Netra Blade X3-2B
(formerly Sun Netra X6270 M3 Blade)

Service Manual

Part No.: E26408-04
November 2012

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Contents

Using This Documentation

This documentation contains service, component removal and replacement, and maintenance procedures for the Netra Blade X3-2B.

Product Notes

For late-breaking information and known issues about this product, see the product notes at:

`http://www.oracle.com/pls/topic/lookup?ctx=NetraBladeX3-2B`

Related Documentation

Documentation	Link
All Oracle products	http://www.oracle.com/documentation
Netra Blade X3-2B	http://www.oracle.com/pls/topic/lookup?ctx=NetraBladeX3-2B
Sun Netra 6000 Modular System	http://www.oracle.com/pls/topic/lookup?ctx=Netra6000
Oracle Integrated Lights Out Manager (ILOM) 3.1	http://www.oracle.com/pls/topic/lookup?ctx=ilom31
Oracle Hardware Management Pack	http://www.oracle.com/pls/topic/lookup?ctx=ohmp

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Support and Accessibility

Description	Links
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Learn about Oracle's commitment to accessibility	http://www.oracle.com/us/corporate/accessibility/index.html
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About the Netra Blade X3-2B

This section contains an overview of the Netra Blade X3-2B and its components.

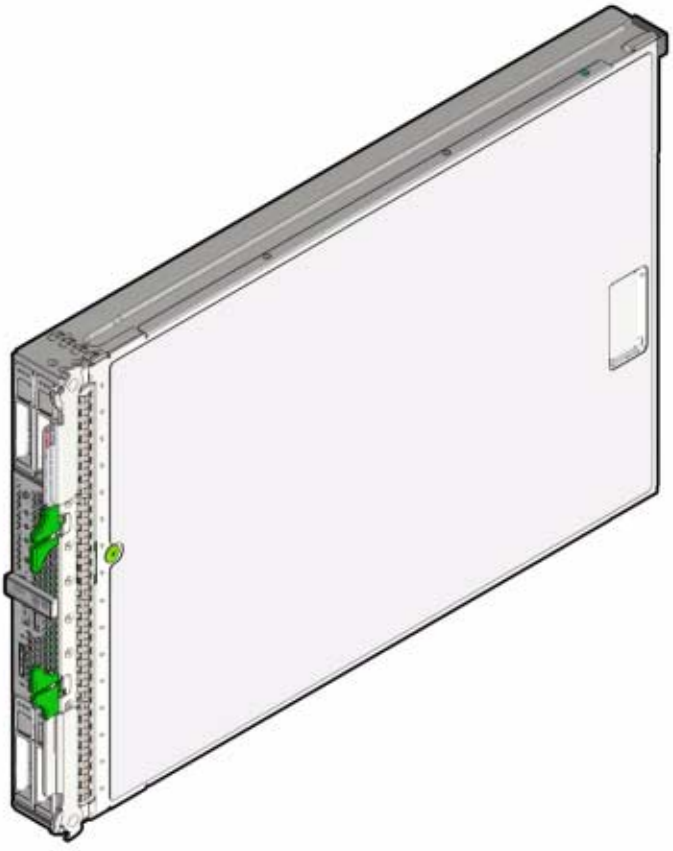
The following topics are covered:

Product Description

The Netra Blade X3-2B is an enterprise class server blade that supports 2P (two processor) configurations. The blade has a standard Netra Blade X3-2B 6000 chassis blade form factor, layout, airflow, and compatibility with RAID expansion modules (REMs) and fabric expansion modules (FEMs). The Netra Blade X3-2B is based on two Intel(R) Xeon(R) processors in the E5-2600 family, and the Intel C600 series chipset. The Netra Blade X3-2B includes an on-board Oracle ILOM service processor (SP).

For more information about the blade and optional components, see the Netra Blade X3-2B product page at:

`http://www.oracle.com/goto/netra-blade-x3-2b`



Related Information

- *Netra Blade X3-2B Installation Guide,* "About Blade Features and Components" on page 1

Front Panel Features

The following illustration shows front panel features on the Netra Blade X3-2B.

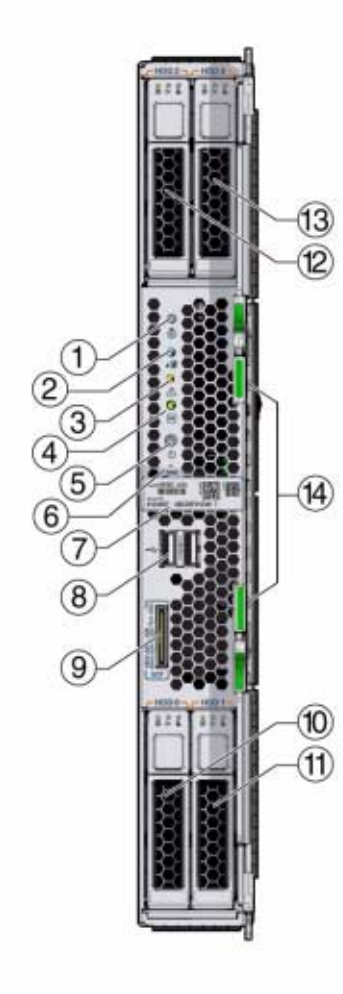


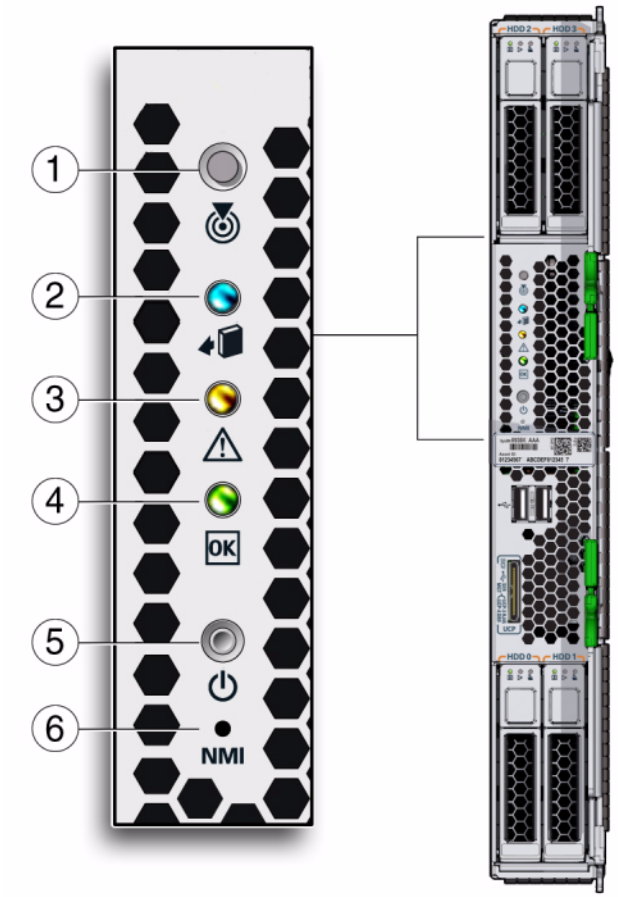
Figure Legend			
1	Locate button and LED - white	8	USB ports (2)
2	Ready to remove LED - blue	9	Universal connector port (UCP)
3	Service action required LED - amber	10	Storage drive (HDD 0)
4	Power OK LED - green	11	Storage drive (HDD 1)
5	Power button	12	Storage drive (HDD 2)
6	NMI Reset button (Service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

Related Information

- "Front Panel LEDs" on page 4
- "Rear Panel Features" on page 6

Front Panel LEDs

The following illustration and table show the location and function of the front panel LEDs.



Legend	Name	Color	Activity
1	: LED/button	White	Press the Locate button to activate the Locate LED, which is used to identify the blade in a chassis. See "Using the Locate LED to Identify the Blade" on page 24. A user can also activate the Locate LED in Oracle ILOM.
2	to Remove LED	Blue	On solid: The blade is ready to remove. See "Removing the Blade from the Chassis" on page 27. Off: Normal operation. Do not remove the blade.
3	e Action Required LED	Amber	On solid: The blade has a fault status. The Service Action Required LED indicates if the server has a fault. See "Troubleshooting the Blade" on page 93. Off: Normal operation.
4	/OK LED	Green	Identifies the power state of the blade. • Service processor is starting: Fast blink • Host is booting: Slow blink at 1 Hz. • Standby power mode: Blink 0.2 seconds on, 2.8 seconds off • Full power mode: On solid (does not blink)
5	Power button	None	Press to power the blade on or off. See "Powering Off the Blade" on page 17 or "Powering On the Blade" on page 87.
6	NMI button	None	Non-maskable interrupt. For service use only.

Note – After the blade is inserted into a powered-on chassis, all front panel LEDs blink three times.

Related Information

- "Front Panel Features" on page 2
- "Rear Panel Features" on page 6

Rear Panel Features

The following illustration shows rear panel features on the Netra Blade X3-2B.

