Sun Blade X4-2B Service Manual

Part No: E37039–04
March, 2014

140306@25097

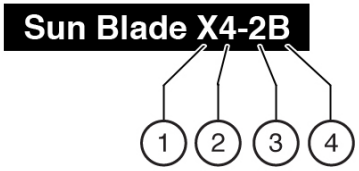
Contents

Using This Documentation

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

Sun Blade X4-2B Model Name

The name identifies the following:



- 1: The alpha character, X, identifies an x86 product.
- 2: The first number, 4, identifies the generation of the server.
- 3: The second number, 2, identifies the number of processors.
- 4: The alpha character, B, identifies the product as a blade server.

Getting the Latest Firmware and Software

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 version 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 resides on a USB drive installed in most servers.

- My Oracle Support – http://support.oracle.com
- Physical media request

For more information, see Oracle x86 Administration Guide for X4 Series Servers (http://www.oracle.com/goto/x86AdminDiag/docs).

Documentation and Feedback

Documentation	Link
All Oracle products	http://www.oracle.com/documentation
Sun Blade X4-2B server module	http://www.oracle.com/goto/X4-2B/docs
X4 server series system administration	Oracle x86 Administration Guide for X4 Series Servers (http://www.oracle.com/goto/x86AdminDiag/docs)
Oracle System Assistant	Oracle x86 Administration Guide for X4 Series Servers (http://www.oracle.com/goto/x86AdminDiag/docs)
Oracle Integrated Lights Out Manager (ILOM) 3.1	http://www.oracle.com/goto/ILOM/docs
Oracle Hardware Management Pack	http://www.oracle.com/goto/OHMP/docs
Chassis Sun Blade 6000 modular system	http://www.oracle.com/goto/SB6000/docs

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

About This Documentation

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

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

Support and Training

These web sites provide additional resources:

- Support: http://support.oracle.com
- Training: http://education.oracle.com

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.

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Change History

The following lists the release history of this documentation set:

- September 2013. Initial publication.
- March 2013. Software 1.1 update.

Service Manual Overview

The *Sun Blade X4-2B Service Manual* contains service and maintenance procedures for the Sun Blade X4-2B server module. The major sections of this manual are described in the following table.

Description	Link
Overview of the server module features and components.	"About the Sun Blade X4-2B" on page 11
Troubleshooting and corrective maintenance-related information.	"Troubleshooting the Server Module" on page 29
Procedures for preparing to service the server module and powering off the server module.	"Preparing for Service " on page 43
Procedures for removal and installation of server module components.	"Servicing Server Module Components " on page 63
Procedures for returning the server to operation and powering on the server module.	"Returning the Server Module to Operation " on page 127
Information about POST code checkpoint testing, provides methods to view POST checkpoint codes, lists the POST code checkpoints, and describes how to configure POST code checkpoint options.	"BIOS Power-On Self-Test (POST) Checkpoints " on page 135
Information about BIOS Setup Utility screen selections and setup options.	"BIOS Setup Utility Menu Options" on page 147

About the Sun Blade X4-2B

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

Description	Link
Review the product overview.	"Product Description" on page 11
Identify status indicators, features, and components of server front and rear panels.	"About Front and Rear Panels" on page 12
Review Sun Blade 6000 chassis, ILOM and CMM components and functions.	"About the Chassis" on page 21
Review replaceable components and component serviceability.	"About System Components" on page 24

Product Description

Oracle's Sun Blade X4-2B server module consists of two processors (from the Intel ® Xeon ® processor E5-2600 V2 processor family), and 24 DIMM slots for a maximum of 768 GB of memory. The blade server module is inserted in to a Sun Blade 6000 chassis, which provides power and cooling to the blades. The Sun Blade X4-2B server module is an ideal blade for building enterprise cloud infrastructures.

Optional I/O modules can be installed. A RAID expansion module (REM) is installed on the Sun Blade X4-2B server module for RAID and SAS drive connectivity. A Fabric Expansion Module (FEM) is also installed on the server module. The FEM enables a connection to the Network Express Modules (NEMs) through the Sun Blade 6000 chassis' midplane. The Sun Blade X4-2B also features an on-board service processor (SP) to enable Oracle Integrated Lights Out Manager (ILOM). Oracle ILOM provides secure local and remote server management.

See Also:

- "About Oracle ILOM " on page 23

- *Sun Blade X4-2B Installation Guide*

About Front and Rear Panels

This section describes the front and rear panels of the server module:

Front Panel Features

The following illustration shows front panel features on the Sun Blade X4-2B.

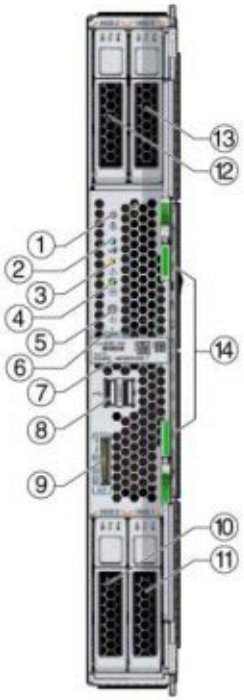


Figure Legend			
1	Locate Button and Indicator– white	8	USB ports (2)
2	Ready to Remove Indicator – blue	9	Universal connector port (UCP)
3	Service Action Required Indicator – amber	10	Storage drive (HDD 0)
4	Power OK Indicator – green	11	Storage drive (HDD 1)
5	Power button	12	Storage drive (HDD 2)
6	NMI Reset button (Service only)	13	Storage drive (HDD 3)
7	RFID tag (with serial number)	14	Ejector levers

See Also:

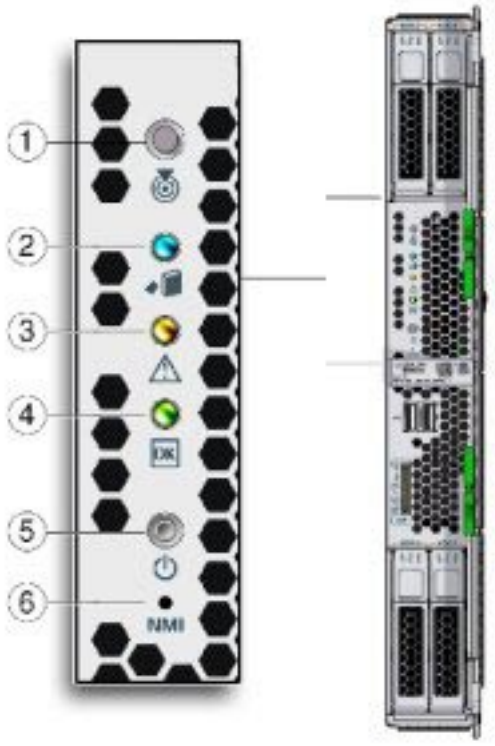
"Front Panel Indicators and Buttons" on page 13

Front Panel Indicators and Buttons

The topics included in this section show the location of the Sun Blade X4-2B front panel indicators and buttons and describe their functions.

Location of Front Panel Indicators and Buttons

The following illustration shows the server module front panel indicator and button locations.



Legend	Name
1	Locate Button and Indicator – White
2	Ready To Remove Indicator – Blue
3	Service Action Required Indicator – Amber
4	Power Button
5	Power OK Indicator – Green
6	NMI Button – Service use only

Detailed descriptions and functions follow.

Locate Indicator Button

Function:

- Combination white indicator and button.
- Activate the Locate Indicator remotely from Oracle ILOM to identify a server module within a chassis.
- Press and hold the Locate Indicator button to activate the front panel lamp test.
- See "Turning the Locate Indicator On and Off" on page 59.

Ready To Remove Indicator

Function:

- Blue indicator.
- Indicates when it is safe to remove the server module from the chassis.
- Off: Normal operation. Do not remove the server module.
- On solid: The server module is ready to remove. See "Remove the Server Module from the Sun Blade Chassis" on page 55.

Service Action Required Indicator

Function:

- Amber LED.
- Indicates a server module component fault.
- Off: Normal operation.
- On solid: The server module has a fault. See "Troubleshooting the Server Module" on page 29.

Power OK Indicator and Button

Function:

- Green Indicator and recessed button.
- Use the Power button to toggle the server between standby power and full power states.
- Use a stylus to operate the Power button.
- The Power/OK Indicator shows the status of the server power:
  - Service processor is booting: Fast blink
  - Host is booting: Slow blink at 1 Hz.
  - Standby power state (SP booted): Blink 0.2 seconds on, 2.8 seconds off
  - Full power state: On solid (does not blink)
- For more information, see "About Server Power States and Resets" on page 47.

NMI Button

Function:

The NMI (non-maskable interrupt) button is for service use only. *Do not press*.

See Also:

- "About Front and Rear Panels" on page 12
- "Rear Panel of the Server Module" on page 17

Rear Panel of the Server Module

The following illustration shows the rear panel features on the Sun Blade X4-2B.

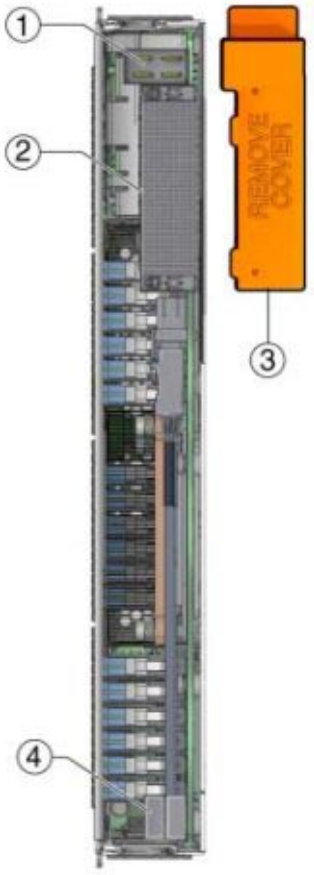


Figure Legend			
1	Power connector	3	Protective shipping cover for rear connector (remove before inserting into chassis)
2	I/O connector	4	USB flash sticks 2, 3 (P0 and P1)

See Also:

- "About Front and Rear Panels" on page 12
- "Front Panel Indicators and Buttons" on page 13
- "The System Chassis" on page 21

UCP and the Multi-Port Dongle Cable

The universal connector port (UCP) and the multi-port dongle cable provide a front panel local access point to the server module boot screen, the BIOS Setup Utility, the Oracle ILOM CLI, and Oracle System Assistant. From this access point you can perform server maintenance and setup tasks, including installing an OS.

The following illustration shows the interfaces available through the UCP using the three-connector multi-port cable.

Note – Multi-port cables are available in two varieties, a newer three cable version and a four cable version. The four-port cable has a DB-9 serial connector, while the three-port cable does not.

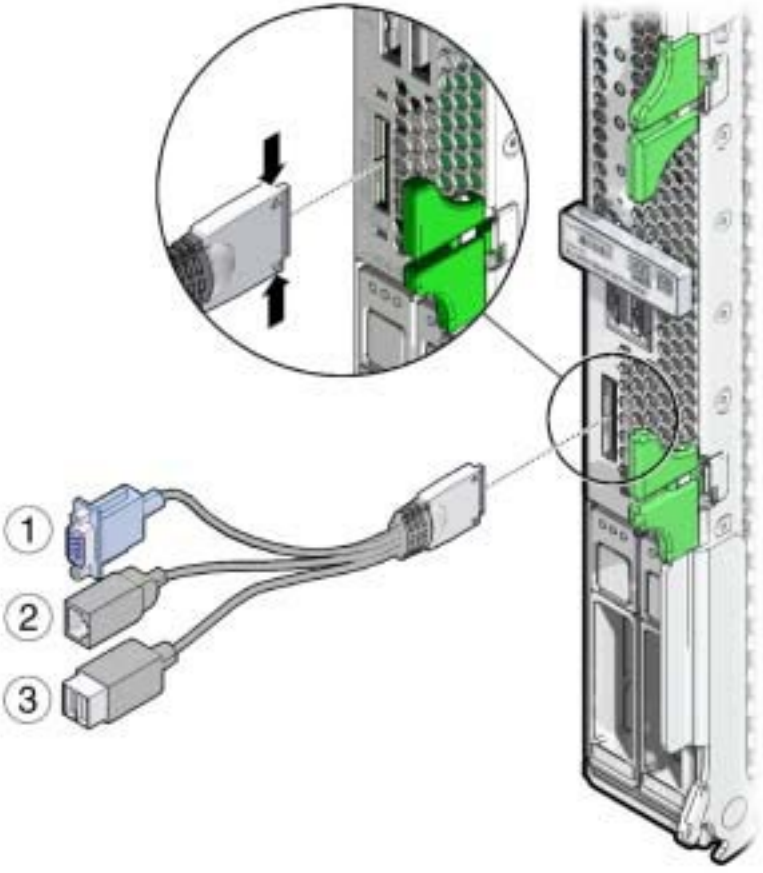


Figure Legend	
1	DB-15 (video port)
2	RJ-45 (serial management port)
3	USB 2.0 (2 ports)

Note – Your chassis might ship with a DB-9-to-RJ-45 serial cable adapter. The adapter allows you to attach a serial cable with a DB-9 connector to the server module using the RJ-45 port on the multi-port cable.

See Also:

- *Sun Blade X4-2B Installation Guide*
- "Attach the Multi-Port Dongle Cable" on page 21

▼ Attach the Multi-Port Dongle Cable

Attach the multi-port dongle cable to the front of the server module using the universal connector port (UCP).

Note – The port does not provide a means to permanently attach the multi-port dongle cable. The connection is intended for temporary usage. Disconnect the cable when finished.

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1. **Position the multi-port cable connector so the flat side of the connector aligns with the flat side of the UCP.**
2. **Gently squeeze the sides of the multi-port cable connector and insert the multi-port cable into the UCP.**
3. **Connect the devices using the appropriate interfaces.**

   For an overview of the available interfaces on the multi-port cable, see "UCP and the Multi-Port Dongle Cable" on page 19.

Caution – Component damage. When not in use, do not leave the cable attached to the server module. The multi-port cable is designed for temporary use.

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4. **To disconnect the multi-port cable, gently squeeze the sides of the cable connector and pull it away from the server module.**

About the Chassis

This section includes Sun Blade 6000 modular system chassis information:

- "The System Chassis" on page 21
- "The Chassis Monitoring Module (CMM) " on page 22
- "About Oracle ILOM " on page 23

The System Chassis

The Sun Blade X4-2B is used in a Sun Blade 6000 modular system chassis. When fully loaded, the chassis can hold a combination of up to ten storage modules and server modules. Server modules draw more power than storage modules, so power limitations apply to the number of server modules that can be installed in a Sun Blade 6000.

For more information about the Sun Blade X4-2B configuration and compatibility, see "Supported Hardware" in *Sun Blade X4-2B Product Notes* .

See Also:

- Sun Blade 6000 Modular System Chassis documentation (`http://www.oracle.com/pls/topic/lookup?ctx=sb6000`)
- "The Chassis Monitoring Module (CMM) " on page 22
- "About Oracle ILOM " on page 23

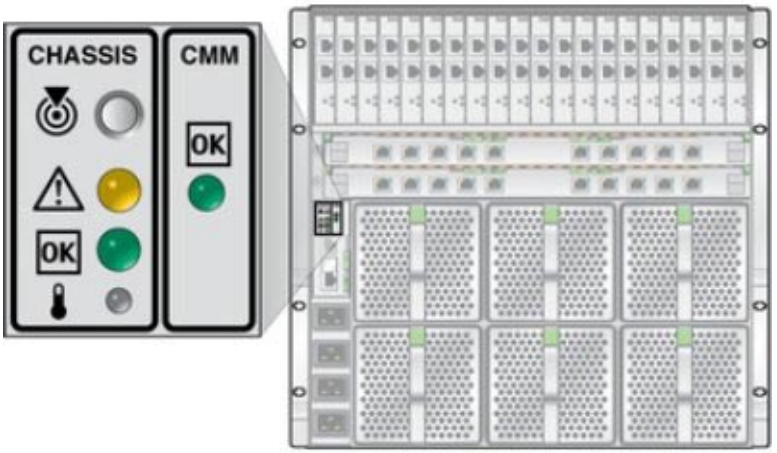
The Chassis Monitoring Module (CMM)

You manage the system and monitor the Sun Blade 6000 modular system chassis using the chassis monitoring module (CMM). The CMM allows you to monitor the status of the chassis and its components (including server modules and storage modules) using a chassis-level version of Oracle Integrated Lights Out Management (Oracle ILOM) firmware. CMM is a chassis-level version of Oracle ILOM provides a single point of management interaction for all chassis functions and components. You can access the CMM either remotely (using SSH or a Web browser) or locally (using a serial cable and a `tip` session).

With the CMM Oracle ILOM, you can:

- Monitor the status of chassis and its server module and storage modules.
- Send events using SNMP traps or e-mail alerts when errors and faults occur.
- Troubleshoot errors and faults.
- Remotely control the power state of server modules and blades.
- Configure the server module BIOS settings.

The CMM is located on the rear of the chassis. The following illustration shows the back side of the chassis and the CMM indicator panel.



See Also:

- Sun Blade 6000 Modular System documentation (`http://docs.oracle.com/cd/E19938-01/index.html`)
- "About Oracle ILOM " on page 23
- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (`http://www.oracle.com/pls/topic/lookup?ctx=ilom31`).

About Oracle ILOM

Oracle's x86- and SPARC-based servers have an embedded service processor (SP) that contains a preinstalled system management firmware called Oracle Integrated Lights Out Manager (Oracle ILOM). Oracle ILOM enables you to access the server remotely or locally, regardless of the power-on state of the server, and actively manage and monitor the system.

With Oracle ILOM, you can:

- Monitor the status of server module sensors and indicators.
- Send events using SNMP traps or e-mail alerts when errors and faults occur.
- Troubleshoot system and component errors and faults.
- Remotely control the power state of your server module.
- Configure the server module BIOS settings.

Oracle ILOM allows you to choose either a command-line interface (CLI) or a browser-based interface.

Note – The chassis also has Oracle ILOM installed on the chassis monitoring module (CMM), which is used to manage chassis functions.

See Also:

- "The Chassis Monitoring Module (CMM) " on page 22
- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (`http://www.oracle.com/pls/topic/lookup?ctx=ilom31`).
- Oracle x86 Administration Guide for X4 Series Servers (`http://www.oracle.com/goto/x86AdminDiag/docs`)

About System Components

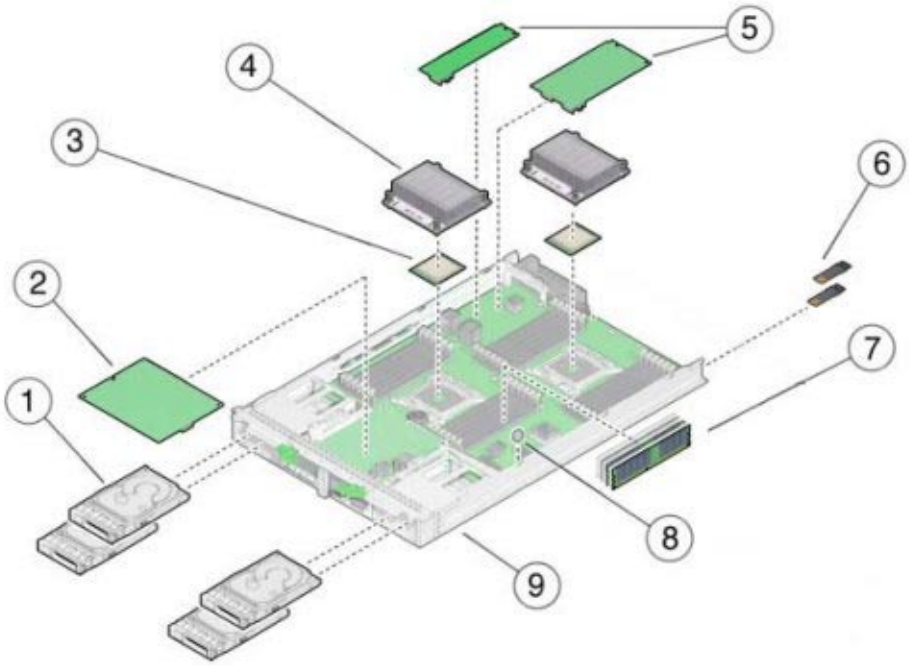
This section includes an illustrated parts breakdown, a replaceable component (CRU and FRU) list, and a component serviceability list:

- "Illustrated Parts Breakdown" on page 24
- "Replaceable Components (FRUs and CRUs)" on page 26
- "Component Serviceability" on page 26

Note – Some Sun Blade X4-2B components are optional. Your server module might not contain every replaceable component.

Illustrated Parts Breakdown

The following illustration and table identifies the replaceable components for the Sun Blade X4-2B:



Call Out	Description	Call Out	Description
1	Storage drives (4 maximum, HDD or SSD)	6	USB 2.0 sticks (0 and 1)
2	RAID expansion module (REM)	7	DIMMs DDR3 LV (24 maximum)
3	Processors (0 and 1)	8	System battery (type: CR2032)
4	Heat sink assemblies (0 and 1)	9	Server module enclosure (Includes motherboard, disk backplane, and enclosure assembly.)
5	Fabric expansion modules (FEM) **Note –** FEMs are available in two form factors (single-width and double-width).		

See Also:

- "About System Components" on page 24
- "Install Server Module Filler Panels" on page 57

Replaceable Components (FRUs and CRUs)

The replaceable components in your Sun Blade X4-2B are designated as either field-replaceable units (FRU) or customer-replaceable units (CRU). A part designated as a FRU must be replaced by an Oracle-qualified service technician.

The following table lists the FRU and CRU components.

Component Description	Designation
HDDs or SSDs (and fillers)	CRU
DIMMs (and fillers)	CRU
Battery, system	CRU
USB 2.0 drives (rear)	CRU
FEM	CRU
REM	CRU
Processor and heat sink assembly (CPU)	FRU
Motherboard and blade enclosure assembly	FRU

See Also:

- "About System Components" on page 24

Component Serviceability

Components are either hot serviceable or cold serviceable. Hot service capability allows you to safely remove this component while the server module is running. Cold service capability requires a powered off state, so you need to remove the server module from the chassis.

The following table lists the serviceability of components.

Component Description	Serviceability
HDDs or SSDs (and fillers)[1]	Hot
DIMMs (and optional fillers)	Cold
Battery, system	Cold
USB 2.0 drives (rear)[2]	Cold

[1] For instructions on safe removal of HDDs or SSDs, consult your operating system .

[2] Server module must be removed from the chassis to access.

Component Description	Serviceability
FEM	Cold
REM	Cold
Processor and heat sink assembly (CPU)	Cold
Motherboard and blade enclosure assembly	Cold

See Also:

- "About System Components" on page 24

Troubleshooting the Server Module

These sections introduce the diagnostic tools and strategies available to help you diagnose problems with the Sun Blade X4-2B.

Description	Link
Troubleshoot server hardware problems.	"Troubleshooting Server Module Hardware Faults" on page 29
Find additional troubleshooting and diagnostic information.	"Troubleshooting and Diagnostic Information" on page 37
Understand the motherboard-based test circuit.	"About the DIMM and Processor Test Circuit " on page 41
Gather information about the system to help a service engineer or technician work on your system.	"Gather Service Information" on page 38
Investigate power issues.	"Troubleshoot Server Module Power Problems" on page 39
Recover the SP firmware (Service personnel only).	"Recover the SP Firmware Using the Preboot Menu (Service Only)" on page 41

Troubleshooting Server Module Hardware Faults

When a server hardware problem occurs, the system lights the Service Action Required indicator and captures it as an event in the system event log (SEL). If you have set up notifications through Oracle ILOM, you also receive an alert through the notification method you chose. When notified that a hardware fault has occurred, you should investigate it immediately.

Use the following to investigate a hardware-related fault:

- "Service Troubleshooting Task List" on page 30
- "Troubleshoot Hardware Faults" on page 31

Service Troubleshooting Task List

These tasks provide an overview for troubleshooting a hardware fault.

Step	Task	Link
1	**Gather Service Information.**	"Gather Service Information" on page 38
2	**Identify the failed component.** Use Oracle ILOM web interface or CLI to identify the server subsystem and failed component.	"Troubleshooting Server Module Hardware Faults" on page 29
3	**Review the server** *Product Notes*. After you have identified the failed component, review the most recent *Product Notes* for the server. The product notes contains up-to-date information about the server, including hardware-related issues that may affect the failed component.	`http://www.oracle.com/goto/X4-2B/docs`
4	**Prepare the server for service**. If you have determined that the hardware fault requires service (physical access to the server), use Oracle ILOM to power off the server, activate the Locate indicator, and take the server offline. Before removing the server module from the chassis, prepare the work space, and ensure ESD protection for the server and components.	"Preparing for Service " on page 43
5	**Service components**. To service the components, see the removal, installation, and replacement procedures in this document. **Note –** A component designated as FRU must be replaced by Oracle Service personnel. Contact Oracle Service.	"Servicing Server Module Components " on page 63
6	**Return the server to service** . Before placing the server module into the chassis, prepare the work space, ensuring ESD protection for the server and components.	"Returning the Server Module to Operation " on page 127

Step	Task	Link
7	**Clear the fault in Oracle ILOM.** Optional: Depending on the component, you might need to clear the fault in Oracle ILOM.	"About Oracle ILOM " on page 23

Next Steps:

- See "Troubleshoot Hardware Faults" on page 31

▼ Troubleshoot Hardware Faults

This procedure provides an example of troubleshooting hardware faults.This procedure expands upon the basic steps described in "Service Troubleshooting Task List" on page 30.

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

Note – This procedure uses a combination of the Oracle ILOM web and CLI interfaces. However, the procedure can be performed using only the Oracle ILOM CLI interface. For more information, refer to the Oracle ILOM documentation at `http://www.oracle.com/goto/ILOM/docs`.

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1 Review the server module *Product Notes* for information about the server, problem, or hardware.

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

2 Access Oracle ILOM CMM.

The CMM provides an overview of all chassis subsystems to help you isolate the fault.

- Open a web browser.
- Type in the CMM SP IP address.
- At the log-in screen, enter a login with root or administrator privileges.

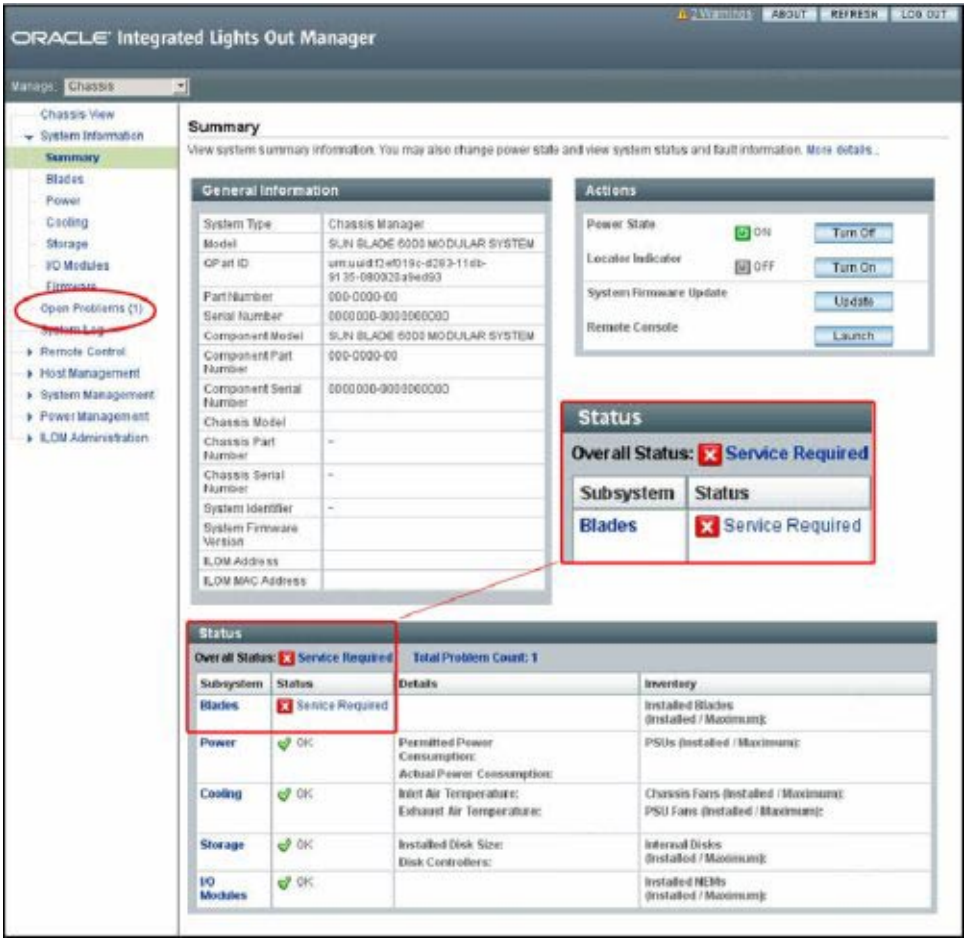
3 identify the chassis subsystem that requires service.

View the ILOM Summary screen Status section, Status section of the Summary screen for information about the following chassis subsystems:

- **Blades**
- **Power**
- **Cooling**
- **Storage**

- **I/O Modules**

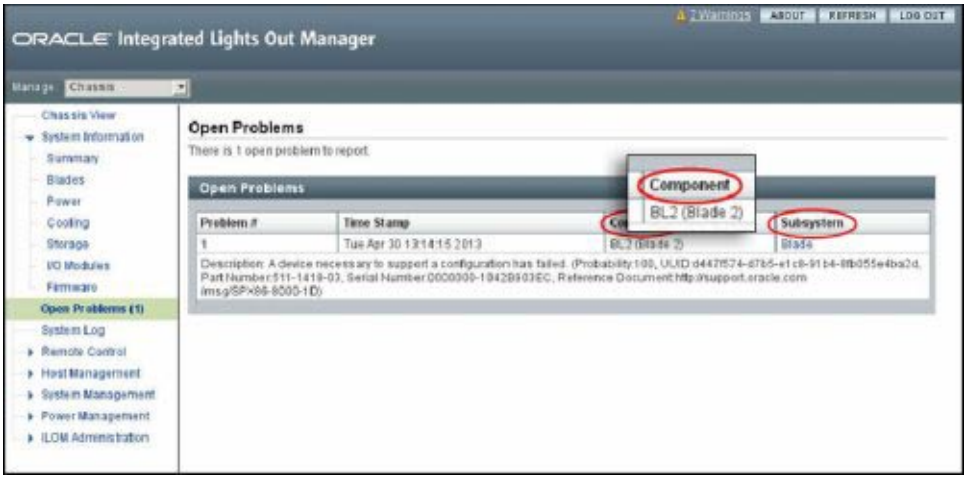
In the following example, the Status section indicates that service is required on one of the blades in the blades subsystem, and the Open Problems link in the left navigation panel shows one (1) logged problem:



4 View specific information by clicking Open Problems in the left navigation panel.

The Open Problems screen provides detailed information about the issue, such as the time the event occurred, the component, the subsystem, and a description.

In the following example, the Open Problems screen indicates that a problem has occurred on blade 2 (BL2):



5 View the System Log.

The System Log provides additional detailed information about the error (event), including the severity, the component or subsystem, and the date and time the event occurred.

6 Access the server module Oracle ILOM.

The server module Oracle ILOM provides specific information about the server module and its components.

a. Access a web browser.

b. Type in the server module SP IP address.

c. At the log-in screen, enter a login with root or administrator privileges.

