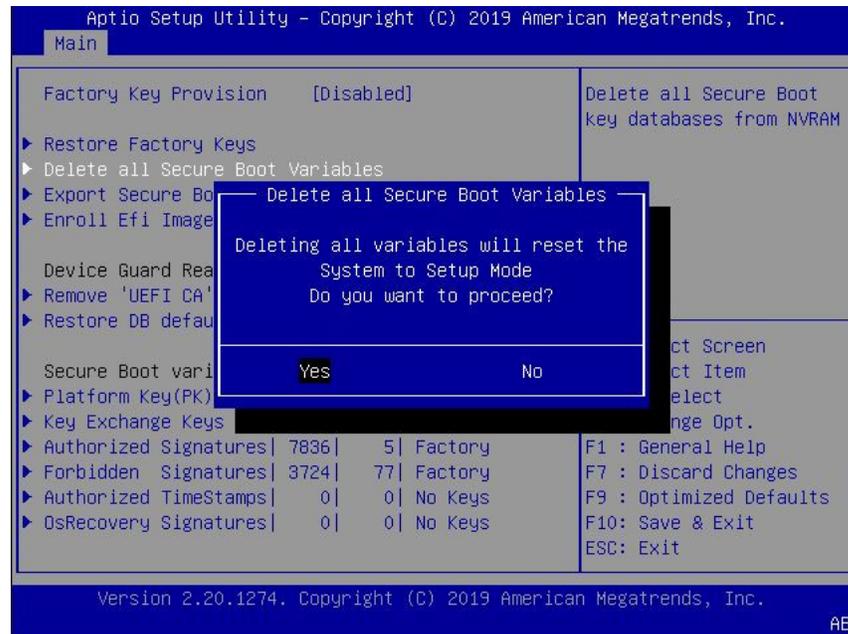
- To provision factory default keys – See [Step 6](#).
- To enroll an EFI image – See [Step 7](#).



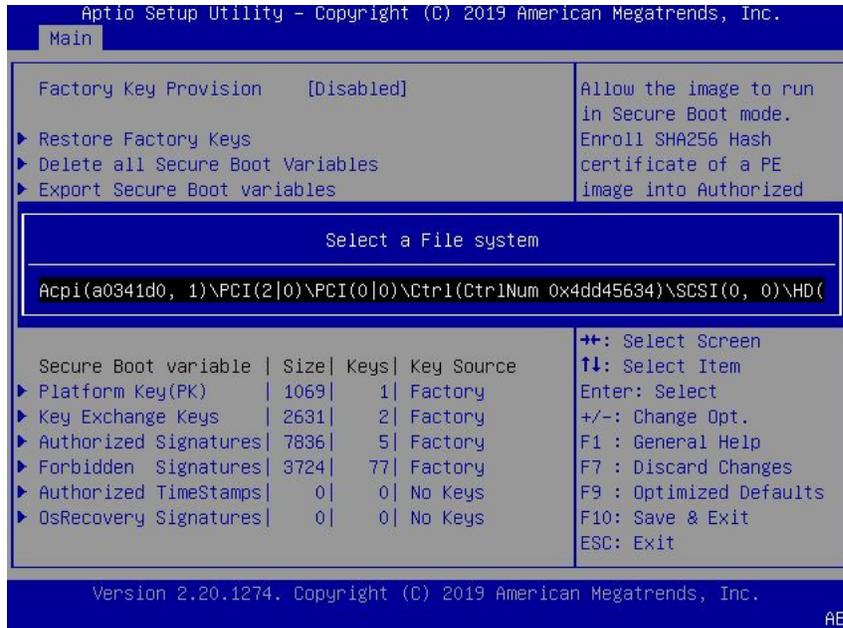
6. If you want to provision factory default keys, select **Factory Key Provision** and press **Enter**. Do one of the following:
 - Select **Enabled** to allow the provisioning of factory default Secure Boot keys when the system is in Setup Mode. When enabled, you can select **Restore Factory Keys** to force the system to User Mode and install all the factory default Secure Boot keys.



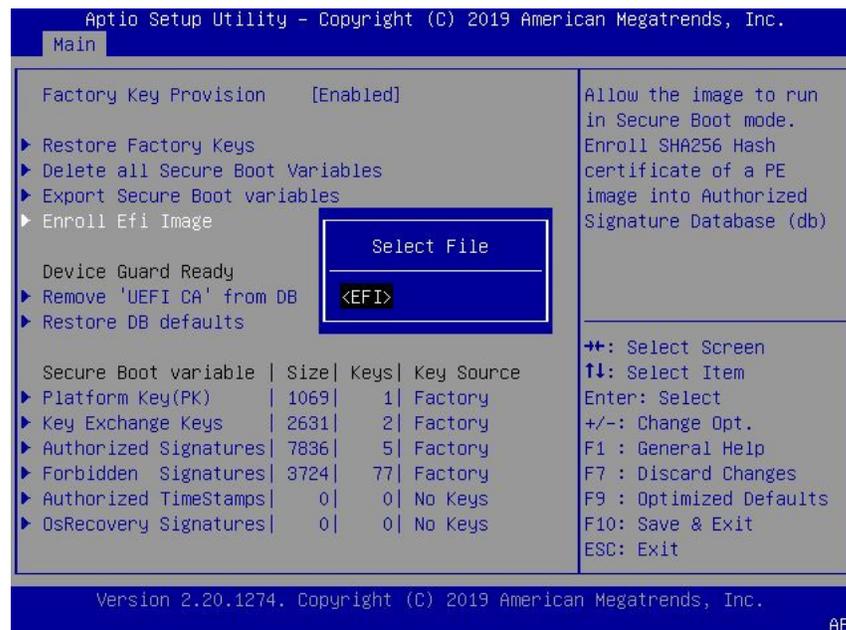
- Select Disabled to disable the provisioning of factory default Secure Boot keys. When disabled, you can select Delete all Secure Boot Variables to remove all Secure Boot keys from the system. Selecting this option also resets the system to Setup Mode.



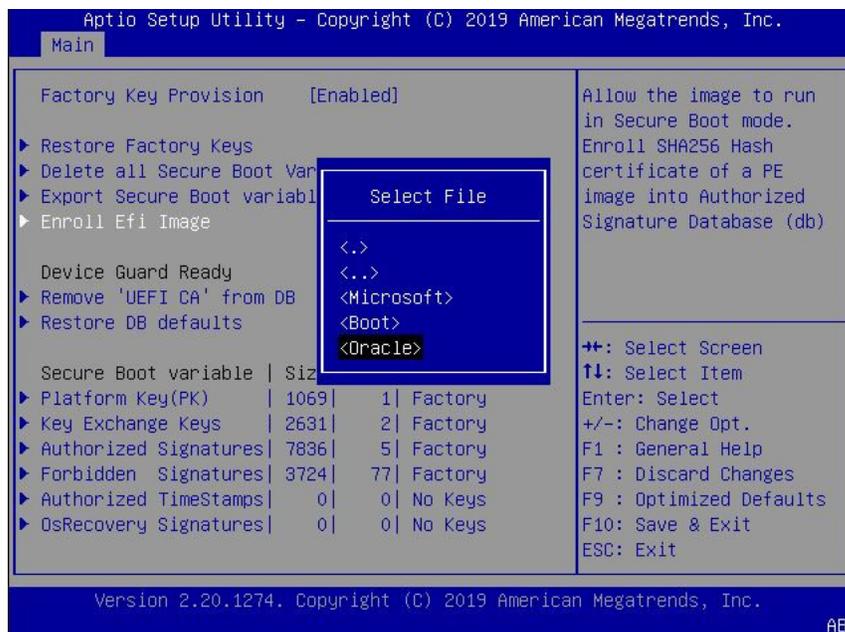
7. If you want to enroll an EFI image, select Enroll Efi Image and press Enter.



