Sun Server X4-2L

Service Manual

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Contents

Using This Documentation

This service manual explains how to remove and replace parts in the Sun Server X4-2L, and how to use and maintain the system.

This document is written for technicians, system administrators, authorized service providers, and users who have advanced experience troubleshooting and replacing hardware.

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

Getting the Latest Software and Firmware

Firmware, drivers, and other hardware-related software for each Oracle x86 server, server module (blade), and blade chassis are updated periodically.

You can obtain the latest software in one of three ways:

- Oracle System Assistant – This is a factory-installed option for Sun Oracle x86 servers. It has all the tools and drivers you need and is built into the server.
- My Oracle Support: `http://support.oracle.com`
- Physical media request

For more information, see the *Sun Server X4-2L Installation Guide,* "Getting Server Firmware and Software Updates" on page 31.

About This Documentation

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

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

Related Documentation

Documentation	Link
All Oracle documentation	http://www.oracle.com/documentation
Sun Server X4-2L	http://www.oracle.com/goto/X4-2L/docs
Oracle Integrated Lights Out Manager (ILOM) 3.1	http://www.oracle.com/goto/ILOM/docs
Oracle Hardware Management Pack 2.2	http://www.oracle.com/pls/topic/lookup?ctx=ohmp

Feedback

You can provide feedback on this documentation at:

http://www.oracle.com/goto/docfeedback

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

About the Sun Server X4-2L

These sections describe the controls, connectors, LEDs, system components, and replaceable components of the server.

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 *Sun Server X4-2L Installation Guide,* "Getting Server Firmware and Software Updates" on page 31.

Description	Links
Review the product description.	"Product Description" on page 1
Review the controls and connectors on the server.	"About Controls and Connectors" on page 2
Learn about server and component status indicators.	"About Server and Component Status Indicators" on page 7
Review system components.	"About System Components" on page 14

Product Description

The Sun Server X4-2L is an enterprise-class, two rack unit (2U) server. It supports the following components:

- Up to two Intel processors. Processors with the following capabilities are supported:
  - 2.5 GHz, 4-core, 80W
  - 2.6 GHz, 6-core, 80W
  - 2.6 GHz, 8-core, 95W

  - 3.0 GHz, 10-core, 130W
  - 2.7 GHz, 12-core, 130W
- Up to 8 DIMMs per processor for a maximum of 16, 32-GB DDR3 DIMMs and a maximum of 512 GB of memory on dual-processor systems. DIMM sizes of 8 GB, 16 GB, and 32 GB are supported.
- Six PCIe Gen3 slots in the dual-processor systems. PCIe slots 1, 2, and 3 are nonfunctional in single-processor systems.
- Either eight, twelve, or twenty-four SAS/SATA storage drives, and a DVD drive, which is supported in the eight-drive configuration only.
- Two hot-pluggable, redundant power supplies.
- An on-board Oracle Integrated Lights Out Manager (Oracle ILOM) service processor (SP) based on the AST2300 chip.
- The Oracle System Assistant server setup tool, which is embedded on a preinstalled USB flash drive.

About Controls and Connectors

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

- "Front Panel Components on Eight Drive Systems" on page 2
- "Front Panel Components on Twelve Drive Systems" on page 4
- "Front Panel Components on Twenty-Four Drive Systems" on page 5
- "Rear Panel Components and Cable Connections" on page 6

Related Information

- "About Server and Component Status Indicators" on page 7
- "About System Components" on page 14
- "Illustrated Parts Breakdown" on page 15

Front Panel Components on Eight Drive Systems

Note – Systems with eight drives contain a DVD drive. Systems with twelve drives and twenty-four drives do not contain a DVD drive.

FIGURE: Front Panel With Eight 2.5-Inch Drives and DVD Configuration

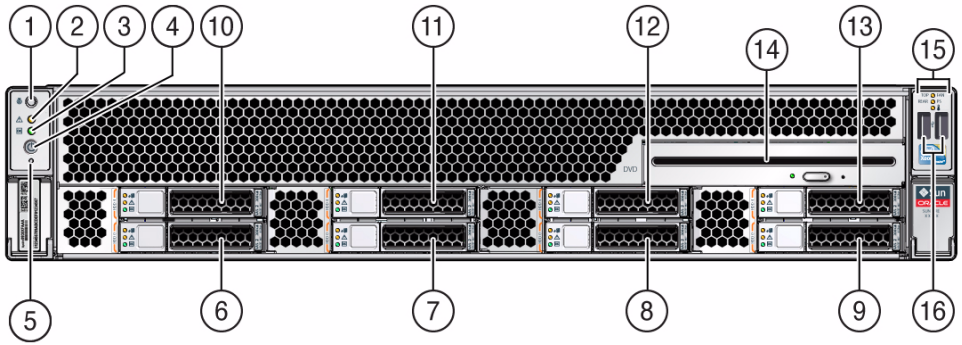


Figure Legend

1	Locator LED/Locator button: white	**9**	Storage drive 3
2	Service Action Required LED: amber	**10**	Storage drive 4
3	Power/OK LED: green	**11**	Storage drive 5
4	Power button	**12**	Storage drive 6
5	SP OK LED: green	**13**	Storage drive 7
6	Storage drive 0	**14**	SATA DVD drive
7	Storage drive 1	**15**	Service Required LEDs (3): Top: Fan Module (amber), Rear: Power Supply (amber), Overtemp Icon: System Over Temperature Warning (amber)
8	Storage drive 2	**16**	USB 2.0 connectors (2)

Related Information

- "Front Panel Components on Twelve Drive Systems" on page 4
- "Front Panel Components on Twenty-Four Drive Systems" on page 5
- "Server General Status Indicators" on page 7
- "Storage and Boot Drive Indicators" on page 9

Front Panel Components on Twelve Drive Systems

FIGURE: Front Panel With Twelve 3.5-Inch Drives Configuration

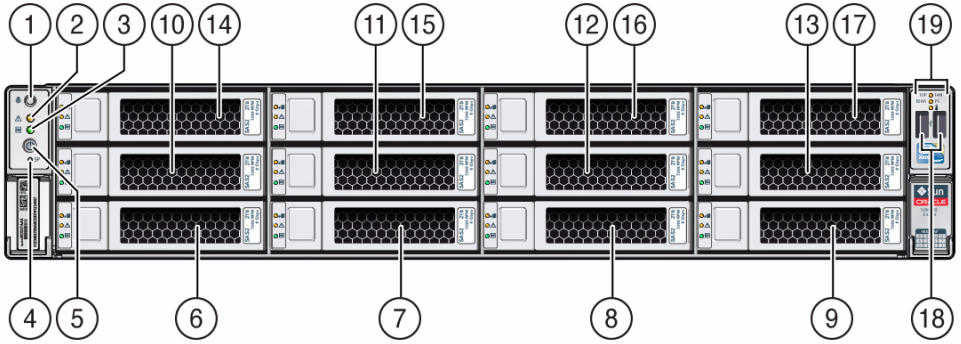


Figure Legend

1	Locator LED/Locator button: white	**11**	Storage drive 5
2	Service Action Required LED: amber	**12**	Storage drive 6
3	Power/OK LED: green	**13**	Storage drive 7
4	SP OK LED: green	**14**	Storage drive 8
5	Power button	**15**	Storage drive 9
6	Storage drive 0	**16**	Storage drive 10
7	Storage drive 1	**17**	Storage drive 11
8	Storage drive 2	**18**	USB 2.0 connectors (2)
9	Storage drive 3	**19**	Service Required LEDs (3): Top: Fan Module (amber), Rear: Power Supply (amber), Overtemp Icon: System Over Temperature Warning (amber)
10	Storage drive 4		

Related Information

- "Front Panel Components on Eight Drive Systems" on page 2
- "Front Panel Components on Twenty-Four Drive Systems" on page 5
- "Server General Status Indicators" on page 7
- "Storage and Boot Drive Indicators" on page 9

Front Panel Components on Twenty-Four Drive Systems

FIGURE: Front Panel With Twenty-Four 2.5-Inch Drives Configuration

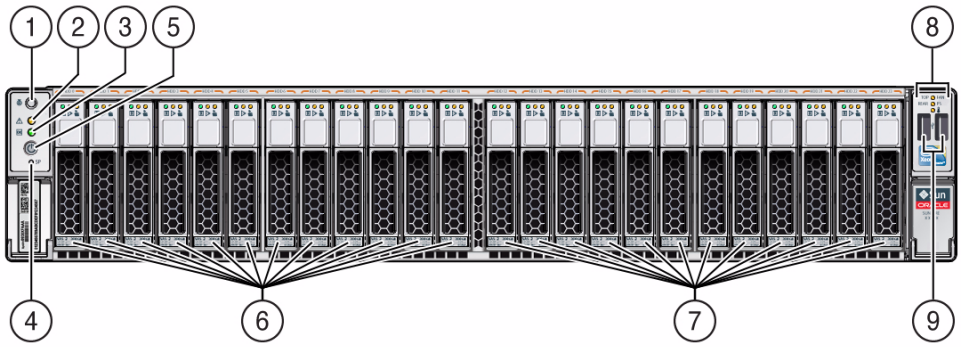


Figure Legend

1	Locator LED/Locator button: white	**6**	Storage drives 0 through 11
2	Service Action Required LED: amber	**7**	Storage drives 12 through 23
3	Power/OK LED: green	**8**	Service Required LEDs (3): Top: Fan Module (amber), Rear: Power Supply (amber), Overtemp Icon: System Over Temperature Warning (amber)
4	SP OK LED: green	**9**	USB 2.0 connectors (2)
5	Power button		

Related Information

- "Front Panel Components on Eight Drive Systems" on page 2
- "Front Panel Components on Twelve Drive Systems" on page 4
- "Server General Status Indicators" on page 7
- "Storage and Boot Drive Indicators" on page 9

Rear Panel Components and Cable Connections

Note – Systems that are configured with twelve and twenty-four front panel storage drives also contain two rear-mounted storage drives. Systems that are configured with eight front panel storage drives do not contain rear-mounted storage drives.

FIGURE: Back Panel With Storage Drives Configuration

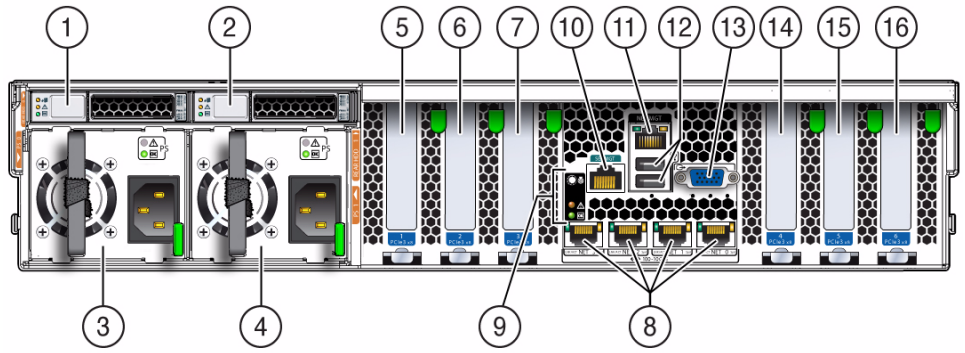


Figure Legend

1	Rear storage drive 0	**9**	System status LEDs: Locator/Button: white, Service Required: amber, Power/OK: green
2	Rear storage drive 1 (In Oracle Engineered Systems, rear storage drive 1 might be populated with a remote battery module for the HBA card.)	**10**	Serial management (SER MGT)/RJ-45 serial port
3	Power supply unit 0 (PSU0)	**11**	Oracle Integrated Lights Out Manager (ILOM) service processor (SP) network management 10/100BASE-T port (NET MGT)
4	Power supply unit 1 (PSU1)	**12**	USB 2.0 ports (2)
5	PCIe slot 1 (Nonfunctional in single-processor systems.)	**13**	DB-15 video connector
6	PCIe slot 2 (Nonfunctional in single-processor systems.)	**14**	PCIe slot 4
7	PCIe slot 3 (Nonfunctional in single-processor systems.)	**15**	PCIe slot 5
8	Network (NET) 100/1000/10000 ports (NET3–NET0) (NET2 and NET3 are nonfunctional in single-processor systems.)	**16**	PCIe slot 6

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

Related Information

- "Power Supply Status Indicators" on page 10
- "Disconnect Cables From the Server" on page 39
- "Reconnect Power and Data Cables" on page 164
- "Identifying the Server Ports" on page 167

About Server and Component Status Indicators

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

- "Server General Status Indicators" on page 7
- "Server Fan Status Indicators" on page 9
- "Storage and Boot Drive Indicators" on page 9
- "Power Supply Status Indicators" on page 10
- "Network Management Port Status Indicators" on page 11
- "Ethernet Ports Status Indicators" on page 12
- "Motherboard Status Indicators" on page 13

Related Information

- "About Controls and Connectors" on page 2
- "Service Troubleshooting Task List" on page 21

Server General Status Indicators

There are seven system-level indicators, which are located on both the server front panel and the server back panel.

TABLE: Server General Status Indicators

Indicator/LED Name	Icon	Color	State Meaning
Locator LED and button		White	• Off – Server is operating normally. • Fast blink – Use Oracle ILOM to activate this indicator to enable you to locate a particular system quickly and easily. • Pressing the Locator button will toggle LED fast blink on or off.
Service Required		Amber	• Off – Normal operation; the server is operating normally. • Steady on – Fault is present on server. This indicator lights whenever a fault LED lights for a replaceable component on the server. **Note -** The lighting of this indicator is always accompanied by a system console message that includes a recommended service action.
Power/OK		Green	This LED indicates the operational state of the chassis. This LED can be in the following states: • Off – AC power is not present, or the Oracle ILOM boot is not complete. • Steady blink – Standby power is on, but the chassis power is off, and the Oracle ILOM SP is running. • Slow blink – Startup sequence has been initiated on the host. This pattern should begin soon after you power on the server. This status indicates either (1) POST diagnostics are running on the server host system, or (2) the host is transitioning from the powered-on state to the standby state on shutdown. • Steady on – The server is powered on, and all host POST tests are complete. The server is in one of the following states: (1) the server host is booting the operating system (OS), (2) the server host is running the OS.
SP OK	None	Green	• Off – The Oracle ILOM service processor is not running. • Slow blink – The service processor is booting. • Steady on – The Oracle ILOM SP is fully operational.
Top Fan	Top	Amber	Indicates that one or more of the internal fan modules have failed. • Off – Indicates steady state; no service action is required. • Steady on – Indicates service action required; service the fan modules.
Rear Power Supply Fault	Rear	Amber	Indicates that one of the server power supplies has failed. • Off – Indicates steady state; no service action is required. • Steady on – Indicates service action required; service the power supply.
Overtemp		Amber	• Off – Normal operation; no service action is required. • Steady on – The system is experiencing an overtemperature warning condition. **Note -** This is a warning indication, not a fatal overtemperature. Failure to correct this might result in the system overheating and shutting down unexpectedly.

Related Information

- "Front Panel Components on Eight Drive Systems" on page 2
- "Front Panel Components on Twelve Drive Systems" on page 4
- "Front Panel Components on Twenty-Four Drive Systems" on page 5
- "Rear Panel Components and Cable Connections" on page 6

Server Fan Status Indicators

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

TABLE: Server Fan Status Indicators

LED Name	Icon	Color	State Meaning
Fan Status	None	Bicolored: Amber/Green	• Amber – There is a fan fault. • Green – Fan is properly installed and functioning correctly. No fan errors detected.

Related Information

- "Servicing Fan Modules (CRU)" on page 56
- "Servicing Fan Modules (CRU)" on page 56
- "Server General Status Indicators" on page 7

Storage and Boot Drive Indicators

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

TABLE: Server Front Storage and Boot Disk Drive LEDs

LED Names	Icon	Color	State Meaning
Activity		Green	Front Drive and Rear SAS Drive Status Indicators: • Off – Power is off or installed drive is not recognized by the system.* • Steady on – The drive is engaged and is receiving power. • Steady blink – There is disk activity. Status indicator blinks on and off to indicate activity. Rear SATA Drive Status Indicators: • Off – Power is off or installed drive is not recognized by the system, or the drive is engaged and is receiving power if there is no activity. • Steady blink – There is disk activity. Status indicator blinks on and off to indicate activity
Service Required		Amber	Front Drive and Rear SAS Drive Status Indicators: • Off – Normal operation; the storage drive is operating normally. • Steady on – The system has detected a fault with the storage drive.
Ready to Remove		Blue	Front and Rear Drive Status Indicators: The storage drive can be removed safely during a hot-plug operation.

* If a rear backplane hard disk's OK LED shuts off, it may also indicate that a rear hard disk has spun down into a temporary "suspend" mode, in which case the disk would again spin up when coming out of suspend mode.

Related Information

- "Front Panel Components on Eight Drive Systems" on page 2
- "Front Panel Components on Twelve Drive Systems" on page 4
- "Front Panel Components on Twenty-Four Drive Systems" on page 5
- "Servicing Storage Drives and Rear Drives (CRU)" on page 47

Power Supply Status Indicators

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

TABLE: Server Power Supply Indicators

LED Name	Icon	Color	State Meaning
AC OK/ DC OK		Green	• Steady on – Normal operation. Input AC power and DC output voltages are both within specification. • Slow blink– Normal operation. Input power is within specification. DC output voltage is not enabled. • Off – No input AC power is present.
Service Required		Amber	• Off – Normal operation; no service action is required. • Steady on – The power supply (PS) has detected a PS fan failure, PS overtemperature, PS over current, or PS over or under voltage.
AC OK	~AC	Green	• Off – No AC power is present. • Steady on – Normal operation. Input power is within specification range.

Related Information

- "Rear Panel Components and Cable Connections" on page 6
- "Servicing Power Supplies (CRU)" on page 61

Network Management Port Status Indicators

The server has one 10/100BASE-T Ethernet management domain interface, labeled NET MGT. There are two status indicators (LEDs) on this port. These indicators are visible from the rear of the server.

TABLE: Network Management Port Status Indicators

Indicator Name	Location	Color	State and Meaning
Link speed	Top left	Bicolored: Amber / Green	• Amber ON - 10BASE-T link. • Green ON - 100BASE-T link. • OFF - No link or link down. • FLASHING - No function.
Activity	Top right	Green	• ON - No function. • OFF - No activity. • FLASHING - Packet activity.

Related Information

- "Network Management Port" on page 169
- "Front Panel Components on Eight Drive Systems" on page 2
- "Rear Panel Components and Cable Connections" on page 6
- "Servicing Power Supplies (CRU)" on page 61

Ethernet Ports Status Indicators

The server has four Ethernet ports (NET 3, NET 2, NET 1, and NET 0). There are two status indicators on each port. These indicators are visible from the rear of the server.

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

TABLE: Gigabit Ethernet Port Status Indicators

Indicator Name	Location	Color	State and Meaning
Activity	Top left	Green	• ON - No function. • OFF - No activity. • FLASHING - Packet activity.
Link speed	Top right	Bicolored: Amber / Green	• Amber ON - 100BASE-T link. • Green ON - 1000/10GBBASE-T link. • OF F- No link or link down. • FLASHING - No function.

Related Information

- “Gigabit-Ethernet Ports” on page 167
- “Front Panel Components on Eight Drive Systems” on page 2
- “Front Panel Components on Twelve Drive Systems” on page 4
- “Front Panel Components on Twenty-Four Drive Systems” on page 5
- “Rear Panel Components and Cable Connections” on page 6
- “Servicing Power Supplies (CRU)” on page 61

Motherboard Status Indicators

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

- “DDR3 DIMM Fault Status Indicators” on page 13
- “Processor Fault Status Indicators” on page 13
- “Fault Remind Status Indicator” on page 14
- “3.3V_STANDBY OK Status Indicator” on page 14

DDR3 DIMM Fault Status Indicators

Each of the 16 DDR3 DIMM sockets on the motherboard has an amber fault LED associated with it. If Oracle ILOM determines that a DIMM is faulty, pressing the Fault Remind button on the motherboard signals the service processor to light the fault LEDs associated with the faulted DIMMs.

Processor Fault Status Indicators

The motherboard includes a fault status indicator (LED) adjacent to each of the two processor sockets. These LEDs indicate when a processor is faulty. Pressing the Fault Remind button on the motherboard signals the service processor to light the fault status indicators associated with the faulty processors.

Fault Remind Status Indicator

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

3.3V_STANDBY OK Status Indicator

The service instructions for all internal components require that all AC power be removed from the power supplies prior to the server top cover being removed. This green status indicator (LED) is located on the motherboard near the rear of the server, and it lights to inform a service technician that the motherboard is receiving standby power from at least one of the power supplies. This indicator is provided to help prevent service actions on the server internal components while the AC line cords are installed and power is being supplied to the server.

Related Information

- "Front Panel Components on Eight Drive Systems" on page 2
- "Front Panel Components on Twelve Drive Systems" on page 4
- "Front Panel Components on Twenty-Four Drive Systems" on page 5
- "Rear Panel Components and Cable Connections" on page 6
- "Illustrated Parts Breakdown" on page 15

About System Components

These sections describe the components of the server:

- "Illustrated Parts Breakdown" on page 15
- "Customer-Replaceable Units" on page 17
- "Field-Replaceable Units" on page 18
- "Battery Module" on page 19

Related Information

- "Servicing CRUs That Do Not Require Server Power-Off" on page 47

- "Servicing CRUs That Require Server Power-Off" on page 67
- "Servicing FRUs" on page 101

Illustrated Parts Breakdown

The following figure identifies the major components of the server.

FIGURE: System Components

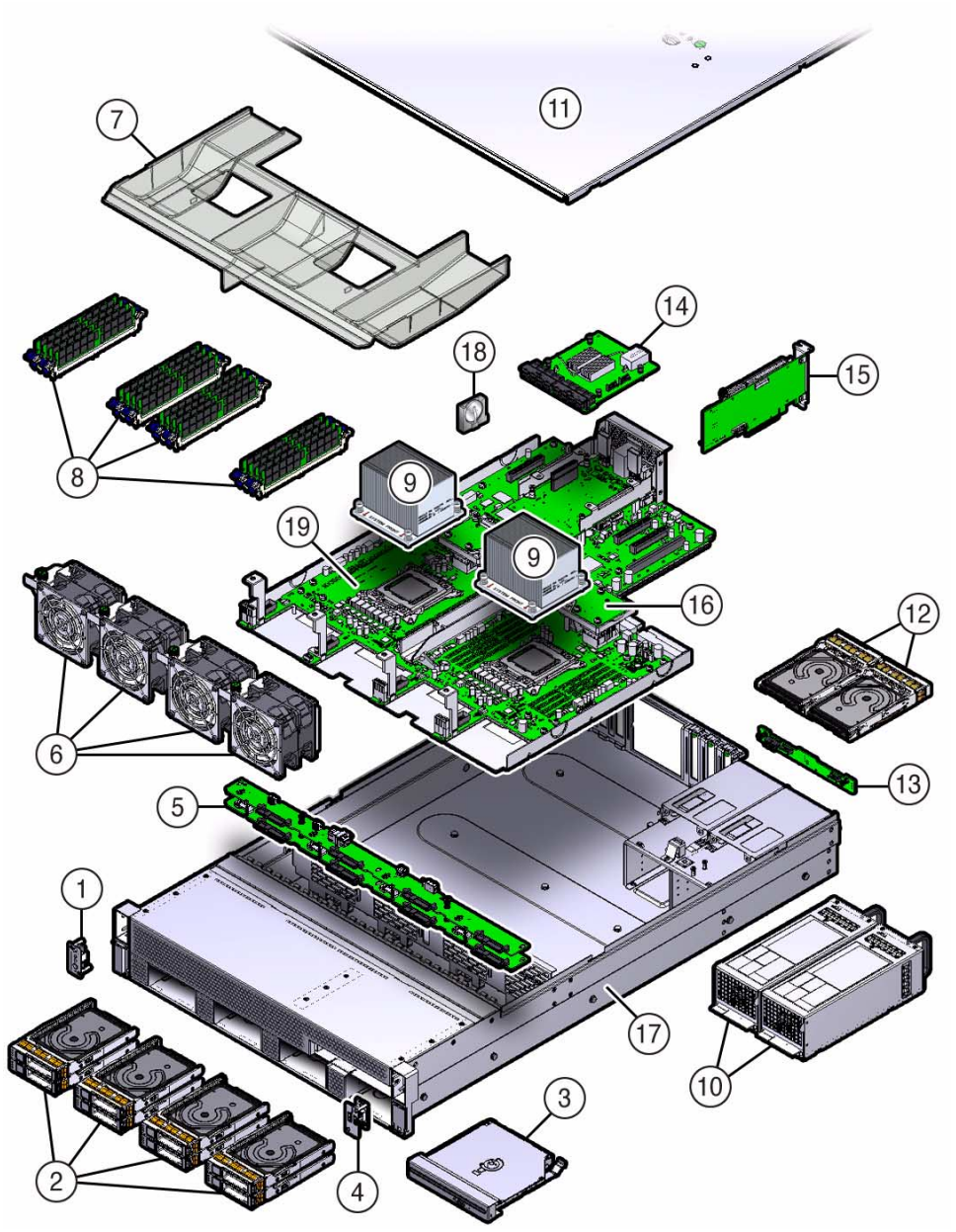


Figure Legend

1	Left LED indicator module	**11**	Top cover

Figure Legend *(Continued)*

2	Storage drives	**12**	Rear-mounted storage drives (In Oracle Engineered Systems, rear storage drive 1 might be populated with a remote battery module for the HBA card.)
3	DVD drive	**13**	Rear storage drive backplane
4	Right LED indicator module	**14**	SAS expander module
5	Front disk drive backplanes	**15**	PCIe cards (PCIe slots 1, 2, and 3 are nonfunctional in single-processor systems.)
6	Fan modules	**16**	Mezzanine board (non-removable)
7	Air baffle	**17**	System chassis
8	DIMMs (Only eight DIMMs are supported in single-processor systems and the DIMMs must be installed in P0 DIMM sockets. Additionally, a DIMM filler panel must always be installed in P1 DIMM socket D7.)	**18**	System battery
9	Processors and heatsinks (Single-processor systems contain only a single processor in socket P0.)	**19**	Motherboard assembly
10	Power supplies		

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
Air baffle	Aids in the cooling of the DIMMs and processors.	"Servicing the Air Baffle (CRU)" on page 89
Battery	Lithium coin-cell battery that powers the CMOS BIOS and real-time clock.	"Servicing the Battery (CRU)" on page 97
DIMMs	Add or replace memory in the system.	"Servicing the DIMMs (CRU)" on page 67
DVD drive	DVD drive on configurations with eight 2.5-inch drives.	"Servicing the DVD Drive (CRU)" on page 92

CRU	Description	Replacement Instructions
Storage drives	Hard disk drive (HDD) configurations can comprise both spinning media or solid state disk (SSD) drives, including: • Up to twelve 3.5-inch hot-pluggable SAS/SATA HDDs • Up to twenty-four 2.5-inch hot-pluggable SAS/SATA HDDs • Up to eight 2.5-inch hot-pluggable SAS/SATA HDDs **Note -** In Oracle Engineered Systems, rear storage drive 1 might be populated with a remote battery module for the HBA card.	"Servicing Storage Drives and Rear Drives (CRU)" on page 47
Fan modules	Contains four fan modules for cooling the server components.	"Servicing Fan Modules (CRU)" on page 56
PCIe cards	Optional add-on cards that can expand the functionality of the server.	"Servicing PCIe Cards (CRU)" on page 81
Power supply unit (PSU)	Two fully redundant AC-powered power supplies.	"Servicing Power Supplies (CRU)" on page 61
SAS expander module	SAS expander that serves as an interface between the disk backplane and the storage drive cables that connect to the HBA PCIe card.	"Servicing the SAS Expander Module (CRU)" on page 85

Related Information

- "Field-Replaceable Units" on page 18
- "Illustrated Parts Breakdown" on page 15
- "Servicing CRUs That Do Not Require Server Power-Off" on page 47
- "Servicing CRUs That Require Server Power-Off" on page 67

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
Processor and heatsink	The processor that carries out the instructions of the system.	"Servicing Processors (FRU)" on page 101
Disk drive backplanes	Provide power and communications connectors for disk drives.	"Servicing the Front and Rear Storage Drive Backplanes (FRU)" on page 118
Front LED/USB indicator modules	Contain the push-button circuitry and LEDs that are displayed on the bezel of the chassis.	"Servicing the Front LED/USB Indicator Modules (FRU)" on page 130
Motherboard assembly	Provides connectors for the DIMMs, processors, PCIe risers, and other components.	"Servicing the Motherboard Assembly (FRU)" on page 144
SAS and SATA cables	Provide signals between the SAS expander and the disk drive backplanes.	"Servicing Cables (FRU)" on page 137

Related Information

- "Customer-Replaceable Units" on page 17
- "Illustrated Parts Breakdown" on page 15
- "Servicing FRUs" on page 101

Battery Module

In Oracle Engineered Systems, rear storage drive 1 might be populated with a remote battery module for the host bus adapter (HBA) card.

Caution – The battery module is not a customer-replaceable unit (CRU) and should not be removed or replaced by customers. The battery module should be removed or replaced only by Oracle field service personnel.

The battery module is hot-pluggable and provides the backup power subsystem for the Sun Storage 6 Gb SAS PCIe RAID internal HBA: SG-SAS6-R-INT-Z. It enables Oracle field service personnel to replace the battery at the end of its service life without requiring the server to be powered off.

Related Information

- "Servicing Storage Drives and Rear Drives (CRU)" on page 47
- "Storage Drives Hot-Plug Conditions" on page 48

- "Remove a Storage Drive" on page 49
- "Remove a Rear Storage Drive" on page 54

Troubleshooting the Server

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

Description	Links
Review the tasks used to locate a specific problem with the system.	"Service Troubleshooting Task List" on page 21
Understand the diagnostic system indicators, utilities, and commands available.	"Diagnostic Tools" on page 22
Gather information about the system to help a service engineer or technician work on your system.	"Gather Service Information" on page 24
Locate the server serial number.	"Locate the Server Serial Number" on page 25
Inspect the system methodically to locate a faulty component or components.	"Inspecting the System" on page 25

Related Information

- "About the Sun Server X4-2L" on page 1
- "Preparing for Service" on page 29
- "Returning the Server to Operation" on page 157

Service Troubleshooting Task List

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

TABLE: Troubleshooting Task List

No.	Description	Section or Document
1	Gather initial service information.	"Gather Service Information" on page 24
2	Investigate any power-on problems.	"Troubleshoot Power Problems" on page 26
3	Perform external visual inspection and internal visual inspection.	"Inspect the Server Externally" on page 26
4	View service processor logs and sensor information.	Oracle ILOM 3.1 Documentation Library at: http://www.oracle.com/goto/ILOM/docs
5	Run diagnostics.	*Oracle x86 Servers Diagnostics, Applications, and Utilities Guide for Servers With Oracle ILOM 3.1* at http://www.oracle.com/goto/x86AdminDiag/docs

Related Information

- "About the Sun Server X4-2L" on page 1
- "Diagnostic Tools" on page 22

Diagnostic Tools

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

- **LEDs** – These indicators provide a quick visual notification of the status of the server and of some of the CRUs and FRUs.
- **Oracle ILOM firmware** – Firmware is located on the service processor and provides a comprehensive service portal via a command-line interface (CLI) and browser user interface (BUI) for lights-out management capabilities (remote power-on, power-off), monitoring of the health of environmental subsystems (power, fans, temperature, interlock), and fault management and automated diagnosis capabilities during server initialization (QuickPath Interconnect code and Memory Reference code), and runtime of the server.
- **Diagnostics** – Accessed through Oracle ILOM, the DOS-based Pc-Check utility tests motherboard components such as processor, memory and I/O, as well as ports and slots. If enabled through Oracle ILOM, this utility will run each time the

system powers on. For information about Pc-Check, refer to the *Oracle x86 Servers Diagnostics, Applications, and Utilities Guide for Servers With Oracle ILOM 3.1* at http://www.oracle.com/goto/x86AdminDiag/docs.

- **POST** – Power-on self-test (POST) performs diagnostics on system components upon system power-on and resets to ensure the integrity of those components. POST messages are displayed and logged in the BIOS event logs. POST works with Oracle ILOM to take faulty components offline, if needed.
- **SNMP** – Simple Network Management Protocol traps are generated by the SNMP agents that are installed on the SNMP devices being managed by Oracle ILOM. Oracle ILOM receives the SNMP traps and converts them into SNMP event messages that appear in the event log.
- **Oracle Solaris OS Diagnostic Tools**
  - **Oracle Solaris OS Predictive Self-Healing (PSH)** – The PSH technology provides automated diagnosis of error events encountered with the processor, memory subsystem, and Integrated I/O subsystem during runtime. The ability of PSH to off-line faulty processors and retire memory pages during runtime enhances system availability and prevents future interruptions.

    The Solaris PSH technology, ILOM, and BIOS provide extensive fault management architecture for placing processors offline and disabling of DIMMs.
  - **Log files and console messages** – These items provide the standard Solaris OS log files and investigative commands that can be accessed and displayed on the device of your choice.
  - **Oracle VTS software** – This application exercises the system, provides hardware validation, and discloses possible faulty components with recommendations for repair.

The LEDs, Oracle ILOM, Oracle Solaris OS PSH, and many of the log files and console messages are integrated. For example, Oracle Solaris software will display a detected fault, log it, pass information to Oracle ILOM, where it will be logged, and depending on the fault, might cause one or more LEDs to light.

Related Information

- "About the Sun Server X4-2L" on page 1
- Oracle Solaris OS Documentation Set
  - Oracle Solaris 10 1/13 Information Library at:

    http://docs.oracle.com/cd/E26505_01/index.html
  - Oracle Solaris 11.1 Information Library at:

    http://docs.oracle.com/cd/E26502_01/index.html
- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: http://www.oracle.com/goto/ILOM/docs

- *Oracle x86 Servers Diagnostics, Applications, and Utilities Guide for Servers With Oracle ILOM 3.1* at:

  http://www.oracle.com/goto/x86AdminDiag/docs

- Oracle VTS documentation at:
  http://docs.oracle.com/cd/E19719-01/index.html

▼ Gather Service Information

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

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

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

Related Information

- "Diagnostic Tools" on page 22
- "Locate the Server Serial Number" on page 25

▼ Locate the Server Serial Number

- **To locate the server serial number, do one of the following:**
  - From the front panel of the server, look at the bottom left side of the bezel to locate the Radio-frequency Identification (RFID) label. The serial number is located on the RFID label on the bottom left side of the front panel, below the general status LEDs.

    The serial number is also recorded on the service label that is attached to the top cover of the system. For illustrations of the server front panel, see "About the Sun Server X4-2L" on page 1.
  - Locate the yellow Customer Information Sheet (CIS) attached to your server packaging. This sheet includes the serial number.
  - From Oracle ILOM, type the `show /System` command, or go to the System Information > Summary page in the Oracle ILOM web interface.

Related Information

- "Diagnostic Tools" on page 22
- "Gather Service Information" on page 24

Inspecting the System

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

- "Troubleshoot Power Problems" on page 26
- "Inspect the Server Externally" on page 26
- "Inspect Internal Server Components" on page 26

Related Information

- "About the Sun Server X4-2L" on page 1
- "Preparing for Service" on page 29

▼ Troubleshoot Power Problems

1. **If the server is powered off, power on the server.**

   See "Power On the Server" on page 165.

   - If the server powers on, go to "Inspect the Server Externally" on page 26.
   - If the server does not power on, go to Step 2.

2. **Check that power cords are attached firmly to the server power supplies and to the power source.**

Related Information

- "Power On the Server" on page 165
- "Inspect the Server Externally" on page 26
- "Servicing Power Supplies (CRU)" on page 61

▼ Inspect the Server Externally

1. **Inspect the external status indicators (LEDs), which can indicate component malfunction.**

   For the LED locations and descriptions of their behavior, see "About Server and Component Status Indicators" on page 7.

2. **Verify that nothing in the server environment is blocking airflow or making a contact that could short out power.**

3. **If the problem is not evident, continue with the next section,** "Inspect Internal Server Components" on page 26**.**

Related Information

- "About the Sun Server X4-2L" on page 1
- "Inspect Internal Server Components" on page 26

▼ Inspect Internal Server Components

1. **Power down the server from main power mode to standby power mode in one of the following ways:**

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

   See "Powering Down the Server" on page 33 for instructions.

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

   See "Preparing the Server for Component Replacement" on page 33.

3. **Inspect the internal status indicators (LEDs). These can indicate component malfunction.**

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

   To light these LEDs, hold down the Locator LED button on the server back panel or front panel for 5 seconds to initiate a "push-to-test" mode that illuminates all other LEDs both inside and outside of the chassis for 15 seconds.

Note – If the server supercapacitor is charged, you can view internal LEDs when the power cables are disconnected from the server. If the supercapacitor has been discharged, the server must be in standby power mode for you to view the internal LEDs. If necessary, reconnect the power cables to the server and wait for the SP to complete its boot process by monitoring the SP OK LED. Disconnect the power cables after inspecting these LEDs.

---

4. **Verify that there are no loose or improperly seated components.**

5. **Verify that all cables inside the system are firmly and correctly attached to the appropriate connectors.**

6. **Verify that any after-factory components are qualified and supported.**

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

7. **Check that the installed DIMMs comply with the supported DIMM population rules and configurations.**

   For more information, see "DIMM Population Rules" on page 72.

8. **Install the server top cover, return the server to its rackmount position, and reconnect data and power cables.**

   See "Returning the Server to Operation" on page 157.

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

   When the power is applied to the server, the Power/OK LED next to the Power button blinks slowly until the OS is ready. When the OS is ready, the Power/OK LED remains lit. For more information about the indicator, see "Server General Status Indicators" on page 7.

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

    For instructions, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: `http://www.oracle.com/goto/ILOM/docs`.

Related Information

- "Preparing for Service" on page 29
- "DIMM Population Rules" on page 72
- "About Server and Component Status Indicators" on page 7
- "Returning the Server to Operation" on page 157

Preparing for Service

These sections describe safety considerations and provide prerequisite procedures and information about replacing components within the server.

Description	Links
Understand the safety precautions, understand the safety symbols, and take ESD precautions prior to removing or installing parts in the server.	"Safety Precautions" on page 29 "Safety Symbols" on page 30 "Electrostatic Discharge Safety" on page 30
Understand the FRU top-level indicator auto-update feature.	"FRU TLI Auto-Update" on page 32
Assemble the required tools.	"Required Tools" on page 32
Before working with components within the server, power down the server and prepare for servicing.	"Preparing the Server for Component Replacement" on page 33

Related Information

- "Returning the Server to Operation" on page 157

Safety Precautions

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

- Follow all standard cautions, warnings, and instructions marked on the equipment and described in *Sun Server X4-2L Safety and Compliance Guide* and *Important Safety Information for Oracle's Hardware Systems*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment electrical rating label.

- Follow the electrostatic discharge safety practices as described in "Electrostatic Discharge Safety" on page 30.
- Disconnect both power supply cords before servicing components.

Related Information

- "Safety Symbols" on page 30
- "Electrostatic Discharge Safety" on page 30

Safety Symbols

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

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

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

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

Related Information

- "Safety Precautions" on page 29
- "Electrostatic Discharge Safety" on page 30

Electrostatic Discharge Safety

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

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

Do the following when handling ESD-sensitive components:

- Use an antistatic wrist strap.

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

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

- Use an antistatic mat.

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

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

Related Information

- "Safety Precautions" on page 29
- "Safety Symbols" on page 30
- "Preparing the Server for Component Replacement" on page 33
- "Returning the Server to Operation" on page 157

FRU TLI Auto-Update

Oracle ILOM includes a top-level indicator (TLI) auto-update feature that ensures that the TLI stored in the server's field-replaceable units (FRUs) is always correct. The TLI, which is unique to each server, is used to track the server's service entitlement and warranty coverage. When a server requires service, the server's TLI is used to verify that the server's warranty has not expired.

The TLI is stored in the FRUID (field-replaceable unit identifiers) of these components: power supply 0 (PSU 0), motherboard (MB), and disk backplane (DBP).

The TLI components stored in each component FRUID include:

- Product name
- PPN (product part number)
- PSN (product serial number)

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

Required Tools

The server can be serviced with the following tools:

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

Related Information

- "Preparing for Service" on page 29
- "Servicing CRUs That Do Not Require Server Power-Off" on page 47
- "Servicing CRUs That Require Server Power-Off" on page 67
- "Servicing FRUs" on page 101

Preparing the Server for Component Replacement

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

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

- "Powering Down the Server" on page 33
- "Disconnect Cables From the Server" on page 39
- "Extend the Server to the Maintenance Position" on page 40
- "Remove the Server From the Rack" on page 41
- "Take Antistatic Measures" on page 43
- "Remove the Server Top Cover" on page 43
- "Remove the Fan Assembly Door From a Server With 2.5-Inch Drives" on page 44

Related Information

- "Returning the Server to Operation" on page 157

Powering Down the Server

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

Description	Link
Power down the server gracefully to prevent data from being corrupted. Performing a graceful shutdown ensures that the system is ready for restart.	• "Power Down the Server Gracefully Using the Oracle ILOM CLI" on page 34 • "Power Down the Server Gracefully Using the Oracle ILOM Web Interface" on page 35 • "Power Down the Server Gracefully Using the Power Button" on page 36

Description	Link
If the server is not responding, or you must shut down the server quickly, perform an immediate shutdown.	• "Power Down the Server for Immediate Shutdown Using the Power Button" on page 37 • "Power Down the Server for Immediate Shutdown Using the Oracle CLI" on page 38 • "Power Down the Server for Immediate Shutdown Using the Oracle ILOM Web Interface" on page 38

Related Information

- "Power On the Server" on page 165

▼ Power Down the Server Gracefully Using the Oracle ILOM CLI

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

1. **Log in to the server as superuser or equivalent.**

   Depending on the nature of the problem, you might want to view the system status or the log files or run diagnostics before you shut down the system. For log file information, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection at: `http://www.oracle.com/goto/ILOM/docs`.

2. **Notify affected users that the server will be powered down.**

3. **Save any open files, and quit all running applications.**

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

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

   Refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection for instructions.

5. **At the Oracle ILOM prompt, shut down the operating system:**

```
-> stop /System
```

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

6. **Disconnect the power and cables from the server.**

   See "Disconnect Cables From the Server" on page 39.

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

Related Information

- "Power Down the Server Gracefully Using the Oracle ILOM Web Interface" on page 35
- "Power Down the Server Gracefully Using the Power Button" on page 36
- "Power Down the Server for Immediate Shutdown Using the Power Button" on page 37
- "Power On the Server" on page 165

▼ Power Down the Server Gracefully Using the Oracle ILOM Web Interface

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

1. **Log in to the server as superuser or equivalent.**

   Depending on the nature of the problem, you might want to view the system status or the log files or run diagnostics before you shut down the system. For log file information, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection at: `http://www.oracle.com/goto/ILOM/docs`.

2. **Notify affected users that the server will be powered down.**

3. **Save any open files, and quit all running applications.**

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

4. **Log in to the Oracle ILOM web interface using an Administrator account.**

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

5. **In the left pane, click Host Management > Power Control, and select Graceful Shutdown and Power Off from the Select Action list box.**

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

   The host server performs an orderly power-down.

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

   See "Disconnect Cables From the Server" on page 39.

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

Related Information

- "Power Down the Server Gracefully Using the Oracle ILOM CLI" on page 34
- "Power Down the Server Gracefully Using the Power Button" on page 36
- "Power Down the Server for Immediate Shutdown Using the Power Button" on page 37
- "Power On the Server" on page 165

▼ Power Down the Server Gracefully Using the Power Button

Note – You can use the Power button on the front of the server to initiate a graceful system shutdown.

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

   This action causes ACPI-enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems shut down to standby power mode immediately.

   When main power is off, the Power/OK LED on the front panel begins flashing, indicating that the server is in standby power mode. See "Server General Status Indicators" on page 7.

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

   See "Disconnect Cables From the Server" on page 39.

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

Related Information

- "Server General Status Indicators" on page 7
- "Power Down the Server Gracefully Using the Oracle ILOM CLI" on page 34
- "Power Down the Server Gracefully Using the Oracle ILOM Web Interface" on page 35
- "Power Down the Server for Immediate Shutdown Using the Power Button" on page 37
- "Power Down the Server for Immediate Shutdown Using the Oracle CLI" on page 38
- "Power Down the Server for Immediate Shutdown Using the Oracle ILOM Web Interface" on page 38
- "Power On the Server" on page 165

▼ Power Down the Server for Immediate Shutdown Using the 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 down 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 Power/OK LED on the front panel begins flashing, indicating that the server is in standby power mode. See "Server General Status Indicators" on page 7.

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

   See "Disconnect Cables From the Server" on page 39.

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

Related Information

- "Server General Status Indicators" on page 7
- "Power Down the Server Gracefully Using the Oracle ILOM CLI" on page 34
- "Power Down the Server Gracefully Using the Power Button" on page 36
- "Power On the Server" on page 165

▼ Power Down the Server for Immediate Shutdown Using the Oracle CLI

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

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

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

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

   The server powers down immediately.

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

   See "Disconnect Cables From the Server" on page 39.

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

Related Information

- "Power Down the Server for Immediate Shutdown Using the Power Button" on page 37
- "Power Down the Server for Immediate Shutdown Using the Oracle ILOM Web Interface" on page 38

▼ Power Down the Server for Immediate Shutdown Using the Oracle ILOM Web Interface

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

   The Oracle ILOM web interface System Information page appears.

2. **In the left pane, click Host Management > Power Control, and select Immediate Power Off in the Actions list.**
3. **Click Save, and then click OK.**

   The server powers down immediately.
4. **Disconnect the power and data cables from the server.**

   See "Disconnect Cables From the Server" on page 39.

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

Related Information

- "Power Down the Server for Immediate Shutdown Using the Power Button" on page 37
- "Power Down the Server for Immediate Shutdown Using the Oracle CLI" on page 38

▼ Disconnect Cables From the Server

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

1. **Label all cables connected to the server.**
2. **Disconnect the power cords from the rear of the server.**
3. **Disconnect all data cables from the rear of the server.**
4. **If your rackmount kit includes a cable management device, remove the cables from it.**
5. **Depending on the components that you are servicing, either extend the server to the maintenance position, or remove the server from the rack.**

Related Information

- "Rear Panel Components and Cable Connections" on page 6
- "Powering Down the Server" on page 33
- "Extend the Server to the Maintenance Position" on page 40

- "Remove the Server From the Rack" on page 41
- "Reconnect Power and Data Cables" on page 164

▼ Extend the Server to the Maintenance Position

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

- Storage drives
- Fan modules
- Power supplies
- DVD drive
- DDR3 DIMMs
- PCIe cards
- SAS expander module
- Internal USB drives
- Motherboard battery

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

1. **Verify that no cables will be damaged or will interfere when the server is extended.**

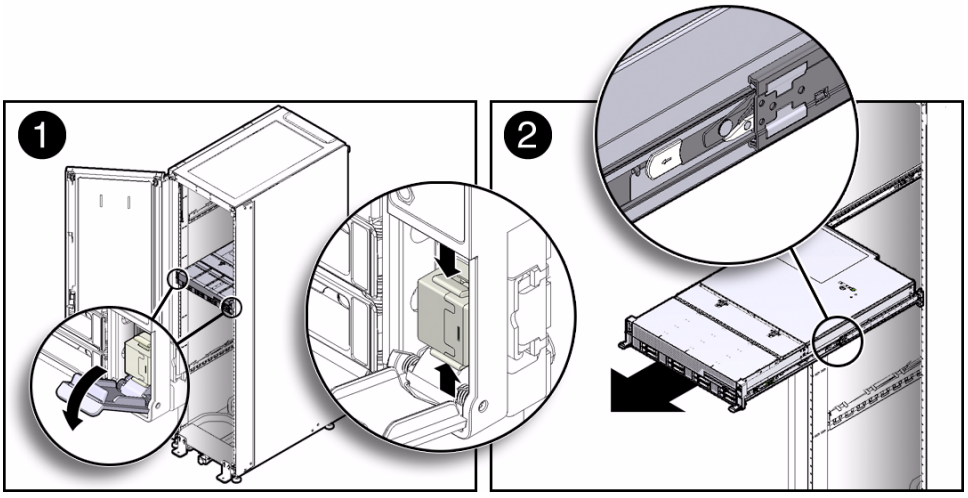
   Although the cable management arm (CMA) that is supplied with the server is hinged to accommodate extending the server, you should ensure that all cables and cords are capable of extending.

2. **From the front of the server, open and hold the left and right release latch covers in the open position.**

   When in an open position, the release latch covers engage the slide-rail release latches [1].

Caution – Deploy any rack anti-tilt mechanism before releasing the slide release latches.

FIGURE: Extending the Server to the Maintenance Position



3. **While the release latch covers are in the open position, slowly pull the server forward until the slide-rails latch into a locked position [2].**

   The server is now in the extended maintenance position.