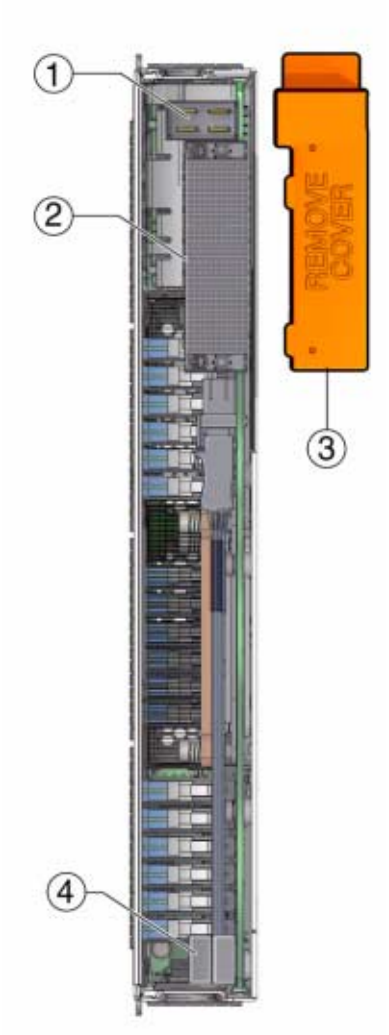


Figure Legend			
1	Power connector	2	I/O connector

Figure Legend			
3	Rear connector cover (remove before inserting into chassis)	4	USB flash drives 2, 3 (P0 and P1)

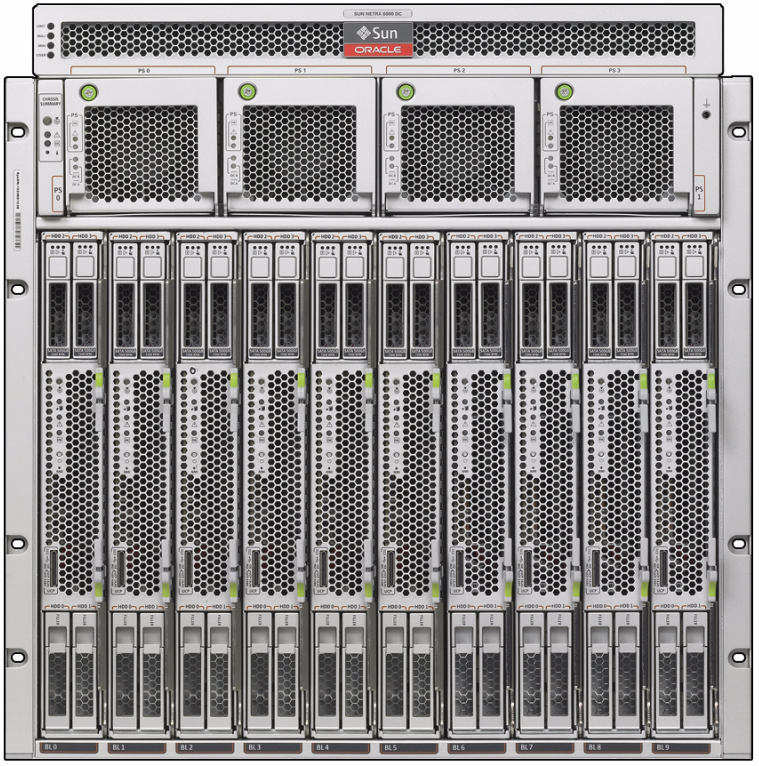
Related Information

- "Front Panel Features" on page 2

Supported Chassis

The Netra Blade X3-2B is compatible with a Sun Netra 6000 modular system chassis. A Sun Netra 6000 modular system's ten slots, when fully loaded, can hold a combination of up to ten blades. Power limitations apply to the number of blades that can be installed in a chassis.

Four Netra 6000 modular system chassis models are supported. Two chassis models are AC and two are DC.

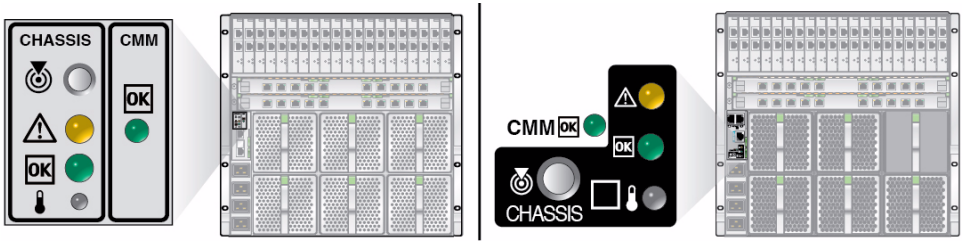


Chassis Marketing Number	CMM ILOM Firmware	Netra Blade X3-2B
N6000-AC 594-6438	3.x	Supported
N6000-DC 594-6726	3.X	Supported
N6000-AC 7100418 594-6893	4.X	Supported
N6000-DC 7100417 594-6892	4.X	Supported

To determine your chassis version, see "Identify Your Chassis Version" on page 9.

▼ Identify Your Chassis Version

- **View the CMM on the rear of the modular system (chassis).**



  - **Left –** CMM (501-7379) on the N6000-AC 594-6438 chassis, and N6000-DC 594-6726 chassis.
  - **Right –** CMM (511-1531) on the N6000-DC 7100417 chassis and the N6000-AC 7100418 chassis.
  - **Right –** CMM (7019286 or higher product part number) on the 7100417 chassis and the 7100418 chassis. (This CMM is required to support the Sun Blade 6000 Virtualized 40GbE Network Express Module.)

  For more details about the chassis, refer to the Sun Blade 6000 modular system documentation.

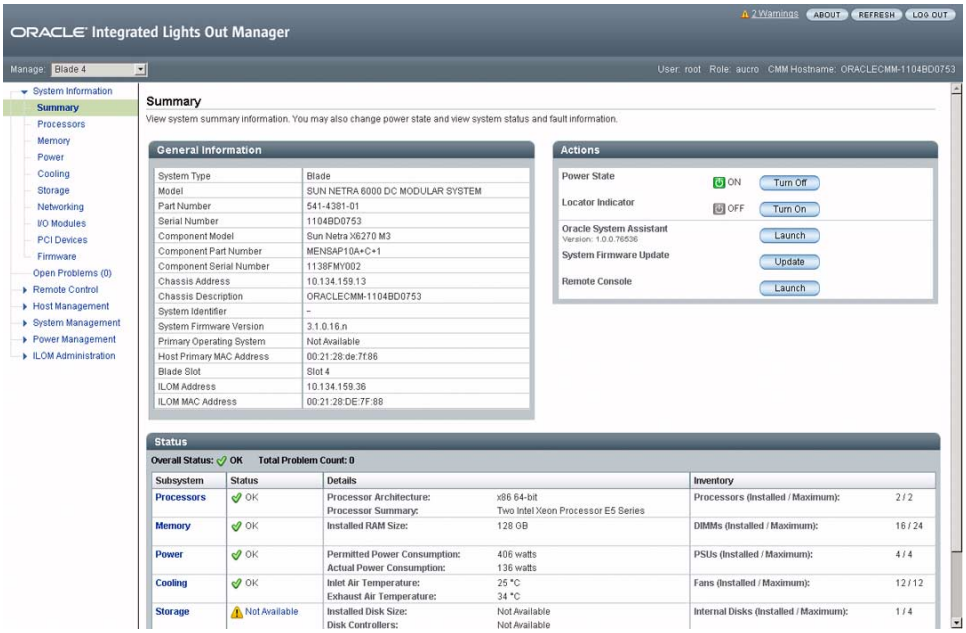
Related Information

- "Removing the Blade from the Chassis" on page 27
- "Install the Blade in the Chassis" on page 86
- Sun Netra 6000 Modular System Documentation (http://www.oracle.com/pls/topic/lookup?ctx=Netra6000)

About Oracle ILOM

Oracle Integrated Lights Out Manager (ILOM) resides on an integrated system service processor (SP) in the Netra Blade X3-2B blades. The SP resides on the motherboard and can be accessed through Oracle ILOM. The Oracle ILOM SP has its own unique IP address. The chassis also has an Oracle ILOM, called the Oracle ILOM chassis monitoring module (CMM), which is used to manage chassis functions.

Oracle ILOM firmware allows you to choose either a full-featured, browser-based web interface (shown) or an equivalent command-line interface (CLI).



Oracle ILOM is system management firmware that is preinstalled on an embedded service processor on Oracle's x86-based servers and SPARC-based servers. Oracle ILOM enables you to actively manage and monitor components in your server. Using Oracle ILOM, you can remotely manage and monitor the server as if you were using a locally attached keyboard, monitor, and mouse, regardless of the state of the host system. The Oracle ILOM firmware automatically initializes when standby power is applied to the server.

With Oracle ILOM, you can:

- View graphical (web browser) and non-graphical (CLI) consoles for the host.
- Monitor the current status of blade sensors and indicators.
- Monitor hardware errors and faults as they occur.
- Send events using SNMP traps or email alerts when faults occur.
- Remotely control the power state of your blade.
- Configure the blade hardware.

The service processor (SP) has a dedicated Ethernet port. The SP runs its own Oracle ILOM embedded operating system and provides out-of-band management capability. In addition, you can access Oracle ILOM from the server's host operating system (Oracle Solaris, Oracle Linux, other variants of Linux, or Windows).

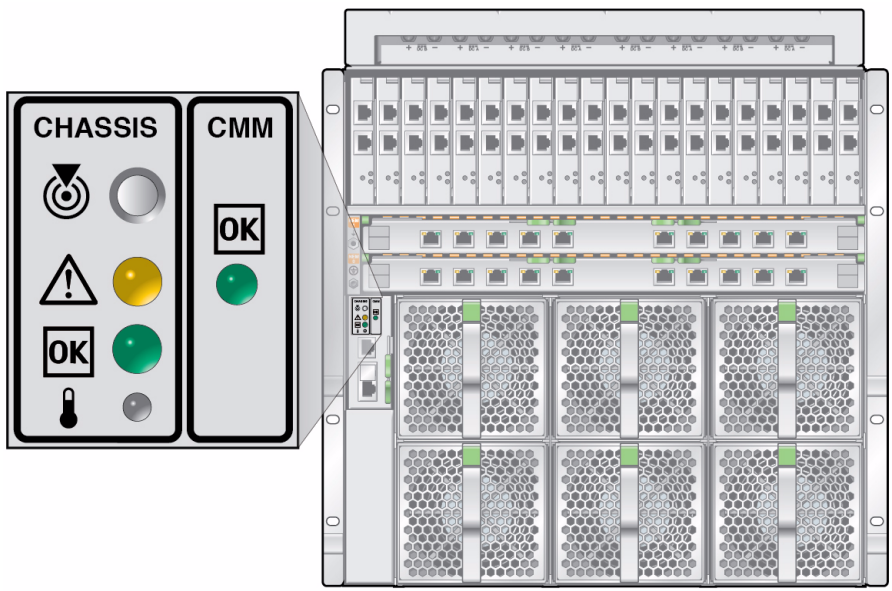
Related Information

- "About the Chassis Monitoring Module (CMM)" on page 11
- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)
- *Netra Blade X3-2B Administration Guide*, "Oracle Integrated Lights Out Manager (ILOM)" on page 5

About the Chassis Monitoring Module (CMM)

The chassis monitoring module (CMM) provides a common management interface for each blade. The CMM is the primary point of management interaction for all shared chassis, components, and functions.