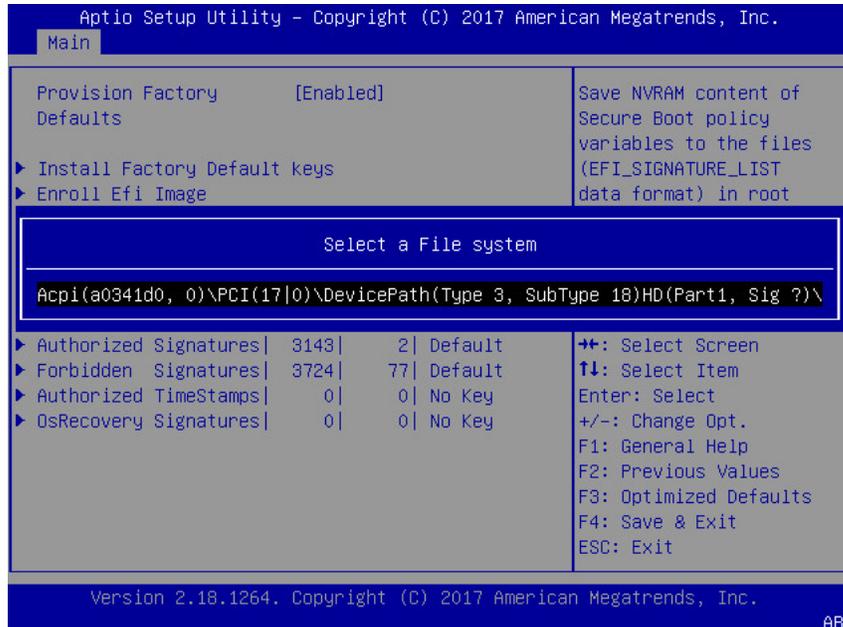
- a. On the Select a File System screen, Scroll through the list and select the file system that contains the EFI file and press Enter.



- 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.

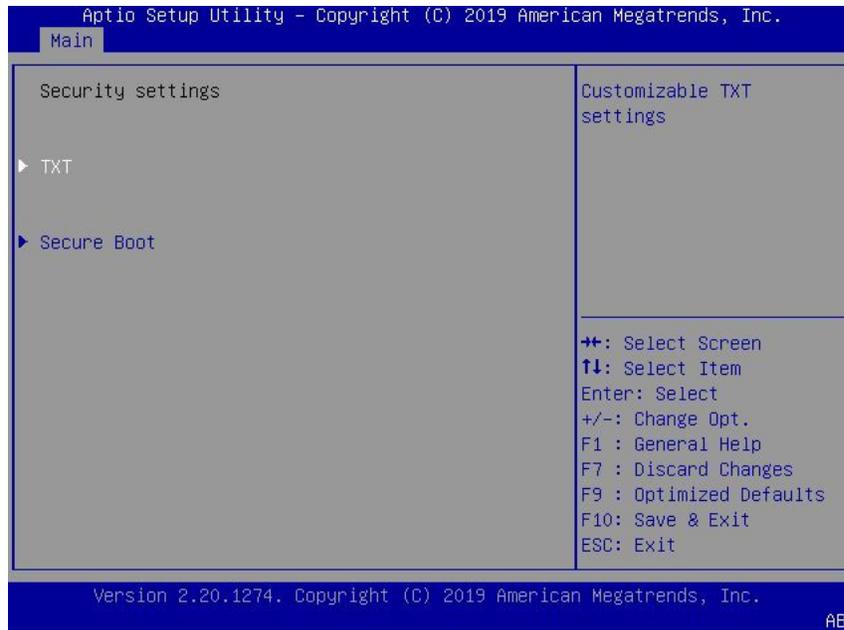
The Secure Boot policy variables are saved to the root folder in the target file system.

8. Press the F10 key to save the changes and exit the BIOS Setup Utility.

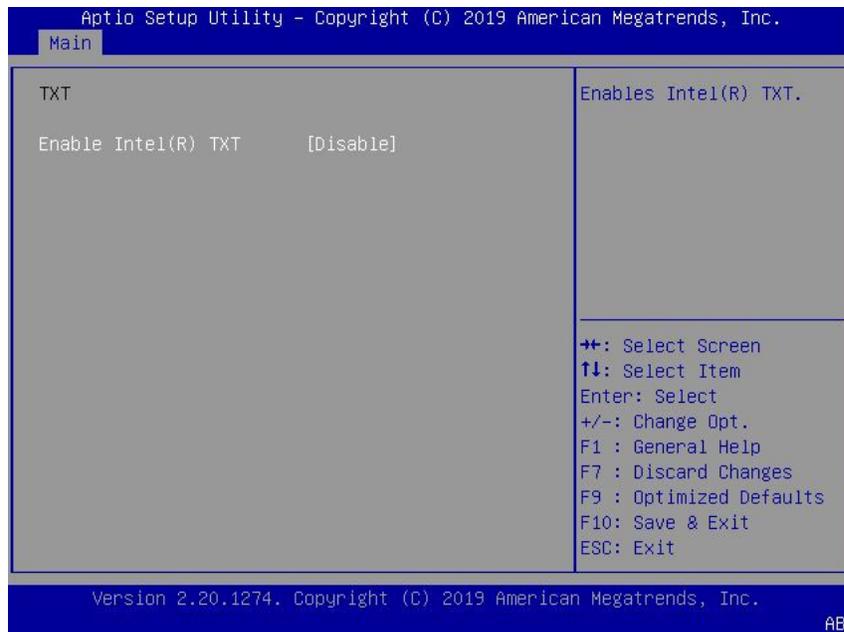
Configure Trusted Execution Technology

The Trusted Platform Module (TPM) feature must be enabled on your server before enabling Trusted Execution Technology (TXT). See [Configure TPM Support](#).

1. Access the BIOS Setup Utility menus.
See [Access BIOS Setup Utility Menus](#).
2. On the Main Menu screen, select Security and press Enter.