Related Information

- "Disconnect Cables From the Server" on page 39
- "Remove the Server From the Rack" on page 41
- "Reinstall the Server Chassis in the Rack" on page 162

▼ Remove the Server From the Rack

You must remove the server from the rack to service the following components:

- Motherboard
- Processors
- Left FIM (front indicator module)
- Right FIM
- Disk backplane
- Rear-mounted storage drive assembly

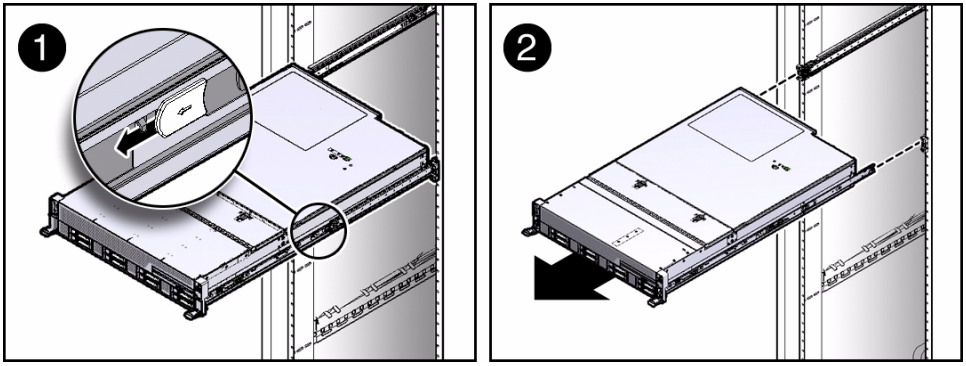
Caution – The server weighs approximately 63 pounds (28.5 kg). Two people are required to unmount and carry the chassis.

1. **Disconnect all the cables and power cords from the server.**
2. **Remove the cable management arm (CMA).**
   - For instructions for removing the second-generation CMA, see the *Sun Server X4-2L Installation Guide,* "Remove the Second-Generation Cable Management Arm" on page 66.
   - For instructions for removing the first-generation CMA, see the *Sun Server X4-2L Installation Guide,* "Install the First-Generation Cable Management Arm" on page 71 and perform the installation steps in reverse order.
3. **Extend the server to the maintenance position.**

   See "Extend the Server to the Maintenance Position" on page 40.
4. **From the front of the server, pull the green slide-rail release tabs toward the front of the server, and pull the server out of the rack until is free of the rack rails [1 and 2].**

   A slide-rail release tab is located on each slide-rail.

FIGURE: Removing the Server From the Chassis



5. **Set the server on a sturdy work surface.**

Related Information

- "Disconnect Cables From the Server" on page 39
- "Extend the Server to the Maintenance Position" on page 40
- "Reinstall the Server Chassis in the Rack" on page 162

▼ Take Antistatic Measures

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

   Place ESD-sensitive components on an antistatic mat. The following items can be used as an antistatic mat:

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

2. **Attach an antistatic wrist strap.**

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

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

Related Information

- "Extend the Server to the Maintenance Position" on page 40
- "Remove the Server From the Rack" on page 41
- "Remove the Server Top Cover" on page 43
- "Remove the Fan Assembly Door From a Server With 2.5-Inch Drives" on page 44
- "Remove Antistatic Measures" on page 161

▼ Remove the Server Top Cover

Caution – If you remove the top cover without first removing the AC power cords, then not only will the server host shut down, but also this condition will be flagged as a system fault (that is, the fault LEDs will light).

Note – Servicing some components requires that the top cover be removed.

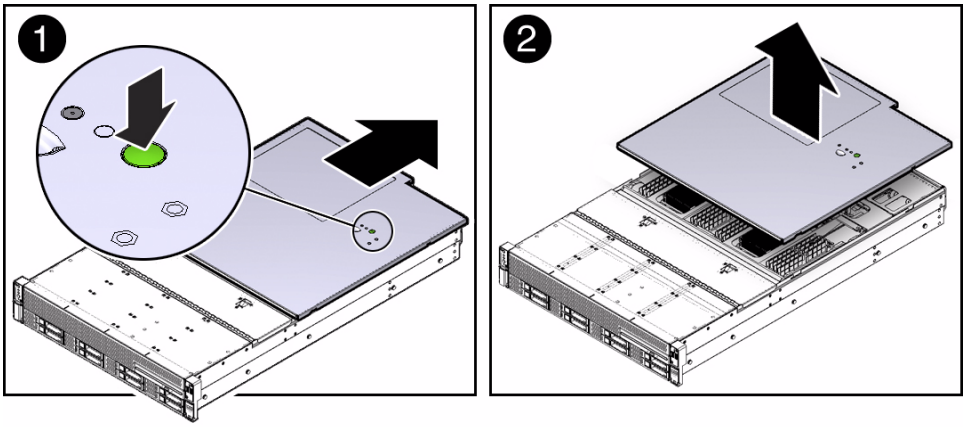
---

1. **Ensure that the AC power cords are disconnected from the server power supplies.**

2. **Unlatch the top cover [1].**

   Press the green release button on the top of the server cover.

FIGURE: Removing the Server Top Cover



3. **While pressing the top cover release button, slide the cover toward the rear of the server [2].**
4. **If necessary, open the fan assembly door.**
5. **Lift up and remove the top cover [2].**

Related Information

- "Take Antistatic Measures" on page 43
- "Remove the Fan Assembly Door From a Server With 2.5-Inch Drives" on page 44
- "Install the Server Top Cover" on page 159

▼ Remove the Fan Assembly Door From a Server With 2.5-Inch Drives

Before you service the server's storage drive backplane, you should first remove the server's front fan assembly door.

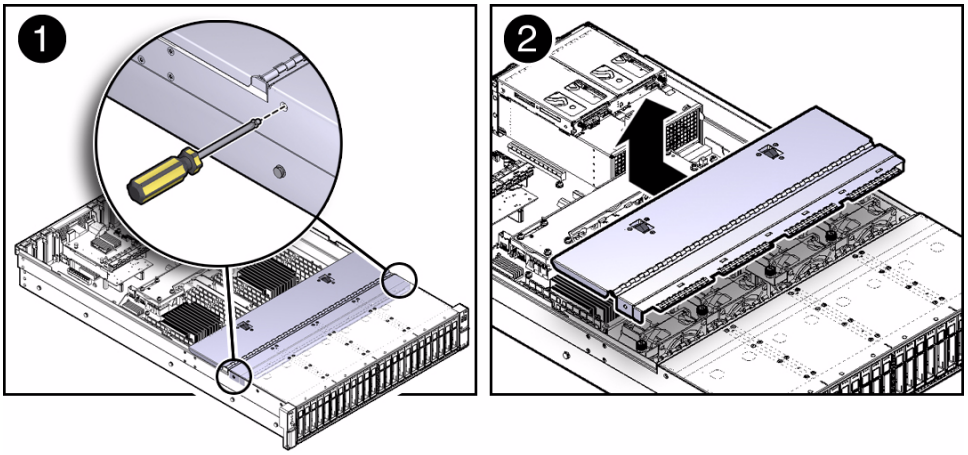
Note – This procedure applies only to servers with 2.5-inch storage drives.

---

1. **Ensure that the AC power cords are disconnected from the server power supplies.**

2. **Using a No. 2 Phillips screwdriver, remove the two screws (one on each side of the chassis) that secure the fan assembly door [1].**

FIGURE: Removing the Fan Assembly Door



3. **Slide the fan assembly door toward the rear of the server, and lift and remove the door from the chassis [2].**

Related Information

- "Take Antistatic Measures" on page 43
- "Remove the Server Top Cover" on page 43
- "Install the Server Top Cover" on page 159

Servicing CRUs That Do Not Require Server Power-Off

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

Description	Links
Service storage and boot drives.	"Servicing Storage Drives and Rear Drives (CRU)" on page 47
Service fan modules.	"Servicing Fan Modules (CRU)" on page 56
Service power supplies.	"Servicing Power Supplies (CRU)" on page 61

Related Information

- "Servicing CRUs That Require Server Power-Off" on page 67
- "Servicing FRUs" on page 101

Servicing Storage Drives and Rear Drives (CRU)

These sections describe how to remove and install storage drives.

Related Information

- "Servicing Cables (FRU)" on page 137

Storage Drives Hot-Plug Conditions

The solid state drives (SSDs) or hard disk drives (HDDs) in the server are hot-pluggable, but this capability depends on how the drives are configured. To hot-plug a drive you must be able to take the drive offline before you can remove it. When you take the drive offline, you prevent any application from accessing the drive and remove the logical software links to the drive.

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

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

If either of the disk drive conditions is true, then you must shut down the system before you replace the drive. See "Powering Down the Server" on page 33.

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

Related Information

- "Storage and Boot Drive Indicators" on page 9
- "Remove a Storage Drive" on page 49
- "Install a Storage Drive" on page 52
- "Remove a Rear Storage Drive" on page 54
- "Install a Rear Storage Drive" on page 55

HDD or SSD Failure and RAID

A single storage drive failure does not cause a data failure if the storage drives are configured as a mirrored RAID 1 volume (optional). The storage drive can be removed, and when a new storage drive is inserted, the contents are automatically rebuilt from the rest of the array with no need to reconfigure the RAID parameters. If the replaced storage drive was configured as a hot-spare, the new HDD is automatically configured as a new hot-spare.

For information about the implementation of RAID on this server, refer to the *Sun Server X4-2L Installation Guide*, "Configuring Server Drives for OS Installation" on page 115.

▼ Remove a Storage Drive

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

   Refer to "Take Antistatic Measures" on page 43.

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

   The following illustrations show the location of the drives and the internal system software designations for the drives.

FIGURE: Drive Location and Numbering on a Server With Eight 2.5-Inch Drives

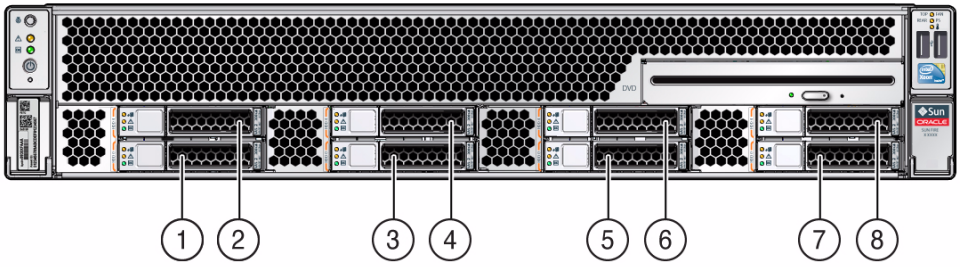


Figure Legend

1	Storage drive 0
2	Storage drive 4
3	Storage drive 1
4	Storage drive 5
5	Storage drive 2
6	Storage drive 6
7	Storage drive 3
8	Storage drive 7

FIGURE: Drive Location and Numbering on a Server With Twelve 3.5-Inch Drives

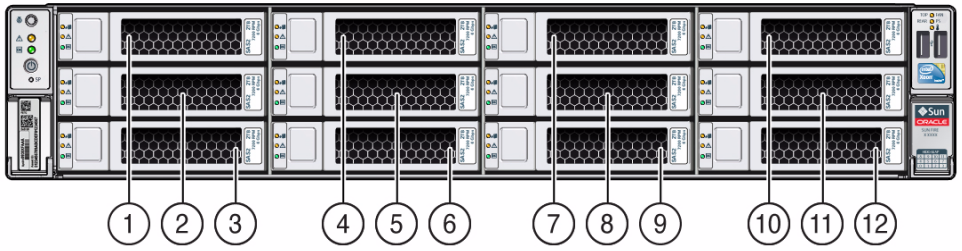


Figure Legend

1	Storage drive 8
2	Storage drive 4
3	Storage drive 0
4	Storage drive 9
5	Storage drive 5
6	Storage drive 1
7	Storage drive 10
8	Storage drive 6
9	Storage drive 2
10	Storage drive 11
11	Storage drive 7
12	Storage drive 3

FIGURE: Drive Location and Numbering on a Server With Twenty-Four 2.5-Inch Drives

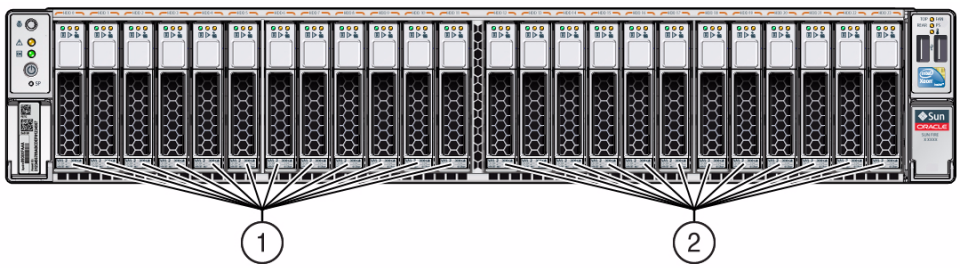


Figure Legend

1	Storage drives 0 through 11
2	Storage drives 12 through 23

3. **Type the operating system commands required to stop the server from using the drive.**

   The exact commands required depend on the configuration of your drives. Unmount file systems, or issue RAID commands as needed.

Note – The blue OK to Remove LED on the drive may or may not light, depending on operating system support.

---

4. **On the drive you plan to remove, push the latch release button to open the drive latch [1, 2].**

FIGURE: Opening the Drive Latch

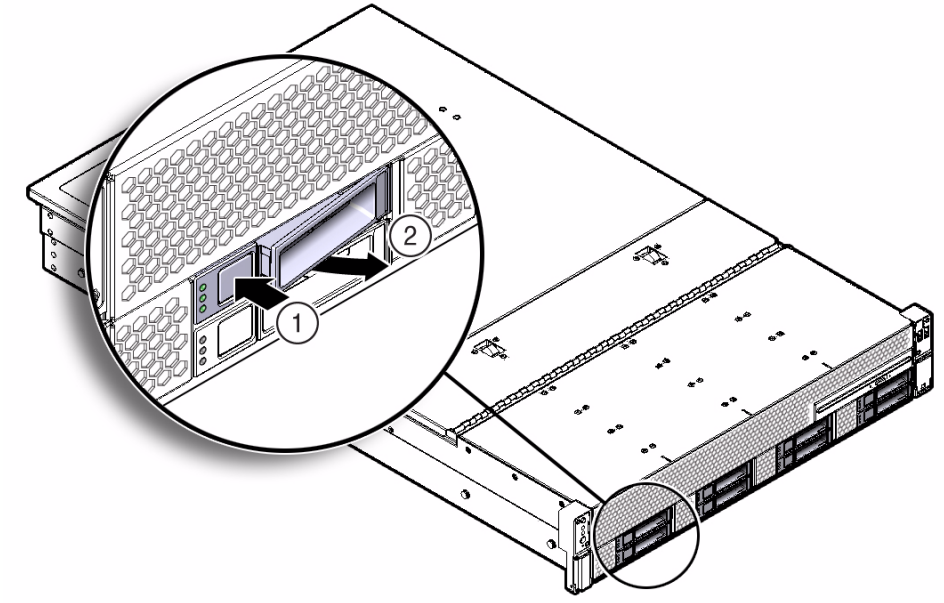


Figure Legend

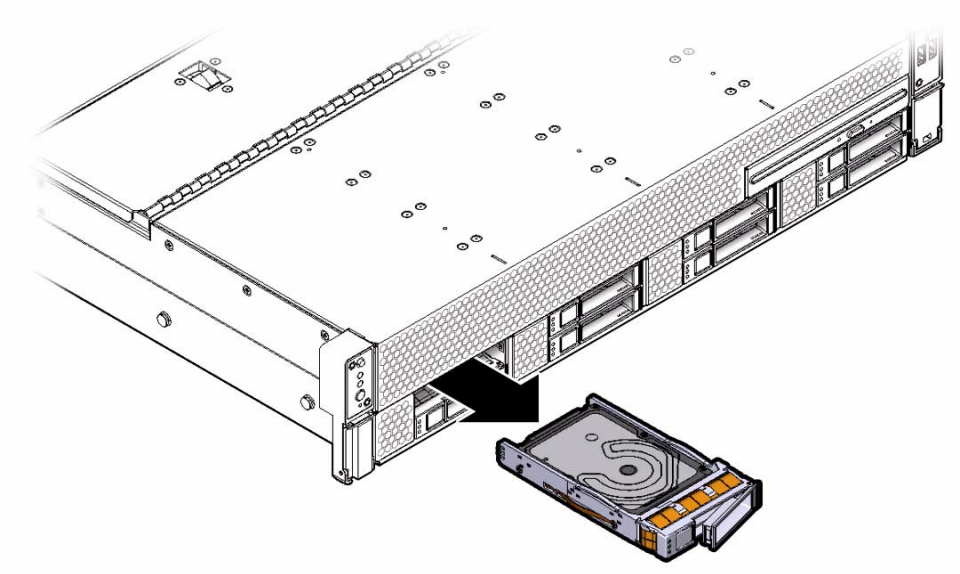
1	Pressing the latch release button.
2	Opening the latch.

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

---

5. **Grasp the latch and pull the drive out of the drive slot.**

FIGURE: Removing a Storage Drive



6. **Consider your next steps:**
   - If you are replacing the drive, continue to "Install a Storage Drive" on page 52.
   - If you are not replacing the drive, perform administrative procedures to configure the server to operate without the drive, and install a filler panel for the unoccupied drive slot. See "Remove and Install Filler Panels" on page 158.

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

Related Information

- "Storage and Boot Drive Indicators" on page 9
- "Storage Drives Hot-Plug Conditions" on page 48
- "Install a Storage Drive" on page 52
- "Install a Rear Storage Drive" on page 55

▼ Install a Storage Drive

1. **Remove the replacement drive from its packaging, and place the drive on an antistatic mat.**

2. **If necessary, remove the drive filler panel.**

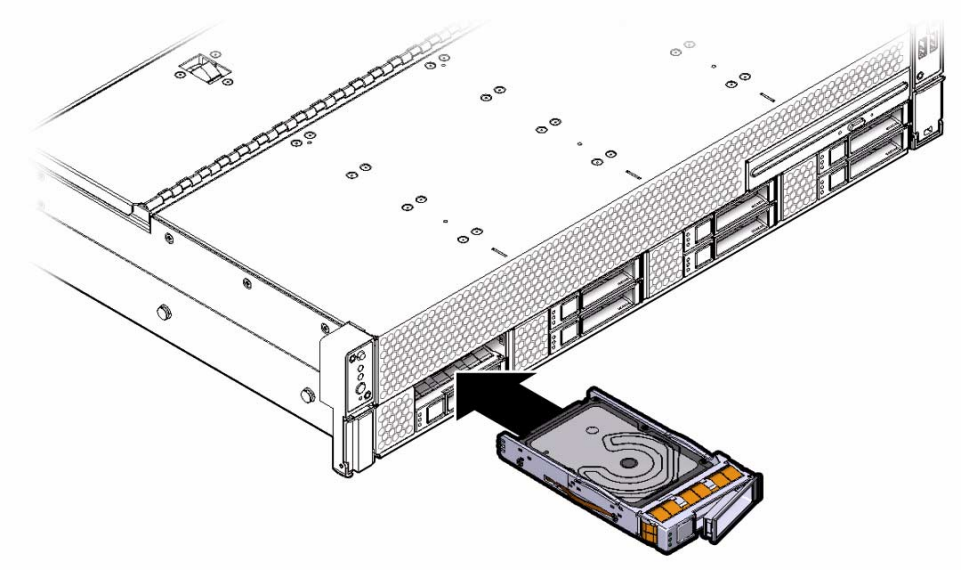
   The system might have filler panels covering unoccupied drive slots.

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

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

4. **Slide the drive into the slot until the drive is fully seated.**

FIGURE: Installing a Storage Drive



5. **Close the drive latch to lock the drive in place.**

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

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

Related Information

- "Storage and Boot Drive Indicators" on page 9
- "Storage Drives Hot-Plug Conditions" on page 48
- "Remove a Storage Drive" on page 49
- "Remove a Rear Storage Drive" on page 54

▼ Remove a Rear Storage Drive

Note – Rear storage drives are supported only in the twelve 3.5-inch storage drive and twenty-four 2.5-inch storage drive configurations. Rear storage drives are not supported in the eight 2.5-inch storage drive configuration.

1. **Identify the rear storage drive you want to remove.**

   The amber Service Required LED might be lit. For specific storage drive locations, see "Rear Panel Components and Cable Connections" on page 6.

Caution – In Oracle Engineered Systems, rear storage drive 1 might be populated with a remote battery module for the host bus adapter (HBA) card. The battery module is not a customer-replaceable unit (CRU) and should not be removed or replaced by customers. The battery module should be removed or replaced only by Oracle field service personnel.

2. **Remove the rear storage drive.**

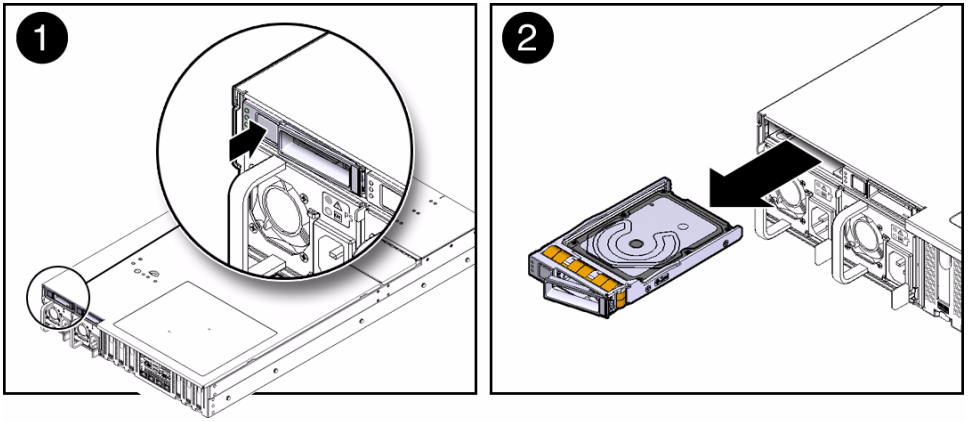
   a. **On the storage drive that you want to remove, push the drive release button to open the latch [1].**

   b. **Grasp the drive latch, and pull the drive out of the drive slot [2].**

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

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

FIGURE: Removing a Rear-Mounted Storage Drive



Related Information

- "Rear Panel Components and Cable Connections" on page 6
- "Storage and Boot Drive Indicators" on page 9
- "Remove a Storage Drive" on page 49

▼ Install a Rear Storage Drive

Note – Rear storage drives are supported only in the twelve 3.5-inch storage drive and twenty-four 2.5-inch storage drive configurations. Rear storage drives are not supported in the eight 2.5-inch storage drive configuration.

1. **If necessary, remove the drive filler panel.**

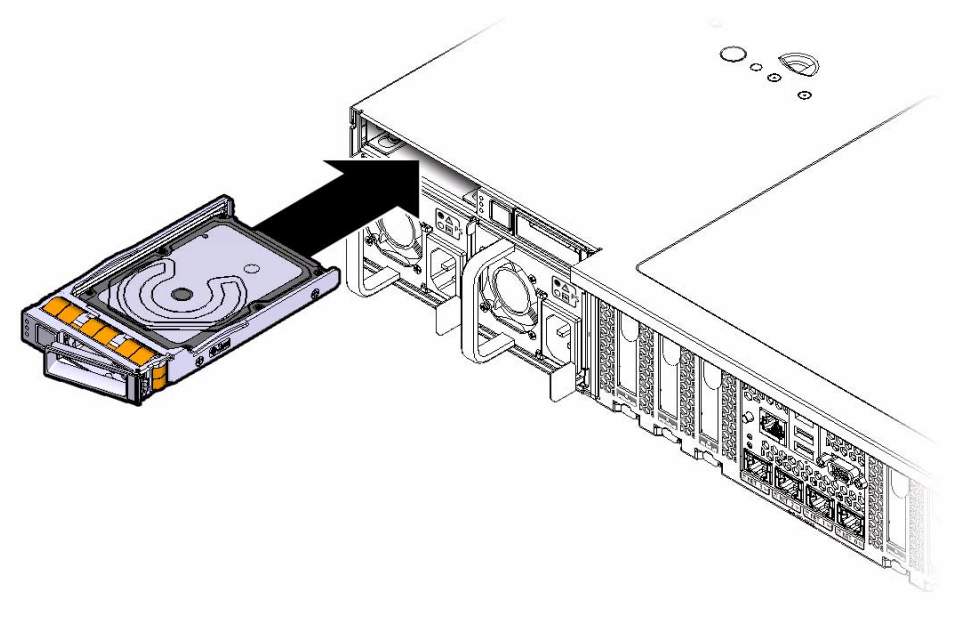
   The system might have filler panels covering unoccupied drive slots.

2. **Determine the drive slot location for the replacement drive.**

   If you removed an existing drive from a slot in the system, you must install the replacement drive in the same slot as the drive that was removed. Drives are physically addressed according to the slot in which they are installed. See "Rear Panel Components and Cable Connections" on page 6 for boot drive locations.

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

FIGURE: Installing a Rear-Mounted Storage Drive



4. **Close the drive latch to lock the drive in place.**

Related Information

- "Install a Storage Drive" on page 52
- "Rear Panel Components and Cable Connections" on page 6
- "Storage and Boot Drive Indicators" on page 9

Servicing Fan Modules (CRU)

The fan modules are located in the front of the server. See the following procedures:

- "Remove a Fan Module" on page 57
- "Install a Fan Module" on page 59

Related Information

- "Remove the Server Top Cover" on page 43

▼ Remove a Fan Module

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

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

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

   See "Extend the Server to the Maintenance Position" on page 40.

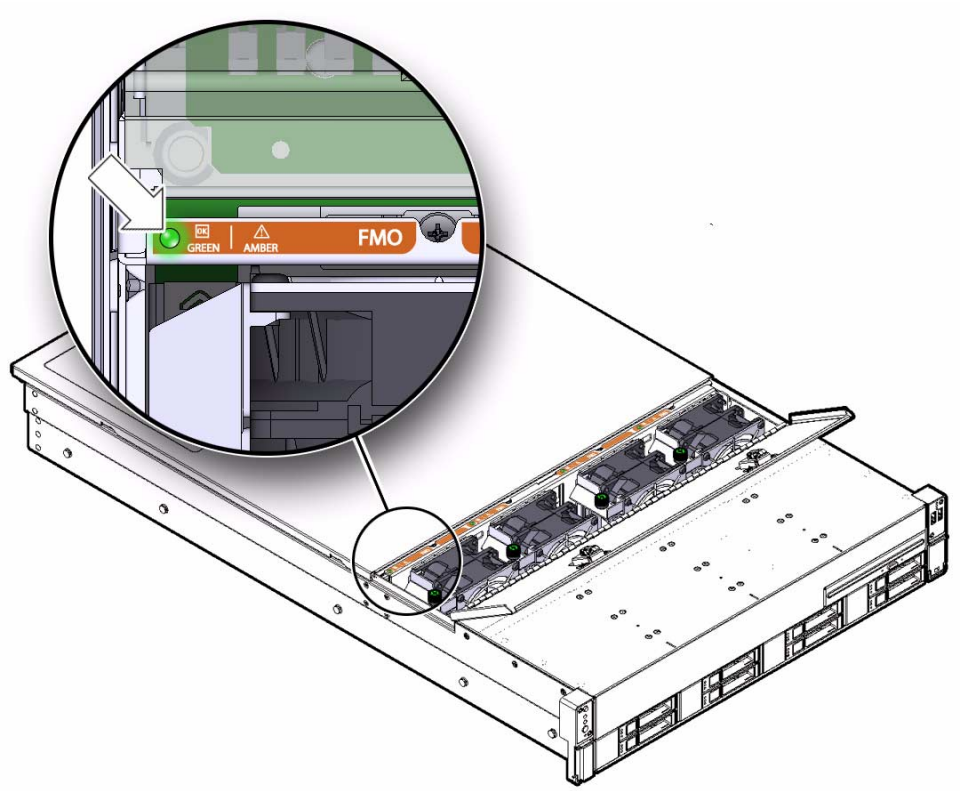
2. **To access the fan modules, open the top cover fan assembly door.**

Caution – Close the top cover fan assembly door within 60 seconds to maintain adequate airflow to properly cool the server. Leaving the door open for more than 60 seconds, while the server is running, will cause the server to automatically shut down.

3. **Identify the faulty fan module.**

   Each fan module has a fan status indicator (LED) that is located next to the module. If the LED is amber, the fan has failed. The location of the fan status LED is shown in the following figure.

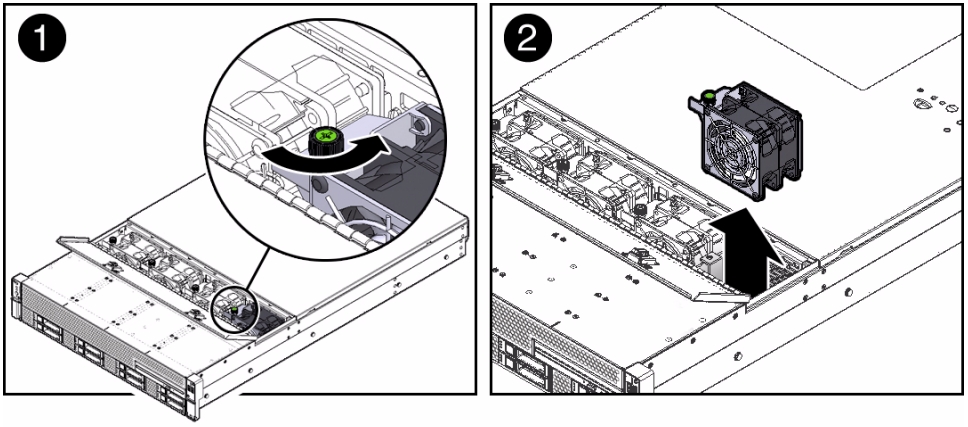
FIGURE: Fan Module Locations and Fan Status Indicators



LED Color and State Meaning
Amber - The fan module is faulty. The front Top Fan LED and the front and rear panel Service Required LEDs are also lit if the system detects a fan module fault.
Green - Indicates that the fan module is correctly installed and operating within specification.

4. **Use a No. 2 Phillips screwdriver to loosen the captive screw that secures the faulty fan module in the chassis [1].**

FIGURE: Removing a Fan Module



5. **Grasp both the captive screw and the opposite end of the module and lift the fan module straight up and out of the chassis, and set it aside on an antistatic mat [2].**

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

Caution – Do not service any other components in the fan compartment unless the system is shut down and the power cords are removed.

6. **Consider your next step:**
   - If you removed the fan assembly as part of another procedure, return to that procedure.
   - Otherwise, continue to "Install a Fan Module" on page 59.

Related Information

- "Install a Fan Module" on page 59

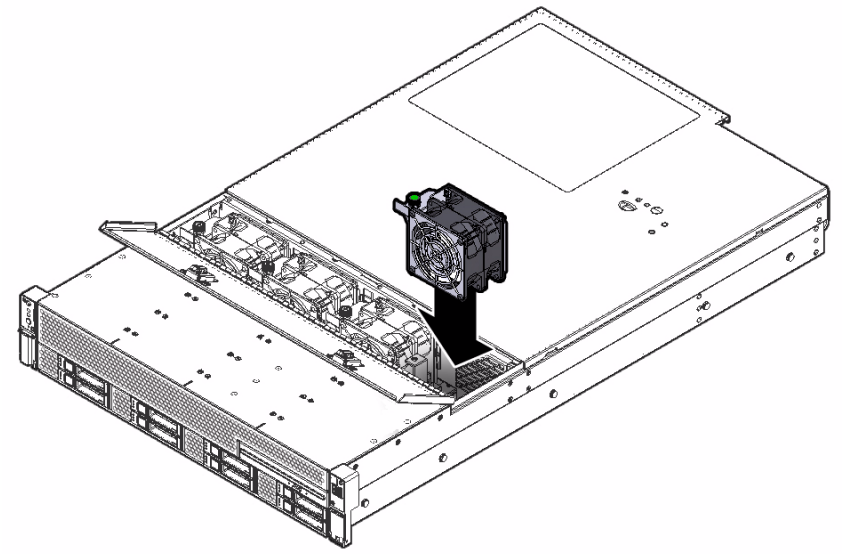
▼ Install a Fan Module

1. **Remove the replacement fan module from its packaging, and place it on an antistatic mat.**

2. **With the top cover fan assembly door open, install the replacement fan module into the server.**

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

FIGURE: Installing a Fan Module



3. **Press down on the fan module and apply firm pressure to fully seat the fan module.**
4. **Verify that the fan module status LED on the replacement fan module is lit green.**
5. **Using your thumb and forefinger, tighten the captive screw to secure the fan module to the chassis. Then use a No. 2 Phillips screwdriver to tighten the screw an additional 1/4 turn to secure the fan module to the chassis.**
6. **Close the top cover fan assembly door.**
7. **Verify that the Top Fan Fault LED on the front of the server and the Service Required LEDs on the front and rear of the server are extinguished.**

   See "Server General Status Indicators" on page 7 for more information about identifying and interpreting system status indicators.

8. **Consider your next step:**
   - If you installed the fan module as part of another procedure, return to that procedure.

- Otherwise, return the server to operation.

  See "Returning the Server to Operation" on page 157.

Related Information

- "Remove a Fan Module" on page 57

Servicing Power Supplies (CRU)

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

The server supports model A258 (1000 watt) power supplies. The A258 power supply unit (PSU) provides conversion from the AC lines to the system, accepting ranges from 100-240 volts AC (VAC). These PSUs are designed to be hot-swappable, and in most cases will provide fully redundant "1+1" power, allowing the system to suffer the loss of a PSU or an AC feed with no loss to system availability.

In maximally configured systems, it is possible that the worst-case power consumption of the system could exceed the capacity of a single PSU. The PSUs 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 PSU. This over-subscription support is accomplished using hardware signaling between the PSU and motherboard circuitry, which can force the system to throttle CPU and memory power in the event that a PSU 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.

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

- Front and rear Service Required LEDs
- Amber 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.

- "Remove a Power Supply" on page 62
- "Install a Power Supply" on page 64

Related Information

- "About Server and Component Status Indicators" on page 7

▼ Remove a Power Supply

1. Identify which power supply requires replacement.

FIGURE: Power Supplies and Latches Locations

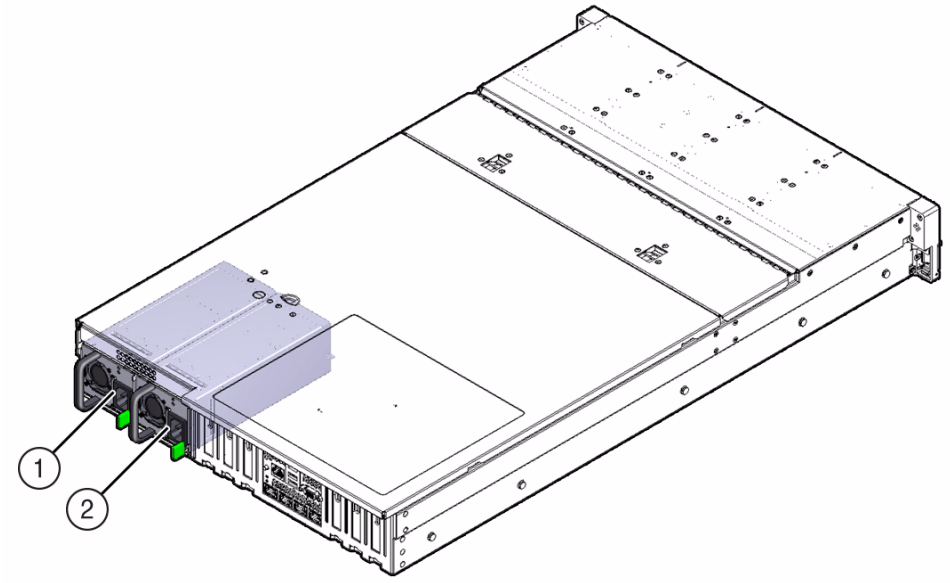


Figure Legend

1	Power supply 0
2	Power supply 1

A lit amber Service Required LED on a power supply indicates that a failure was detected. You can also use the Oracle ILOM `show faulty` command at the Oracle ILOM prompt (->) to identify a power supply failure.

Alternatively, to list all known faults in the server, log into the Oracle Solaris OS and issue the `fmadm faulty` command, or log into the Oracle ILOM service processor from the Oracle ILOM Fault Management Shell and issue the `fmadm faulty` command.

Note – The fans of a failed power supply might still be spinning when the system is powered on. The fans will stop spinning when you disconnect the power cords.

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

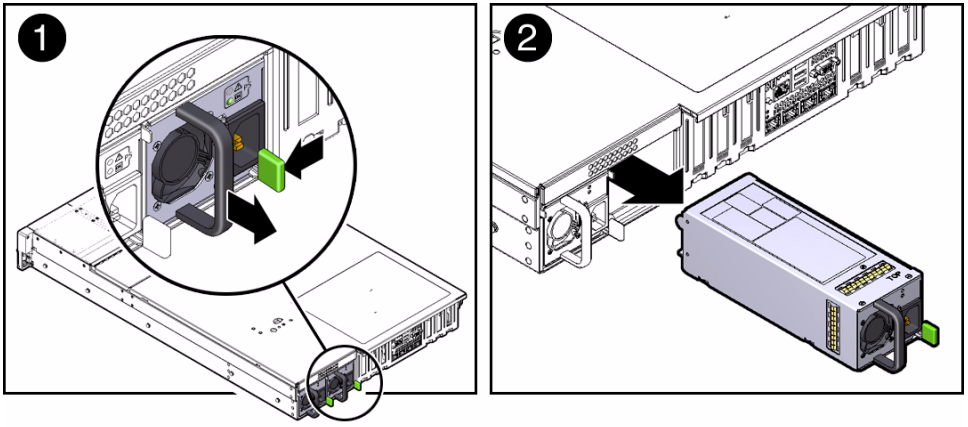
3. **If the cable management arm (CMA) is installed, disconnect both CMA left-side connectors and move the CMA out of the way.**

   For instructions for disconnecting the CMA left-side connectors, see the *Sun Server X4-2L Installation Guide,* "Remove the Second-Generation Cable Management Arm" on page 66 or *Sun Server X4-2L Installation Guide,* "Install the First-Generation Cable Management Arm" on page 71 as applicable.

Caution – When disconnecting the CMA left-side connectors, be sure to use your arm to support the CMA so that it does not hang down under its own weight and stress the right-side connectors; otherwise, the CMA might be damaged. You must continue to support the CMA until you have reconnected both of the left-side connectors.

4. **Disconnect the power cord from the faulty power supply.**
5. **Grasp the power supply handle and push the power supply latch to the left [1].**

FIGURE: Removing a Power Supply



6. **Pull the power supply out of the chassis [2].**
7. **Continue to** "Install a Power Supply" on page 64**.**

Related Information

- "Rear Panel Components and Cable Connections" on page 6
- "Power Supply Status Indicators" on page 10
- "Install a Power Supply" on page 64

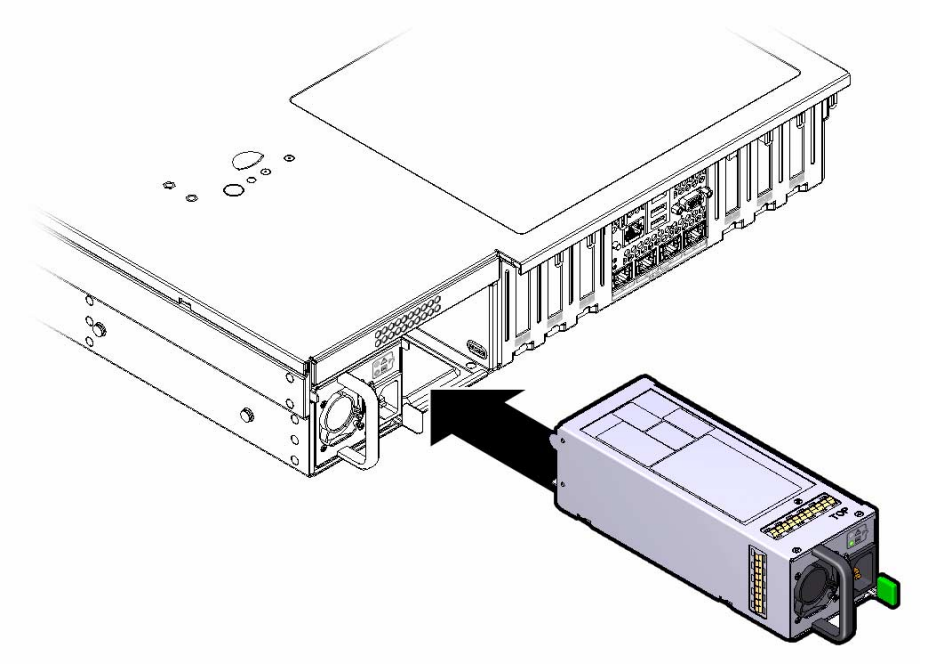
▼ Install a Power Supply

Caution – Always replace the failed power supply with the same type of power supply.

1. **Remove the replacement power supply from its packaging, and place it on an antistatic mat.**
2. **Align the replacement power supply with the empty power supply slot.**
3. **Slide the power supply into the slot until it is fully seated.**

   You will hear an audible click when the power supply fully seats.

FIGURE: Installing a Power Supply



4. **Reconnect the power cord to the power supply.**
5. **Verify that the amber Service Required LED on the replaced power supply and the Service Required LEDs are not lit on the front and rear panels.**

Note – After you have replaced Power Supply 0, you must reset the ILOM service processor (SP) to propagate the FRU top-level indicator (TLI) data to the new power supply. For instructions on resetting the SP, see the Oracle Integrated Lights Out Manager (ILOM) 3.1 Configuration and Maintenance Guide at `http://www.oracle.com/goto/ILOM/docs`. Power Supply 1 does not contain FRU TLI data, and therefore does not require an SP reset after replacement.

6. **If you disconnected the two CMA left-side connectors, reconnect the connectors.**

   For instructions for reconnecting the CMA left-side connectors, see *Sun Server X4-2L Installation Guide,* "Install the Second-Generation Cable Management Arm" on page 54 or *Sun Server X4-2L Installation Guide,* "Install the First-Generation Cable Management Arm" on page 71.

Related Information

- "Rear Panel Components and Cable Connections" on page 6
- "Power Supply Status Indicators" on page 10
- "Remove a Power Supply" on page 62

Servicing CRUs That Require Server Power-Off

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

Description	Links
Service the DIMMs.	"Servicing the DIMMs (CRU)" on page 67
Service the PCIe cards.	"Servicing PCIe Cards (CRU)" on page 81
Service the SAS expander module.	"Servicing the SAS Expander Module (CRU)" on page 85
Service the air baffle.	"Servicing the Air Baffle (CRU)" on page 89
Service the DVD drive.	"Servicing the DVD Drive (CRU)" on page 92
Service the internal USB flash drives.	"Servicing the Internal USB Flash Drives (CRU)" on page 94
Service the battery.	"Servicing the Battery (CRU)" on page 97

Related Information

- "Servicing CRUs That Do Not Require Server Power-Off" on page 47
- "Servicing FRUs" on page 101

Servicing the DIMMs (CRU)

The Sun Server X4-2L supports a variety of DDR3 DIMM configurations that can include quad-rank (QR), dual-rank (DR), or single-rank (SR) DDR3 DIMMs.

Note – While single-rank DIMMs can be installed in the Sun Server X4-2L, Oracle does not offer single-rank DIMMs for purchase.

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 Safety" on page 30.

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

When replacing or upgrading a DIMM on the server, consider the following:

Description	Links
Learn the location of the DIMM sockets in relation to the processors.	"DIMM and Processor Physical Layout" on page 69
Learn the rules to follow when installing DIMMs in slots.	"DIMM Population Rules" on page 72
Understand the classification rank labels on DIMMs.	"DIMM Rank Classification Labels" on page 74
Review how Oracle ILOM and BIOS identify DIMM fault locations, and review inconsistencies between DIMM fault LEDs and BIOS mapping.	"Inconsistencies Between DIMM Fault LEDs and the BIOS Isolation of Faulty DIMMs" on page 75
Identify the faulty DIMM using the Fault Remind button.	"Using the Fault Remind Button" on page 75
Remove the faulty DIMMs from the server.	"Remove Faulty DIMMs" on page 76
Install replacement or new DIMMs.	"Install DDR3 DIMMs" on page 79

Related Information

- "Servicing the Air Baffle (CRU)" on page 89
- "Servicing Processors (FRU)" on page 101

DIMM and Processor Physical Layout

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

FIGURE: DIMM and Processor Physical Layout

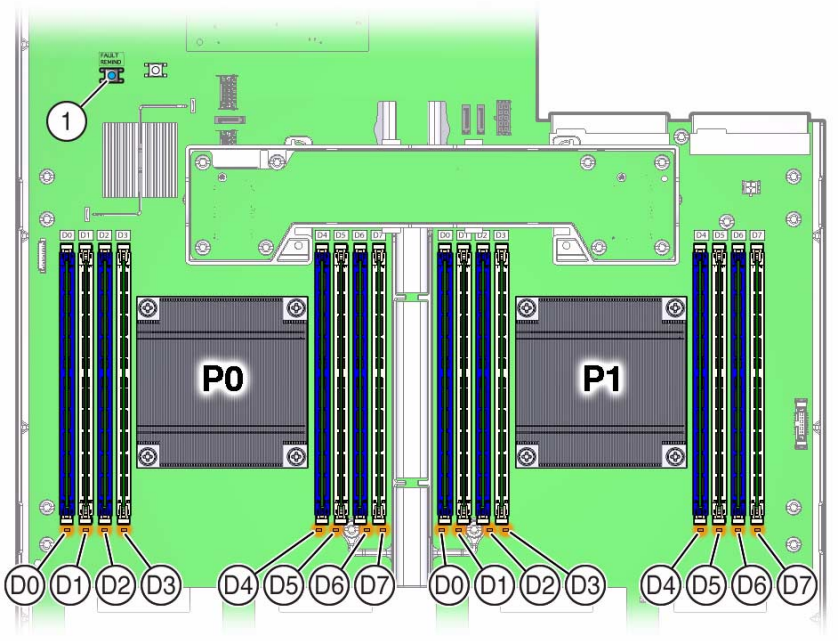


Figure Legend

1	Fault Remind button

Note – Only DIMM sockets associated with processor P0 are supported in single-processor systems.

Related Information

- "DIMM Rank Classification Labels" on page 74
- "Inconsistencies Between DIMM Fault LEDs and the BIOS Isolation of Faulty DIMMs" on page 75
- "Remove Faulty DIMMs" on page 76
- "Install DDR3 DIMMs" on page 79

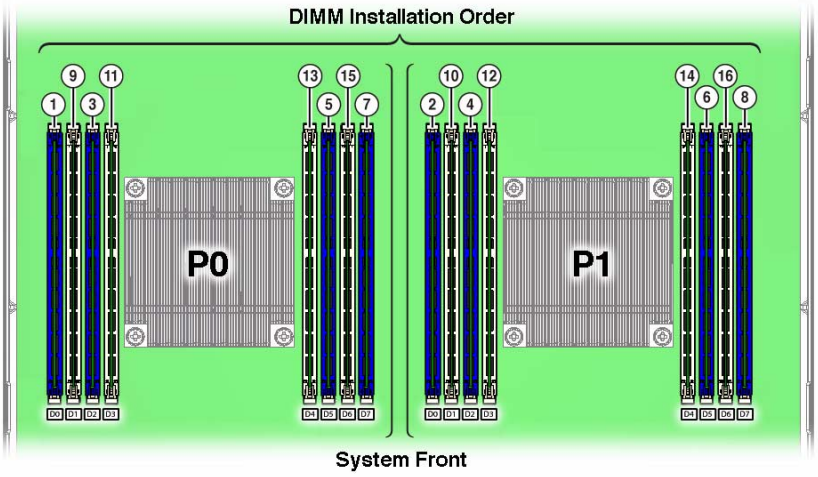
DIMM Population Example for Optimal System Performance

This section provides an example of how to populate the DIMM sockets to achieve optimal system performance.

Note – Not all possible configurations are shown here.

The following figure shows the order in which the DIMM sockets should be populated on a dual-processor system. On a single-processor system, you should follow the same order except that you should only install DIMMs in the DIMM sockets for processor 0 (P0). On a single-processor system, a DIMM filler panel must always be installed in processor 1 (P1) DIMM socket D7.

FIGURE: DIMM Population Example



For more information on populating the DIMMs, see the following topics:

- "DIMM Population Order for Single-Processor Systems" on page 70
- "DIMM Population Order for Dual-Processor Systems" on page 71

DIMM Population Order for Single-Processor Systems

For single-processor systems, DIMMs should only be installed into DIMM sockets associated processor 0 (P0) starting with P0 D0, first filling the blue sockets and then the white. This DIMM population order is illustrated in FIGURE: DIMM Population Example on page 70.

The following table describes the order in which the DIMM sockets should be populated on a single-processor system. The figure callouts in column two of the table refer to the callouts in FIGURE: DIMM Population Example on page 70.

TABLE: DIMM Population Order for Single-Processor Systems

Population Order	Figure Callouts	DIMMs Sockets for Processor 0 (P0)
Fill the blue sockets first		
First	1	D0
Second	3	D2
Third	5	D5
Fourth	7	D7
Then fill the white sockets		
Fifth	9	D1
Sixth	11	D3
Seventh	13	D4
Eighth	15	D6

DIMM Population Order for Dual-Processor Systems

For dual-processor systems, DIMMs should be installed into DIMM sockets starting with P0 D0 and then alternating between sockets associated with processor 0 (P0) and matching sockets for processor 1 (P1), first filling the blue sockets and then the white. This DIMM population order is illustrated in FIGURE: DIMM Population Example on page 70.

The following table describes the order in which the DIMM sockets should be populated on a dual-processor system. The figure callouts in columns two and four of the table refer to callouts in FIGURE: DIMM Population Example on page 70.