7 View the Summary screen Status section for service required and other error indications.

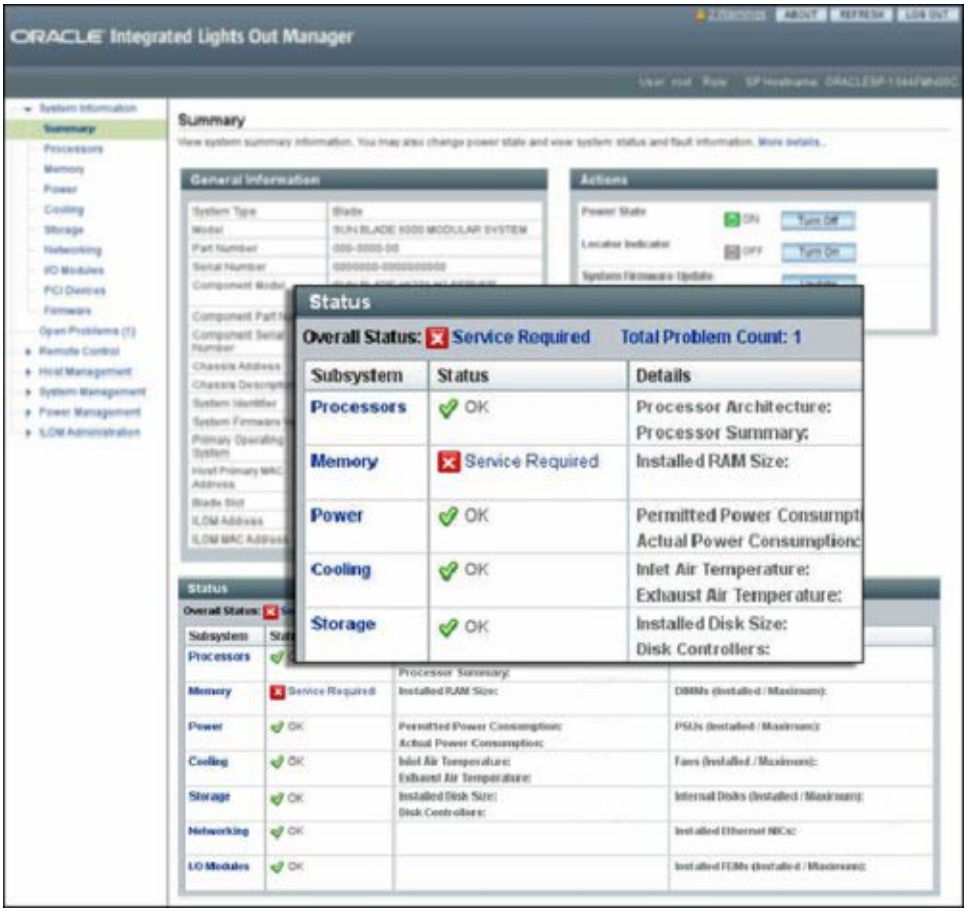
Identify the component that is in a fault state from the *server module* Oracle ILOM web interface.

The Status section provides information for the following subsystems:

- **Processors**
- **Memory**
- **Power**
- **Cooling**
- **Storage**
- **Networking**

- **I/O Modules**

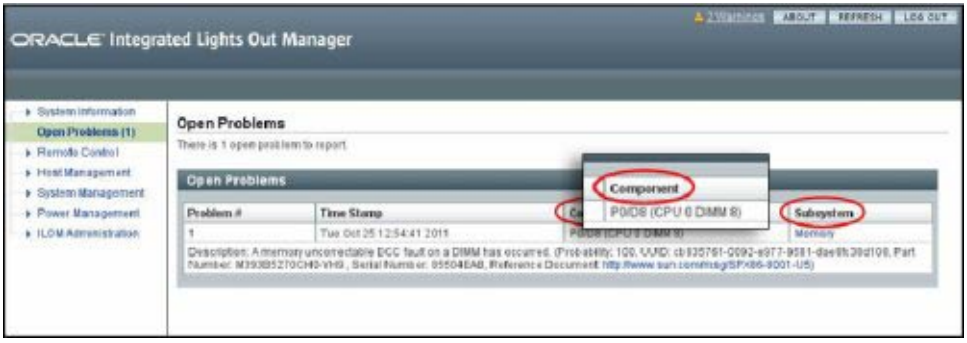
In the following example, the server module Status section shows that the Memory subsystem requires service:



8 Click the Open Problems link in the left navigation panel.

The Open Problems screen provides detailed information about the issue, such as the time the event occurred, the component, the subsystem, and a description.

In the following example, the Open Problems screen indicates that DIMM 8 on CPU 0 has an uncorrectable ECC fault. In this example, the hardware fault with DIMM 8 of CPU 0 on blade 2 (BL2) requires local access to the server.



9 View the System Log.

The System Log provides additional detailed information about the error (event), including the severity, the component or subsystem, and the date and time the event occurred.

10 Replace the failed component.

a. To prepare the server for service, see "Preparing the Server Module for Component Replacement" on page 43.

b. To service components, see "Servicing Server Module Components " on page 63.

c. To return the server to service, see "Returning the Server Module to Operation " on page 127.

11 After servicing the component, you might need to clear the fault in Oracle ILOM.

Refer the component service procedure for more information. See "Servicing Server Module Components " on page 63.

See Also

- "Service Troubleshooting Task List" on page 30
- "Troubleshooting and Diagnostic Information" on page 37
- "Preparing the Server Module for Component Replacement" on page 43

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 Front and Rear Panels" on page 12
- `http://www.oracle.com/goto/ILOM/docs`
- `http://www.oracle.com/goto/x86AdminDiag/docs`
- "BIOS Power-On Self-Test (POST) Checkpoints " on page 135

Troubleshooting and Diagnostic Information

The following table lists diagnostic and troubleshooting-related procedures and references that can assist you with resolving server issues.

Information About:	Link
Dagnostic tools for the Sun Blade X4-2B server and other X-4 series servers, including procedures for performing runtime and firmware-based tests, using Oracle ILOM, and running U-Boot and Pc-Check to exercise the system and isolate intermittent hardware-related problems.	x86 Diagnostics Guide
■ Administration of Sun Blade X4-2B server modules and other X4 series servers. ■ How to use Oracle System Assistant. ■ How to use Oracle ILOM system event logs (SEL) to identify a problem's possible source.	`http://www.oracle.com/goto/x86AdminDiag/docs`
How to use the DIMM and processor test circuit.	"About the DIMM and Processor Test Circuit " on page 41
How to troubleshoot server module power issues.	"Troubleshoot Server Module Power Problems" on page 39
How to recover from corrupted service processor firmware.	"Recover the SP Firmware Using the Preboot Menu (Service Only)" on page 41
How to review the power-on self test (POST) checkpoint code sequence.	"BIOS Power-On Self-Test (POST) Checkpoints " on page 135

▼ 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.**

See Also
- "Service Troubleshooting Task List" on page 30
- "Troubleshooting and Diagnostic Information" on page 37

Locate the Server Module Serial Number

The server system serial number (SysSN) is a unique alpha-numeric label that identifies your server to Oracle systems, such as My Oracle Support (MOS). The SysSN is encoded in the server. You might need it when contacting Oracle. You can find the SysSN in the following locations:

- Oracle System Assistant System Information (Home) screen
- Oracle ILOM Summary screen
- Server module front panel as shown in the following figure:

Related Information:

- "About Front and Rear Panels" on page 12
- "Powering Down the Server Module" on page 47
- `http://www.oracle.com/goto/x86AdminDiag/docs`
- `http://www.oracle.com/goto/ILOM/docs`

▼ Troubleshoot Server Module Power Problems

If the server module does not power on to either a full power or standby power state, the issue might be related to Sun Blade 6000 Chassis power limitations. Power limitations are managed by the CMM Oracle Integrated Lights Out Management (ILOM). Every time a server module attempts to power on, it queries the CMM Oracle ILOM to ensure that sufficient power is available from the chassis power supply units (PSUs). If the PSUs cannot supply enough power, the CMM Oracle ILOM prevents the server module from receiving power (standby and full), and the server module front panel OK/Power indicator blinks and does not display solid.

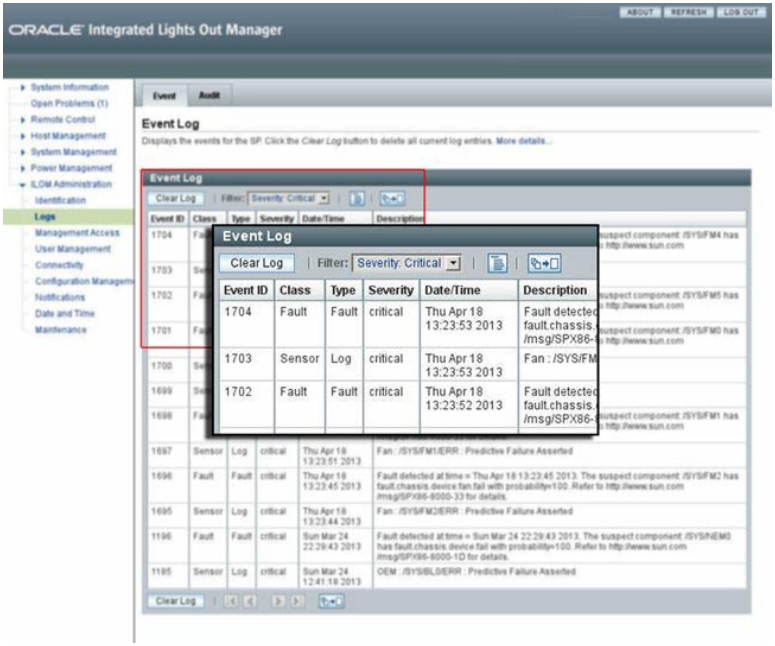
The chassis power supplies can only supply enough power for certain configurations of server modules and storage modules. Review the power supply and the slot configurations (the

number of server modules and storage modules) of your chassis, and refer to the *Sun Blade X4-2B Product Notes* document for the server module and the Sun Blade 6000 Chassis for configuration information.

Use this procedure to troubleshoot server module power on issues If the server module fails to power on to a standby or full power state:

1. **Log in to the CMM ILOM.**

2. **Review the system event log (SEL) messages.**



3. **Confirm that the server has permission to power on.**

   If the chassis cannot supply adequate power to the server module, A message is generated in the SEL.

   For more information about SEL messages and power management, refer to the `http://www.oracle.com/goto/x86AdminDiag/docs`.

4. **Ensure that the system chassis has the proper number of power supplies to support powering on all the chassis components currently installed.**

   For more information about the Oracle ILOM system event log or monitoring power consumption, refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (`http://www.oracle.com/pls/topic/lookup?ctx=ilom31`).

5 **Verify that the Oracle ILOM CMM power management settings for PSUs is configured to default settings, to avoid power loss.**

See Also
- "Service Troubleshooting Task List" on page 30
- "Troubleshooting and Diagnostic Information" on page 37

About the DIMM and Processor Test Circuit

You can identify failed DIMM and processor components by removing the server module from the chassis and pressing the internal Fault Remind test circuit button. The Fault Remind test circuit lights the failed component's Fault LED indicator.

Use the test circuit wthin 30–60 minutes. After you remove the server from the chassis (and its power source) and press the internal Fault Remind test circuit button, you have 30–60 minutes before the charge dissipates completely and disables the test circuit.

To determine if the circuit is usable, press the Fault Remind button and verify that the green Charge Status indicator is lit.

- If the Charge Status indicator lights, the circuit is usable and you can look for an amber Fault indicator to identify the failed component.
- If the Charge Status indicator does not light, the circuit has no charge; the error information is lost, and you need to install the server module into the chassis and power on to recharge the circuit and allow the error to occur again.

For more information about how to use the DIMM and processor test circuit to identify faulty DIMMs or processors, see:

- "Identify Faulty DIMMs" on page 77
- "Identify a Faulty Processor" on page 100

▼ Recover the SP Firmware Using the Preboot Menu (Service Only)

Note – This procedure must be performed by an Oracle Service representative.

The preboot menu allows you to recover the Oracle ILOM firmware image by updating (flashing) the SP firmware.

Before You Begin
- Set up to view server boot messages.
- Obtain the `.flash` firmware image for the server.

- Refer to the `http://www.oracle.com/goto/x86AdminDiag/docs` for detailed preboot menu and Oracle ILOM information.

1. **Make the `.flash` firmware image file for the server available on a TFTP server.**

   This `.flash` file is available on the Oracle My Oracle Support (MOS) download site.

Note – Recovering the SP firmware using the preboot menu requires a `.flash` file instead of the `.pkg` file that is used to update the SP from Oracle ILOM.

---

2. **Restart the SP.**

3. **Interrupt the SP boot process to access the preboot utility menu.**

   Choose one of the following methods:

   - Press the Locate button during the SP boot process. For more information, see "Turn the Locate Indicator On and Off Locally" on page 61.
   - Wait for a pause in the bootstrap process.

   The preboot prompt appears.

   ```
   Preboot>
   ```

4. **At the preboot prompt, type:**

   `net flash` *IPaddress path/name*`.flash`

   where *IPaddress* is the IP address of a TFTP server,

   path is the path to the file relative to `/tftpboot`, and

   name is the first part of the `.flash` file name.

   For example:

   ```
   Preboot>
   net flash 10.8.173.25 images/system-rom.flash
   ```

   After a series of messages, the flash process finishes, and the preboot prompt appears.

   ```
   Preboot>
   ```

5. **To restart the SP, type:**

   ```
   Preboot> reset
   ```

   The preboot menu exits and Oracle ILOM boots.

See Also

- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (`http://www.oracle.com/pls/topic/lookup?ctx=ilom31`)

Preparing for Service

These sections describe how to safely prepare the Sun Blade X4-2B for service and component removal and replacement:

Description	Link
Before working with components within the server, power down the server module and prepare for servicing.	"Preparing the Server Module for Component Replacement" on page 43
Understand options for powering off and resetting the server.	"Powering Down the Server Module" on page 47
Guard against electrostatic discharge (ESD).	"Performing ESD and Anti-static Prevention Measures" on page 53
Remove the server module from the chassis.	"Remove the Server Module from the Sun Blade Chassis" on page 55
Note server module filler panels.	"Install Server Module Filler Panels" on page 57
Remove the server cover to access internal components and test circuitry.	"Remove the Server Module Top Cover" on page 58
Understand the FRU top-level indicator auto-update feature.	"FRU TLI Auto-Update" on page 61
Assemble the required tools.	"Required Tools" on page 61

▼ Preparing the Server Module for Component Replacement

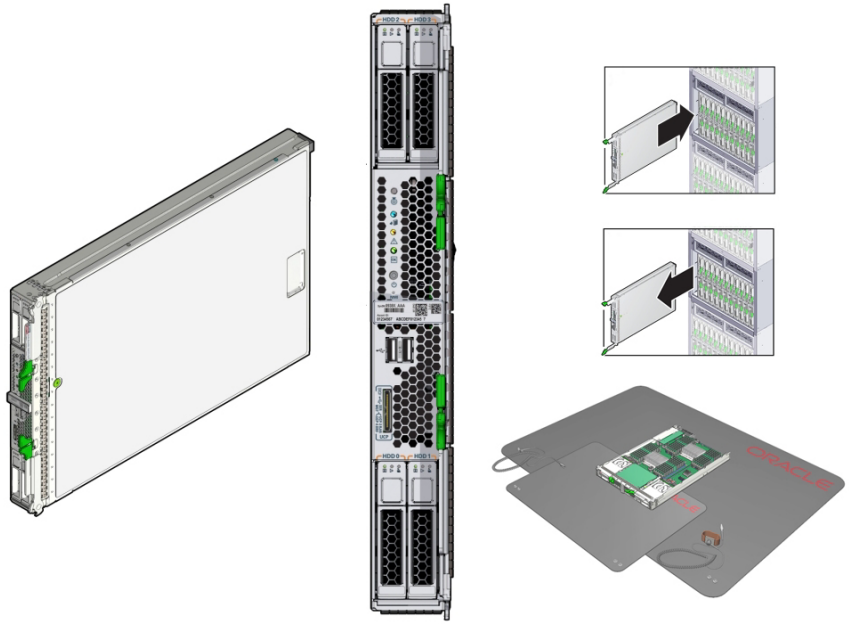
This procedure describes how to prepare the server module for service, so you can:

- Remove or replace the server module
- Remove or install server module internal components
- Add new server module components
- Use the motherboard DIMM and processor Fault Remind circuitry

Before You Begin

- **Important**: Before performing removal and installation procedures, review the *Sun Blade X4-2B Product Notes*.
- If necessary, back up BIOS and SP/ILOM configurations. For configuration back up options, refer to `http://www.oracle.com/goto/x86AdminDiag/docs`
- For troubleshooting information, see "Troubleshooting the Server Module" on page 29.
- You need a server module filler panel or a replacement server module or storage module. For more information, see "Install Server Module Filler Panels" on page 57.

Note – This procedure shows both Oracle ILOM web and CLI interface methods. The procedure can be performed using only Oracle ILOM CLI interface. For more information about Oracle ILOM, refer to the Oracle ILOM documentation at `http://www.oracle.com/goto/ILOM/docs`.



To prepare the server for service:

1. **Power down the server module to standby power.**

   See "Powering Down the Server Module" on page 47 for detailed instructions.

   a. **Access Oracle ILOM web interface.**

      Type the IP address into a web browser and log in as a user with root or administrator privileges. For CLI log-in instructions, see Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (`http://www.oracle.com/pls/topic/lookup?ctx=ilom31`).

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

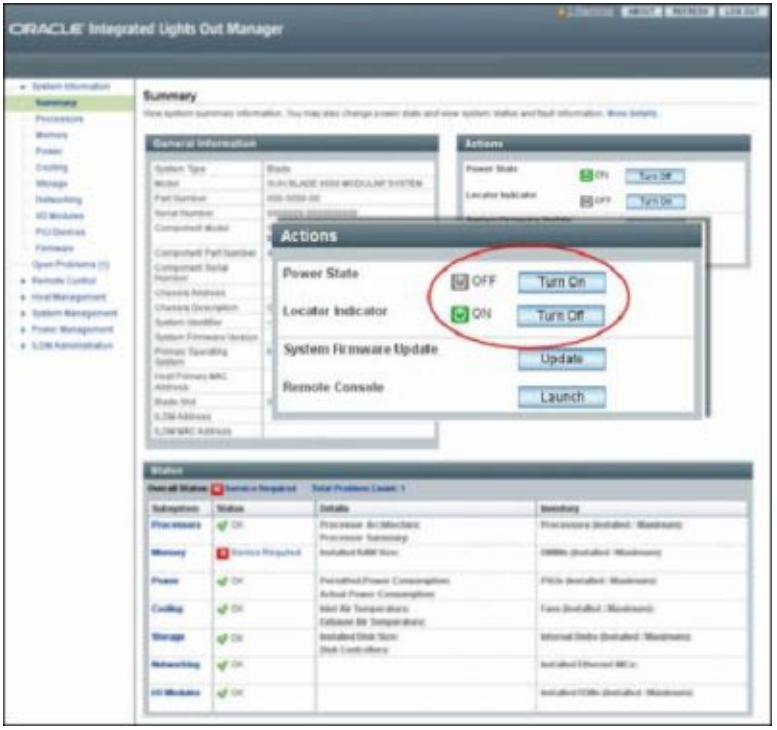
      This action powers off the server to standby power mode.

2. **(Optional) In the Actions section of the Summary screen, click the Locate Indicator Turn On button**

   This action activates the Locate indicator on the server front panel.

   See "Turning the Locate Indicator On and Off" on page 59.

   The following sample screen shows the Actions section of the Summary screen with the server power off and the Locate indicator turned on.



3 Take the server module offline.

Note – Taking the server module offline prevents any low level tasks (such as an SP update) from being initiated on the server module while it is waiting to be accessed and serviced. An interruption of such a task could render the server unusable.

---

a. Access the server module SP Oracle ILOM CLI prompt.

Open a terminal window.

Type: **ssh root@***ipaddress*

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

Type the password.

b. Remove the server from operation by typing the following command:

```
-> set /System/ action=prepare_to_remove
```

This command takes the server offline and activates the blue Ready to Remove indicator on the server module front panel.

c. Verify the state of the server by typing the following command:

```
-> show /System/ health
```

In the command output, view the health property. The value should appear as Offline. For example:

```
/System

Properties:

health = Offline

->
```

The server module can be accessed locally and removed from the chassis.

4 Set up an ESD-safe service location.

Before removing the server module from the chassis, prepare the service location. See "Set Up for ESD Prevention" on page 54.

5 Remove the server module from the chassis.

See "Remove the Server Module from the Sun Blade Chassis" on page 55.

6 Insert a server module filler panel into the the vacant server module slot immediately.

See "Install Server Module Filler Panels" on page 57.

7 **Remove the server module cover.**

See "Remove the Server Module Top Cover" on page 58.

Next Steps

- "Servicing Server Module Components " on page 63
- "Returning the Server Module to Operation " on page 127

Powering Down the Server Module

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 Off, Graceful (Power Button)" on page 50 ■ "Power Off, Remote (Oracle ILOM CLI)" on page 51 ■ "Power Off, Remote (Oracle ILOM Web Interface)" on page 5
If the server is not responding, or you must shut down the server quickly, perform an immediate shutdown.	■ "Power Off, Immediate (Power Button)" on page 50 ■ "Remove Power Completely" on page 52

See Also:

- "About Server Power States and Resets" on page 47
- "Powering On the Server Module" on page 131

About Server Power States and Resets

This section contains information about power modes, server shutdown and reset options, and power off and reset procedures.

Note – Powering off the server module involves shutting down the server from full power mode to standby power. Powering the server module from full power mode to standby power does *not* completely remove power from the server. If you need to completely remove power from the server module, you must disengage it from the power connections on the chassis mid plane by partially removing it.

Determine how you will shut down power from the following methods:

Tip – Whenever possible, shut down the server gracefully using the server OS shutdown procedure.

You can power off the server module *locally* or *remotely*.

- To power off locally, use the front panel power button.
- To power off remotely, use the server OS shutdown procedure or Oracle ILOM.

You can perform either a *graceful* or an *immediate* shutdown of the server.

- If possible, shut down the server gracefully using the server OS shutdown procedure or Oracle ILOM.
- An immediate shutdown should be used in emergency situations or when you know that the loss of data is nonexistent or minimal.

Power descriptions follow.

Full Power

Full power is the normal operational state for the server. When the server enters full power, power is supplied to all the server components, the server boots, and the operating system (OS) functions. You achieve full power by pressing the Power button on the server front panel when the server is in standby power. You can also achieve full power by powering on the server from Oracle ILOM. Once the server is operating in full power, the Power OK indicator is on continuously (does not blink).

Standby Power

Standby power is a non-operating state (OS does not boot), in which low-level power is supplied only to the components that are required to run the service processor (SP) and Oracle ILOM. To enter standby power, install the server into a fully-powered chassis, but do *not* press the front panel Power button. You can also enter standby power by powering off the server (from full power) using one of the power-off methods described in, "Powering Down the Server Module" on page 47. When entering standby power mode, the server front panel Power indicator blinks quickly while the SP is booting. When the SP has booted, the indicator blinks slowly to show that the server is in standby power mode.

Graceful Shutdown

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

Immediate Shutdown

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

Complete Power Removal

Shutting down the server from full power mode to standby power mode does *not* completely remove power from the server. When it is in standby power mode, the server is in a low-power state. This low-power state is enough to maintain the service processor (SP), which runs Oracle ILOM. To completely remove power from the server module, you must disengage its internal connector from the chassis mid-plane by performing a full or partial removal. To perform a cold reset (see following section) of the server, completely remove power, wait 30-60 seconds, and install the server back into the chassis.

Warm Reset or Reboot

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

Cold Reset

A cold reset of the server is a restart of the server from a completely powered-off state. A cold reset might be required to resolve a system issue. To perform a cold reset, place the server module in standby power mode, disconnect the server from its power source by performing a complete power removal (see above), wait 30-60 seconds, and then connect the server to its power source.

See Also:

- "Power Off, Graceful (Power Button)" on page 50
- "Power Off, Immediate (Power Button)" on page 50
- "Power Off, Remote (Oracle ILOM CLI)" on page 51
- "Power Off, Remote (Oracle ILOM Web Interface)" on page 52
- "Remove Power Completely" on page 52
- "Powering Down the Server Module" on page 47
- "Powering On the Server Module" on page 131

▼ Power Off, Graceful (Power Button)

Note – This procedure is performed locally requiring access to the server module front panel.

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

1 **To power off the server gracefully, use a stylus to gently press and *immediately* release the front panel Power button when it *clicks*.**

Caution – Potential for loss of data. Do *not* press in and hold the power button for longer than five seconds. Doing so causes an immediate server shutdown.

2 **Verify that the full power is off.**

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

Next Steps

- "About Server Power States and Resets" on page 47
- "Remove the Server Module from the Sun Blade Chassis" on page 55

▼ Power Off, Immediate (Power Button)

Note – This procedure is performed locally requiring access to the server module front panel.

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

Caution – Data loss. All applications and files close abruptly without saving. Before powering off, warn users and close all applications.

Before You Begin

- Physical access to the server front panel is required.
- "Front Panel Indicators and Buttons" on page 13

Use this procedure to immediately power off the server.

1. **Use a stylus to press and hold the Power button for at least five seconds until the full power is off and the server module enters standby power mode.**
2. **Verify that the full power is off, and that the OK indicator on the front panel blinks, indicating that the server module is in standby power mode.**

Next Steps

- "About Server Power States and Resets" on page 47
- "Remove the Server Module from the Sun Blade Chassis" on page 55

▼ Power Off, Remote (Oracle ILOM CLI)

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

1. **Open an SSH session.**
2. **At the command line, log in to Oracle ILOM on the server module SP.**

   Log in as a user with root or administrator privileges.

   For example:

   `ssh root@`*`ipadress`*

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

   For more information, see `http://www.oracle.com/goto/x86AdminDiag/docs`.

   The Oracle ILOM CLI prompt appears:

   ```
   ->
   ```

3. **At the prompt, type one of the following commands:**

   - For *graceful* power off:

     `stop /System`

   - For *immediate* power off:

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

     `stop -force /System`

Next Steps

- "About Server Power States and Resets" on page 47
- "Turn On the Locate Indicator Remotely (Oracle ILOM Web Interface)" on page 60
- "Turn On the Locate Indicator Remotely (Oracle ILOM CLI)" on page 59

- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

▼ Power Off, Remote (Oracle ILOM Web Interface)

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

   To log in, open a web browser and direct it using the IP address of the server module SP. Log in as root or a user with administrator privileges. For more information, refer to the server Administration Guide: www.oracle.com/goto/x86AdminDiag/docs .

   The Summary screen appears.

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

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

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

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

4. **Click OK.**

Next Steps

- "About Server Power States and Resets" on page 47
- "Turn On the Locate Indicator Remotely (Oracle ILOM Web Interface)" on page 60
- "Turn On the Locate Indicator Remotely (Oracle ILOM CLI)" on page 59

▼ Remove Power Completely

Note – For the server module *removal* procedure, see "Remove the Server Module from the Sun Blade Chassis" on page 55.

Powering the server module from full power mode to standby power mode does *not* completely remove power from the server. If you need to completely remove power from the server module to perform a cold reset or to place it in an non-powered state, disengage the server module from the power connections on the chassis mid-plane by partially removing it.

Before You Begin

- This procedure is performed locally requiring physical access to the server.

1. **Place the server module in standby power mode.**
   See "Powering Down the Server Module" on page 47.

2. **To unlock the server module ejector arms, squeeze together the green tabs on the ends of ejector arms.**

3. **To disengage the server module from the chassis internal connector, rotate both ejector arms away from the server module at the same time until they are fully extended.**
   This action disengages the server module, places it in a no-power state, and leaves it protruding from the front of the chassis approximately three inches.

4. **If you are performing a cold reset wait at least 60 seconds before reengaging the server module and chassis backplane connectors.**

See Also
- "About Server Power States and Resets" on page 47
- "Remove the Server Module from the Sun Blade Chassis" on page 55

Performing ESD and Anti-static Prevention Measures

Server components, such as processors, circuit boards, drives, and DIMMs, are extremely sensitive to electrostatic discharge (ESD). Ordinary amounts of ESD transferred from your clothing or your work environment to components while servicing can destroy them and possibly render the server inoperable. To reduce ESD, perform the prevention measures described in this section *before* you service the server.

Use an Anti-static Wrist Strap and an Anti-static Mat

Always wear an anti-static wrist strap and use an anti-static mat when servicing or handling ESD-sensitive server components, such as storage drive assemblies, circuit boards (including DIMMs), and PCIe cards.

Note – Anti-static wrist straps are included with optional components.

To use the wrist strap, place the anti-static strap on your wrist and attach the clip end to a bare metal area on the chassis, server module, or blade. When properly worn, the anti-static strap equalizes the electrical potentials between you and the server.

Anti-static mats provide an ESD-free surface in which to work and set components. Some mats are grounded in the same manner as a wrist strap; that is, you attach one end of the grounding strap to the connector on the mat and attach the clip end of the strap to bare metal. If a grounding mat is not available, you can use the anti-static mylar bag in which the component was shipped.

Additionally, always handle components that have exposed connectors by the non-connector edges (do not touch the connectors) and set the components on an anti-static mat or anti-static packaging.

See Also:

- "Set Up for ESD Prevention" on page 54

▼ Set Up for ESD Prevention

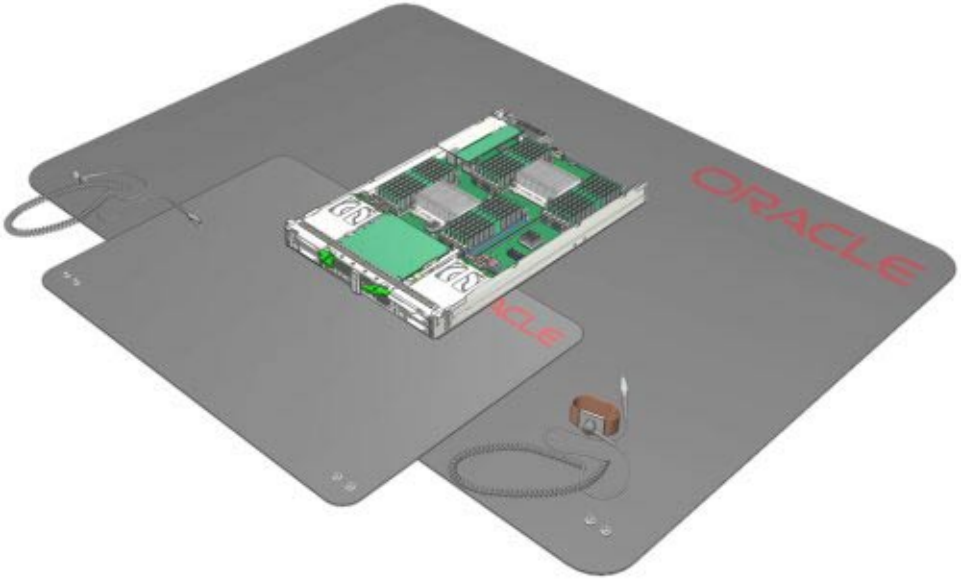
Before You Begin

- See "Performing ESD and Anti-static Prevention Measures" on page 53

1 Prepare an anti-static surface to set parts on during the removal, installation, or replacement process.

Place ESD-sensitive components such as the printed circuit boards on an anti-static mat. The following items can be used as an anti-static mat:

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



2 **Attach an anti-static wrist strap.**

When servicing or removing server module components, attach an anti-static strap to your wrist and then to a bare metal area on the chassis, server module, or blade.

Next Steps

- "Remove the Server Module from the Sun Blade Chassis" on page 55.

▼ Remove the Server Module from the Sun Blade Chassis

To service *internal* server components and to troubleshoot processors and DIMMs using the motherboard Fault Remind circuitry, you need to remove the server module from the chassis. Removing the server module leaves a vacant slot in the chassis, which disrupts the chassis cooling and airflow system. The system requires that every chassis slot contain a component, either a server module, a storage module, or a server module filler panel.