Through their associated Oracle ILOM service processors, all individual blade's supported communication protocols, such as IPMI, HTTPs, CLI (SSH), SNMP, and file transfer interfaces are directly accessible from the CMM Ethernet management port. Each blade is assigned an IP address that is used for CMM management. IP addresses for blades are assigned by static or DHCP methods.



Related Information

- Sun Netra 6000 Modular System Documentation (http://www.oracle.com/pls/topic/lookup?ctx=Netra6000)
- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

Replaceable Blade Components

This section includes an illustrated parts breakdown and replaceable component lists.

The following topics are covered:

Illustrated Parts Breakdown

The following illustration and table identifies Netra Blade X3-2B internal components.

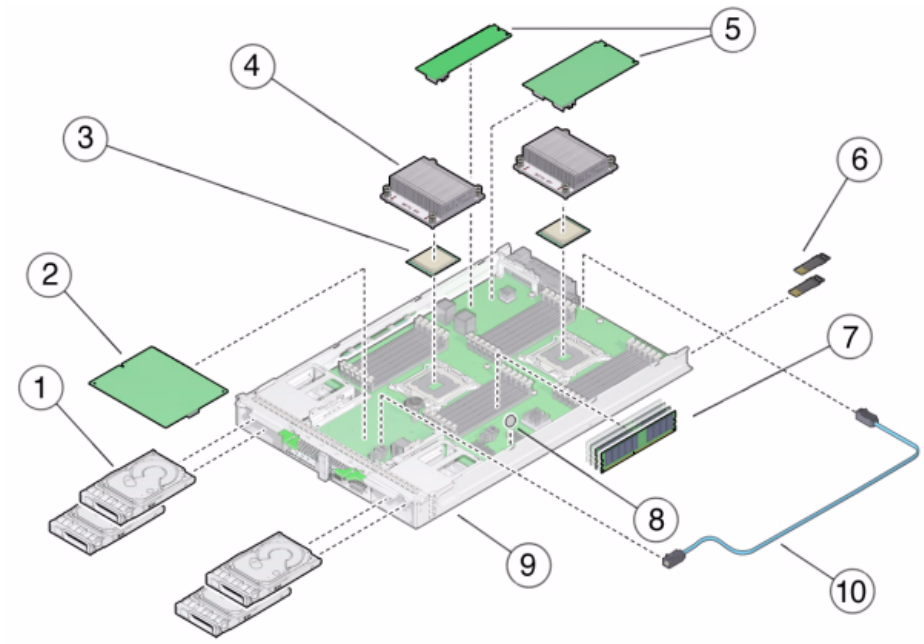


Figure Legend			
1	Storage drives (4 maximum, HDD) Note: SSD are not supported.	6	USB 2.0 drives (0 and 1)
2	RAID expansion module (REM)	7	DDR3 LV DIMMs (24 maximum)
3	Processors (0 and 1)	8	CR2032 battery
4	Heat sink assemblies (0 and 1)	9	Blade, including motherboard, disk backplane, and enclosure assembly
5	Fabric expansion modules (FEM)	10	REM storage drive cable

Related Information

- "Replaceable Components" on page 14

Replaceable Components

The replaceable components in your Netra Blade X3-2B are designated as either customer replaceable or service technician replaceable. A part designated as not customer replaceable must be replaced by an Oracle-qualified service technician. The following table lists replaceable components.

Component Description	Service*	Go to:
HDDs (and fillers)	Hot	"Servicing a Storage Drive" on page 37
DIMMs (and fillers)	Cold	"Servicing DIMMs" on page 45
Battery	Cold	"Servicing the System Battery" on page 56
USB 2.0 drives (rear)	Cold	"Servicing USB Flash Drives" on page 58
FEM	Cold	"Servicing a Fabric Expansion Module" on page 61
REM	Cold	"Servicing a RAID Expansion Module" on page 63
Processor and heat sink assembly (CPU)*	Cold	"Servicing a Processor and Heat Sink Assembly" on page 68
Motherboard and blade enclosure assembly*	Cold	"Servicing the Blade and Motherboard Assembly" on page 82

* These components must be serviced by an Oracle-qualified service technician.

Hot service capability allows you to safely remove this component while the blade is running. Cold service capability requires you to remove the blade from service.

Blade components and their part numbers are subject to change. For the most up-to-date list of replaceable components, go to: http://www.oracle.com/goto/netra-blade-x3-2b.

Preparing the Blade for Service

This section describes how to safely prepare the Netra Blade X3-2B for service and component removal and replacement. These preparatory procedures are referenced throughout this manual. Power information and procedures for powering off the blade are included.

The following topics are covered:

Obtaining the Serial Number

To obtain support for your blade, you need your serial number.

The serial number (SysSN) is located on the front panel of the blade on an RFID label, as shown in the following figure.

The serial number is also visible on the top of the blade. Access requires blade removal.

Powering Off the Blade

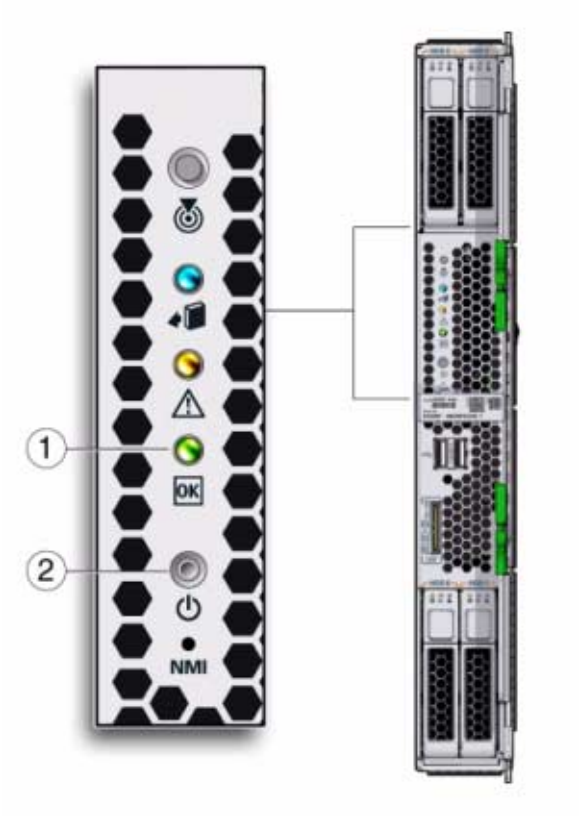
This section contains procedures for powering off the blade. To remove host power from the blade, choose one of the following methods.

The procedures in this section assume that you are working locally, at the blade. For detailed information about powering the server on or off remotely, see the:

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

- "Graceful Shutdown and Power Off" on page 18
- "Immediate Power Off" on page 19
- "Complete Power Removal" on page 19
- "Remote Power Off Using (CLI)" on page 20
- "Remote Power Off Using (Web)" on page 21

Powering off the blade from full power mode places the blade in standby power mode. Immediate Power Off cuts power to the system. Graceful Shutdown and Power Off attempts to bring the OS down gracefully, then cuts power to the system. Power On gives the system full power. Power Cycle brings the system to power off, then automatically powers the system back on. Reset reboots the system immediately.



Legend			
1	Power OK LED	2	Power button

▼ Graceful Shutdown and Power Off

Pressing the Power button causes Advanced Configuration and Power Interface (ACPI) enabled operating systems to perform an orderly shutdown of the operating system. Blades not running ACPI-enabled operating systems might ignore this event, and the host will not shut down.

Note – To remove all power from the blade, you must disconnect the blade from the chassis midplane.

1. **Use a pen, or other non-conducting pointed object, to press and release the Power button on the front panel.**

   See the illustration in "Powering Off the Blade" on page 17.

2. **Verify that the full power is off, and the OK LED on the front panel blinks, indicating that the blade is in standby power mode.**

Related Information

- "Using the Locate LED to Identify the Blade" on page 24

▼ Immediate Power Off

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

   See the illustration in "Powering Off the Blade" on page 17.

2. **Verify that the full power is off, and that the OK LED on the front panel blinks, indicating that the blade is in standby power mode.**

   See "Front Panel LEDs" on page 4.

Caution – All applications and files will be closed abruptly without changes being saved. Possible data loss and file system corruption might occur.

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

▼ Complete Power Removal

To completely power off the blade, you must disengage the blade from the midplane connector inside the chassis. To completely remove power from a blade:

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

   See "Graceful Shutdown and Power Off" on page 18.

2. **Unconfigure the blade using Oracle ILOM commands, as required.**

3. **Pull the blade out 3 inches (8 cm) from the rack using the ejector levers.**

Caution – Blades can be safely removed only if the blue Ready to Remove LED is lit, or if you are certain that a firmware update is not in progress. Pulling the blade out of the chassis during a firmware update might damage the blade, which might not be repairable in the field.