TABLE: DIMM Population Order for Dual-Processor Systems

Population Order	Figure Callouts	DIMM Sockets for Processor 0 (P0)	Figure Callouts	DIMM Sockets for Processor 1 (P1)
Fill the blue sockets first				
First	1	Fill D0 first	2	Then D0
Second	3	Fill D2 first	4	Then D2
Third	5	Fill D5 first	6	Then D5

TABLE: DIMM Population Order for Dual-Processor Systems *(Continued)*

Population Order	Figure Callouts	DIMM Sockets for Processor 0 (P0)	Figure Callouts	DIMM Sockets for Processor 1 (P1)
Fourth	7	Fill D7 first	8	Then D7
Then fill the white sockets				
Fifth	9	Fill D1 first	10	Then D1
Sixth	11	Fill D3 first	12	Then D3
Seventh	13	Fill D4 first	14	Then D4
Eighth	15	Fill D6 first	16	Then D6

DIMM Population Rules

The DIMM population rules for the server are as follows:

- On dual-processor systems, all DIMM sockets can have either a DIMM or DIMM filler panel installed.
- On single-processor systems, all DIMM sockets associated with processor socket P0 can have either a DIMM or DIMM filler panel.

Note – A DIMM filler panel must always be installed in processor 1 (P1) DIMM socket D7 to support proper air flow for cooling; however, DIMM filler panels are not required in any of the other DIMM sockets for P0 or P1.

- A single DIMM configuration is supported.
- Do not populate DIMM sockets next to an empty processor socket. Each processor contains a separate memory controller.
- Each processor has four channels and can support two DIMMs per channel for a maximum of eight quad-rank (QR) Load Reduced DIMMs (LRDIMMs), dual-rank (DR) DIMMs, or single-rank (SR) DIMMs.
- The server supports 32-GB QR LRDIMMs in addition to 8-GB and 16-GB RDIMMs.
- You cannot mix LRDIMMs and RDIMMs in the same server. If you choose to install 32-GB QR LRDIMMs in the server, you cannot install any 8-GB or 16-GB single-rank or dual-rank RDIMMs.
- If you are installing a mix of RDIMM sizes (for example, 8-GB and 16-GB), install the larger RDIMMs first, then the smaller RDIMMs, until all of the RDIMMs are installed.
- If you are installing QR LRDIMMs within a channel, populate the blue sockets prior to populating the white sockets.

Note – While the processor used in the server supports four modes of operation—Independent Channel Mode, Lockstep Channel Mode, Mirrored Channel Mode, and Device Tagging Mode—the server supports the Independent Channel Mode only.

Note – Each processor (P0, P1) has eight associated DIMM sockets, numbered D0, D1, D2, D3, D4, D5, D6, and D7.

- DIMMs should be installed into DIMM sockets starting with P0 D0 and then alternating between sockets associated with P0 and matching sockets on P1, first filling the blue sockets and then the white sockets. For an example of a configuration that follows this rule, see "DIMM Population Example for Optimal System Performance" on page 70.
- For maximum performance, apply the following rules:
  - The best performance is ensured by preserving symmetry. For example: add four of the same kind of DIMMs, one per memory channel, and if the server has two processors, ensure that both processors have the same size of DIMMs installed in the same manner.
  - For optimal performance, the memory installation should be identical across both sockets. Populate each socket with QR, DR, or SR DIMMs in sets of four, one per memory channel.

  All memory installed in the system will operate at the same speed. DIMM operational speed, or frequency, is limited to the lowest speed determined by each of the following factors:

  - Maximum memory frequency supported by processor
  - Maximum memory frequency supported by the installed DIMMs
  - Memory configuration within a channel

  The table below lists the memory speed limitations associated with all the possible combinations of DIMMs within an individual memory channel.

Blue Socket	White Socket	Speed
Quad-rank LRDIMM	Empty	1066 MT/s
Dual-rank DIMM	Empty	1600 MT/s
Single-rank DIMM	Empty	1600 MT/s
Quad-rank LRDIMM	Quad-rank LRDIMM	1600 MT/s
Dual-rank DIMM	Dual-rank DIMM	1600 MT/s
Dual-rank DIMM	Single-rank DIMM	1600 MT/s

Blue Socket	White Socket	Speed
Single-rank DIMM	Single-rank DIMM	1600 MT/s

Related Information

- "DIMM and Processor Physical Layout" on page 69
- "DIMM Rank Classification Labels" on page 74
- "Inconsistencies Between DIMM Fault LEDs and the BIOS Isolation of Faulty DIMMs" on page 75
- "Remove Faulty DIMMs" on page 76
- "Install DDR3 DIMMs" on page 79

DIMM Rank Classification Labels

DIMMs come in a variety of ranks: single, dual, or quad. Each DIMM is shipped with a label identifying its rank classification. The following table identifies the label corresponding to each DIMM rank classification:

TABLE: DIMM Rank Classification Labels

Rank Classification	Label
Quad-rank LRDIMM	4Rx4
Dual-rank DIMM	2Rx4
Single-rank DIMM	1Rx4

Note – While single-rank DIMMs can be installed in the Sun Server X4-2L, Oracle does not offer single-rank DIMMs for purchase.

Related Information

- "DIMM and Processor Physical Layout" on page 69
- "Remove Faulty DIMMs" on page 76
- "Install DDR3 DIMMs" on page 79

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

When a single DIMM is marked as faulty by Oracle ILOM (for example, `fault.memory.intel.dimm.training-failed` is listed in the SP event log), BIOS might disable the entire memory channel that contains the faulty DIMM as failing, that is, up to two DIMMs. As a result, the memory available to the operating system is reduced. However, when the Fault Remind button is pressed, only the fault status indicator (LED) associated with the faulty DIMM lights. The fault LED for the other DIMM in the memory channel remains off. Therefore, you can correctly identify the faulty DIMM.

When the faulty DIMM is replaced and the DIMM fault is cleared using Oracle ILOM, the memory available to the operating system returns to normal. You can use the Oracle ILOM web interface or the command-line interface (CLI) to manually clear faults. For information on how to use the Oracle ILOM web interface or the CLI to clear server faults, see the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at:

`http://www.oracle.com/goto/ILOM/docs`.

Related Information

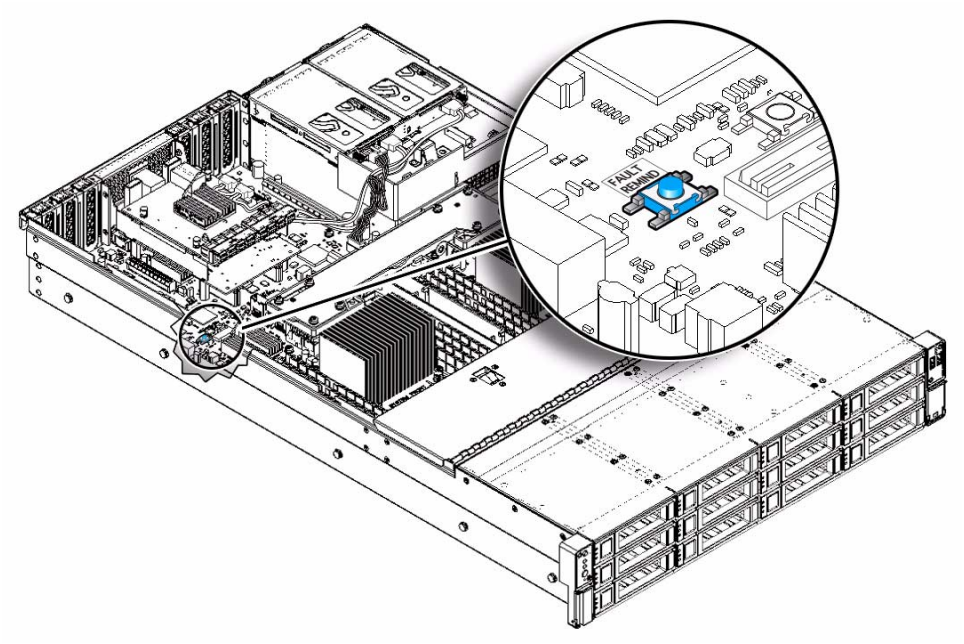
- "DIMM and Processor Physical Layout" on page 69
- "Remove Faulty DIMMs" on page 76
- "Install DDR3 DIMMs" on page 79

Using the Fault Remind Button

When the Fault Remind button is pressed, an LED located next to the Fault Remind button lights green to indicate that there is sufficient voltage present in the fault remind circuit to light any fault LEDs that were 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 has lost its charge. This can happen if the Fault Remind button is pressed for a long time with fault LEDs lit or if power has been removed from the server for more than 15 minutes.

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

FIGURE: DIMM Fault Remind Button Location



▼ Remove Faulty DIMMs

Note – The DDR3 DIMMs are customer-replaceable units (CRUs) and do not require an authorized service provider for replacement.

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

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

      See "Powering Down the Server" on page 33.

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

      See "Extend the Server to the Maintenance Position" on page 40.

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

      See "Electrostatic Discharge Safety" on page 30.

d. Remove the server top cover.

See "Remove the Server Top Cover" on page 43.

e. Remove the air baffle.

See "Servicing the Air Baffle (CRU)" on page 89.

2. Replace the faulty DIMMs.

a. To identify the location of the faulty DDR3 DIMMs, press the Fault Remind button on the motherboard.

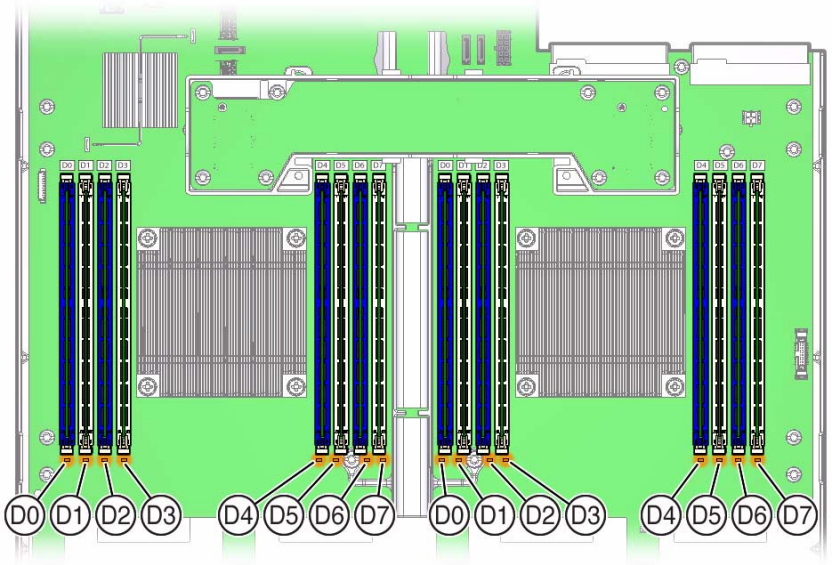
See "Using the Fault Remind Button" on page 75.

b. Note the location of faulty DDR3 DIMMs.

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.

FIGURE: Identifying Faulty DIMMs



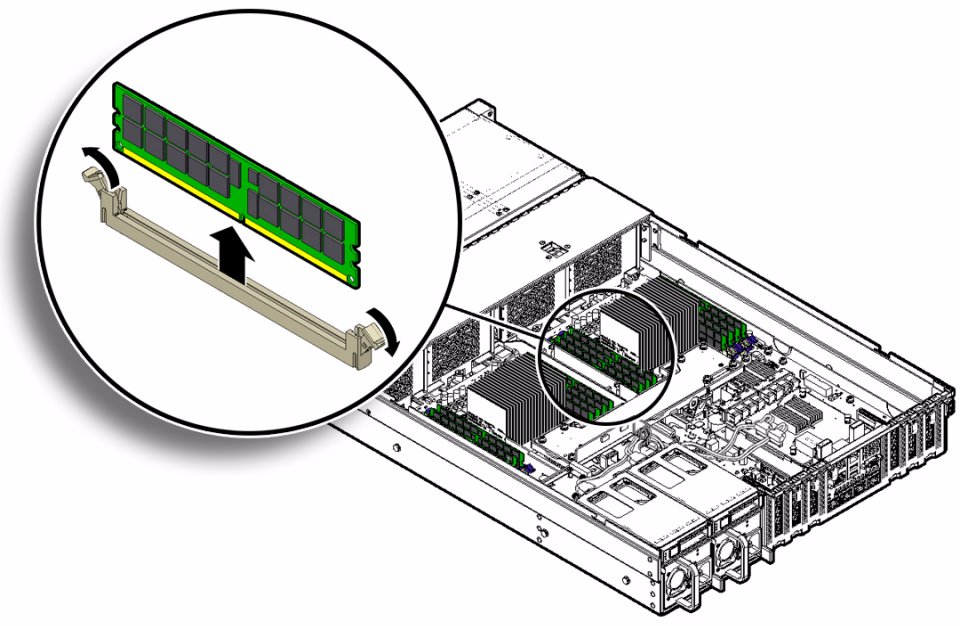
c. To remove the faulty DIMM, do the following:

- Rotate both DIMM socket ejector levers for the faulty DIMM outward as far as they will go.

  The DIMM is partially ejected from the socket.

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

FIGURE: Removing a DIMM



d. Replace each faulty DIMM with either another DIMM of the same rank size (quad-rank, dual-rank, or single-rank) or leave it empty.

For DIMM replacement instructions, see "Install DDR3 DIMMs" on page 79.

Note – With one exception, DIMM filler panels are optional and not required. The exception is processor 1 (P1) DIMM socket D7 in single-processor systems, which is required to support proper air flow for cooling.

Related Information

- "DIMM and Processor Physical Layout" on page 69
- "DIMM Population Rules" on page 72
- "DIMM Rank Classification Labels" on page 74
- "Install DDR3 DIMMs" on page 79

▼ Install DDR3 DIMMs

1. **Unpack the new or replacement DDR3 DIMMs, and place them on an antistatic mat.**
2. **Ensure that the DDR3 DIMMs match the sizes of the DDR3 DIMMs they are replacing.**

   If you violate the DIMM population rules, the performance of the server might be adversely affected. For DIMM socket population rules, see "DIMM Population Rules" on page 72.
3. **Install a DIMM.**

   a. **Ensure that the ejector tabs are in the open position.**

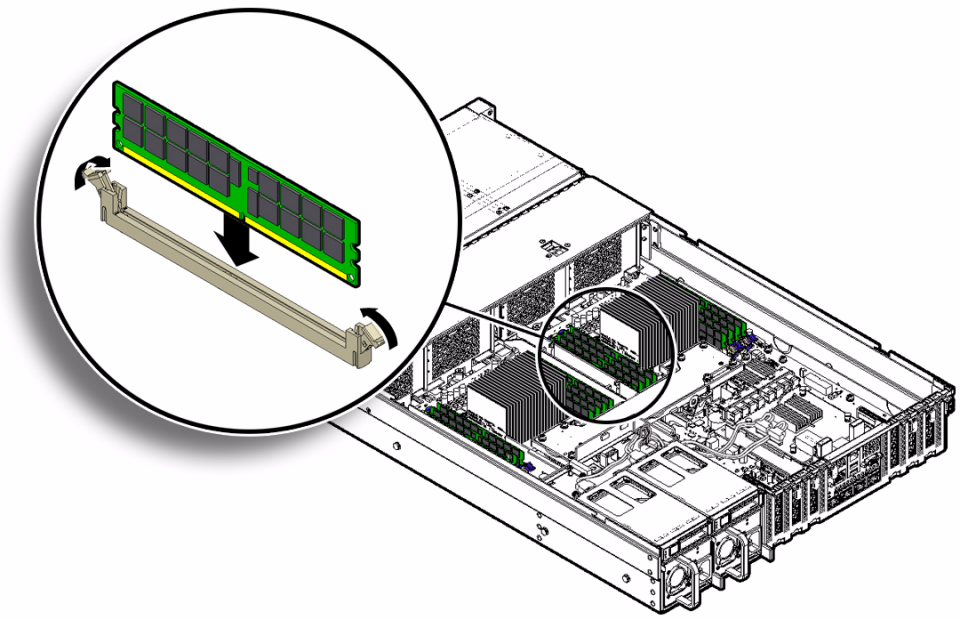
   b. **Align the notch in the replacement DIMM with the key in the connector socket.**

      The aligned notch ensures that the DIMM is oriented correctly.

   c. **Push the DDR3 DIMM into the connector socket until the ejector levers lock the DIMM into 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.

FIGURE: Installing a DIMM



4. **Repeat** Step 3 **until all replacement DIMMs are installed.**
5. **Return the server to operation:**
   a. **Install the air baffle.**
      See "Install the Air Baffle" on page 90.
   b. **Install the server top cover.**
      See "Install the Server Top Cover" on page 159.
   c. **Return the server to the normal rack position.**
      See "Reinstall the Server Chassis in the Rack" on page 162.
   d. **Reconnect the power cords to the server power supplies, and power on the server.**
      See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.
6. **(Optional) Use Oracle ILOM to clear server DDR3 DIMM faults.**
   DDR3 DIMM faults are automatically cleared after a new memory DIMM has been installed. If you need to manually clear DDR3 DIMM faults, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: `http://www.oracle.com/goto/ILOM/docs`.

Related Information

- "DIMM and Processor Physical Layout" on page 69
- "DIMM Population Rules" on page 72
- "DIMM Rank Classification Labels" on page 74
- "Remove Faulty DIMMs" on page 76

Servicing PCIe Cards (CRU)

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

Note – For a complete list of supported PCIe cards, refer to the *Sun Server X4-2L Product Notes* at: `http://www.oracle.com/goto/X4-2L/docs`.

- "PCIe Slot Locations" on page 81
- "Remove a PCIe Card" on page 82
- "Install a PCIe Card" on page 84

Related Information

- "Servicing the Air Baffle (CRU)" on page 89
- "Servicing the SAS Expander Module (CRU)" on page 85

PCIe Slot Locations

There are six PCIe slots available for optional PCIe cards. The following figure shows the PCIe slot numbering.

FIGURE: PCIe Slot Locations

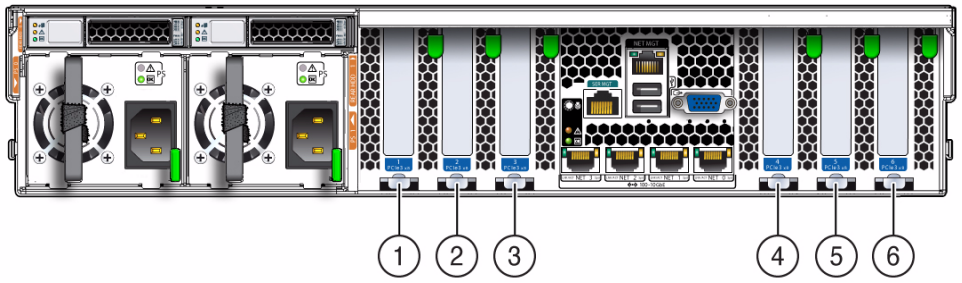


Figure Legend

1	PCIe slot 1 (PCIe slot 1 is nonfunctional in single-processor systems.)
2	PCIe slot 2 (PCIe slot 2 is nonfunctional in single-processor systems.)
3	PCIe slot 3 (PCIe slot 3 is nonfunctional in single-processor systems.)
4	PCIe slot 4
5	PCIe slot 5
6	PCIe slot 6 (Primary internal HBA card slot)

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

Related Information

- "Remove a PCIe Card" on page 82
- "Install a PCIe Card" on page 84

▼ Remove a PCIe Card

Note – PCIe slots 1, 2, and 3 are nonfunctional in single-processor systems.

Note – Prior to replacing or installing a PCIe card, refer to the card documentation for specific installation and cabling instructions.

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

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

   See "Powering Down the Server" on page 33.

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

   See "Extend the Server to the Maintenance Position" on page 40.

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

   See "Electrostatic Discharge Safety" on page 30.

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

   See "Remove the Server Top Cover" on page 43.

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

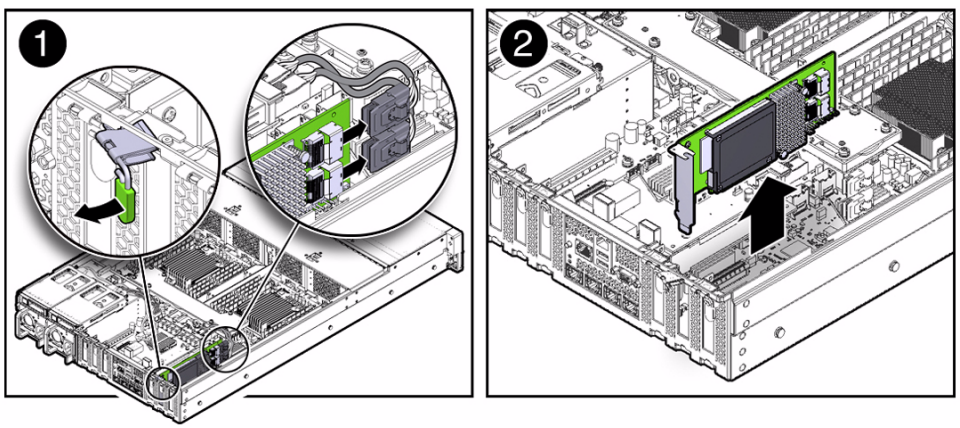
   See "PCIe Slot Locations" on page 81.

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

4. **Unplug all data cables from the PCIe card [1].**

5. **Rotate the PCIe card locking mechanism [1], and then lift up on the PCIe card to disengage it from the motherboard connectors [2].**

FIGURE: Removing a PCIe Card



6. **Place the PCIe card on an antistatic mat.**

Caution – If you are not immediately inserting a replacement PCIe card into the empty slot, insert a PCIe filler panel in the slot to reduce the possibility of radiated electromagnetic interference (EMI). For instructions for installing a PCIe filler panel, see "Remove and Install Filler Panels" on page 158.

Related Information

- "PCIe Slot Locations" on page 81
- "Install a PCIe Card" on page 84

▼ Install a PCIe Card

Note – PCIe slots 1, 2, and 3 are nonfunctional in single-processor systems.

1. **Unpack the replacement PCIe card, and place it on an antistatic mat.**
2. **Locate the proper PCIe slot for the card you are replacing.**

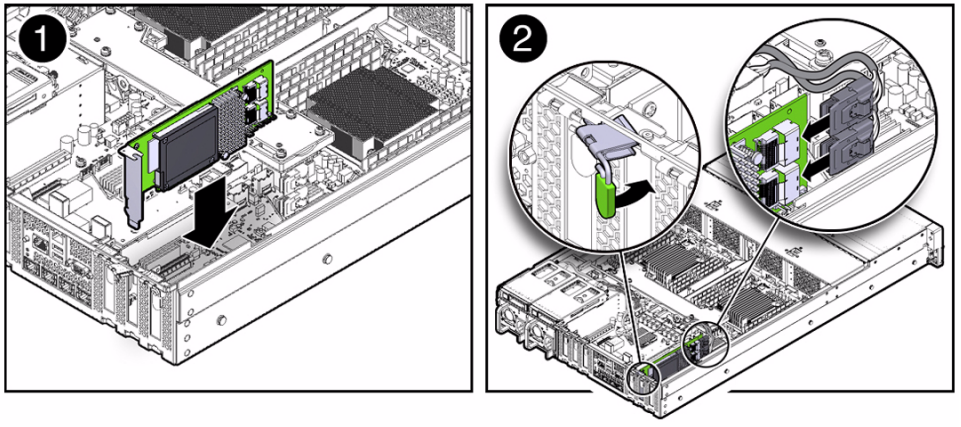
Note – PCIe slot 6 is the primary slot for the internal HBA for controlling and managing the storage drives.

3. **If necessary, remove the PCIe filler panel from the slot.**

Note – Save this filler panel in case you ever need to remove the PCIe card from the system.

4. **Insert the PCIe card into the correct slot [1], and rotate the PCIe locking mechanism to secure the PCIe card in place [2].**

FIGURE: Installing a PCIe Card



5. **Reconnect the cables to the PCIe card that you unplugged during the removal procedure [2].**

6. **Return the server to operation.**

   a. **Install the top cover.**

      See "Install the Server Top Cover" on page 159.

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

      See "Return the Server to the Normal Rack Position" on page 163.

   c. **Connect any required data cables to the PCIe card.**

      Route data cables through the cable management arm.

   d. **Reconnect the power cords to the power supplies and power on the server.**

      See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

7. **Use Oracle ILOM to clear the server PCIe card fault.**

   You can use the Oracle ILOM web interface or the command-line interface (CLI) to manually clear faults. For information on how to use the Oracle ILOM web interface or the CLI to clear server faults, see the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at:

   `http://www.oracle.com/goto/ILOM/docs`.

8. **To determine if additional steps are required to complete the installation of the PCIe card, see the server product notes for the type of PCIe card you installed.**

   For a complete listing of the PCIe host bus adapter (HBA) cards supported by the server, refer to the *Sun Server X4-2L Product Notes* at:
   `http://www.oracle.com/goto/X4-2L/docs`.

Related Information

- "PCIe Slot Locations" on page 81
- "Remove a PCIe Card" on page 82

Servicing the SAS Expander Module (CRU)

The SAS expander module serves as an interface between the storage drive backplane and the storage drive cables that connect to the HBA PCIe card.

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

- "Remove the SAS Expander Module" on page 86
- "Install the SAS Expander Module" on page 87

Related Information

- "Servicing Storage Drives and Rear Drives (CRU)" on page 47
- "Servicing PCIe Cards (CRU)" on page 81
- "Servicing Cables (FRU)" on page 137

▼ Remove the SAS Expander Module

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

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

      See "Powering Down the Server" on page 33.

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

      See "Extend the Server to the Maintenance Position" on page 40.

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

      See "Electrostatic Discharge Safety" on page 30.

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

      See "Remove the Server Top Cover" on page 43.

2. **Remove the SAS expander module.**

   a. **Locate the SAS expander module [1].**

   b. **Disconnect the HBA cable and SAS cables from the SAS expander module [1 and 2].**

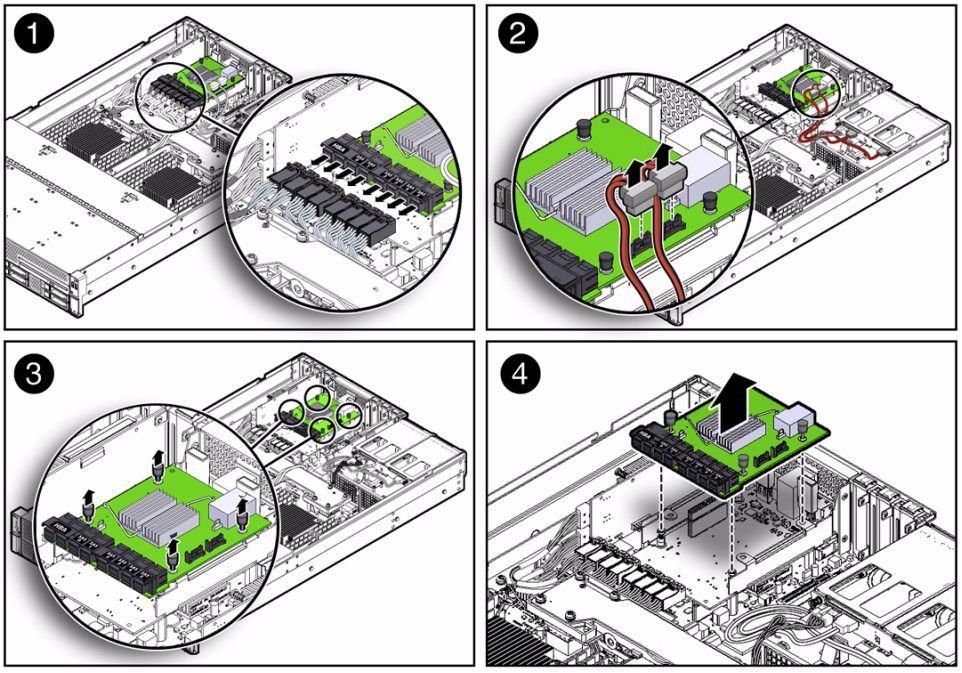
      See "Remove Storage Drive Cables From a SAS/SATA Configuration" on page 137.

   c. **Locate and loosen the four black push pins that secure the SAS expander module to the server's chassis. Loosen each push pin by pulling up on the pin until it clicks into the open position [3].**

d. **Grasp the sides of the SAS expander module, and gently lift the module to disengage the module from the chassis connector [4].**

e. **Place the SAS expander module on an antistatic mat.**

FIGURE: Removing the SAS Expander Module



Related Information

- "Install the SAS Expander Module" on page 87
- "Remove Storage Drive Cables From a SAS/SATA Configuration" on page 137

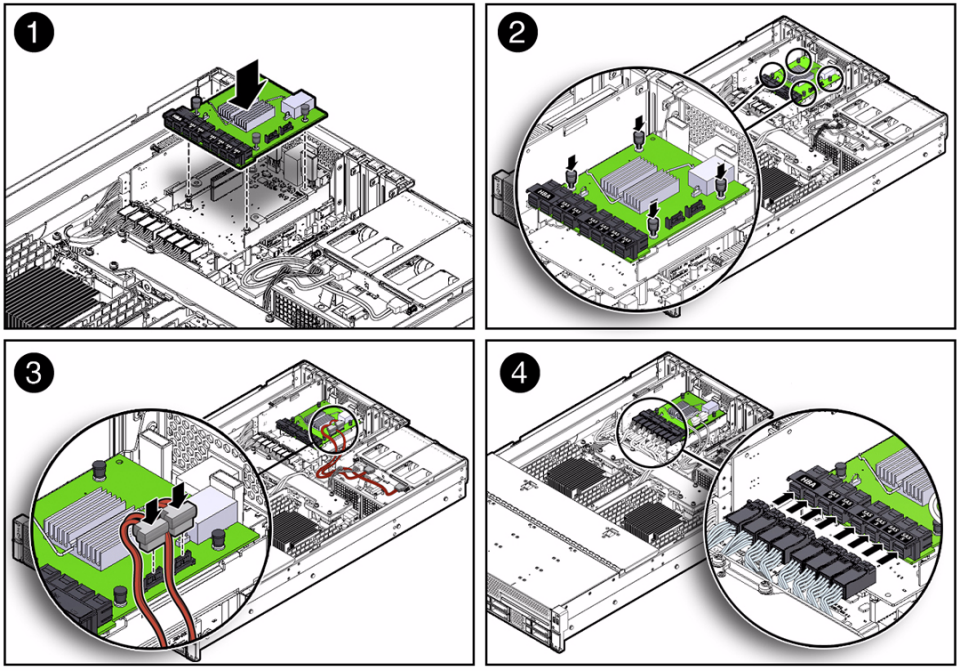
▼ Install the SAS Expander Module

1. **Install the SAS expander module.**

   a. **Lower the SAS expander module into the server chassis, and gently push down on the module to engage the chassis connector [1].**

   b. **Push down on the four black push pins to secure the SAS expander module to the server's chassis [2].**

FIGURE: Installing the SAS Expander Module



c. Connect the HBA cable and SAS cables to the SAS expander module [3 and 4].

See "Install Storage Drive Cables in a SAS/SATA Configuration" on page 140.

2. Return the server to operation.

a. Install the server top cover.

See "Install the Server Top Cover" on page 159.

b. Return the server to the normal rack position.

See "Return the Server to the Normal Rack Position" on page 163.

c. Reconnect the power cords to the power supplies and power on the server.

See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

Related Information

- "Remove the SAS Expander Module" on page 86
- "Install Storage Drive Cables in a SAS/SATA Configuration" on page 140

Servicing the Air Baffle (CRU)

You must remove the air baffle to access certain motherboard components, such as DIMMs and processors.

Caution – To prevent the system from overheating, ensure that the air baffle is correctly installed before powering on the system.

Caution – You must disconnect all power cables from the system before performing this procedure.

- "Remove the Air Baffle" on page 89
- "Install the Air Baffle" on page 90

Related Information

- "Servicing the DIMMs (CRU)" on page 67
- "Servicing Processors (FRU)" on page 101

▼ Remove the Air Baffle

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

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

      See "Powering Down the Server" on page 33.

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

      See "Extend the Server to the Maintenance Position" on page 40.

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

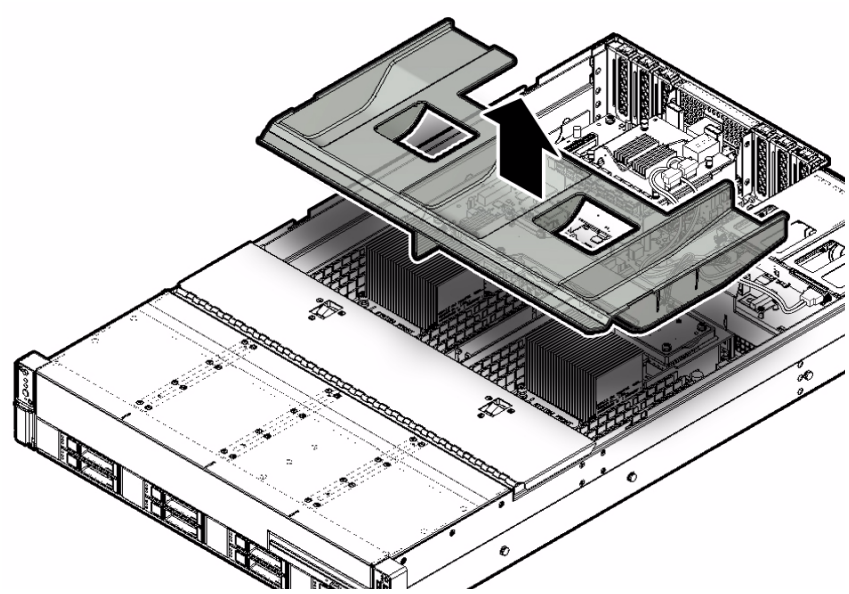
      See "Electrostatic Discharge Safety" on page 30.

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

      See "Remove the Server Top Cover" on page 43.

2. **Remove the air baffle by lifting the baffle up and out of the server.**

FIGURE: Removing the Air Baffle



3. **Set the air baffle aside.**
4. **Consider your next step:**
   - If you removed the air baffle as part of another procedure, return to that procedure.
   - Otherwise, continue to "Install the Air Baffle" on page 90.

Related Information

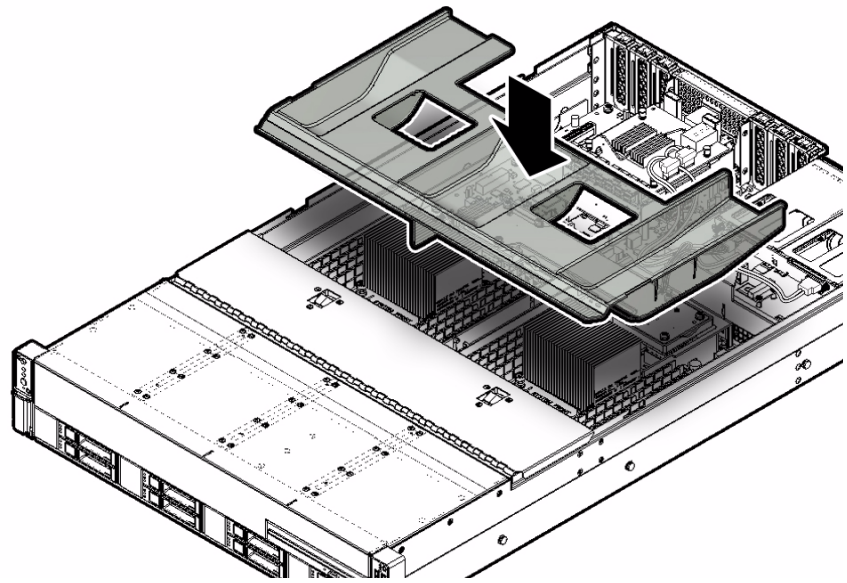
- "Install the Air Baffle" on page 90
- "Servicing the DIMMs (CRU)" on page 67
- "Servicing Processors (FRU)" on page 101

▼ Install the Air Baffle

Caution – When the server is in operation, ensure that the air baffle is correctly installed to prevent the system from overheating.

1. **Remove the replacement air baffle from its packaging.**
2. **Install the air baffle by placing it into the server and lowering it to its down position.**

FIGURE: Installing the Air Baffle



3. **Consider your next step:**
   - If you installed the air baffle as part of another procedure, return to that procedure.
   - Otherwise, continue with this procedure.
4. **Return the server to operation.**
   a. **Install the server top cover.**

      See "Install the Server Top Cover" on page 159.

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

      See "Return the Server to the Normal Rack Position" on page 163.

   c. **Reconnect the power cords to the server power supplies, and power on the server.**

      See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

Related Information

- "Remove the Air Baffle" on page 89

Servicing the DVD Drive (CRU)

The DVD drive is available only on eight-drive systems. The DVD drive is accessible from the chassis front panel and by opening the fan door assembly.

- "Remove the DVD Drive" on page 92
- "Install the DVD Drive" on page 93

Related Information

- "Servicing Fan Modules (CRU)" on page 56

▼ Remove the DVD Drive

1. **Remove media from the drive.**
2. **Prepare the server for service.**
   a. **Power off the server and disconnect the power cords from the server power supplies.**

      See "Powering Down the Server" on page 33.

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

      See "Extend the Server to the Maintenance Position" on page 40.

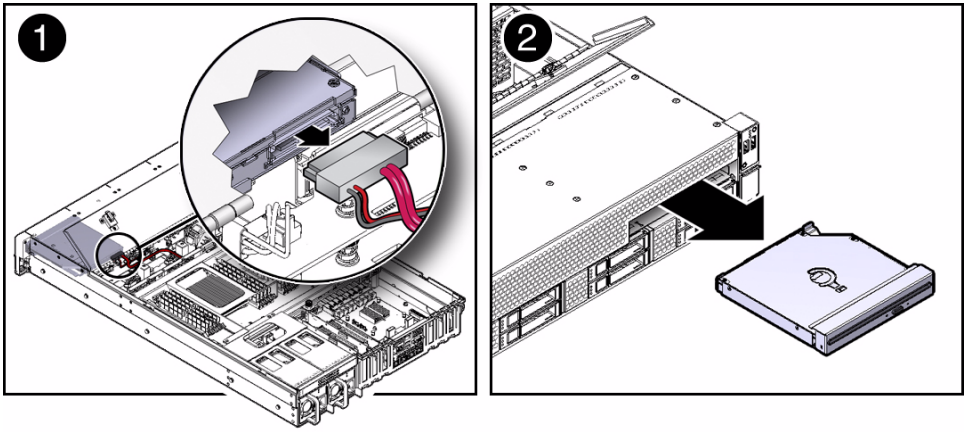
   c. **Attach an antistatic wrist strap.**

      See "Electrostatic Discharge Safety" on page 30.

   d. **Open the fan assembly door.**
3. **Remove fan modules 2 and 3 from the chassis.**

   See "Remove a Fan Module" on page 57.
4. **Reach into the server directly behind the DVD drive, and disconnect the power and communication connector from rear of the DVD drive [1].**

FIGURE: Removing a DVD Drive



5. **Lift up on the release tab on the rear of the DVD drive to disengage the drive from chassis.**
6. **Gently push the DVD forward and out of the front of the chassis [2].**
7. **Standing in front of the chassis, grasp the DVD drive with both hands, and continue to pull the DVD drive from the chassis until it clears the front of the server.**
8. **Place the DVD drive on an antistatic mat.**

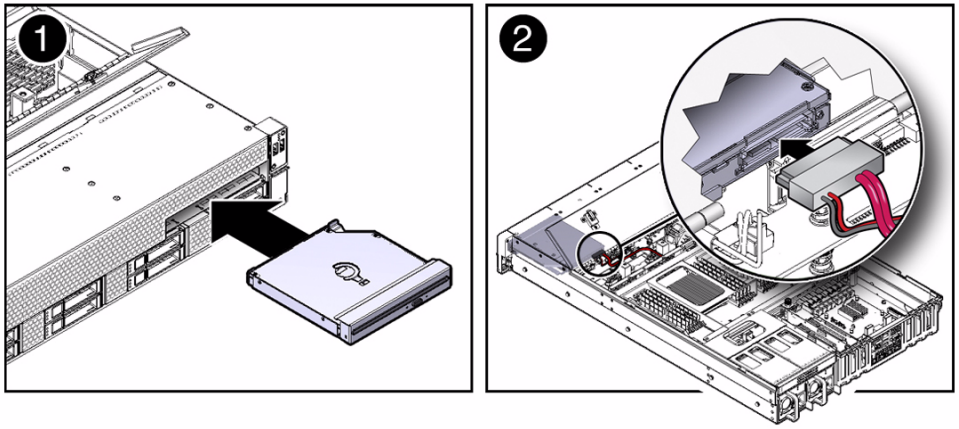
Related Information

- "Install the DVD Drive" on page 93

▼ Install the DVD Drive

1. **Gently push the replacement DVD drive into the chassis [1].**
2. **Continue to push the DVD drive into the chassis until the release tab on the rear of the drive engages the chassis with an audible click.**

FIGURE: Installing a DVD Drive



3. **Reach into the server directly behind the DVD drive, and reconnect the power and communication connector to the rear of the DVD drive [2].**
4. **Reinstall fan modules 2 and 3 in the chassis, and close the fan assembly door.**

   See "Install a Fan Module" on page 59.
5. **Return the server to operation.**

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

      See "Return the Server to the Normal Rack Position" on page 163.

   b. **Reconnect the power cords to the server power supplies, and power on the server.**

      See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

Related Information

- "Remove the DVD Drive" on page 92

Servicing the Internal USB Flash Drives (CRU)

This section covers the following topics:

- "Servicing the Oracle System Assistant USB Flash Drive" on page 95

- "Remove an Internal USB Flash Drive" on page 95
- "Install an Internal USB Flash Drive" on page 96

Related Information

- "Servicing the Air Baffle (CRU)" on page 89

Servicing the Oracle System Assistant USB Flash Drive

If the Oracle System Assistant software is corrupted on the USB flash drive, you should try to repair it before replacing the USB flash drive.

For instructions for troubleshooting and repairing Oracle System Assistant, see the Oracle System Assistant troubleshooting information in the *Oracle X4 Series Servers Administration Guide* at `http://www.oracle.com/goto/x86AdminDiag/docs`.

▼ Remove an Internal USB Flash Drive

The server can be equipped with up to two internal USB Flash drives.

Caution – Ensure that all power is removed from the server before removing or installing the USB flash drives. You must disconnect the power cables from the system before performing this procedure.

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

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

      See "Powering Down the Server" on page 33.

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

      See "Extend the Server to the Maintenance Position" on page 40.

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

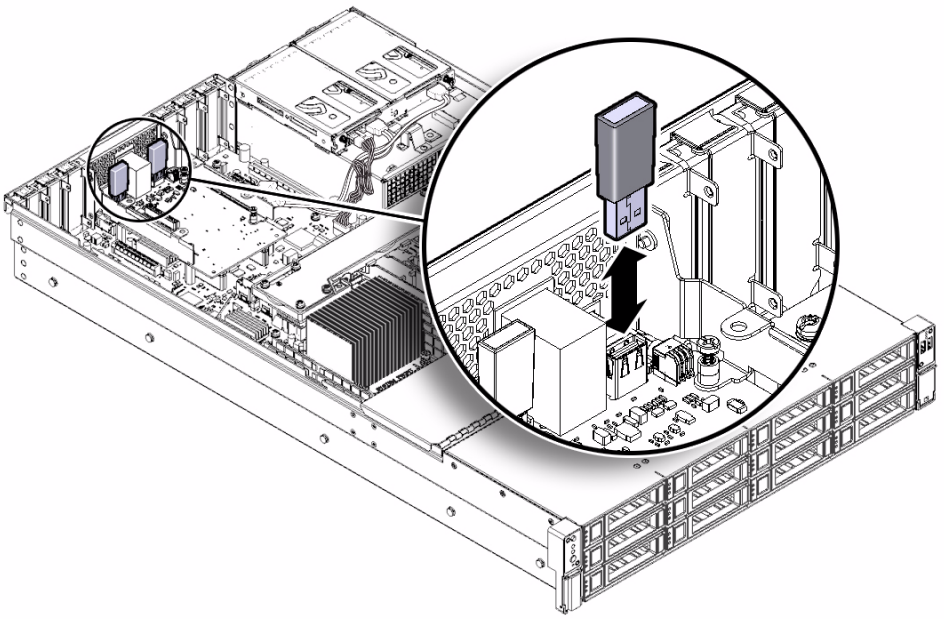
      See "Electrostatic Discharge Safety" on page 30.

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

      See "Remove the Server Top Cover" on page 43.

2. **To remove a USB flash drive, grasp the flash drive and pull it from the slot.**

FIGURE: Removing the USB Flash Drive



Related Information

- "Install an Internal USB Flash Drive" on page 96

▼ Install an Internal USB Flash Drive

Caution – Ensure that all power is removed from the server before removing or installing the USB flash drives. You must disconnect the power cables from the system before performing this procedure.

1. **Unpack the replacement USB flash drive.**
2. **Insert the flash drive into the USB slot.**
3. **Return the server to operation.**
   a. **Install the server top cover.**
      See "Install the Server Top Cover" on page 159.

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

   See "Return the Server to the Normal Rack Position" on page 163.

c. **Reconnect the power cords to the server power supplies and power on the server.**

   See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

4. **If the USB flash drive that you replaced was the Oracle System Assistant USB flash drive, you need reinstall Oracle System Assistant on the new USB flash drive.**

   For instructions, see the procedures for restoring Oracle System Assistant in the *Oracle X4 Series Servers Administration Guide* at:
   `http://www.oracle.com/goto/x86AdminDiag/docs`.

Related Information

- "Remove an Internal USB Flash Drive" on page 95

Servicing the Battery (CRU)

The real-time clock (RTC) 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.

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.

- "Remove the Battery" on page 97
- "Install the Battery" on page 98

▼ Remove the Battery

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

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

      See "Powering Down the Server" on page 33.

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

   See "Extend the Server to the Maintenance Position" on page 40.

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

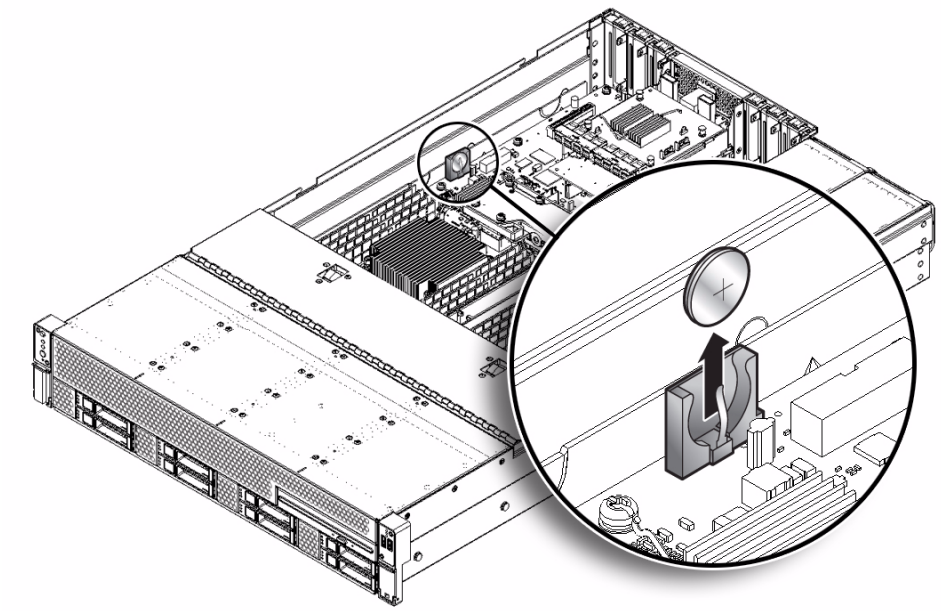
   See "Electrostatic Discharge Safety" on page 30.

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

   See "Remove the Server Top Cover" on page 43.

2. **To dislodge the battery from its retainer, gently push the top edge of the battery away from the retainer.**

FIGURE: Removing the System Battery



3. **Lift the battery up and out of its retainer.**

Related Information

- "Install the Battery" on page 98

▼ Install the Battery

1. **Unpack the replacement battery.**

2. **Press the new battery into the battery retainer with the positive side (+) facing the server chassis side wall.**

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. If the service processor is not configured to use NTP, you must reset the Oracle ILOM SP clock using the Oracle ILOM CLI or the web interface. For instructions, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: http://www.oracle.com/goto/ILOM/docs.

---

3. **Return the server to operation.**

   a. **Install the server top cover.**

      See "Install the Server Top Cover" on page 159.

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

      See "Return the Server to the Normal Rack Position" on page 163.

   c. **Reconnect the power cords to the server power supplies, and power on the server.**

      See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

Related Information

- "Remove the Battery" on page 97

Servicing FRUs

The following sections describe how to service field-replaceable units (FRUs). You must power down the system and remove the AC power cords before servicing all FRU components.

Note – Only authorized service personnel should service FRUs.

Description	Links
Service the processors.	"Servicing Processors (FRU)" on page 101
Service the front and rear storage drive backplanes.	"Servicing the Front and Rear Storage Drive Backplanes (FRU)" on page 118
Service the front indicator LED/USB modules.	"Servicing the Front LED/USB Indicator Modules (FRU)" on page 130
Service SAS and SATA cables.	"Servicing Cables (FRU)" on page 137
Service the motherboard assembly.	"Servicing the Motherboard Assembly (FRU)" on page 144

Related Information

- "Servicing CRUs That Do Not Require Server Power-Off" on page 47
- "Servicing CRUs That Require Server Power-Off" on page 67

Servicing Processors (FRU)

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

Caution – This procedure requires that you handle components that are sensitive to electrostatic discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow electrostatic discharge safety measures and antistatic practices. See "Electrostatic Discharge Safety" on page 30.

Note – On single-processor systems, neither a heatsink nor a processor filler cover are installed in the processor socket 1 (P1). To protect the delicate processor socket pins, the cover that comes on the motherboard from manufacturing is left in place.

The following topics are covered:

Related Information

- "Servicing the DIMMs (CRU)" on page 67

Selecting the Correct Processor Removal/Replacement Tool

Caution – The correct processor removal/replacement tool must be used to remove and replace a processor; otherwise, the processor or the processor socket might be damaged.