Before You Begin

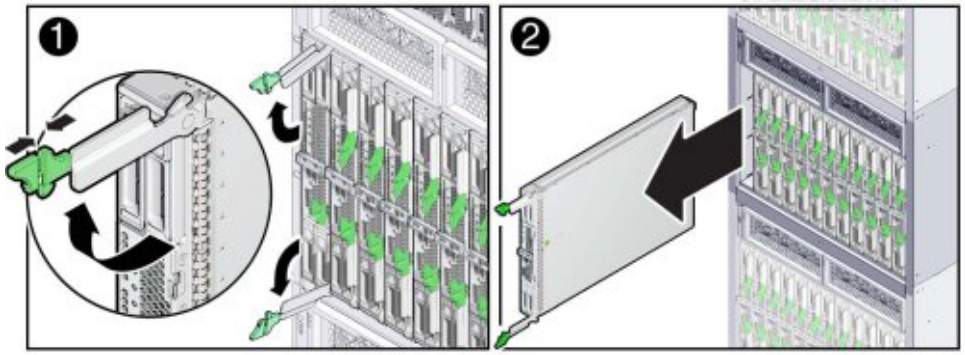
- See "Preparing for Service " on page 43.
- You need a replacement server module, a storage module, or a server module filler panel, to fill the vacant slot created when you remove the server module. For more information, see "Install Server Module Filler Panels" on page 57.

1 **To unlock the server module lever handles, squeeze the green tabs on the ends of handles.**

2 **To disengage the server module from the internal connector, simultaneously rotate both lever handles outward away from the server module until fully extended.**

The result of this action disengages the server module, places it in a no-power state, and leaves it protruding approximately three inches from the front of the chassis.

Caution – Component damage or personal injury. Blades can weigh up to 22 lbs (10kg). Use two hands to install or remove the blade from the chassis. Do *not* attempt to remove the server module from the chassis using the ejector levers.



3 **Pull the server module away from the Sun Blade chassis (approximately 5–6 inches) using the lever handles.**

4 **Close the lever handles.**

Rotate the handles inward toward the server module front panel until they lock (click) into place.

5 **To remove the server module, use both hands to pull the server module out of the chassis.**

6 **Set the server module on prepared work space.**

See "Set Up for ESD Prevention" on page 54.

7 **To insert a server module filler panel or replacement server module in the vacant slot, do one of the following:**

- **If replacing the server module with a filler panel, see "Install Server Module Filler Panels" on page 57.**
- **If replacing the server module with a replacement server module or a storage module, see "Install the Server Module in the Chassis" on page 130.**

Next Steps "Remove the Server Module Top Cover" on page 58

Server Module and Component Filler Panels

Filler panels are required for server module and storage drive vacant slots. A filler panel occupies a vacant slot to maintain proper cooling and air flow throughout the system. A filler panel is a metal or plastic enclosure that does not contain any functioning system hardware or cables.

Do *not* operate your system with empty slots for more than 60 seconds. Improper cooling and airflow can compromise the operating performance of your system and quickly damage components.

For server module and storage drive filler panel installing and removing tasks, see:

- "Install Server Module Filler Panels" on page 57
- "Remove Storage Drive Filler Panels" on page 73
- "Insert Storage Drive Filler Panels" on page 73

Note – For instructions for adding or replacing *chassis* component filler panels (for example, network modules or PCI Express modules), refer to the documentation supplied with your chassis.

▼ Install Server Module Filler Panels

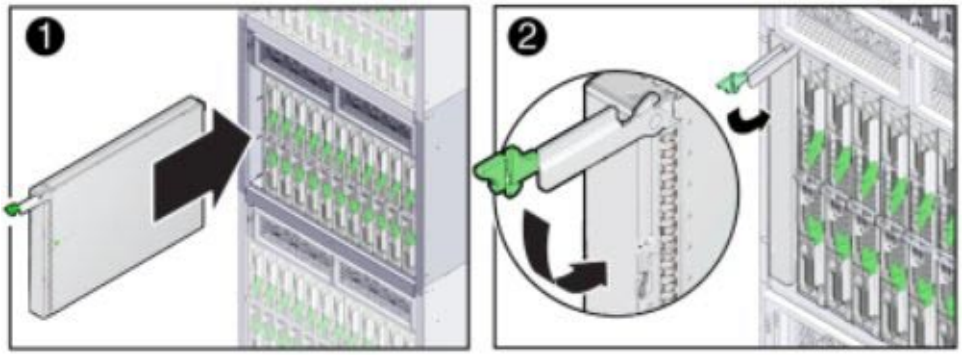
Install a server module filler panel after removing a server module from the chassis. The filler panel maintains cooling and prevents chassis shutdown. For more information about filler panels, see "Server Module and Component Filler Panels" on page 56.

Caution – Chassis shutdown due to over-temperature. Vacant slots disrupt the chassis cooling. Fill vacant slots within 60 seconds of removing a server module, storage module, of filler panel.

---

1. **Locate the vacant server module slot in the chassis.**
2. **Ensure that the filler panel release lever is in the fully open position.**
3. **Align the filler panel with the vacant slot in the chassis, ensuring that the release lever is on the right.**

4 **Slide the filler panel into the vacant slot until it stops.**



5 **Close the release lever until it locks (clicks) the filler panel in place.**

Next Steps

- "Remove the Server Module Top Cover" on page 58

▼ Remove the Server Module Top Cover

You need to remove the server module cover to access the mother board Fault Remind circuitry and service components inside the server.

1 **Power off the server module.**

See "Powering Down the Server Module" on page 47.

2 **Remove the server module from the chassis.**

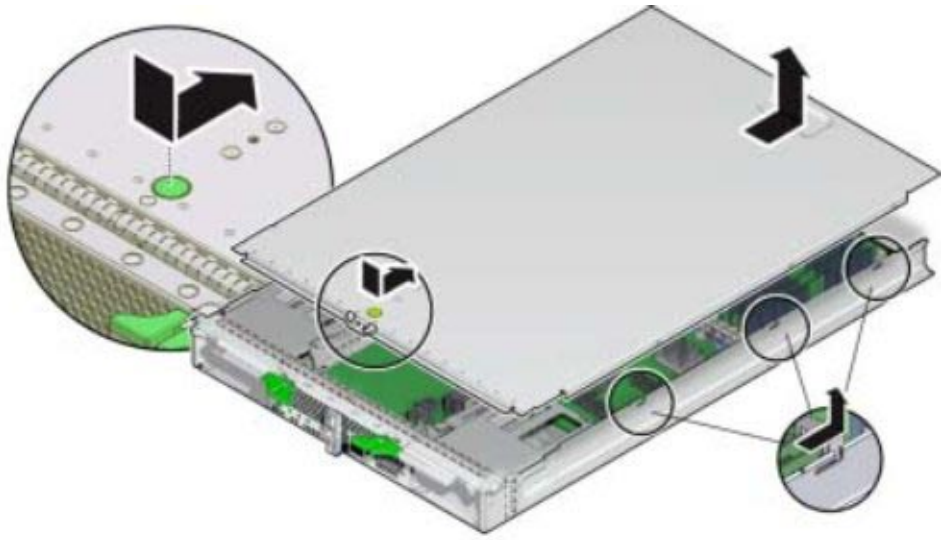
See "Remove the Server Module from the Sun Blade Chassis" on page 55.

3 **Attach an anti-static wrist strap.**

See "Set Up for ESD Prevention" on page 54.

4 **Press down on the server module cover release button and, using the indent for leverage, slide the top cover toward the rear of the server module chassis approximately 0.5 inch (12 mm).**

5 **Lift the cover straight up from the server module.**



Next Steps

- "Servicing Server Module Components " on page 63

Turning the Locate Indicator On and Off

This section provides procedures for turning the Locate indicator on and off remotely (using Oracle ILOM) and locally (using the front panel Locate button), so you can identify the server module within the chassis.

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

Before going to the server, activate the server's Locate indicator. This allows you to identify the correct server module within the chassis.

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

See "Access Oracle ILOM Using CLI" in X4 Series Administration Guide.

The CLI prompt appears:

–>

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

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

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

3. **To verify the status of the Locate indicator, type:**

   ```
   –> show /System/ locator_indicator
   ```

   The output of the command appears:

   ```
   /System

   Properties:

   locator_indicator = Off
   ```

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

Next Steps

- "Set Up for ESD Prevention" on page 54
- "Remove the Server Module from the Sun Blade Chassis" on page 55

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

Before going to the server, activate the server's Locate indicator. This allows you to identify the correct server module within the chassis.

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

   See "Access Oracle ILOM Using a Web Browser" in X4 Series Administration Guide.

   The Oracle ILOM screen appears.

2. **Select the server module.**

   The Oracle ILOM Summary screen appears.

3. **In the Actions section, verify that the Locate indicator is off, and then click the Turn On button.**

4. **Click OK.**

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

Next Steps

- "Set Up for ESD Prevention" on page 54
- "Remove the Server Module from the Sun Blade Chassis" on page 55

▼ Turn the Locate Indicator On and Off Locally

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

Before You Begin

- You must be physically present at the server.
- For button and indicator location information, see "Front Panel Indicators and Buttons" on page 13.

- **To turn the Locate indicator on or off locally, do one of the following:**
  - **To turn off the blinking indicator, press the Locate indicator button.**
  - **To turn on the Locate indicator, press the Locate indicator button.**

    Note – Some procedures might require that you turn on the Locate indicator locally, as part of a verification step.
  - **To perform an lamp test of all front panel indicators, press and hold the Locate indicator until all the front panel indicators light up.**

    The indicators remain lit for 15-20 seconds.

Next Steps

- "Set Up for ESD Prevention" on page 54
- "Remove the Server Module from the Sun Blade Chassis" on page 55

Required Tools

The server can be serviced with the following tools:

- Anti-static wrist strap
- Anti-static mat
- No. 2 Phillips screwdriver

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: motherboard (MB).

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 is installed, the TLI of the replacement module is programmed by Oracle ILOM to contain the same TLI as the other module.

Servicing Server Module Components

This section contains procedures and information about how to remove and install Sun Blade X4-2B components.

Description	Link
Review replaceable components and component serviceability.	"About the Chassis" on page 21
Remove and install a storage drive.	"Servicing a Storage Drive (CRU)" on page 63
Remove and install DIMMs.	"Servicing DIMMs (CRU)" on page 74
Remove and install USB sticks.	"Servicing USB Flash Sticks (CRU)" on page 84
Remove and install a FEM.	"Servicing a Fabric Expansion Module (CRU)" on page 87
Remove and install a REM.	"Servicing a RAID Expansion Module (CRU)" on page 89
Remove and install a processor and heat sink assembly.	"Servicing Processors (FRU)" on page 94
Replace the server motherboard.	"Servicing the Motherboard Assembly (FRU)" on page 117
Replace the server system battery.	"Servicing the System Battery (CRU)" on page 125

Servicing a Storage Drive (CRU)

The Sun Blade X4-2B server module can contain up to four storage drives, which are hot-swappable components. The storage drives are located on the front panel of the server module.

Note – A hot-swap component can be safely removed while the server module is running. However, before removing system drives, you might need to first prepare the server module operating system.

To remove and install a hard drive (HDD) or a solid state drive (SSD), use the following procedures:

- "Identifying Storage Drives" on page 64

Identifying Storage Drives

The system software designation for storage drive devices (hard disk drives [HDD] or solid state drives [SSD]) is shown in the following figure.

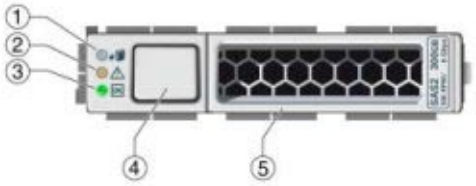
Figure Legend			
0	Hard disk drive (HDD 0)	2	Hard disk drive (HDD 2)
1	Hard disk drive (HDD 1)	3	Hard disk drive (HDD 3)

Related Information:

- "Identifying Storage Drive Indicators and Mechanical Components" on page 66

Identifying Storage Drive Indicators and Mechanical Components

The topics included in this section show the location of the storage drive indicators and mechanical components and describe their functions.



Legend	Name
1	Ready to Remove indicator
2	Service Action Required indicator
3	Power/OK indicator
4	Lever Release button
5	Lever

The following topics describe storage drive indicator and mechanical component functions.

Ready to Remove Indicator

This topic describes the Ready to Remove indicator.

Function:

- Blue LED with the following states:
  - On solid: The storage drive is in standby power state. The storage drive can be removed safely during a hot-plug operation. A lit Ready to Remove indicator indicates that service action is allowed on the storage drive.
  - Off: Normal operation. Do not remove the drive.

Service Action Required Indicator

This topic describes the Service Action Required indicator.

Function:

- An amber LED with the following states:
  - On solid: The system has detected a fault with the storage drive.
  - Off: Normal operation.

Power/OK Indicator

This topic describes the Power/OK indicator.

Function:

- Green LED that identifies the following power state of the storage drive:
  - Off: Power is off, idle (SATA only), or installed drive is not recognized by the system.

    SATA HDD (SSD) only: Green LED is *off* when the storage drive is idle.
  - Blink, variable: Drive activity.
  - On solid (does not blink): Drive is engaged and is receiving full power.

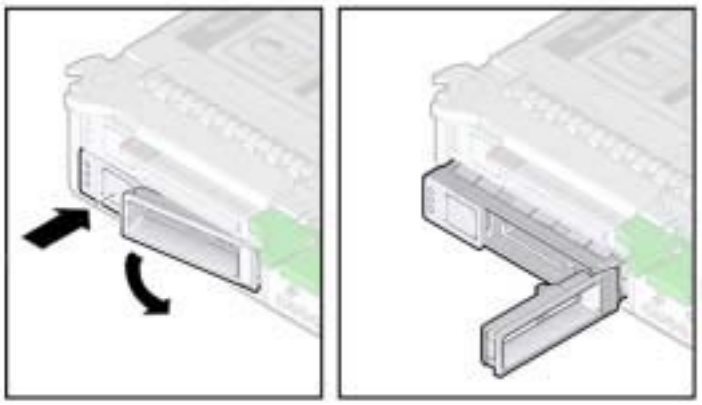
    SAS HDD only: Green LED is *on* when the storage drive is idle.

Note – LED activity changes for drive type:

- SAS HDD storage drive: Green LED is *on* when the storage drive is idle.
- SATA HDD (SSD) storage drive: Green LED is *off* when the storage drive is idle.

Lever and Lever Release Button

This topic describes the operation and purpose of the storage drive lever and the lever release button.



Function:

- Press the lever release button to unlock the lever.
- When the button is pressed, the spring-loaded lever unlocks and pops open.
- Lever functions:
  - Drive removal: Use the lever to pull the drive out of the server. For more information, see "Remove a Storage Drive" on page 70.
  - Drive installation: Use the lever to engage the drive with the internal connector. For more information, see "Install a New Storage Drive" on page 71.

Related Information:

- "Identifying Storage Drives" on page 64

Storage Drive Failure and RAID

A single storage device failure does not cause data loss if the storage devices are configured as a mirrored RAID volume. Failed storage devices, such as HDDs, can be removed, and when a new storage device 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.

Before you permanently remove a storage device from the server that is part of an active RAID volume, you should delete the active RAID volume from the storage device. For information about how to delete a RAID volume, use the appropriate RAID management utility for the RAID controller installed.

Caution – Data loss. If you insert a storage device that has been configured with a RAID volume into a server that did not previously have its storage devices configured with RAID volumes, the existing storage devices in the server will be converted to RAID volumes during automatic synchronization, and any existing data on the existing storage devices in the server is erased.

Related Information:

- "Configuring RAID" in the server Administration Guide `http://www.oracle.com/goto/x86AdminDiag/docs`

About Disk Backplane Cabling

The server has two internal disk backplanes, one on the right side and one on the left side. The right side backplane supports drives HDD 0 and HDD 1. The left side backplane supports drives HDD 2 and HDD 3. Each backplane has three connectors, one 10-pin power connector and two color-coded data connectors (one for each drive). Power and data cables connect the backplane to connectors on the motherboard. The connectors on the motherboard are labeled DBP Power (for power) and REM 0 - REM 3 (for data).

Cabling for the two disk backplanes:

- Disk backplane for HDD 0 and HDD 1:
  - Backplane power: the cable connects to the nearby DBP Power connector on the MB.
  - Blue connector on the backplane (HDD 0): cable connects to the REM 0 connector on the MB.

- Black connector on the backplane (HDD 1): cable connects to the REM 1 connector on the MB.

- Disk backplane for HDD 2 and HDD 3:
  - Backplane power: the cable connects to the nearby DBP Power connector on the MB.
  - Blue connector on the backplane (HDD 2): cable connects to the REM 2 connector on the MB.
  - Black connector on the backplane (HDD 3): cable connects to REM 3 on the MB.

▼ Remove a Storage Drive

1 **If necessary, prepare the server module operating system, before you remove drives.**

Refer to the OS documentation.

2 **Locate the storage drive in the server module bays.**

For drive locations on the server module, see "Identifying Storage Drives" on page 64.

3 **Identify the faulty drive.**

Faulty storage drives are identified by lit blue (Ready to Remove) and amber LED status indicators.

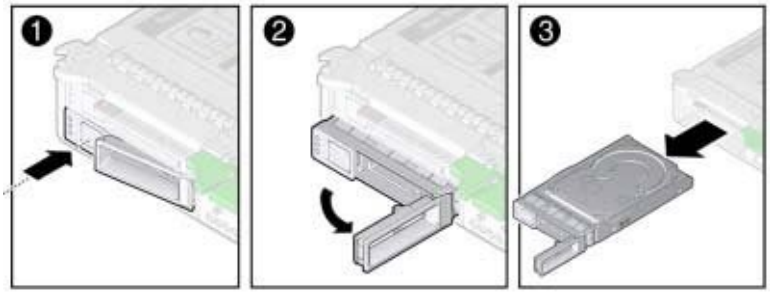
For more information, see "Identifying Storage Drive Indicators and Mechanical Components" on page 66.

4 **Press the release lever button on the drive front panel and rotate the lever into its fully opened position.**

5 **Hold the opened release lever and gently slide the drive toward you.**

6 **If you are not immediately replacing the drive, insert a filler panel into the empty drive slot on the server.**

Caution – Over-temperature condition. Do not operate the server with empty storage device slots. Always insert a filler panel into an empty storage device slot. See "Insert Storage Drive Filler Panels" on page 73.



Next Steps "Replace a Storage Drive" on page 72

▼ Install a New Storage Drive

1. **Locate the storage drive filler panel in the server module bays.**

   For drive locations on the server, see "Identifying Storage Drives" on page 64.

2. **Remove the storage drive filler panel from the server module bays.**

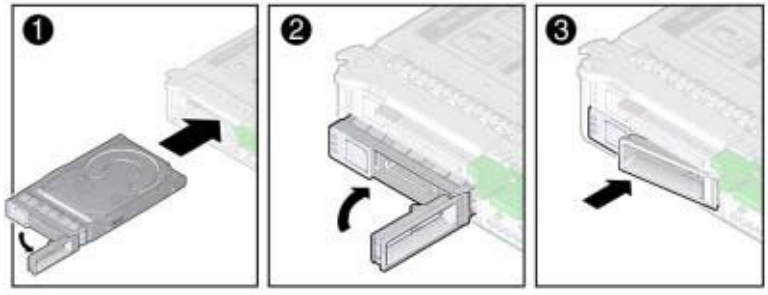
   For instructions to remove drive filler panels, see "Remove Storage Drive Filler Panels" on page 73.

3. **Ensure that the storage drive release lever on the drive is in a fully opened position.**

4. **Slide the storage drive into the vacant slot by pressing the middle of the storage drive faceplate with your thumb or finger until the release lever engages with the chassis.**

   The release lever starts to close as it makes contact with the chassis. Do not slide the storage drive in all the way. Leave the storage drive out approximately 0.25 to 0.50 inch (6 to 12 mm) from the opening.

5. **Close the release lever until the storage drive clicks into place and is flush with the front of the server.**



A pawl near the hinge on the lever engages the sidewall drawing the drive inward and seating the drive connector with the internal hard drive backplane connector.

▼ Replace a Storage Drive

1 **Remove the storage drive or filler panel from the server module.**

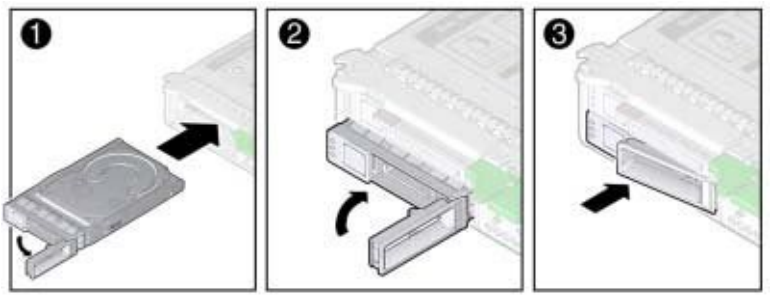
- **"Remove Storage Drive Filler Panels" on page 73**
- **"Remove a Storage Drive" on page 70**

2 **Ensure that the replacement storage drive release lever is in its fully opened position.**

3 **Slide the storage drive into the vacant slot by pressing the middle of the storage drive faceplate with your thumb or finger until the release lever engages with the chassis.**

The release lever will start to close as it makes contact with the chassis. Do not slide the storage drive in all the way. Leave the storage drive out approximately 0.25 to 0.50 inch (6 to 12 mm) from the opening.

4 **Close the release lever until the storage drive clicks into place and is flush with the front of the server.**



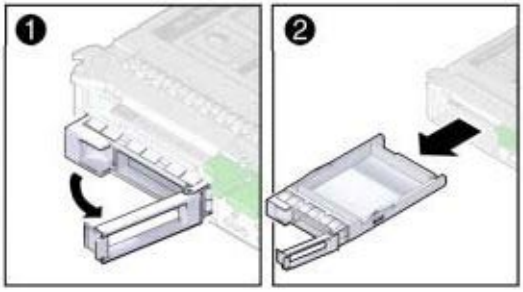
Note – If the storage devices were previously configured as a mirrored RAID array, an automatic synchronization is invoked and the contents are rebuilt from the rest of the array with no need to reconfigure the RAID parameters. If the replaced storage device was configured as a hot-spare, the new HDD is automatically configured as a new hot-spare.

▼ Remove Storage Drive Filler Panels

1 **Locate the storage drive filler panel to be removed from the server.**

2 **Unlatch the storage drive filler panel, and rotate the lever to its fully opened position [1].**

3 **Remove the filler panel from the slot by holding the opened release lever and gently sliding the filler panel toward you [2].**



▼ Insert Storage Drive Filler Panels

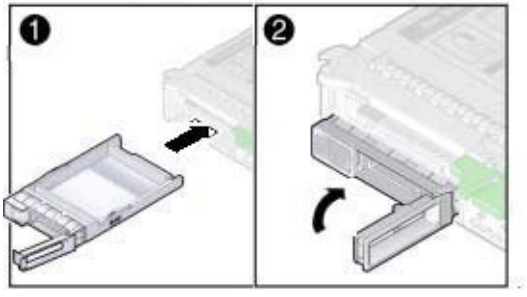
1 **Locate the vacant storage drive module slot in the server module.**

2 **Ensure that the release lever on the filler panel is fully opened.**

3 **Slide a standard storage drive filler panel into the vacant storage drive slot until the release lever engages with the chassis [1].**

The release lever starts to close 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.

4 **Close the release lever until it clicks into place and is flush with the front of the server [2].**



Servicing DIMMs (CRU)

Note – This component is a customer-replaceable unit (CRU).

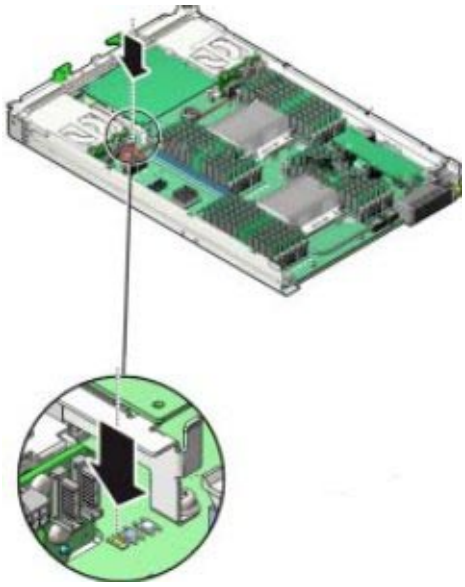
This section describes how to diagnose, remove, and replace DDR3 LV DIMM memory modules in the Sun Blade X4-2B.

Use these procedures to service DIMMs:

DIMM Fault Remind Circuit and ECC Errors

The following topics describe the components of the Fault Remind circuitry:

Fault Remind Button and Charge Status Indicator



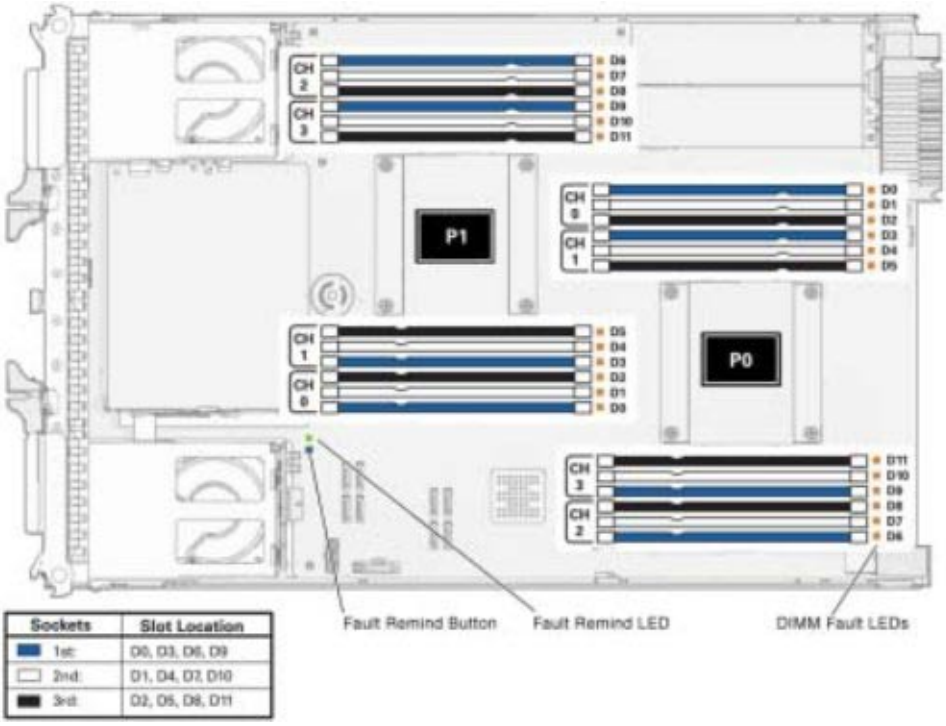
The blue Fault Remind button (SW3001) is located on the motherboard next to the Charge Status indicator (CR3002). The Charge Status indicator indicates the usability of the test circuit. When the Fault Remind button is pressed, the Charge Status indicator, lights green to indicate that there is sufficient voltage present in the Fault Remind circuit to activate the fault indicators. DIMM Fault indicators identify DIMMs in a fault state.

Note – Do not press the white Clear CMOS Button (SW1801).

Note – Press the blue Fault Remind button within 15 minutes of removing the server from the chassis. If the green Charge Status indicator fails to light when you press the Fault Remind button, it is likely that the Fault Remind circuit has lost its charge.

DIMM Fault Indicators

The DIMM Fault indicators are located on the motherboard next to each DIMM slot. The amber indicators light up when the Fault Remind button is pressed and a DIMM fault condition exists.



Related Information:

- "About the DIMM and Processor Test Circuit " on page 41
- "Identify Faulty DIMMs" on page 77

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 three 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`.

Error Correction and Parity

The server's processor provides data parity protection on its internal cache memories and error-correction code (ECC) protection. The system can detect the following types of errors: correctable and uncorrectable memory ECC errors and uncorrectable CPU internal errors. Errors are recorded in the Oracle ILOM system event log (SEL).

Advanced ECC corrects up to 4 bits in error on nibble boundaries, as long as they are all in the same DRAM. If a DRAM fails, the DDR3 DIMM continues to function. For instructions for clearing DDR3 DIMM faults, refer to `http://www.oracle.com/goto/x86AdminDiag/docs`.

▼ Identify Faulty DIMMs

Before You Begin

- For information about using the DIMM test circuit, see "About the DIMM and Processor Test Circuit " on page 41.

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

   See "Preparing for Service " on page 43.

Caution – Avoid component damage. Ensure that you follow electrostatic discharge safety measures and anti static practices. This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause components to fail. See "Performing ESD and Anti-static Prevention Measures" on page 53.

2. **Verify that the charge status indicator is lit green.**

   A lit green Charge Status indicator, located next to the Fault Remind button, indicates that the Fault Remind indicator circuit is working.

Note – The Charge Status indicator shows the test circuit power level. If the power in the circuit is depleted, the Charge Status and the Fault Remind indicators do not light. To recharge the circuit, insert the server module into a powered-on chassis.

3. **Press and hold the blue Fault Remind button on the motherboard (SW3001).**

4. **Note the location of the faulty DIMMs on the motherboard.**

   A lit amber indicator next to a DIMM slot indicates a faulty DIMM.

Indicator State	DIMM Status
Off	Operating properly.
On (amber)	Faulty.

5 **Ensure that all DIMMs are seated correctly in their connector slots.**

If re-seating the DIMM does not fix the problem, remove and replace the faulty DIMM.

Note – The DIMM Fault indicator remains on when the Fault Remind button is pressed after the DIMM is re-seated. The server module must be powered up again to verify if re-seating fixes the DIMM problem.

Next Steps "Remove DIMMs" on page 82

See Also
- "DIMM Population Rules and Guidelines" on page 78
- "About the DIMM and Processor Test Circuit " on page 41

DIMM Population Rules and Guidelines

Use these DIMM guidelines and illustrations to help you plan the memory configuration of the Sun Blade X4-2B.

Basic Memory Guidelines

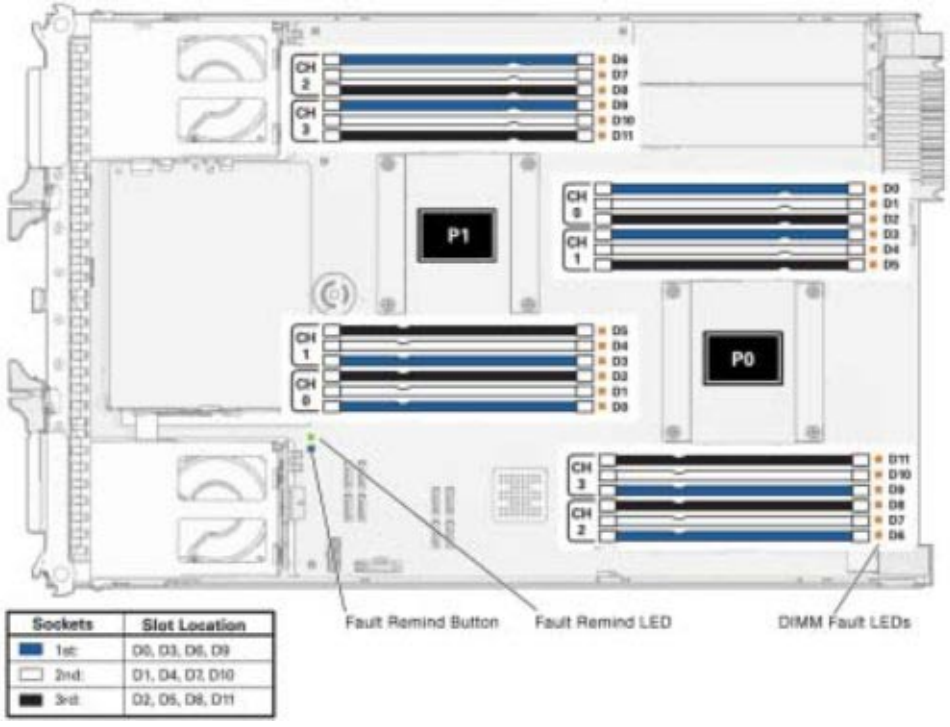
When populating DIMM slots, follow these population rules and guidelines.