4. **If you remove the blade completely, insert a filler panel in its place within 60 seconds.**

Caution – Do not reinsert a blade until at least 20 seconds has elapsed since the blade was disengaged from the midplane connector.

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

▼ Remote Power Off Using (CLI)

You can use the Oracle ILOM service processor Command-Line Interface (CLI) to perform a graceful shutdown of the blade and ensure that all of the data is saved and the blade is ready for restart.

1. **Log into the blade host OS as a superuser or equivalent.**

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

2. **Notify affected users.**

3. **Save any open files and quit all running programs.**

   See your application documentation for specific information.

4. **Open an SSH session to the SP.**

5. **Log in to the service processor CLI interface.**

   See *Netra Blade X3-2B Administration Guide,* "Accessing System Management Tools" on page 17.

   The default user name is **root**, and the password is **changeme**.

6. **Type:** `stop /System`

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

▼ Remote Power Off Using (Web)

You can use the Oracle ILOM service processor web interface to perform a graceful shutdown of the blade and ensure that all of your data is saved and the blade is ready for restart.

1. **Log in as a superuser or equivalent to the blade HOST OS.**

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

2. **Notify affected users.**

3. **Save any open files and quit all running programs.**

   See your application documentation for specific information.

4. **Log in to the service processor web interface.**

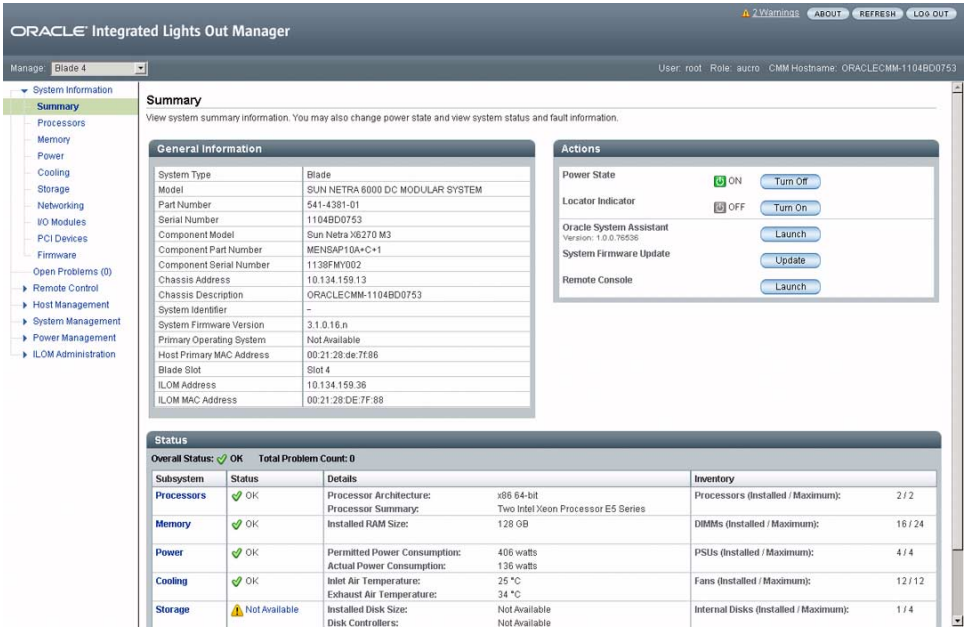
   See *Netra Blade X3-2B Administration Guide*, "Accessing System Management Tools" on page 17.

   The default user name is **`root`**, and the password is **`changeme`**.

5. **In the Actions box, verify that the power state is ON.**

6. **Click the Turn Off button.**

7. **Click OK.**



Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

Performing ESD and Antistatic Prevention Measures

Caution – Circuit boards and drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy the components located on these boards. As a minimum precaution, do *not* touch the component's connector edges.

The section contains important electrostatic discharge and antistatic information and procedures:

- "Using an Antistatic Wrist Strap" on page 22
- "Using an Antistatic Mat" on page 22
- "Set Up for ESD Prevention" on page 23

Using an Antistatic Wrist Strap

Wear an antistatic wrist strap and use an antistatic mat when handling components such as hard drive assemblies, circuit boards (including DIMMs), or PCIe cards. When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Following this practice equalizes the electrical potentials between you and the server.

Note – An antistatic wrist strap is not included in the accessory kit for the Netra Blade X3-2B. However, antistatic wrist straps are included with optional components.

Using an Antistatic Mat

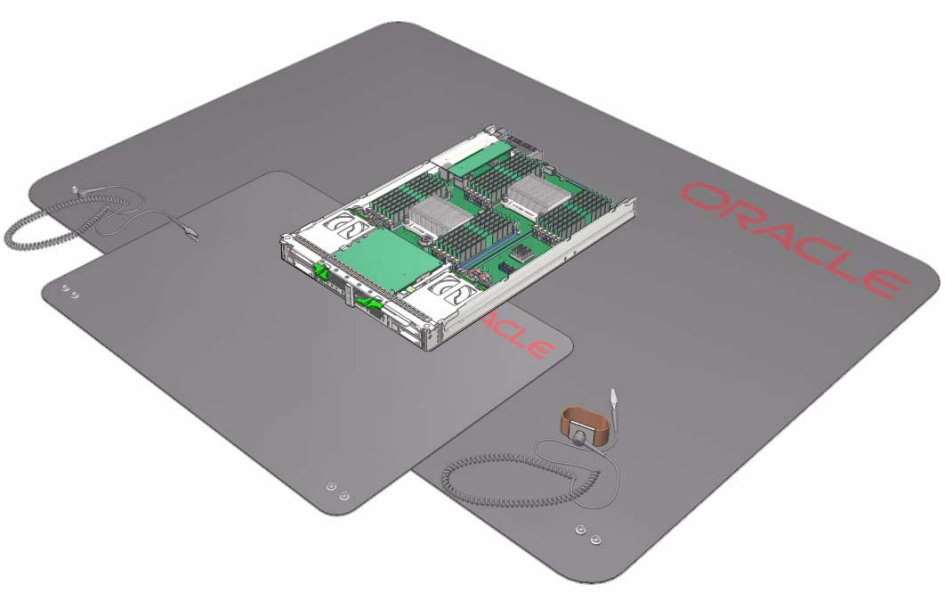
Place ESD-sensitive components such as motherboards, memory, and other PCBs on an antistatic mat.

▼ Set Up for ESD Prevention

1. **Prepare an antistatic surface to set parts on during the removal, installation, or replacement process.**

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

   - Antistatic 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 antistatic wrist strap.**

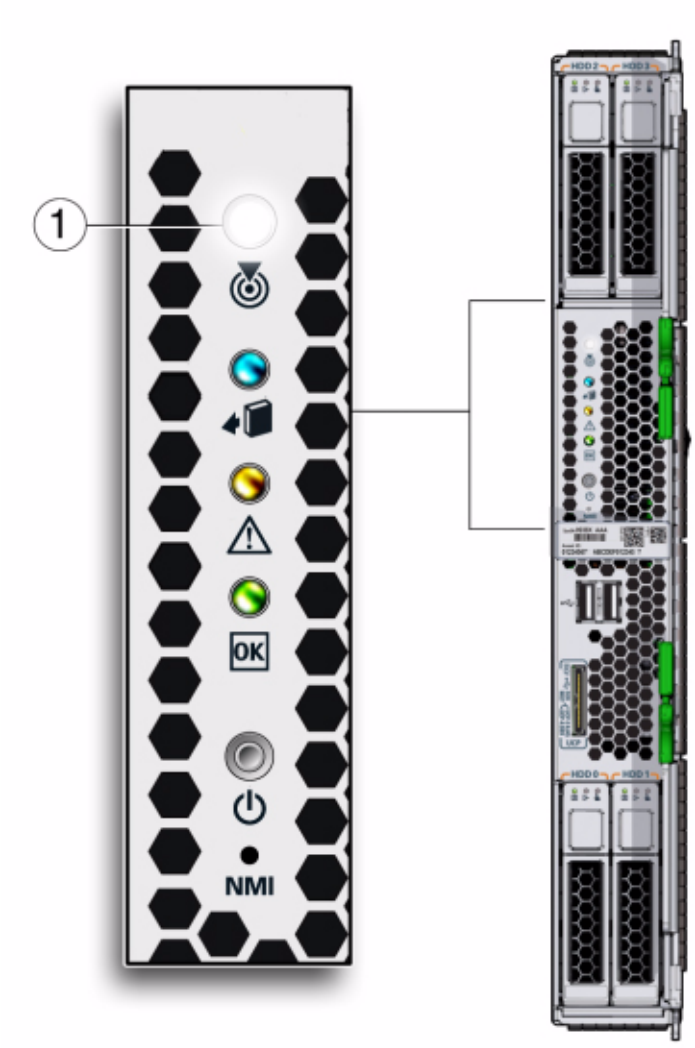
   When servicing or removing blade components, attach an antistatic strap to your wrist and then to a metal area on the chassis.

Related Information

- "Performing ESD and Antistatic Prevention Measures" on page 22.

Using the Locate LED to Identify the Blade

A white user-activated Locate LED/button [1] is on the blade front panel, which is used to identify the blade in a chassis. You can use Oracle ILOM remotely to turn the Locate LED on to locate a specific blade within a chassis, as required. Then, you can turn the Locate LED off, remotely or locally, as required.



Choose one of the following methods to turn the blade Locate LED on or off:

- Press the Locate button [1] to activate the Locate LED, if you are co-located with the blade.
- "Use the Locate LED From Oracle ILOM SP (Web)" on page 26
- "Use the Locate LED From Oracle ILOM (CLI)" on page 26

▼ Use the Locate LED From Oracle ILOM SP (Web)

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

   See *Netra Blade X3-2B Administration Guide,* "Accessing System Management Tools" on page 17.