Selecting the correct processor removal/replacement tool is a two-step process. First you determine the size of the processor that is being replaced, then you select the removal/replacement tool that fits that size.

The processors supported by the Sun Server X4-2L are available in two sizes. The processors with 10 or fewer cores are smaller than the processors with 12 cores. You can determine the size of the processor that you are going to remove and replace in either of these two ways:

- Use Oracle Integrated Lights Out Manager (ILOM) 3.1 to display processor information.

  For instructions, see the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: `http://www.oracle.com/goto/ILOM/docs`.

- Visually check the size of the processor installed in the server.

This requires that you remove the processor heatsink and open the processor independent loading mechanism (ILM) assembly that holds the processor in the socket. For instructions, see "Remove a Processor" on page 106. This is the same procedure that you will use when you remove the processor.

If you choose to visually check the size of the processor, refer to the next two figures to see how to distinguish the smaller processors from the larger processors. FIGURE: Smaller Processor Installed in a Motherboard Processor Socket on page 103 shows the smaller processor installed. Notice that the right and left edges of the processor are within the boundaries of the processor alignment brackets.

FIGURE: Smaller Processor Installed in a Motherboard Processor Socket

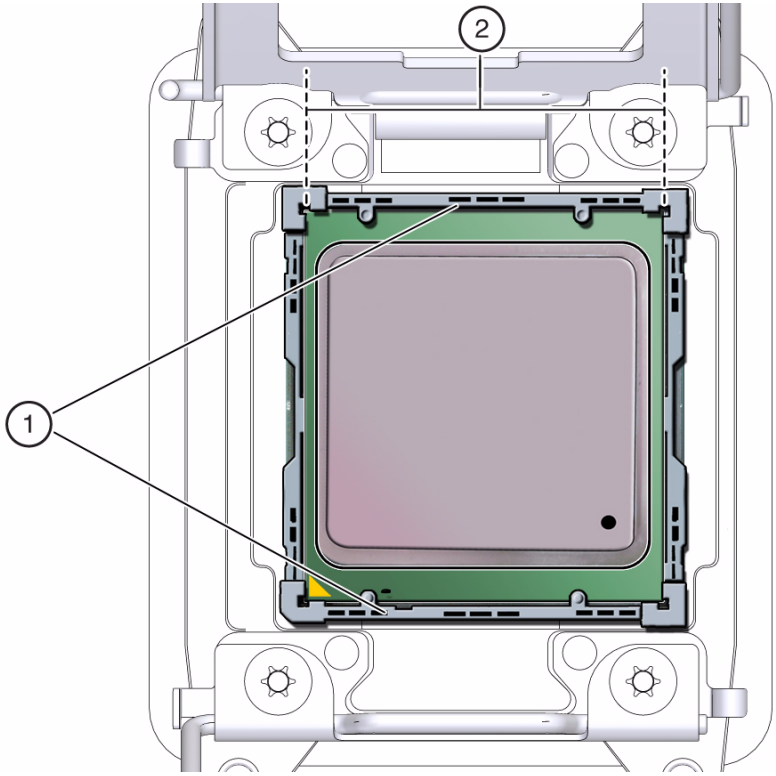


Figure Legend

1	Processor alignment brackets
2	Processor left and right edges are within alignment bracket boundaries

FIGURE: Larger Processor Installed in a Motherboard Processor Socket on page 104 shows the larger processor installed. Notice that the right and left edges of the processor extend beyond the boundaries of the processor alignment brackets.

FIGURE: Larger Processor Installed in a Motherboard Processor Socket

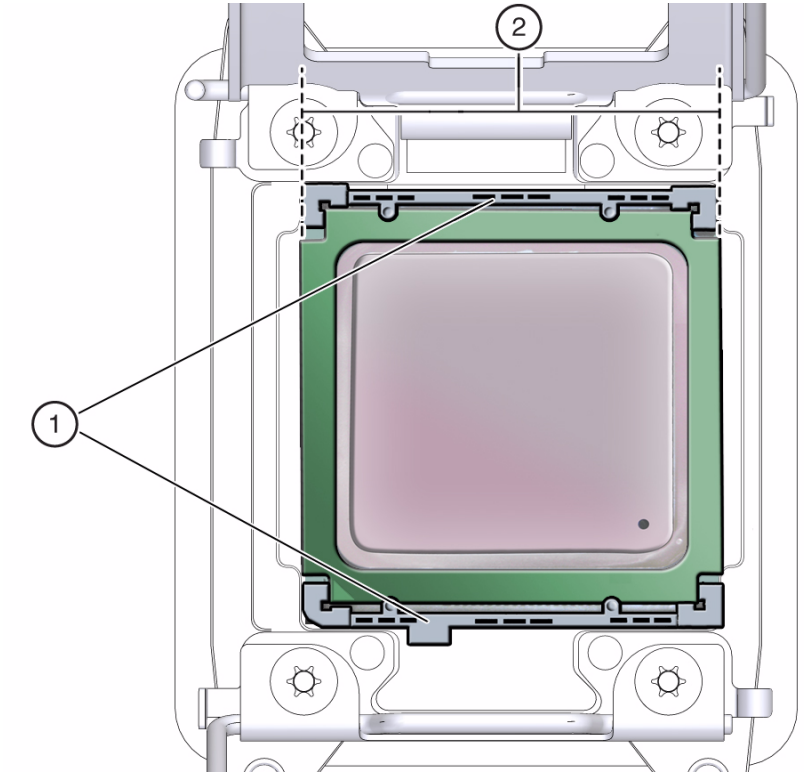


Figure Legend

1	Processor alignment brackets
2	Processor left and right edges extend beyond alignment bracket boundaries

After you have determined the size of the processor installed in your server, select the correct processor removal/replacement tool. Like the processors, the processor removal/replacement tool is also available in two sizes. The tool for the smaller processors (processors with 10 or fewer cores) is color-coded green. The tool for the larger processors (12-core processors) is color-coded pink. See FIGURE: Color-Coded Processor Removal/Replacement Tool on page 105).

FIGURE: Color-Coded Processor Removal/Replacement Tool

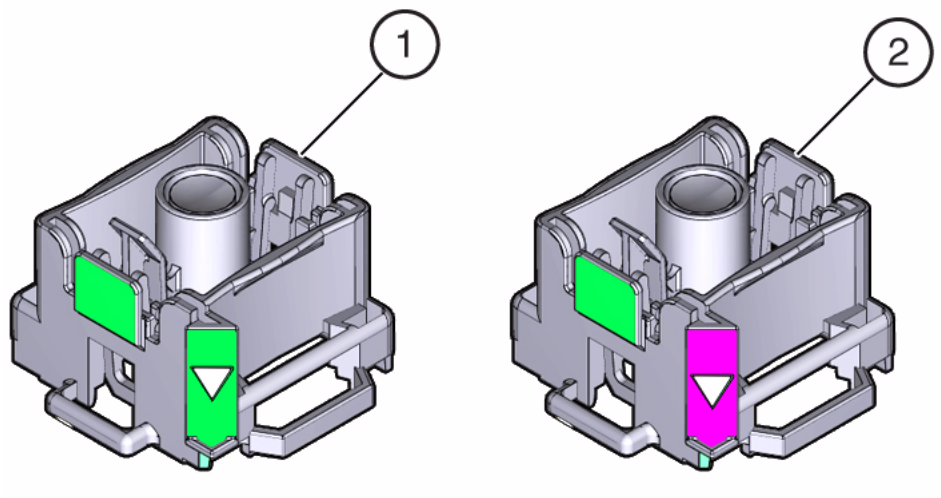


Figure Legend

1	Green, color-coded removal/replacement tool for the smaller processors—models E5-2609 V2 (4-core), E5-2630 V2 (6-core), E5-2650 V2 (8-core), and E5-2690 V2 (10-core)
2	Pink, color-coded removal/replacement tool for the larger processor—model E5-2697 V2 (12-core)

Caution – The pink color-coded processor removal/replacement tool must be used only with the larger processor (the 12-core processor). Likewise, the green color-coded removal/replacement tool must be used only with smaller processors (the 4-, 6-, 8-, and 10-core processors); otherwise, the processor or the processor socket might be damaged.

The following table provides an easy reference for matching a processor (by number of cores or model number) to the correct processor removal/replacement tool.

TABLE: Processor Model Numbers by Number of Cores

Processor Cores	Processor Model Number	Processor Removal/Replacement Tool Color Code
4-core	E5-2609 V2	Green
6-core	E5-2630 V2	
8-core	E5-2650 V2	
10-core	E5-2690 V2	
12-core	E5-2697 V2	Pink

Note – The correct processor removal/replacement tool is included in the box with the replacement processor. Additionally, both removal/replacement tools ship with replacement motherboards.

▼ Remove a Processor

Caution – Processors should be removed only by a Oracle qualified service technician.

Caution – The correct color-coded processor removal/replacement tool must be used to remove a processor; otherwise, the processor or the processor socket might be damaged. For information on how to select the correct processor removal/replacement tool, see "Selecting the Correct Processor Removal/Replacement Tool" on page 102.

Caution – Be careful not to touch the processor socket pins. The processor socket pins are very fragile. A light touch can bend the processor socket pins beyond repair. Always use the processor removal/replacement tool to remove and replace the processor.

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

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

   See "Powering Down the Server" on page 33.

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

   See "Take Antistatic Measures" on page 43.

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

   See "Extend the Server to the Maintenance Position" on page 40

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

   See "Remove the Server Top Cover" on page 43.

e. **Remove the air baffle.**

   See "Remove the Air Baffle" on page 89.

2. **Identify the location of the faulty processor by pressing the Fault Remind button on the motherboard.**

Note – When the Fault Remind button is pressed, an LED located next to the Fault Remind button lights green to indicate that there is sufficient voltage present in the fault remind circuit to light any fault LEDs that were 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 has lost its charge. This can happen if the Fault Remind button is pressed for a long time with fault LEDs lit or if power has been removed from the server for more than 15 minutes.

The processor Fault LED for the faulty processor lights. The processor Fault LEDs are located next to the processors:

- 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 should be replaced.

FIGURE: Identifying Faulty Processors

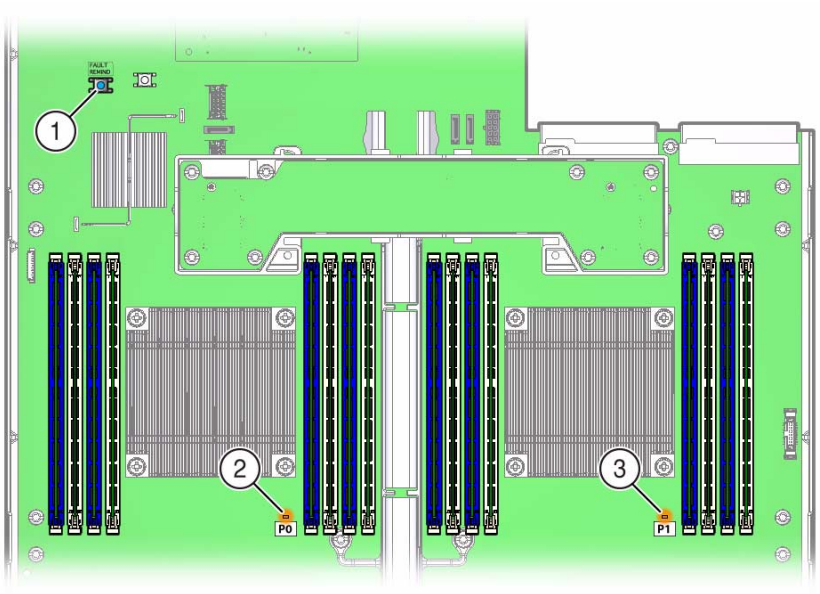


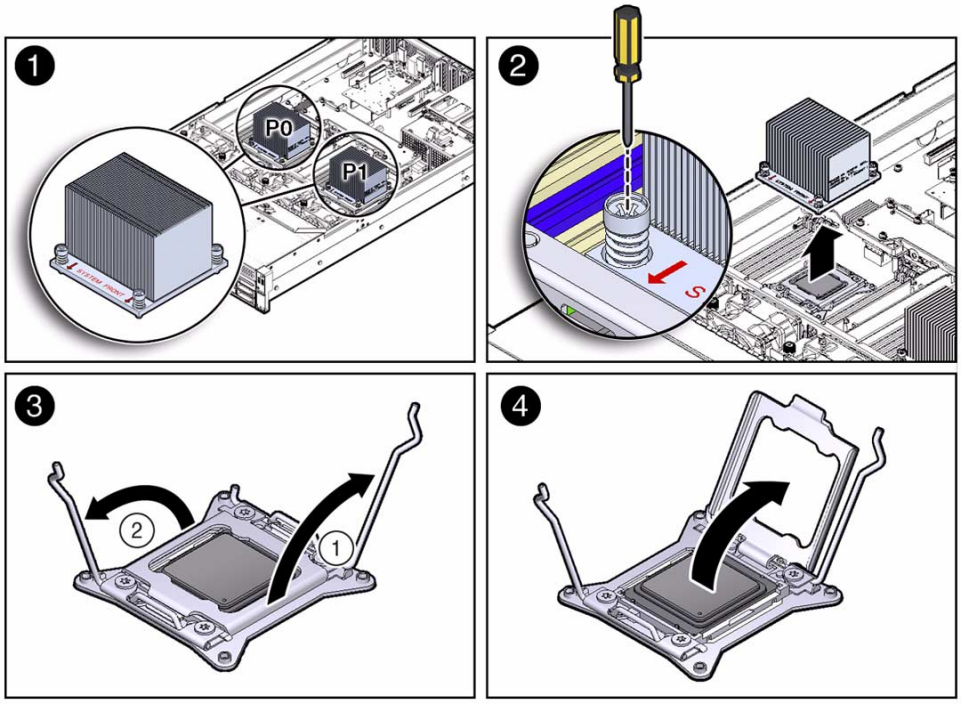
Figure Legend

1	Fault Remind button
2	Processor 0 LED
3	Processor 1 LED

3. **Gently press down on the top of the heatsink to counteract the pressure of the captive spring-loaded screws that secure the heatsink to the motherboard and loosen the four Phillips captive screws in the heatsink using a No. 2 Phillips screwdriver [2].**

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

FIGURE: Removing the Heatsink



4. **To separate the heatsink from the top of the processor, gently twist the heatsink left and right, while pulling upward, and then lift off the heatsink and place it upside down on a flat surface.**

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

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

---

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

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

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

---

6. **Disengage the processor ILOM assembly hinge lever on the right side of the processor socket (viewing the server from the front) by pushing down on the lever and moving it to the side away from the processor, and then rotating the lever upward [3].**

7. **Disengage the processor ILM assembly load lever on the left side of the processor socket (viewing the server from the front) by pushing down on the lever and moving it to the side away from the processor, and then rotating the lever upward [3].**

8. **To lift the processor ILM assembly load plate off of the processor socket, rotate the ILM hinge lever on the right side of the processor toward the closed position (the pressure frame is lifted up as the hinge lever is lowered toward the closed position) and carefully swing the ILM load plate to the fully open position [4].**

Caution – Whenever you remove a processor, you must replace it with another processor and reinstall the processor heatsink; otherwise, the server might overheat due to improper airflow. For instructions for installing a processor, see "Install a Processor" on page 113.

9. **To remove the processor from the processor socket, acquire the correct processor removal/replacement tool and perform the following steps.**

Caution – Before removing the processor, ensure that you are using the correct color-coded processor removal/replacement tool. For information on how to select the correct processor removal/replacement tool, see "Selecting the Correct Processor Removal/Replacement Tool" on page 102.

   a. **Locate the button in the center of the top of the processor removal/replacement tool and press it to the down position [1].**

   b. **Properly position the tool over the processor socket and lower it into place over the processor socket [2].**

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

   c. **Press the release lever on the processor tool to release the center button and engage the processor [3].**

      An audible click indicates that the processor is engaged.

   d. **Grasp the processor removal tool by the sides and remove it from the server [4].**

e. **Turn the processor removal tool upside down and verify that it contains the processor [5].**

f. **While holding the processor removal tool upside down, press the center button to release the processor from the tool [5].**

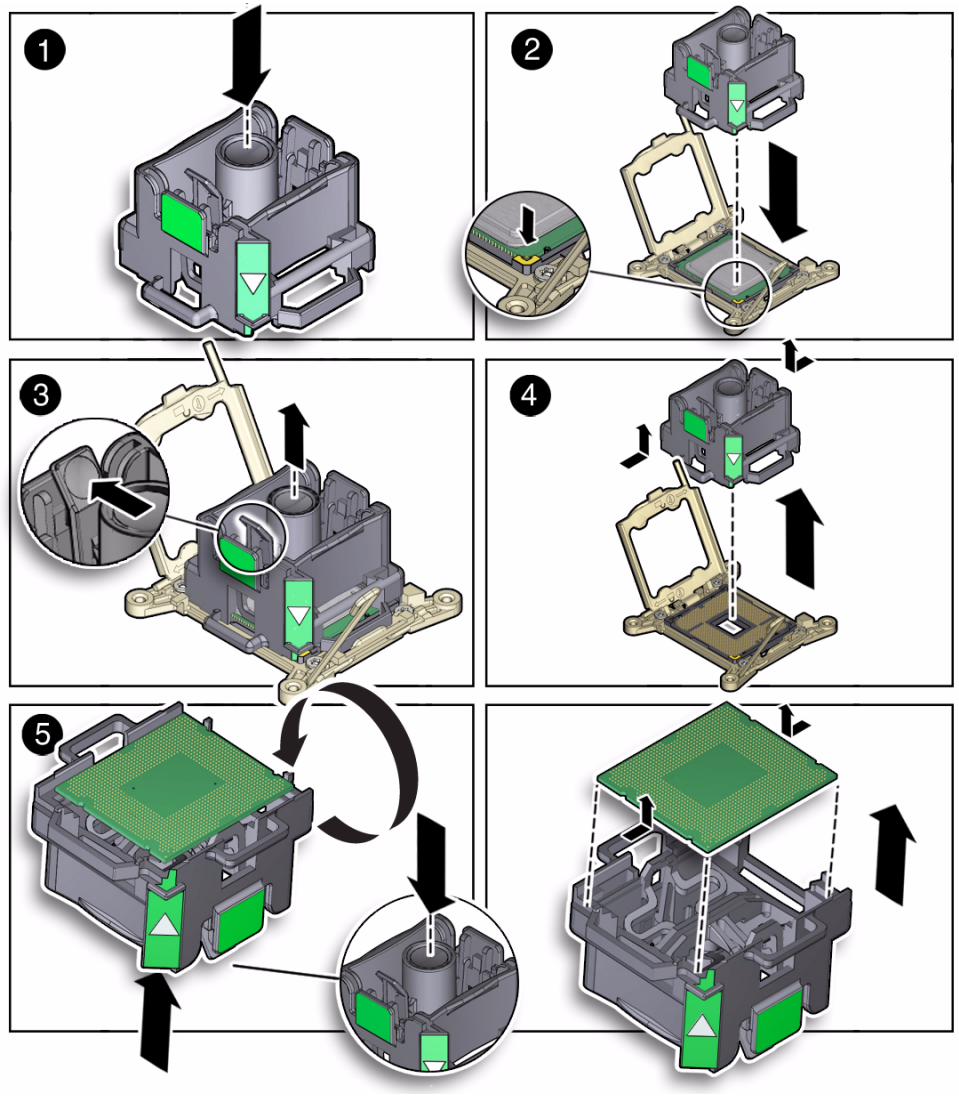
g. **Carefully grasp the processor by the front and back edges, lift it out of the tool and place it with the circuit side down (the installed orientation) into an antistatic container.**

Caution – Ensure that the antistatic mat is clean and free of debris; otherwise, the processor pins might be damaged.

h. **Carefully clean the thermal grease off the top of the processor.**

Caution – The following figure shows the green color-coded processor removal/replacement tool. If you are removing a 12-core processor, you must use the pink color-coded processor removal/replacement tool. For information on how to select the correct processor removal/replacement tool, see "Selecting the Correct Processor Removal/Replacement Tool" on page 102.

FIGURE: Removing the Processor



Related Information

- "Install a Processor" on page 113

▼ Install a Processor

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

Caution – The correct color-coded processor removal/replacement tool must be used to install a processor; otherwise, the processor or the processor socket might be damaged. For information on how to select the correct processor removal/replacement tool, see "Selecting the Correct Processor Removal/Replacement Tool" on page 102.

Caution – Be careful not to touch the processor socket pins. The processor socket pins are very fragile. A light touch can bend the processor socket pins beyond repair. Always use the processor removal/replacement tool to remove and replace the processor.

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

   See "Take Antistatic Measures" on page 43.

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

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

   For a description of the processors that are supported by the server, see the *Sun Server X4-2L Installation Guide*, "About Server Features and Components" on page 19.

4. **Ensure that the two processor ILM assembly levers and the ILM assembly load plate are in the fully open position.**

   For instructions for opening the processor ILM assembly levers and the load plate, see Step 6 through Step 8 of "Remove a Processor" on page 106.

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

Caution – Before installing the processor, ensure that you are using the correct color-coded processor removal/replacement tool. For information on how to select the correct processor removal/replacement tool, see "Selecting the Correct Processor Removal/Replacement Tool" on page 102.

a. Locate the button in the center of the top of the tool and press it to the down position [1].

b. Turn the tool upside down, grasp the processor by its front and back edges and position the processor (circuit side up) in the tool so that the triangle on the corner of the processor aligns with the triangle on the side of the processor removal/replacement tool [2].

c. Lower the processor into the tool and press the tool release lever to release the center button and engage the processor [3].

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

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

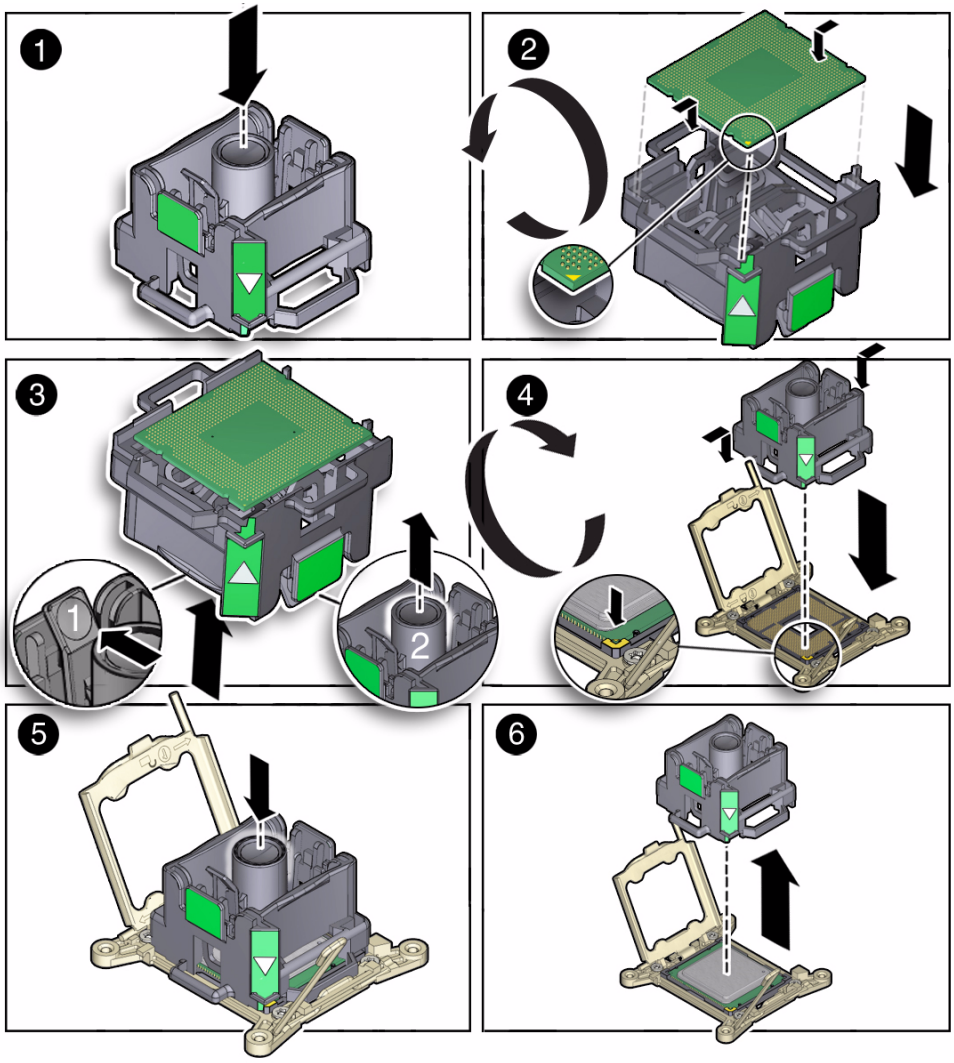
To properly position the tool in the processor socket, rotate the tool until the green triangle on the side of the tool is facing the front of the server and it is over the left side of the processor socket (when viewing the server from the front) and lower the tool into the processor socket.

e. Press the center button on the tool down to release the processor so that it is installed in the socket [5].

f. Remove the processor removal/replacement tool [6].

Caution – The following figure shows the green color-coded processor removal/replacement tool. If you are installing a 12-core processor, you must use the pink color-coded processor removal/replacement tool. For information on how to select the correct processor removal/replacement tool, see "Selecting the Correct Processor Removal/Replacement Tool" on page 102.

FIGURE: Installing the Processor



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

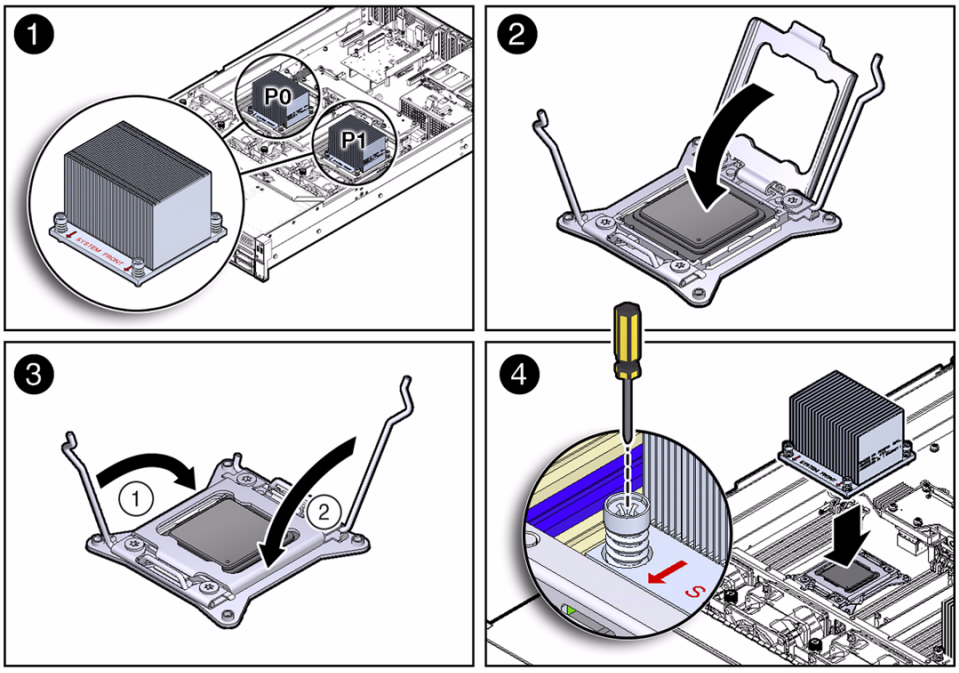
   When properly aligned, the processor sits flat in the processor socket.

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

7. **Swing the processor ILM assembly load plate into the closed position [2].**

   Ensure that the load plate sits flat around the periphery of the processor.

FIGURE: Installing the Heatsink



8. **Engage the processor ILM assembly load lever on the left side of the socket (viewing the server from the front) by rotating it downward and slipping it under the catch [3].**

9. **Engage the processor ILM assembly hinge lever on the right side of the socket (viewing the server from the front) by rotating it downward and slipping it under the catch [3].**

10. **Use the syringe (supplied with the new or replacement processor) to apply approximately 0.1 mL of thermal grease to the center of the top of the processor.**

    To measure 0.1 ml of thermal grease, use the graduated scale on the thermal grease syringe.

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

---

11. **Inspect the heatsink for dust and lint.**

    Clean the heatsink if necessary.

12. **Orient the heatsink so that the screws line up with the mounting posts [4].**

    The processor heatsink is not symmetrical.

13. **Carefully position the heatsink on the processor, aligning it with the mounting posts to reduce movement after it makes initial contact with the layer of thermal grease [4].**

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

14. **Use a No. 2 Phillips screwdriver to tighten the screws alternately one-half turns until fully seated [4].**

15. **Return the server to operation.**

    a. **Install the air baffle.**

       See "Install the Air Baffle" on page 90.

    b. **Install the server top cover.**

       See "Install the Server Top Cover" on page 159.

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

       See "Return the Server to the Normal Rack Position" on page 163.

    d. **Reconnect the power cords to the power supplies, and power on the server.**

       See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

16. **Use Oracle ILOM to clear server processor faults.**

    Refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library for more information about the following steps.

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

   -> **show /SP/faultmgmt**

   The server lists all known faults, for example:

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

   Alternatively, to list all known faults in the server, log into the Oracle Solaris OS and issue the `fmadm faulty` command, or log into the Oracle ILOM service processor from the Oracle ILOM Fault Management Shell and issue the `fmadm faulty` command.