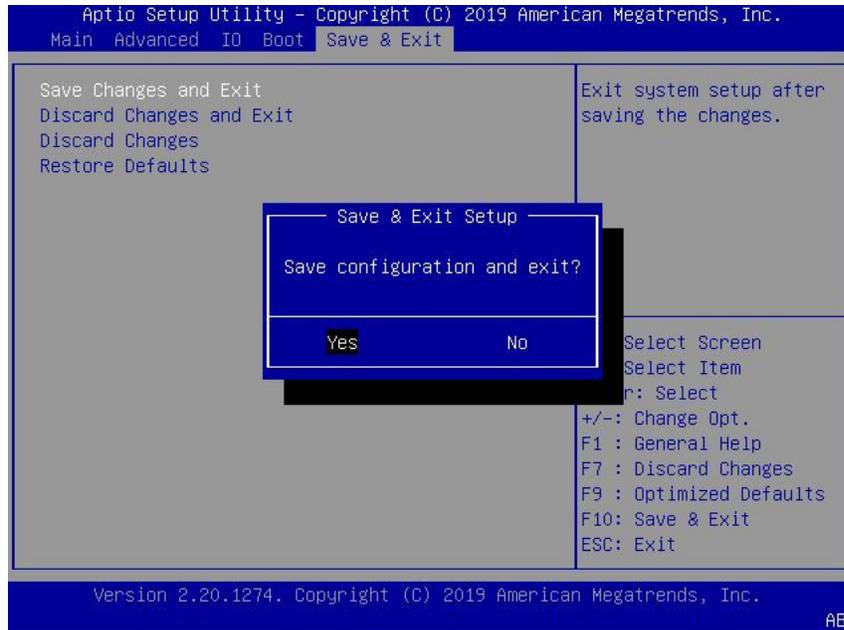
3. On the Security Settings screen, select TXT and press Enter.



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.

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.

8

BIOS Setup Utility Menu Options

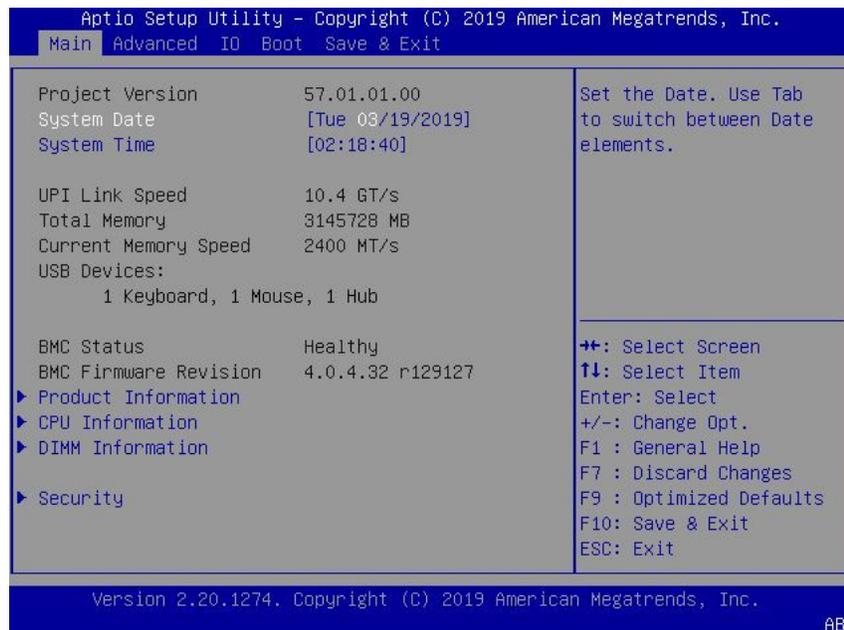
This section includes screens of the main menus in the BIOS Setup Utility for Oracle Exadata Database Server X8-8. Following the screen for each menu is a table of the options available from that menu.

For more information, refer to the *Oracle X8 Series Servers Administration Guide* at [Oracle x86 Servers Administration, Diagnostics, and Applications Documentation](#).

- [BIOS Main Menu Selections](#)
- [BIOS Advanced Menu Selections](#)
- [BIOS IO Menu Selections](#)
- [BIOS Boot Menu Selections](#)
- [BIOS Save and Exit Menu Selections](#)

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) | | | BIOS version is displayed. This string is a unique identifier used to reference a specific BIOS release. Format is XXYYZZPP, which indicates: <ul style="list-style-type: none"> • XX - Unique project/platform code. • YY - BIOS major release. • ZZ - BIOS minor release. • PP - Build number. Example: 57.01.01.00 |
| System Date | | | Current date is displayed. You can change the date setting. Example: [Thu 06/20/2017] |
| System Time | | | Current time is displayed. You can change the time setting. Example: 13:38:27 |
| UPI Link Speed (R/O) | SLOW/ 9.6 GT/s 10.4 GT/s | | Intel UltraPath Interconnect (UPI) operational speed is displayed. The 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 X8-8 |
| 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." |

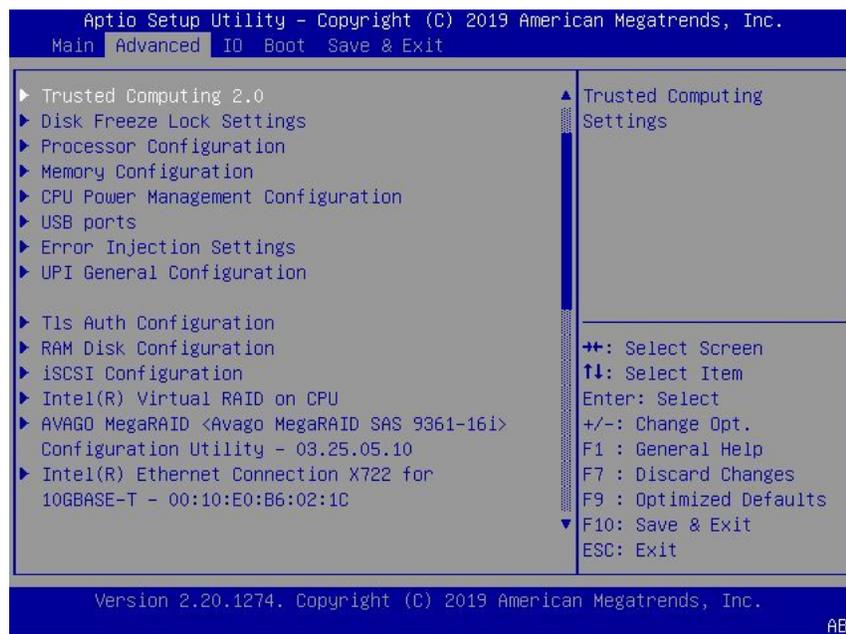
| Setup Options | Options | Defaults | Description |
|--|---------------------------------|----------|---|
| Intel Xeon Platinum 8268 CPU @ 2.90GHz | | | Processor ID brand is displayed. |
| CPU Signature | | | Processor information is displayed. Example: 50654 |
| Microcode Patch | | | Software update (microcode patch) information is displayed. Example: 2000026 |
| Max CPU Speed | | | Maximum non-turbo speed of the processor is displayed. Example: 2900 MHz |
| Min CPU Speed | | | Minimum speed of the processor is displayed. Example: 1200 MHz |
| Max Processor Cores | | | Number of available processor cores is displayed. Example: 24 |
| 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 24 |
| L1 Code Cache | | | Example: 32 KB x 24 |
| L2 Cache | | | Example: 1024 KB x 24 |
| L3 Cache | | | Example: 36608 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. |