   The Oracle ILOM screen is displayed.

2. **Select the blade.**

   The Oracle ILOM Summary screen is displayed.

3. **In the Actions area, verify that the Locator indicator is OFF, and then click the Turn On button.**

4. **Click OK.**

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

Related Information

- "Use the Locate LED From Oracle ILOM (CLI)" on page 26
- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

▼ Use the Locate LED From Oracle ILOM (CLI)

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

   See the *Netra Blade X3-2B Administration Guide,* "Access Oracle ILOM (CLI)" on page 23.

   The CLI prompt is displayed:

   ```
   ->
   ```

2. **Type one of the following commands:**

   - To *turn on* the Locate LED, type:

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

   - To *turn off* the Locate LED, type:

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

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

   -> **show /System/ locator_indicator**

   The output of the command is displayed:

```
/System
 Properties:
        locator_indicator = Off
```

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

Related Information

- "Use the Locate LED From Oracle ILOM SP (Web)" on page 26
- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

Removing the Blade from the Chassis

The blade must be removed from the Sun Netra 6000 chassis to:

- Service internal system components such as: system battery, cables, rear USB drives, DIMMs, processors (CPU), REMs and FEMs.
- Access Fault Remind buttons for processors and DIMMs.
- Clear CMOS using the motherboard button.

You do not need to remove the blade from the Sun Netra chassis to service storage drive components on the Netra Blade X3-2B front panel.

See "Remove the Blade from the Chassis" on page 27.

▼ Remove the Blade from the Chassis

To safely remove the blade from the Sun Netra 6000 chassis:

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

   See the *Netra Blade X3-2B Administration Guide*, "Access Oracle ILOM (CLI)" on page 23.

   The CLI prompt is displayed: `->`

2. **Type:**

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

3. **Verify the removal status. Type:**

```
-> show /System/ health
  /System
   Properties:
     health = Offline
 ->
```

Offline status ensures that no firmware updates are taking place before you remove the blade.

Caution – Blades can be safely removed only if the blue LED is lit, or if you are certain that a firmware update is not in progress. Pulling the blade out of the chassis during a firmware update might damage the blade, which might not be repairable in the field.

4. **Power off the blade or place it in standby power mode.**

   See "Powering Off the Blade" on page 17.

   When the blade is in standby power mode, the OK LED on the front panel blinks (0.1 second on, 2.9 seconds off).

5. **Press the green ejector buttons at the top and bottom to unseat the blade from the Sun Netra chassis connector.**

Caution – Do not install a blade into the chassis until at least 20 seconds has elapsed since the blade was disengaged from the chassis mid-plane connector.

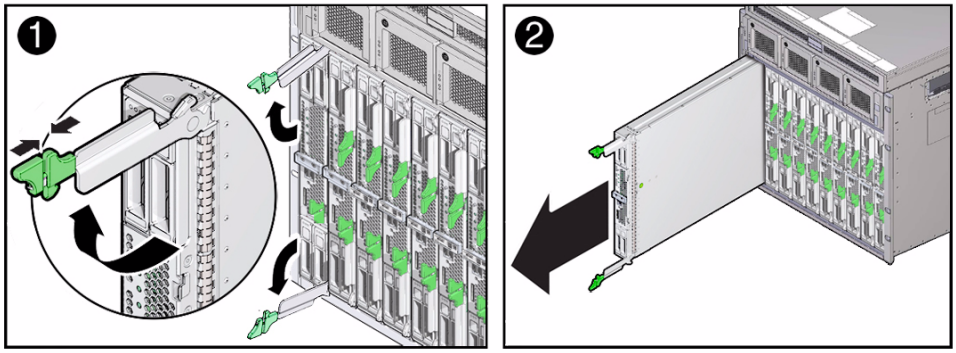
6. **Rotate both ejector arms away from the blade at the same time until fully extended.**

Caution – Possible component damage or personal injury. Do *not* attempt to remove the blade using only the ejector levers.

7. **Do one of the following to remove the blade from the chassis:**

Caution – Blades can be safely removed only if the blue Ready to Remove LED is lit, or if you are certain that a firmware update is not in progress. Pulling the blade out of the chassis during a firmware update might damage the blade, which might not be repairable in the field.

- **Complete removal:** Pull the blade out of the Sun Netra chassis by the ejector levers until you are able to grasp the blade with both hands (approximately 5-6 inches). Use your hands to slowly pull the blade out of the chassis.



- **Partial removal:** Pull the blade out 3 inches (8 cm) from the rack using the ejector levers. Use your hands to slowly pull the blade out of the chassis.

Note – This method is used to remove power from the blade.

---

8. **Set the blade on a flat antistatic surface.**

   See "Performing ESD and Antistatic Prevention Measures" on page 22.

Caution – Observe the proper ESD precautions when handling the blade. Wear a securely grounded ESD wrist strap. Handle components by the edges only. Do not touch metal contacts. Damage to system components can occur through improper handling.

---

9. **Insert a blade filler panel in the unused server slot to ensure proper airflow throughout the system.**

   See "Insert Blade Filler Panels" on page 32.

Caution – Always insert a blade filler panel into an empty slot within 60 seconds to reduce the possibility of blade shutdown. Do *not* operate the chassis with empty slots. If you operate the chassis with an empty blade slot, you might notice a reduction in system performance. Possible system and component over-temperature warnings, shutdown, and heat-related damage might be caused by empty chassis slots.

Related Information

- Oracle Integrated Lights Out Manager (ILOM) 3.1 Documentation Collection (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)
- "Remove the Blade Top Cover" on page 30

Removing the Blade Top Cover

You need to remove the blade cover to service components inside the Netra Blade X3-2B, except for storage drives and rear USB 2.0 drives.

See "Remove the Blade Top Cover" on page 30.

▼ Remove the Blade Top Cover

1. **Power down the blade.**

   See "Powering Off the Blade" on page 17.

2. **Remove the blade from the chassis.**

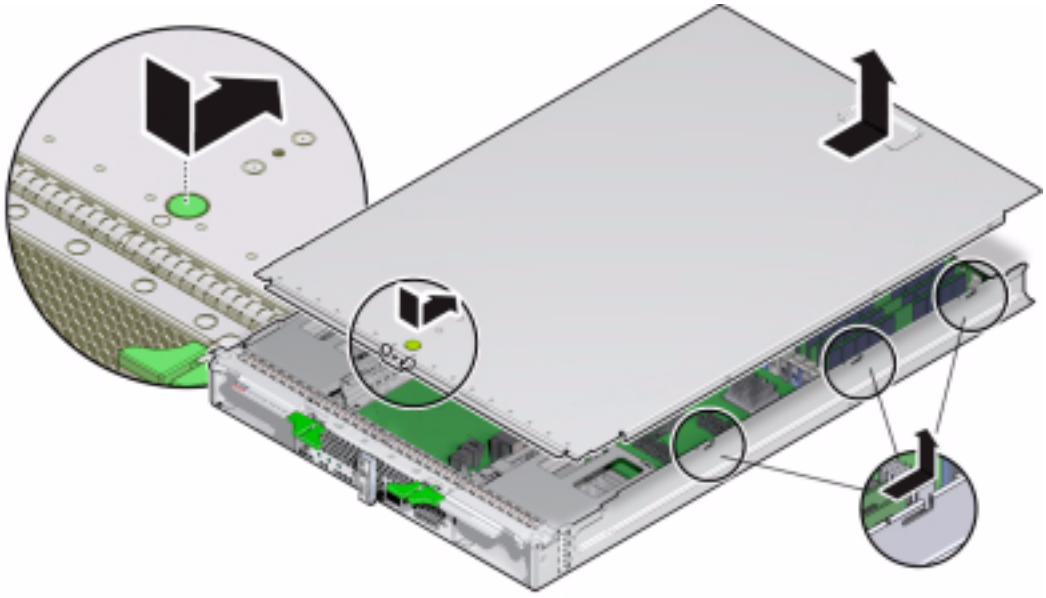
   See "Remove the Blade from the Chassis" on page 27.

3. **Attach an antistatic wrist strap.**

   See "Performing ESD and Antistatic Prevention Measures" on page 22.

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

5. **Grasp the blade cover by its rear edge. Lift the cover straight up from the blade.**



Related Information

- "Insert Blade Filler Panels" on page 32
- "Servicing Blade Components" on page 37

Removing or Inserting Blade Filler Panels

This section contains procedures for removing or inserting filler panels in the blade slot. To remove or insert filler panels in the blade slot, choose one of the following procedures.

A filler panel is a metal or plastic enclosure that does not contain any functioning system hardware or cable connectors. These panels must remain in any unused slots to ensure proper air flow throughout the system. If you remove a filler panel and continue to operate your system with an empty module slot, the operating performance for your system could decline.

Note – For instructions for adding or replacing chassis component filler panels (for example, network modules or chassis monitoring modules), see the documentation supplied with your chassis.