b. **To clear the fault identified in Step 16a, type the following command:**

   -> **set /System/MB/P0 clear_fault_action=true**

   For example:

```
-> set /System/MB/P0 clear_fault_action=true
Are you sure you want to clear /SYS/MB/P0 9y/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.

Related Information

- "Remove a Processor" on page 106

Servicing the Front and Rear Storage Drive Backplanes (FRU)

To remove and install the front and rear storage drive backplanes, follow the procedures in these sections.

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

- "Remove the Storage Drive Backplane for Eight-Drive and Twelve-Drive Systems" on page 119
- "Install the Storage Drive Backplane for Eight-Drive and Twelve-Drive Systems" on page 122
- "Remove the Storage Drive Backplane for Twenty-Four Drive Systems" on page 123
- "Install the Storage Drive Backplane for Twenty-Four Drive Systems" on page 126
- "Remove the Storage Drive Backplane for Rear-Mounted Storage Drives" on page 127
- "Install the Storage Drive Backplane for Rear-Mounted Storage Drives" on page 129

Related Information

- "Servicing Storage Drives and Rear Drives (CRU)" on page 47
- "Servicing the SAS Expander Module (CRU)" on page 85
- "Servicing Cables (FRU)" on page 137

▼ Remove the Storage Drive Backplane for Eight-Drive and Twelve-Drive Systems

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

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

      See "Powering Down the Server" on page 33.

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

      See "Take Antistatic Measures" on page 43.

   c. **Extend the server into the maintenance position.**

      See "Extend the Server to the Maintenance Position" on page 40.

d. Open the server fan assembly door, and remove the fan modules from the server.

See "Remove a Fan Module" on page 57.

2. Remove all of the storage drives from the storage drive cage.

See "Remove a Storage Drive" on page 49.

Note – Ensure that you note storage drive locations when removing the storage drives from the storage drive cage. Storage drives must be reinserted into the correct slots after storage drive backplane replacement.

---

3. Disconnect the cables from the storage drive backplane [1].

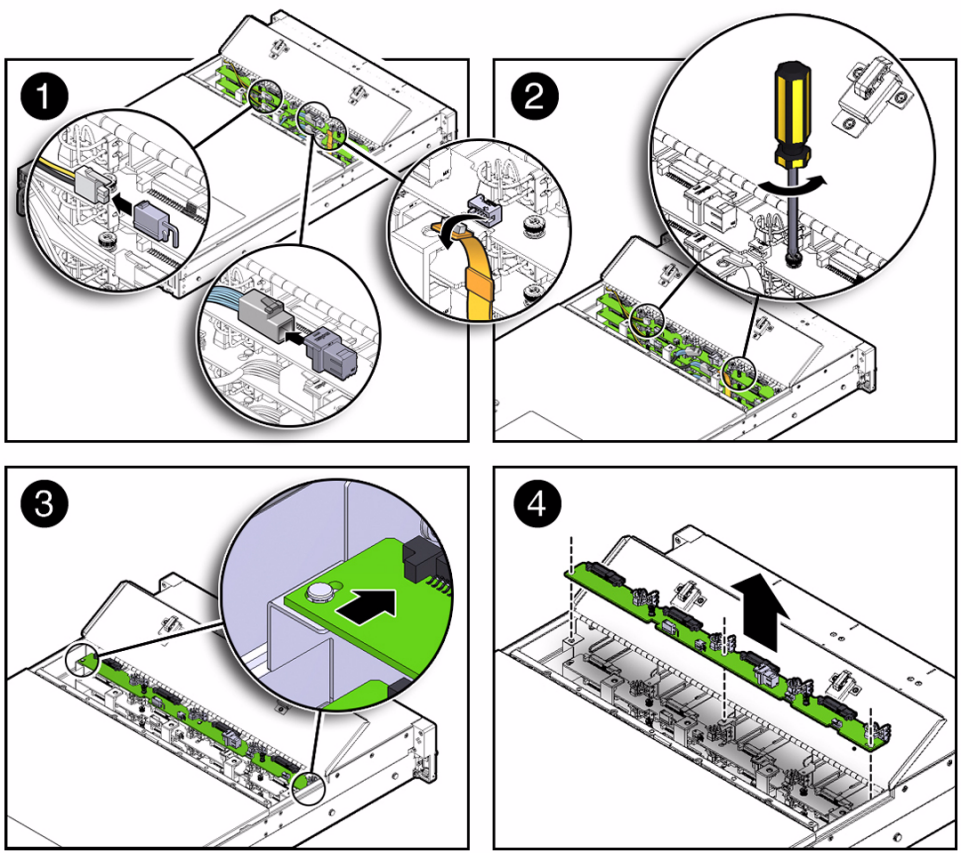
a. Disconnect the SAS/SATA cable from the storage drive backplane. Note the cable connections in order to ease proper reconnection of the cables.

b. Disconnect the power cable from the storage drive backplane.

c. Disconnect the disk backplane LED cable from the storage drive backplane.

d. Disconnect the DVD power cable (eight-drive system only) from the top storage drive backplane.

FIGURE: Removing the Storage Drive Backplane



4. **Using a No. 2 Phillips screwdriver, loosen the two screws that secure the storage drive backplane to the chassis [2].**
5. **Slide the backplane toward the front of the server to release it from the three mushroom-shaped standoffs, and lift it out of the chassis [3 and 4].**
6. **Place the storage drive backplane on an antistatic mat.**
7. **Repeat Step 3 through Step 6 to remove the second storage drive backplane in an eight-drive system.**
8. **Repeat Step 3 through Step 6 to remove the third storage drive backplane in a twelve-drive system.**

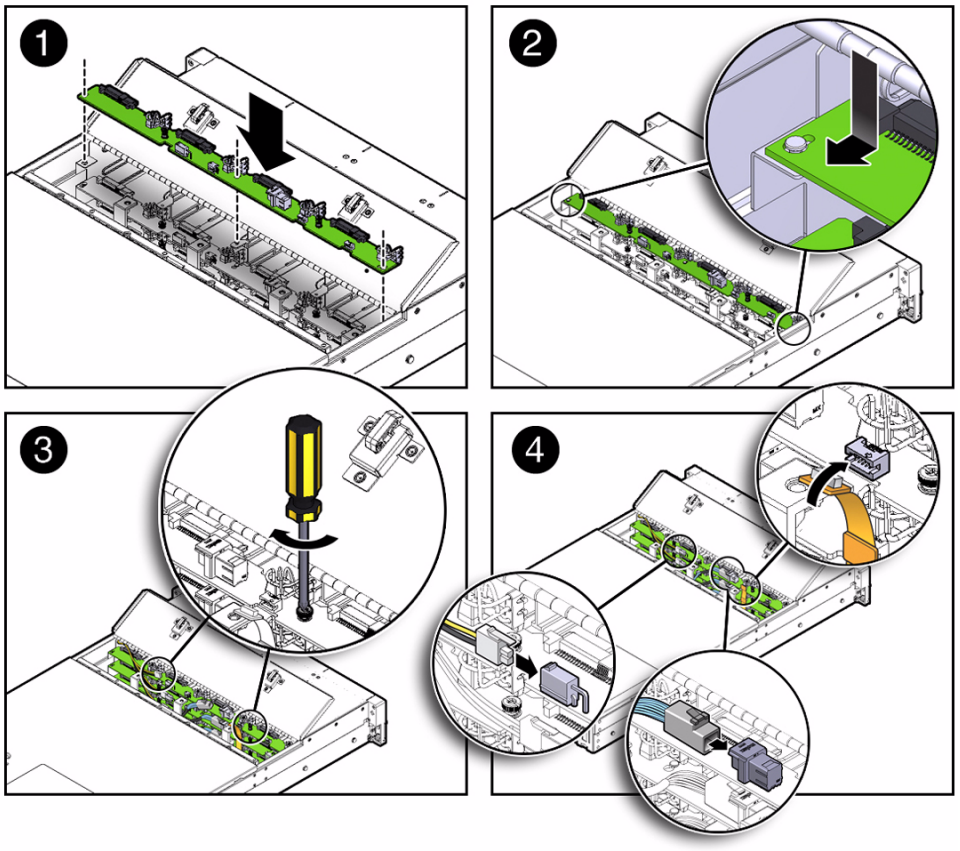
Related Information

- "Install the Storage Drive Backplane for Eight-Drive and Twelve-Drive Systems" on page 122

▼ Install the Storage Drive Backplane for Eight-Drive and Twelve-Drive Systems

1. **Lower the storage drive backplane into the server, and position it to engage the three mushroom-shaped standoffs [1 and 2].**

FIGURE: Installing the Storage Drive Backplane



2. **Using a No. 2 Phillips screwdriver, install and tighten the two screws to secure the storage drive backplane to the chassis [3].**
3. **Reconnect the cables to the disk backplane [4].**
   a. **Reconnect the disk backplane LED cable to the storage drive backplane.**
   b. **Reconnect the power cable to the storage drive backplane.**
   c. **Reconnect the SAS/SATA cable to the storage drive backplane.**

d. **Reconnect the DVD power cable (eight-drive system only) to the top storage drive backplane.**

4. **Repeat Step 1 through Step 3 to install the second storage drive backplane in an eight-drive system.**

5. **Repeat Step 1 through Step 3 to install the third storage drive backplane in a twelve-drive system.**

6. **Return the server to operation.**

   a. **Install the fan modules, and close the fan assembly door.**

      See "Install a Fan Module" on page 59.

   b. **Install all storage drives into the storage cage.**

      See "Install a Storage Drive" on page 52.

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

      See "Return the Server to the Normal Rack Position" on page 163

   d. **Reconnect the power cords to the power supplies, and power on the server.**

      See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

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

Related Information

- "Remove the Storage Drive Backplane for Eight-Drive and Twelve-Drive Systems" on page 119

▼ Remove the Storage Drive Backplane for Twenty-Four Drive Systems

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

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

      See "Powering Down the Server" on page 33.

b. Extend the server into the maintenance position.

See "Extend the Server to the Maintenance Position" on page 40.

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

See "Take Antistatic Measures" on page 43.

d. Open the server fan assembly door, and remove the fan modules from the server.

See "Remove a Fan Module" on page 57.

e. Remove the fan assembly door from the server.

See "Remove the Fan Assembly Door From a Server With 2.5-Inch Drives" on page 44.

2. Remove all of the storage drives from the storage drive cage.

See "Remove a Storage Drive" on page 49.

Note – Ensure that you note storage drive locations when removing the storage drives from the disk cage. Storage drives must be reinserted into the correct slots after disk backplane replacement.

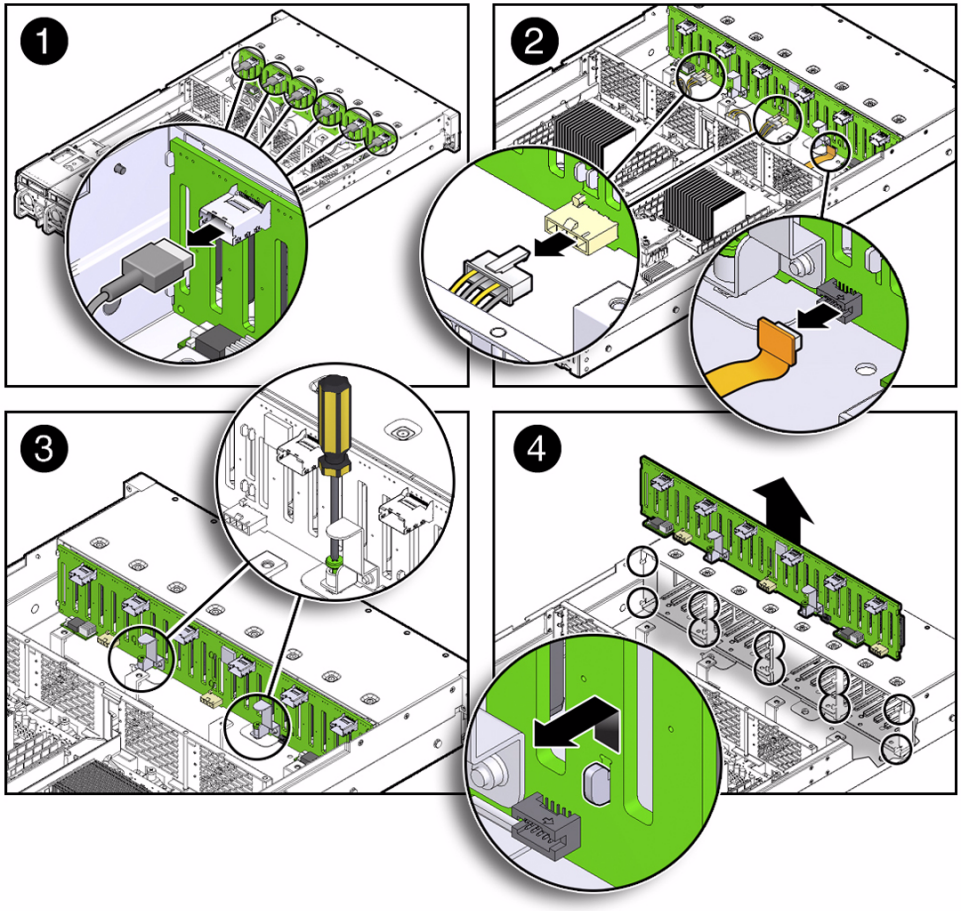
---

3. Disconnect the cables from the storage drive backplane.

a. Disconnect the six SAS/SATA cables from the storage drive backplane. Note the cable connections in order to ease proper reconnection of the cables [1].

b. Disconnect the power cables and the LED cable from the storage drive backplane [2].

FIGURE: Removing the Storage Drive Backplane



4. **Using a No. 2 Phillips screwdriver, loosen the two screws that secure the storage drive backplane to the chassis [3].**
5. **Lift the storage drive backplane up to release it from the standoff hooks [4].**
6. **Pull the storage drive backplane away from the standoff hooks and out of the chassis [4].**
7. **Place the storage drive backplane on an antistatic mat.**

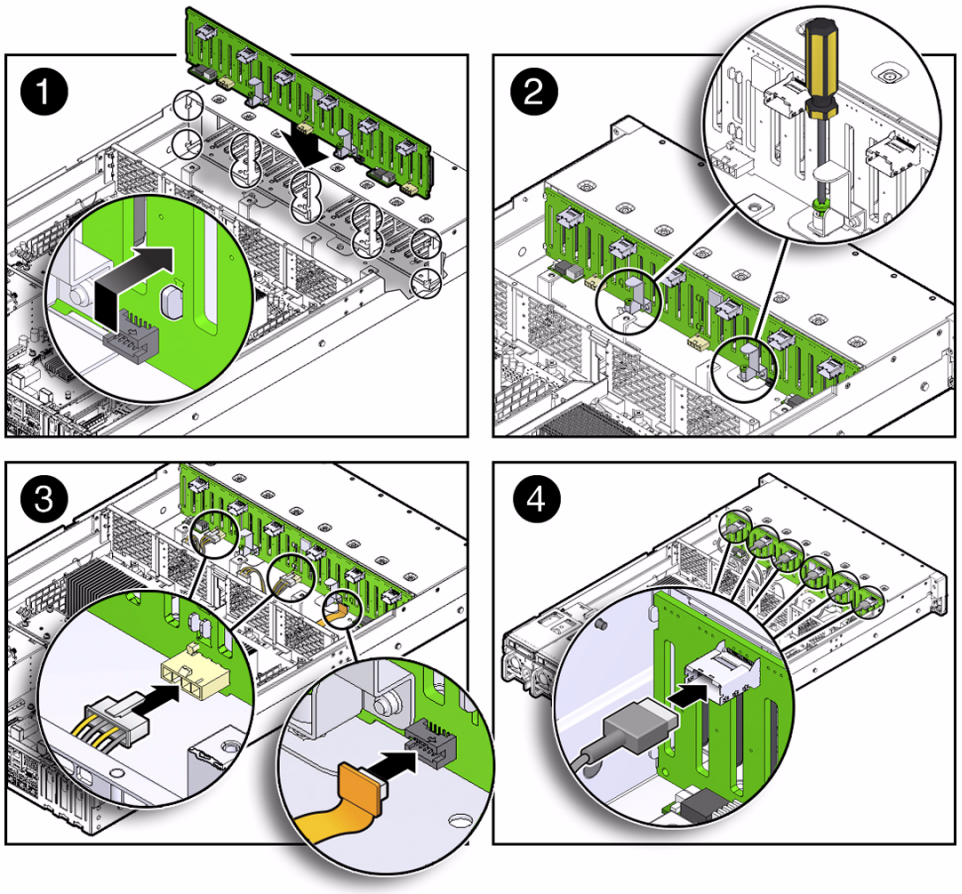
Related Information

- "Install the Storage Drive Backplane for Twenty-Four Drive Systems" on page 126

▼ Install the Storage Drive Backplane for Twenty-Four Drive Systems

1. **Lower the storage drive backplane into the server, and position it to engage the standoff hooks [1].**

FIGURE: Installing the Storage Drive Backplane



2. **Using a No. 2 Phillips screwdriver, install and tighten the two screws to secure the storage drive backplane to the chassis [2].**
3. **Reconnect the cables to the storage drive backplane.**
   a. **Reconnect the power cables and the LED cable to the storage drive backplane [3].**

b. Reconnect the six SAS/SATA cables to the storage drive backplane [4].

4. **Return the server to operation.**

   a. Install the fan assembly door top cover.

   See "Install the Fan Assembly Door" on page 161.

   b. Install the fan modules and close the fan assembly door.

   See "Install a Fan Module" on page 59.

   c. Install all storage drives into the storage drive cage.

   See "Install a Storage Drive" on page 52.

   d. Return the server to the normal rack position.

   See "Return the Server to the Normal Rack Position" on page 163.

   e. Reconnect the power cords to the power supplies, and power on the server.

   See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

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

Related Information

- "Remove the Storage Drive Backplane for Twenty-Four Drive Systems" on page 123

▼ Remove the Storage Drive Backplane for Rear-Mounted Storage Drives

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

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

   See "Powering Down the Server" on page 33.

   b. Extend the server into the maintenance position.

   See "Extend the Server to the Maintenance Position" on page 40.

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

   See "Take Antistatic Measures" on page 43.

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

   See "Remove the Server Top Cover" on page 43.

2. **Remove all of the rear-mounted storage drives from the storage drive cage.**

   See "Remove a Rear Storage Drive" on page 54.

Note – Ensure that you note drive locations when removing the storage drives from the storage drive cage. Storage drives must be reinserted into the correct slots after storage drive backplane replacement.

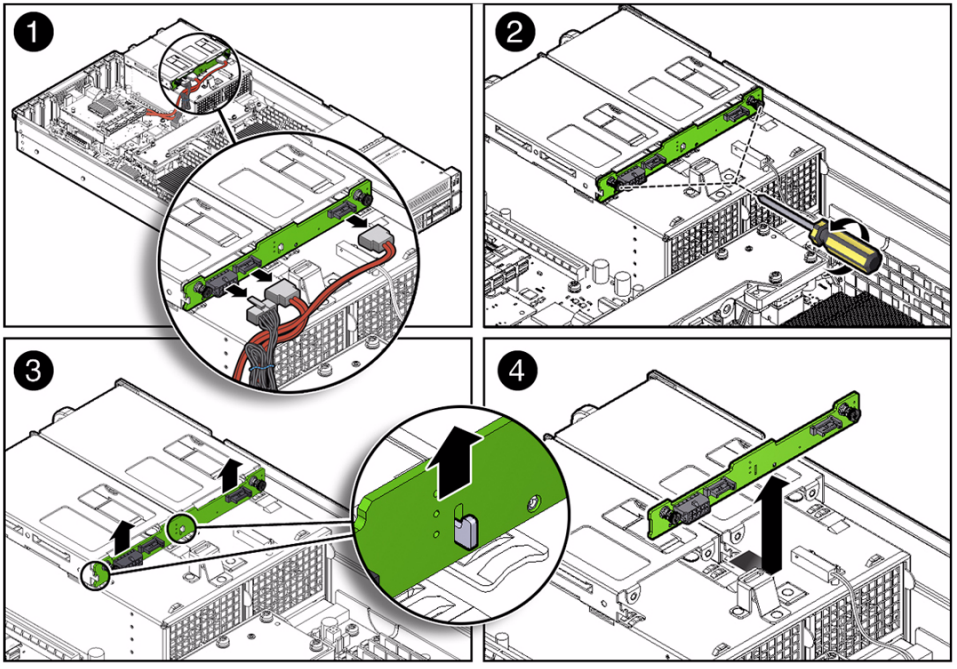
---

3. **Disconnect the cables from the storage drive backplane [1].**

   a. **Disconnect the two SAS cables from the storage drive backplane.**

   b. **Disconnect the power cable from the storage drive backplane.**

FIGURE: Removing the Storage Drive Backplane for Rear-Mounted Storage Drives



4. **Using a No. 2 Phillips screwdriver, loosen the two screws that secure the storage drive backplane to the storage drive cage [2].**
5. **Lift the storage drive backplane up to release it from the two sets of standoff hooks [3].**
6. **Pull the storage drive backplane away from the standoff hooks and out of the chassis [4].**
7. **Place the storage drive backplane on an antistatic mat.**

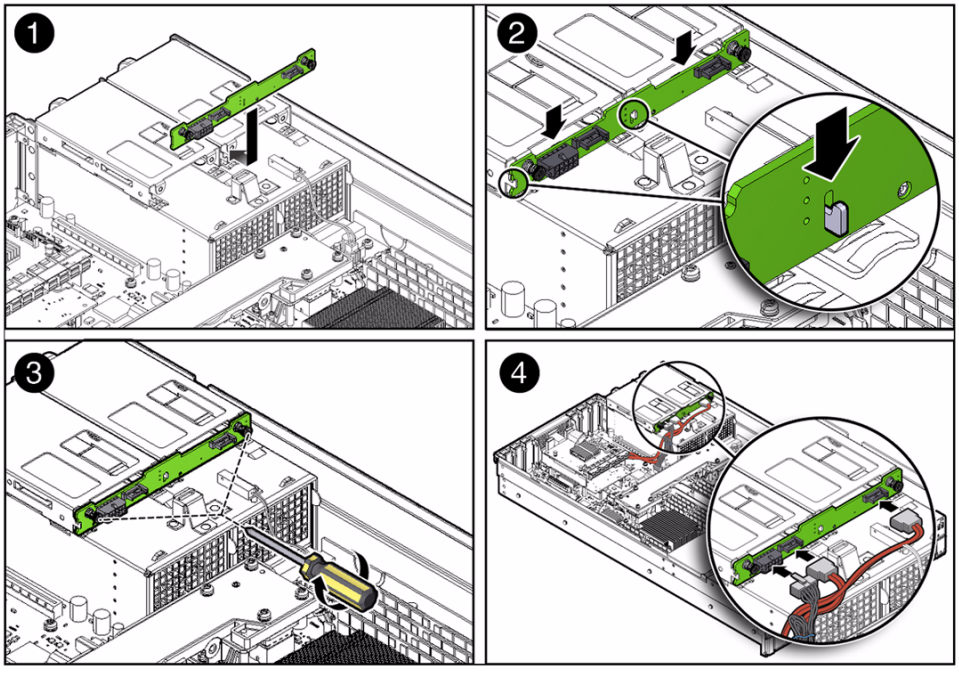
Related Information

- "Install the Storage Drive Backplane for Rear-Mounted Storage Drives" on page 129

▼ Install the Storage Drive Backplane for Rear-Mounted Storage Drives

1. **Lower the storage drive backplane into the server, and position it to engage the two standoff hooks [1 and 2].**

FIGURE: Installing the Storage Drive Backplane for Rear-Mounted Storage Drives



2. **Using a No. 2 Phillips screwdriver, install and tighten the two screws to secure the storage drive backplane to the storage drive cage [3].**
3. **Reconnect the cables to the storage drive backplane [4].**
   a. **Reconnect the power cable to the storage drive backplane.**
   b. **Reconnect the two SAS cables to the storage drive backplane.**
4. **Return the server to operation.**
   a. **Install the server top cover.**
      See "Install the Server Top Cover" on page 159.
   b. **Install all storage drives into the storage drive cage.**
      See "Install a Rear Storage Drive" on page 55.
   c. **Return the server to the normal rack position.**
      See "Return the Server to the Normal Rack Position" on page 163
   d. **Reconnect the power cords to the power supplies, and power on the server.**
      See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

Related Information

- "Remove the Storage Drive Backplane for Rear-Mounted Storage Drives" on page 127

Servicing the Front LED/USB Indicator Modules (FRU)

Caution – Ensure that all power is removed from the server before removing or installing a front LED/USB indicator module. You must disconnect the power cables before performing this procedure.

To remove and install the front LED/USB indicator modules, follow the procedures in these sections.

- "Remove the Left LED Indicator Module" on page 131
- "Install the Left LED Indicator Module" on page 132
- "Remove the Right LED/USB Indicator Module" on page 133

- "Install the Right LED/USB Indicator Module" on page 135

Related Information

- "About Server and Component Status Indicators" on page 7

▼ Remove the Left LED Indicator Module

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

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

      See "Powering Down the Server" on page 33.

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

      See "Extend the Server to the Maintenance Position" on page 40.

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

      See "Take Antistatic Measures" on page 43.

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

      See "Remove the Server Top Cover" on page 43.

2. **Remove the left indicator module.**

   a. **Remove the two No. 2 Phillips screws that secure the LED indicator module to the server front panel [1].**

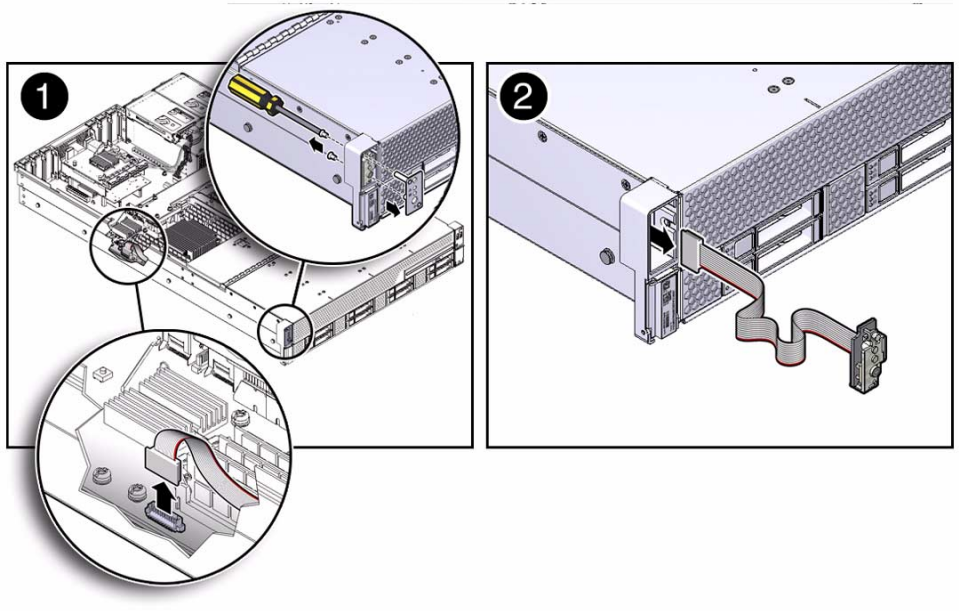
   b. **Disconnect the LED indicator module cable from the motherboard, and gently pull the cable through the chassis mid-plane and side wall of the server chassis [1 and 2].**

Note – Alternatively, if you only need to replace the LED indicator, you do not need to pull the cable through the chassis mid-plane and side wall of the chassis.

---

   c. **Remove the LED indicator module from the server front panel [2].**

FIGURE: Removing the Left LED Indicator Module



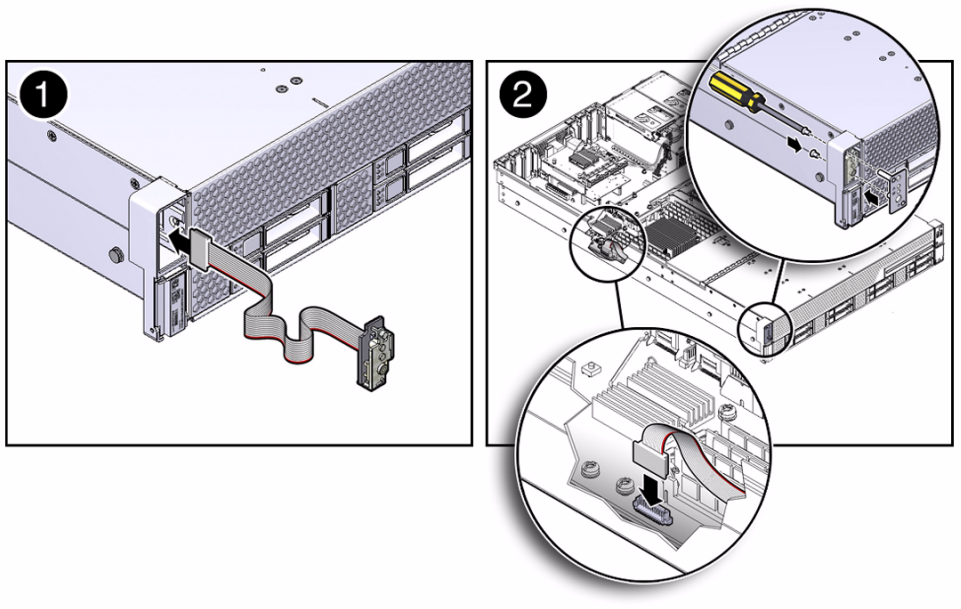
Related Information

- "Server General Status Indicators" on page 7
- "Install the Left LED Indicator Module" on page 132

▼ Install the Left LED Indicator Module

1. **Install the left LED indicator module.**
   a. **Push the LED indicator module cable through the side wall and mid-plane of the server chassis [1 and 2].**
   b. **Reconnect the LED indicator module cable to the motherboard [2].**
   c. **Insert and tighten the two No. 2 Phillips screws to secure the LED indicator module to the server front panel [2].**

FIGURE: Installing the Left LED Indicator Module



2. **Return the server to operation.**

   a. **Install the server top cover.**

      See "Install the Server Top Cover" on page 159.

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

      See "Return the Server to the Normal Rack Position" on page 163

   c. **Reconnect the power cords to the power supplies, and power on the server.**

      See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

Related Information

- "Server General Status Indicators" on page 7
- "Remove the Left LED Indicator Module" on page 131

▼ Remove the Right LED/USB Indicator Module

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

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

   See "Powering Down the Server" on page 33.

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

   See "Extend the Server to the Maintenance Position" on page 40.

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

   See "Take Antistatic Measures" on page 43.

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

   See "Remove the Server Top Cover" on page 43.

2. **Remove the right LED/USB indicator module.**

   a. **Remove the two No. 2 Phillips screws that secure the LED/USB indicator module to the server front panel [1].**

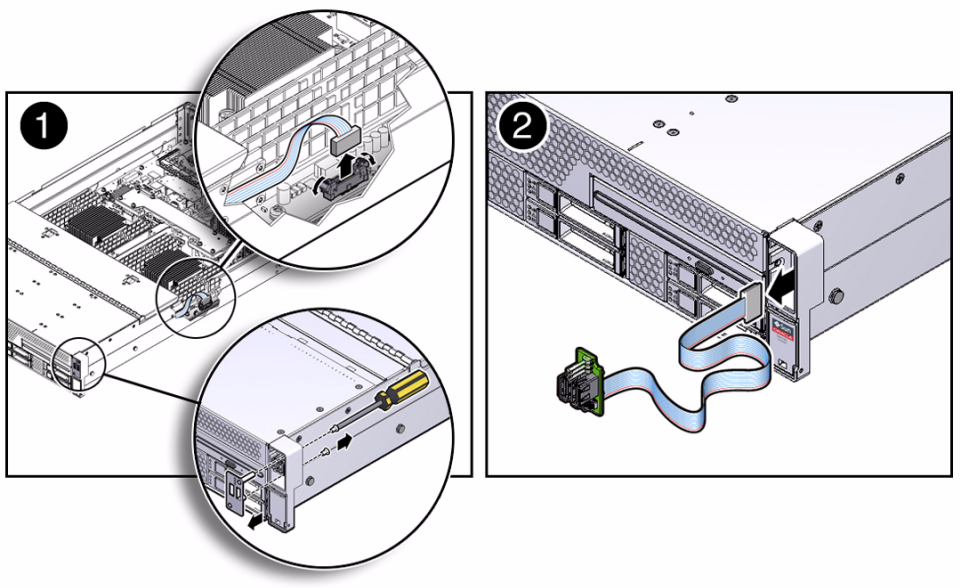
   b. **Disconnect the LED/USB indicator module cable from the motherboard, and gently pull the cable through the chassis mid-plane and side wall of the server chassis [1 and 2].**

Note – Alternatively, if you only need to replace the LED/USB indicator, you do not need to pull the cable through the chassis mid-plane and side wall of the chassis.

---

   c. **Remove the LED/USB indicator module from the server front panel [2].**

FIGURE: Removing the Right LED/USB Indicator Module



Related Information

- "Server General Status Indicators" on page 7
- "Install the Right LED/USB Indicator Module" on page 135

▼ Install the Right LED/USB Indicator Module

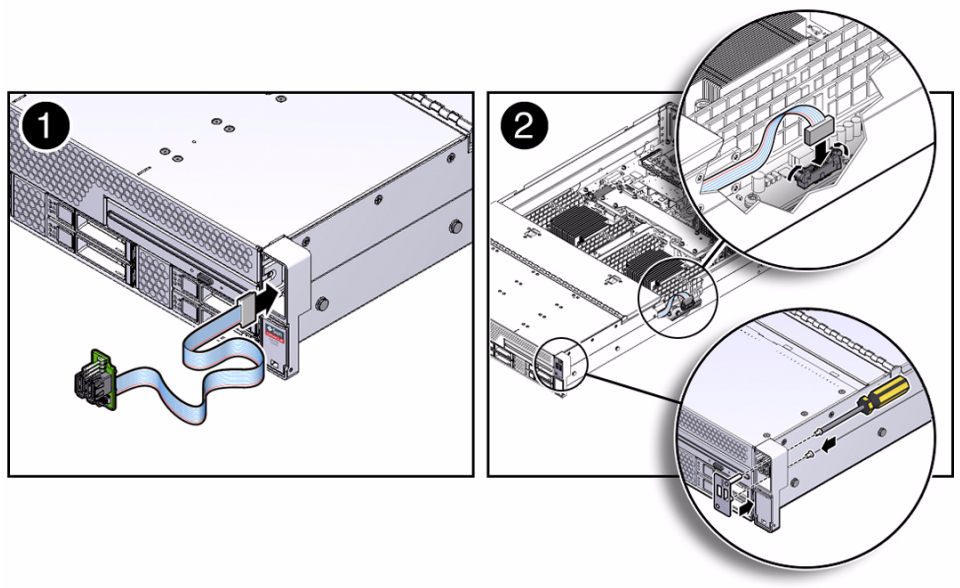
1. **Install the right LED/USB indicator module.**

   a. **Push the LED/USB indicator module cable through the side wall and mid-plane of the server chassis [1 and 2].**

   b. **Reconnect the LED/USB indicator module cable to the motherboard [2].**

   c. **Insert and tighten the two No. 2 Phillips screws to secure the LED/USB indicator module to the server front panel [2].**

FIGURE: Installing the Right LED/USB Indicator Module



2. **Return the server to operation.**

   a. **Install the server top cover.**

      See "Install the Server Top Cover" on page 159.

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

      See "Return the Server to the Normal Rack Position" on page 163.

   c. **Reconnect the power cords to the power supplies, and power on the server.**

      See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

Related Information

- "Server General Status Indicators" on page 7
- "Remove the Right LED/USB Indicator Module" on page 133

Servicing Cables (FRU)

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

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

- "Remove Storage Drive Cables From a SAS/SATA Configuration" on page 137
- "Install Storage Drive Cables in a SAS/SATA Configuration" on page 140

Related Information

- "Servicing Storage Drives and Rear Drives (CRU)" on page 47
- "Servicing the SAS Expander Module (CRU)" on page 85

▼ Remove Storage Drive Cables From a SAS/SATA Configuration

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

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

      See "Powering Down the Server" on page 33.

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

      See "Extend the Server to the Maintenance Position" on page 40.

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

      See "Electrostatic Discharge Safety" on page 30.

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

      See "Remove the Server Top Cover" on page 43.

   e. **Remove the air baffle.**

      See "Remove the Air Baffle" on page 89.

f. **Remove fan modules 1 and 2, leaving fan modules 0 and 3 in place.**

   See "Remove a Fan Module" on page 57.

g. **If you are removing the SAS/SATA cables from a server with twenty-four 2.5-inch storage drives, remove the server's front fan assembly door cover.**

   See "Remove the Fan Assembly Door From a Server With 2.5-Inch Drives" on page 44.

2. **Disconnect SAS/SATA cables from the SAS expander module.**

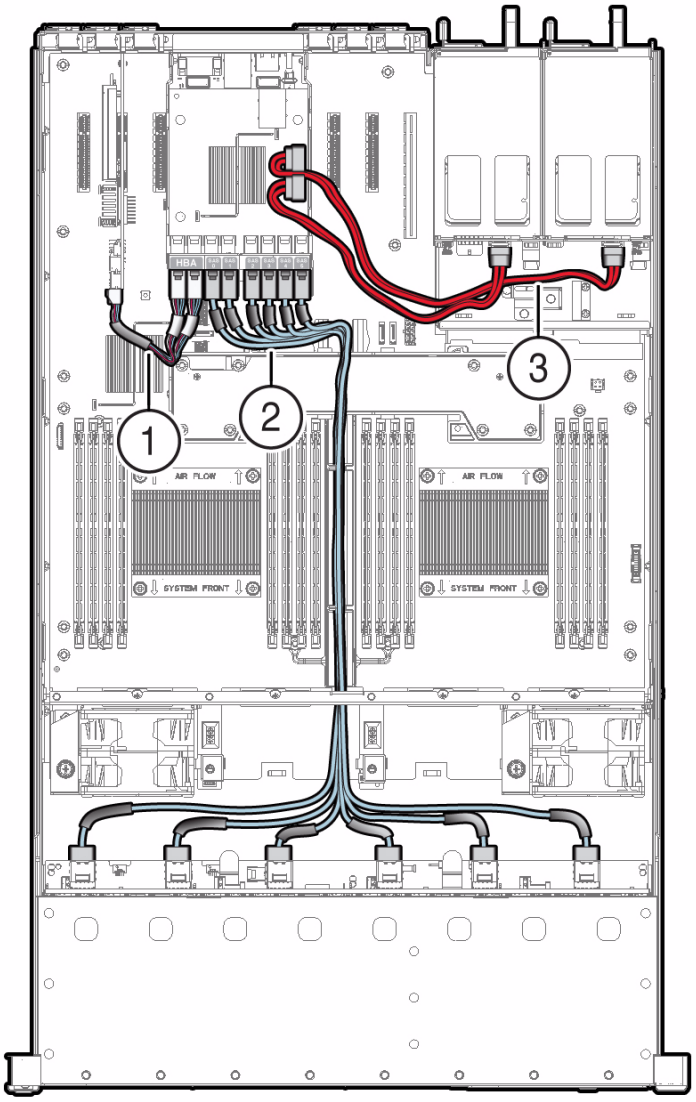
   a. **To disconnect the HBA cable and the SAS/SATA cables from the SAS expander module, press the latch, and then pull out to disengage each cable from the SAS expander module [1].**

      See also "Remove a PCIe Card" on page 82.

   b. **To disconnect the SAS/SATA cables from the front storage drive backplane and the SAS expander module, press the latch, and then pull out to disengage the cables from each storage drive backplane [2].**

   c. **(Optional) To disconnect the rear storage drive SAS cables from the SAS expander module, press the latch, and then pull up to disengage the disk drive SAS drive cable from the SAS expander module [3].**

FIGURE: Removing SAS/SATA Storage Drive Cables



3. **Remove the SAS expander module from the chassis.**

   See "Remove the SAS Expander Module" on page 86.

4. **Remove the SAS/SATA cables from the server.**

   Be careful not to snag the cables on the server components.

Related Information

- "Remove the SAS Expander Module" on page 86
- "Remove a PCIe Card" on page 82
- "Install Storage Drive Cables in a SAS/SATA Configuration" on page 140

▼ Install Storage Drive Cables in a SAS/SATA Configuration

1. **Install storage drive cables.**
   a. **Install the cable connectors into the front storage drive backplane.**
   b. **Route the cables between the fan modules and between processors and DIMMs.**

      There is a trough between the fan modules and processors for routing the cables.
   c. **(Optional) Install the cable connectors into the rear-mounted storage drive backplane.**
2. **Reconnect the SAS/SATA cables to the SAS expander module.**
   a. **To reconnect the HBA cable and the SAS/SATA cables to the SAS expander module, plug each cable into its SAS expander module connector until you hear an audible click [1].**

      See also "Install a PCIe Card" on page 84.

      In eight drive systems, attach the HBA cables directly to disk backplanes (DBPs) 0 and 1. In twelve and twenty-four drive systems, attach the HBA cables to the HBA port on the SAS expander.
   b. **To reconnect the front storage drive SAS/SATA cables to the SAS expander module, plug each cable into its SAS expander module connector until you hear an audible click [2].**

      Use the following table to ensure proper SAS/SATA cable connections for twelve and twenty-four storage drive systems.

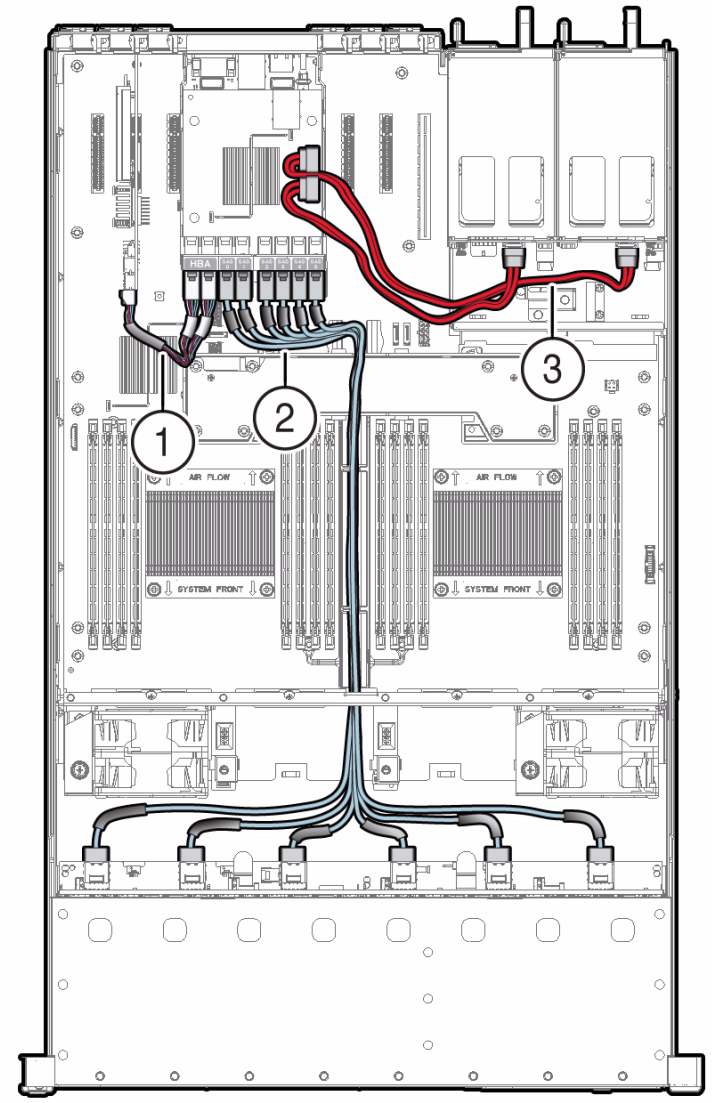
System Disk Configuration	SAS Expander Ports	Disk Backplane Ports
Twelve storage drives	SAS0	DBP0, slots 0-3
	SAS1	DBP1, slots 4-7
	SAS2	DBP2, slots 8-11

System Disk Configuration	SAS Expander Ports	Disk Backplane Ports
Twenty-four storage drives	SAS0	DBP slots 0-3
	SAS1	DBP slots 4-7
	SAS2	DBP slots 8-11
	SAS3	DBP slots 12-15
	SAS4	DBP slots 16-19
	SAS5	DBP slots 20-23

c. (Optional) To reconnect the rear-mounted storage drive SAS cables to the SAS expander module, plug each cable into its top SAS expander module connector until you hear an audible click [3].

In twelve and twenty-four drive systems, attach SAS expander ports RHDD0 and RHDD1 to their corresponding RHDD0 and RHDD1 rear-mounted storage drive connectors.

FIGURE: Installing SAS/SATA Storage Drive Cables



3. **Place the cables into cable tie-downs, and secure them with the tie-downs [3].**
4. **Return the server to operation.**
   a. **Install fan modules 1 and 2.**
      See "Install a Fan Module" on page 59.

b. If required, install the server's front fan assembly door.

See "Install the Fan Assembly Door" on page 161.

c. Install the air baffle.

See "Install the Air Baffle" on page 90.

d. Install the server top cover.

See "Install the Server Top Cover" on page 159.

e. Return the server to the normal rack position.

See "Return the Server to the Normal Rack Position" on page 163.

f. Reconnect the power cords to the power supplies, and power on the server.

See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

Related Information

- "Install the SAS Expander Module" on page 87
- "Install a PCIe Card" on page 84
- "Remove Storage Drive Cables From a SAS/SATA Configuration" on page 137

Servicing the Motherboard Assembly (FRU)

Caution – The motherboard assembly should be removed only by a qualified Oracle service technician.

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

Caution – These procedures require that you handle components that are sensitive to electrostatic discharge. This discharge can cause server components to fail. To avoid damage, ensure that you follow the antistatic practices as described in "Electrostatic Discharge Safety" on page 30.

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

- "Remove the Motherboard Assembly" on page 144
- "Install the Motherboard Assembly" on page 152

Related Information

- "About System Components" on page 14

▼ Remove the Motherboard Assembly

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

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

      See "Powering Down the Server" on page 33.

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

      See "Extend the Server to the Maintenance Position" on page 40.

c. **Attach an antistatic wrist strap to your wrist, and then to a metal area of the chassis.**

   See "Take Antistatic Measures" on page 43.

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

   See "Remove the Server Top Cover" on page 43.

2. **To remove components, follow these instructions:**

Caution – During the motherboard removal procedure, it is important to label power supplies with the slot numbers from which they were removed (PS0, PS1). This is required because the power supplies must be reinstalled into the slots from which they were removed; otherwise, the server FRU top-level indicator (TLI) data might be lost. When a server requires service, the FRU TLI is used by Oracle to verify that the warranty on the server has not expired. For more information on the server FRU TLI, see "FRU TLI Auto-Update" on page 32.

- "Remove the Air Baffle" on page 89
- "Remove a Fan Module" on page 57
- "Remove Storage Drive Cables From a SAS/SATA Configuration" on page 137
- "Remove the SAS Expander Module" on page 86
- "Remove a PCIe Card" on page 82
- "Remove a Power Supply" on page 62

3. **Disconnect the ribbon cables from the left front I/O module and right front I/O modules [1].**

   See "Servicing the Front LED/USB Indicator Modules (FRU)" on page 130.

4. **Disconnect the LED cable between the motherboard to the disk backplane [2].**

   See "Servicing the Front and Rear Storage Drive Backplanes (FRU)" on page 118.

5. **Disconnect the signal cable from the server intrusion switch [2].**

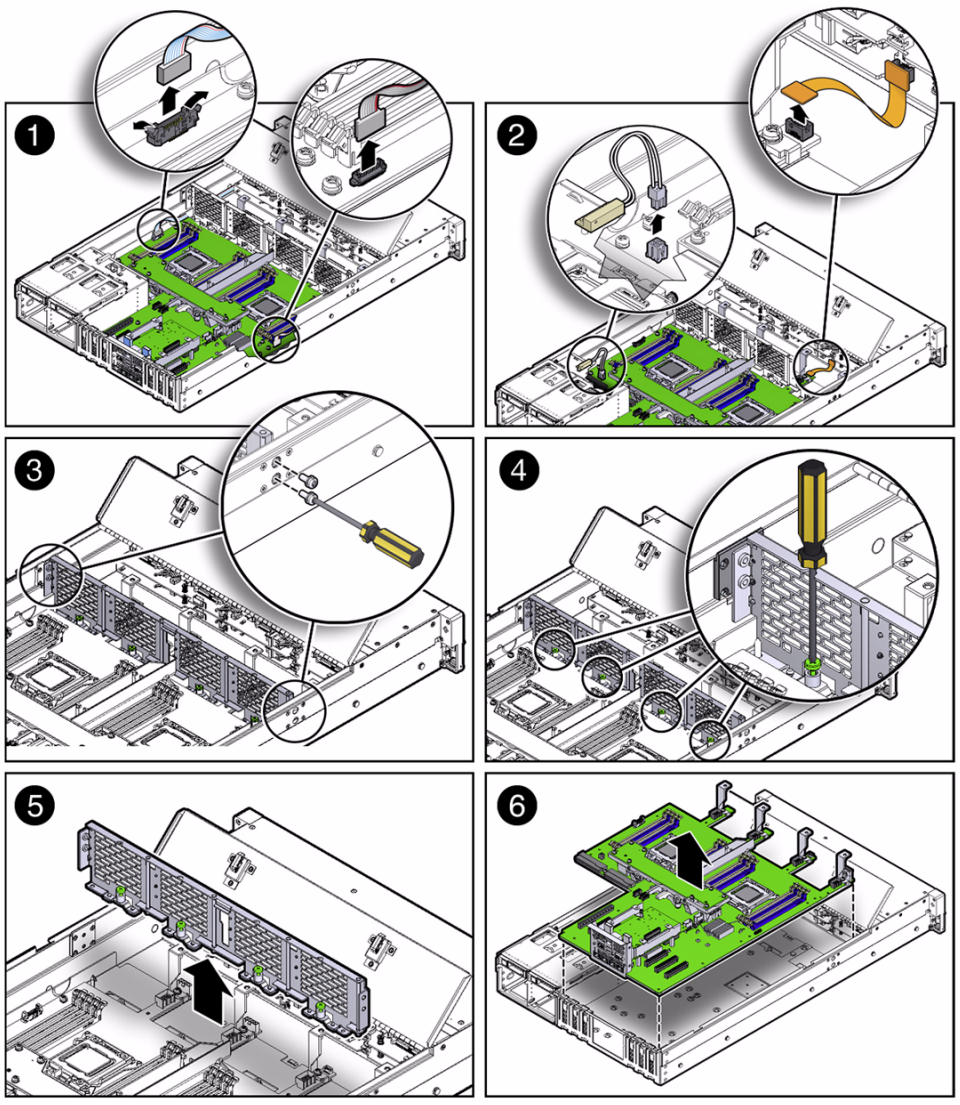
6. **Remove the mid-wall from the chassis.**

   a. **Using a No. 2 Phillips screwdriver, remove the two screws on each side of the chassis that secure the mid-wall to the chassis [3].**

   b. **Using a No. 2 Phillips screwdriver, loosen the four green captive screws that secure the chassis mid-wall to the bottom of the chassis [4].**

   c. **Lift the mid-wall out of the chassis [5].**

FIGURE: Removing the Motherboard Assembly



7. **With the server in the extended maintenance position, remove the motherboard from the server with all reusable components that populate the motherboard in place.**

   a. **Carefully slide the motherboard forward, and lift it out of the chassis [6].**

   b. **Place the motherboard assembly on an antistatic mat, and next to the replacement motherboard.**

8. **Remove the following reusable components from the motherboard and install them on to the replacement motherboard.**

   - DDR3 DIMMs

     See "Remove Faulty DIMMs" on page 76 and "Install DDR3 DIMMs" on page 79.

Note – Install the DDR3 DIMMs only in the slots (connectors) from which they were removed. Performing a one-to-one replacement of DIMMs significantly reduces the possibility that DIMMs will be installed in the wrong slots. If you do not reinstall the DIMMs in the same slots, server performance might be reduced and some DIMMs might not be used.

   - USB flash drives

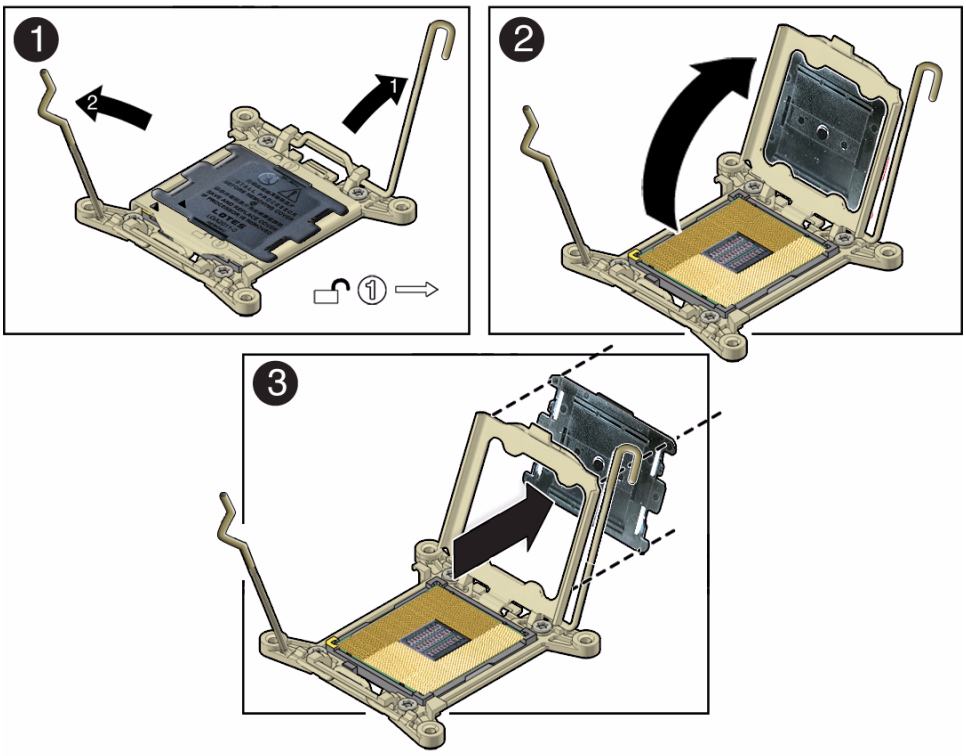
     See "Remove an Internal USB Flash Drive" on page 95 and "Install an Internal USB Flash Drive" on page 96.

   - Processors

     See "Remove a Processor" on page 106 and "Install a Processor" on page 113.

9. **Remove the processor socket covers from the replacement motherboard and install the processors.**

   a. **Disengage the processor ILM assembly hinge lever on the right side of the processor socket (viewing the server from the front) by pushing down on the lever and moving it to the side away from the processor, and then rotating the lever upward [Frame 1].**



b. **Disengage the processor ILM assembly load lever on the left side of the processor socket (viewing the server from the front) by pushing down on the lever and moving it to the side away from the processor, and then rotating the lever upward [1].**

c. **To lift the processor ILM assembly load plate off of the processor socket, rotate the ILM assembly hinge lever on the right side of the processor toward the closed position (the load plate is lifted up as the hinge lever is lowered) and carefully swing the load plate to the fully open position [2].**

d. **Grasp the top and underside of the processor socket cover with one hand (place your thumb against the underside of the cover), place your other thumb against the underside of the cover, and carefully push the cover out of the processor ILM assembly load plate [3].**

Caution – Be careful not to allow the processor socket cover to fall into the processor socket as this could result in damage to the socket.

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

   For instructions for installing a processor, see "Install a Processor" on page 113.

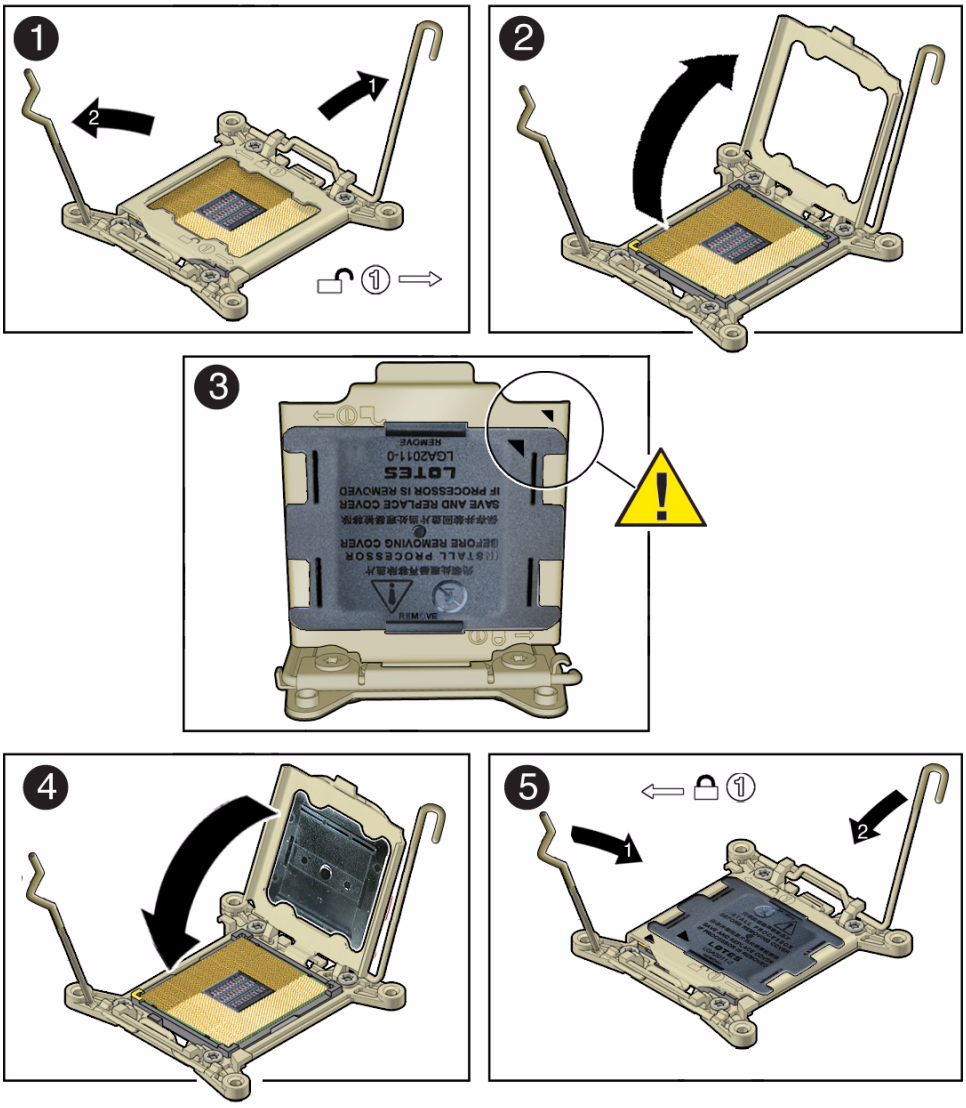
f. **Repeat Step a through Step e above to remove the second processor socket cover from the replacement motherboard and install the second processor.**

10. **Install the processor socket covers on the faulty motherboard.**

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

Caution – Be careful not to allow the processor socket cover to fall into the processor socket as this could result in damage to the socket.

a. **Open one of the processor ILM assemblies on the faulty motherboard [Frames 1 and 2].**



b. Hold the processor ILM assembly load plate open with one hand and position the processor socket cover over the top of the pressure frame so that 1) the arrow on the processor socket cover is aligned with the arrow on the load plate and 2) the fasteners on one side of the cover (the fasteners are located on the underside of the cover) are inside the load plate (it does not matter which side), and use your thumb to press the other side of the processor socket cover into the load plate. [3].

You will hear a clicking sound when the processor socket cover snaps into place.

c. Close the processor ILM assembly load plate [4 and 5].

d. Repeat Step a through Step c above to install the second processor socket cover on the faulty motherboard.

Related Information

- "About System Components" on page 14
- "Field-Replaceable Units" on page 18
- "Install the Motherboard Assembly" on page 152

▼ Install the Motherboard Assembly

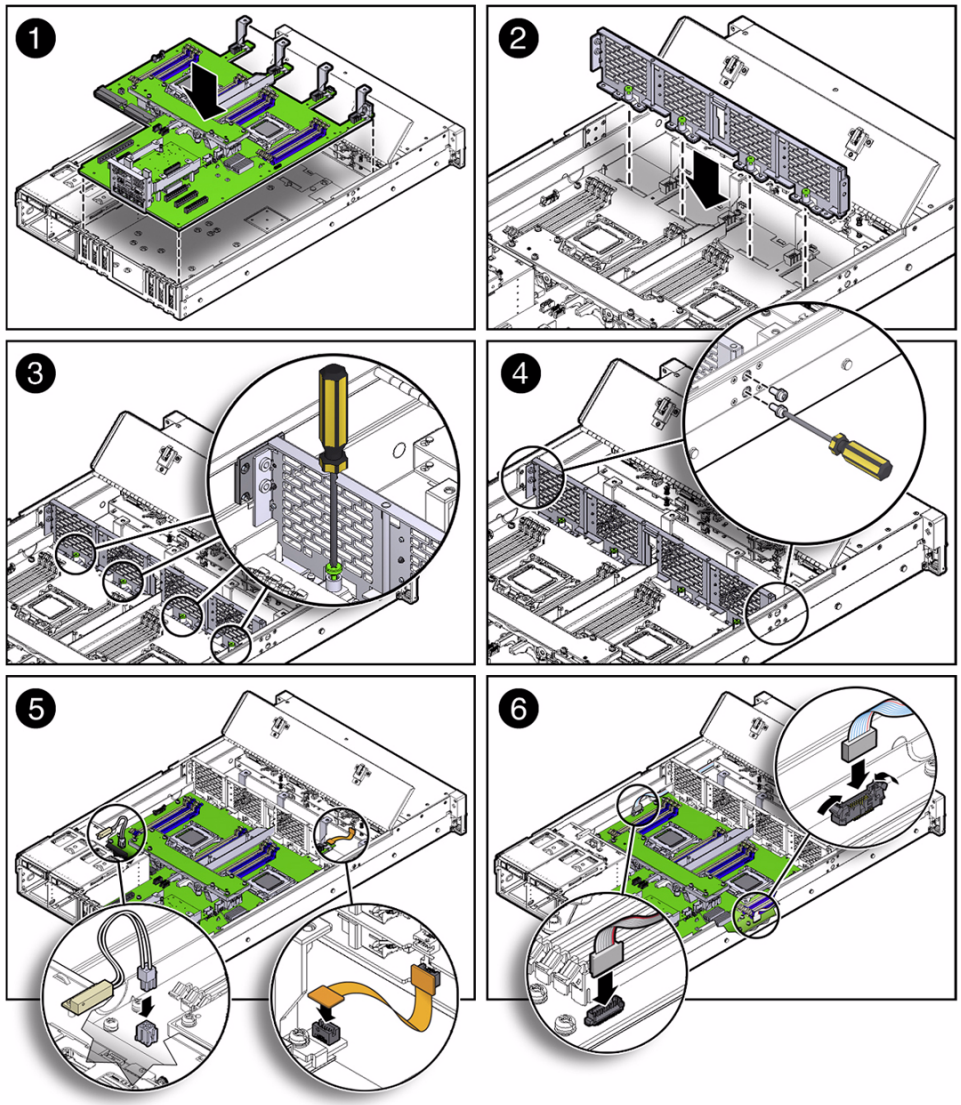
1. **Attach an antistatic wrist strap to your wrist, and then to a metal area on the chassis.**

   See "Take Antistatic Measures" on page 43.

2. **Carefully lift and place the motherboard assembly into the chassis [1].**

   Tilt the motherboard to the right side to fit under the power supply assembly, level the motherboard and place it into the server chassis, then slide it to the rear of the server to engage the mushroom-shaped standoffs.

FIGURE: Installing the Motherboard Assembly



3. **Install the mid-wall into the chassis.**

   a. **Lift and place the mid-wall into the chassis [2].**

   b. **Using a No. 2 Phillips screwdriver, tighten the four green captive screws that secure the mid-wall to the bottom of the chassis [3].**

   c. **Using a No. 2 Phillips screwdriver, insert and tighten the two screws on each side of the chassis to secure the mid-wall in the chassis [4].**

4. **Reconnect the server intrusion switch cable to the motherboard [5].**
5. **Reconnect the signal cable from the storage drive backplane to the motherboard [5].**

   See "Servicing the Front and Rear Storage Drive Backplanes (FRU)" on page 118.
6. **Reconnect the ribbon cables from left and right LED/USB indicator modules to the motherboard [6].**

   See "Servicing the Front LED/USB Indicator Modules (FRU)" on page 130.
7. **To reinstall components, follow these instructions:**

Caution – When reinstalling power supplies, it is important to reinstall them into the slots from which they were removed during the motherboard removal procedure; otherwise, the server FRU top-level indicator (TLI) data might be lost. When a server requires service, the FRU TLI is used by Oracle to verify that the warranty for the server has not expired. For more information on the server FRU TLI, see "FRU TLI Auto-Update" on page 32.

- "Install a Power Supply" on page 64
- "Install a PCIe Card" on page 84
- "Install the SAS Expander Module" on page 87
- "Install Storage Drive Cables in a SAS/SATA Configuration" on page 140
- "Install a Fan Module" on page 59
- "Install the Air Baffle" on page 90

8. **Return the server to operation.**

   a. **Install the top cover.**

      See "Install the Server Top Cover" on page 159.

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

      See "Return the Server to the Normal Rack Position" on page 163.

   c. **Reconnect the power cords to the power supplies, and power on the server.**

      See "Reconnect Power and Data Cables" on page 164 and "Power On the Server" on page 165. Verify that the AC OK LED is lit.

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

Related Information

- "About System Components" on page 14
- "Customer-Replaceable Units" on page 17
- "Field-Replaceable Units" on page 18
- "Remove the Motherboard Assembly" on page 144

Returning the Server to Operation

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

Description	Links
Note server filler panel requirements.	"Server Filler Panel Requirements" on page 157
Install the server top cover.	"Install the Server Top Cover" on page 159
Install the fan door assembly top cover.	"Install the Fan Assembly Door" on page 161
Remove any antistatic measures.	"Remove Antistatic Measures" on page 161
Reinstall the server chassis in the rack.	"Reinstall the Server Chassis in the Rack" on page 162
Return the server to the normal rack position.	"Return the Server to the Normal Rack Position" on page 163
Reconnect power and data cables.	"Reconnect Power and Data Cables" on page 164
Power on the server.	"Power On the Server" on page 165

Related Information

- "Preparing for Service" on page 29

Server Filler Panel Requirements

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

Note – In single-processor systems, the server ships with a DIMM filler panel installed in processor 1 (P1) socket D7. This DIMM filler panel must not be removed from the system because it supports proper air flow for cooling.

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

Related Information

- "Preparing for Service" on page 29

▼ Remove and Install Filler Panels

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

Filler Panel Type	Removal Procedure	Installation Procedure
Storage drive	1. Locate the storage drive filler panel to be removed from the server. 2. To unlatch the storage drive filler panel, press the release lever button, and then tilt the lever up into a fully opened position. 3. To remove the filler panel from the slot, hold the opened release lever, and gently slide the filler panel toward you.	1. Locate the vacant storage drive module slot in the server, and then ensure that the release lever on the filler panel is fully opened. Slide the filler panel into the vacant slot by pressing the middle of the filler panel faceplate with your thumb or finger. 2. The release lever will lower as it makes contact with the chassis. Do not slide the filler panel in all the way. Leave the filler panel out approximately 0.25 to 0.50 inch (6 to 12 mm) from the opening. 3. Using your thumb or finger, press on the middle of the filler panel faceplate until the release lever engages with the chassis. 4. Close the release lever until it clicks into place and is flush with the front of the server.
PCIe slot	1. Remove the server top cover. 2. Remove the PCIe slot filler panel from the location into which you intend to install the PCIe card. **Note -** PCIe slots 1, 2, and 3 are nonfunctional in single-processor systems.	1. Remove the server top cover. 2. Press the PCIe filler panel into the vacant PCIe slot.

▼ Install the Server Top Cover

1. **Place the top cover on the chassis.**

   Set the cover down so that it hangs over the rear of the server by about 1 inch (25 mm) and the side latches align with the cutouts in the chassis.

2. **Check both sides of the chassis to ensure that the top cover is fully down and flush with the chassis.**

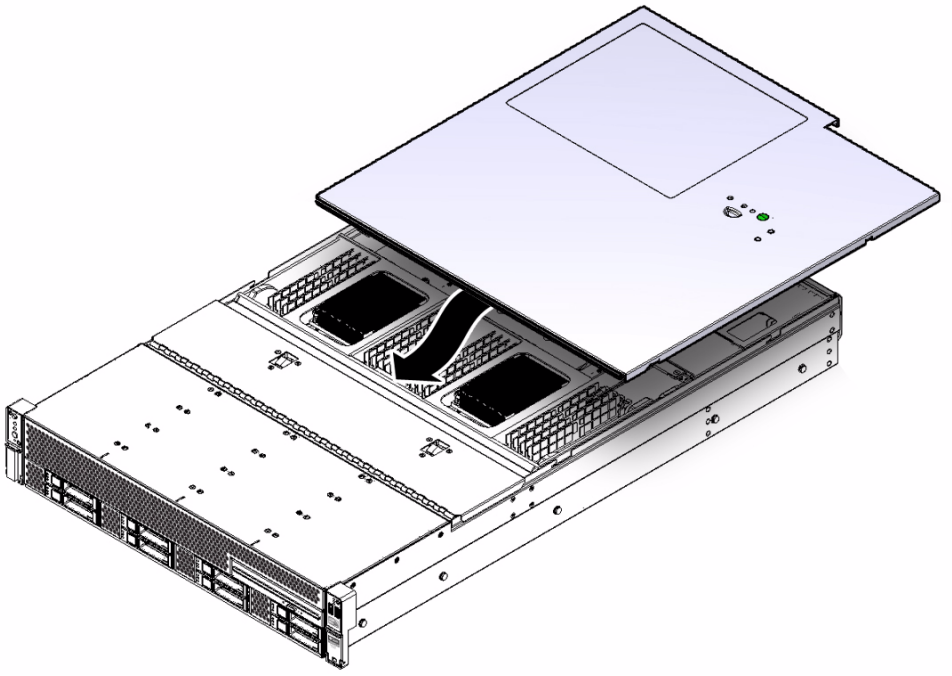
   If the cover is not fully down and flush with the chassis, slide the cover towards the rear of the chassis to position the cover in the correct position.

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

3. **Gently slide the cover toward the front of the chassis until it latches into place (with an audible click).**

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

FIGURE: Installing the Server Top Cover



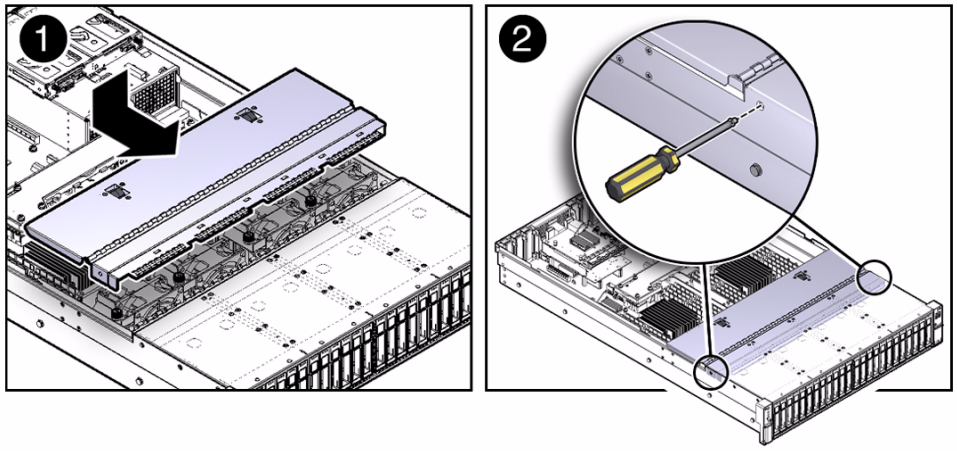
Related Information

- "Remove the Server Top Cover" on page 43

▼ Install the Fan Assembly Door

1. **Place the fan assembly door on the chassis and slightly over the fan assembly.**
2. **Slide the fan assembly door forward and under the lip of the forward top cover until it latches into place [1].**

FIGURE: Installing the Fan Assembly Door



3. **Using a No. 2 Phillips screwdriver, install and tighten the screws on each side of the chassis to secure the fan assembly door [2].**

Related Information

- "Remove the Fan Assembly Door From a Server With 2.5-Inch Drives" on page 44
- "Remove the Server Top Cover" on page 43

▼ Remove Antistatic Measures

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

Related Information

- "Take Antistatic Measures" on page 43

▼ Reinstall the Server Chassis in the Rack

After servicing the system, reinstall it into the rack.

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

Caution – The server weighs approximately 63 pounds (28.5 kg). Two people are required to carry the chassis and install it in the rack.

1. **Lift the server from the antistatic mat, and reinstall the server into the rack.**

   Refer to the *Sun Server X4-2L Installation Guide,* "Installing the Server Into a Rack" on page 41 for the installation instructions specific to your rackmount kit.

2. **If the cable management arm (CMA) is not installed, that is, you removed it because you removed the server completely out of the rack, install the CMA.**

   For installation instructions for the CMA, see one of the following procedures, depending on which version of the CMA is installed on your server.

   - *Sun Server X4-2L Installation Guide,* "Install the Second-Generation Cable Management Arm" on page 54
   - *Sun Server X4-2L Installation Guide,* "Install the First-Generation Cable Management Arm" on page 71

3. **If the cables are disconnected from the rear of the server, that is, you disconnected the cables because you removed the server completely out of the rack, reconnect the cables.**

   - For instructions on reconnecting cables to the rear of the server, see "Reconnect Power and Data Cables" on page 164.
   - For detailed information on connecting cables to the rear of the server, see *Sun Server X4-2L Installation Guide,* "Rear Cable Connections and Ports" on page 79.

Related Information

- "Remove the Server From the Rack" on page 41
- "Reconnect Power and Data Cables" on page 164

▼ Return the Server to the Normal Rack Position

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

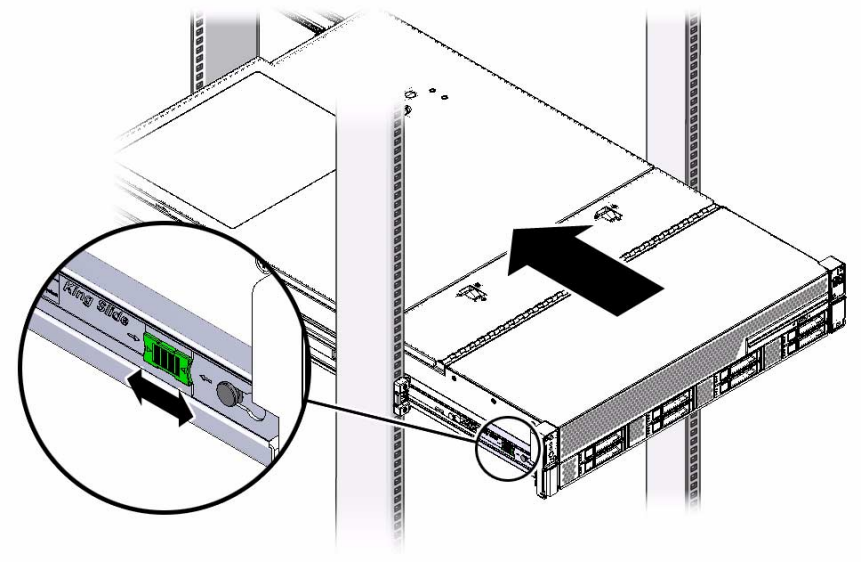
1. **Push the server back into the rack, as described in the following steps.**

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

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

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

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



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

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

2. **If the CMA is not installed, that is, you removed it because you removed the server completely out of the rack, install the CMA.**

   For installation instructions for the CMA, see one of the following procedures, depending on which version of the CMA is installed on your server:

   - *Sun Server X4-2L Installation Guide,* "Install the Second-Generation Cable Management Arm" on page 54
   - *Sun Server X4-2L Installation Guide,* "Install the First-Generation Cable Management Arm" on page 71

3. **If the cables are disconnected from the rear of the server, that is, you disconnected the cables because you removed the server completely out of the rack, reconnect the cables.**

   - For instructions on reconnecting cables to the rear of the server, see "Reconnect Power and Data Cables" on page 164.
   - For detailed information on connecting cables to the rear of the server, see *Sun Server X4-2L Installation Guide,* "Rear Cable Connections and Ports" on page 79.

Related Information

- "Reconnect Power and Data Cables" on page 164

▼ Reconnect Power and Data Cables

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

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

2. **Reconnect the power cables to the power supplies.**

3. **If necessary, reinstall the cables into the cable management arm and secure them with Velcro straps or cable straps, depending on which version of the CMA you are using.**

4. **Power on the server.**

   See "Power On the Server" on page 165.

Related Information

- "Disconnect Cables From the Server" on page 39

- "Reinstall the Server Chassis in the Rack" on page 162
- "Return the Server to the Normal Rack Position" on page 163
- "Power On the Server" on page 165

▼ Power On the Server

As soon as the power cords are connected, standby power is applied. In standby power mode, the Power/OK LED on the server front panel blinks steadily. Depending on the configuration of the firmware, the system might boot. If it does not, follow this procedure.

- **Power on the server by performing one of the following actions:**
  - Press the Power button on the front bezel.
  - Log in to the Oracle ILOM web interface, click Host Management > Power Control and select Power On from the Select Action list.
  - Log in to the Oracle ILOM SP, and type the following command at the Oracle ILOM prompt.