- Each processor has four DDR3 memory channels (or buses).
- Each DDR3 memory channel supports up to three DIMMs for a total of 12 DIMMs per processor.
- The server module supports one DIMM per channel, two DIMMs per channel, and three DIMMs per channel across all sockets. Minimum per processor: 1, Maximum per processor: 12.
- The minimum supported memory configuration is one DIMM per processor D0.
- The maximum supported memory configuration is 768 GB.
- Use 8 GB DDR3–1600 LV DIMMs, 16 GB DDR3–1600 LV DIMMs only, and 32 GB DDR3-1600 LRDIMM:
  - Install up to four memory channels, with three DIMMs per channel.
  - Install up to 24 DIMMs per server module or up to 12 DIMMs per processor.
- For optimal performance, install DIMMs in groups of three sockets per channel.

- Always install DIMMs in ascending order, within a color or group following the “farthest from processor first” convention. See the following table:

DIMM Sockets	DIMM Slot Location	Socket Color
First	D0, D3, D6, D9	Blue
Second	D1, D4, D7, D10	White
Third	D2, D5, D8, D11	Black

- The following illustration shows the motherboard, DIMM slot numbering and DIMM slot locations within the Sun Blade X4-2B enclosure.



Detailed Memory Population Rules

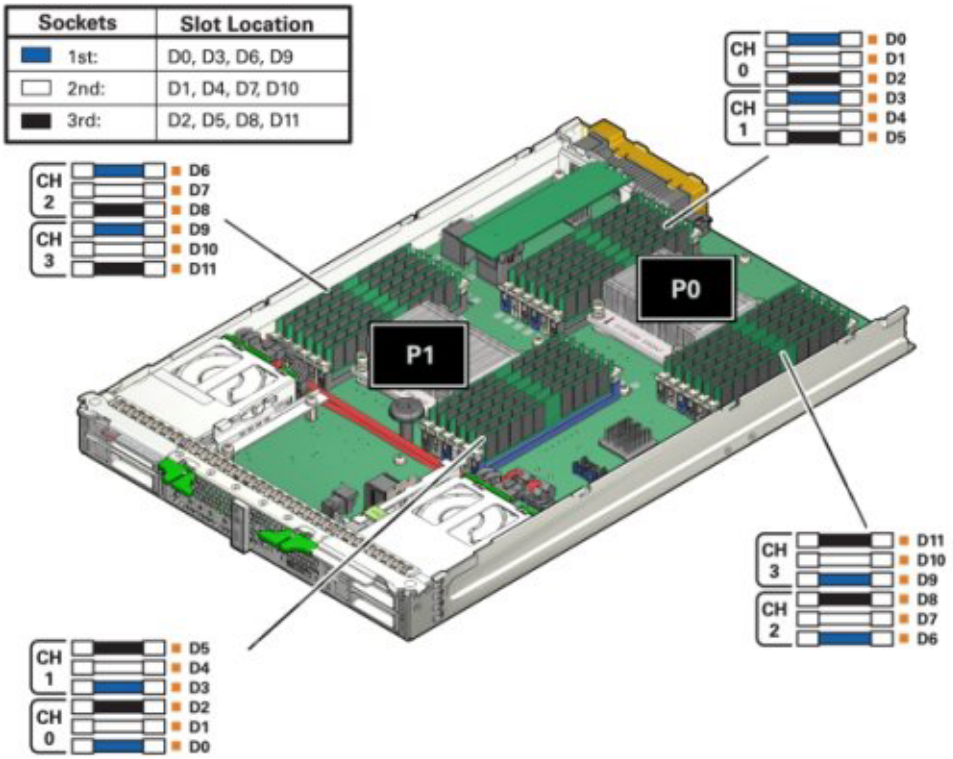
- **Rule 1**: Always populate the channels as follows. See the following figure.
  1. Fill up all the blue sockets.

     Always populate the DIMMs furthest from the processor (blue sockets) first.

2. Fill up all the white sockets.
3. Fill up the black sockets.

Example	Configuration
A processor with four DIMMs.	Install four DIMMs in blue sockets D0, D3, D6 and D9.
A processor with eight DIMMs.	Install four DIMMs in blue sockets D0, D3, D6 and D9, and four more DIMMs in the white sockets D1, D4, D7 and D10.
A processor with 12 DIMMs.	Install processors in all the sockets as shown in the following figure.

The following figure shows the DIMM slot designations and population order for the Sun Blade X4-2B.



Tip – This is known as the "fill farthest" approach to DIMM installation.

- **Rule 2**: Memory symmetry across processors is required.

  Processor 1 memory must match processor 0 memory, in placement, type, size, capacity, frequency and voltage.
- **Rule 3**: Each processor can support a single DIMM, two DIMMs, three DIMMs or four DIMMs per color socket set.
- **Rule 4**: Within every set of four DIMMs (for example: blue socket set, white socket set, black socket set), mixing/matching of different size, memory speed and voltage is *not* allowed.
  - Memories in D0, D3, D6 and D9 must be all the same.
  - Next, memories in D1, D4, D7 and D10 must be all the same, and so on. While doing this, Rule 2 must be maintained.
- **Rule 5**: Mixing and matching of different size, voltage and speed across different 4 DIMM sets is allowed. For example, memories in D0, D3, D6, D9 (blue sockets) must have the same size. But, they do not have to match memory size/voltage/speed in D1, D4, D7, D10 (white sockets).

Note – When mixing speed across different four DIMM sets, all memory is tuned to the slower speed.

Note – When mixing sizes across different 4 DIMM sets, populate the highest density (largest) DIMMs on the blue socket set, the next size in the white socket set and the smallest DIMMs in the black socket set.

- **Rule 6**: The blade must have all LVDIMMs installed. Mixing of different DIMM technology is not supported.
- **Rule 7**: Each processor can support a maximum of 12 dual-rank (DR) DIMMs.
- **Rule 8**: For maximum performance, apply the following rules:
  - DIMMs can run in one of the following three speeds: 1600 MHz, 1333 MHz, or 1067 MHz.
  - DIMM speed rules are: (SR = single rank; DR = dual rank; LR = load reduced)

Note – Quad rank (QR) not supported.

1. One DIMM per channel or 2 DIMMs per channel = 1600 (or 1333 MHz with E5-2609v2 CPU)
2. Three DIMMs per channel = 1067 MHz.

- **Rule 9**: The maximum DIMM speed is limited by the processor part number, with the DIMM population, whichever is lower. Currently, processor memory speed limitation is a function of core count:
  - 12-core processors from Intel Xeon processor E5-2600 V2 product family run at a maximum speed of 1600 MHz.
  - 10-core processors from Intel Xeon processor E5-2600 V2 product family run at a maximum speed of 1600 MHz
  - 8-core processors from Intel Xeon processor E5-2600 V2 product family run at a maximum speed of 1600 MHz.
  - 6-core processors from Intel Xeon processor E5-2600 V2 product family run at a maximum speed of 1600 MHz.
  - 4-core processors from Intel Xeon processor E5-2600 V2 product family run at a maximum speed of 1333 MHz.

▼ Remove DIMMs

1 Prepare the server module for service.

See "Preparing for Service " on page 43.

2 Identify faulty DIMMs.

See "Identify Faulty DIMMs" on page 77.

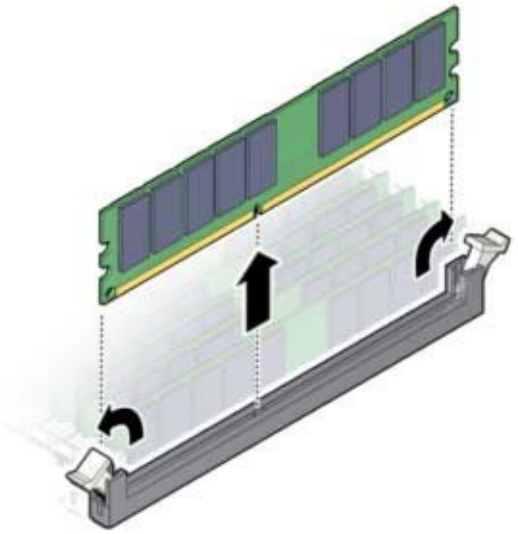
3 Rotate both DIMM slot ejector tabs outward to their fully open position.

This action ejects the DIMM from the slot.

Caution – Component damage. Exercise caution when removing DIMMs close to the drive enclosure and P1. Space near the DIMM slot ejector tabs is limited.

4 **Carefully lift the DIMM straight up to remove it from the slot.**

Place the DIMM on an anti static mat.



Next Steps

- "Install DIMMs" on page 83
- "Return the Server Module to Operation" on page 127.

▼ Install DIMMs

Before You Begin

- "DIMM Population Rules and Guidelines" on page 78
- "Remove DIMMs" on page 82.

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

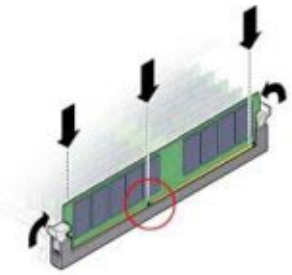
See "Preparing for Service " on page 43.

2 **Unpack the replacement DIMMs and place them on an anti static mat.**

3 **Ensure that the connector slot ejector tabs are in the open position.**

4 **Align the replacement DIMM with the connector.**

Align the DIMM notch with the key in the connector. This ensures that the DIMM is oriented correctly.



5 **Push the DIMM into the slot until the ejector tabs lift and lock the DIMM in place.**

Caution – Component damage. If the DIMM does not easily seat into the connector, verify correct orientation. If the orientation is reversed, damage to the DIMM or DIMM slot might occur.

6 **Clear any DIMM-related faults and verify DIMM component information.**

Use the Oracle ILOM web interface or CLI to view DIMM component information.

Refer to the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (`http://www.oracle.com/pls/topic/lookup?ctx=ilom31`)

Next Steps

- "Return the Server Module to Operation" on page 127.

Servicing USB Flash Sticks (CRU)

Note – The Oracle System Assistant USB drive *cannot* be used for OS install and boot. The drive is encoded and this function is not permitted by the system. Do *not* overwrite the Oracle System Assistant USB drive.

Two USB flash drive ports (P0 and P1) are located on the motherboard at the rear of the server module. The USB flash drive port 0, P0, might contain the factory-installed Oracle System Assistant USB flash drive. This drive contains server-specific data and provides important server functionality (for more information about Oracle System Assistant, see "Return the Server Module to Operation" on page 127).

Caution – Data and functionality loss. USB flash drive P0 (port 0) might contain the Oracle System Assistant USB flash drive. Do *not* misplace, damage, or overwrite this drive.

Use these procedures to remove and install USB flash sticks:

- "Remove USB Flash Sticks" on page 85
- "Install USB Flash Sticks" on page 86

▼ Remove USB Flash Sticks

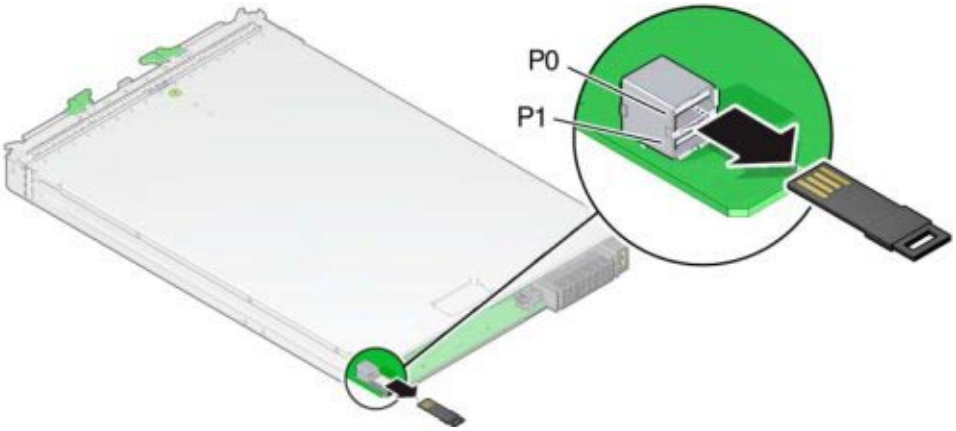
Caution – Data loss. Oracle System Assistant (OSA) software resides on a USB flash drive and comes preinstalled on X4-2B servers in USB slot P0. Do not remove the Oracle System Assistant USB drive. For information about Oracle System Assistant, see `http://www.oracle.com/goto/x86AdminDiag/docs`.

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

   See "Preparing for Service " on page 43.

   Note – You do not have to remove the server module top cover to access the rear USB ports.

2. **Locate the USB ports P0 (Oracle System Assistant) and P1 on the back of the motherboard.**



3. **Pull the USB flash stick out of the USB port.**

Next Steps

- "Return the Server Module to Operation" on page 127.
- "Install USB Flash Sticks" on page 86

▼ Install USB Flash Sticks

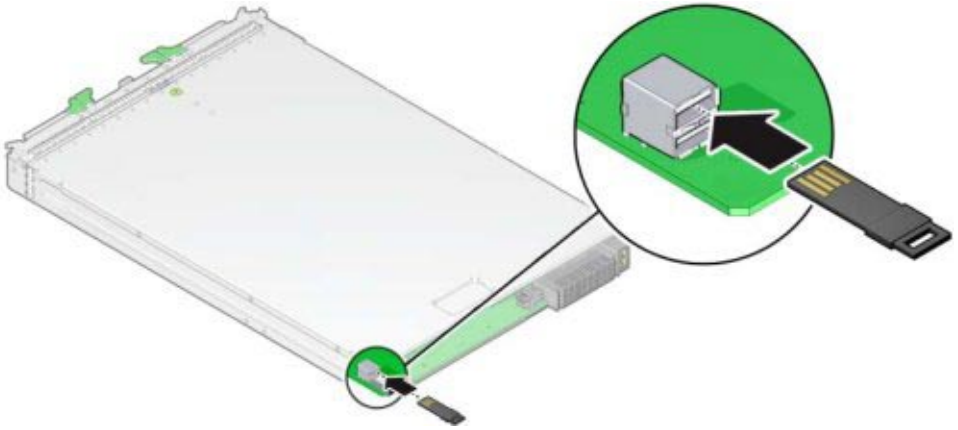
Caution – Data loss. Oracle System Assistant (OSA) software resides on a USB flash drive and comes preinstalled on X4-2B servers in USB slot P0. Do not remove the Oracle System Assistant USB drive. For information about Oracle System Assistant, see `http://www.oracle.com/goto/x86AdminDiag/docs`.

1. **Prepare the server module for service.**
   See "Preparing for Service " on page 43.

Note – You do not have to remove the server module top cover to access the rear USB ports.

2. **Locate the correct rear USB port P0 (Oracle System Assistant) or P1.**
3. **Push the USB flash drive into port 0 or 1.**

Caution – Component damage or data loss. USB flash sticks must fit inside the rear of the motherboard. Installing a longer USB drive on the rear port might damage the blade when inserted into the chassis. Drives can be no larger than 7.5 mm wide and 43 .0 mm deep.



Next Steps

- "Return the Server Module to Operation" on page 127.

Servicing a Fabric Expansion Module (CRU)

Note – This component is a customer-replaceable unit (CRU).

The fabric expansion module (FEM) is available in either single-width or double-width form factor.

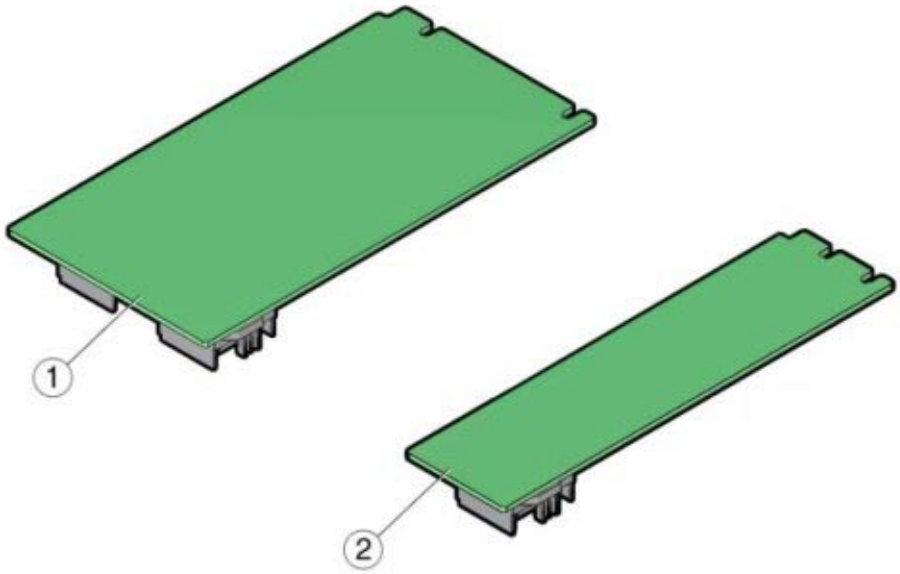


Figure Legend			
1	FEM double-width form factor.	2	FEM single-width form factor. Install in FEM 0.

Use these procedures to remove and install a fabric expansion module (FEM) card option:

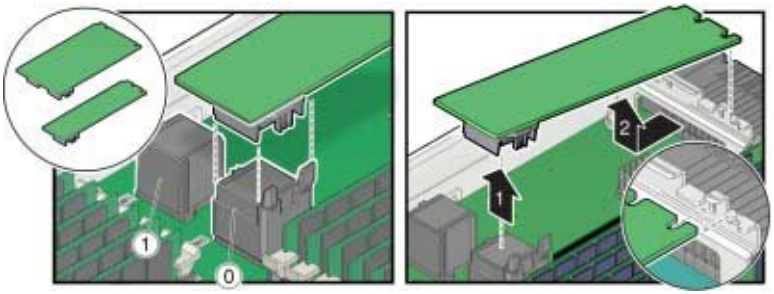
- "Remove a FEM" on page 88
- "Install a FEM" on page 88

▼ Remove a FEM

1 **Prepare the server module for service.**
See "Preparing for Service " on page 43.

2 **Insert a filler panel into the empty server slot to reduce the possibility of a system shut down.**

3 **Pull the FEM card up and out of the motherboard.**



Next Steps
- "Install a FEM" on page 88
- "Return the Server Module to Operation" on page 127.

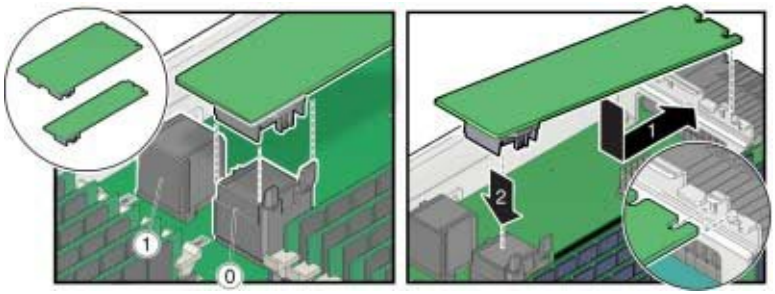
▼ Install a FEM

1 **Prepare the server module for service.**
See "Preparing for Service " on page 43.

2 **Remove the existing FEM card.**
See "Remove a FEM" on page 88.

3 **Slide the FEM card into the support bracket at a slight angle .**
Ensure that the edge of the card is under the clips on the bracket.

Note – Always install a single-width form factor FEM in FEM 0.



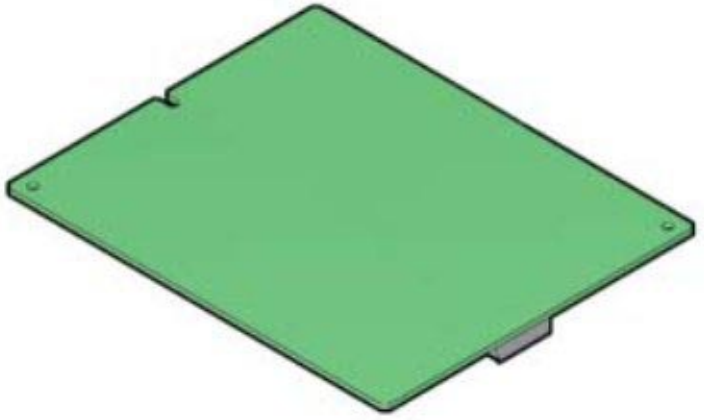
4 **Press the FEM card carefully into the connector.**

Next Steps

- "Return the Server Module to Operation" on page 127.

Servicing a RAID Expansion Module (CRU)

Note – This component is a customer-replaceable unit (CRU).



The RAID expansion module (REM), if ordered, might not arrive installed on the Sun Blade X4-2B. In some cases, this option is shipped separately for customer installation. The REM enables the RAID functionality for SAS drives.

For additional information, refer to `http://www.oracle.com/goto/x86AdminDiag/docs`.

Use these procedures to service a REM card option:

- “Remove a REM Card” on page 90
- “Install a REM Card” on page 90
- “Replace a REM Battery on the REM Card” on page 92

Remove a REM Card

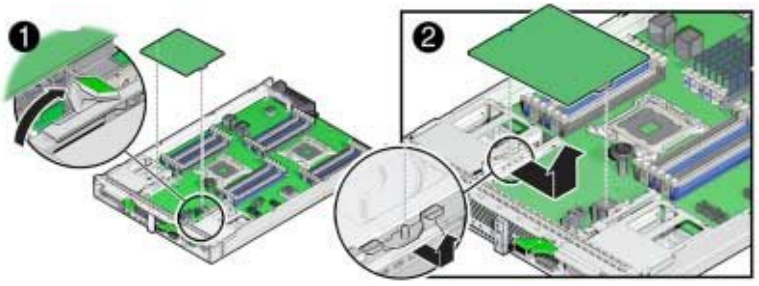
Before You Begin

Caution – Data loss. Back up your data to an external site before proceeding. The following steps removes all data from the system.

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

   See “Preparing for Service ” on page 43.

2. **Open the REM latch.**



3. **Locate the REM support bracket on the motherboard, and pull the REM card out at an angle away from the support bracket.**

4. **Pull the REM card carefully out of the connector.**

Next Steps

- “Install a REM Card” on page 90
- “Return the Server Module to Operation” on page 127.

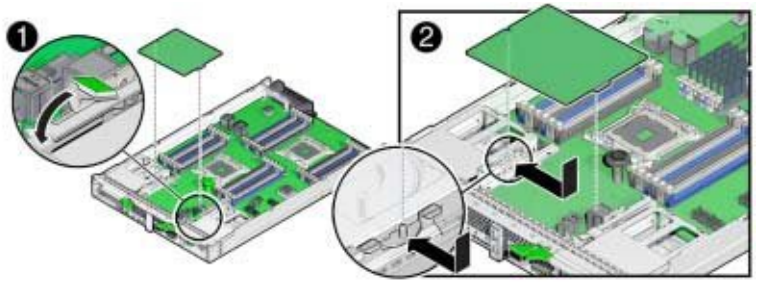
Install a REM Card

Use this procedure with the REM removal procedure to replace an existing REM, or use this procedure for first-time installation of a REM card in the server.

Before You Begin

Caution – Data loss. Back up your data to an external site before proceeding. The following steps will remove all data from the system.

1. **Prepare the server module for service.**
   See "Preparing for Service " on page 43.
2. **Insert a filler panel into the empty server slot to reduce the possibility of a system shut down.**
   See "Install Server Module Filler Panels" on page 57.
3. **If you are replacing a REM card, remove the existing card.**
   See "Remove a REM Card" on page 90.
4. **Locate the REM support bracket on the motherboard.**
   For more information, see "About the Chassis" on page 21.
5. **Close the REM handle.**



6. **Slide the REM card under the flanges on the support bracket.**
   The flanges are on the support bracket opposite the REM handle.
7. **Carefully align the connector on the underside of the REM card with the connector on the motherboard.**
8. ***Gently* push down on the connector end of the REM card until the card is fully seated under the REM card retaining spring.**

Caution – Component damage. Excessive downward force is *not* required. When properly aligned, the connectors mate with minimum downward pressure. If not, realign the connectors slightly and try again. Do *not* apply excessive force.

An audible click occurs when the spring secures the card.

9 **If this is a first-time installation of a REM card in the server module, perform the following sub-steps.**

Perform the following sub–steps only if the new disk does not have an operating system, or any data. Skip this step if preloaded software resides on the storage drives.

a. **Restore the data from backups.**

b. **Install an operating system.**

Operating System	Link
Linux	*Sun Blade X4-2B Installation Guide for Linux Operating Systems*
Oracle Solaris	*Sun Blade X4-2B Installation Guide for the Oracle Solaris Operating System*
Windows	*Sun Blade X4-2B Installation Guide for Windows Operating Systems*
VM	*Sun Blade X4-2B Installation Guide for ESX Software*
Oracle VM	*Sun Blade X4-2B Installation Guide for Oracle VM Server*

Next Steps

- "Return the Server Module to Operation" on page 127.

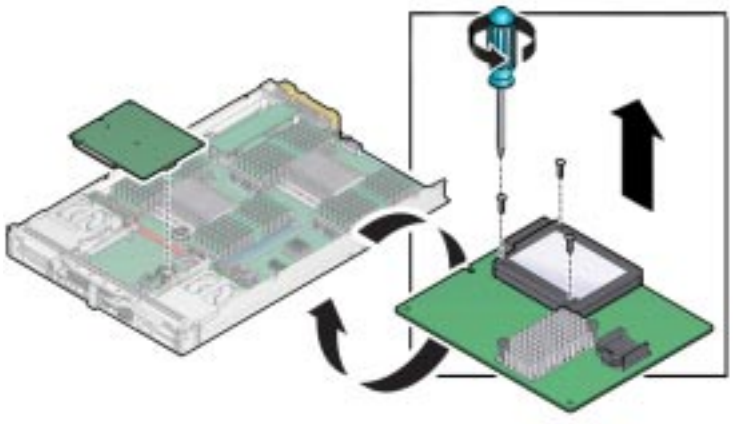
▼ Replace a REM Battery on the REM Card

Before You Begin This task requires a #2 Phillips screwdriver.

1 **Remove the REM card.**

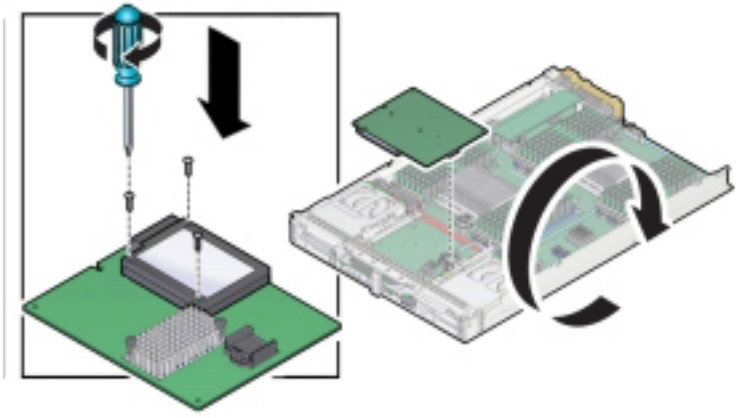
See "Remove a REM Card" on page 90.

2 **Remove and retain the three screws securing the REM battery to the card.**



3 **Remove the REM battery from the REM card.**

4 **Attach the new battery to the REM card using the three screws.**



5 **Attach any required battery cables.**

Next Steps

- "Install a REM Card" on page 90
- "Return the Server Module to Operation" on page 127.

Servicing Processors (FRU)

Note – This component is a field-replaceable unit (FRU). A part designated as a FRU must be replaced by an Oracle-qualified service technician.

Use these procedures to remove and install processor and heat sink assemblies:

When replacing processors, you must install processors (CPUs) of the same speeds on the same motherboard.

Selecting the Correct Processor Removal/Replacement Tool

Caution – Component damage. 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 Blade X4-2B 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:

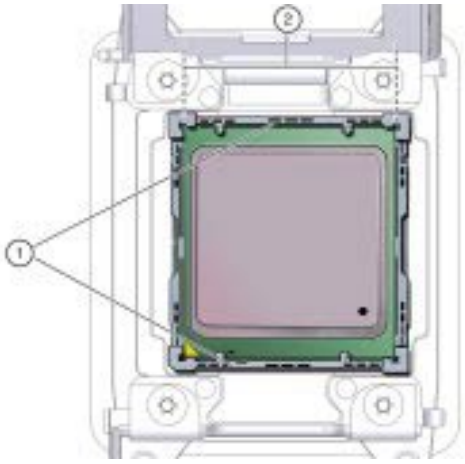
- Use Oracle Integrated Lights Out Manager (ILOM) 3.1 to display processor information.

  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.

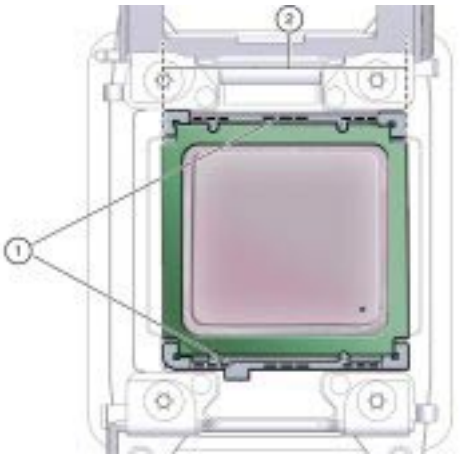
  This requires that you remove the processor heatsink and open the processor independent loading mechanism (ILM) assembly that holds the processor in the socket. For instructions, see Remove a Processor. This is the same procedure that you will use when you remove the processor.

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. The following image shows the smaller processor installed. Notice that the right and left edges of the processor are within the boundaries of the processor alignment brackets.



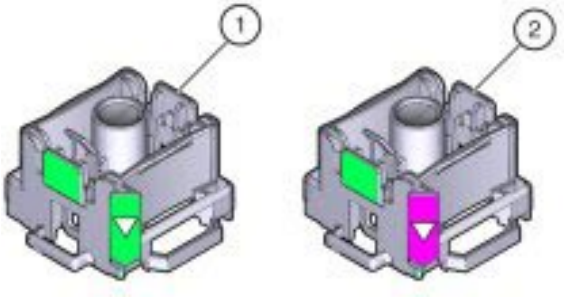
Legend	Name
1	Processor alignment brackets
2	Processor left and right edges are within alignment bracket boundaries

The following illustration shows the larger processor installed. Notice that the right and left edges of the processor extend beyond the boundaries of the processor alignment brackets.



Legend	Name
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 the following illustration for the Color-Coded Processor Removal/Replacement Tool.



Legend	Name
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)

Legend	Name
2	Pink, color-coded removal/replacement tool for the larger processor—model E5-2697 V2 (12-core)

Caution – Component damage. 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.