| Setup Options | Options | Defaults | Description |
|----------------------------------|------------------------------------|----------|---|
| 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. |
| Restore Factory Keys | Yes/No | | Forces system to User mode. Installs factory default Secure Boot key databases. |
| Delete all Secure Boot Variables | Yes/No | | Deletes all Secure Boot key databases from NVRAM. |
| Key Management | | | Enables expert users to modify Secure Boot Policy variables without full authentication. |
| Factory Key Provision | Disabled/Enabled | Disabled | Allows the provisioning of factory default Secure Boot keys when the system is in Setup Mode. |
| Restore Factory Keys | Yes/No | | Forces system to User mode. Installs factory default Secure Boot key databases. |
| Delete all Secure Boot variables | Yes/No | | Deletes all Secure Boot key databases from NVRAM. |
| Export Secure Boot Variables | Select a file system | | Copies the NVRAM content of Secure Boot variables to files in a root folder on a file system device. |
| Enroll Efi Image | | | Enrolls an EFI image to run in Secure Boot mode. |
| Device Guard Ready | | | |
| Remove 'UEFI CA' from DB | Yes/No | | Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database (db). |
| Restore DB defaults | Yes/No | | Restores DB variable to factory defaults. |
| 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/ Erase | | Enroll factory defaults or load certificates from a file. |
| Key Exchange Keys | Save to File/Set New/ Append/Erase | | Enroll factory defaults or load certificates from a file. |
| Authorized Signatures | Save to File/Set New/ Append/Erase | | Enroll factory defaults or load certificates from a file. |
| Forbidden Signatures | Save to File/Set New/ Append/Erase | | 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/Erase | | Enroll factory defaults or load certificates from a file. |

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 Serial Port Console Redirection Options](#)
- [BIOS Advanced Menu Network Stack Configuration Options](#)
- [BIOS Advanced Menu NVMe Configuration Options](#)
- [BIOS Advanced Menu Primary Video Selection Options](#)
- [BIOS Advanced Menu Trusted Computing 2.0 Options](#)
- [BIOS Advanced Menu Disk Freeze Lock Settings Option](#)
- [BIOS Advanced Menu Processor Configuration Options](#)
- [BIOS Advanced Menu Memory Configuration Options](#)
- [BIOS Advanced Menu CPU Power Management Configuration Options](#)
- [BIOS Advanced Menu USB Ports Options](#)
- [BIOS Advanced Menu Error Injection Settings Option](#)
- [BIOS Advanced Menu UPI General Configuration Options](#)
- [BIOS Advanced Menu T1s Auth Configuration Options](#)
- [BIOS Advanced Menu RAM Disk Configuration Options](#)
- [BIOS Advanced Menu iSCSI Configuration Options](#)
- [BIOS Advanced Menu Intel Virtual RAID on CPU Options](#)
- [BIOS Advanced Menu Gigabit Network Connection Options](#)
- [BIOS Advanced Menu Driver Health Options](#)

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. |
| 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 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. |
| 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 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. |

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. |
| 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 | 256G | Selects the allocation size used to assign memory-mapped I/O (MMIO) resources. Total MMIO space can be up to 32x granularity. |
| Volatile Memory Mode | 1LM/2LM/Auto | Auto | Selects whether 1LM or 2LM memory mode should be enabled for Data Center Persistent Memory Modules (DCPMMs). |

| Setup Option | Options | Defaults | Description |
|----------------------|------------------|----------|---|
| DDR4 2933MHZ Support | Disabled/Enabled | Disabled | Enable or disable DDR4 2933MHZ support. |

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 (UFS) | Enabled/Disabled | Disabled | Enable/disable Uncore Frequency Scaling (USF). |
| Hardware P-States | Disabled Native Mode Out of Band | Native Mode | Select the Hardware P-State. Disable chooses a P-State based on operating system request (Legacy P-States). Native Mode chooses a P-State based on OS guidance. Out of Band lets hardware autonomously choose the P-State (no OS guidance). |

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 UPI General Configuration Options

The following table describes the BIOS Advanced Menu UPI general configuration options.

| Setup Options | Options | Defaults | Description |
|------------------------|-------------------------------------|----------|---|
| Local/Remote Threshold | Disable/Auto/Low/Medium/High/Custom | Auto | Selects the local/remote threshold setting. |

BIOS Advanced Menu T1s Auth Configuration Options

The following table describes the BIOS Advanced Menu T1s Auth configuration options.

| Setup Options | Options | Defaults | Description |
|--------------------------------|-------------------------|----------|--|
| Server CA Configuration | | | Configures Server CA. |
| Enroll Cert | | | Enroll Cert using a selected file, enter a Cert ID, then commit changes and exit, or discard changes and exit. |
| Enroll Cert Using File | Select a storage device | | |
| Cert GUID | | | Enter a digital character in 11111111-2222-3333-4444-1234567890ab format. |

| Setup Options | Options | Defaults | Description |
|----------------------------------|---------|----------|-----------------------------|
| Commit Changes and Exit | | | Commits changes and exits. |
| Discard Changes and Exit | | | Discards changes and exits. |
| Delete Cert | Yes/No | | Deletes Cert. |
| Client Cert Configuration | | | |

BIOS Advanced Menu RAM Disk Configuration Options

The following table describes the BIOS Advanced Menu RAM disk configuration options.

| Setup Options | Options | Defaults | Description |
|-----------------------------|----------------------------|----------|--|
| Disk Memory Type | Boot Service Data Reserved | | Specifies the type of memory to use from available memory pool in system to create a disk. |
| Create raw | | | Creates a raw RAM disk. |
| Size (Hex): | | | Enter a valid RAM disk size. The disk size should be multiples of the RAM disk block size. |
| Create & Exit | | | Creates the new RAM disk with the given starting and ending address. |
| Discard & Exit | | | Discards changes and exits |
| Create from file | Select Storage Device | | Creates a RAM disk from a given file. |
| Remove selected RAM disk(s) | | | Removes the selected RAM disk(s). |

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. |

| Setup Options | Options | Defaults | Description |
|---------------------------------|------------------------------|---|--|
| 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 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 Intel Virtual RAID on CPU Options

The following table describes the BIOS Advanced Menu virtual RAID on CPU options.

| Setup Options | Options | Defaults | Description |
|--|---------|----------|--|
| No RAID volumes on the system | | | Information is displayed only when Virtual RAID on CPU is enabled. |
| No Intel VMD Controllers on the system | | | Information is displayed only when Virtual RAID on CPU is enabled. |

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: xxxxxxx-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. |
| MAC Address (R/O) | NA | NA | Lists the MAC address of the network interface controller (NIC). |

| Setup Options | Options | Defaults | Description |
|---------------------------|---------|----------|--|
| 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.