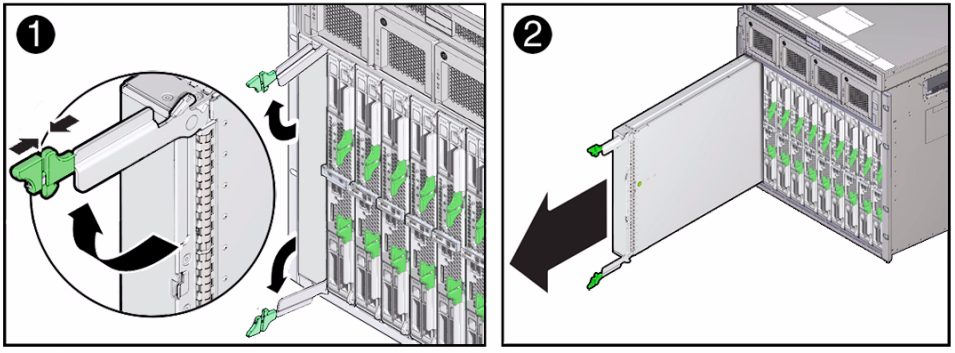
- "Remove Blade Filler Panels" on page 32
- "Insert Blade Filler Panels" on page 32

Related Information

- "Removing or Inserting Component Filler Panels" on page 33

▼ Remove Blade Filler Panels

1. **Locate the blade filler panel to be removed from the chassis.**
2. **To unlatch the blade 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.**



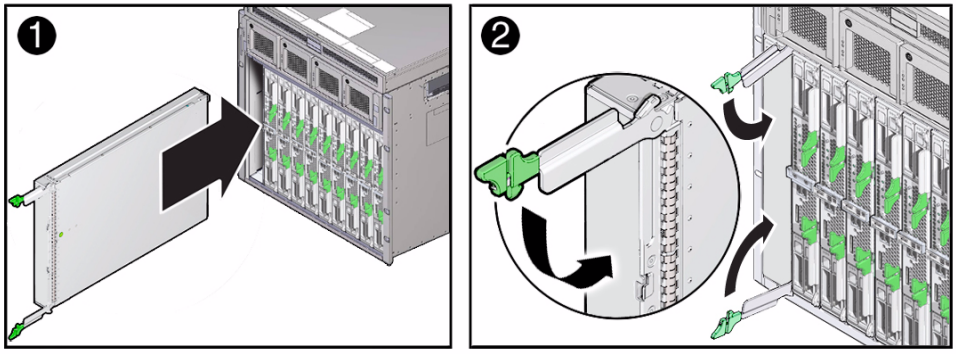
▼ Insert Blade Filler Panels

1. **Locate the vacant blade slot in the chassis.**
2. **Ensure that the release lever is fully opened, and then align the filler panel with the vacant blade slot.**

3. **Slide the filler panel into the vacant blade slot.**

   As the release lever makes contact with the chassis, the lever will start to close.

4. **Close the release lever until it locks the filler panel in place.**



Removing or Inserting Component Filler Panels

In addition to filler panels in blade slots, each blade arrives with component-replacement filler panels for storage drives and memory modules. These filler panels are installed at the factory and must remain in the blade until you are ready to replace them with components.

To remove or insert component filler panels, choose one of the following procedures.

- "Remove Storage Drive Filler Panels" on page 43
- "Insert Storage Drive Filler Panels" on page 44
- "Remove DIMM Filler Panels" on page 54
- "Insert DIMM Filler Panels" on page 55

Connecting the Multi-port Cable

The multi-port cable (dongle) provides a single multiple-interface access point to the blade. You can use the multi-port cable to connect devices directly into the universal connector port (UCP) on the front of the blade for service, maintenance, and OS installation procedures. Using the multi-port cable, you can work locally at the server and attach USB, serial, and video devices directly to the blade.

Your multi-port cable might have three cables, or it might have four cables. The four-port cable has a DB-9 serial connector, while the three-port cable does not. 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 blade using the RJ-45 port on the multi-port cable.

Caution – Possible damage to the cable, blade, or chassis. Disconnect the multi-port cable when you are finished using the cable. Otherwise, the cable, blade, or chassis can be damaged when the chassis door is closed or the cable is abruptly pulled.

See "Attach or Detach a Multi-port Cable" on page 35.

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

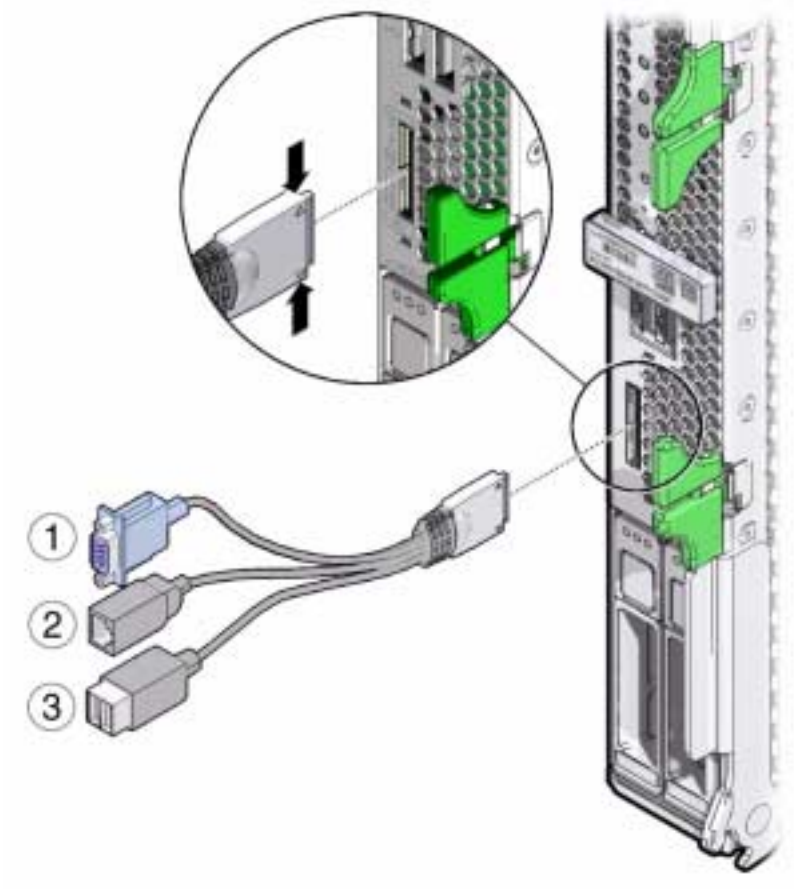


Figure Legend	
1	DB-15 (video port)
2	RJ-45 (serial management port)
3	USB 2.0 (2 ports)

▼ Attach or Detach a Multi-port Cable

The multi-port cable attaches to the front of the blade using the universal connector port (UCP). The multi-port cable is designed for temporary attachment. Disconnect the cable when finished.

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

   For an overview of the available interfaces on the multi-port cable, see "Connecting the Multi-port Cable" on page 34.

Caution – When not in use, do not leave the cable attached to the blade. Possible component damage. The multi-port cable is designed for temporary use.

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

Related Information

- *Netra Blade X3-2B Installation Guide*
- "Attach or Detach a Multi-port Cable" on page 35

Servicing Blade Components

This section contains procedures and information about how to safely and efficiently remove and install Netra Blade X3-2B components.

The following sections are covered:

Servicing a Storage Drive

To remove and install hard disk drive (HDD) devices on the blade, use the following procedures:

Identify Storage Drives

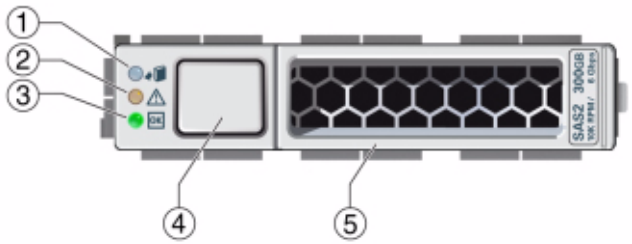
The internal system software designation for hard disk drives (HDD) is shown in the following figure.

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

- "Identify Storage Drive LED Status" on page 39

Identify Storage Drive LED Status



Legend	Name	Color	Activity
1	I to Remove LED	Blue	• On solid: The storage drive is in standby power mode. The storage drive can be removed safely during a hot-plug operation. A lit Ready to Remove LED indicates that service action is allowed on the storage drive. The "prepare_to_remove_status" status is "Ready (OK to remove)." • Off: Normal operation. Do not remove the drive.
2	e Action Required LED	Amber	• On solid: The system has detected a fault with the storage drive. • Off: Normal operation.
3	/OK LED	Green	Identifies the power state of the storage drive. • Off: Power is off or installed drive is not recognized by the system. • Blink, variable: Disk activity. • On solid (does not blink): The drive is engaged and is receiving full power.
4	Eject button	None	Press to remove the storage drive.
5	Release lever	None	Pull to remove the storage drive. Push to insert the storage drive.

Related Information

- "Identify Storage Drives" on page 38

About Storage Drive Failure and RAID

A single storage device failure does not cause a data failure if the storage devices are configured as a mirrored RAID 1 volume (optional). 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, 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 – Possible 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

- *Netra Blade X3-2B Administration Guide*, "Configuring RAID" on page 129

▼ Add a New Storage Drive

To install an additional storage drive (hard disk drive) in a blade that has an empty storage drive slot:

1. **Locate the storage drive filler panels in the blade bays.**

   For drive locations on the server, see "Identify Storage Drives" on page 38.

2. **Remove the storage drive filler panels from the blade bays.**

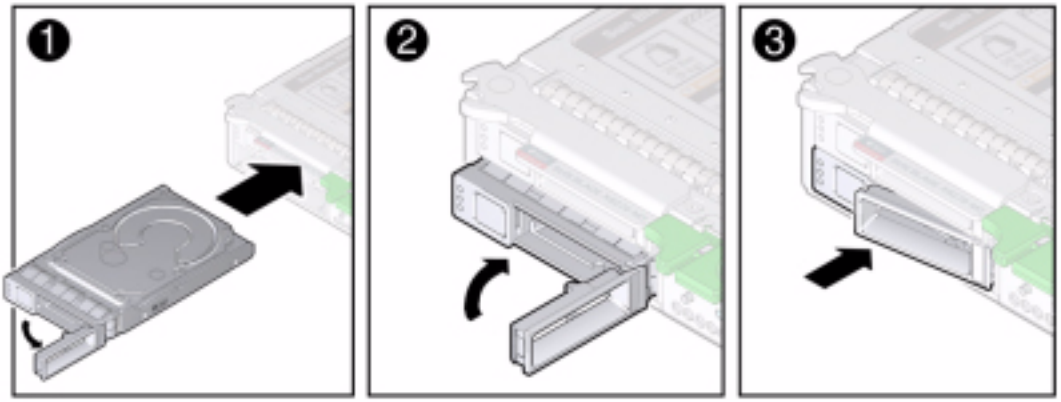
   For instructions to remove drive filler panels, see "Remove Storage Drive Filler Panels" on page 43.