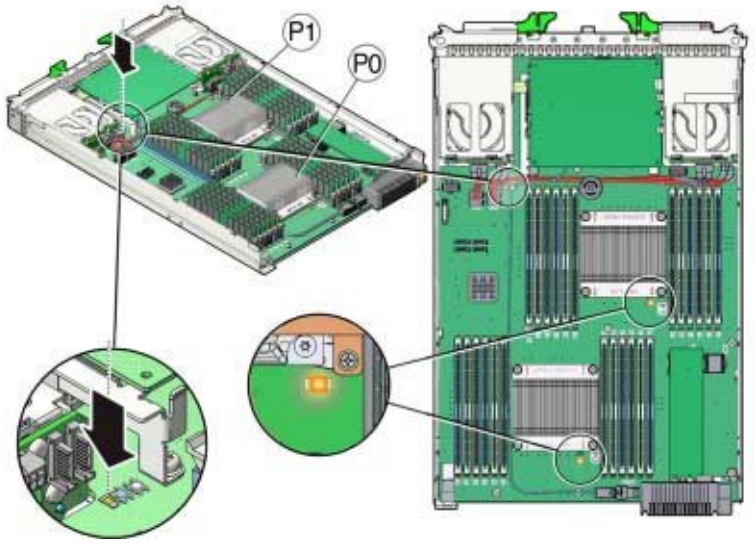
The following table provides an easy reference for matching a processor (by number of cores or model number) to the correct processor removal/replacement tool.

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

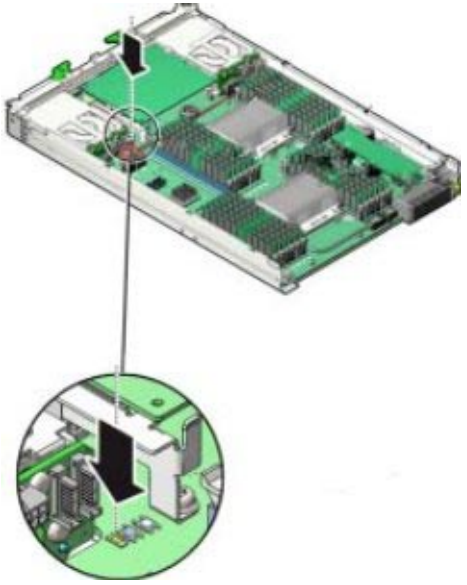
Processor Fault Remind Circuit

Use the Fault Remind circuit to identify a failed processor. The processor Fault Remind circuit components are the Fault Remind button, the Charge Status indicator, and the Processor Fault indicators. The following illustrations shows the location of the Fault Remind circuit components and the processors.



The following topics describe the components of the Fault Remind circuitry.

Fault Remind Button and Charge Status Indicator

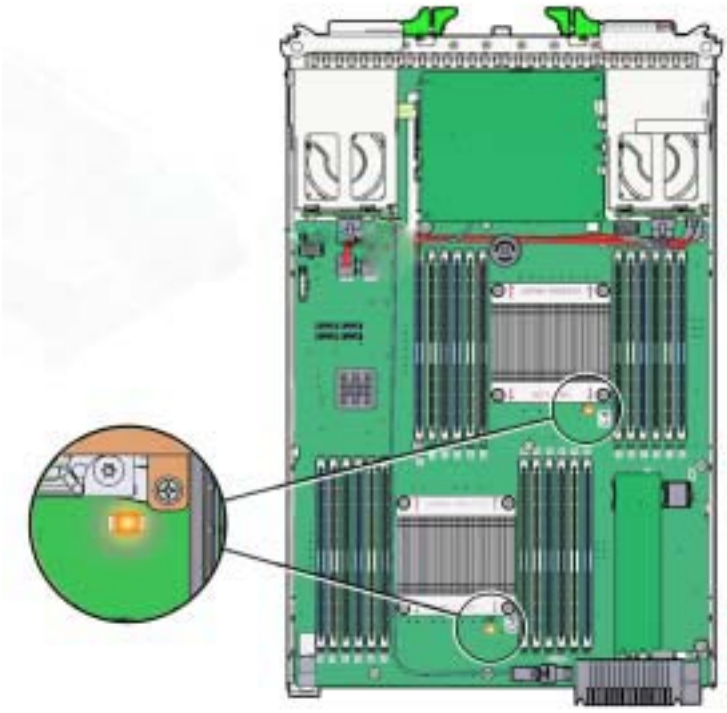


Note – Do not press the white Clear CMOS Button (SW1801).

The blue Fault Remind button (SW3001) is located on the motherboard next to the Charge Status indicator (CR3002). The Charge Status indicator is next to the button and shows the usability of the processor test circuit. When the Fault Remind button is pressed, the Charge Status indicator lights green to indicate that there is sufficient voltage present in the Fault Remind circuit to activate the fault indicators. Fault indicators identify a processor in a fault state.

Note – Press the Fault Remind circuitry within 15 minutes of removing the server from the chassis. If the green Charge Status indicator fails to light when you press the Fault Remind button, it is likely that the Fault Remind circuit has lost its charge.

Processor Fault Indicators



The amber Processor Fault indicators are mounted on the server module motherboard next to each processor. If a processor is faulty, the indicator for the failed processor lights up when you press the Fault Remind button.

Related Information:

- See "About the DIMM and Processor Test Circuit " on page 41

▼ Identify a Faulty Processor

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

See "Preparing for Service " on page 43.

Caution – Component damage. This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid damage, ensure that you follow electrostatic discharge safety measures and anti static practices. See "Performing ESD and Anti-static Prevention Measures" on page 53.

2 **Press and hold the blue Fault Remind button (SW3001) on the motherboard to illuminate a processor Fault indicator (for more information, see "Processor Fault Remind Circuit" on page 97).**

Ensure that the Charge Status indicator lights when the button is pressed. The amber-colored processor Fault indicator lights if the processor is faulty.

Indicator State	Processor Status
Off	Operating properly.
On (amber)	Faulty.

Next Steps "Remove a Processor Heat Sink (FRU)" on page 101

▼ Remove a Processor Heat Sink (FRU)

To replace a processor, you must first remove the processor heat sink. The heat sink sits on top of the processor and is secured to the motherboard by four screws. Once removed, retain the heat sink for reuse.

Caution – Component damage. Handle processor socket pins with extreme care. Processor and socket pins are very fragile. A light touch can bend the processor socket pins and damage the board beyond repair.

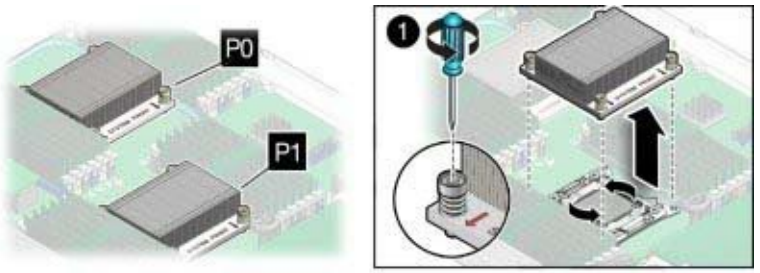
Before You Begin

- "Preparing for Service " on page 43
- "Identify a Faulty Processor" on page 100
- "Required Tools" on page 61 A number 2 Phillips screwdriver is required for this procedure.

1 **Gently press down on the top of the heat sink to counteract the pressure of the captive spring-loaded screws that secure the heat sink to the motherboard.**

2 **Using a No. 2 Phillips screwdriver, *alternately* loosen the four screws in the heat sink.**

Turn each screw one and one half turns until they are fully disengaged.



3 **Separate the heat sink from the top of the processor by gently wiggling the heat sink left and right, while pulling upward.**

A thin layer of thermal compound separates the heat sink and the processor. This compound also acts as an adhesive.

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

---

4 **Place the heat sink upside down on a flat surface.**

Next Steps

- "Remove a Processor (FRU)" on page 102

▼ Remove a Processor (FRU)

Caution – Component damage. Processor socket pins are fragile. A light touch can bend the processor socket pins and damage the board beyond repair. Avoid contact with the processor socket pins.

Before You Begin

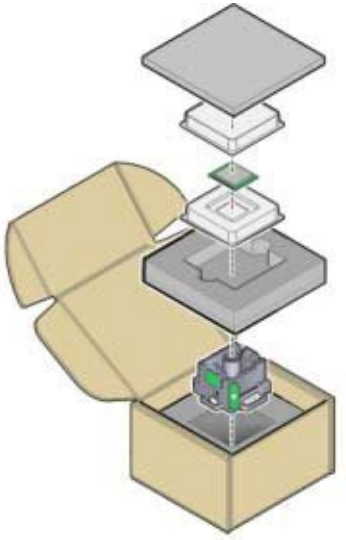
- See "Remove a Processor Heat Sink (FRU)" on page 101.
- Processor replacement tool model LGA2011 (green label) is required for this procedure.

Caution – Component damage. Use the correct processor replacement tool. Attempting to replace the processor using the incorrect tool could result in irreparable damage to the processor or the motherboard.

---

1 **Unpack the processor and processor removal/insertion tool from the replacement processor packaging.**

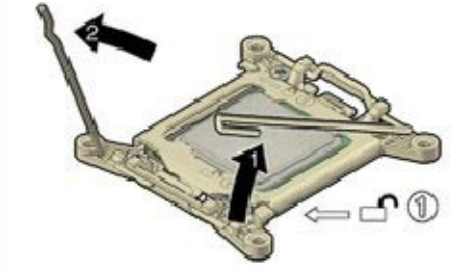
Leave the processor in the anti-static tray until it is ready to be installed.



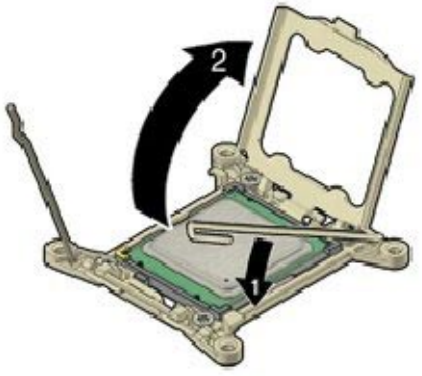
2 **Release the two processor pressure frame retaining levers by moving them to their fully open position.**

The levers are on the right and left side of the processor retaining frame and are held in place by a retaining clip.

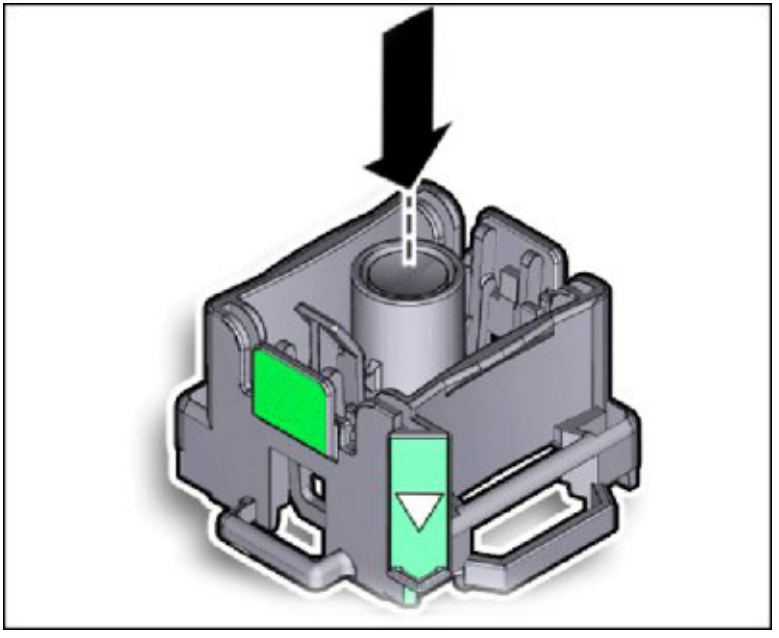
Disengage the levers by pushing each one down and moving levers slightly away from the processor.



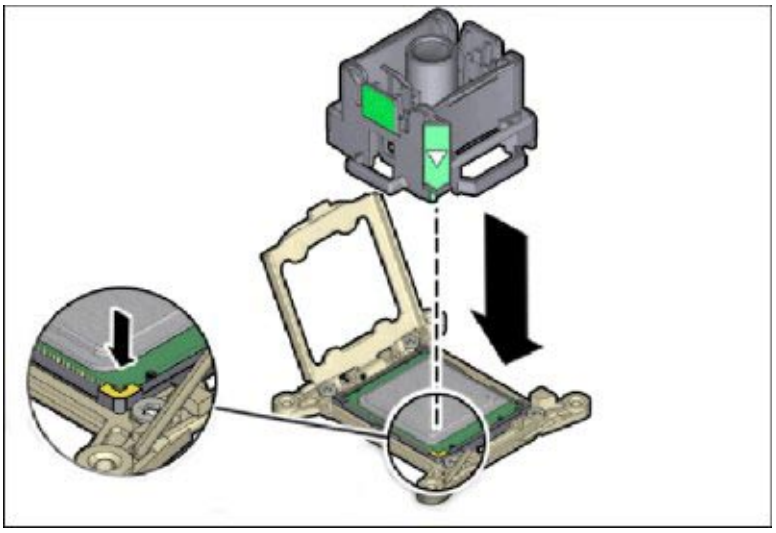
3 **Close the right side lever and lift the processor pressure frame up to the fully open position.**



4 **Push the removal/insertion button on the top of the tool.**



5 Place the removal/insertion tool on top of the processor.



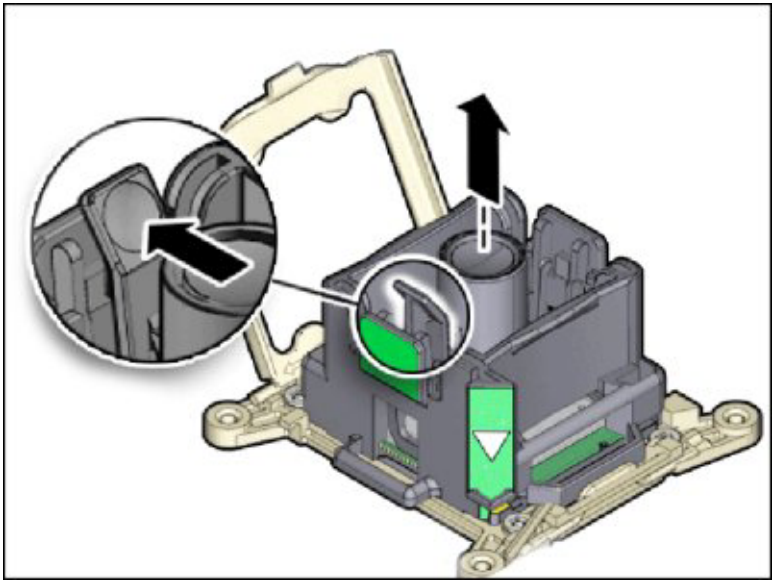
a. Lower the tool into place over the processor socket.

b. Ensure that the tool and processor key corners are aligned.

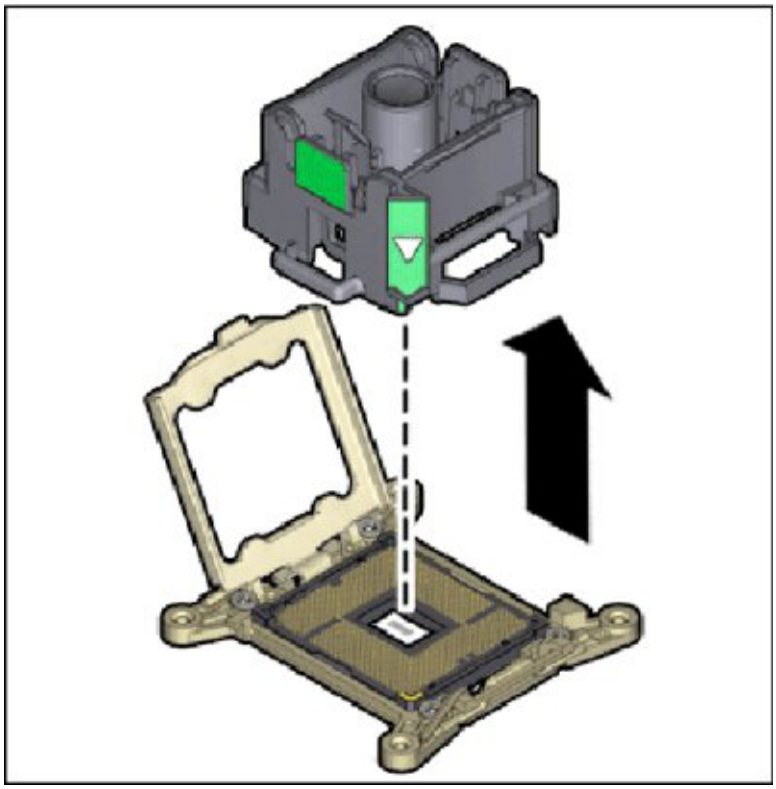
c. As required, rotate the tool until the triangle on the side of the tool is facing the front of the server and it is over the left side of the processor socket when viewing the server from the front.

6 Click the tab on the removal/insertion tool to secure the tool to the processor.

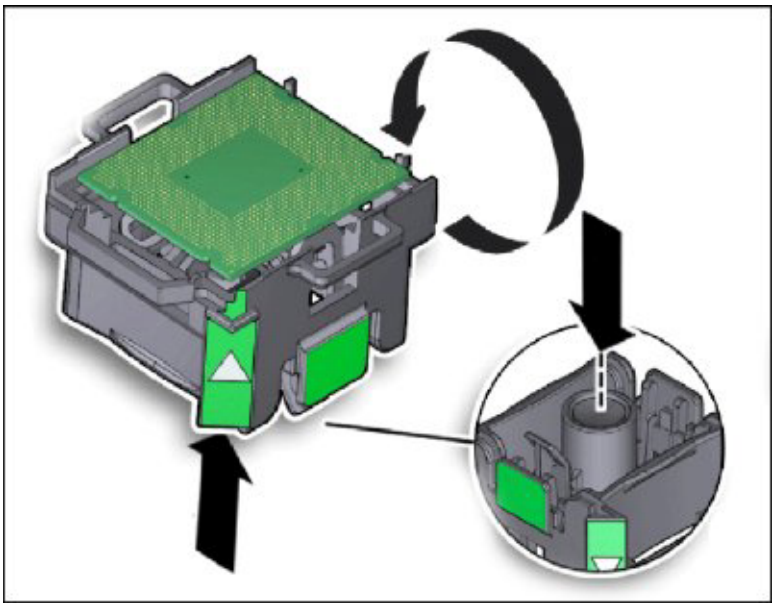
Press the release lever on the tool to release the center button and engage the processor. An audible click indicates that the processor is engaged.



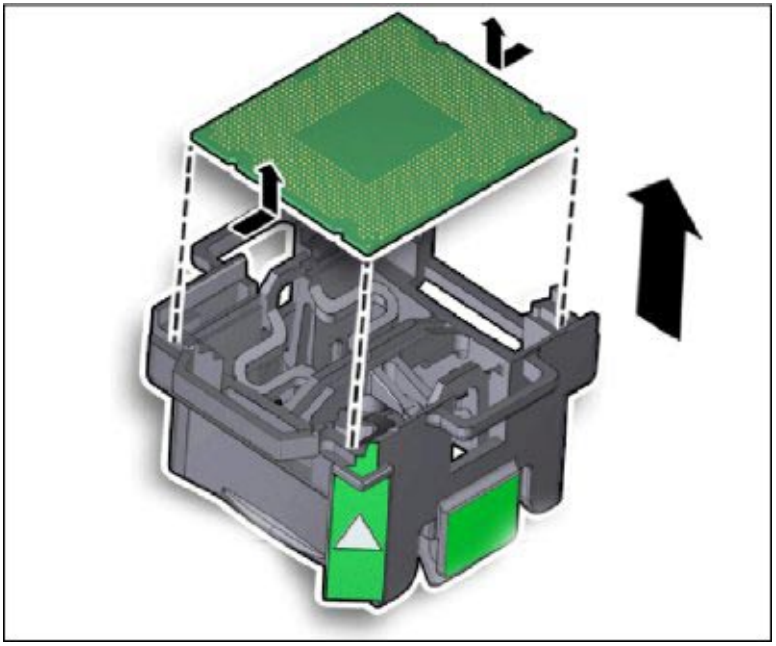
7 Lift the processor out of the socket while it is still attached to the removal/insertion tool.



8 **Turn the tool upside down and verify that it contains the processor.**



9 **Hold the processor by its edges and press the center button on the tool to release the processor.**



10 **Lift the processor out of the tool and place contact side down on an anti-static mat.**

11 **Clean the thermal compound off the top of the processor using an alcohol wipe.**

12 **Follow the procedure for the return or the disposal of the processor.**

Next Steps

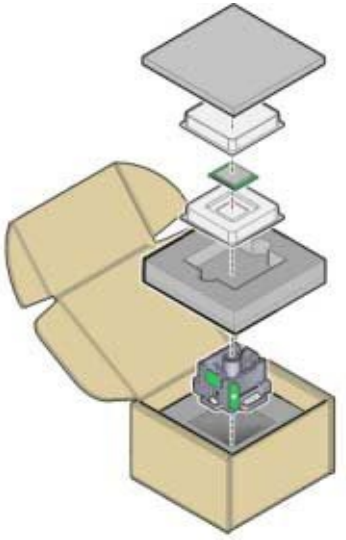
- “Install a Processor (FRU)” on page 109

▼ Install a Processor (FRU)

Before You Begin

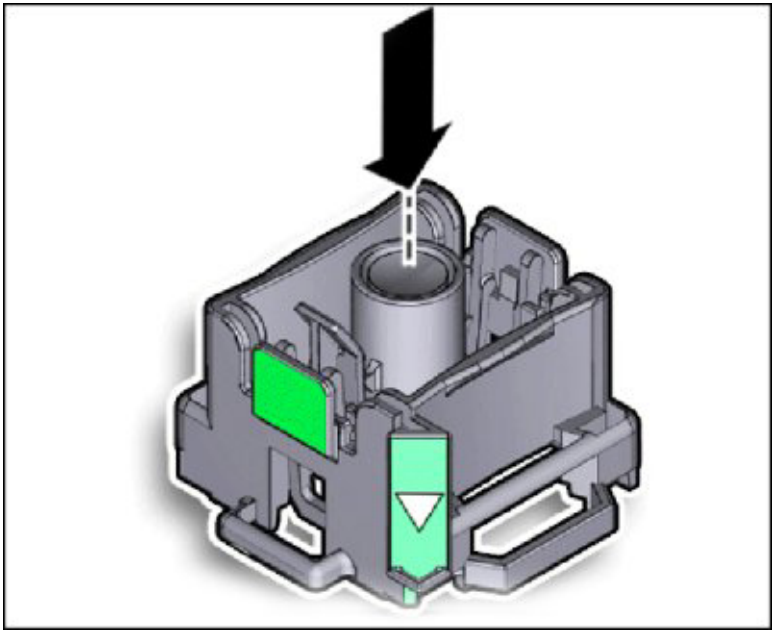
- “Preparing for Service ” on page 43
- “Remove a Processor Heat Sink (FRU)” on page 101
- “Remove a Processor (FRU)” on page 102

1 **Unpack the replacement processor and place it on an anti-static mat.**



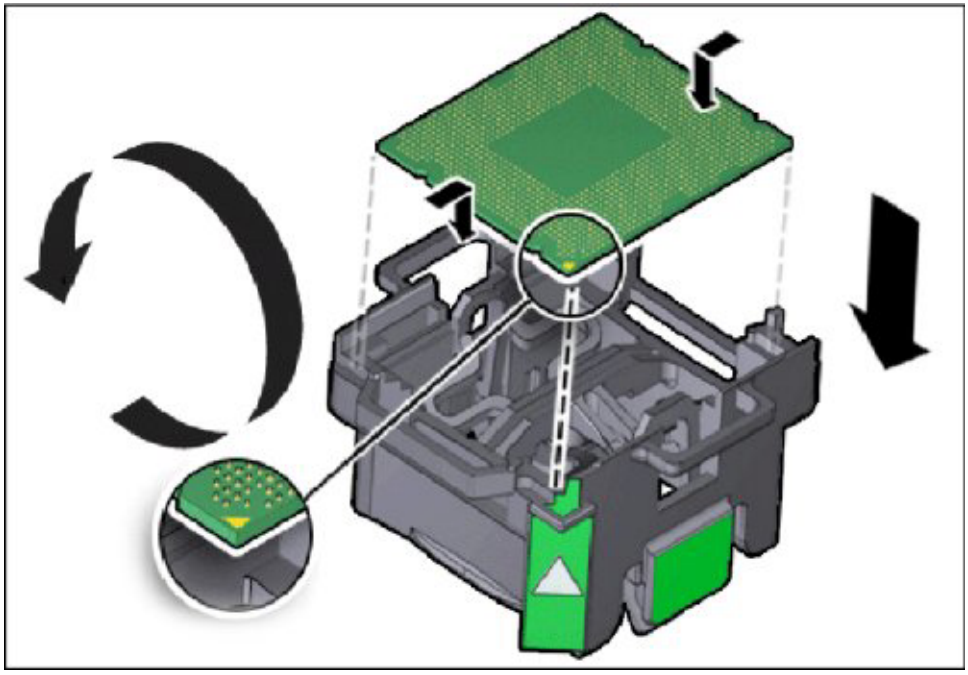
2 **Ensure that the two processor socket release levers and the processor pressure frame are in the fully open position.**

3 **Push the removal/insertion tool button on the top of the tool.**



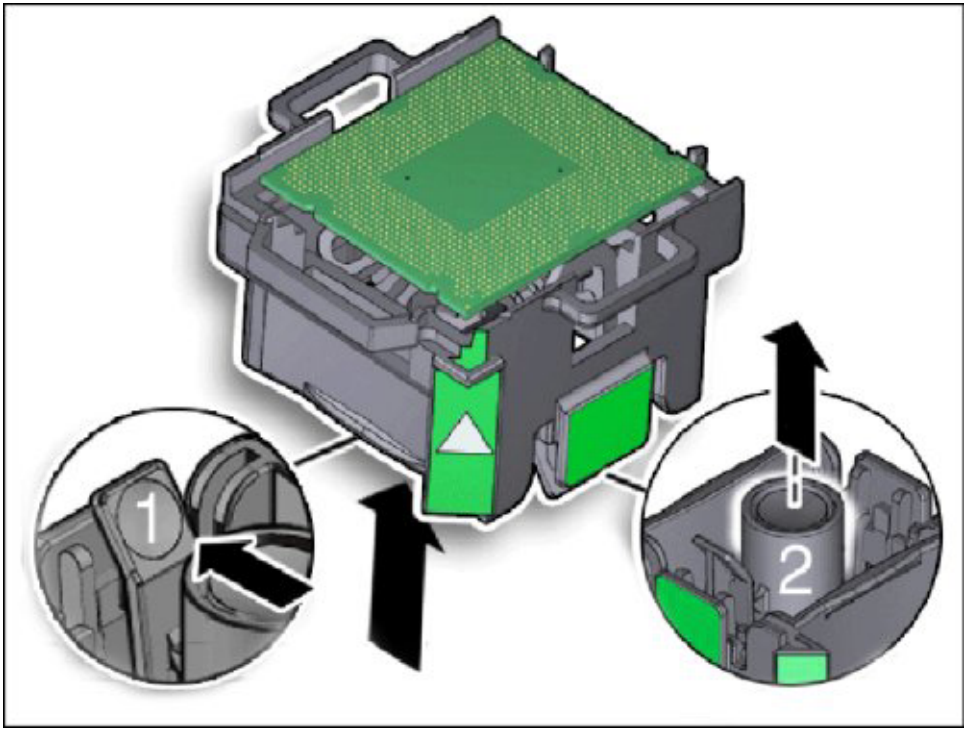
4 **Turn the tool upside down, lift the processor by its edges, and place it (circuit side up) in the tool.**

Ensure that the triangle on the corner of the processor aligns with the triangle on the side of the processor removal/replacement tool.



5 **While still holding the tool in the upside down position, press the release lever (which is now facing downward) to secure the processor in the tool.**

When the lever is pressed, the center button releases. An audible click indicates that the processor is locked in place.

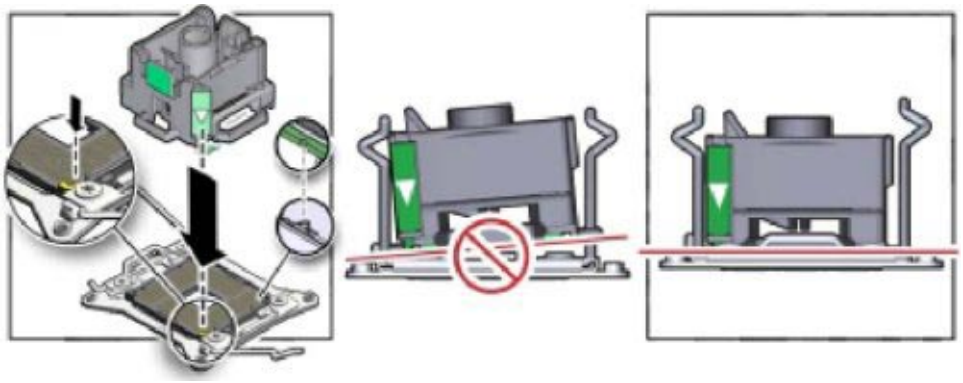


6 **Ensure that the processor is secure in the tool before rotating the tool.**

7 **Rotate the tool, so the processor faces downward.**

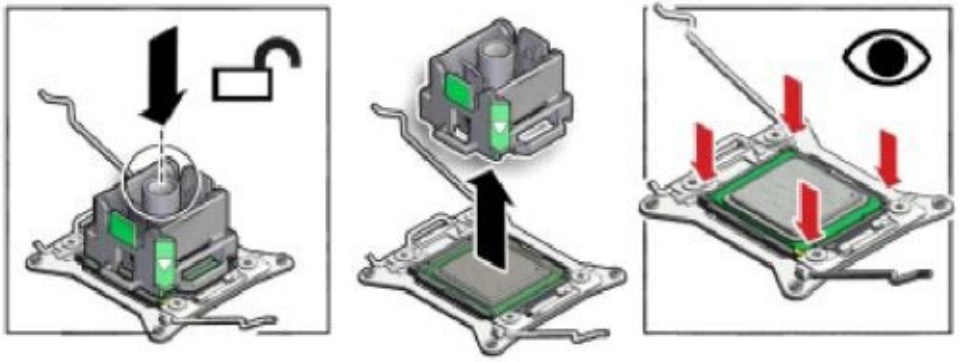
8 **Properly position the tool over the processor socket and lower it into place.**

Ensure that the notches on the sides of the processor align with the keys on the socket, and the green triangle on the side of the tool is aligned with the front left corner of the processor socket (when viewing from the front of the server).



9 **Press the center button to release the processor.**

Caution – Component damage. Do *not* press down on the processor. Irreparable damage to the processor or motherboard might occur from excessive downward pressure.



10 **Remove the processor removal/replacement tool.**

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

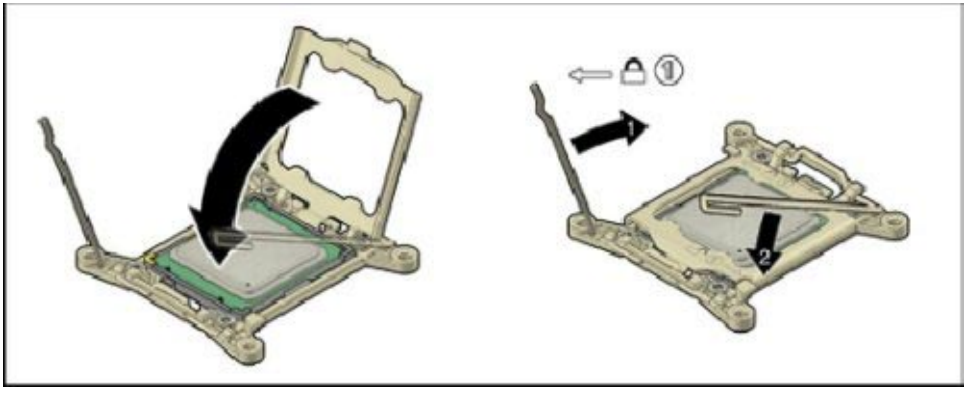
When properly aligned, the processor sits flat in the processor socket and has minimal side to side movement.