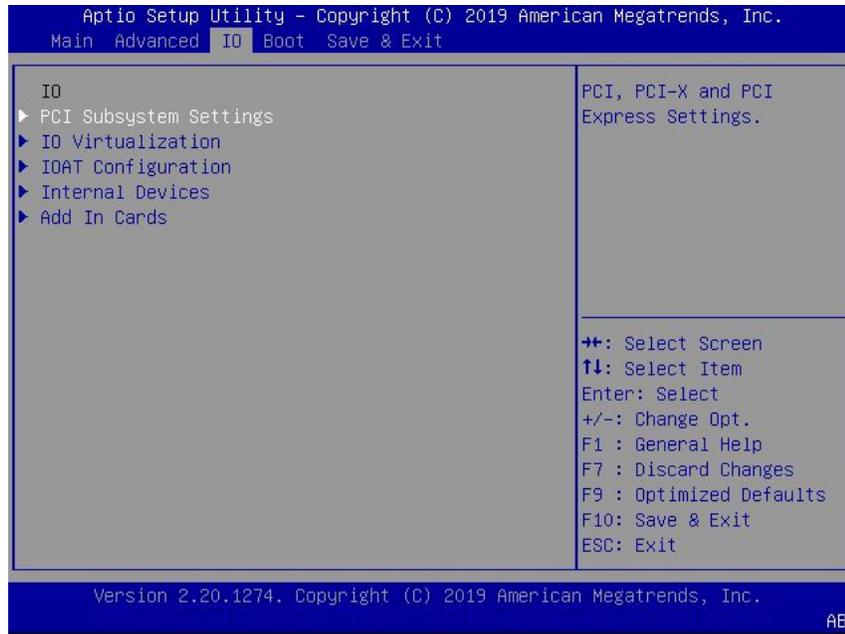
Note:

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. |
| Broadcom NXE Gigabit Ethernet Driver (R/O) | | Healthy | Lists the health status of drivers/controllers. |
| Intel DCPMM Driver | | Healthy | Lists the health status of drivers/controllers. |
| Intel 40GbE Driver | | 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 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](#)
- [BIOS IO Menu IO Virtualization Options](#)
- [BIOS IO Menu IOAT Configuration Options](#)
- [BIOS IO Menu Internal Devices Options](#)
- [BIOS IO Menu Add-in Cards Options](#)

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. |
| 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 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. |

| Setup Options | Options | Defaults | Description |
|-----------------------------------|------------------|----------|--|
| 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. |

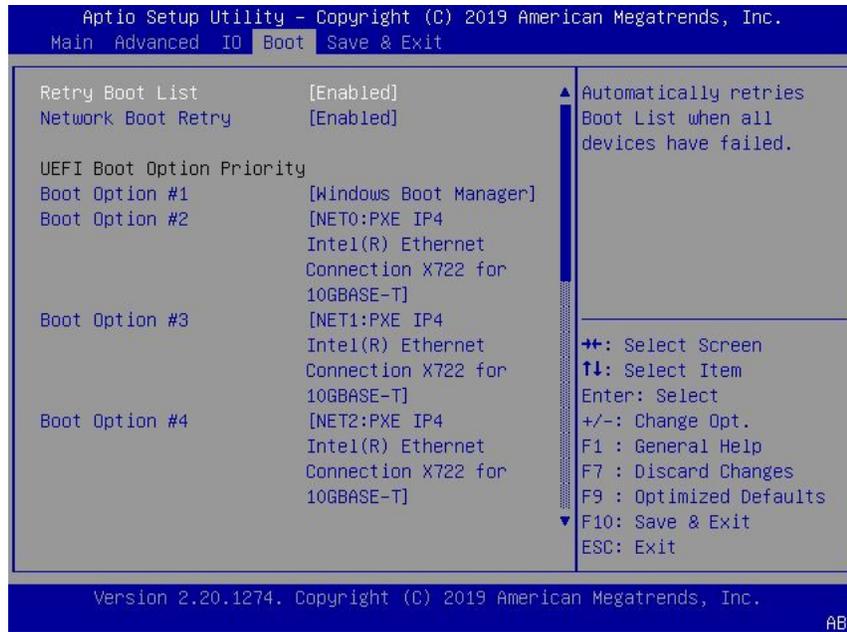
BIOS IO Menu Add-in Cards Options

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. |
| PCIE SLOT DDIO | Disabled/Enabled | Enabled | Enable or disable DDIO Use_Allocating_Flow_WR for this slot. |
| Slot 2 through Slot 16 | | | Same description as Slot 1. |

BIOS Boot Menu Selections

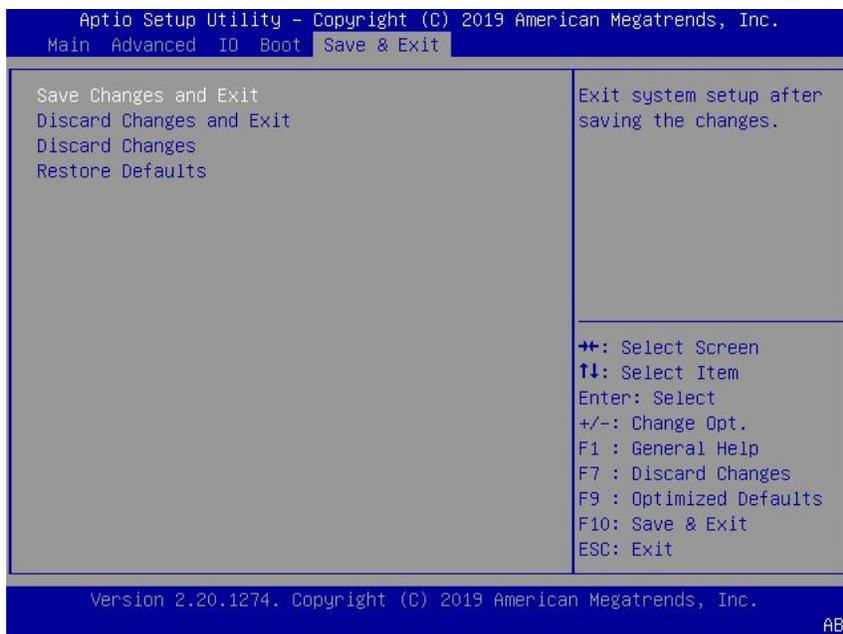
This section includes a screen of the BIOS Boot Menu. The options that are available from the Boot Menu are described in the table that follows.



| 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. |

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. |

9

Monitoring and Identifying Server Components

This section includes information about monitoring and identifying components for the Oracle Exadata Database Server X8-8.