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.**



▼ Remove a Storage Drive

To remove a storage drive (hard disk drive) from the blade:

1. **Prepare the blade operating system, as required, before you remove drives.**

   Refer to the OS documentation.

2. **Locate the storage drive in the blade bays.**

   For drive locations on the blade, see "Identify Storage Drives" on page 38.

3. **View the storage drive front panel LEDs to identify the faulty drive in the blade.**

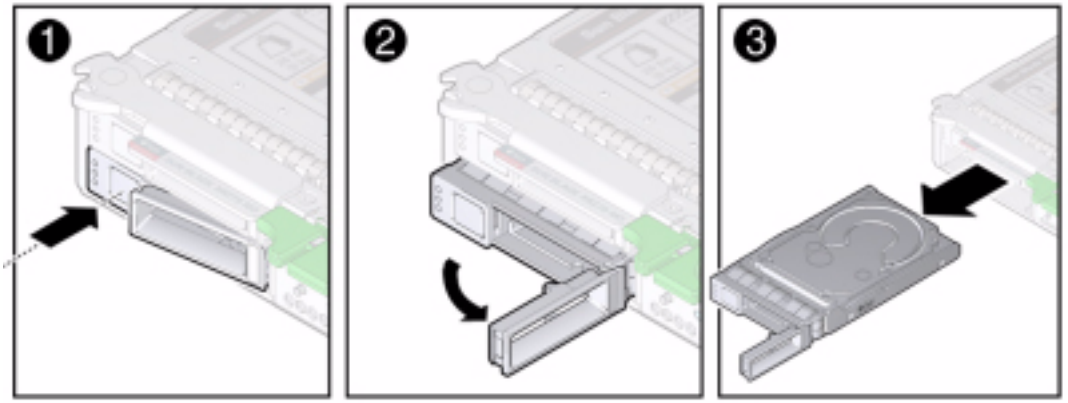
   Ensure that the blue Ready to Remove LED is lit. See "Identify Storage Drive LED Status" on page 39.

4. **Press the release lever button on the drive front panel, and then tilt the lever into a 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 – 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 44.



7. **Replace the drive.**

   See "Replace a Storage Drive" on page 42.

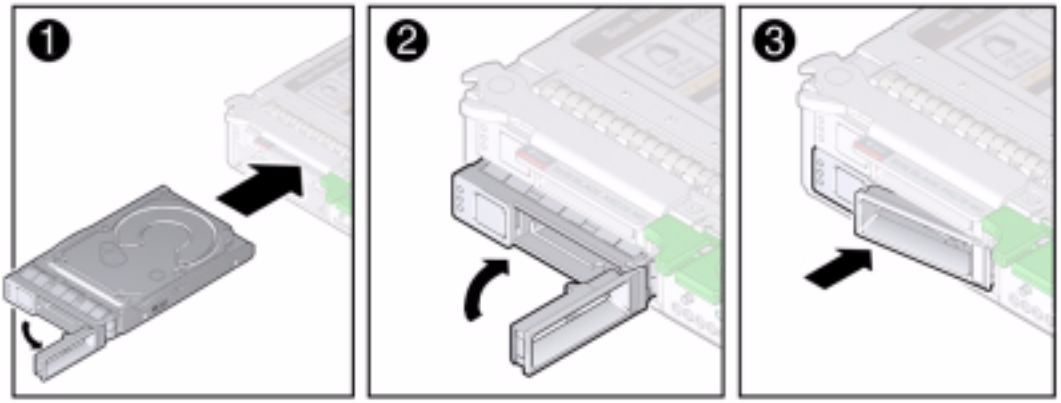
▼ Replace a Storage Drive

To replace a drive (hard disk drive) in the blade:

1. **Remove a filler panel or storage drive from the storage device slot in the blade.**
2. **Ensure that the storage drive release lever is in a 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 1 array, an automatic resynchronization is invoked and the contents are automatically 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.

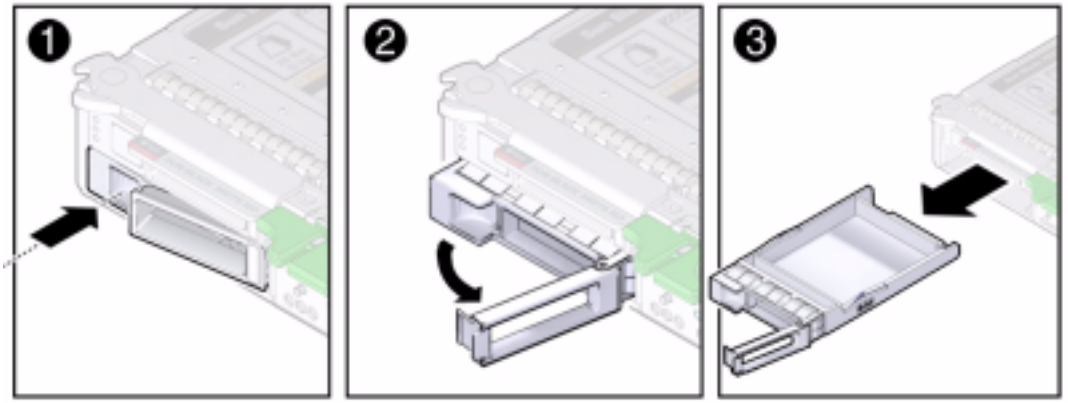
▼ Remove Storage Drive Filler Panels

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

   Filler panels have no button on the drive front panel.

2. **To unlatch the storage drive filler panel, press the release lever button, and then tilt the lever up into the fully opened position.**

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



▼ Insert Storage Drive Filler Panels

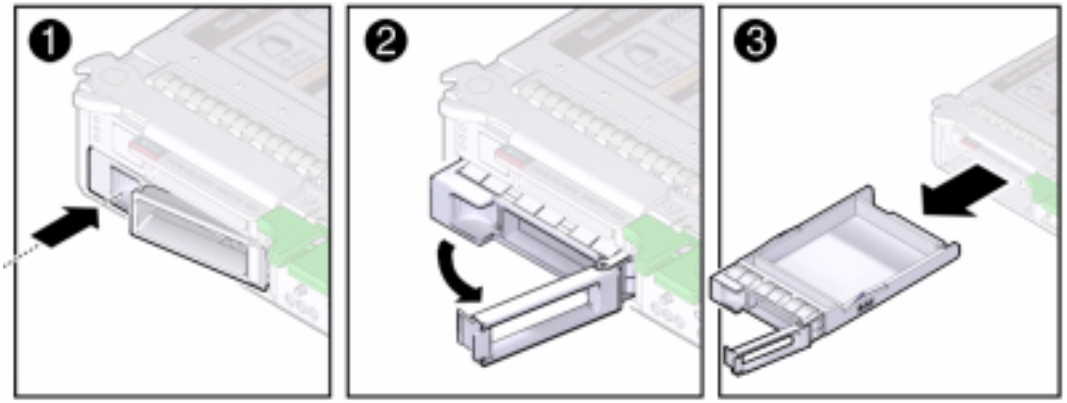
1. **Locate the vacant storage drive module slot in the blade.**
2. **Ensure that the release lever on the filler panel is fully opened.**
3. **Slide a standard storage drive filler panel into the vacant storage drive slot.**

   Press the middle of the filler panel 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 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.

Caution – Do not insert an XL size filler panel.

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



Servicing DIMMs

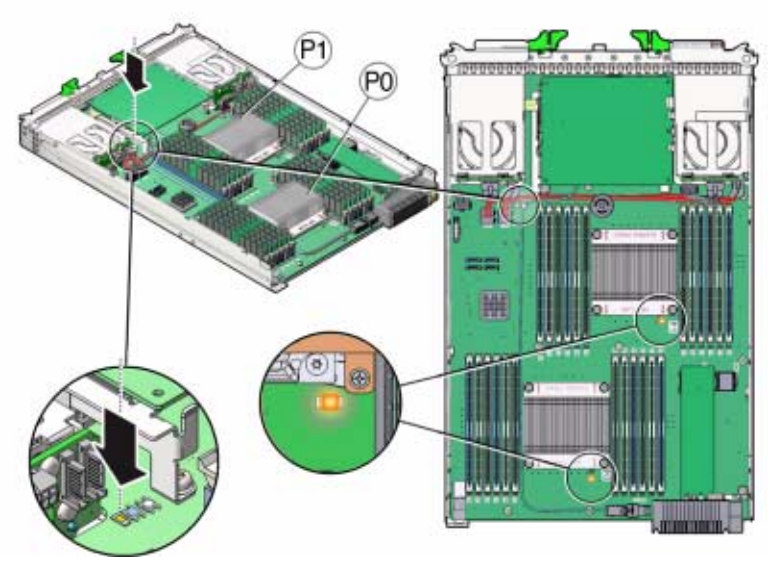
This section describes how to diagnose, remove, and replace DDR3 LV DIMM memory modules in the Netra Blade X3-2B.

For the location of all components, including DIMMs, see "Replaceable Blade Components" on page 12.