12 **Close the processor pressure frame cover.**

13 **Lower the first retaining lever and secure it under the retaining clip.**

14 **Lower the second retaining lever and secure it under the retaining clip.**

This action locks the processor in the socket.



Next Steps

- "Install a Processor Heat Sink (FRU)" on page 114

▼ Install a Processor Heat Sink (FRU)

The replacement processor is not shipped with a heat sink. Reuse the original processor heat sink.

Before You Begin

- "Remove a Processor (FRU)" on page 102
- "Install a Processor (FRU)" on page 109

1 **Clean the heat sink:**

- **Remove any dust or debris that might be lodged in the heat sink fins.**

- **Use an alcohol pad to completely clean all thermal compound from the underside of the heat sink.**

2 **Use the syringe (supplied with the replacement processor) to apply the entire contents (approximately 0.1 ml) of thermal compound as a single dollop to the center of the top of the processor.**

Note – Do not distribute or spread the compound; the pressure applied when attaching the heat sink performs this action.

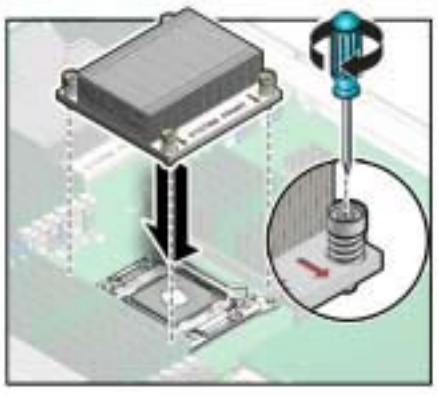
3 **Position the heat sink over the processor, aligning it with the threaded mounting posts.**

Orient the heat sink so that the screws line up with the mounting posts. The processor heat sink is not symmetrical.

Caution – Component damage. When handling the heat sink, do not transfer the compound to other server components.

4 *Carefully* **lower the heat sink onto the processor taking care to reduce the amount of movement it makes after initial contact with the layer of thermal compound on top of the processor.**

Caution – Over-temperature condition. Avoid moving the heat sink after it has contacted the top of the processor. Too much movement could spread the layer of thermal compound, causing voids in the distribution and leading to ineffective heat dissipation and component damage.



5 **Use a No. 2 Phillips screwdriver to alternately tighten each Phillips screw one-half turn until fully seated.**

6 **Prepare the server module for operation.**

See "Return the Server Module to Operation" on page 127.

7 **Update the BIOS and ILOM firmware.**

Refer to the `http://www.oracle.com/goto/x86AdminDiag/docs` and "5. Set up Server Module Software and Firmware (Oracle System Assistant)" in *Sun Blade X4-2B Installation Guide* Setting Up Software and Firmware in Sun Blade X4-2B Installation Guide.

Next Steps

- "Returning the Server Module to Operation " on page 127

- "Getting the Latest Firmware and Software" on page 5

Servicing the Motherboard Assembly (FRU)

Note – This component is a field-replaceable unit (FRU). A part designated as a FRU must be replaced by an Oracle-qualified service technician.

The motherboard cannot be replaced independently of the server module enclosure. If you need to replace the motherboard, you must replace the entire motherboard assembly, which includes the motherboard, the disk backplane, and the server module enclosure.

The motherboard assembly includes the motherboard, the disk backplane and the server module enclosure. The motherboard and the disk backplane are shipped installed in the enclosure. Do *not* remove the motherboard or the disk backplane from the enclosure. If either of these components fails, replace the entire motherboard assembly.

To replace the motherboard assembly, transfer all reusable components from the failed assembly to the replacement assembly and update the FRUID using the following procedures:

- "Remove Motherboard Assembly Components (FRU)" on page 117
- "Install Motherboard Assembly Components (FRU)" on page 121
- "Update FRUID (Service Only)" on page 124

▼ Remove Motherboard Assembly Components (FRU)

Use this procedure to replace the motherboard assembly if the motherboard or the disk backplane fails.

Caution – The motherboard should be serviced only by an Oracle qualified service technician.

Caution – Ensure that all power is removed from the server before removing or installing the server module enclosure.

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 anti-static practices as described in "Performing ESD and Anti-static Prevention Measures" on page 53,

1. **Back up the SP configuration.**

   Refer to `http://www.oracle.com/goto/x86AdminDiag/docs`.

2. **Prepare the server module for service.**

   For instructions, see "Preparing for Service " on page 43.

3. **Insert a blade filler panel into the empty chassis slot.**

   See "Install Server Module Filler Panels" on page 57.

Caution – Data loss and over-temperature condition possible if slots are open more than one minute.

4. **Place the removed server module on an anti-static mat next to the replacement the server module.**

   See "Performing ESD and Anti-static Prevention Measures" on page 53.

5. **Label the server module components before removal to ensure components are returned to original locations.**

   - Storage drives
   - USB flash sticks
   - DIMMs
   - CPUs
   - FEM
   - REM

   See "About System Components" on page 24.

6. **Remove any storage drives from the enclosure and install them on the replacement enclosure.**

   For instructions, see "Servicing a Storage Drive (CRU)" on page 63

7. **Remove any storage drive filler panels from the enclosure and install them on the replacement enclosure.**

   For instructions, see "Remove Storage Drive Filler Panels" on page 73 and "Install Server Module Filler Panels" on page 57

8 **Remove the internal USB flash sticks from the motherboard and install them on the replacement motherboard.**

Note the flash drive positions (0 and 1).

For instructions, see "Remove USB Flash Sticks" on page 85.

9 **Remove the internal FEM card from the motherboard and install it on the replacement motherboard.**

For instructions, see "Servicing a Fabric Expansion Module (CRU)" on page 87.

10 **Remove the internal REM card from the motherboard and install it on the replacement motherboard.**

For instructions, see "Servicing a RAID Expansion Module (CRU)" on page 89.

11 **Remove the DDR3 DIMMs from the motherboard and install them on the replacement motherboard.**

Install the DDR3 DIMMs only in the sockets (connectors) that correspond to the sockets from which they were removed. Performing a one-to-one replacement of the DIMMs significantly reduces the possibility that the DIMMs will be installed in the wrong sockets. If you do not reinstall the DIMMs in the same sockets, server performance might suffer and some DIMMs might not be used by the server..

For instructions, see "Servicing DIMMs (CRU)" on page 74.

12 **Remove the processors from the faulty motherboard.**

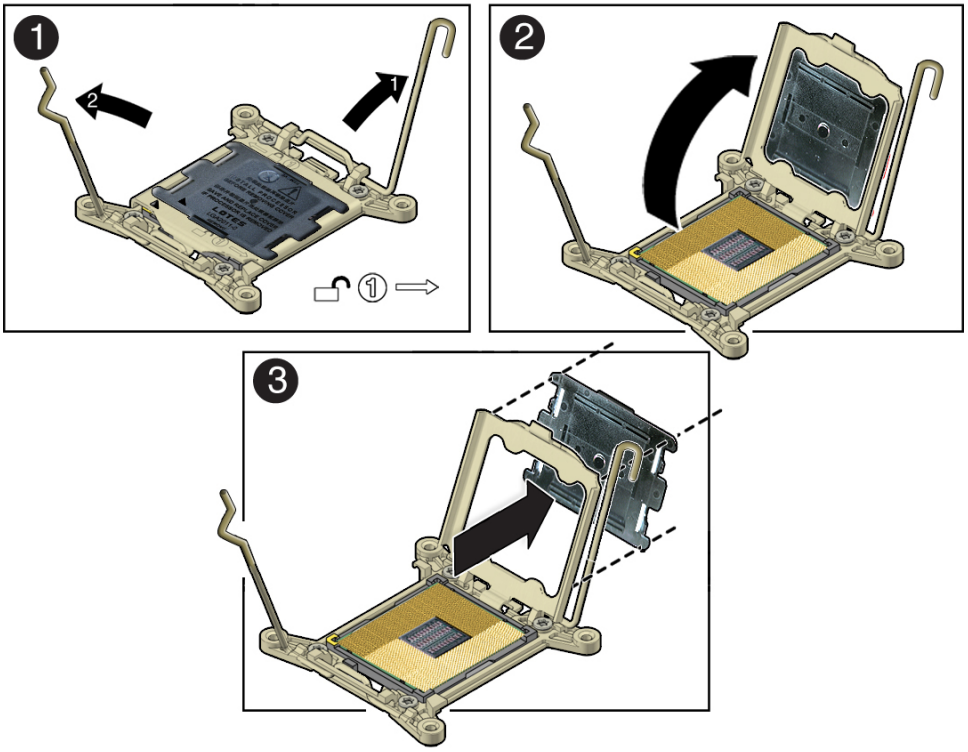
Note the processor positions (0 and 1).

For instructions, see "Remove a Processor Heat Sink (FRU)" on page 101 and "Remove a Processor (FRU)" on page 102.

13 **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. Lift the processor ILM assembly load plate off of the processor socket by rotating 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 "Servicing Processors (FRU)" on page 94 "Install a Processor".

f. **Repeat Step a through Step e above to remove the second processor socket cover from the replacement motherboard and install the second processor.**

14 **Install the Motherboard Assembly Components.**

For instructions, see "Install Motherboard Assembly Components (FRU)" on page 121.

Next Steps

- "Install Motherboard Assembly Components (FRU)" on page 121.
- "Return the Server Module to Operation" on page 127.

▼ Install Motherboard Assembly Components (FRU)

The motherboard cannot be replaced independently of the server module enclosure. If you need to replace the motherboard, you must replace the entire motherboard assembly, which includes the motherboard, the disk backplane, and the server module enclosure.

Use this procedure to install the motherboard assembly after removing the motherboard.

Caution – The motherboard should be serviced only by an Oracle qualified service technician.

Caution – Ensure that all power is removed from the server before removing or installing the server module enclosure.

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 anti-static practices as described in "Performing ESD and Anti-static Prevention Measures" on page 53,

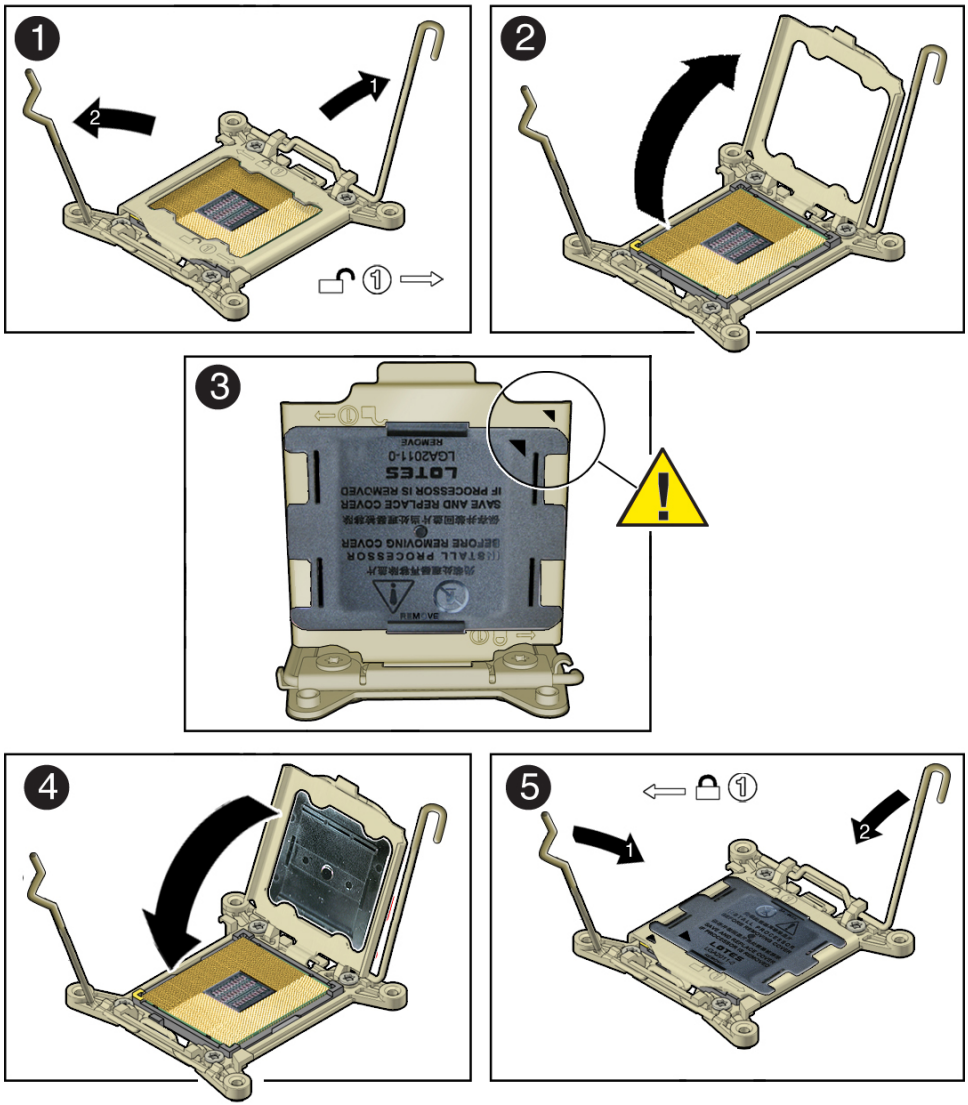
Before You Begin Perform Remove Motherboard Assembly Components. See "Remove Motherboard Assembly Components (FRU)" on page 117.

1 **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.**

2 **Prepare the server module for operation.**

See "Returning the Server Module to Operation " on page 127.

Note – Do *not* power on the server.

---

3 **Update the FRUID/serial number on the new motherboard.**

See "Update FRUID (Service Only)" on page 124.

4 **Restore SP configuration from backup.**

Next Steps

- "Remove Motherboard Assembly Components (FRU)" on page 117.
- "Return the Server Module to Operation" on page 127.
- "Update FRUID (Service Only)" on page 124.

▼ Update FRUID (Service Only)

Note – This procedure requires access to Escalation mode.

Use the `setpsnc` command to program the previous serial number to the new FRUID.

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

See "Power Off, Graceful (Power Button)" on page 50.

2 **To restore FRUID information, log in to Escalation mode.**

The Escalation mode command-line prompt appears: **#**

3 **Perform the update procedure.**

Next Steps

- "Return the Server Module to Operation" on page 127.

▼ Servicing the System Battery (CRU)

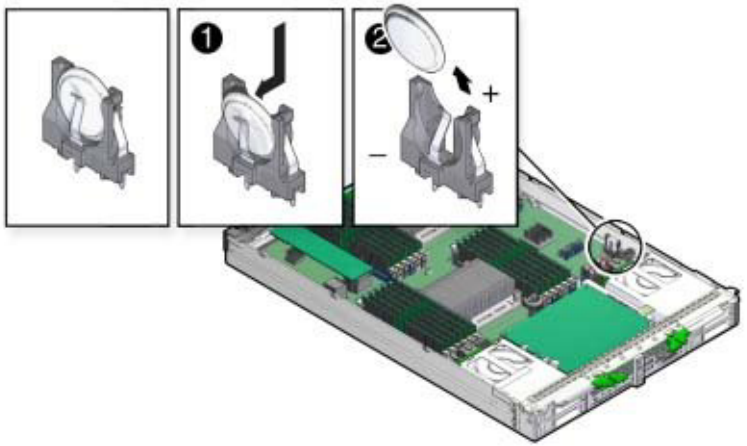
Note – This component is a customer-replaceable unit (CRU).

A real-time clock (RTC) system battery (type CR2032) is located on the motherboard. The system battery maintains the real-time clock.

To remove and replace the system battery:

1. **Prepare the server module for service.**
   See "Preparing for Service " on page 43.

2. **To remove the battery from its holder, *gently* push the top edge of the battery away from the battery holder and lift it out.**
   See the following illustration.



Caution – Component damage. Exercise caution when removing the battery. The battery is located near the server module side wall.

3. **Orient the new battery so that the + symbol faces towards the server module side wall.**

4. **Insert the battery into the holder, and then press the battery into position.**

5. **Access the BIOS Setup Utility to configure the BIOS time and date settings.**
   Refer to `http://www.oracle.com/goto/x86AdminDiag/docs`.

Next Steps ■ "Return the Server Module to Operation" on page 127.

Returning the Server Module to Operation

This section describes how to return the Sun Blade X4-2B to operation after you have performed service procedures.

Description	Link
How to prepare the server for operation.	"Return the Server Module to Operation" on page 127
How to install the server module cover.	"Install the Server Module Top Cover " on page 128
How to install the server module into the chassis.	"Install the Server Module in the Chassis" on page 130
How to power on the server module.	"Powering On the Server Module" on page 131
How to clear server module faults in Oracle ILOM	"Clear Server Module Faults" on page 133

▼ Return the Server Module to Operation

Use this procedure to return the server to operation.

1. **Ensure that all components are properly seated and secured.**
2. **Remove debris and tools from the inside of the server.**

   If necessary, use a vacuum or blower to remove dust from component surfaces and server air vents.
3. **Install the server module top cover.**

   See "Install the Server Module Top Cover " on page 128.
4. **Remove the server module filler panel.**

   If you installed a server module filler panel when you removed the server module, remove it now. "Remove Server Module Filler Panel" on page 129
5. **Install the server module in the chassis.**

   See "Install the Server Module in the Chassis" on page 130.

   Standby power is applied to the server.

6 **If necessary, restore BIOS and SP/ILOM configurations before powering on the server.**

For configuration restore options, refer to `http://www.oracle.com/goto/x86AdminDiag/docs`

7 **To power on the server module, do one of the following:**

- **Press the front panel Power button.**

  See "Power On Using the Power Button " on page 131.

- **Use the Oracle ILOM CLI.**

  See "Power On (Oracle ILOM SP CLI)" on page 132.

- **Use the Oracle ILOM web interface.**

  See "Power On (Oracle ILOM SP Web Interface)" on page 132.

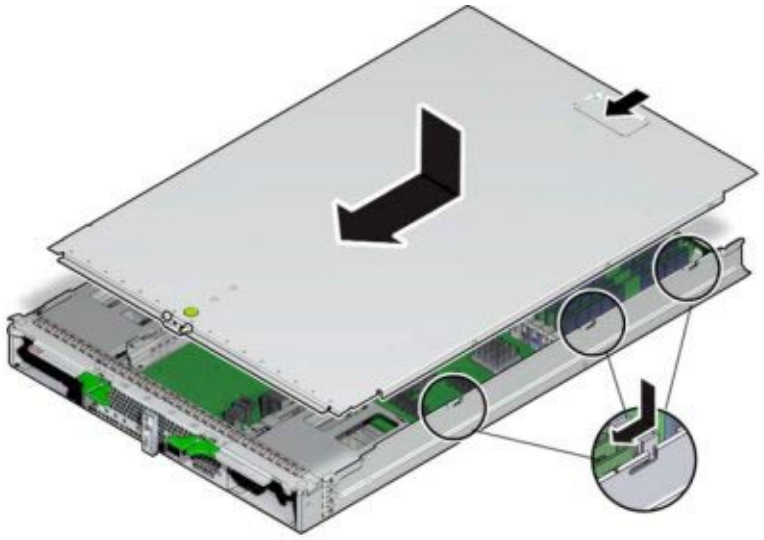
8 **To clear server faults, use the Oracle ILOM CLI.**

See "Clear Server Module Faults" on page 133.

▼ Install the Server Module Top Cover

Caution – Over-temperature condition. The server module cover must be in place for proper airflow. Never attempt to run the server module with the cover removed. Equipment damage possible. Hazardous voltage present.

1. **Place the cover on the server module allowing approximately 0.5 inch (12 mm) to extend over the rear of the chassis.**



2. **Slide the top cover toward the front of the server module chassis until it locks into place.**

   Ensure that you slide the cover under the tabs at the front of the server module.

3. **Gently press down on the cover to engage it with the server module chassis.**

Next Steps "Install the Server Module in the Chassis" on page 130

▼ Remove Server Module Filler Panel

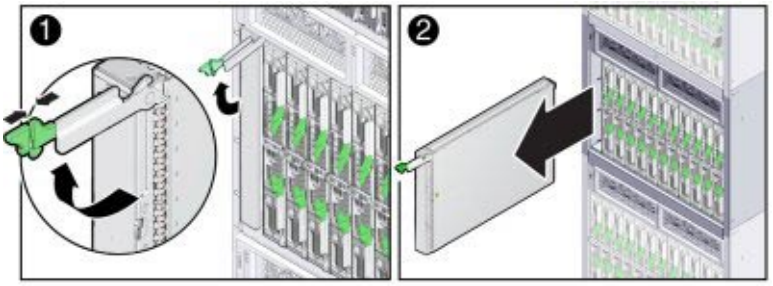
Server module filler panels occupy vacant slots to maintain cooling and proper air flow throughout the system.

Use this procedure to remove a server module filler panel.

1. **Locate the slot in the chassis that contains server module filler panel that needs to be removed .**

2. **To unlatch the server module filler panel from the chassis, press the button on the release lever handle, and then lower the lever into the fully open position.**

3 **To remove the filler panel from the chassis, hold the release lever, and then gently slide the filler panel toward you.**



Next Steps

- "Install the Server Module in the Chassis" on page 130

▼ Install the Server Module in the Chassis

Caution – Component damage or personal injury. Blades can weigh up to 22 lbs (10kg). Use two hands to install or remove the blade from the chassis.

1 **If necessary, remove the server module filler panel.**

Caution – Over-temperature condition. Do not operate the chassis with empty slots. Always insert a server module filler panel into an empty slot within 60 seconds to reduce the possibility of server module shutdown due to overheating.

Pull the lever handle out and eject the server module filler panel.

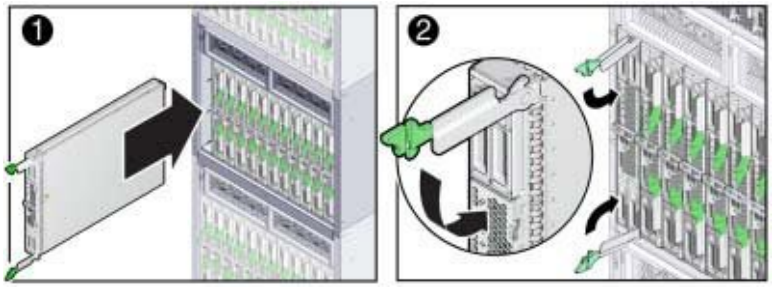
Retain the server module filler panel.

2 **Unlock the server module lever handles and rotate them to their fully open position.**

To unlock the handles, squeeze the green color lock releases on the end of the handles. Rotate the handles outward, away from the front of the server module.

3 **Position the server module vertically so that the ejectors are on the right.**

4 **Push the server module into the slot until it stops.**



5 **Ensure that the pawl on the end handle is aligned with the slot on the chassis side wall and rotate both levers inward toward the server module until the locks on the end of the handle click into place.**

Rotating the levers draws the server module into the chassis and engages the connector on the server with the internal connector on the chassis mid plane. The server module is now flush with the chassis, and the ejectors are locked.

Note – When the server module is inserted into a powered-on chassis, all front panel indicators blink three times.

If the chassis has power, the server module SP boots and the server powers on to standby power state. The green OK indicator on the front panel blinks (0.2 seconds on, 2.8 seconds off).

Next Steps

- "Powering On the Server Module" on page 131.

Powering On the Server Module

This section contains power-on options for the server module:

- "Power On Using the Power Button " on page 131
- "Power On (Oracle ILOM SP CLI)" on page 132
- "Power On (Oracle ILOM SP Web Interface)" on page 132

▼ Power On Using the Power Button

Before You Begin

Refer to:

- "About Server Power States and Resets" on page 47
- "Front Panel Indicators and Buttons" on page 13
- "Return the Server Module to Operation" on page 127

1. **Verify that standby power is on.**

   The server module green OK indicator on the front panel blinks once every three seconds, indicating that the server module is in standby power state.

2. **Use a stylus to quickly press and release the recessed Power button on the server module front panel.**

   When full power is applied to the server module host, the green OK indicator next to the Power button first slow blinks at 1 Hz, until the host completes booting, and then remains lit solid.

▼ Power On (Oracle ILOM SP CLI)

You can use the Oracle ILOM command-line interface (CLI) to apply full power to the server module.

Before You Begin

- "About Server Power States and Resets" on page 47
- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (`http://www.oracle.com/pls/topic/lookup?ctx=ilom31`)
- `http://www.oracle.com/goto/x86AdminDiag/docs`

1. **From the host OS, open an SSH session.**
2. **Log in to the server module Oracle ILOM CLI as a user with root or full administrator privileges.**
3. **To power on the system, type the following command:**

   ```
   start /System
   ```

See Also

-

▼ Power On (Oracle ILOM SP Web Interface)

You can use the Oracle ILOM web interface to apply full power to the server module.

Before You Begin

- "About Server Power States and Resets" on page 47
- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (`http://www.oracle.com/pls/topic/lookup?ctx=ilom31`)
- `http://www.oracle.com/goto/x86AdminDiag/docs`

1. **Open a web browser.**

   Direct the browser using the server module SP IP address.

2. **Log in to the server module's Oracle ILOM as a root or a user with administrator privileges.**

   The Oracle ILOM Summary screen appears.

3. **In the Actions section of the Summary screen, verify that the Power State is set to OFF.**

4. **To power on the server, click Turn On.**

   The server module powers on to full power state and boots.

See Also

- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

Clear Server Module Faults

1. **Log in to the server as root, using Oracle ILOM CLI.**

   For Oracle ILOM login information, refer to http://www.oracle.com/goto/x86AdminDiag/docs

2. **To list all known faults on the system, type:**

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

   The server lists all known faults. For example, the output of the following command indicates a known fault on processor P0:

   ```
   -> show /SP/faultmgmt

   Targets: 0 (/SYS/MB/P0)

   Properties:

   Commands:

   cd

   show
   ```

3. **To clear the fault, type:**

   -> **set** *Target* **clear_fault_action=true**

   where *Target* is the Target listed in the output of the **show /SP/faultmgmt** command entered in the previous step.

   For example, to clear the fault on processor P0 (from the previous example above):