- [Monitoring Component Health and Faults Using Oracle ILOM](#)
- [Monitoring System Components](#)
- [System Components \(FRUs\) Network Access Control \(NAC\) Names](#)
- [System Indicators Network Access Control \(NAC\) Names](#)
- [System Sensors Network Access Control \(NAC\) Names](#)

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](#) and [System Indicators Network Access Control \(NAC\) Names](#).
- 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* at [Systems Management and Diagnostics Documentation](#).
- 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* at [Systems Management and Diagnostics Documentation](#).

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* at [Systems Management and Diagnostics Documentation](#).

Monitoring System Components

This section includes information for the following server components:

- [System FRU Component NAC Names](#)
- [System Indicator NAC Names](#)

- [System Sensor NAC Names](#)

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 Exadata Database Server X8-8.

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 [Systems Management and Diagnostics Documentation](#).

System FRU Component 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) |

| Name (8-Socket 1x8) | System A Name (Dual 4-Socket 2x4-A Side) | System B Name (Dual 4-Socket 2x4-B Side) | Description |
|-------------------------------|--|--|---|
| /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 |
| /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 Indicator 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. |

| Name (1x8) | System A Name (2x4-A Side) | System B Name (2x4-B Side) | Description |
|---|---|---|---|
| /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 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. |

| 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/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/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]/SERVICEFM (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 Sensor 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 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 |

| Name (1x8) | System A Name (2x4-A Side) | System B Name (2x4-B Side) | Description |
|-------------------------------------|-------------------------------------|-------------------------------------|--|
| /SYS/CMOD[0-7]/PRSNT | /SYS/CMOD[0-3]/PRSNT | /SYS/CMOD[4-7]/PRSNT | Discrete CPU module motherboard presence. 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 |

| Name (1x8) | System A Name (2x4-A Side) | System B Name (2x4-B Side) | Description |
|-------------------------|----------------------------|----------------------------|---|
| /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 |

Index

A

- AC power block
 - indicators, [3-21](#)
- AC power inlet locations, [5-9](#)
- add-in cards
 - configuration utilities in UEFI BIOS, [7-4](#)
- Advanced BIOS screen, [8-4](#)
- antistatic measures
 - mat, [4-1](#)
 - removing, [6-1](#)
 - wrist strap, [4-1](#)
- assign serial port output
 - Oracle ILOM CLI, [3-39](#)
 - Oracle ILOM web interface, [3-40](#)
- attaching devices to server, [3-37](#)
- ATTN buttons
 - dual PCIe card carrier (DPCC), [5-15](#)
- Auto Service Request, [3-42](#)

B

- back panel
 - connecting cables, [3-38](#)
- backplanes, storage drive, [1-18](#)
- battery
 - installing, [5-57](#)
 - location, [1-16](#)
 - removing, [5-56](#)
 - serviceability, [1-10](#)
 - system, replacing, [5-55](#)
- BIOS
 - configuring serial port sharing, [3-39](#)
 - Ethernet ports booting priority, [3-40](#)
 - factory defaults, verifying, [7-5](#)
- BIOS Setup Utility
 - accessing, [7-1](#), [7-2](#)
 - Advanced screen, [8-4](#)
 - Boot screen, [8-18](#)
 - configuration management, [7-1](#)
 - exiting from, [7-19](#)
 - function keys, [7-2](#)
 - IO screen, [8-15](#)
 - Main screen, [8-1](#)
 - menus, accessing, [7-2](#)

- BIOS Setup Utility (*continued*)
 - navigating menu options, [7-3](#)
 - Save and Exit screen, [8-19](#)
 - setup screens summary, [7-1](#)
 - shortcut key sequences, [7-2](#)
 - TPM support, [7-7](#)
 - UEFI BIOS, [7-4](#)
- boot device, selecting, [7-6](#)
- buttons
 - ATTN, [5-15](#)
 - CMOD fault remind, [1-22](#), [3-7](#)
 - fault remind, [5-33](#)
 - host reset, [1-22](#)
 - back panel, [3-25](#)
 - Locate Button/LED, [1-22](#), [3-12](#), [3-24](#), [4-9](#)
 - NMI, [1-22](#)
 - back panel, [3-25](#)
 - On/Standby, [1-22](#), [3-12](#)
 - Power, [4-7](#)
 - SP reset, [1-22](#)
 - back panel, [3-25](#)

C

- carrier
 - dual PCIe card carrier (DPCC), [5-14](#)
 - processors, [1-11](#)
- charge status indicator, [3-7](#)
- chassis
 - features, [1-19](#)
 - front panel components, [1-20](#)
 - internal components, [1-19](#)
 - overview, [1-18](#)
- clearing faults, [3-5](#)
- CMOD
 - shipping, [5-41](#)
- command-line interface (CLI), Oracle ILOM
 - controlling Locate Button/LED indicator, [4-10](#)
- complete power removal, [4-5](#), [4-8](#)
- component
 - back panel, [1-5](#)
 - back panel accessible, [1-21](#)
 - chassis front panel accessible, [1-20](#)
 - chassis internal components, [1-19](#)
 - CPU module (CMOD), [1-11](#)

component (*continued*)

- DIMMs, [1-13](#)
- field-replaceable units (FRUs), [9-2](#)
- filler panels, [4-11](#)
- front panel, [1-3](#)
- identification, [1-7](#)
- indicators, [9-3](#)
- locations, [1-7](#)
- monitoring, [9-1](#)
- monitoring faults, [9-1](#)
- processors, [1-12](#)
- replaceable, [1-7](#)
- serviceability requirements, [1-9](#), [1-10](#)
- SMOD, [1-15](#), [1-16](#)
- system sensors, [9-5](#)
- connecting
 - back panel, [3-38](#)
 - devices to server, [3-37](#)
 - external cables, [3-37](#)
- contacting support, [3-41](#)
- controls, [3-22](#)
 - back panel, [1-3](#), [1-5](#), [3-22](#)
 - front panel, [1-3](#), [3-22](#)
 - Locate Button/LED indicator, [4-11](#)
 - CLI, [4-10](#)
- cooling
 - fan modules, [3-34](#)
 - subsystem, [3-33](#)
 - zones, [3-33](#)
- CPU module (CMOD)
 - components, [1-11](#)
 - cover, removing and installing, [5-28](#), [5-29](#)
 - description, [1-11](#)
 - fan module power supply, [1-14](#)
 - fault remind circuit, [1-11](#)
 - installing, [5-30](#)
 - memory, [1-11](#), [1-13](#)
 - memory slot locations, [5-44](#)
 - overview, [1-11](#)
 - processors, [1-11](#), [1-12](#)
 - removing, [5-26](#)
 - rules, [5-25](#)
 - service, [5-24](#)
 - slot designations, [5-24](#)
- customer-replaceable units (CRUs)
 - description, [1-9](#)
 - serviceability, [1-9](#)

D

diagnostics

- server, [3-1](#)
- tools, [3-10](#)