```
-> start /System
```

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

Related Information

- "Powering Down the Server" on page 33
- "Reconnect Power and Data Cables" on page 164

Identifying the Server Ports

These sections describe the pinouts of the server connectors.

Description	Links
Review the Gigabit-Ethernet ports.	"Gigabit-Ethernet Ports" on page 167
Review the network management ports.	"Network Management Port" on page 169
Review the serial management ports.	"Serial Management Port" on page 169
Review the video connectors.	"Video Connector" on page 171
Review the USB ports.	"USB Ports" on page 172

Related Information

- "About the Sun Server X4-2L" on page 1

Gigabit-Ethernet Ports

The server has four auto-negotiating 100/1000/10GBASE-T Gigabit-Ethernet (GbE) system domain ports. All four Ethernet ports use a standard RJ-45 connector. The transfer rates are shown in the following table:

Note – Ethernet ports NET2 and NET3 are nonfunctional in single-processor systems.

TABLE: Ethernet Port Transfer Rates

Connection Type	IEEE Terminology	Transfer Rate
Fast Ethernet	100BASE-TX	100 Mbps
Gigabit Ethernet	1000BASE-T	1000 Mbps
10 Gigabit Ethernet	10GBASE-T	10000 Mbps

The following figure and table describe the 10GbE port pin signals.

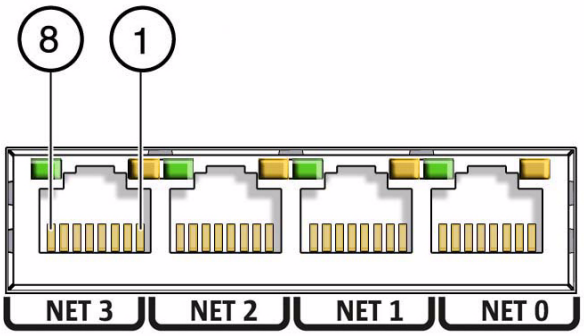


TABLE: 10GbE Port Signals

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

Related Information

- "Rear Panel Components and Cable Connections" on page 6
- "Server General Status Indicators" on page 7
- "Disconnect Cables From the Server" on page 39
- "Reconnect Power and Data Cables" on page 164

Network Management Port

The server has one auto-negotiating 10/100BASE-T Ethernet management domain interface, labeled NET MGT. For information about configuring this port for managing the server with Oracle ILOM, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: http://www.oracle.com/goto/ILOM/docs.

TABLE: Network Management Port Signals

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

Related Information

- "Rear Panel Components and Cable Connections" on page 6
- "Server General Status Indicators" on page 7
- "Disconnect Cables From the Server" on page 39
- "Reconnect Power and Data Cables" on page 164

Serial Management Port

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

TABLE: Default Serial Connections for Serial Port

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

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

TABLE: Serial Management Port Signals

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

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

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

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

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

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

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

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

Related Information

- "Rear Panel Components and Cable Connections" on page 6
- "Disconnect Cables From the Server" on page 39
- "Reconnect Power and Data Cables" on page 164

Video Connector

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

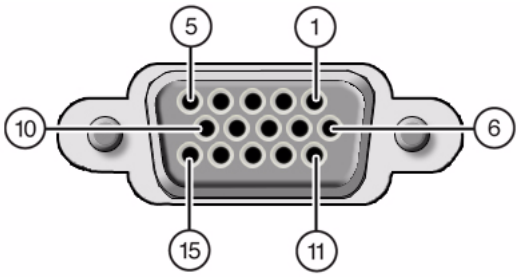


TABLE: Video Connector Signals

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

Related Information

- "Rear Panel Components and Cable Connections" on page 6
- "Disconnect Cables From the Server" on page 39
- "Reconnect Power and Data Cables" on page 164

USB Ports

The server has six USB ports for attaching supported USB 2.0–compliant devices. Two USB ports are on the rear panel, two USB ports are on the front panel, and two USB ports are located on the motherboard.

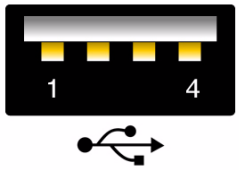


TABLE: USB Port Signals

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

Related Information

- "Rear Panel Components and Cable Connections" on page 6
- "Disconnect Cables From the Server" on page 39
- "Reconnect Power and Data Cables" on page 164

Setting Up BIOS Configuration Parameters

This section provides an overview of BIOS configuration management, Legacy BIOS, UEFI BIOS, and the BIOS Setup utility.

The following topics are discussed.

Description	Links
Learn about the tools available to manage the BIOS configuration.	"Managing the BIOS Configuration" on page 175
Learn how to access the BIOS Setup Utility.	"Accessing the BIOS Setup Utility" on page 176
Learn about Legacy BIOS and UEFI BIOS.	"Using Legacy or UEFI BIOS" on page 181
Learn how BIOS allocates Option ROM and I/O resources.	"Using BIOS for Resource Allocation" on page 184
Learn how to perform common BIOS setup procedures.	"Common BIOS Setup Utility Tasks" on page 186

Related Information

- "BIOS Setup Utility Menu Options" on page 209

Managing the BIOS Configuration

The BIOS configuration parameters on an Oracle x86 server are manageable from the BIOS Setup Utility and Oracle ILOM. You can also download the BIOS firmware using Oracle System Assistant. For information about using these tools to manage the BIOS configuration, see:

- **Oracle System Assistant** – *Oracle X4 Series Servers Administration Guide* at: `http://www.oracle.com/goto/x86AdminDiag/docs`.

- **Oracle ILOM** – "Maintaining x86 BIOS Configuration Parameters" in the *Oracle ILOM 3.1 Configuration and Maintenance Guide*
- **BIOS Setup Utility** – "Common BIOS Setup Utility Tasks" on page 186

Related Information

- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: `http://www.oracle.com/goto/ILOM/docs`

Accessing the BIOS Setup Utility

The BIOS Setup Utility provides six 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

The following table provides descriptions for the top-level BIOS Setup Utility menus.

TABLE: BIOS Setup Utility Menus Summary

Menu	Description
Main	General product information, including memory, time/date, security settings, system serial number, and CPU and DIMM information.
Advanced	Configuration information for the CPU, trusted computing, USB, and other information. Set the IP address for the server SP.
Boot	Enable or disable Oracle System Assistant support, set the boot mode to Legacy BIOS or UEFI BIOS, and configure the boot device priority.

TABLE: BIOS Setup Utility Menus Summary *(Continued)*

Menu	Description
IO	Manage configuration settings for I/O devices, such as I/O virtualization settings, and enable and disable Option ROMs.
UEFI Driver Control	Manage PCIe drivers for all configurable devices. Menu is only available when operating in UEFI Boot Mode.
Save & Exit	Save changes and exit, discard changes and exit, discard changes, or restore the default BIOS settings.

See "BIOS Setup Utility Menu Options" on page 209 for examples of each of these screens.

Related Information

- "BIOS Setup Utility Menu Options" on page 209
- "Navigate BIOS Setup Utility Menus" on page 179

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.

TABLE: Function Key to Control Key Sequence Mapping

Function Key	Control Key Sequence	BIOS POST Function	BIOS Setup Function
F1	Ctrl+Q	Not applicable	Activate the Setup Utility Help menu.
F2	Ctrl+E	Enter BIOS Setup Utility while the system is performing the power-on self-test (POST).	Not applicable
F7	Ctrl+D	Not applicable	Discard changes. (Not applicable to UEFI Driver Control menu)
F8	Ctrl+P	Activate the BIOS Boot Menu.	Not applicable

TABLE: Function Key to Control Key Sequence Mapping *(Continued)*

Function Key	Control Key Sequence	BIOS POST Function	BIOS Setup Function
F9	Ctrl+O	Launch Oracle System Assistant. BIOS boots to Oracle System Assistant, bypassing the current Boot Options Priority list for this one-time boot method.	Activate Load Optimal Values pop-up menu. (Not applicable to UEFI Driver Control menu)
F10	Ctrl+S	Not applicable	Activate Save and Exit pop-up menu. (Not applicable to UEFI Driver Control menu)
F12	Ctrl+N	Activate Network boot.	Not applicable

Related Information

- "Access BIOS Setup Utility Menus" on page 178
- "Navigate BIOS Setup Utility Menus" on page 179

▼ Access BIOS Setup Utility Menus

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

- Use a USB keyboard and VGA monitor connected directly to the server. (A mouse is not required to access the BIOS Setup Utility.)
- 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 Console application.

1. **Reset or power on the server.**

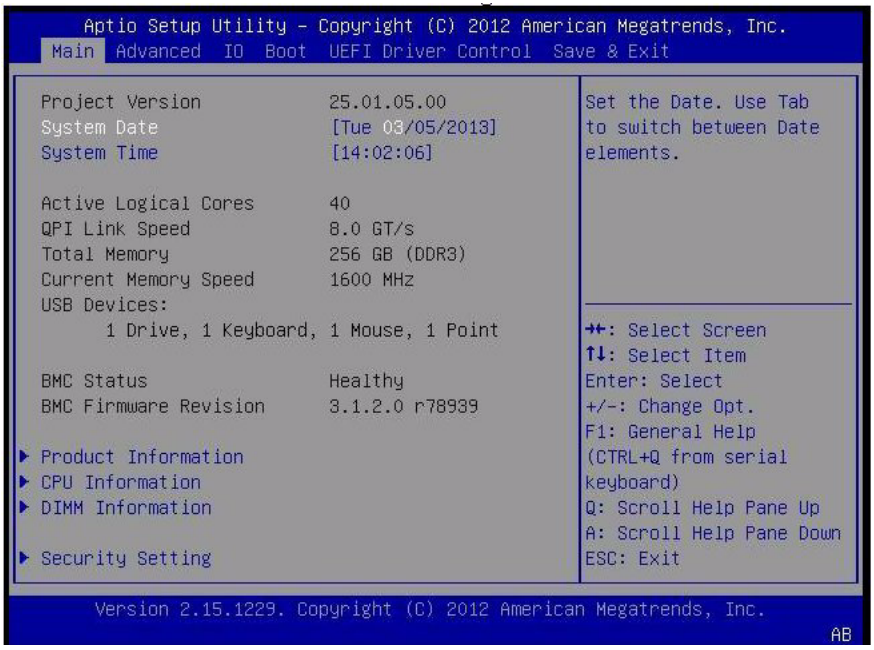
   For example, to reset the server:

   - **From the local server,** press the Power button on the front panel of the server to power off the server, and then press the Power 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.
   - **From the Oracle ILOM CLI on the server SP,** type **`reset /System`**

   The power-on self-test (POST) sequence begins.

2. **To enter the BIOS Setup Utility, press the F2 key (Ctrl+E from a serial connection) when prompted and while the BIOS is running the power-on self-tests (POST).**

   The BIOS Setup Utility Main Menu screen appears.



Related Information

- "BIOS Setup Utility Menus" on page 176
- "BIOS Key Mappings" on page 177
- "BIOS Setup Utility Menu Options" on page 209

▼ Navigate BIOS Setup Utility Menus

To navigate the menus or options listed on a menu, use the arrow keys. The currently selected option or sub-menu is highlighted. For further instructions on how to navigate and change settings in the BIOS Setup Utility, refer to the online information provided on the menu.

1. **Access the BIOS Setup Utility.**

   See "Access BIOS Setup Utility Menus" on page 178.

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 - keys (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 F10 to save your changes and exit the BIOS Setup Utility.**

   Alternatively, you can select the Save & Exit Menu, and then select the `Save Changes and Reset` to save your changes and exit the BIOS Setup Utility.

Note – After modifying any BIOS settings and selecting `Save Changes and Reset` from the Save & Exit Menu, the subsequent reboot might take longer than a typical reboot where no settings were modified. The additional delay is required to ensure that changes to the BIOS settings are synchronized with Oracle ILOM.

Related Information

- "BIOS Setup Utility Menus" on page 176
- "BIOS Key Mappings" on page 177
- "BIOS Setup Utility Menu Options" on page 209

Using Legacy or UEFI BIOS

The BIOS firmware controls the system from power-on until an operating system is booted. The BIOS is based on the Unified Extensible Firmware Interface (UEFI) specification. However, the BIOS supports booting from both Legacy BIOS and UEFI BIOS, depending on which operating system you are using.

This section includes the following information:

Selecting Legacy BIOS or UEFI Boot Mode

BIOS supports two modes: Legacy BIOS and UEFI BIOS. You can set the UEFI BIOS Boot Mode using the Boot Menu in the BIOS Setup Utility. UEFI BIOS Boot Mode selection depends on the operating system type and configuration that is installed in the system. Some devices and operating systems do not yet support UEFI BIOS and can only boot in Legacy BIOS Boot Mode. Depending on your situation, you might have to specify which boot mode of BIOS you want to use, Legacy BIOS Boot Mode or UEFI BIOS Boot Mode.

Choose Legacy BIOS Boot Mode to allow host bus adapters (HBAs) to use Option ROMs. Choose UEFI BIOS Boot Mode to use UEFI drivers.

When using operating systems that support booting only from Legacy BIOS, the Legacy BIOS Boot Mode must be used. When using operating systems that support booting from Legacy BIOS or UEFI BIOS, either mode can be used. However, once a mode is chosen and an operating system is installed, the operating system can be booted only using the same mode that was used for the installation.

The following operating systems do not support UEFI BIOS:

- Oracle Solaris 10
- Oracle Linux 5.*x*
- Red Hat Enterprise Linux 5.*x*
- Oracle VM 3.2.1

For updates to this list, refer to the *Sun Server X4-2L Product Notes* at:
`http://www.oracle.com/goto/X4-2L/docs`

Only devices that support the selected mode are listed on the BIOS Boot screen. If you select UEFI Boot Mode, only boot candidates that support UEFI BIOS are listed in the Boot Options Priority list. If you select Legacy BIOS Mode, only boot candidates that support Legacy BIOS are listed in the Boot Options Priority list.

- When an operating system is installed using Legacy BIOS Mode, the operating system can be booted only in Legacy BIOS Mode.
- When an operating system is installed using UEFI Boot Mode, the operating system can be booted only in UEFI Boot Mode.

Related Information

- "Switching Between Legacy BIOS and UEFI BIOS" on page 182
- "UEFI BIOS Boot Mode Advantages" on page 183
- "Configuration Utilities for Add-In Cards" on page 183

Switching Between Legacy BIOS and UEFI BIOS

When switching between Legacy BIOS Mode and UEFI BIOS Boot Mode (either direction), BIOS settings that affect the Boot Options Priority list settings will be changed. If the boot mode is changed, the boot candidates from the previous boot mode disappear. The boot candidates for the newly changed boot mode appear after you save your changes and reset the host and in the next boot to the BIOS Setup Utility.

Note – When switching between Legacy BIOS Boot Mode and UEFI BIOS Boot Mode, Boot Options Priority List settings will not be preserved. Typically, once a boot mode is selected, there is no need to switch boot modes. However, there is one notable exception: the Pc-Check utility must be run in Legacy BIOS Mode. If boot settings are customized while in UEFI BIOS Boot Mode, and you need to run Pc-Check, you should use the BIOS Backup and Restore feature to capture the customized settings prior to switching the boot mode to Legacy BIOS Boot Mode to run Pc-Check. When you return to UEFI BIOS Boot Mode, you can use the Oracle ILOM Backup and Restore feature to reinstate your saved settings

---

Because the settings for a given mode do not persist after a transition between modes, you should use the BIOS Backup and Restore feature to capture and preserve the BIOS configuration if you intend to switch back to the previous boot mode and want to retain your previous BIOS settings. For information about the BIOS Backup and Restore feature, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at `http://www.oracle.com/goto/ILOM/docs`.

Related Information

- "Selecting Legacy BIOS or UEFI Boot Mode" on page 181
- "UEFI BIOS Boot Mode Advantages" on page 183
- "Configuration Utilities for Add-In Cards" on page 183

UEFI BIOS Boot Mode Advantages

When the option is available to choose between a Legacy BIOS Boot Mode or UEFI BIOS Boot Mode operating system installation, the advantages to choosing a UEFI BIOS Boot Mode installation include the following:

- Avoids Legacy Option ROM address constraints. For more information, see "Legacy Option ROM Allocation" on page 184.
- Supports operating system boot partitions greater than 2 terabytes (2 TB) in size. For more information about limitations for supported operating systems, refer to the *Sun Server X4-2L Product Notes* at: `http://www.oracle.com/goto/X4-2L/docs`.
- Integrate PCIe device configuration utilities within the BIOS Setup Utility menus. For more information, see "BIOS Setup Utility Menu Options" on page 209.
- Displays Bootable operating system images in the boot list as labeled entities, for example, you will see a Windows boot manager label as opposed to raw device labels.

Related Information

- "Selecting Legacy BIOS or UEFI Boot Mode" on page 181
- "Select the Boot Device" on page 189

Configuration Utilities for Add-In Cards

The method for interacting with configuration utilities for add-in cards and (system resident) I/O adapters differs depending on whether Legacy BIOS Boot Mode or UEFI BIOS Boot Mode is used.

In Legacy BIOS Boot Mode, I/O adapter utilities are invoked during BIOS POST progression using hot keys identified by the adapter Option ROM during POST. When the hot key is pressed, the adapter specific configuration utility interface is presented. Often the interface will have a vendor-specific design.

In UEFI BIOS Boot Mode, the configuration screens for the add-in cards will appear as menu items in the BIOS UEFI Driver Control Menu as part of the standard BIOS Setup Utility screens. For example, if the Oracle Sun Storage 6Gb SAS PCIe RAID host bus adapter is installed in the server, the configuration utility for the HBA appears as a menu selection on the BIOS UEFI Driver Control Menu.

Related Information

- "Selecting Legacy BIOS or UEFI Boot Mode" on page 181

Using BIOS for Resource Allocation

This section explains how the BIOS allocates Option ROM and I/O resources.

- "Legacy Option ROM Allocation" on page 184
- "I/O Resource Allocation" on page 185

Legacy Option ROM Allocation

In Legacy BIOS Boot Mode, there are PC architecture constraints on Legacy Option ROM allocation. These constraints do not apply to UEFI Option ROMs, which are often referred to as UEFI drivers.

Choose Legacy BIOS Boot Mode to allow host bus adapters (HBAs) to use Option ROMs. Choose UEFI BIOS Boot Mode to use UEFI drivers.

The system BIOS allocates 128 KB of address space for Legacy Option ROMs. This address space is shared between on-board devices and PCIe add-in cards. This fixed address space limitation is imposed by the PC architecture and not by the BIOS itself. It is possible to exhaust the available address space when installing PCIe add-in cards. When the address space is exhausted, Oracle ILOM displays an `Option ROM Space Exhausted` message, which means that one or more devices cannot load Option ROMs.

For example, if you install a SAS PCIe card, you might encounter a message similar to the following message in the Oracle ILOM event log:

```
Option ROM Space Exhausted - Device XXX Disabled
```

By default, all on-board Legacy Options ROMs are enabled in the BIOS. However, you can disable most of these Option ROMs, unless they are required to support booting from the associated device or to provide some other boot-time function. For

example, it is not necessary to load the Option ROM for the on-board network ports unless you want to boot from one or more network ports (even then, you can disable the Options ROMs for the remaining ports).

To minimize server boot time and reduce the likelihood of exhausting the available Option ROM address space, disable the Option ROMs for all devices that you do not intend to boot from. Enable Option ROMs only for those devices from which you intend to boot. If Option ROMs are enabled for more than one boot device, you might encounter an Option ROM space exhausted condition.

If you encounter the Option ROM space exhausted condition even after disabling all devices from which you do not intend to boot, then disable additional Option ROMs. Under some circumstances it might be necessary to disable Option ROMs for all devices except for the primary boot device.

Related Information

- "Access BIOS Setup Utility Menus" on page 178
- "Configure Option ROM Settings" on page 205

I/O Resource Allocation

The system provides 64 KB of I/O address space. With the increasing number of PCIe devices supported on the system, there is a possibility that there are not enough I/O resources for all the devices. Setup options are available to enable or disable the I/O resource allocation for each PCIe slot. The default for this option is enabled. When enabled, I/O resources are allocated to the device as normal. When disabled, I/O resources are not allocated to the device.

If there are one or more Sun Quad Port Gigabit Ethernet PCIe Low Profile Adapter cards installed in the server, then the BIOS might detect a condition where legacy I/O address space resources are exhausted. The following is a common form of error that might be logged:

```
6491 Tue Dec 7 14:19:57 2012 IPMI Log minor

ID = a5a9 : 12/07/2012 : 14:19:57 : System Firmware Error :

sensor number

= 0x00 : PCI resource exhaustion : Bus 147 Device 0 Func 0

6490 Tue Dec 7 14:19:57 2012 IPMI Log minor

ID = a5a8 : 12/07/2012 : 14:19:57 : System Firmware Error :