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

   Are you sure you want to clear /SYS/MB/P0 (y/n)?y

   Set 'clear_fault_action' to 'true'
   ```

4. **Close the Oracle ILOM session.**

BIOS Power-On Self-Test (POST) Checkpoints

This section explains POST code checkpoint testing, provides methods to view POST checkpoint codes, lists the POST code checkpoints, and describes how to configure POST code checkpoint options.

Note – For information about accessing the BIOS Setup Utility, refer to the Oracle x86 Administration Guide for X4 Series Servers (`http://www.oracle.com/goto/x86AdminDiag/docs`)

The following sections are covered:

Overview of POST code checkpoint memory testing.	"POST Code Checkpoint Memory Testing " on page 135
Procedures for viewing POST code checkpoints.	"Viewing POST Code Checkpoints" on page 136
POST code reference information.	"POST Code Checkpoint Reference" on page 137

POST Code Checkpoint Memory Testing

The system BIOS provides a basic power-on self-test (POST) during start up. When the server module is powered on or booted, it goes through a series of hardware tests called checkpoints. During POST code checkpoint testing, the BIOS tests the basic devices required for the server to operate. A series of checkpoint codes indicates POST progress.

The BIOS POST checkpoint memory testing is performed as follows:

1. The first megabyte of DRAM is tested by the BIOS before the BIOS code is shadowed (that is, copied from ROM to DRAM).
2. Once executing out of DRAM, the BIOS performs a simple memory test.
3. The BIOS polls the memory controllers for both correctable and non-correctable memory errors and logs those errors into the SP.
4. The message `BMC Responding` appears at the end of POST.

Viewing POST Code Checkpoints

You can view the BIOS POST codes locally using a local console, or remotely using the Oracle ILOM web interface or the CLI. Choose one of the following local or remote methods:

- "View BIOS POST Code Checkpoints (Oracle ILOM Web Interface)" on page 136
- "View BIOS POST Code Checkpoints (Oracle ILOM CLI)" on page 137

▼ View BIOS POST Code Checkpoints (Oracle ILOM Web Interface)

1. **Open a browser and use the server module's SP IP address as the URL.**

   For information about how to obtain the IP address of the SP, refer to the *Oracle Integrated Lights Out Manager 3.1 User's Guide* in the Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection.

2. **Type a user name and password as follows:**

   User name: **`root`**. Password: **`changeme`**

3. **The Oracle ILOM SP web interface screen appears.**

4. **Click the Remote Control tab.**

5. **Click the Redirection tab.**

6. **Click the Start Redirection button.**

   The remote console window appears and prompts you for your user name and password again, and then the current POST checkpoint screen appears.

7. **To view POST checkpoint codes, use Oracle ILOM to reboot the server.**

See Also

- "View BIOS POST Code Checkpoints (Oracle ILOM CLI)" on page 137
- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (`http://www.oracle.com/pls/topic/lookup?ctx=ilom31`)

▼ View BIOS POST Code Checkpoints (Oracle ILOM CLI)

1. **Access a terminal window.**
2. **To log in to the SP, type:**

   `ssh root@`*SP_IPaddress*

   where *SP_IPaddress* is the IP address of the server module SP.
3. **To start the serial console, type:**

   `-> start /HOST/console`
4. **The post codes appear in the terminal window.**

See Also "View BIOS POST Code Checkpoints (Oracle ILOM Web Interface)" on page 136

POST Code Checkpoint Reference

POST (power-on self-test) works with other processes to complete initialization of the host system prior to booting. During the host initialization process, if failures occur, the failures are communicated to Oracle ILOM for analysis and logging.

The following table describes each POST code, listed in the order in which they are generated. POST codes appear at the bottom right of the BIOS screen as a four-digit string that is a combination of two-digit output from primary I/O port 80 and two-digit output from secondary I/O port 81. In the POST checkpoint codes listed in this section, the first two digits are from port 81 and the last two digits are from port 80.

The Response column describes the action taken by the system on encountering the corresponding error. The actions are:

- **Warning** or **Not an Error**: The message appears on the screen. An error record is logged to the system event log (SEL) for a hardware component. The system continues booting with a degraded state. The user might want to replace the component.
- **Pause**: The message appears on the screen, an error is logged to the SEL, and user input is required to continue. The user can take immediate corrective action or choose to continue booting.
- **Halt**: The message appears on the screen, an error is logged to the SEL, and the system cannot boot unless the error is resolved. The user needs to replace the faulty part and restart the system.

Checkpoint Ranges

Status Code Range	Description
0x01 — 0x0B	SEC execution
0x0C – 0x0F	SEC errors
0x10 — 0x2F	PEI execution up to and including memory detection
0x30 - 0x4F	PEI execution after memory detection
0x50 - 0x5F	PEI errors
0x60 - 0x8F	DXE execution up to BDS
0x90 - 0xCF	BDS execution
0xD0 - 0xDF	DXE errors
0xE0 - 0xE8	S3 Resume (PEI)
0xE9 - 0xEF	S3 Resume errors (PEI)
0xF0 - 0xF8	Recovery (PEI)
0xF9 - 0xFF	Recovery errors (PEI)

Standard Checkpoints: SEC Phase

Status Code	Description
0x00	Not used
Progress Codes	
0x00	Power on. Reset type detection (soft/hard).
0x02	AP initialization before microcode loading
0x03	North Bridge initialization before microcode loading
0x04	South Bridge initialization before microcode loading
0x05	OEM initialization before microcode loading
0x06	Microcode loading
0x07	AP initialization after microcode loading
0x08	North Bridge initialization after microcode loading
0x09	South Bridge initialization after microcode loading

Status Code	Description
0x0A	OEM initialization after microcode loading
0x0B	Cache initialization
SEC Error Codes	
0x0C — 0x0D	Reserved for future AMI SEC error codes
0x0E	Microcode not found
0x0F	Microcode not loaded
SEC Beep Codes	
None	

Standard Checkpoints: PEI Phase

Status Code	Description
Progress Codes	
0x10	PEI Core is started
0x11	Pre-memory CPU initialization is started
0x12	Pre-memory CPU initialization (CPU module specific)
0x13	Pre-memory CPU initialization (CPU module specific)
0x14	Pre-memory CPU initialization (CPU module specific)
0x15	Pre-memory North Bridge initialization is started
0x16	Pre-Memory North Bridge initialization (North Bridge module specific)
0x17	Pre-Memory North Bridge initialization (North Bridge module specific)
0x18	Pre-Memory North Bridge initialization (North Bridge module specific)
0x19	Pre-memory South Bridge initialization is started
0x1A	Pre-memory South Bridge initialization (South Bridge module specific)
0x1B	Pre-memory South Bridge initialization (South Bridge module specific)
0x1C	Pre-memory South Bridge initialization (South Bridge module specific)
0x1D - 0x2A	OEM pre-memory initialization codes
0x2B	Memory initialization. Serial Presence Detect (SPD) data reading
0x2C	Memory initialization. Memory presence detection

Status Code	Description
0x2D	Memory initialization. Programming memory timing information
0x2E	Memory initialization. Configuring memory
0x2F	Memory initialization (other).
0x30	Reserved for ASL (see ASL Status Codes section below)
0x31	Memory Installed
0x32	CPU post-memory initialization is started
0x33	CPU post-memory initialization. Cache initialization
0x34	CPU post-memory initialization. Application Processor(s) (AP) initialization
0x35	CPU post-memory initialization. Boot Strap Processor (BSP) selection
0x36	CPU post-memory initialization. System Management Mode (SMM) initialization
0x37	Post-Memory North Bridge initialization is started
0x38	Post-Memory North Bridge initialization (North Bridge module specific)
0x39	Post-Memory North Bridge initialization (North Bridge module specific)
0x3A	Post-Memory North Bridge initialization (North Bridge module specific)
0x3B	Post-Memory South Bridge initialization is started
0x3C	Post-Memory South Bridge initialization (South Bridge module specific)
0x3D	Post-Memory South Bridge initialization (South Bridge module specific)
0x3E	Post-Memory South Bridge initialization (South Bridge module specific)
0x3F-0x4E	OEM post memory initialization codes
0x4F	DXE IPL is started
PEI Error Codes	
0x50	Memory initialization error. Invalid memory type or incompatible memory speed
0x51	Memory initialization error. SPD reading has failed
0x52	Memory initialization error. Invalid memory size or memory modules do not match.
0x53	Memory initialization error. No usable memory detected
0x54	Unspecified memory initialization error.
0x55	Memory not installed
0x56	Invalid CPU type or speed.

Status Code	Description
0x57	CPU mismatch
0x58	CPU self test failed or possible CPU cache error
0x59	CPU micro-code is not found or micro-code update is failed
0x5A	Internal CPU error
0x5B	reset PPI is not available
0x5C-0x5F	Reserved for future AMI error codes
S3 Resume Progress Codes	
0xE0	S3 Resume is stared (S3 Resume PPI is called by the DXE IPL)
0xE1	S3 Boot Script execution
0xE2	Video repost
0xE3	OS S3 wake vector call
0xE4-0xE7	Reserved for future AMI progress codes
S3 Resume Error Codes	
0xE8	S3 Resume Failed
0xE9	S3 Resume PPI not Found
0xEA	S3 Resume Boot Script Error
0xEB	S3 OS Wake Error
0xEC-0xEF	Reserved for future AMI error codes
Recovery Progress Codes	
0xF0	Recovery condition triggered by firmware (Auto recovery)
0xF1	Recovery condition triggered by user (Forced recovery)
0xF2	Recovery process started
0xF3	Recovery firmware image is found
0xF4	Recovery firmware image is loaded
0xF5 – 0xF7	Reserved for future AMI progress codes
Recovery Error Codes	
0xF8	Recovery PPI is not available
0xF9	Recovery capsule is not found

Status Code	Description
0xFA	Invalid recovery capsule
0xFB — 0xFF	Reserved for future AMI error codes
PEI Beep Codes	
# of Beeps	Description
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXEIPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

Standard Checkpoints: DXE Phase

Status Code	Description
0x60	DXE Core is started
0x61	NVRAM initialization
0x62	Installation of the South Bridge Runtime Services
0x63	CPU DXE initialization is started
0x64	CPU DXE initialization (CPU module specific)
0x65	CPU DXE initialization (CPU module specific)
0x66	CPU DXE initialization (CPU module specific)
0x67	CPU DXE initialization (CPU module specific)
0x68	PCI host bridge initialization
0x69	North Bridge DXE initialization is started
0x6A	North Bridge DXE SMM initialization is started
0x6B	North Bridge DXE initialization (North Bridge module specific)
0x6C	North Bridge DXE initialization (North Bridge module specific)

Status Code	Description
0x6D	North Bridge DXE initialization (North Bridge module specific)
0x6E	North Bridge DXE initialization (North Bridge module specific)
0x6F	North Bridge DXE initialization (North Bridge module specific)
0x70	South Bridge DXE initialization is started
0x71	South Bridge DXE SMM initialization is started
0x72	South Bridge devices initialization
0x73	South Bridge DXE Initialization (South Bridge module specific)
0x74	South Bridge DXE Initialization (South Bridge module specific)
0x75	South Bridge DXE Initialization (South Bridge module specific)
0x76	South Bridge DXE Initialization (South Bridge module specific)
0x77	South Bridge DXE Initialization (South Bridge module specific)
0x78	ACPI module initialization
0x79	CSM initialization
0x7A - 0x7F	Reserved for future AMI DXE codes
0x80 - 0x8F	OEM DXE initialization codes
0x90	Boot Device Selection (BDS) phase is started
0x91	Driver connecting is started
0x92	PCI Bus initialization is started
0x93	PCI Bus Hot Plug Controller Initialization
0x94	PCI Bus Enumeration
0x95	PCI Bus Request Resources
0x96	PCI Bus Assign Resources
0x97	Console Output devices connect
0x98	Console input devices connect
0x99	Super IO Initialization
0x9A	USB initialization is started
0x9B	USB Reset
0x9C	USB Detect

Status Code	Description
0x9D	USB Enable
0x9E - 0x9F	Reserved for future AMI codes
0xA0	IDE initialization is started
0xA1	IDE Reset
0xA2	IDE Detect
0xA3	IDE Enable
0xA4	SCSI initialization is started
0xA5	SCSI Reset
0xA6	SCSI Detect
0xA7	SCSI Enable
0xA8	Setup Verifying Password
0xA9	Start of Setup
0xAA	Reserved for ASL (see ASL Status Codes section below)
0xAB	Setup Input Wait
0xAC	Reserved for ASL (see ASL Status Codes section below)
0xAD	Ready To Boot event
0xAE	Legacy Boot event
0xAF	Exit Boot Services event
0xB0	Runtime Set Virtual Address MAP Begin
0xB1	Runtime Set Virtual Address MAP End
0xB2	Legacy Option ROM Initialization
0xB3	System Reset
0xB4	USB hot plug
0xB5	PCI bus hot plug
0xB6	Clean-up of NVRAM
0xB7	Configuration Reset (reset of NVRAM settings)
0xB8 - 0xBF	Reserved for future AMI codes
0xC0 - 0xCF	OEM BDS initialization codes

Status Code	Description
DXE Error Codes	
0xD0	CPU initialization error
0xD1	North Bridge initialization error
0xD2	South Bridge initialization error
0xD3	Some of the Architectural Protocols are not available
0xD4	PCI resource allocation error. Out of Resources
0xD5	No Space for Legacy Option ROM
0xD6	No Console Output Devices are found
0xD7	No Console Input Devices are found
0xD8	Invalid password
0xD9	Error loading Boot Option (LoadImage returned error)
0xDA	Boot Option is failed (StartImage returned error)
0xDB	Flash update is failed
0xDC	Reset protocol is not available
DXE Beep Codes	
# of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

ACPI/ASL Checkpoints

Status Code	Description
0x01	System is entering S1 sleep state
0x02	System is entering S2 sleep state

Status Code	Description
0x03	System is entering S3 sleep state
0x04	System is entering S4 sleep state
0x05	System is entering S5 sleep state
0x10	System is waking up from the S1 sleep state
0x20	System is waking up from the S2 sleep state
0x30	System is waking up from the S3 sleep state
0x40	System is waking up from the S4 sleep state
0xAC	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
0xAA	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

OEM-Reserved Checkpoint Ranges

Status Code	Description
0x05	OEM SEC initialization before microcode loading
0x0A	OEM SEC initialization after microcode loading
0x1D - 0x2A	OEM pre-memory initialization codes
0x3F - 0x4E	OEM PEI post memory initialization codes
0x80 - 0x8F	OEM DXE initialization codes
0xC0 - 0xCF	OEM BDS initialization codes

BIOS Setup Utility Menu Options

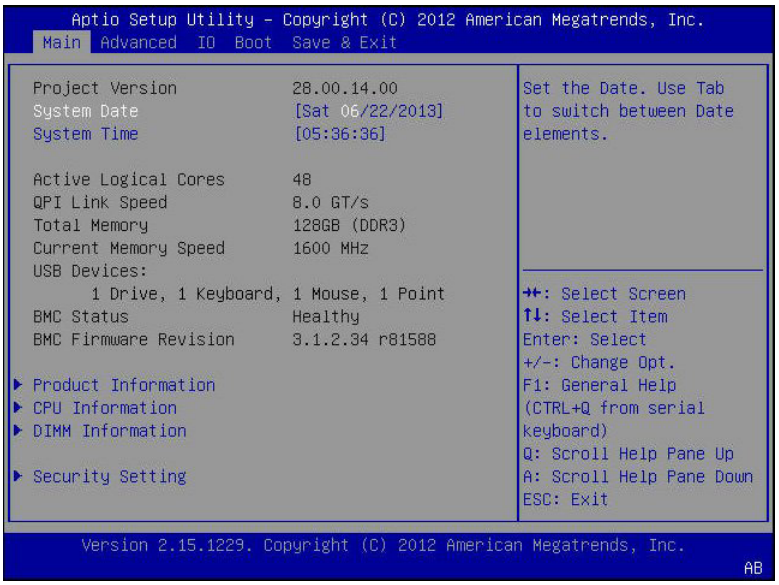
This section contains screen shots of the BIOS Setup Utility screens. Following the screenshot for each top level menu is a table of the options available from that menu and sub-menus.

For information on BIOS access, set up, and configuration parameters, refer to the Oracle x86 Administration Guide for X4 Series Servers (`http://www.oracle.com/goto/x86AdminDiag/docs`)