DIMMs

- fault LEDs
 - inconsistencies with BIOS, [5-46](#)
- identifying a faulty DIMM, [5-46](#)
- installing, [5-48](#)
- overview, [1-13](#)
- physical layout, [5-44](#)
- population rules, [5-45](#)
- population scenarios, [5-45](#)
- removing, [5-46](#)
- replacing, [5-46](#)
- service, [5-43](#)
- serviceability, [1-10](#)
- slot location, [1-11](#)
- slot locations, [5-44](#)
- slot numbering, [5-44](#)
- speeds, [5-45](#)
- supported configurations, [5-45](#)
- disk drive backplanes
 - serviceability, [1-10](#)
- DPCC
 - dual PCIe card carrier (DPCC), [5-17](#)
 - serviceability, [1-9](#)
- dual PCIe card carrier (DPCC)
 - indicator panels, [5-17](#)
 - indicators, [3-20](#)
 - installing components, [5-22](#)
 - location, [1-21](#), [3-37](#)
 - overview, [5-15](#), [5-17](#)
 - population rules, [5-17](#)
 - removing, [5-17](#)
 - service, [5-14](#)
 - slot locations, [5-15](#)
 - slots, [5-16](#)

E

- electrostatic discharge (ESD) prevention
 - measures, [4-1](#)
- energy storage module (ESM)
 - location, [1-16](#)
- equipment and tools
 - required for service, [4-3](#)
- ESM extension cable
 - location, [1-16](#)
- Ethernet
 - connecting cables, [3-37](#)
 - port device naming, [3-40](#)
- Ethernet ports
 - booting priority, [3-40](#)
 - device and driver naming, [3-40](#)
- exploded view of server, [1-7](#)

F

- fan frame
 - installing, [5-7](#)
 - removing, [5-6](#)
 - service, [5-1](#)
 - serviceability, [1-9](#)
- fan modules
 - cooling, [3-33](#)
 - designations, [5-1](#)
 - fault, [3-25](#)
 - indicators, [3-15](#)
 - installing, [5-4](#)
 - power, [3-34](#)
 - redundancy, [3-35](#)
 - removing, [5-2](#)
 - service, [5-1](#)
 - serviceability, [1-9](#)
 - warning, [4-2](#)
- fault
 - fan modules, [3-25](#)
 - memory, [3-25](#)
 - over-temperature, [3-25](#)
 - power supply (PS), [3-25](#)
 - processors, [3-25](#)
 - service processor (SP), [3-25](#)
- fault management shell
 - Oracle ILOM, [3-5](#)
- fault remind button
 - identifying failed processors, [5-33](#)
 - location, [5-33](#)
- fault remind circuit, [1-11](#)
- faults
 - clearing, [3-5](#)
 - fmadm tool, [3-5](#)
 - server, [3-1](#)
- features
 - chassis, [1-19](#)
 - component, [1-1](#)
- field-replaceable units (FRUs)
 - components, [9-2](#)
 - description, [1-9](#)
 - NAC names, [9-2](#)
 - serviceability, [1-10](#)
- front indicator module (FIM)
 - installing, [5-61](#)
 - location, [3-12](#)
 - removing, [5-60](#)
 - service, [5-60](#)
 - serviceability, [1-10](#)
- function keys within BIOS Setup Utility, [7-2](#)

G

- graceful power off, [4-5](#), [4-8](#)

H

- heatsink and processor
 - location, [1-11](#)
 - help, getting, [3-41](#)
 - host
 - reset button, [1-22](#)
 - host bus adapter (HBA)
 - location, [1-16](#)
 - host reset button, [3-25](#)
-
- I**
- illustrated parts breakdown, [1-7](#)
 - immediate power off, [4-5](#), [4-8](#)
 - indicators, [3-22](#)
 - AC power block, [3-21](#)
 - back panel, [1-5](#), [1-22](#), [3-22](#)
 - blink rates, [3-26](#)
 - charge status, [3-7](#)
 - DPCC, [3-20](#)
 - dual PCIe card carrier (DPCC), [5-17](#)
 - fan modules, [3-15](#)
 - Fault-Service Required
 - front panel, [3-12](#)
 - FIM, [3-12](#)
 - front panel, [1-3](#), [3-22](#)
 - HBA, [1-22](#)
 - Locate Button/LED, [1-22](#), [3-24](#), [4-10](#)
 - front panel, [3-12](#)
 - Locate Button/LED indicator, [4-11](#)
 - NAC names, [9-3](#)
 - normal operating state, [3-23](#)
 - Overtemperature, [3-12](#)
 - Power OK, [1-22](#)
 - front panel, [3-12](#)
 - power supply (PS), [3-16](#), [5-9](#)
 - SMOD, [1-22](#)
 - SP, [1-22](#)
 - front panel, [3-12](#)
 - system module (SMOD), [3-17](#)
 - test, [3-25](#)
 - troubleshooting, [3-12](#)
 - installation task overview, [2-1](#)
 - installing components
 - battery, [5-57](#)
 - CMOD, [5-30](#)
 - CMOD cover, [5-29](#)
 - DIMMs, [5-48](#)
 - DPCC, [5-22](#)
 - fan frame, [5-7](#)
 - fan modules, [5-4](#)
 - FIM, [5-61](#)
 - midplane assembly, [5-68](#)
 - PCIe card, [5-20](#)

installing components (*continued*)
 power supply (PS), [5-13](#)
 processors, [5-37](#)
 SMOD, [5-54](#)
 internal USB flash drives
 serviceability, [1-10](#)
 IO allocation
 enabling and disabling resources, [7-10](#)
 IO BIOS screen, [8-15](#)
 IPMI type, [9-1](#)

L

LEDs
 power supply (PS), [5-9](#)
 See indicators., [3-12](#)
 test, [3-25](#)
 Locate Button/LED indicator
 controlling, [4-11](#)
 CLI, [4-10](#)
 controlling the Locate Button/LED indicator,
[4-10](#)
 managing, [4-9](#)
 LRDIMMs
 service, [5-43](#)

M

Main BIOS screen, [8-1](#)
 Main power, [4-8](#)
 memory
 description, [1-13](#)
 fault, [3-25](#)
 replacing, [5-43](#)
 service, [5-43](#)
 slot locations, [5-44](#)
 menus, BIOS Setup Utility, [7-2](#)
 midplane assembly
 installing, [5-68](#)
 removing, [5-63](#)
 service, [5-63](#)
 serviceability, [1-10](#)
 monitoring
 component faults, [9-1](#)
 components, [9-1](#)
 motherboard assembly
 serviceability, [1-10](#)

N

NAC names, [9-2](#)
 Network Time Protocol (NTP), [5-57](#)
 NMI
 reset button, [1-22](#)
 NMI button, [3-25](#)