sensor number
```

```
= 0x00 : PCI resource exhaustion : Bus 147 Device 0 Func 1
```

To eliminate the PCI resource exhaustion condition, you should disable I/O resource allocation for any slot in which the Sun Quad Port Gigabit Ethernet PCIe Low Profile Adapter card is installed unless you intend to use that card as a bootable device. If you intend to use that card as a bootable device and you are encountering a PCI resource exhaustion event for that specific device, then it is necessary to disable I/O allocation for some of the other card slots in the system. In general, it is safe, but not typically required, to disable I/O resource allocation for any cards not intended to be used as bootable devices, similar to the disabling of Option ROMs.

Related Information

- "Access BIOS Setup Utility Menus" on page 178
- "Configure I/O Resource Allocation" on page 206

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

In the BIOS Setup Utility, you 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 the following requirements are met:

- A hard disk drive or solid state drive is properly installed in the server.
- A console connection is established to the server.

1. **Reset or power on the server.**
   - **From the local server,** press the Power button on the front panel of the server to power off the server, and then press the Power 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.
   - **From the Oracle ILOM CLI on the server SP,** type **`reset /System`**

   The server resets.
2. **When prompted, press the F2 key to access the BIOS Setup Utility.**
3. **To ensure that the factory defaults are set, do the following:**
   a. **Press the F9 key to automatically load the optimal factory default settings.**

      A message appears prompting you to continue this operation by selecting OK or to cancel the operation by selecting Cancel.

   b. **In the message, highlight OK, and then press Enter.**

      The BIOS Setup Utility screen appears with the cursor highlighting the first value on the screen.
4. **Press F10 to save the changes and exit the BIOS Setup Utility.**

   Alternatively, you can save the changes and exit the BIOS Setup Utility by navigating to the Save & Exit Menu and selecting `Save Changes and Reset`.

Related Information

- "Access BIOS Setup Utility Menus" on page 178
- "BIOS Setup Utility Menus" on page 176
- "BIOS Key Mappings" on page 177

▼ Select Legacy BIOS or UEFI BIOS Boot Mode

The BIOS firmware supports both Legacy BIOS Mode and UEFI BIOS Boot Mode. The default setting is Legacy BIOS Boot Mode. Because some operating systems (OS) support both Legacy BIOS and UEFI BIOS, and some operating systems support only Legacy BIOS, you have the following options:

- If the OS being installed supports only Legacy BIOS, you must ensure that the BIOS is set to Legacy BIOS Boot Mode before you do the OS installation.

- If the OS being installed supports both Legacy BIOS and UEFI BIOS, you can set the BIOS to either Legacy BIOS Boot Mode or UEFI BIOS Boot Mode before you do the OS installation.

The following operating systems do not support UEFI-based BIOS:

- Oracle Solaris 10
- Oracle Linux 5.*x*
- Red Hat Enterprise Linux 5.*x*
- Oracle VM 3.2

1. **Access the BIOS Setup Utility menus.**

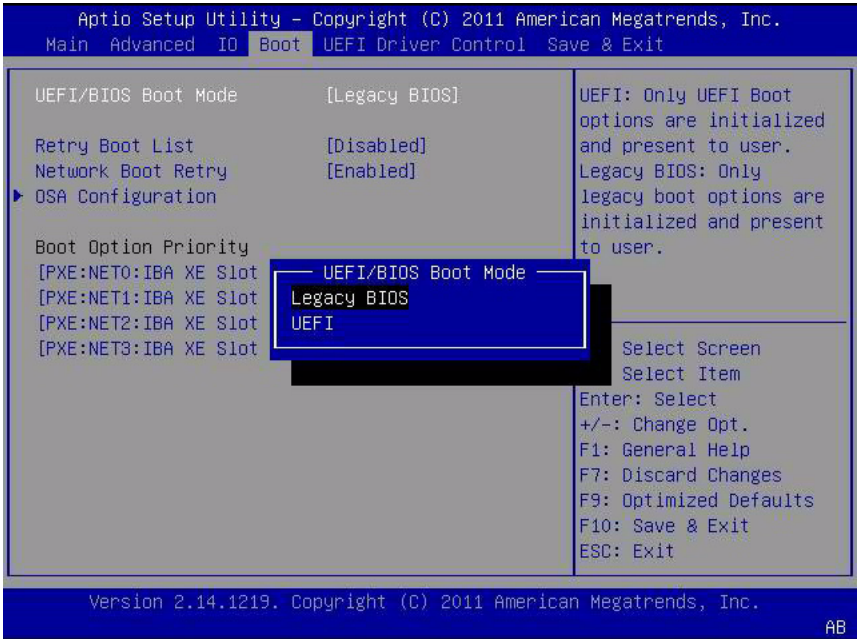
   See "Access BIOS Setup Utility Menus" on page 178.

2. **From the BIOS Main Menu screen, select** `Boot`**.**

   The Boot Menu screen appears.

3. **From the Boot Menu screen, use the up and down arrow keys to select** `UEFI/Legacy BIOS Boot Mode`**, and then press Enter.**

   The UEFI/BIOS dialog box appears.



Note – You cannot configure the boot device priority after switching the boot mode. A system reboot is required to properly populate the Boot Options Priority list with devices that support the chosen boot mode.

4. **Use the up and down arrow keys to select the appropriate Legacy or UEFI mode, and then press Enter.**
5. **Press F10 to save the changes and exit the BIOS Setup Utility.**

Related Information

- "BIOS Setup Utility Menus" on page 176
- "BIOS Key Mappings" on page 177

▼ Select the Boot Device

The Boot Options Priority list contents depend on which BIOS mode is selected. When UEFI BIOS Boot Mode is selected, only UEFI BIOS boot candidates will be initialized and displayed in the Boot Options Priority list. When Legacy BIOS is selected, only Legacy BIOS boot candidates are initialized and displayed.

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.**
   - **From the local server,** press the Power button on the front panel of the server to power off the server, and then press the Power 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.
   - **From the Oracle ILOM CLI on the server SP,** type **`reset /System`**

     The server resets.
2. **Press the F8 key (or Ctrl+P from a serial connection) when prompted while the BIOS is running the power-on self-test (POST).**

   The Please Select Boot Device dialog box appears.

3. **In the dialog, select the boot device option according to the operating system and BIOS mode you elected to use, and then press Enter.**

   Use the up and down arrow keys to select the boot device. Based on the boot mode you selected (UEFI BIOS Boot Mode or Legacy BIOS Boot Mode), the Please Select Boot Device dialog box displays only the applicable devices. For example, when the UEFI BIOS Boot Mode is elected, only UEFI BIOS boot devices are displayed in the dialog box.

4. **Press F10 to save the changes and exit the BIOS Setup Utility.**

Related Information

- "BIOS Setup Utility Menus" on page 176
- "BIOS Key Mappings" on page 177

▼ Configure iSCSI Virtual Drives

iSCSI virtual drives are used primarily to run supported operating systems that reside on an external server that function as the Sun Server X4-2L host operating system.

iSCSI virtual drives must be configured in the iSCSI BIOS Setup Utility screens. You must set the iSCSI parameters on the selected port.

Before you begin:

- You should be familiar with iSCSI theory of operation for the selected OS.
- Refer to the OS documentation to verify that ISCSI targets can be mounted on a client.
- You will need access to an external iSCSI server running on any supported OS.
- The Sun Server X4-2L must be in UEFI BIOS Boot Mode, not Legacy BIOS Boot Mode.

  See "Select Legacy BIOS or UEFI BIOS Boot Mode" on page 187.
- You must provide the following information from the iSCSI target server. The following items are entered into the iSCSI BIOS Setup Utility screens:

Item Number	Name	Example
1	Target name	`iqn.198812.com.oracle:x4-2-target` **Note -** iSCSI requires an iqn format for this item.
2	iSCSI initiator name	`iqn.198812.com.oracle:002222de444e` **Note -** iSCSI requires an iqn format for this item.
3	Virtual device	Virtual Disk 0

Item Number	Name	Example
4	Logical Unit Number	LUN 0
Additional Information:		
5	IP address of iSCSI server	111.111.1.11 (IPv4)
6	Port number	3210

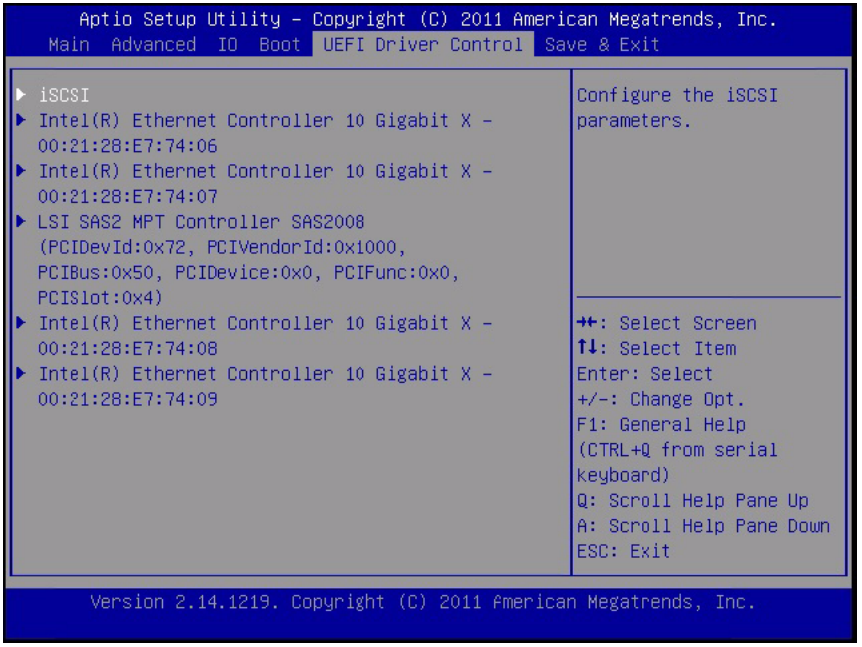
1. **Access the BIOS Setup Utility menus.**

   See "Access BIOS Setup Utility Menus" on page 178.

2. **In the BIOS Setup Utility menus, navigate to the UEFI Driver Control Menu.**

   Options displayed include iSCSI booting and all controllable devices.

Note – The selection for iSCSI will always be an option in UEFI BIOS Boot Mode; however, other menu options might change depending on which cards are installed in the system.

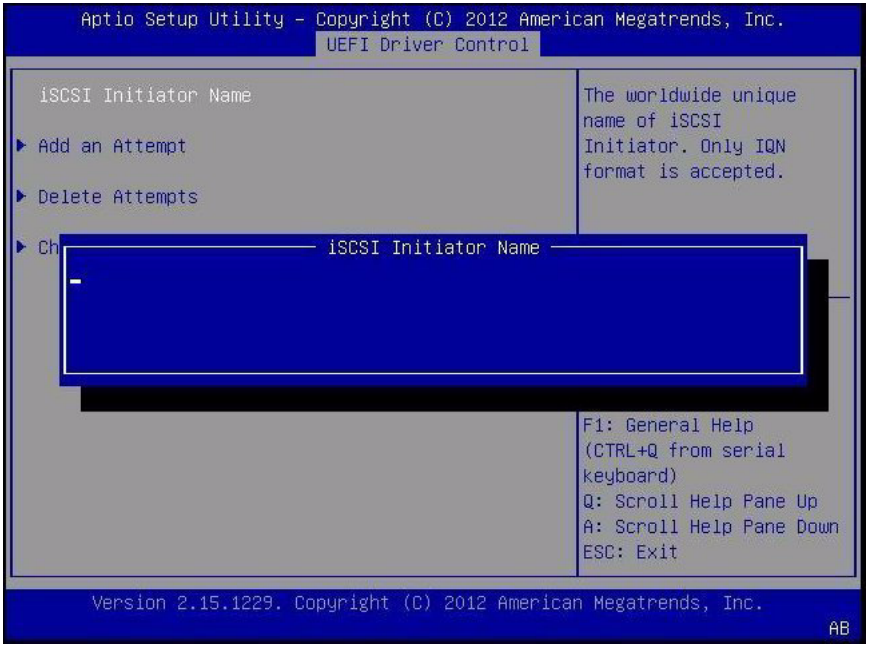


3. **Select `iSCSI`, and then to press Enter.**

   The iSCSI Initiator Name screen appears.

4. **Select** `iSCSI Initiator Name`**, and then press Enter-.**

   The iSCSI Initiator Name dialog box appears.



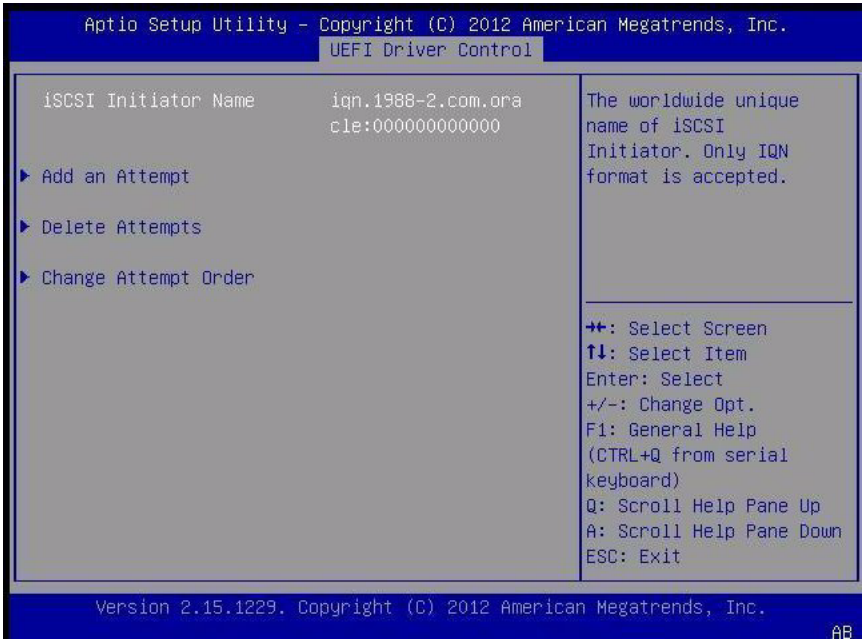
5. **Type the desired iSCSI Qualified Name (IQN) into the iSCSI Initiator Name dialog box, and then press Enter to save the changes.**

   The IQN identifies:

   - The string "iqn"
   - A date code that specifies the year and month in which the organization registered the domain or subdomain name used as the naming authority string
   - The organizational naming authority string, which consists of a valid, reversed domain or subdomain name
   - Optionally, a ":" (colon) followed by a string that the assigning organization can choose, which must make each assigned iSCSI name unique

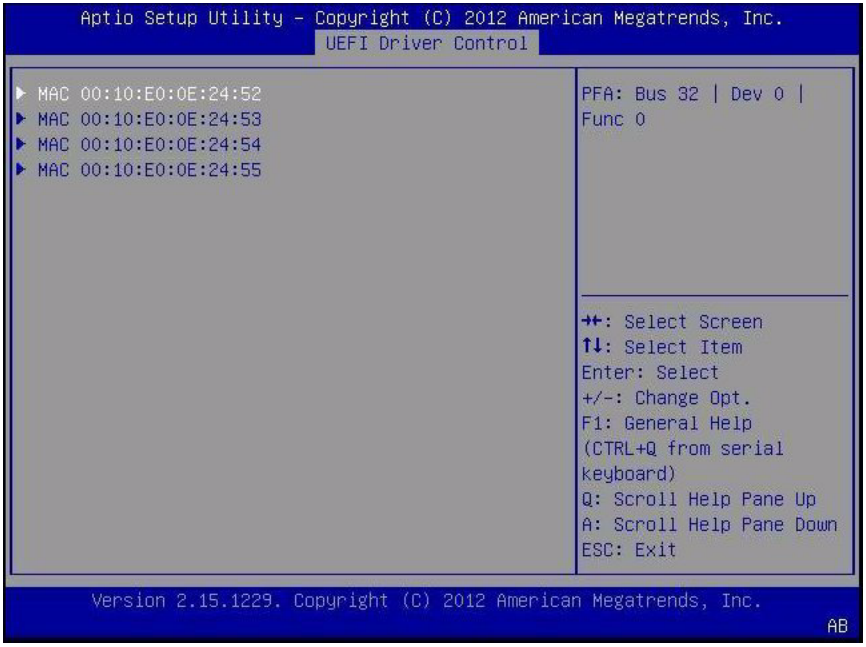
   The iSCSI Initiator Name must conform to the IQN naming scheme (see *RFC 3271 – Internet Small Computer Systems Interface (iSCSI) Naming and Discovery*). For example: `iqn.1988-2.com.oracle:000000000000`

   The iSCSI Initiator Name appears in the UEFI Driver Control screen.



6. **Select** `Add an Attempt`**, and then press Enter.**

   The Add and Attempt screen appears.



7. **Select the NIC port MAC address that corresponds to your chosen iSCSI boot target, and then press Enter.**

   For example: `Port 00-21-28-E7-71-06`.

   The Port Configuration screen appears. iSCSI is disabled by default.

8. **Select** `iSCSI Mode`**, then press the + or - key (plus or minus key) to toggle** `iSCSI Mode` **to** `Enabled` **to enable the iSCSI port for iSCSI boot.**

9. **Determine whether you want to set DHCP to enabled or disabled.**

   DHCP is disabled by default.

   - If you keep DHCP disabled, continue to Step 10.
   - If you set DHCP to enabled, continue to Step 11.

10. **If you elect to keep DHCP disabled, manually enter the following settings, and then press Enter to save your changes.**

    a. **Select** `Target Name`**, and then type the iqn target name.**

       For example: **`iqn.1988-12.oracle.com:X4-2-target`**

    b. **Select** `Target IP Address`**, and then type the target IP address of the iSCSI server in dotted-decimal notation.**

       For example: **`111.111.1.11`**

    c. **Select the** `Target Port`**, and then type the target port of the iSCSI server.**

       For example: **`3260`** (default target port setting)

Note – When iSCSI is enabled on a network port, PXE is disabled for the port.

---

d. **Select the** `Boot LUN`**, and then type the hexadecimal representation of the logical unit number (LUN).**

   For example: **0**

e. **Continue to** Step 12**.**

11. **To set DHCP to enabled, do the following, and then press Enter to save your changes.**

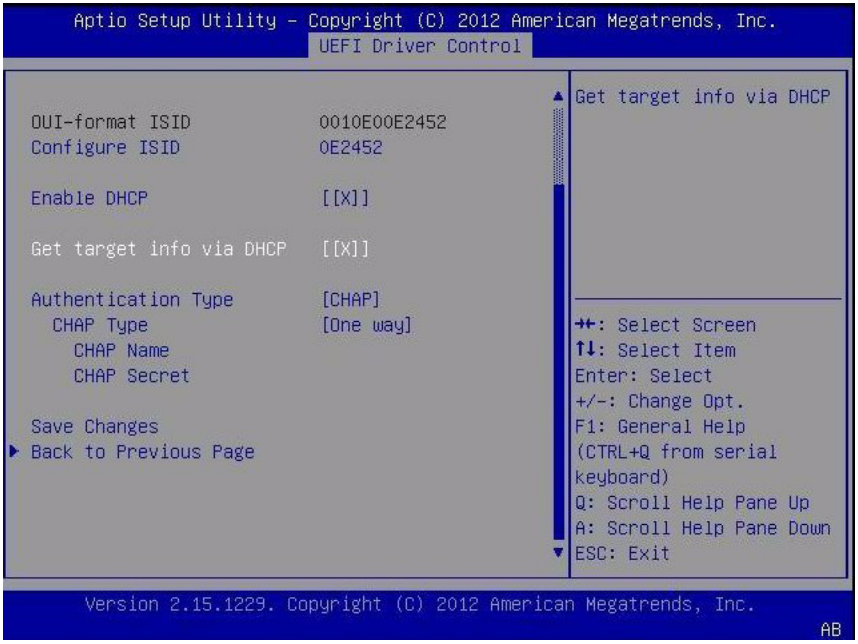
    a. **Select** `Enable DHCP`**, and then press the + or - key (plus or minus key) to change the setting to** `Enabled`**.**

       You do not need to enter the settings for the iSCSI Initiator and the related fields are hidden.

    b. **Select the** `Get target info via DHCP setting`**, and toggle the setting to** `Enabled`**.**

       The Target information is retrieved from the DHCP service and the related fields are hidden.

       The following screen shows `DHCP` and `Get target info via DHCP` set to `Enabled`.

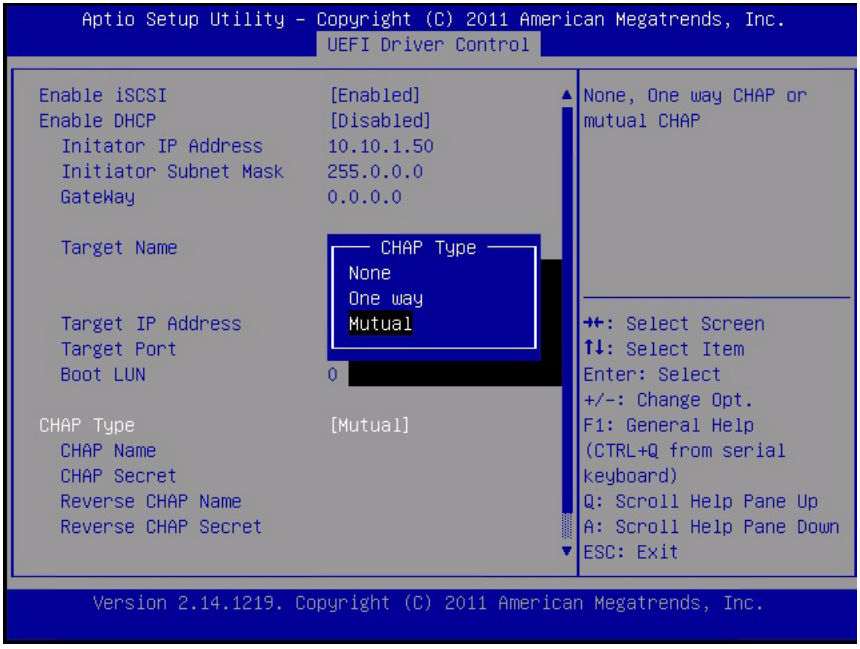


12. **Select a Challenge-Handshake Authentication Protocol (CHAP) Type to enable password security.**

    - `None` – If `None` is selected, the default setting, CHAP is disabled and not required.

- `One Way` (also known as unidirectional) or Mutual – If `One Way` is selected, the `CHAP Name` and `CHAP Secret` are required.
  - `CHAP Name` – User configurable. Typically the name of the Initiator, but can be any name. Must also be set at the target to authenticate the Initiator.
  - `CHAP Secret` – User configurable password. Must be set on the target and the Initiator.
- `Mutual` – If `Mutual` (also known as bidirectional) is selected, `CHAP Name`, `CHAP Secret`, `Reverse CHAP Name`, and `Reverse CHAP Secret` are required.
  - `Reverse CHAP Name` – Set a CHAP name for the target as a parameter of the target.
  - `Reverse CHAP Secret` – Set a password for the target.

Note – The target must be configured to acknowledge a CHAP and for the parameters to be used.



13. **Verify that your settings match the iSCSI target server information.**
14. **Press F10 to save the changes and exit the BIOS Setup Utility.**

    See "Exit BIOS Setup Utility" on page 207.
15. **Restart the server.**

16. **Press the F8 key (or Ctrl+P from a serial console) when prompted while the BIOS is running the power-on-self-test (POST) code checkpoint tests.**

    The Please Select Boot device dialog box appears.

17. **Verify that the iSCSI target appears in the boot list.**

Related Information

- "Access BIOS Setup Utility Menus" on page 178
- "Exit BIOS Setup Utility" on page 207

▼ Enable or Disable Oracle System Assistant

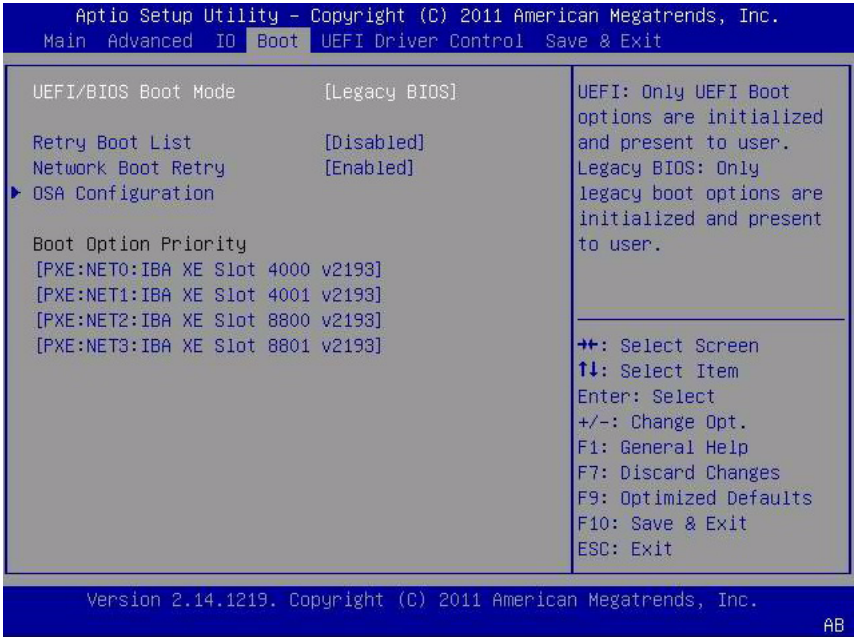
If you have disabled Oracle System Assistant, you can use the BIOS Setup Utility Boot Menu to put the USB device in an online state, so that Oracle System Assistant becomes available to the operating system.

1. **Access the BIOS Setup Utility.**

   See "Access BIOS Setup Utility Menus" on page 178.

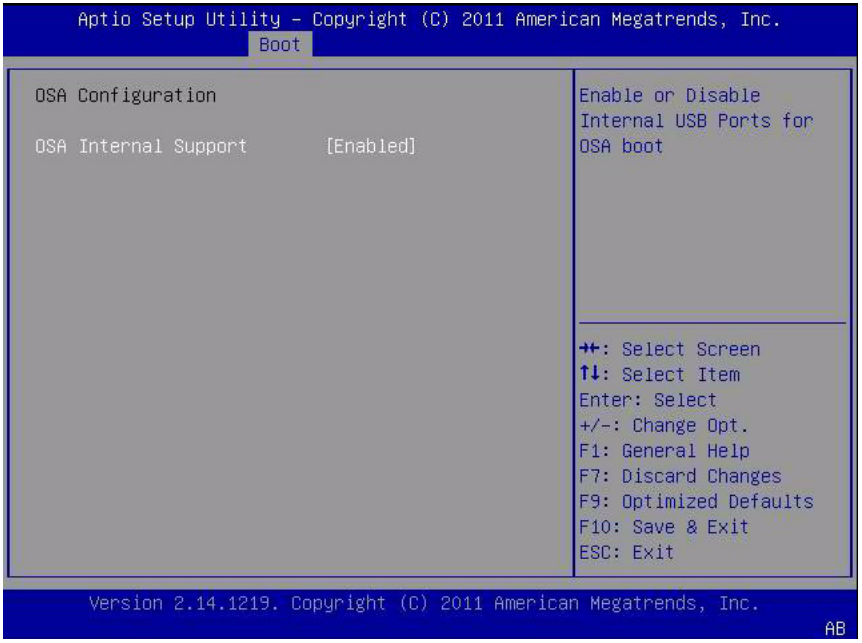
2. **In the BIOS Setup Utility menus, navigate to the Boot Menu.**

   The Boot Menu screen appears.



3. **Select** `OSA Configuration`**.**

   The OSA Configuration screen appears. The setting for OSA Internal Support is either `Enabled` or `Disabled`.



4. **To change the setting, use the + or - key (plus or minus key), and then press Enter to select either** `Enabled` **or** `Disabled`**.**

5. **Press F10 to save the changes and exit the BIOS Setup Utility.**

Related Information

- "BIOS Boot Menu Selections" on page 230

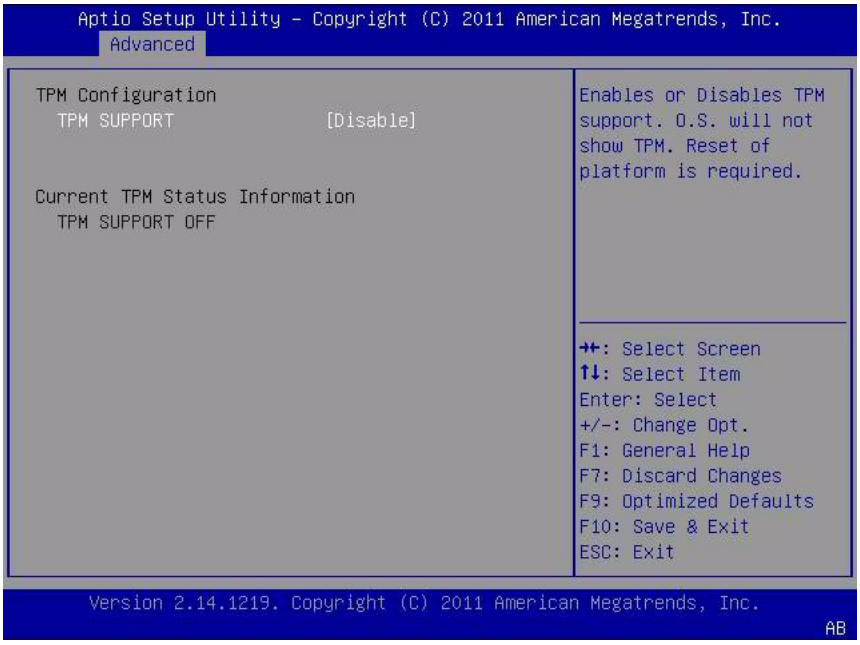
▼ Configure TPM Support

If you intend to use the Trusted Platform Module (TPM) feature set, you must configure the server to support this feature.

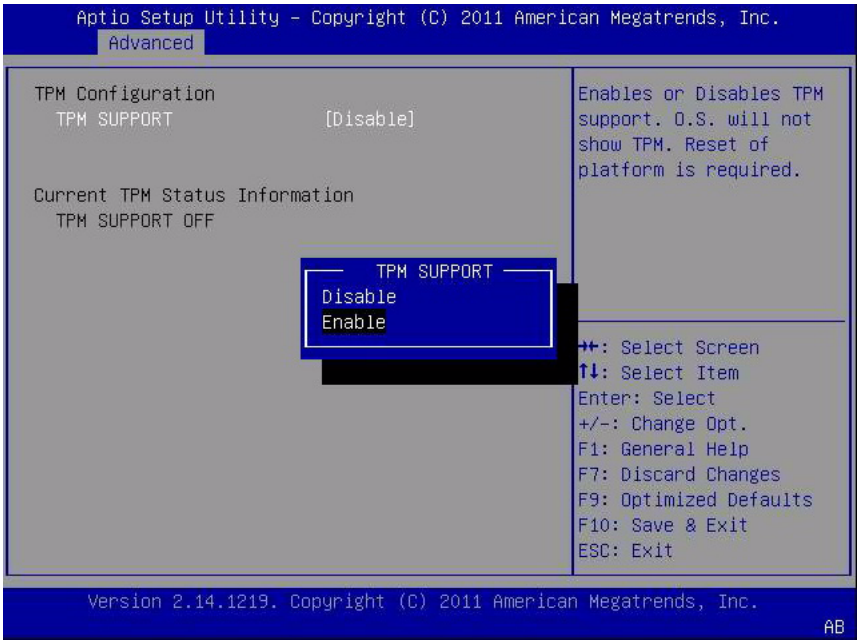
Note – TPM enables you to administer the TPM security hardware in your server. For additional information about implementing this feature, refer to the Windows Trusted Platform Module Management documentation provided by your operating system vendor.

---

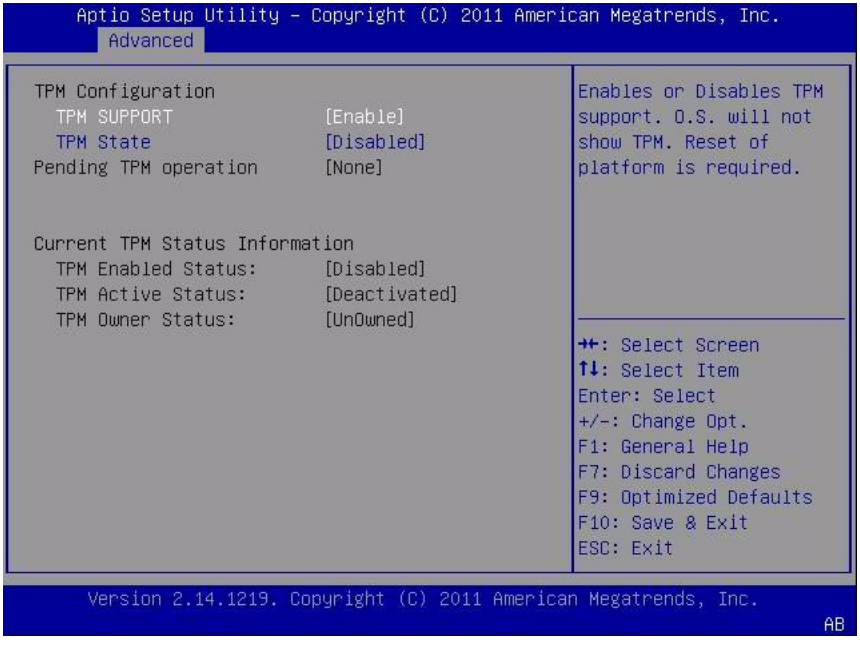
1. **Access the BIOS Setup Utility menus.**
   See "Access BIOS Setup Utility Menus" on page 178.
2. **In the BIOS Setup Utility menus, navigate to the Advanced Menu.**
   The Advanced Menu screen appears.
3. **In the Advanced Menu screen, select** `Trusted Computing`**.**
   The TPM Configuration screen appears.



4. **If the TPM State is listed as** `Disabled`**, select** `TPM Support` **and press Enter.**
   A TPM Support dialog box appears.



5. **In the dialog box, set** `TPM Support` **to** `Enable`**, and then press Enter.**
   The updated TPM Configuration screen appears.



6. **Press F10 to save the changes and exit the BIOS Setup Utility.**

Related Information

- "BIOS Setup Utility Menus" on page 176
- "Exit BIOS Setup Utility" on page 207
- Microsoft's Windows Trusted Platform Module Management documentation

▼ Configure SP Network Settings

Choose one of the following methods to specify service processor (SP) network settings:

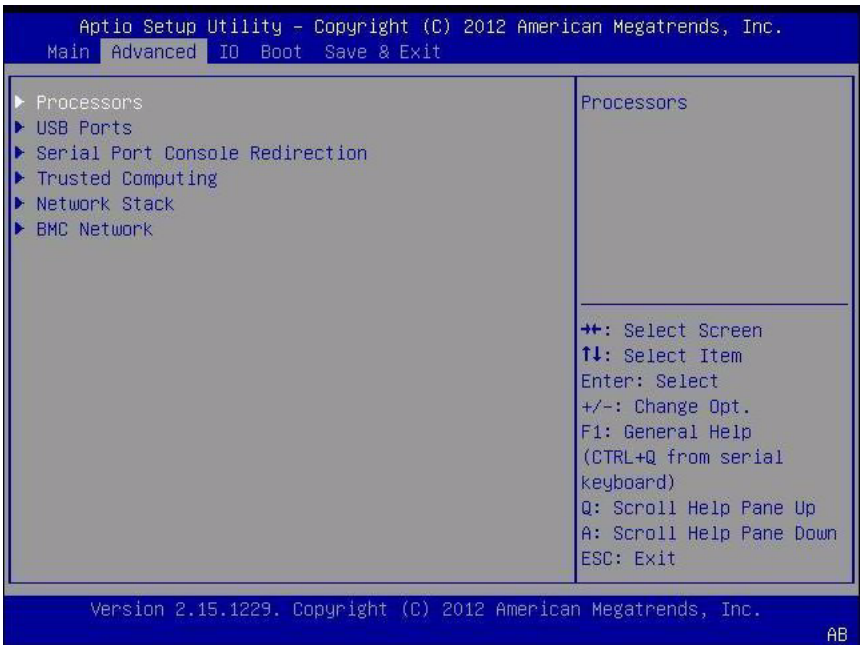
- **BIOS** – Assign the IP address for the server SP from the BIOS Setup Utility on the Advanced Menu.
- **Oracle ILOM** – For instructions on setting the IP address for the server SP using Oracle ILOM, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: `http://www.oracle.com./goto/ILOM/docs`
- **Oracle System Assistant** – For instructions on using Oracle System Assistant to configure SP network settings, see the *Oracle X4 Series Servers Administration Guide* at: `http://www.oracle.com/goto/x86AdminDiag/docs`.

1. **Access the BIOS Setup Utility menus.**

   See "Access BIOS Setup Utility Menus" on page 178.

2. **In the BIOS Setup Utility menus, navigate to the Advanced Menu.**

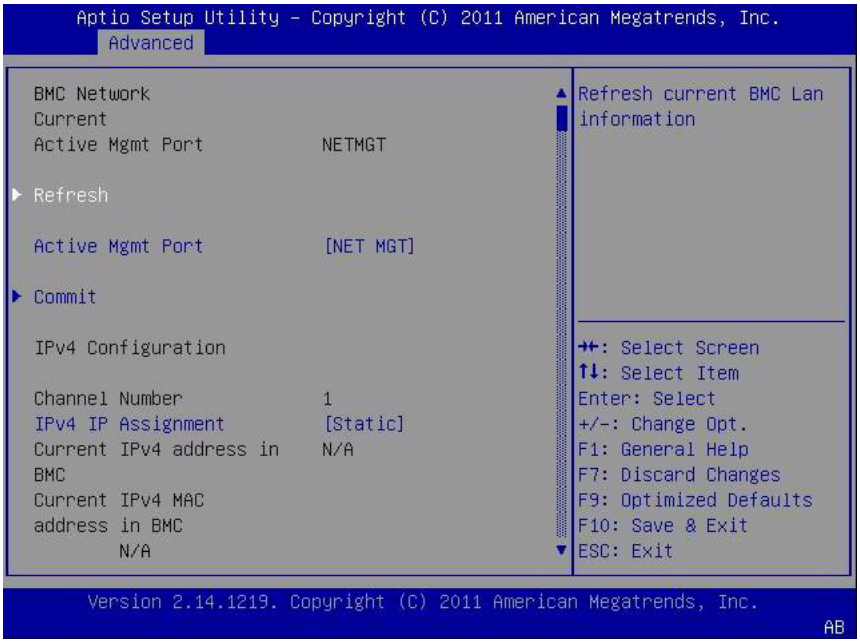
   The Advanced Menu screen appears.



3. **In the Advanced Menu, select** `BMC Network`**, and then press Enter.**

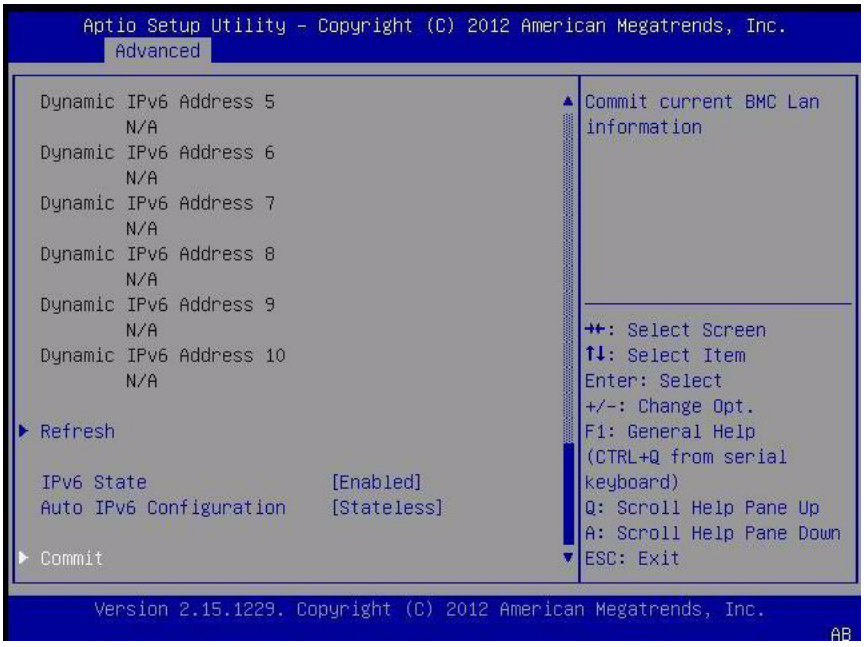
   The BMC Network Configuration screen appears.

   The BMC is the Baseboard Management Controller.



4. **Select** `Refresh`**, and then press Enter to display the current BMC network settings.**

   The BMC Network Configuration screen appears.



5. **Select `Commit` to update the BMC network settings with the latest values.**
6. **Press F10 to save the changes and exit the BIOS Setup Utility.**

Related Information

- "BIOS Setup Utility Menus" on page 176
- "Exit BIOS Setup Utility" on page 207

▼ Configure Option ROM Settings

1. **Access the BIOS Setup Utility menus.**

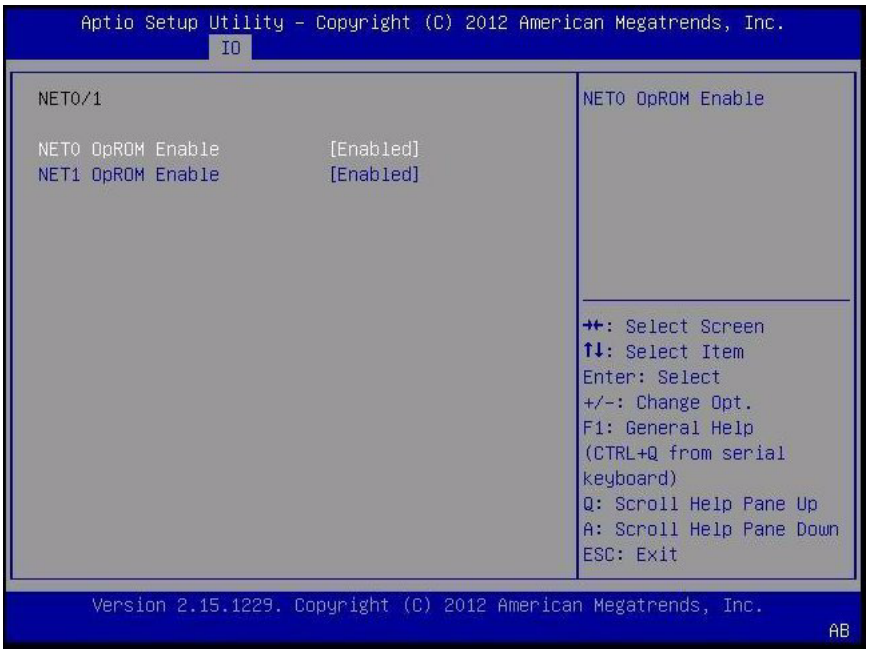
   See "Access BIOS Setup Utility Menus" on page 178.

2. **In the BIOS Setup Utility menus, navigate to the IO Menu.**

   The IO Menu screen appears.

3. **Select the internal device or add-in card slot for which you want to enable or disable Option ROM.**

   The Option ROM screen for that device or add-in card slot appears.



4. **Do one of the following:**
   - Select `Enabled` to enable the Option ROM setting.
   - Select `Disabled` to disable the Option ROM setting.
5. **Press the F10 key to save the changes and exit the BIOS Setup Utility.**

Related Information

- "Legacy Option ROM Allocation" on page 184
- "Access BIOS Setup Utility Menus" on page 178
- "BIOS Setup Utility Menus" on page 176
- "Exit BIOS Setup Utility" on page 207

▼ Configure I/O Resource Allocation

1. **Access the BIOS Setup Utility menus.**
   See "Access BIOS Setup Utility Menus" on page 178.
2. **In the BIOS Setup Utility menus, navigate to the IO Menu.**
   The IO Menu screen appears.
3. **Select the add-in card you want to configure.**

4. **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.
5. **Press F10 to save the changes and exit the BIOS Setup Utility.**

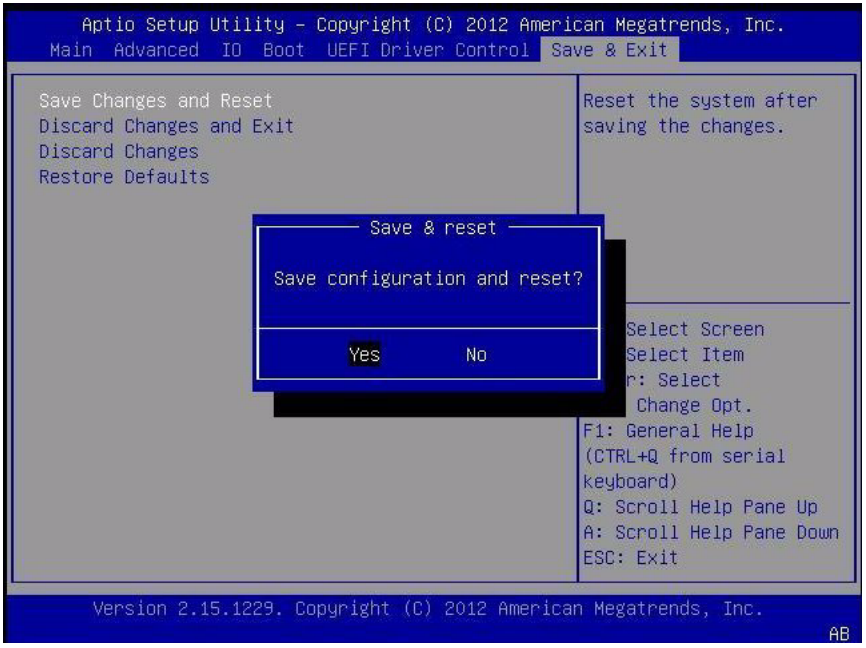
Related Information

- "I/O Resource Allocation" on page 185
- "Access BIOS Setup Utility Menus" on page 178
- "BIOS Setup Utility Menus" on page 176
- "Exit BIOS Setup Utility" on page 207

▼ 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.**

   A confirmation dialog box appears.



4. **In the confirmation dialog box, select `Yes` to proceed and exit the BIOS Setup Utility, or select `No` to stop the exit process.**

Note – After modifying any BIOS settings and selecting `Save Changes and Reset` from the Save & Exit Menu, the subsequent reboot might take longer than a typical reboot where no settings were modified. The additional delay is required to ensure that changes to the BIOS settings are synchronized with Oracle ILOM.

Related Information

- "Access BIOS Setup Utility Menus" on page 178
- "BIOS Setup Utility Menus" on page 176

BIOS Setup Utility Menu Options

This section includes searchable text-based representations and screenshots of the main menus in the BIOS Setup Utility for the Sun Server X4-2L. Following the text and screenshot for each menu is a table of the options available from that menu.

The following topics are discussed.

Description	Links
Review the BIOS Main Menu selections.	"BIOS Main Menu Selections" on page 210
Review the BIOS Advanced Menu selections.	"BIOS Advanced Menu Selections" on page 215
Review the BIOS IO Menu selections.	"BIOS IO Menu Selections" on page 225
Review the Boot Menu selections.	"BIOS Boot Menu Selections" on page 230
Review the BIOS UEFI Driver Control Menu selections.	"UEFI Driver Control Menu Selections" on page 234
Review the BIOS Save & Exit Menu selections.	"BIOS Save & Exit Menu Selections" on page 238

Related Information

- *Oracle X4 Series Servers Administration Guide* at: `http://www.oracle.com/goto/x86AdminDiag/docs`
- "Setting Up BIOS Configuration Parameters" on page 175

BIOS Main Menu Selections

This section includes a searchable text-based representation and a screenshot 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.

```
 Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main  Advanced  IO  Boot  UEFI Driver Control  Save & Exit
/-----------------------------------------------------+-----------------------\
|  Project Version           26.01.05.01              |Set the Date. Use Tab    |
|  System Date               [Sat 03/05/2013]        |to switch between Data   |
|  System Time               [19:58:46]              |elements.                |
|                                                    |                         |
|  Active Logical Cores      40                     |
|  QPI Link Speed             8.0 GT/s               |                         |
|  Total Memory               16 GB (DDR3)           |                         |
|  Current Memory Speed       1333 MHz               |                         |
|  USB Devices:                                       | ----------------------|
|       1 Drive, 1 Keyboard, 1 Mouse, 3 Hubs          |><: Select Screen        |
|                                                     |^v: Select Item          |
|                                                     |                         |
|BMC Firmware Status      Healthy                     |Enter: Select            |
|BMC Firmware Revision    3.1.2.0 r78939              |+/-: Change Opt.         |
|                                                     |F1: General Help         |
|> Product Information                                |(Ctrl+Q from serial      |
|> CPU Information                                    |keyboard)                |
|> DIMM Information                                   |Q: Scroll Help Pane Up   |
|                                                    |A: Scroll Help Pane Down|
|> Security Setting                                   |ESC: Exit                |
-----------------------------------------------------+------------------------/
 Version 2.15.1229. Copyright (C) 2011 American Megatrends, Inc.
```

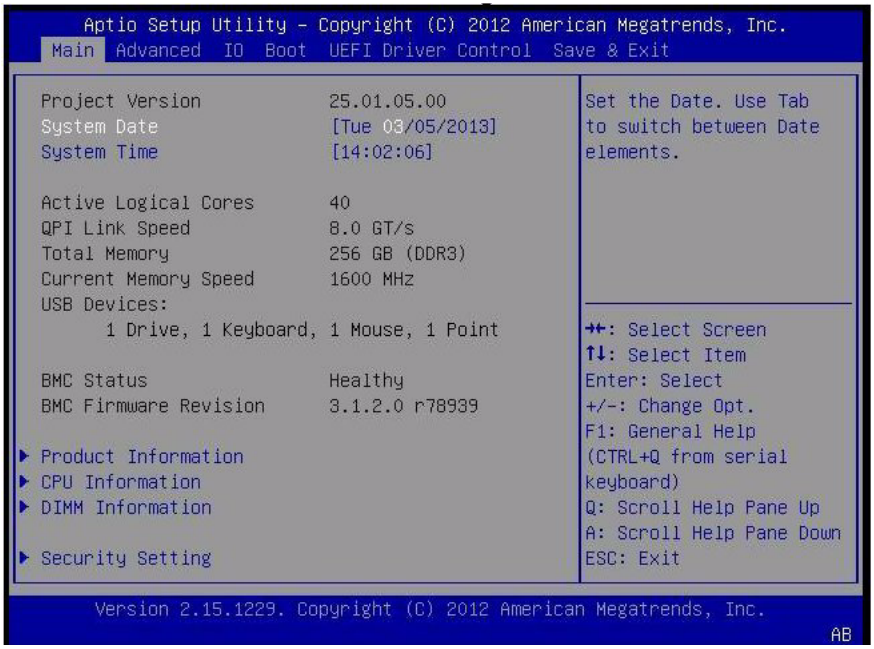


TABLE: BIOS Main Menu Options

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: • XX - Unique project/platform code. • YY - BIOS major release. • ZZ - BIOS minor release. • PP - Build number. Example: 18.01.04.01
System Date			Current date is displayed. You can change the date setting. Example: [Thu 03/05/2013]
System Time			Current time is displayed. You can change the time setting. Example: [13:38:27]
Active Logical Cores		40	

TABLE: BIOS Main Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
QPI Link Speed (R/O)	SLOW, 6.4 GT/s 7.2 GT/s 8.0 GT/s		Intel Quick Path Interconnect (QPI) operational speed is displayed.
Total Memory (R/O)			Memory in gigabytes is displayed. Example: 16 GB (DDR3)
Current Memory Speed (R/O)			Memory speed is displayed. Example: 1333 MHz
USB Devices (R/O)			Detected USB devices are displayed. Example: 1 keyboard, 1 mouse, 3 hubs
BMC Status (R/O)			
BMC Firmware Revision (R/O)			The service processor firmware version is displayed. Example: 3.1.2.0 r78939
PRODUCT INFORMATION (R/O)			Product information is displayed.
Product Name			Product name is displayed. Example: Sun Server X4-2L
Product Serial Number			Product serial number is displayed. Example: 1134FML00V
Board Serial Number			Board serial number is displayed. Example: 0328MSL-1132U900
CPU INFORMATION (R/O)			Attributes of a single processor (CPU) are defined. A separate information structure is provided for each processor supported in the system. Most of the values are dependent on the processor.
Socket 0 CPU Information			If CPU socket 0 is populated, the following options are listed. Otherwise, displays “Not Present.”
Intel CPU @ 2.70 GHz			Processor ID brand is displayed.

TABLE: BIOS Main Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
CPU Signature			Processor (CPU) information is displayed. Example: 206d5
Microcode Patch			Software update (microcode patch) information is displayed. Example: 512
Max CPU Speed			Maximum non-turbo speed of the processor is displayed. Example: 2700 MHz
Min CPU Speed			Minimum speed of the processor is displayed. Example: 1200 MHz
Processor Cores			Number of available processor cores is displayed. Example: 8
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 8
L1 Code Cache			Example: 32 KB x 8
L2 Cache			Example: 256 KB x 8
L3 Cache			Example: 20480 KB
Socket 1 CPU Information			If CPU socket 1 is 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.
CPU Socket 0 DIMM Information			If DIMM is present, memory size in gigabytes is displayed. Otherwise, displays “Not Present.”

TABLE: BIOS Main Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
D0...D7			Memory size in gigabytes is displayed. Example: Socket 0 DIMMs D0 – 4 GB D1 – 4 GB D2 – 4 GB D3 – 4 GB D4 – 2 GB D5 – 2 GB D6 – Not present D7 – Not present
CPU Socket 1 DIMM Information			If DIMM is present, memory size in gigabytes is displayed. Otherwise, displays "Not Present."
D0...D7			See previous DIMM information example.
SECURITY SETTING			Configure the security setting.
Administrator Password			Set the Administrator password.

Related Information

- "BIOS Advanced Menu Selections" on page 215
- "BIOS IO Menu Selections" on page 225
- "BIOS Boot Menu Selections" on page 230
- "UEFI Driver Control Menu Selections" on page 234
- "BIOS Save & Exit Menu Selections" on page 238

BIOS Advanced Menu Selections

This section includes a searchable text-based representation and a screenshot of the BIOS Advanced Menu. The options that are available from the Advanced 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.

```
 Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main  Advanced  IO  Boot  UEFI Driver Control  Save & Exit
/-----------------------------------------------------+----------------------\
|> Processors                                         |CPU Configuration     |
|> USB Ports                                          |Parameters            |
|> Serial Port Console Redirection                    |                      |
|> Trusted Computing                                  |                      |
|> Network Stack                                      |                      |
|> BMC Network                                        |                      |
|                                                     |                      |
|                                                     |                      |
|                                                     |                      |
|                                                    |-----------------------|
|                                                    |><: Select Screen      |
|                                                    |^v: Select Item        |
|                                                    |Enter: Select          |
|                                                    |+/-: Change Opt.       |
|                                                    |F1: General Help       |
|                                                    |F7: Discard Changes    |
|                                                    |F9: Optimized Defaults |
|                                                    |F10: Save & Exit       |
|                                                    |ESC: Exit              |
-----------------------------------------------------+-----------------------/
 Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

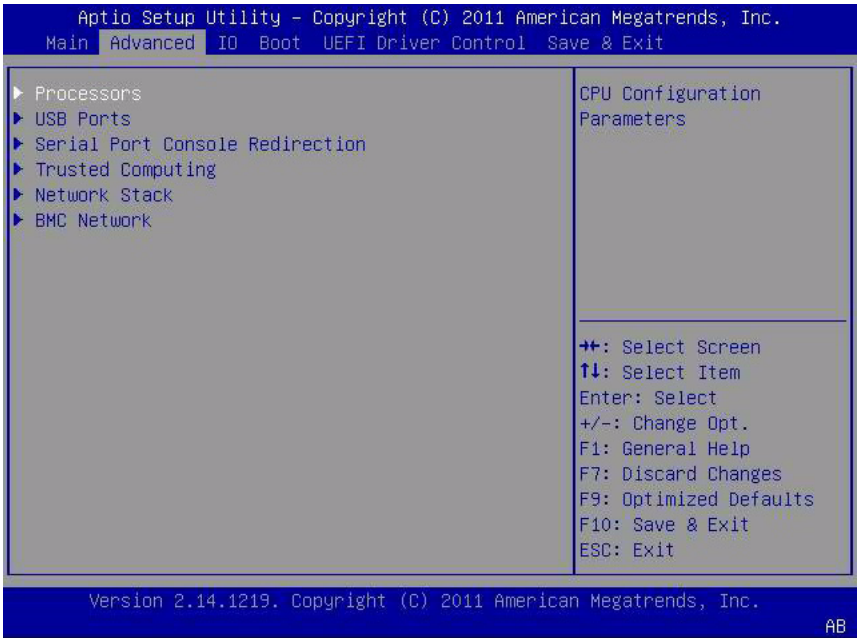


TABLE: BIOS Advanced Menu Options

Setup Options	Options	Defaults	Description
PROCESSORS			Enable or disable processor (CPU) features.
Hyper-threading	Disabled/Enabled	Enabled	When enabled, two threads are available per enabled core. When disabled, only one thread per enabled core is available.
Execute Disable Bit	Disabled/Enabled	Enabled	When enabled, execute disable bit can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Oracle Solaris, Oracle VM, Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, and VMware ESXi).
Hardware Prefetcher	Disabled/Enabled	Enabled	Enable the mid-level cache (L2) streamer prefetcher.

TABLE: BIOS Advanced Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
Adjacent Cache Line Prefetcher	Disabled/Enabled	Enabled	Enable the mid-level cache (L2) prefetching of adjacent cache lines.
DCU Streamer Prefetcher	Disabled/Enabled	Enabled	Enable prefetching of next L1 data line based on multiple loads in same cache line.
DCP IP Prefetcher	Disabled/Enabled	Enabled	Enable prefetching of next L1 line based on sequential load history.
Intel Virtualization Technology	Disabled/Enabled	Enabled	When enabled, a Virtual Machine Manager (VMM) can utilize the additional hardware capabilities provided by Intel Virtualization Technology.
CPU Power Management Configuration			Displays processor (CPU) information. BIOS provides C-states, P-states, and T-states support in order for the OS to manage the power utilization of the system. Power management is also controlled by the service processor based on system policies.
Power Technology	Disabled/Enabled/ Efficient/Custom	Efficient	Enable the power management features. The following options are not displayed if Power Technology is set to Disabled.
Intel SpeedStep	Disabled/Enabled	Enabled	Displays only if Power Technology is set to Custom. Enable or disable Intel SpeedStep. The Intel technology used to support P-state transitions is referred to as Intel SpeedStep.
Turbo Mode	Disabled/Enabled	Enabled	Displays only if Power Technology is set to Custom, Intel SpeedStep is set to enabled, and Turbo Mode is supported in the CPU. Enable or disable Turbo Mode.

TABLE: BIOS Advanced Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
CPU C3 Report	Disabled/Enabled	Disabled	Displays only if Power Technology is set to Custom and power state (C3) is supported in the CPU. Enable or disable CPU C3 (ACPI C2) report to operating system.
CPU C6 Report	Disabled/Enabled	Enabled	Displays only if Power Technology is set to Custom and power state (C6) is supported in the CPU. Enable or disable CPU C6 (ACPI C3) report to operating system.
CPU C7 Report	Disabled/Enabled	Enabled	Displays only if Power Technology is set to Custom and power state (C7) is supported in the CPU. Enable or disable CPU C7 (ACPI C3) report to operating system.
Package C-States	Disabled/Enabled	Enabled	Displays only if Power Technology is set to Custom. The power state control is referred to as C-State. Enable or disable the Package C-State limit.
Energy Performance	Performance/ Balanced Performance/ Balanced Energy/ Energy Efficient	Balanced Performance	Optimize between performance and power savings. Windows 2008 and later operating systems override this value according to its power plan.
USB PORTS			Set USB port configuration parameters.
EHCI Hand-off	Disabled/Enabled	Disabled	Enable or disable Enhanced Host Controller Interface (EHCI) hand-off support.
Port 60/64 Emulation	Disabled/Enabled	Enabled	Enable I/O port 60h/64h emulation support. Enable this setting for the complete USB keyboard legacy support for non-USB aware operating systems.
All USB Devices	Disabled/Enabled	Enabled	Enable or disable all USB devices.
Rear Port 0	Disabled/Enabled	Enabled	Enable or disable USB Port 0.

TABLE: BIOS Advanced Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
Rear Port 1	Disabled/Enabled	Enabled	Enable or disable USB Port 1.
Front Port 0	Disabled/Enabled	Enabled	Enable or disable USB Port 2.
Front Port 1	Disabled/Enabled	Enabled	Enable or disable USB Port 3.
Internal Port 0	Disabled/Enabled	Enabled	Enable or disable USB Port 4.
Internal Port 1	Disabled/Enabled	Enabled	Enable or disable USB Port 5.
SERIAL PORT CONSOLE REDIRECTION			Provides the capability to redirect console output/input to the serial port. Graphic output is not redirected. BIOS serial console redirection lets you monitor BIOS POST messages and navigate the BIOS Setup Utility menus and Option ROMs from a terminal connected to the server using a serial connection.
External Serial Port	System/BMC	System	Control whether the external serial port connects to the Baseboard Management Controller (BMC) or directly to the system. Set to BMC for serial link management.
EMS Console Redirection	Disabled/Enabled	Disabled	Enable or disable console redirection for Windows Emergency Management Service (EMS) administration.
Console Redirection	Disabled/Enabled	Enabled	Enable or disable console redirection.
Terminal Type	VT100/ VT100+/ VT-UTF8/ ANSI	VT100+	Select the emulation for the terminal: • VT100: ASCII character set. • VT100+: Extends VT100 to support color, function keys, etc. • VT-UTF8: Uses UTF8 encoding to map Unicode characters onto one or more bytes. • ANSI: Extended ASCII character set.

TABLE: BIOS Advanced Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
Bits per Second	9600/ 10200/ 57600/ 115200	9600	Select the serial port transmission speed. The speed must be matched on the connecting serial device. Long or noisy lines require lower speeds.
Data Bits	07/08/11	8	Select the data bits.
Parity	None/ Even/ Odd/ Mark/ Space	None	A parity bit can be sent with the data bits to detect some transmission errors. • None: No parity bits are sent. • Even: Parity bit is 0 if the number of 1s in the data bits is even. • Odd: Parity bit is 0 if the number of 1s in the data bits is odd. • Mark: Parity bit is always 1. • Space: Parity bit is always 0. Mark and Space parity do not allow for error detection. They can be used as an additional data bit.
Stop Bits	01/02/11	1	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning of a serial data packet.) The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	None/Hardware/ RTS/CTS	None	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to restart the flow. Hardware flow control uses two wires to send start and stop RTS (request to send) and CTS (clear to send) signals.

TABLE: BIOS Advanced Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
TRUSTED COMPUTING			If you intend to use the Trusted Platform Module (TPM) feature set, you must configure the server to support TPM. The TPM feature is used by the OS for proof that BIOS code has not been tampered with.
TPM Support	Disabled/Enabled	Enabled	Enable or disable TPM support. Only UEFI BIOS implements this setup option. If disabled, the OS will not show TPM. Reset of the platform is required.
TPM State	Disabled/Enabled	Disabled	Displays whether TPM Support is enabled.
Current TPM Status Information (R/O)			If TPM Support is disabled, Current TPM Status displays "TPM SUPPORT OFF." If TPM Support is enabled, Current TPM Status displays: • TPM Enabled Status: • TPM Active Status: • TPM Owner Status:
NETWORK STACK			Configure network stack settings.
Network Stack	Disabled/Enabled	Enabled	Enable or disable the UEFI network stack.
BMC NETWORK			Configure Baseboard Management Controller (BMC) network parameters.
BMC Network: Current Active Management Port (R/O)			Active management port settings are displayed.
Refresh			Refresh current BMC network information with the latest information from the service processor.
Active Management Port	NETMGT/ NET0/ NET1/ NET2/ NET3		Change the management port that is currently active.

TABLE: BIOS Advanced Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
Commit			Commit the current BMC network information.
IPv4 Configuration (R/O)			Current configuration of the IPv4 settings is displayed.
Channel Number (R/O)		1	Current channel number is displayed.
IPv4 Assignment (R/O)	Static/Dynamic	Static	View whether the service processor is assigned a static IPv4 address or assigned a dynamic IPv4 address using Dynamic Host Control Protocol (DHCP).
Current IPv4 Address in BMC (R/O)			Current IPv4 address of the service processor is displayed. Example: 172.31.255.255
Current IPv4 MAC Address in BMC (R/O)			Current IPv4 MAC address for the service processor is displayed. Example: 00:12:46:BE:0A:02
Current IPv4 Subnet Mask in BMC (R/O)			Current IPv4 subnet mask address for the service processor is displayed. Example: 255.255.255.0
Refresh			Select Refresh to update to the current settings.
IPv4 Address			If IPv4 Assignment is set to Static, set the IPv4 address for the service processor. Example: 172.31.255.255
IPv4 Subnet Mask			If the IPv4 Assignment is set to Static, set the IPv4 subnet mask. Example: 255.255.255.0
IPv4 Default Gateway			If the IPv4 Assignment is set to Static, set the IPv4 default gateway. Example: 129.144.82.254
Commit			Commit the IPv4 configuration settings.

TABLE: BIOS Advanced Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
IPv6 Configuration (R/O)	Static/Dynamic	Dynamic	Current configuration of the IPv6 settings is displayed. IPv6 addresses are written with hexadecimal digits and colon separators. For example: 2001:0db0:000:82a1:0000:0000:1234:abcd. IPv6 addresses are composed of two parts: a 64-bit subnet prefix and a 64-bit host interface ID. To shorten the IPv6 address, you can (1) omit all leading zeros, and (2) replace one consecutive group of zeros with a double colon (::). For example: 2001:db0:0:82a1::1234:abcd
Channel Number (R/O)		1	Current channel number is displayed.
Current IPv6 State (R/O)			Current IPv6 state is displayed.
Current IPv6 Auto Configuration (R/O)			Current IPv6 autoconfiguration parameters are displayed.
Link Local IPv6 Address (R/O)			Current link local IPv6 address is displayed. Example: fe80::214:4fff:feca:5f7e/64
Static IPv6 Address (R/O)			Current static IPv6 address is displayed. Example: 2001:0db0:000:82a1:0000:0000:1234:abcd
IPv6 Gateway (R/O)			Current IPv6 gateway address is displayed. Example: fe80::211:5dff:febe:5000/128
Dynamic IPv6 Address 1 – (R/O)			Current dynamic IPv6 address is displayed. Example: fec0:a:8:b7:214:4fff:feca:5f7e/64
Refresh			Select Refresh to update to the current settings.

TABLE: BIOS Advanced Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
IPv6 State (R/O)	Disabled/Enabled		View whether the IPv6 state is enabled or disabled.
Auto IPv6 Configuration	Disabled/ Stateless/ Dhcpv6_stateless/ Dhcpv6_stateful	Disabled	Autoconfiguration options are: • Disabled: When autoconfiguration is disabled, only the Link Local address is set. None of the autoconfiguration options to configure an IPv6 address are run. • Stateless: When enabled, the IPv6 Stateless autoconfiguration is run to learn the IPv6 addresses for the device. • Dhcpv6_stateless: When enabled, the Dhcpv6_stateless autoconfiguration is run to learn the DNS and domain information for the device. • Dhcpv6_stateful: When enabled, the Dhcpv6_stateful autoconfiguration is run to learn the IP addresses and DNS information for the device.
Static IPv6 Address			Set the static IPv6 address. Example: 2001:0db0:000.82a1:0000:0000:1234:abcd
Commit			Commit the IPv6 configuration settings.