BIOS Main Menu Selections

The following screen captures show the BIOS Setup Utility Main menu screens.

Note – For information about accessing the BIOS Setup Utility, refer to the Oracle x86 Administration Guide for X4 Series Servers (`http://www.oracle.com/goto/x86AdminDiag/docs`)

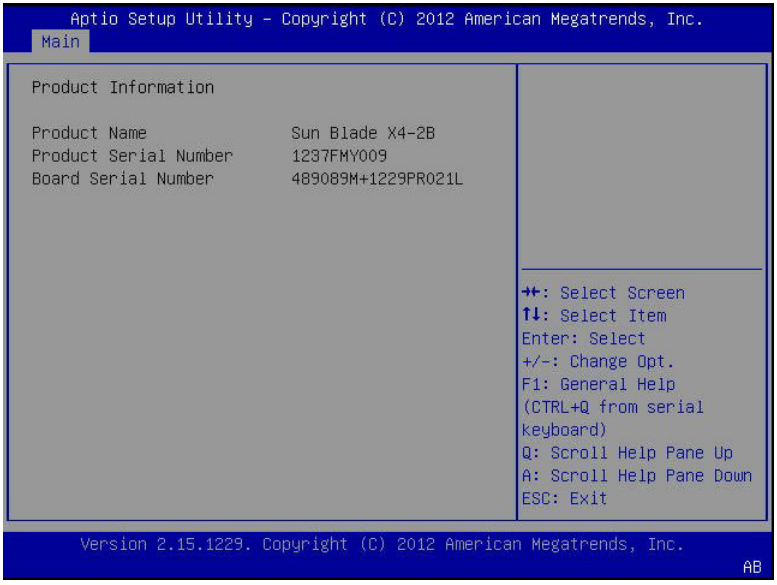


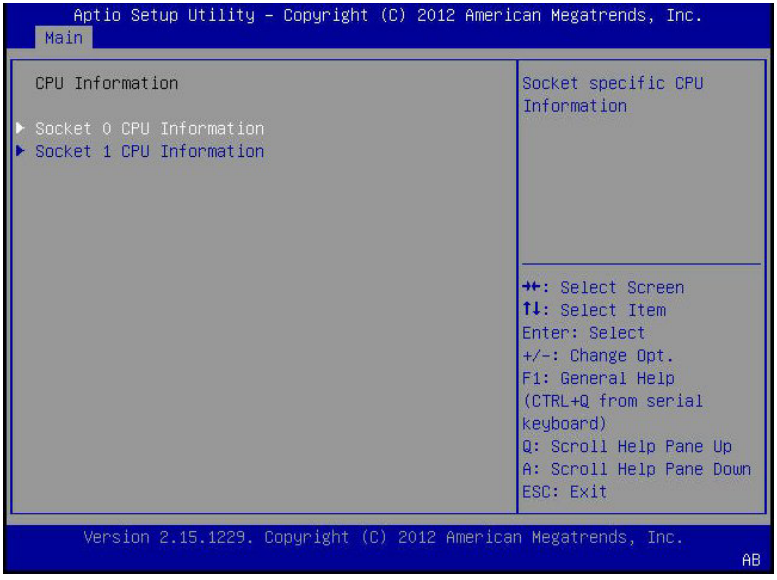
The following table lists the BIOS Setup Utility Main menu setup options:

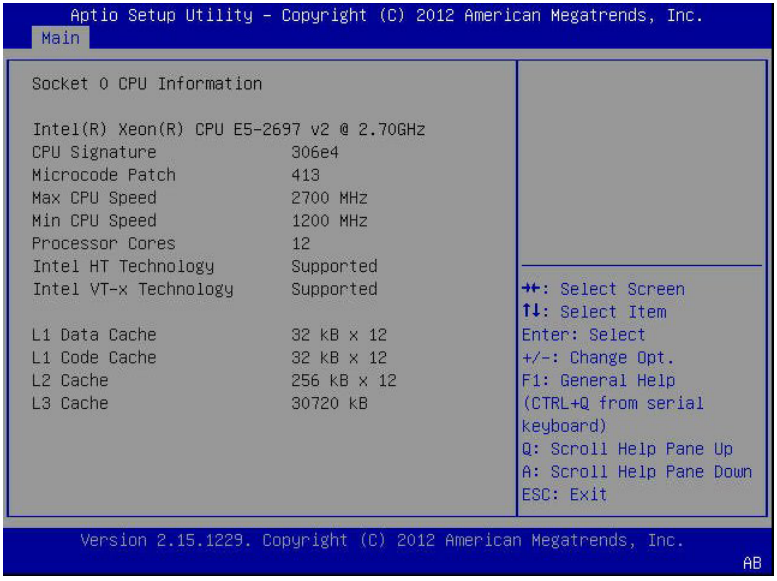
Main Setup Options	Options	Defaults	Description
Project Version (R/O)			BIOS version is displayed. This string is a unique identifier used to reference a specific BIOS release. Format is XXYYZZPP, which indicates: XX - Unique project/platform code. YY - BIOS major release. ZZ - BIOS minor release. PP - Build number. Example: 18.01.04.01 System Date
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	
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.

Main Setup Options	Options	Defaults	Description
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)			D
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 X4-2B
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.
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.
Processor Cores			Number of available processor cores is displayed. Example: 8
Intel HT Technology			Indicates whether Intel Hyper Threading is supported.

Main Setup Options	Options	Defaults	Description
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."
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.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main
Product Information
Product Name Sun Blade X4-2B
Product Serial Number 1237FMY009
Board Serial Number 489089M+1229PR021L
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main
CPU Information
Socket specific CPU Information
Socket 0 CPU Information
Socket 1 CPU Information
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main
Socket 0 CPU Information
Intel(R) Xeon(R) CPU E5-2697 v2 @ 2.70GHz
CPU Signature 306e4
Microcode Patch 413
Max CPU Speed 2700 MHz
Min CPU Speed 1200 MHz
Processor Cores 12
Intel HT Technology Supported
Intel VT-x Technology Supported
L1 Data Cache 32 kB x 12
L1 Code Cache 32 kB x 12
L2 Cache 256 kB x 12
L3 Cache 30720 kB
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
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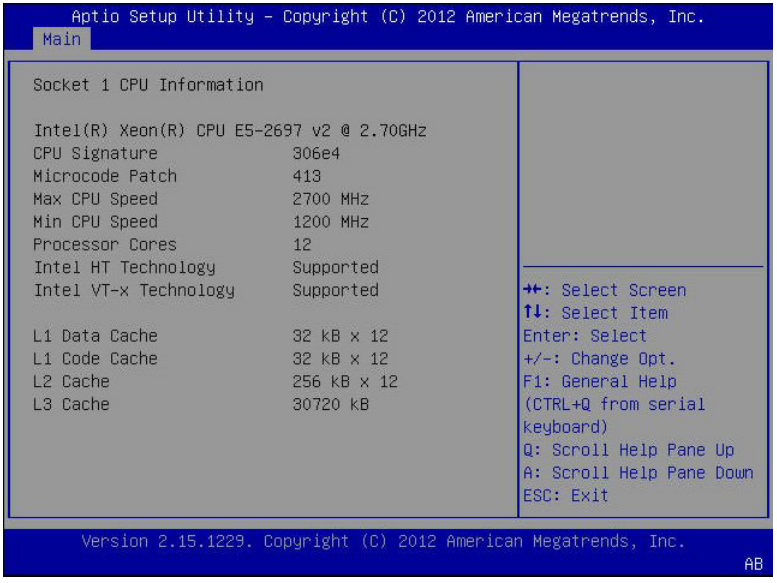
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main
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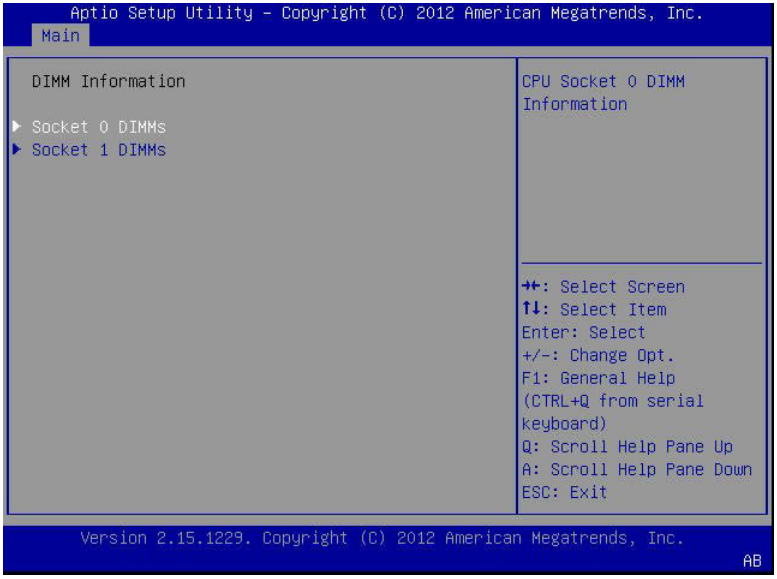
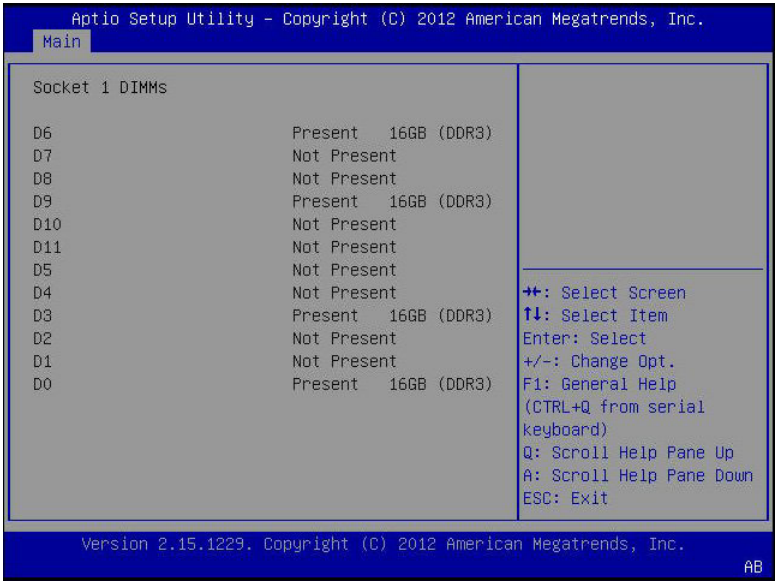

Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main
DIMM Information
Socket 0 DIMMs
Socket 1 DIMMs
CPU Socket 0 DIMM Information
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main
Socket 1 DIMMs
D6 Present 16GB (DDR3)
D7 Not Present
D8 Not Present
D9 Present 16GB (DDR3)
D10 Not Present
D11 Not Present
D5 Not Present
D4 Not Present
D3 Present 16GB (DDR3)
D2 Not Present
D1 Not Present
D0 Present 16GB (DDR3)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
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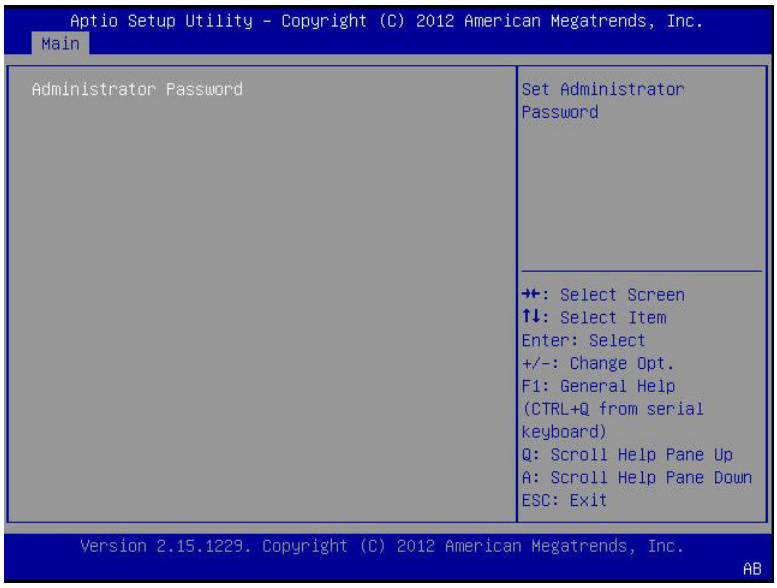
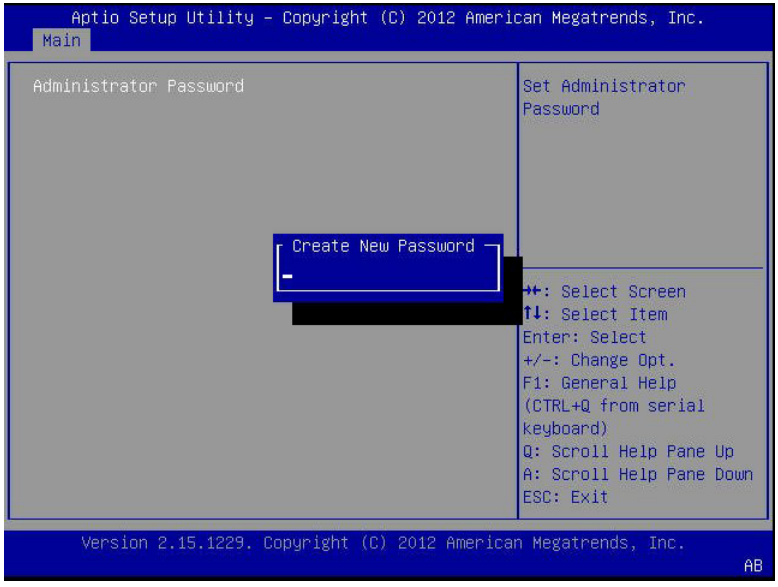

Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main
Administrator Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main
Administrator Password
Set Administrator Password
Create New Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
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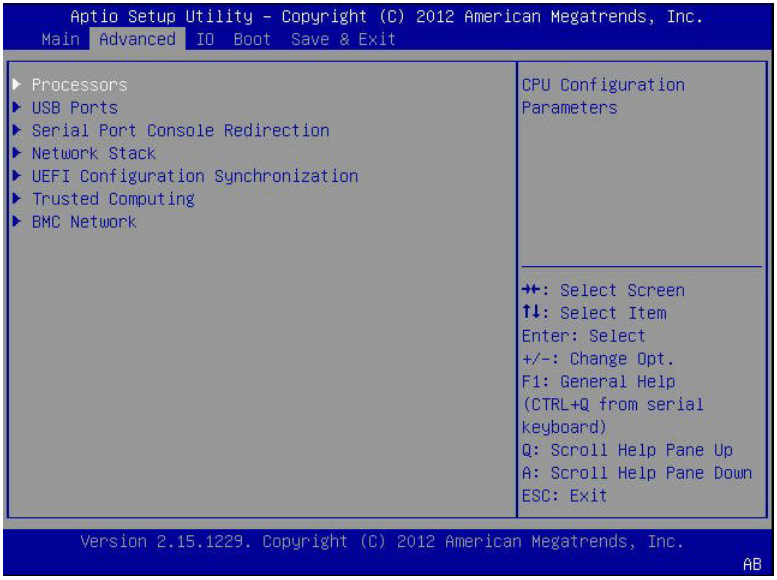
BIOS Advanced Menu Selections

The following screen captures show the BIOS Setup Utility Advanced menu screens.



The following table lists the BIOS Setup Utility Advanced menu setup options:

Advanced Setup Options	Options	Defaults	Description
Processors			Enable or disable processor (CPU) features.
Hyper-threading	Disabled/ Enabled	Enabled	When enabled, two threads are available per enabled core. When disabled, only one thread per enabled core is available.
Execute Disable Bit	Disabled/ Enabled	Enabled	When enabled, execute disable bit can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Oracle Solaris, Oracle VM, Windows Server, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, and VMware ESXi).
Hardware Prefetcher	Disabled/ Enabled	Enabled	Enable the mid-level cache (L2) streamer prefetcher.
Adjacent Cache Line Prefetcher	Disabled/ Enabled	Enabled	Enable the mid-level cache (L2) prefetching of adjacent cache lines.

Advanced Setup Options	Options	Defaults	Description
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.
CPU C3 Report	Disabled/ Enabled	Enabled	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 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.

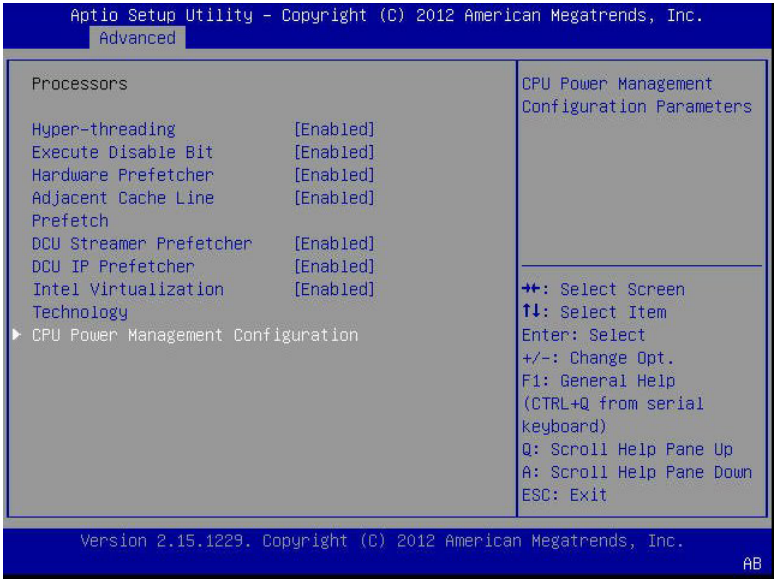
Advanced Setup Options	Options	Defaults	Description
EHCI Hand-off	Disabled/ Enabled	Disabled	Enable or disable Enhanced Host Controller Interface (EHCI) hand-off support.
Port 60/64 Emulation	Disabled/ Enabled	Enabled	Enable I/O port 60h/64h emulation support. Enable this setting for the complete USB 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.
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.

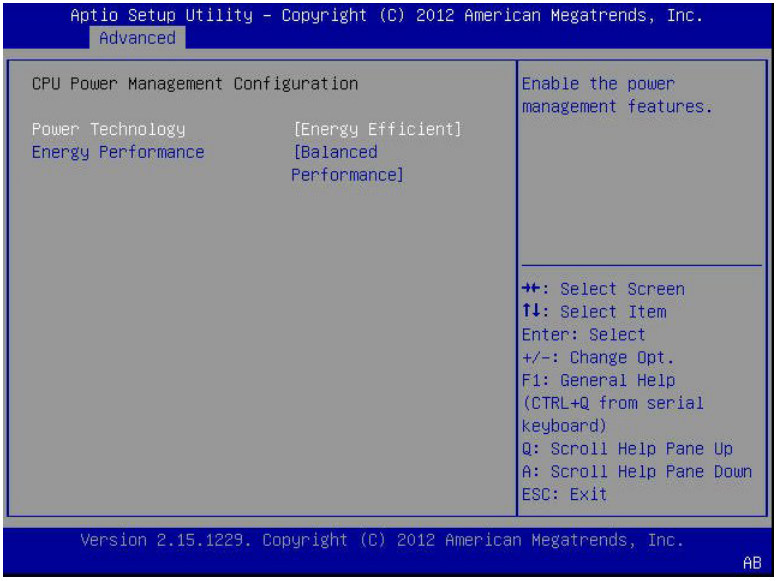
Advanced Setup Options	Options	Defaults	Description
Bits per Second	9600/ 10200 / 57600/ 115200	9600	Select the serial port transmission speed. The speed must be matched on the connecting serial device. Long or noisy lines require lower speeds.
Data Bits	07/08/11	8	Select the data bits.
Parity	None/ 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.
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
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:

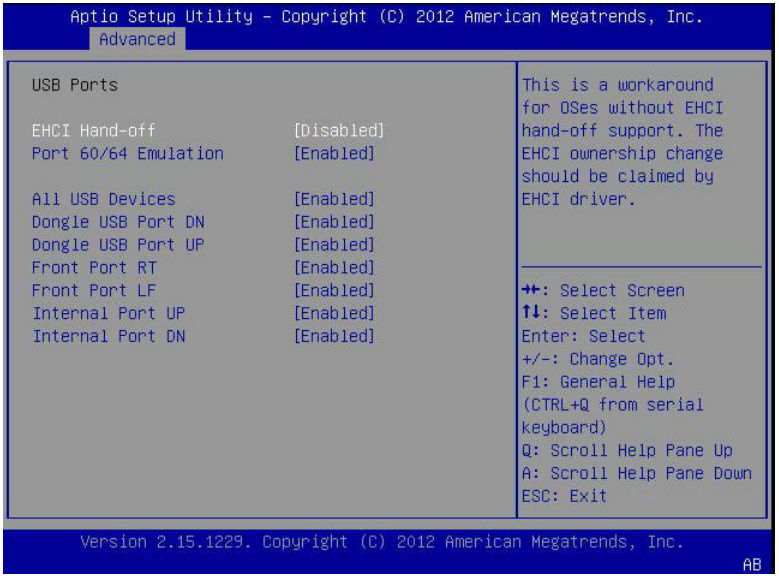
Advanced Setup Options	Options	Defaults	Description
NETWORK STACK			Configure network stack settings.
Network Stack	Disabled/ Enabled	Enabled	Enable or disable the UEFI network stack.
BMC NETWORK			Configure Baseboard Management Controller (BMC) network parameters.
BMC Network: Current Active Management Port (R/O)	Disabled/ Enabled	Enabled	Active management port settings are displayed. Refresh
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.
Commit			Commit the current BMC network information.
IPv4 Configuration (R/O)			Current configuration of the IPv4 settings is displayed.
Channel Number (R/O)			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.

Advanced Setup Options	Options	Defaults	Description
IPv4 Address			If IPv4 Assignment is set to Static, set the IPv4 address for the service processor.
IPv4 Subnet Mask			If the IPv4 Assignment is set to Static, set the IPv4 subnet mask. Example: 255.255.255.0
IPv4 Default Gateway			If the IPv4 Assignment is set to Static, set the IPv4 default gateway. Example: 129.144.82.254
Commit			Commit the IPv4 configuration settings.
IPv6 Configuration (R/O)	Static/ Dynamic	Dynamic	urrent 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.
IPv6 State (R/O)	Disabled/ Enabled		View whether the IPv6 state is enabled or disabled.

Advanced Setup Options	Options	Defaults	Description
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.




Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
CPU Power Management Configuration
Power Technology [Energy Efficient]
Energy Performance [Balanced Performance]
Enable the power management features.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
USB Ports
EHCI Hand-off [Disabled]
Port 60/64 Emulation [Enabled]
All USB Devices [Enabled]
Dongle USB Port DN [Enabled]
Dongle USB Port UP [Enabled]
Front Port RT [Enabled]
Front Port LF [Enabled]
Internal Port UP [Enabled]
Internal Port DN [Enabled]
This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
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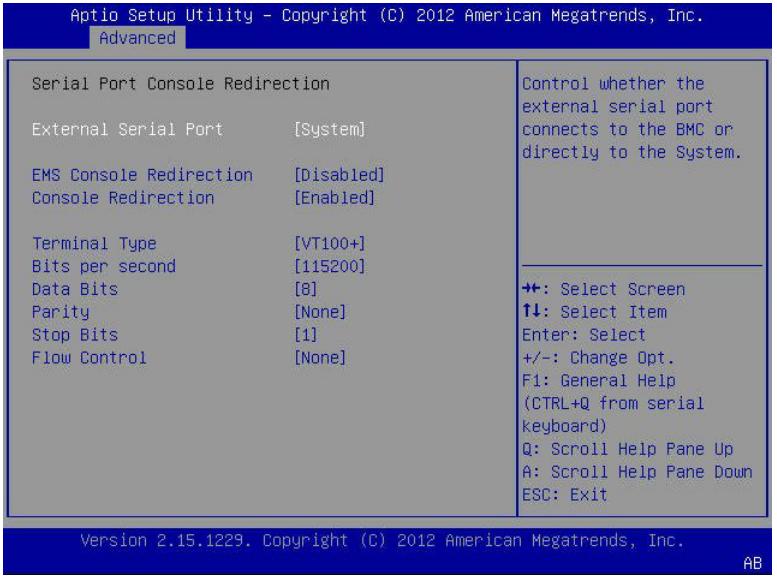
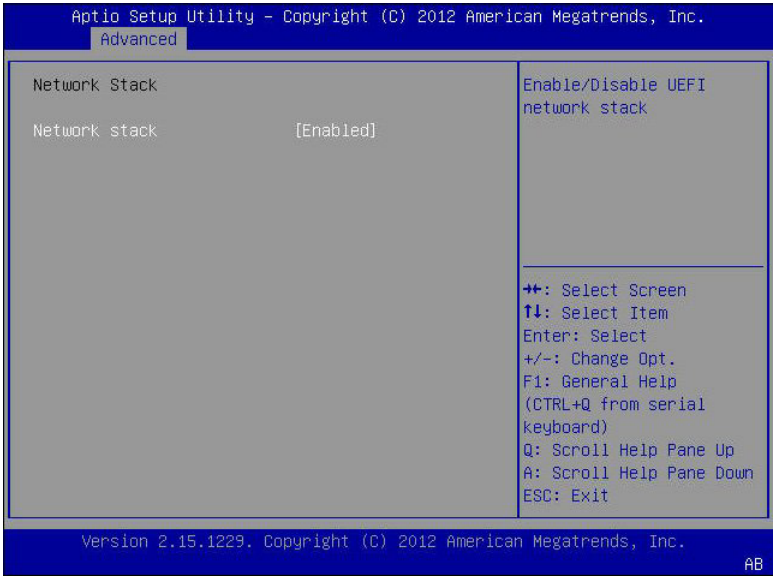
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Serial Port Console Redirection
External Serial Port [System]
EMS Console Redirection [Disabled]
Console Redirection [Enabled]
Terminal Type [VT100+]
Bits per second [115200]
Data Bits [8]
Parity [None]
Stop Bits [1]
Flow Control [None]
Control whether the external serial port connects to the BMC or directly to the System.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Network Stack
Network stack [Enabled]
Enable/Disable UEFI network stack
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
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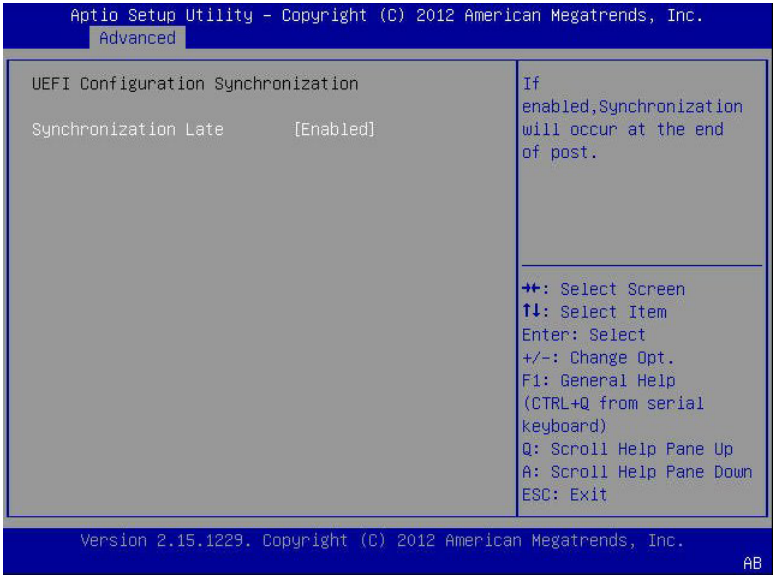
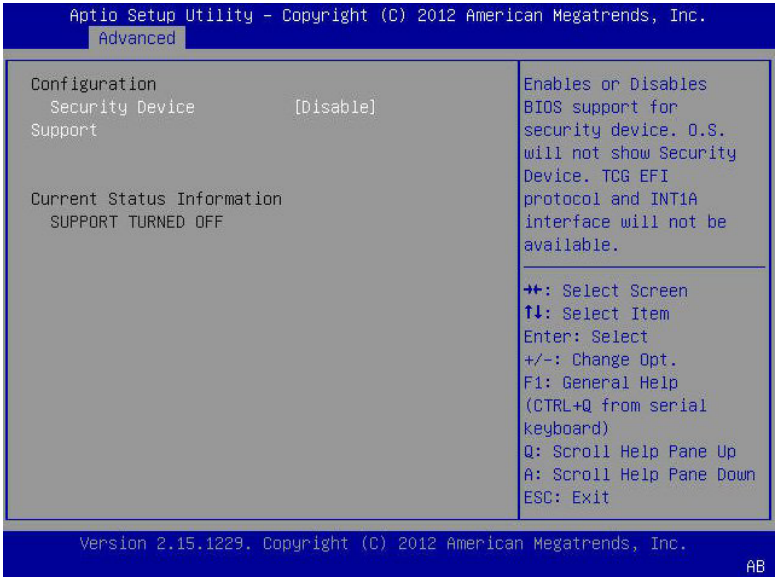
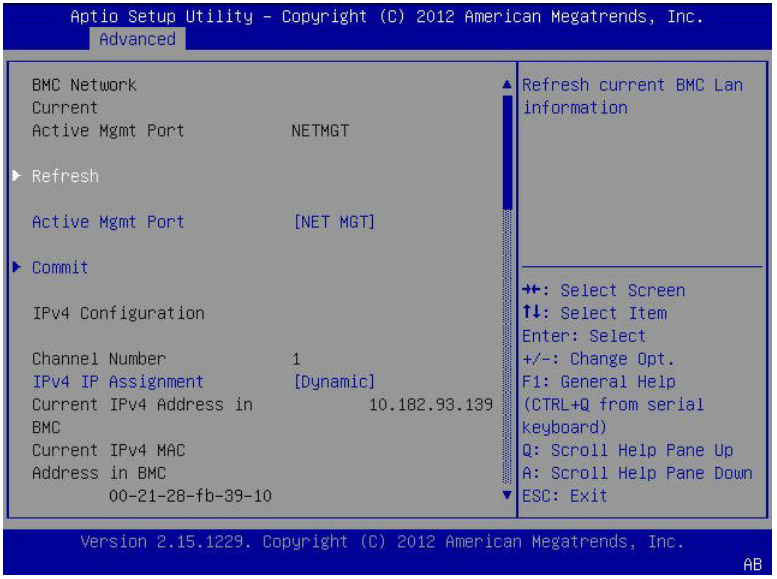
AB

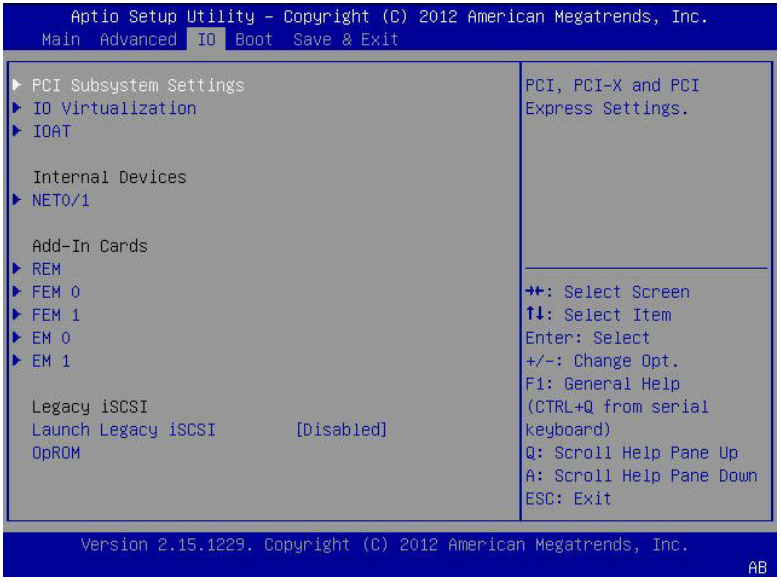

Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
UEFI Configuration Synchronization
Synchronization Late [Enabled]
If enabled,Synchronization will occur at the end of post.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Configuration
Security Device Support [Disable]
Current Status Information
SUPPORT TURNED OFF
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB



BIOS I/O Menu Selections

The following screen captures show the BIOS Setup Utility I/O menu screens.

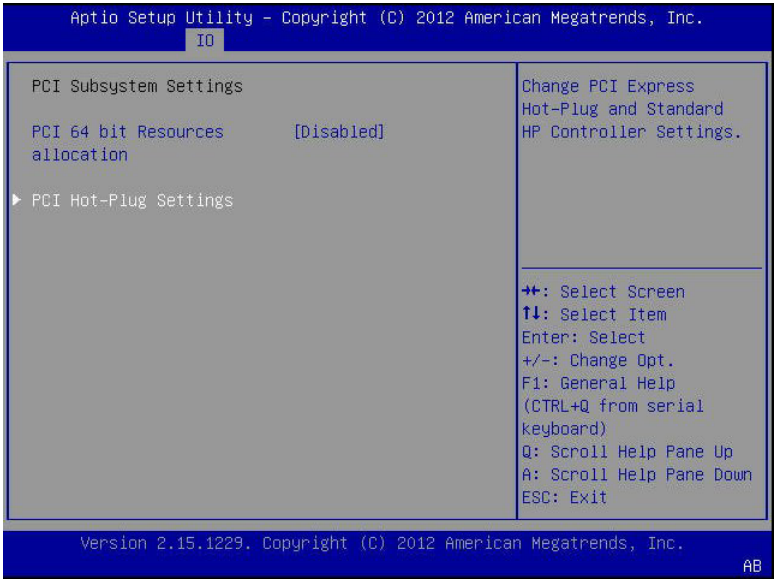


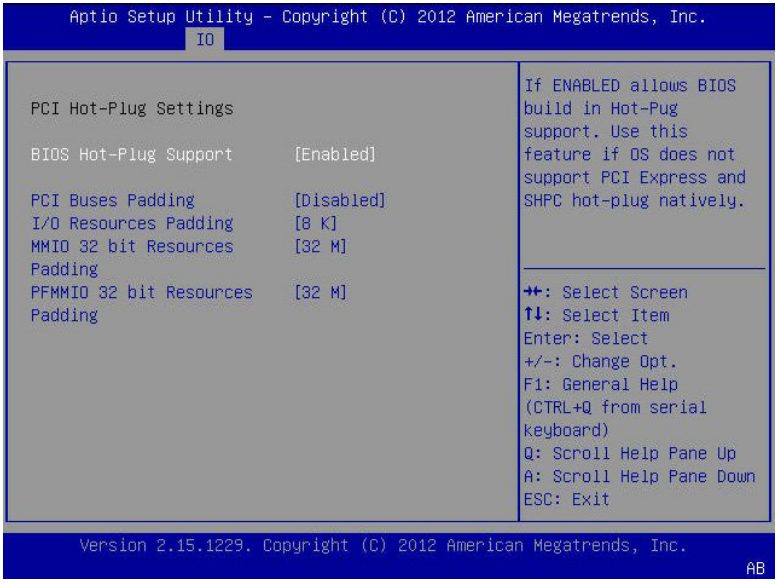
The following table lists the BIOS Setup Utility I/O menu setup options:

I/O Setup Options	Options	Defaults	Description
PCI SUBSYSTEM SETTINGS			Configure PCI, PCI-X, and PCI Express settings.
PCI 64 Bit Resources Allocation	Disabled/ Enabled	Disabled	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.
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	Enabled	If Alternate Routing ID (ARI) is supported by the hardware and set to enabled, devices are permitted to locate virtual functions (VFs) in function numbers 8 to 255 of the captured bus number, instead of normal function numbers 0 to 7.
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.

I/O 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: REM FEM 0 FEM 1 EM 0 EM 1
REM			
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.
FEM 0			
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..
FEM 1			
IO Enable	Disabled/ Enabled	Enabled	Enable or disable I/O for the add-in card.
OpROM Enable	Disabled/ Enabled	Enabled	Enable or disable Option ROM for the add-in card.
EM 0			
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.

I/O Setup Options	Options	Defaults	Description
EM 1			
IO Enable	Disabled/ Enabled	Enabled	Enable or disable I/O for the add-in card.
OpROM Enable	Disabled/ Enabled	Enabled	Enable or disable Option ROM for the add-in card.
Maximum Link Speed			Displays speed as [GEN2 (De-Emph=1 -3.5 dB]
PCI Hot-Plug Settings			Change PCI Express and standard HP controller settings. If enabled allows BIOS built in hot-plug support. Use this feature if OS does not support PCI Express and SHPC hot-plug natively. Use this feature to enable or disable PCI Hot-Plug Settings: BIOS Hot-Plug Support PCI Buses Padding I/O Resources Padding MMIO 32 bit Resources Padding PFMMIO 32 bit Resources Padding
PCI Buses Padding	Disabled/ Enabled	Disabled	Use this feature if OS does not support PCI Express and SHPC hot-plug natively.
I/O Resources Padding.		8 k	Use this feature if OS does not support PCI Express and SHPC hot-plug natively.
MMIO 32 bit Resources Padding.		32 M	Use this feature if OS does not support PCI Express and SHPC hot-plug natively.
PFMMIO 32 bit Resources Padding.		32 M	Use this feature if OS does not support PCI Express and SHPC hot-plug natively.
Legacy iSCSI			Configure the iSCSI parameters.
Launch Legacy iSCSI	Disabled/ Enabled	Disabled	Enable or disable iSCSI for the add-in card.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
IO
PCI Subsystem Settings
PCI 64 bit Resources allocation [Disabled]
PCI Hot-Plug Settings
Change PCI Express Hot-Plug and Standard HP Controller Settings.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
IO
PCI Hot-Plug Settings
BIOS Hot-Plug Support [Enabled]
PCI Buses Padding [Disabled]
I/O Resources Padding [8 K]
MMIO 32 bit Resources Padding [32 M]
PFMMIO 32 bit Resources Padding [32 M]
If ENABLED allows BIOS build in Hot-Pug support. Use this feature if OS does not support PCI Express and SHPC hot-plug natively.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
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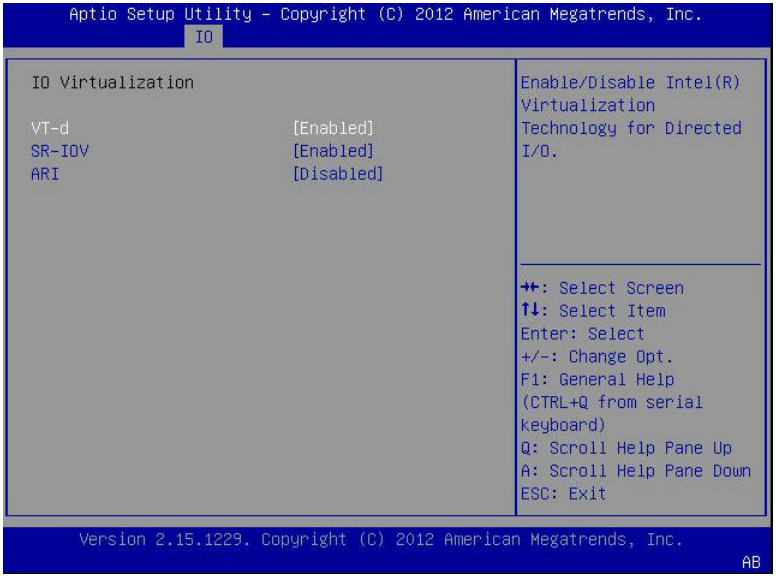
Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
IO
IO Virtualization
VT-d [Enabled]
SR-IOV [Enabled]
ARI [Disabled]
Enable/Disable Intel(R) Virtualization Technology for Directed I/O.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
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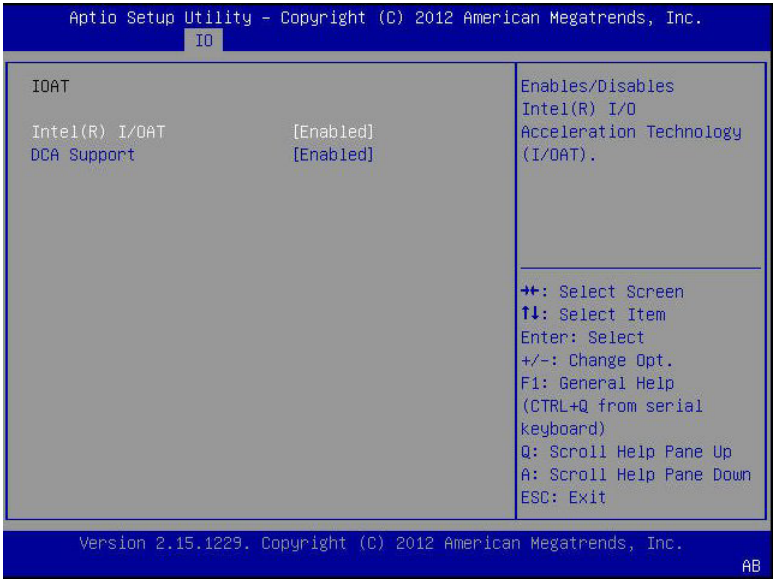
Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
IO
IOAT
Intel(R) I/OAT [Enabled]
DCA Support [Enabled]
Enables/Disables Intel(R) I/O Acceleration Technology (I/OAT).
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
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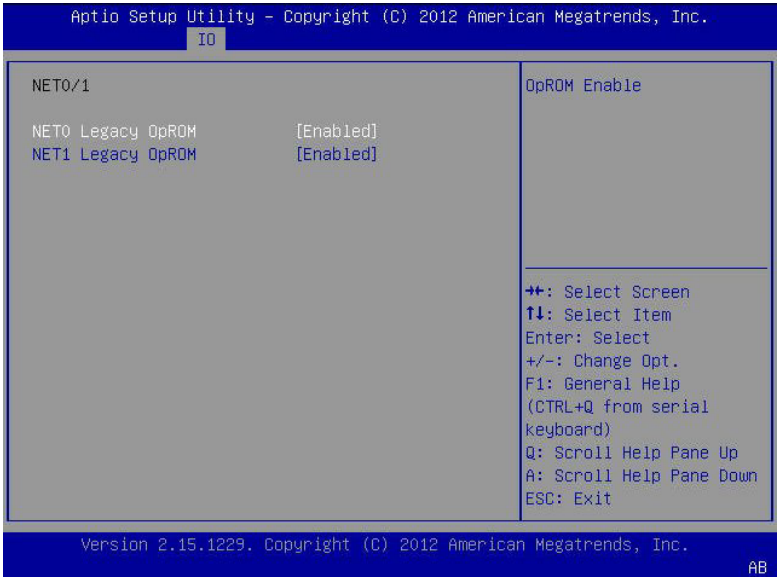
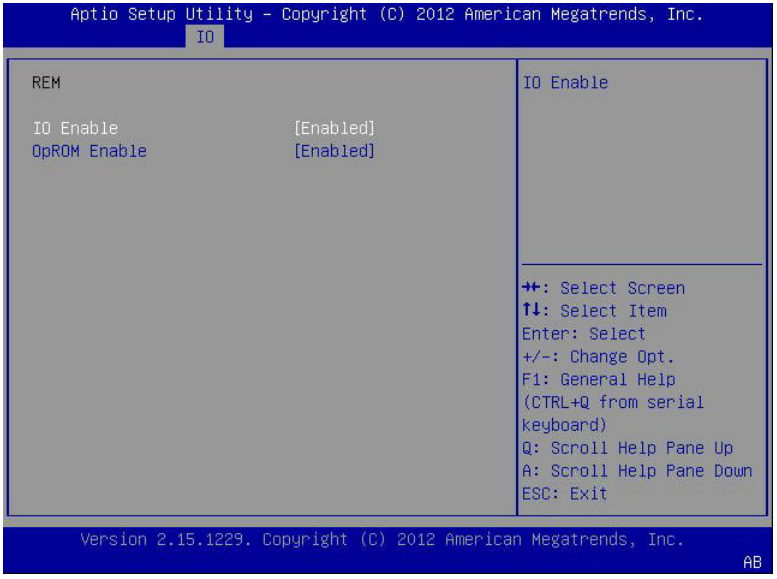

Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
IO
NET0/1
NET0 Legacy OpROM [Enabled]
NET1 Legacy OpROM [Enabled]
OpROM Enable
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
IO
REM
IO Enable [Enabled]
OpROM Enable [Enabled]
IO Enable
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
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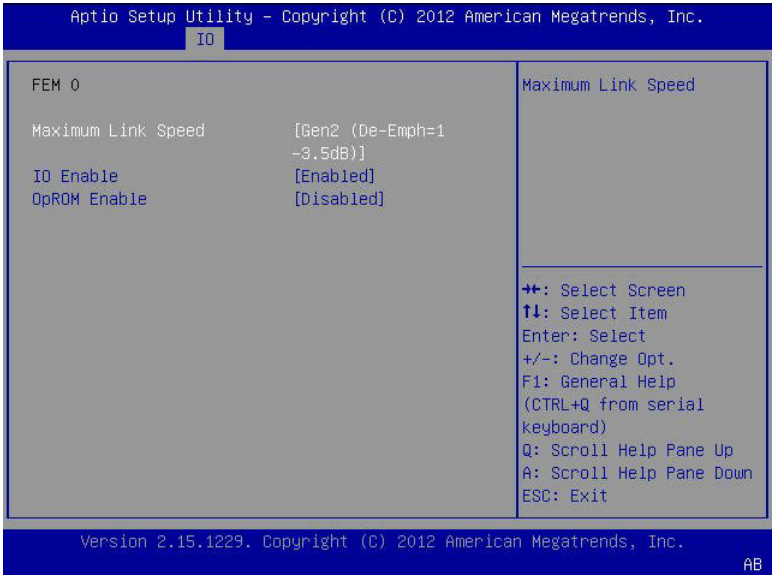
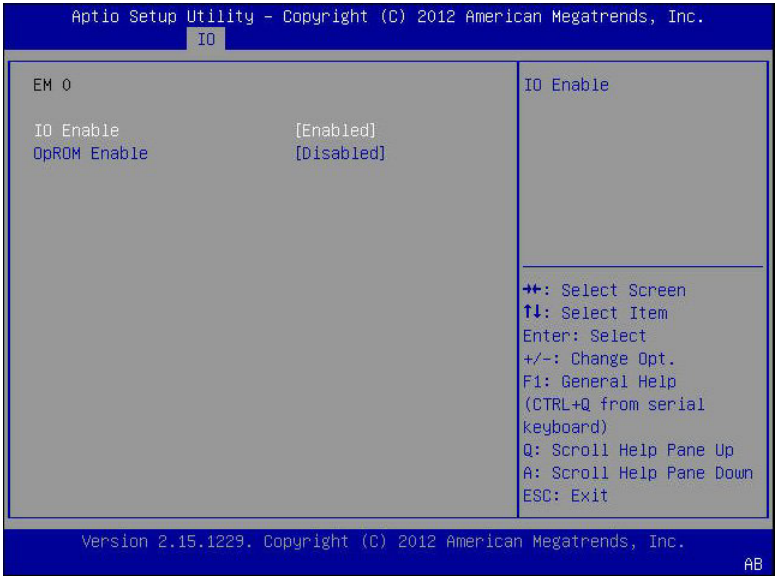

Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
IO
FEM 0
Maximum Link Speed [Gen2 (De-Emph=1 -3.5dB)]
IO Enable [Enabled]
OpROM Enable [Disabled]
Maximum Link Speed
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
AB


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
IO
EM 0
IO Enable [Enabled]
OpROM Enable [Disabled]
IO Enable
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
(CTRL+Q from serial keyboard)
Q: Scroll Help Pane Up
A: Scroll Help Pane Down
ESC: Exit
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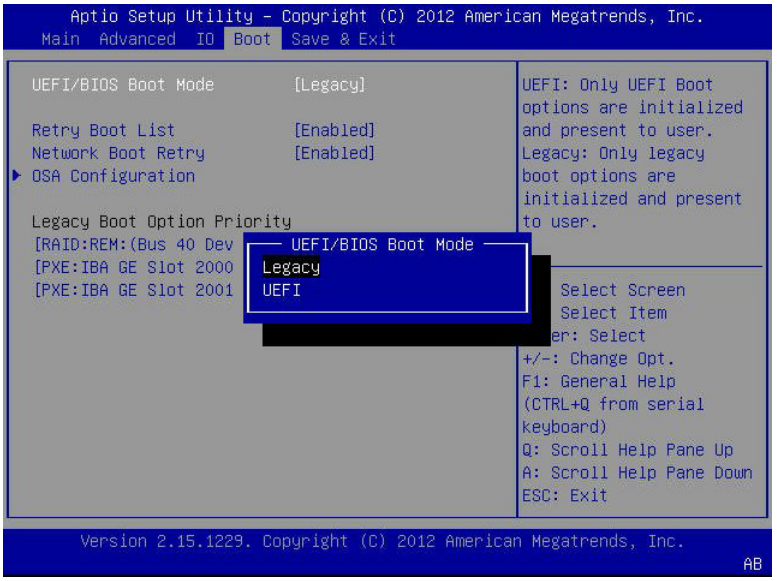
BIOS Boot Menu Selections

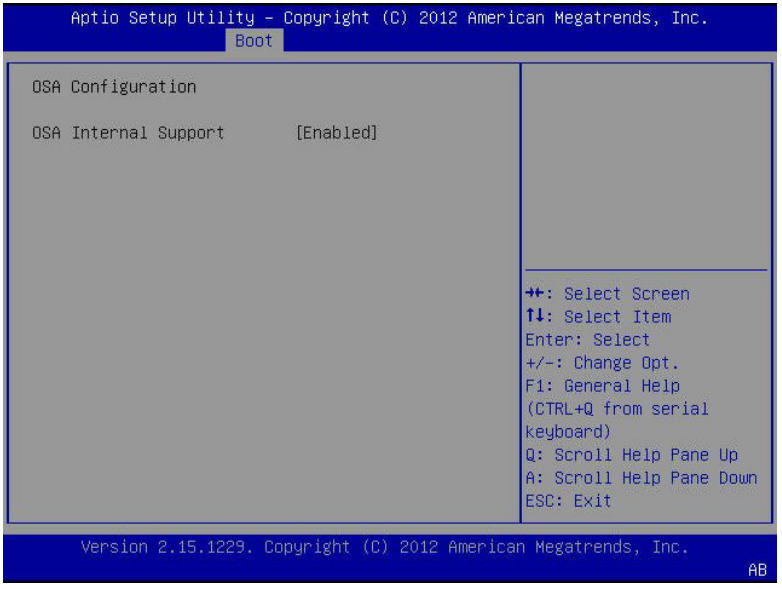
The following screen captures show the BIOS Setup Utility Boot menu screens.



The following table lists the BIOS Setup Utility Boot menu setup options:

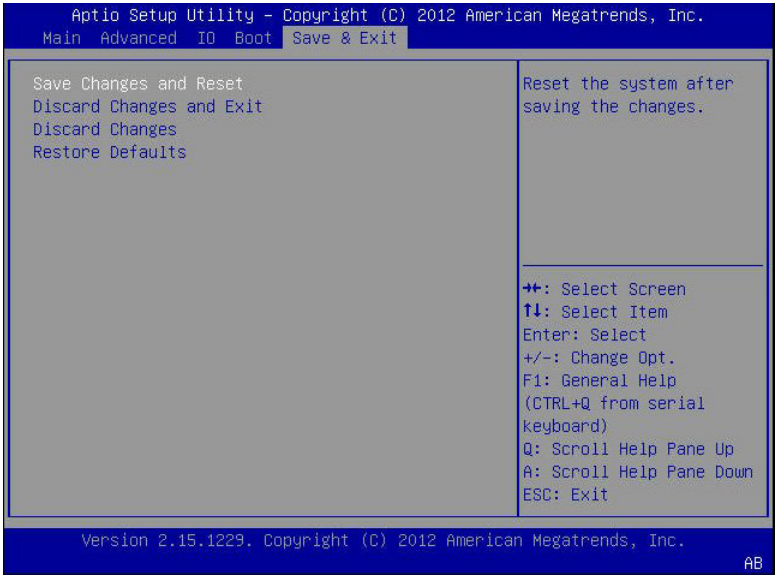
Boot Setup Options	Options	Defaults	Description
UEFI/BIOS Boot Mode	Legacy BIOS /UEFI	Legacy BIOS	Select either Legacy BIOS or UEFI BIOS as the boot mode. Enable UEFI: Only UEFI BIOS boot options are initialized and presented to user. Enable Legacy BIOS: Only Legacy BIOS boot options are initialized 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.

Boot 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]



BIOS Save and Exit Menu Selections

The following screen capture shows the BIOS Setup Utility Save and Exit menu screen.



The following table lists the BIOS Setup Utility Save and Exit menu setup options:

Save and Exit 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.

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