O

on-board test circuit, [3-7](#)
 Oracle Integrated Lights Out Manager (ILOM)
 assign serial port output
 CLI, [3-39](#)
 web interface, [3-40](#)
 controlling the Locate Button/LED indicator,
[4-10](#)
 fault management shell, [3-5](#)
 key identity properties (KIP) for FRUID auto-
 update feature, [4-2](#)
 over-temperature
 fault, [3-25](#)
 overview
 back panel components, [1-21](#)
 chassis, [1-18](#)
 CMOD, [1-11](#)
 front panel components, [1-20](#)
 server, [1-1](#)
 SMOD, [1-15](#)

P

PCIe cards
 installing components, [5-20](#)
 overview, [5-15](#)
 population rules, [5-17](#)
 removing, [5-19](#)
 service, [5-14](#)
 serviceability, [1-9](#)
 slot locations, [5-15](#)
 slot numbering, [5-15](#)
 slots, [5-16](#)
 power
 button, [4-7](#)
 modes, shutdowns, and resets, [4-8](#)
 removal, [4-5](#)
 subsystem, [3-31](#)
 power supply (PS)
 fault, [3-25](#)
 indicators, [3-16](#)
 installing, [5-13](#)
 LEDs, [5-9](#)
 locations, [5-8](#)
 overview, [5-9](#)
 removing, [5-10](#)
 service, [5-8](#)
 serviceability, [1-9](#)
 powering off server
 emergency, [4-7](#)
 graceful power off, [4-5](#)
 immediate power off, [4-5](#)
 immediately, using Oracle ILOM CLI, [4-5](#)

powering off server (*continued*)
 immediately, using Oracle ILOM web interface, [4-6](#)
 immediately, using the Power button, [4-7](#)
 power removal, [4-8](#)
 server OS, [4-7](#)

powering on server
 using Oracle ILOM CLI, [6-2](#)
 using Oracle ILOM web interface, [6-2](#)

processor-heatsink module
 socket cover, [5-41](#)

processors
 fault, [3-25](#)
 identification, [5-33](#)
 identifying faulty processor, [5-33](#)
 installing, [5-37](#)
 maximum DIMMs supported, [5-45](#)
 overview, [1-12](#)
 physical layout, [5-44](#)
 processor heatsink module (PHM), [1-11](#)
 removing, [5-33](#)
 replacing, [5-32](#)
 service, [5-32](#)
 serviceability, [1-10](#)
 supported, [1-1](#)

R

RDIMMs
 service, [5-43](#)

removing
 antistatic measures, [6-1](#)
 CMOD cover, [5-28](#)
 power, completely, [4-5](#), [4-8](#)

removing components
 battery, [5-56](#)
 CMOD, [5-26](#)
 DIMMs, [5-46](#)
 DPCC, [5-17](#)
 fan frame, [5-6](#)
 fan modules, [5-2](#)
 FIM, [5-60](#)
 midplane assembly, [5-63](#)
 PCIe card, [5-19](#)
 power supply (PS), [5-10](#)
 processors, [5-33](#)
 SMOD, [5-52](#)

replacing components
 DIMMs, [5-46](#)
 memory, [5-43](#)
 processors, [5-32](#)
 SMOD, [5-51](#)
 system battery, [5-55](#)

reset server
 cold, [4-8](#)

reset server (*continued*)
 warm, [4-8](#)

RTC battery, replacing, [5-55](#)

S

safety symbols, [4-1](#)

SAS cables
 location, [1-16](#)
 serviceability, [1-10](#)

Save and Exit BIOS screen, [8-19](#)

screens, BIOS Setup Utility, [7-1](#), [7-2](#)

serial number, locating, [3-41](#)

server
 Auto Service Request, [3-42](#)
 boot process, [3-23](#)
 contacting support, [3-41](#)
 description, [1-1](#)
 diagnostics, [3-1](#)
 faults, [3-1](#)
 powering off immediately, using the Power button, [4-7](#)
 prepare the server for servicing, [4-1](#)
 returning server to operation, [6-1](#)
 serial number, locating, [3-41](#)
 troubleshooting, [3-1](#), [3-10](#), [3-12](#)
 troubleshooting hardware faults, [3-2](#)

server boot process
 LEDs, [3-23](#)

service
 cold, [1-9](#)
 CPU module (CMOD), [5-24](#)
 fan frames, [5-1](#)
 fan modules, [5-1](#)
 front indicator module (FIM), [5-60](#)
 hot, [1-9](#)
 memory (DIMMs), [5-43](#)
 midplane assembly, [5-63](#)
 PCIe cards, [5-14](#)
 power supply (PS), [5-8](#)
 processors (CPUs), [5-32](#)
 SMOD, [5-51](#)
 warm, [1-9](#)

service processor (SP), [1-18](#)
 fault, [3-25](#)
 reset button, [1-22](#), [3-25](#)
 service, hot, warm, or cold, [1-9](#), [1-10](#)
 serviceability requirements, [1-9](#), [1-10](#)
 shortcut key sequences, BIOS Setup Utility, [7-2](#)

SMOD
 shipping, [5-59](#)

Standby power, [4-7](#), [4-8](#)

static prevention
 antistatic mat, [4-1](#)
 antistatic wrist strap, [4-1](#)

storage drive
 backplanes, [1-18](#)
 serviceability, [1-9](#)

subsystem
 cooling subsystem, [3-33](#)
 I/O subsystem, [3-36](#)
 memory subsystem, [3-30](#)
 networking subsystem, [3-35](#)
 PCI devices subsystem, [3-36](#)
 power subsystem, [3-31](#)
 processor subsystem, [3-30](#)

support, product, [3-41](#)

switches, [1-22](#)
 host reset
 back panel, [3-25](#)
 SP reset
 back panel, [3-25](#)

system
 battery, replacing, [5-55](#)
 components, [9-3](#)
 components and nomenclature, [9-1](#)
 NAC names, [9-5](#)
 sensors, [9-5](#)
 status indicators, front, [3-12](#)

system module (SMOD)
 components, [1-16](#)
 indicators and switches, [3-17](#)
 installing, [5-54](#)
 motherboard, [1-18](#)
 overview, [1-15](#)
 population rules, [5-52](#)
 removing, [5-52](#)
 replacing, [5-51](#)
 service, [5-51](#)

system module (SMOD) (*continued*)

T

technical support, [3-41](#)
 test circuit, [3-7](#)
 thermal interface material (TIM), [1-11](#)
 tools and equipment
 required for service, [4-3](#)

troubleshooting
 contacting support, [3-41](#)
 cooling issues, [3-7](#)
 diagnostic tools, [3-10](#)
 fault management shell
 Oracle ILOM, [3-5](#)
 hardware faults, [3-2](#)
 indicators, [3-12](#)
 power issues, [3-9](#)
 server, [3-1](#), [3-10](#), [3-12](#)

Trusted Execution Technology (TXT)
 description, [7-5](#)
 enabling and disabling, [7-18](#)

Trusted Platform Module (TPM)
 enabling and disabling, [7-7](#)

U

UEFI driver
 enabling and disabling, [7-8](#)

UEFI Secure Boot
 description, [7-5](#)
 enabling and disabling, [7-12](#)

USB ports, internal, [1-18](#)