Related Information

- "BIOS Main Menu Selections" on page 210
- "BIOS IO Menu Selections" on page 225
- "BIOS Boot Menu Selections" on page 230
- "UEFI Driver Control Menu Selections" on page 234
- "BIOS Save & Exit Menu Selections" on page 238

BIOS IO Menu Selections

This section includes a searchable text-based representation and a screenshot of the BIOS IO Menu. The options that are available from the IO Menu are described in the table that follows.

```
 Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main  Advanced  IO  Boot  UEFI Driver Control  Save & Exit
/-----------------------------------------------------+----------------------\
|> PCI Subsystem Settings                             |PCI, PCI-X and PCI    |
|> IO Virtualization                                  |Express Settings.     |
|> IOAT                                               |                      |
|                                                     |                      |
|  Internal Devices                                   |                      |
|> NET0/1                                             |                      |
|> NET2/3                                             |                      |
|                                                     |                      |
|  Add-In Cards                                       |                      |
|> Slot 1                                            |----------------------|
|> Slot 2                                             |><: Select Screen     |
|> Slot 3                                             |^v: Select Item       |
|> Slot 4                                             |Enter: Select         |
|> Slot 5                                             |+/-: Change Opt.      |
|> Slot 6                                             |F1: General Help      |
|                                                     |F7: Discard Changes   |
|                                                     |F9: Optimized Defaults|
|                                                     |F10: Save & Exit      |
|                                                     |ESC: Exit             |
\-----------------------------------------------------+----------------------/
 Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

Note – PCIe slots 1, 2, 3, and Ethernet ports NET2 and NET3 are nonfunctional in single-processor systems.

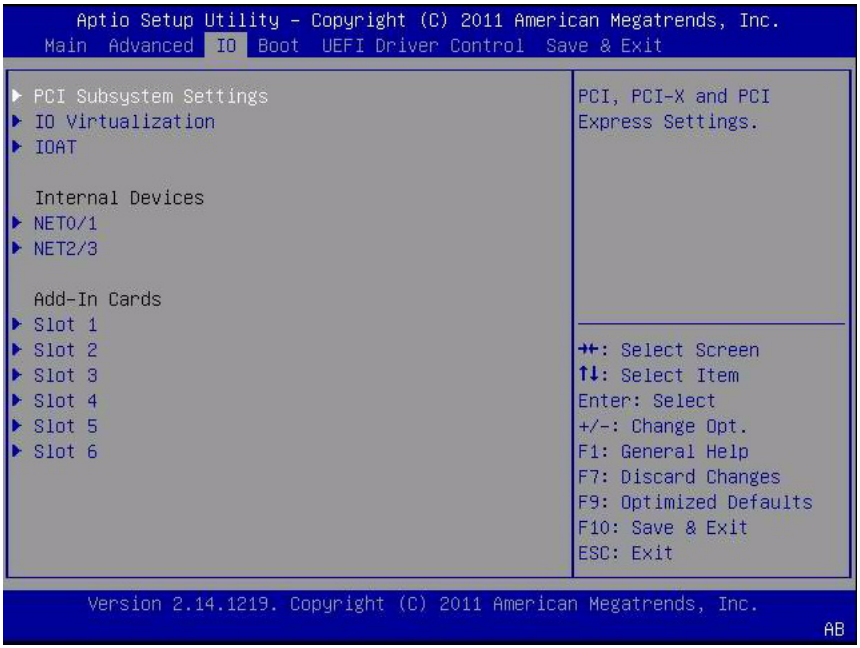


TABLE: BIOS IO Menu Options

Setup Options	Options	Defaults	Description
PCI SUBSYSTEM SETTINGS			Configure PCI, PCI-X, and PCI Express settings.
PCI 64 Bit Resources Allocation	Disabled/Enabled	Enabled	Enable or disable 64-bit capable devices to be decoded in above 4G address space. This setting is available only if the system supports 64-bit decoding.
IO VIRTUALIZATION			Configure VT-d, SR-IOV, and ARI virtualization settings.
VT-d	Disabled/Enabled	Enabled	Enable or disable Intel Virtualization Technology for directed I/O (VT-d). If enabled, ensures improved isolation of I/O resources for greater reliability, security, and availability.

TABLE: BIOS IO Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
SR-IOV	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	Disabled	If Alternate Routing ID (ARI) is supported by the hardware and set to enabled, devices are permitted to locate virtual functions (VFs) in function numbers 8 to 255 of the captured bus number, instead of normal function numbers 0 to 7.
I/OAT			Configure settings for the Intel I/O Acceleration Technology (I/OAT).
Intel I/OAT	Disabled/Enabled	Enabled	Enable or disable Intel I/OAT.
DCA Support	Disabled/Enabled	Enabled	Enable or disable direct cache access (DCA) support.
INTERNAL DEVICES			Configure settings for the embedded network controller.
NET0/1 OpROM Enable	Disabled/Enabled	Enabled	Enable or disable Option ROM. If set to enabled, Option ROM for the card executes as normal. If set to disabled, Option ROM for the card is not copied into memory and the execution of the Option ROM is inhibited.

TABLE: BIOS IO Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
NET2 and NET3 OpROM Enable **Note -** Ethernet ports NET2 and NET3 are nonfunctional in single-processor systems.	Disabled/Enabled	Enabled	Enable or disable Option ROM. If set to enabled, Option ROM for the card executes as normal. If set to disabled, Option ROM for the card is not copied into memory and the execution of the Option ROM is inhibited.
ADD-IN CARDS			Enable or disable the add-in cards.
Slot 1 **Note -** PCIe slot 1 is nonfunctional in single-processor systems.			
IO Enable	Disabled/Enabled	Enabled	Enable or disable I/O for the add-in card.
OpROM Enable	Disable/Enabled	Enabled	Enable or disable Option ROM for the add-in card.
Slot 2 **Note -** PCIe slot 2 is nonfunctional in single-processor systems.			
IO Enable	Disabled/Enabled	Enabled	Enable or disable I/O for the add-in card.
OpROM Enable	Disable/Enabled	Enabled	Enable or disable Option ROM for the add-in card..
Slot 3 **Note -** PCIe slot 3 is nonfunctional in single-processor systems.			
IO Enable	Disabled/Enabled	Enabled	Enable or disable I/O for the add-in card.
OpROM Enable	Disable/Enabled	Enabled	Enable or disable Option ROM for the add-in card.
Slot 4	Disabled/Enabled	Enabled	
IO Enable	Disabled/Enabled	Enabled	Enable or disable the I/O for the add-in card.
OpROM Enable	Disable/Enabled	Enabled	Enable or disable Option ROM for the add-in card.
Slot 5			

TABLE: BIOS IO Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
IO Enable	Disabled/Enabled	Enabled	Enable or disable I/O for the add-in card.
OpROM Enable	Disabled/Enabled	Enabled	Enable or disable Option ROM for the add-in card.
Slot 6			
IO Enable	Disabled/Enabled	Enabled	Enable or disable I/O for the add-in card.
OpROM Enable	Disabled/Enabled	Enabled	Enable or disable Option ROM for the add-in card.

Related Information

- "BIOS Main Menu Selections" on page 210
- "BIOS Advanced Menu Selections" on page 215
- "BIOS Boot Menu Selections" on page 230
- "UEFI Driver Control Menu Selections" on page 234
- "BIOS Save & Exit Menu Selections" on page 238

BIOS Boot Menu Selections

This section includes a searchable text-based representation and a screenshot of the BIOS Boot Menu. The options that are available from the Boot Menu are described in the table that follows.

```
 Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main  Advanced  IO  Boot  UEFI Driver Control  Save & Exit
/-----------------------------------------------------+-----------------------\
|  UEFI/BIOS Boot Mode        [Legacy BIOS]           |UEFI: Only UEFI Boot   |
|                                                     |options are initialized|
|  Retry Boot List            [Disabled]              |and present to user.   |
|  Network Boot Retry         [Enabled]               |Legacy BIOS: Only      |
|> OSA Configuration                                  |legacy boot options are|
|                                                     |initialized and present|
|  Boot Option Priority                               |to user.               |
|  [PXE:NET0:IBA XE Slot 4000 v2193]                  |                       |
|  [PXE:NET1:IBA XE Slot 4001 v2193]                  |                       |
|  [PXE:NET2:IBA XE Slot 8800 v2193]                  |-----------------------|
|  [PXE:NET3:IBA XE Slot 8801 v2193]                  |><: Select Screen      |
|                                                     |^v: Select Item        |
|                                                     |Enter: Select          |
|                                                     |+/-: Change Opt.       |
|                                                     |F1: General Help       |
|                                                     |F7: Discard Changes    |
|                                                     |F9: Optimized Defaults |
|                                                     |F10: Save & Exit       |
|                                                     |ESC: Exit              |
-----------------------------------------------------+-----------------------/
 Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

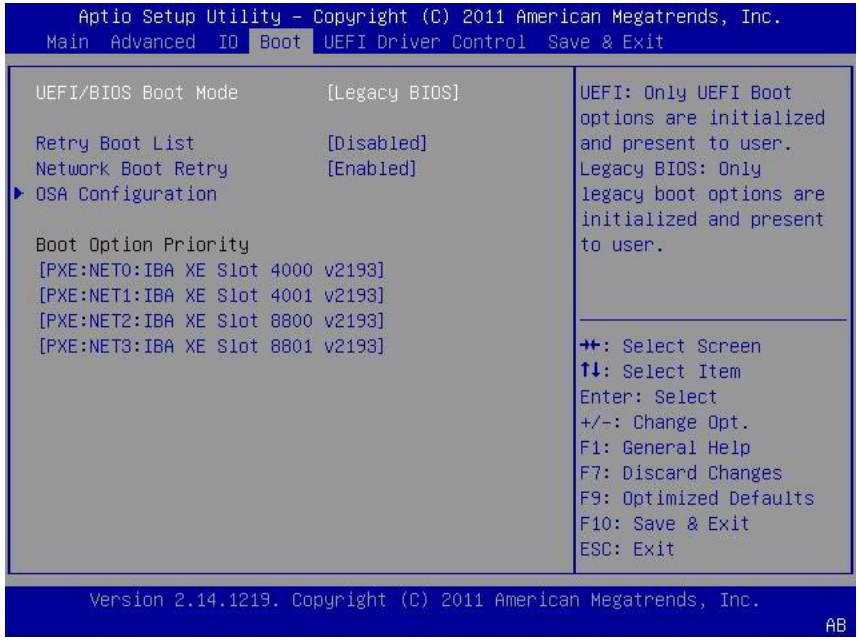

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced IO Boot UEFI Driver Control Save & Exit
UEFI/BIOS Boot Mode [Legacy BIOS]
Retry Boot List [Disabled]
Network Boot Retry [Enabled]
OSA Configuration
Boot Option Priority
[PXE:NET0:IBA XE Slot 4000 v2193]
[PXE:NET1:IBA XE Slot 4001 v2193]
[PXE:NET2:IBA XE Slot 8800 v2193]
[PXE:NET3:IBA XE Slot 8801 v2193]
UEFI: Only UEFI Boot options are initialized and present to user. Legacy BIOS: Only legacy boot options are initialized and present to user.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F7: Discard Changes
F9: Optimized Defaults
F10: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
AB

TABLE: BIOS Boot Menu Options

Setup Options	Options	Defaults	Description
UEFI/BIOS Boot Mode	Legacy BIOS/UEFI	Legacy BIOS	Select either Legacy BIOS or UEFI BIOS as the boot mode. • Enable UEFI: Only UEFI BIOS boot options are initialized and presented to user. • Enable Legacy BIOS: Only Legacy BIOS boot options are initialized and presented to user.
Retry Boot List	Disabled/Enabled	Enabled	If enabled, BIOS automatically retries to boot from the top of the Boot Options Priority list when all devices have been attempted and failed.
Network Boot Retry	Disabled/Enabled	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.

TABLE: BIOS Boot Menu Options *(Continued)*

Setup Options	Options	Defaults	Description
OSA Configuration			Configure whether the operating system recognizes Oracle System Assistant at boot.
OSA Internal Support	Disabled/Enabled	Enabled	Enable or disable the internal USB port for Oracle System Assistant boot. If enabled, the Oracle System Assistant media is recognized by the system. If disabled, the Oracle System Assistant media will not be recognized by the system.
Boot Option Priority			Set the system boot order. Example: [PXE:NET0:IBA XESlot 2000 v2193] [PXE:NET0:IBA XESlot 2001 v2193] [PXE:NET0:IBA XESlot 8800 v2193] [PXE:NET0:IBA XESlot 8801 v2193] [Disabled]

Related Information

- "BIOS Main Menu Selections" on page 210
- "BIOS Advanced Menu Selections" on page 215
- "BIOS IO Menu Selections" on page 225
- "UEFI Driver Control Menu Selections" on page 234
- "BIOS Save & Exit Menu Selections" on page 238

UEFI Driver Control Menu Selections

This section includes a searchable text-based representation and a screenshot of the UEFI Driver Control Menu. The options that are available from the UEFI Driver Control Menu are described in the table that follows.

```
 Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main  Advanced  IO  Boot  UEFI Driver Control  Save & Exit
/-----------------------------------------------------+-----------------------\
|  iSCSI - ************************************** |Configure the iSCSI |
|  Intel(R) Ethernet Controller 10 Gigabit X -       |parameters |
|  00:21:28:E7:74:CC |
|  Intel(R) Ethernet Controller 10 Gigabit X - |
|  00:21:28:E7:74:CD                                  |                       |
|  LSI SAS2 MPT Controller SAS2008                    |                       |
|  (PCIDevId:0x72, PCIVendorId:0x1000,                |                       |
|  PCIBus:0x50, PCIDevice:0x0, PCIFunc:0x0,           |                       |
|  PCISlot:0x4)                                       |                       |
|  Intel(R) Ethernet Controller 10 Gigabit X -        |                       |
|  00:21:28:E7:74:CE                                 |-----------------------|
|  Intel(R) Ethernet Controller 10 Gigabit X -       |><: Select Screen      |
|  00:21:28:E7:74:CF                                 |^v: Select Item        |
|                                                    |Enter: Select          |
|                                                    |+/-: Change Opt.       |
|                                                    |F1: General Help       |
|                                                    |F7: Discard Changes    |
|                                                    |F9: Optimized Defaults |
|                                                    |F10: Save & Exit       |
|                                                    |ESC: Exit              |
-----------------------------------------------------+-----------------------/
 Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

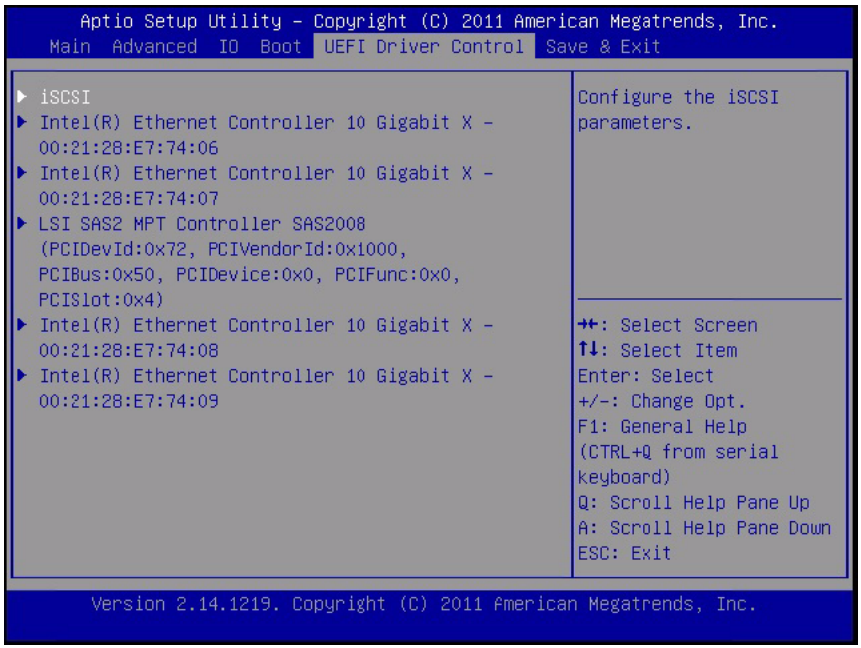


TABLE: BIOS UEFI Driver Control Menu Options

Setup Options	Options	Default	Description
iSCSI Configuration	NA	NA	Select to configure the iSCSI initiator name parameters. Only available in UEFI BIOS mode.
iSCSI Initiator Name	NA (must be specified)	None.	The worldwide unique name of the iSCSI Initiator. Only IQN format is accepted.
Add an Attempt	When this option is selected, a sub-menu with following options is presented.		
	• iSCSI Attempt Name	None.	The human name that you assigned to this attempt.
	• iSCSI Mode	Disabled	Set to Enabled for multipath I/O (MPIO). MPIO can boost the performance of an application by load balancing traffic across multiple ports.

TABLE: BIOS UEFI Driver Control Menu Options *(Continued)*

Setup Options	Options	Default	Description
Add an Attempt (Continued)	• Internet Protocol	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	The count range is 0 to 16. If set to 0, there are no retries.
	• Connection Establishing Timeout	1,000	The timeout value in milliseconds. The timeout range is 100 milliseconds to 20 seconds.
	• OUI-format ISID (R/O)	This valued is derived from MAC address.	OUI-format ISID represented in six bytes.
	• Configure ISID	The last three bytes of the OUI-for mat ISID.	The default value is derived from the MAC address. Only this portion of the ISID is configurable.
	• Enable DHCP	Enabled	Enabled or disable.
	• Initiator IP Address	None.	Use to set the initiator IP address.
	• Initiator Subnet Mask	None.	Use to set initiator subnet mask address.
	• Gateway	None.	Use to set initiator gateway address.
	• Target Name		Worldwide unique name of the target. Only IQN format is accepted.
	• Target IP address	None.	Use to set target IP address.
	• 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).

TABLE: BIOS UEFI Driver Control Menu Options *(Continued)*

Setup Options	Options	Default	Description
Add an Attempt (Continued)	• Authentication Type	CHAP	Defines the Challenge-Handshake Authentication Protocol (CHAP).
	• CHAP Type	One Way	Use to set CHAP type to either One Way or Mutual.
	• CHAP Name	None.	Use to set CHAP name.
	• CHAP Secret	None.	Use to set the CHAP secret. The secret length range is 12 to 16 bytes.
Delete Attempts	NA	None.	Use to delete one or more attempts.
Change Attempt Order	NA	None.	Use to change the order of attempts.
Controller Management			Select to manage controller properties, to create or clear controller configurations, and to save or clear controller events.
View Controller Properties (R/O)			Select to view controller properties.
Change Controller Properties			Select to change controller properties.
Create Configuration			Use to specify RAID level and select physical disks.
Save Controller Events			Select to specify the file system, the directory and the file name to used to save controller events.
Physical Disk Management			Select to view properties and perform operations on physical disks.
View Physical Disk Properties (R/O)			Select to view physical disk properties.
Select Physical Disk Operations			Select to manage physical disk operations.
Port Configuration Menu			Select to set and display port configuration information.
NIC Configuration (R/O)			Select to view the network device port setting.
Blink LEDs	0 - 15	0	LEDs will blink for a specified duration (up to 15 seconds).
Port Configuration Information (R/O)			Displays the port settings for the network device.

Related Information

- "BIOS Main Menu Selections" on page 210

BIOS Save & Exit Menu Selections

This section includes a searchable text-based representation and an on-screen image of the BIOS Save & Exit Menu. The options that are available from the Save & Exit Menu are described in the table that follows.

```
 Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
 Main  Advanced  IO  Boot  UEFI Driver Control  Save & Exit
/-----------------------------------------------------+-----------------------\
|  Save Changes and Reset                            |Reset the system after  |
|  Discard Changes and Exit                          |saving the changes.     |
|  Discard Changes                                    |                        |
|  Restore Defaults                                   |                        |
|                                                     |                        |
|                                                     |                        |
|                                                     |                        |
|                                                     |                        |
|                                                     |                        |
|                                                    |------------------------|
|                                                    |><: Select Screen       |
|                                                    |^v: Select Item         |
|                                                    |Enter: Select           |
|                                                    |+/-: Change Opt.        |
|                                                    |F1: General Help        |
|                                                    |F7: Discard Changes     |
|                                                    |F9: Optimized Defaults  |
|                                                    |F10: Save & Exit        |
|                                                    |ESC: Exit               |
-----------------------------------------------------+------------------------/
 Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
```

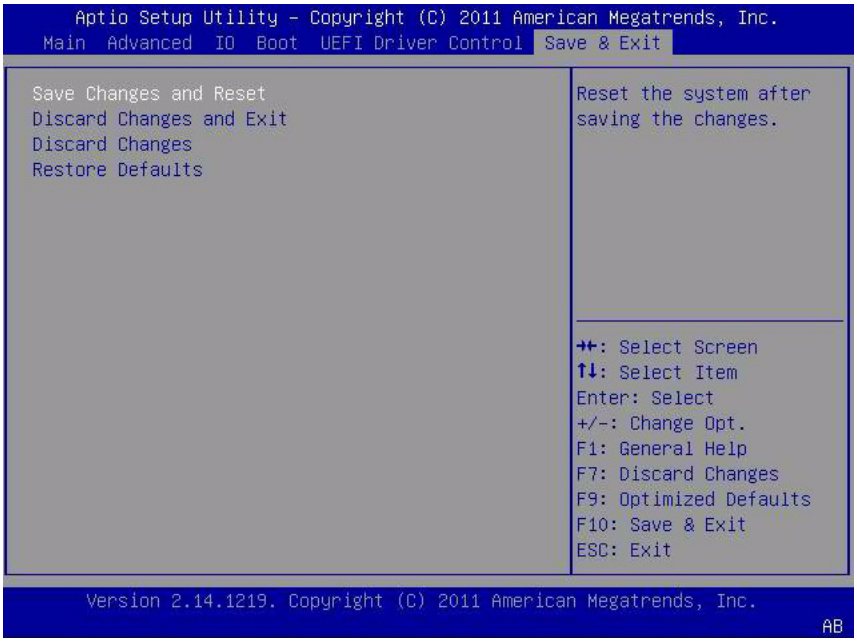


TABLE: BIOS Save & Exit Menu Options

Setup Options	Description
Save Changes and Reset	Save changes and then reset the system.
Discard Changes and Exit	Exit the BIOS Setup Utility without saving any changes.
Discard Changes	Discard changes made to the setup options so far.
Restore Defaults	Restore and load all default setup options for BIOS.

Related Information

- "BIOS Main Menu Selections" on page 210
- "BIOS Advanced Menu Selections" on page 215
- "BIOS IO Menu Selections" on page 225
- "BIOS Boot Menu Selections" on page 230
- "UEFI Driver Control Menu Selections" on page 234

Monitoring Components and Identifying SNMP Messages

This section includes information about monitoring components and identifying SNMP messages for the Sun Server X4-2L.

The following topics are discussed.

Description	Links
Review how Oracle ILOM monitors component health and faults.	"Monitoring Component Health and Faults Using Oracle ILOM" on page 241
Review information about system components and nomenclature.	"Monitoring System Components" on page 242
Review SNMP traps generated by the server.	"Identifying SNMP Trap Messages" on page 253

Related Information

- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: http://www.oracle.com/goto/ILOM/docs

Monitoring Component Health and Faults Using Oracle ILOM

The Oracle ILOM 3.1 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.
- Identify the faulted component in the Open Problems table.
- Record system information about the faulted component or condition in the event log.

For further information about administering open problems that are detected and reported by Oracle ILOM, refer to "Administering Open Problems" in the *Oracle Integrated Lights Out Manager (ILOM) 3.1 User's Guide*.

Related Information

- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at: http://www.oracle.com/goto/ILOM/docs

Monitoring System Components

The tables in this section identify the system components and describe the naming conventions applied to the components of the Sun Server X4-2L.

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. Further, as of Oracle ILOM 3.1, the Oracle ILOM 3.0 legacy targets `/SYS` and `/STORAGE` have been replaced by `/System`. Even though these legacy targets might be hidden, you can still use them to issue commands. For information on legacy targets, see the ILOM 3.1 Documentation Library at http://www.oracle.com/goto/ILOM/docs.

This section includes information for the following server components:

System Chassis Components

The following table lists the system chassis components.

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/**SYS**	FRU	General host FRU	
/SYS/**UUID**	FRU	Unique system ID	Derived from host MAC address. Use for PXE boot and licensing.
/SYS/**ACPI**	State sensor	Precondition for sensors that need to know if the host is on	(*hidden*) 01h-ACPI_ON_WORKING 20h-ACPI_SOFT_OFF
/SYS/**PWRBS**	Discrete sensor	Power budget status	01h-DEASSERTED 02h-ASSERTED
/SYS/**VPS**	Threshold sensor	Virtual power sensor	Watts
/SYS/**VPS_CPUS**	Threshold sensor	Virtual power sensor (CPUs)	Watts
/SYS/**VPS_MEMORY**	Threshold sensor	Virtual power sensor (Memory)	Watts
/SYS/**VPS_FANS**	Threshold sensor	Virtual power sensor (Fans)	Watts
/SYS/**INTSW**	Discrete sensor	Chassis intrusion switch	01h-DEASSERTED 02h-ASSERTED

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/**T_AMB**	Threshold sensor	System ambient temperature	Degrees C
/SYS/**TEMP_FAULT**	Indicator	Temperature Fault LED	Color: Amber Location: Mainboard Off: Normal On: Chassis overtemp fault
/SYS/**OK**	Indicator	OK LED	Color: Green Location: Front panel Off: Power is off. Fast blink: SP is booting. Slow blink: Host is in BIOS. On: Host is booting OS
/SYS/**SERVICE**	Indicator	Service Required LED	Color: Amber Location: Front panel Off: Normal. On: Server requires service.
/SYS/**LOCATE**	Indicator	Locator LED	Color: White Location: Front and rear panels Off: Normal Fast blink: Locate function is activated; self-extinguishes after 30 minutes.
/SYS/**HOST_ERR**	Discrete sensor	Writable digital, OEM reserved sensor type, per IPMI	0x02: asserts SYS/SERVICE 0x01: deasserts SYS/SERVICE
/SYS/**PS_FAULT**	Indicator	Rear Power Supply Fault LED	Color: Amber Location: Mainboard Off: Normal On: General power supply fault
/SYS/**FAN_FAULT**	Indicator	Top Fan Fault LED	Color: Amber Location: Mainboard Off: Normal On: General fan fault

Related Information

- "Cooling Unit Components" on page 245
- "Disk Backplane Components" on page 246
- "Memory Device Components" on page 246
- "Power Unit Components" on page 247
- "Processor Components" on page 248
- "System Board Components" on page 249
- "System Firmware Components" on page 251
- "Hard Disk Drive Components" on page 252

Cooling Unit Components

The system has 3.5-inch fan modules with two fans in each module. The following table lists the system cooling unit components.

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/**MB/FM[0-3]**	FRU	Fan module FRU	
/SYS/**MB/FM[0-3]/PRSNT**	Discrete sensor	Fan module is present.	01h-ENTITY_PRESENT, 02h-ENTITY_ABSENT
/SYS/**MB/FM[0-3]/F[0-1]/TACH**	Threshold sensor	Fan module fan speed	RPM
/SYS/**MB/FM[0-3]/SERVICE**	Indicator	Fan Service Required LED	Color: Amber Location: Mainboard Off: Normal On: Fan module was diagnosed as faulty.
/SYS/**MB/FM[0-3]/OK**	Indicator	Fan Module OK LED	Color: Green Location: Mainboard On: Normal Off: Fan module is offline.

Related Information

- "System Chassis Components" on page 243
- "Disk Backplane Components" on page 246
- "Memory Device Components" on page 246

- "Power Unit Components" on page 247
- "Processor Components" on page 248
- "System Board Components" on page 249
- "System Firmware Components" on page 251
- "Hard Disk Drive Components" on page 252

Disk Backplane Components

The following table lists the disk backplane (DBP) components.

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description
/SYS/**DBP[0-2]**	FRU	Disk backplane FRUs for a multiple DBP configuration
/SYS/**DBP**	FRU	Disk backplane FRU for a single DBP configuration

Related Information

- "System Chassis Components" on page 243
- "Cooling Unit Components" on page 245
- "Memory Device Components" on page 246
- "Power Unit Components" on page 247
- "Processor Components" on page 248
- "System Board Components" on page 249
- "System Firmware Components" on page 251
- "Hard Disk Drive Components" on page 252

Memory Device Components

The following table lists the memory device components.

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/MB/**P[0-1]/D[0-7]**	FRU	Host CPU DIMM FRU	

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/MB/P[0-1]/D[0-7]/PRSNT	Discrete sensor	Host CPU DIMM is present.	01h-ENTITY_PRESENT, 02h-ENTITY_ABSENT
/SYS/MB/P[0-1]/D[0-7]/SERVICE	Indicator	Host CPU DIMM Service LED	Color: Amber Location: Mainboard Off: Normal On: DIMM is diagnosed as faulty.

Related Information

- "System Chassis Components" on page 243
- "Cooling Unit Components" on page 245
- "Disk Backplane Components" on page 246
- "Power Unit Components" on page 247
- "Processor Components" on page 248
- "System Board Components" on page 249
- "System Firmware Components" on page 251
- "Hard Disk Drive Components" on page 252

Power Unit Components

The following table lists the power unit components.

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/**PS[0-1]**	FRU	Power supply FRU	
/SYS/**PS[0-1]/PRSNT**	Discrete sensor	Power supply is present.	01h-ENTITY_PRESENT, 02h-ENTITY_ABSENT

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/**PS[0-1]/STATE**	Discrete sensor	Multistate, power supply sensor type, per IPMI	Presence detected Failure detected Predictive failure Power supply input lost Power supply input lost or out-of-range Power supply input out-of-range Configuration error
/SYS/**PS[0-1]/P_IN**	Power sensor	Input power draw	Watts
/SYS/**PS[0-1]/P_OUT**	Power sensor	Output power	Watts
/SYS/**PS[0-1]/V_IN**	Voltage sensor	Input voltage	Volts
/SYS/**PS[0-1]/V_12V**	Voltage sensor	12V rail voltage	Volts
/SYS/**PS[0-1]/V_3V3**	Voltage sensor	3.3V rail voltage	Volts
/SYS/**PS[0-1]/T_OUT**	Temperature sensor	Ambient temperature	Degrees C

Related Information

- "System Chassis Components" on page 243
- "Cooling Unit Components" on page 245
- "Disk Backplane Components" on page 246
- "Memory Device Components" on page 246
- "Processor Components" on page 248
- "System Board Components" on page 249
- "System Firmware Components" on page 251
- "Hard Disk Drive Components" on page 252

Processor Components

The following table lists the processor (CPU) components.

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/**MB/P[0-1]**	FRU	Host CPU FRU	
/SYS/**MB/P[0-1]/PRSNT**	Discrete sensor	Host CPU is present.	01h-ENTITY_PRESENT, 02h-ENTITY_ABSENT
/SYS/**MB/P[0-1]/SERVICE**	Indicator	Host CPU Service Required LED	Color: Amber Location: Mainboard Off: Normal On: Processor was diagnosed as faulty.
/SYS/**MB/P[0-1]/V_DIMM**	Static sensor	CPU DIMM bank operating voltage	LVDIMM = 1.3V non-LVDIMM = 1.5V

Related Information

- "System Chassis Components" on page 243
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System Board Components

The following table lists the system board components.

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/**MB**	FRU	General host system board FRU	
/SYS/**MB/NET[0-3]**	FRU	Host Ethernet FRU	

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/**MB/PCIE[1-6]/PRSNT**	Discrete sensor	Option card inserted into PCIe slot	01h-ENTITY_PRESENT, 02h-ENTITY_PRESENT
/SYS/**MB/T_OUT_ZONE[0-2]**	Threshold sensor	Cooling zone exhaust temperature	Degrees C
/SYS/**MB/T_IN_ZONE[0-2]**	Threshold sensor	Cooling zone inlet temperature	Degrees C
/SYS/**MB/T_CORE_NET01**, /SYS/**MB/T_CORE_NET23**	Threshold sensor	Gigabit Ethernet controller die temperature	Degrees C
/SYS/**MB/T_IN_PS[0,1]**	Threshold sensor	PSU inlet temperature	Degrees C
/SYS/**MB/SASEXP**	FRU	SAS expander FRU	
/SYS/**MB/SASEXP/PRSNT**	Discrete sensor	SAS expander board presence	01h-ENTITY_PRESENT, 02h-ENTITY_PRESENT
/SYS/**MB/SASEXP/T_CORE**	Threshold sensor	SAS expander board temperature	Degrees C
/SYS/**MB/RIO**	FRU	Rear I/O board	
/SYS/**MB/RIO/PRSNT**	Discrete sensor	Rear I/O board presence	01h-ENTITY_PRESENT, 02h-ENTITY_PRESENT
/SYS/**MB/CONNBD**	FRU	Connector board on QPI bridge	
/SYS/**MB/CONNBD/PRSNT**	Discrete sensor	Connector board presence	01h-ENTITY_PRESENT, 02h-ENTITY_PRESENT
/SYS/**SP**	FRU	Service processor FRU	
/SYS/**SP/OK**	Indicator	SP OK LED	Color: Green Location: Front panel On: SP is operating.

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/**SP/SERVICE**	Indicator	SP Service Required LED	Color: Amber Location: Front panel Off: SP is working properly. On: SP requires service.
/SYS/**SP/NET[0-1]**	FRU	SP Ethernet FRU	

Related Information

- "System Chassis Components" on page 243
- "Cooling Unit Components" on page 245
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System Firmware Components

The following table lists the system firmware components.

Component Name (Oracle ILOM CLI Target)	IPMI Type	Description
/SYS/**MB/BIOS**	FRU	BIOS FRU

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- "Cooling Unit Components" on page 245
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Hard Disk Drive Components

The following table lists the hard disk drive (HDD) components.

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/**MB/RHDD[0-1]**	FRU	Rear hard disk drive FRU	From host
/SYS/**MB/RHDD[0-1]/PRSNT**	Discrete sensor	Rear hard disk drive presence	01h-ENTITY_PRESENT, 02h-ENTITY_ABSENT
/SYS/**MB/RHDD[0-1]/SERVICE**	Indicator	Rear hard disk drive Service Required LED	Color: Amber Location: Rear HDD On: Hard disk drive was diagnosed as faulty.
/SYS/**MB/RHDD[0-1]/OK2RM**	Indicator	Rear hard disk drive OK to Remove LED	Color: Blue Location: Rear HDD Off: Normal On: Ready to remove
/SYS/**MB/RHDD[0-1]/STATE**	Discrete sensor	Writable multistate, slot/connector sensor type, per IPMI	FAULT: Asserts SERVICE IDENTIFY: Blinks OK2RM OK2RM: Asserts OK2RM
/SYS/**DBP[0-2]/HDD[0-x]**	FRU	Hard disk drive FRU	From host
/SYS/**DBP[0-2]/HDD[0-y]/PRSNT**	Discrete sensor	Hard disk drive presence	01h-ENTITY_PRESENT, 02h-ENTITY_ABSENT

Component Name (Oracle ILOM CLI Targets)	IPMI Type	Description	Values (if applicable)
/SYS/**DBP[0-2]/HDD[0-y]/SERVICE**	Indicator	Hard disk drive Service Required LED	Color: Amber Location: HDD Off: Normal On: Hard disk drive was diagnosed as faulty.
/SYS/**DBP[0-2]/HDD[0-y]/OK2RM**	Indicator	Hard disk drive OK to Remove LED	Color: Blue Location: HDD Off: Normal On: Ready to remove
/SYS/**DBP[0-2]/HDD[0-y]/STATE**	Discrete sensor	Writable multistate, slot/connector sensor type, per IPMI	FAULT: Asserts SERVICE IDENTIFY: Blinks OK2RM OK2RM: Asserts OK2RM

Related Information

- "System Chassis Components" on page 243
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- "System Firmware Components" on page 251

Identifying SNMP Trap Messages

It is possible to configure Oracle ILOM to generate Simple Network Management Protocol (SNMP) traps when hardware problems occur. For information about how to configure SNMP alert rule destinations to start receiving these traps, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Library at:

`http://www.oracle.com/goto/ILOM/docs`

The tables in these sections list the set of SNMP traps that are generated from Oracle ILOM.

Generic Host Events

The following table lists generic host events.

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** Assert **Severity and Description:** A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/HOST_ERR
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** Deassert **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/HOST_ERR

Related Information

Environmental Events

The following table lists environmental events.

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapTempFatalThresholdExceeded **Oracle ILOM Event Message:** Lower fatal threshold exceeded **Severity and Description:** Critical; A temperature sensor has reported that its value has gone above an upper fatal threshold setting or below a lower fatal threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/PS0/T_OUT /SYS/PS1/T_OUT /SYS/MB/T_IN_ZONE0 /SYS/MB/T_OUT_ZONE0 /SYS/MB/T_IN_ZONE1 /SYS/MB/T_OUT_ZONE1 /SYS/MB/T_IN_ZONE2 /SYS/MB/T_OUT_ZONE2
SNMP Trap Message: sunHwTrapTempFatalThresholdDeasserted **Oracle ILOM Event Message:** Lower fatal threshold no longer exceeded **Severity and Description:** Informational; A temperature sensor has reported that its value has gone below an upper fatal threshold setting or above a lower fatal threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/PS0/T_OUT /SYS/PS1/T_OUT /SYS/MB/T_IN_ZONE0 /SYS/MB/T_OUT_ZONE0 /SYS/MB/T_IN_ZONE1 /SYS/MB/T_OUT_ZONE1 /SYS/MB/T_IN_ZONE2 /SYS/MB/T_OUT_ZONE2
SNMP Trap Message: sunHwTrapTempFatalThresholdExceeded **Oracle ILOM Event Message:** Upper fatal threshold exceeded **Severity and Description:** Critical; A temperature sensor has reported that its value has gone above an upper fatal threshold setting or below a lower fatal threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/PS0/T_OUT /SYS/PS1/T_OUT /SYS/MB/T_IN_ZONE0 /SYS/MB/T_OUT_ZONE0 /SYS/MB/T_IN_ZONE1 /SYS/MB/T_OUT_ZONE1 /SYS/MB/T_IN_ZONE2 /SYS/MB/T_OUT_ZONE2
SNMP Trap Message: sunHwTrapTempFatalThresholdDeasserted **Oracle ILOM Event Message:** Upper fatal threshold no longer exceeded **Severity and Description:** Informational; A temperature sensor has reported that its value has gone below an upper fatal threshold setting or above a lower fatal threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/PS0/T_OUT /SYS/PS1/T_OUT /SYS/MB/T_IN_ZONE0 /SYS/MB/T_OUT_ZONE0 /SYS/MB/T_IN_ZONE1 /SYS/MB/T_OUT_ZONE1 /SYS/MB/T_IN_ZONE2 /SYS/MB/T_OUT_ZONE2

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapTempFatalThresholdExceeded **Oracle ILOM Event Message:** Lower fatal threshold exceeded **Severity and Description:** Critical; A temperature sensor has reported that its value has gone above an upper fatal threshold setting or below a lower fatal threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/T_AMB /SYS/MB/T_CORE_NET01 /SYS/MB/T_CORE_NET23 /SYS/MB/T_IN_PS0 /SYS/MB/T_IN_PS1
SNMP Trap Message: sunHwTrapTempFatalThresholdDeasserted **Oracle ILOM Event Message:** Lower fatal threshold no longer exceeded **Severity and Description:** Informational; A temperature sensor has reported that its value has gone below an upper fatal threshold setting or above a lower fatal threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/T_AMB /SYS/MB/T_CORE_NET01 /SYS/MB/T_CORE_NET23 /SYS/MB/T_IN_PS0 /SYS/MB/T_IN_PS1
SNMP Trap Message: sunHwTrapTempFatalThresholdExceeded **Oracle ILOM Event Message:** Upper fatal threshold exceeded **Severity and Description:** Critical; A temperature sensor has reported that its value has gone above an upper fatal threshold setting or below a lower fatal threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/MB/T_CORE_NET01 /SYS/MB/T_CORE_NET23 /SYS/MB/T_IN_PS0 /SYS/MB/T_IN_PS1
SNMP Trap Message: sunHwTrapTempFatalThresholdDeasserted **Oracle ILOM Event Message:** Upper fatal threshold no longer exceeded **Severity and Description:** Informational; A temperature sensor has reported that its value has gone below an upper fatal threshold setting or above a lower fatal threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/MB/T_CORE_NET01 /SYS/MB/T_CORE_NET23 /SYS/MB/T_IN_PS0 /SYS/MB/T_IN_PS1

Related Information

- "System Chassis Components" on page 243
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Hard Disk Drive Events

The following table lists hard disk drive events.

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapSlotOrConnectorError **Oracle ILOM Event Message:** Assert **Severity and Description:** Major: A sensor associated with a slot or connector has detected an error.	/SYS/DBP/HDD0/STATE /SYS/DBP/HDD1/STATE /SYS/DBP/HDD2/STATE /SYS/DBP/HDD3/STATE /SYS/DBP/HDD4/STATE /SYS/DBP/HDD5/STATE /SYS/DBP/HDD6/STATE /SYS/DBP/HDD7/STATE /SYS/DBP/HDD8/STATE /SYS/DBP/HDD9/STATE /SYS/DBP/HDD10/STATE /SYS/DBP/HDD11/STATE /SYS/DBP/HDD12/STATE /SYS/DBP/HDD13/STATE /SYS/DBP/HDD14/STATE /SYS/DBP/HDD15/STATE /SYS/DBP/HDD16/STATE /SYS/DBP/HDD17/STATE /SYS/DBP/HDD18/STATE /SYS/DBP/HDD19/STATE /SYS/DBP/HDD20/STATE /SYS/DBP/HDD21/STATE /SYS/DBP/HDD22/STATE /SYS/DBP/HDD23/STATE

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapSlotOrConnectorOk **Oracle ILOM Event Message:** Deassert **Severity and Description:** Informational; A sensor associated with a slot or connector has returned to its normal state.	/SYS/DBP/HDD0/STATE /SYS/DBP/HDD1/STATE /SYS/DBP/HDD2/STATE /SYS/DBP/HDD3/STATE /SYS/DBP/HDD4/STATE /SYS/DBP/HDD5/STATE /SYS/DBP/HDD6/STATE /SYS/DBP/HDD7/STATE /SYS/DBP/HDD8/STATE /SYS/DBP/HDD9/STATE /SYS/DBP/HDD10/STATE /SYS/DBP/HDD11/STATE /SYS/DBP/HDD12/STATE /SYS/DBP/HDD13/STATE /SYS/DBP/HDD14/STATE /SYS/DBP/HDD15/STATE /SYS/DBP/HDD16/STATE /SYS/DBP/HDD17/STATE /SYS/DBP/HDD18/STATE /SYS/DBP/HDD19/STATE /SYS/DBP/HDD20/STATE /SYS/DBP/HDD21/STATE /SYS/DBP/HDD22/STATE /SYS/DBP/HDD23/STATE

Related Information

- "System Chassis Components" on page 243
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Power Events

The following table lists power events.

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** Assert **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/POLL /SYS/PS1/POLL
SNMP Trap Message: sunHwTrapPowerSupplyOk **Oracle ILOM Event Message:** Deassert **Severity and Description:** Informational; A power supply sensor has returned to its normal state.	/SYS/PS0/POLL /SYS/PS1/POLL
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_PRESENCE ASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_PRESENCE DEASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_FAILURE ASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_FAILURE DEASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_PREDICTIVE_FAILURE ASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_PREDICTIVE_FAILURE DEASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_INPUT_LOST ASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_INPUT_LOST DEASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_INPUT_ERROR ASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_INPUT_ERROR DEASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_INPUT_RANGE_ERROR ASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_INPUT_RANGE_ERROR DEASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_CONFIG_ERROR ASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** PS_CONFIG_ERROR DEASSERT **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PS0/STATE /SYS/PS1/STATE
SNMP Trap Message: sunHwTrapSensorNonCritThresholdExceeded **Oracle ILOM Event Message:** Upper noncritical threshold exceeded **Severity and Description:** Minor; A sensor has reported that its value has gone above an upper non-critical threshold setting or below a lower non-critical threshold setting. This generic 'sensor' trap is generated when the SNMP agent does not recognize the component type. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/VPS

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapSensorThresholdOk **Oracle ILOM Event Message:** Upper noncritical threshold no longer exceeded **Severity and Description:** Informational; A sensor has reported that its value is in the normal operating range. This generic 'sensor' trap is generated when the SNMP agent does not recognize the component type.	/SYS/VPS
SNMP Trap Message: sunHwTrapPowerSupplyError **Oracle ILOM Event Message:** Assert **Severity and Description:** Major; A power supply sensor has detected an error.	/SYS/PWRBS
SNMP Trap Message: sunHwTrapPowerSupplyOk **Oracle ILOM Event Message:** Deassert **Severity and Description:** Informational; A power supply sensor has returned to its normal state.	/SYS/PWRBS
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** ACPI_ON_WORKING ASSERT **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/ACPI
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** ACPI_ON_WORKING DEASSERT **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/ACPI
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** ACPI_SOFT_OFF ASSERT **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/ACPI
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** ACPI_SOFT_OFF DEASSERT **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/ACPI

Related Information

- "System Chassis Components" on page 243
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Fan Events

The following table lists fan events.

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapFanSpeedCritThresholdExceeded **Oracle ILOM Event Message:** Lower critical threshold exceeded **Severity and Description:** Major; A fan speed sensor has reported that its value has gone above an upper critical threshold setting or below a lower critical threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/MB/FM0/F0/TACH /SYS/MB/FM0/F1/TACH /SYS/MB/FM1/F0/TACH /SYS/MB/FM1/F1/TACH /SYS/MB/FM2/F0/TACH /SYS/MB/FM2/F1/TACH /SYS/MB/FM3/F0/TACH /SYS/MB/FM3/F1/TACH

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapFanSpeedCritThresholdDeasserted **Oracle ILOM Event Message:** Lower critical threshold no longer exceeded **Severity and Description:** Informational; A fan speed sensor has reported that its value has gone below an upper critical threshold setting or above a lower critical threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/MB/FM0/F0/TACH /SYS/MB/FM0/F1/TACH /SYS/MB/FM1/F0/TACH /SYS/MB/FM1/F1/TACH /SYS/MB/FM2/F0/TACH /SYS/MB/FM2/F1/TACH /SYS/MB/FM3/F0/TACH /SYS/MB/FM3/F1/TACH
SNMP Trap Message: sunHwTrapFanSpeedFatalThresholdExceeded **Oracle ILOM Event Message:** Lower fatal threshold exceeded **Severity and Description:** Critical; A fan speed sensor has reported that its value has gone above an upper fatal threshold setting or below a lower fatal threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/MB/FM0/F0/TACH /SYS/MB/FM0/F1/TACH /SYS/MB/FM1/F0/TACH /SYS/MB/FM1/F1/TACH /SYS/MB/FM2/F0/TACH /SYS/MB/FM2/F1/TACH /SYS/MB/FM3/F0/TACH /SYS/MB/FM3/F1/TACH
SNMP Trap Message: sunHwTrapFanSpeedFatalThresholdDeasserted **Oracle ILOM Event Message:** Lower fatal threshold no longer exceeded **Severity and Description:** Informational; A fan speed sensor has reported that its value has gone below an upper fatal threshold setting or above a lower fatal threshold setting. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower threshold.	/SYS/MB/FM0/F0/TACH /SYS/MB/FM0/F1/TACH /SYS/MB/FM1/F0/TACH /SYS/MB/FM1/F1/TACH /SYS/MB/FM2/F0/TACH /SYS/MB/FM2/F1/TACH /SYS/MB/FM3/F0/TACH /SYS/MB/FM3/F1/TACH

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- "System Chassis Components" on page 243
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Memory Events

The following table lists memory events.

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapSensorNonCritThresholdExceeded **Oracle ILOM Event Message:** Upper noncritical threshold exceeded **Severity and Description:** Minor; A sensor has reported that its value has gone above an upper non-critical threshold setting or below a lower non-critical threshold setting. This generic 'sensor' trap is generated when the SNMP agent does not recognize the component type. The sunHwTrapThresholdType object indicates whether the threshold was an upper or lower.	/SYS/VPS_CPUS /SYS/VPS_MEMORY
SNMP Trap Message: sunHwTrapSensorThresholdOk **Oracle ILOM Event Message:** Upper noncritical threshold no longer exceeded **Severity and Description:** Informational; A sensor has reported that its value is in the normal operating range. This generic 'sensor' trap is generated when the SNMP agent does not recognize the component type.	/SYS/VPS_CPUS /SYS/VPS_MEMORY
SNMP Trap Message: sunHwTrapComponentFault **Oracle ILOM Event Message:** event fault.cpu.intel.quickpath.link_slow **Severity and Description:** Major; A component is suspected of causing a fault. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFaultCleared **Oracle ILOM Event Message:** event fault.cpu.intel.quickpath.link_slow **Severity and Description:** Informational; A component fault has been cleared. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFault **Oracle ILOM Event Message:** event fault.cpu.intel.quickpath.unknown-errcode **Severity and Description:** Major; A component is suspected of causing a fault. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapComponentFaultCleared **Oracle ILOM Event Message:** event fault.cpu.intel.quickpath.unknown-errcode **Severity and Description:** Informational; A component fault has been cleared. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.none **Severity and Description:** Major; A component is suspected of causing a fault. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.none **Severity and Description:** Informational; A component fault has been cleared. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.memtest-failed **Severity and Description:** Major; A component is suspected of causing a fault. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.memtest-failed **Severity and Description:** Informational; A component fault has been cleared. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.quadrank-3rd-slot **Severity and Description:** Major; A component is suspected of causing a fault. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.quadrank-3rd-slot **Severity and Description:** Informational; A component fault has been cleared. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapComponentFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.ddr3u-unsupported **Severity and Description:** Major; A component is suspected of causing a fault. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.ddr3u-unsupported **Severity and Description:** Informational; A component fault has been cleared. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFault **Oracle ILOM Event Message:** event fault.memory.intel.mrc.unknown-errcode **Severity and Description:** Major; A component is suspected of causing a fault. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapComponentFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.mrc.unknown-errcode **Severity and Description:** Informational; A component fault has been cleared. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.udimm-unsupported **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.udimm-unsupported **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.sodimm-unsupported **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.sodimm-unsupported **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.4gb-fused **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.4gb-fused **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.8gb-fused **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.8gb-fused **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.incompatible **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.incompatible **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.incompatible-maxranks **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.incompatible-maxranks **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.incompatible-quadrank **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.incompatible-quadrank **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.numranks-unsupported **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.numranks-unsupported **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.speed-slow **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.speed-slow **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.disable-quadrank **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.disable-quadrank **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.population-invalid **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.population-invalid **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.out-of-order **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.out-of-order **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFault **Oracle ILOM Event Message:** event fault.memory.intel.dimm.category-unknown **Severity and Description:** Major; A memory component is suspected of causing a fault.	/SYS/MB/P/D
SNMP Trap Message: sunHwTrapMemoryFaultCleared **Oracle ILOM Event Message:** event fault.memory.intel.dimm.category-unknown **Severity and Description:** Informational; A memory component fault has been cleared.	/SYS/MB/P/D

Related Information

- "System Chassis Components" on page 243
- "Cooling Unit Components" on page 245
- "Disk Backplane Components" on page 246
- "Memory Device Components" on page 246
- "Power Unit Components" on page 247
- "Processor Components" on page 248
- "System Board Components" on page 249
- "Hard Disk Drive Components" on page 252

Entity Presence Events

The following table lists entity presence events.

Messages and Descriptions	Description
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** ENTITY_PRESENT ASSERT **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB/P0/PRSNT /SYS/MB/P1/PRSNT
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** ENTITY_PRESENT DEASSERT **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB/P0/PRSNT /SYS/MB/P1/PRSNT
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** ENTITY_ABSENT ASSERT **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB/P0/PRSNT /SYS/MB/P1/PRSNT
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** ENTITY_ABSENT DEASSERT **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB/P0/PRSNT /SYS/MB/P1/PRSNT
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** ENTITY_DISABLED ASSERT **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB/P0/PRSNT /SYS/MB/P1/PRSNT
SNMP Trap Message: sunHwTrapComponentError **Oracle ILOM Event Message:** ENTITY_DISABLED DEASSERT **Severity and Description:** Major; A sensor has detected an error. This generic 'component' trap is generated when the SNMP agent does not recognize the component type.	/SYS/MB/P0/PRSNT /SYS/MB/P1/PRSNT

Physical Presence Events

Messages and Descriptions	Sensor Name
SNMP Trap Message: sunHwTrapSecurityIntrusion **Oracle ILOM Event Message:** Assert **Severity and Description:** Major; An intrusion sensor has detected that someone may have physically tampered with the system.	/SYS/INTSW /SYS/SP/SP_NEEDS_REBOOT
SNMP Trap Message: sunHwTrapSecurityIntrusion **Oracle ILOM Event Message:** Deassert **Severity and Description:** Major; An intrusion sensor has detected that someone may have physically tampered with the system.	/SYS/INTSW /SYS/SP/SP_NEEDS_REBOOT

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