Use these procedures to service DIMMs:

▼ Identify Faulty DIMMs

The following illustration and table show the blade locations and functions of the DIMM Fault LED, the Charge Status LED, and the Fault Remind button.



Use the following DIMM test circuit items to diagnose DIMM faults:

Item	Description	More information
DIMM Fault LEDs	Located on the blade motherboard adjacent to each DIMM slot. An amber Service Action Required LED lights if the blade detects a DIMM fault.	"Using the DIMM and Processor Test Circuit" on page 95
Fault Remind button (SW3001)	Located on the motherboard next to the Charge Status LED. Pressing the blue Fault Remind Button lights up the processor Fault LED to indicate that a DIMM is in a fault state.	
Charge Status LED (CR3002)	Indicates the usability of the DIMM and processor test circuit. When the Fault Remind button is pressed, a Charge Status LED located next to the Fault Remind button lights green to indicate that there is sufficient voltage present in the fault remind circuit to light any fault LEDs that were set due to a failure.	

Note – If the green Charge Status LED fails to light when you press the Fault Remind button, it is likely that the capacitor powering the fault remind circuit has lost its charge. This can happen if the Fault Remind button is pressed for a long time with fault LEDs lit or if power has been removed from the server for more than 15 minutes.

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

To identify faulty DIMMs:

1. **Prepare the blade for service.**

   See "Preparing the Blade for Service" on page 15.

Caution – 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 antistatic practices. See "Performing ESD and Antistatic Prevention Measures" on page 22.

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

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

Note – The Charge Status LED indicates the test circuit power level. If the Charge Status LED is out, the Fault Remind LEDs can not function. After the blade is inserted into the Sun Netra chassis, the test circuit will recharge. However, any DIMM errors must reoccur to be stored and visible on a DIMM Fault LED during the next fault remind test.

3. **To identify a faulty DIMM, press and hold the blue Fault Remind button on the motherboard (SW3001).**

   Release the button after an amber DIMM Fault LED lights. Do not hold the Fault Remind button down longer than necessary.

   For information about using the DIMM test circuit, see "Using the DIMM and Processor Test Circuit" on page 95.

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

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

LED State	DIMM Status
Off	Operating properly, if the DIMM test circuit is ready to use.
On (amber)	Faulty and must be replaced.

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

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

6. **If re-seating the DIMM does not fix the problem, replace the faulty DIMM.**

   See "Remove DIMMs" on page 52.

Related Information

- "DIMM Population Guidelines and Rules" on page 48
- "Using the DIMM and Processor Test Circuit" on page 95

DIMM Population Guidelines and Rules

Use these DIMM guidelines and illustrations to help you plan and configure the memory for the Netra Blade X3-2B.

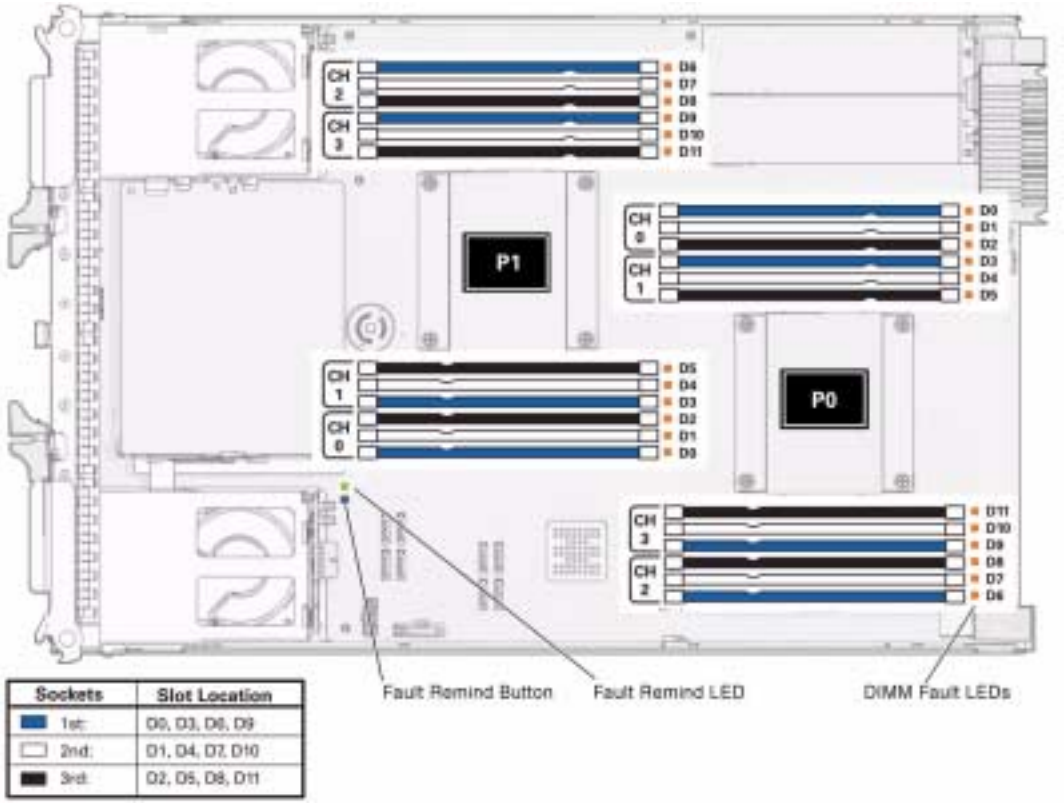
Memory Guidelines

When populating DIMM slots, use the following 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 blade supports one DIMM per channel, two DIMMs per channel, and three DIMMs per channel across all sockets. Minimum per processor is 1 and the maximum per processor is 12.
- The minimum supported memory configuration is one DIMM per processor D0.
- The maximum supported memory configuration is 384 GB.
- Use 8 GB DDR3-1600 LV DIMMs and 16 GB DDR-1600 LV DIMMs only:
  - Install up to four memory channels, with three DIMMs per channel.

- Install up to 24 DIMMs per blade or up to 12 DIMMs per processor.
- For optimal performance, install DIMMs in groups of three sockets per channel.
- Ensure all slots are filled with either a DIMM or DIMM filler for proper airflow.
- 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

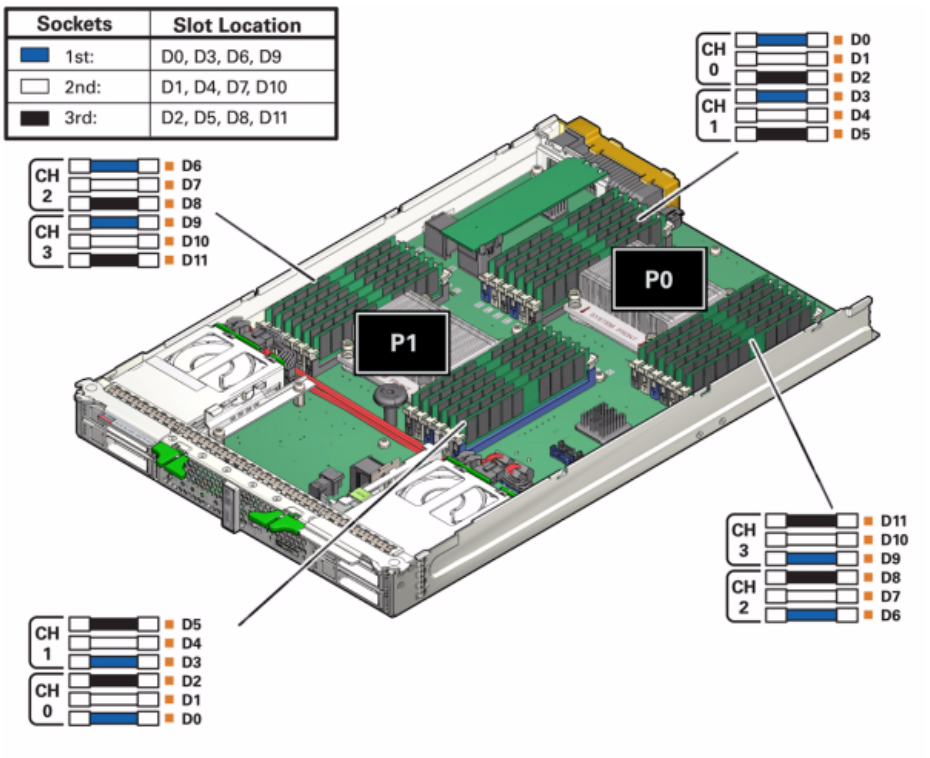


Memory Rules

- *Rule 1*: Always populate the channels as follows.

- Fill up all the blue sockets. Always populate the DIMMs furthest from the processor (blue sockets) first.
- Fill up all the white sockets.
- 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 figure.



Tip – The figure illustrates 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 will be tuned to the slower speed.

Note – When mixing sizes across different four-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 RDIMMs 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, DIMMs can run in one of the following three speeds: 1600 MHz, 1333 MHz, and 1067 MHz.

  DIMM speed rules are: (SR = single rank; DR = dual rank; QR = quad rank)
  - One DIMM per channel or 2 DIMMs per channel (DR) = 1600 or 1333 MHz , at full speed as rated by the DIMM.
  - One DIMM per channel = 1067 MHz.
  - Three DIMMs per channel (DR) = 1067 MHz
  - Three DIMMs per channel (QR) is not supported, currently.
- *Rule 9*: The maximum DIMM speed is limited by the processor part number, in conjunction with the DIMM population, whichever is lower. Currently, processor memory speed limitation is a function of core count:
  - 8-core processors from Intel Xeon processor E5-2600 product family will run at a maximum speed of 1600 MHz.

- See the following table for the maximum possible memory bus speed (compared to the Intel specification).

	1 DIMM per Channel	2 DIMMs per Channel	3 DIMMs per Channel									
			1.5 V	1.35 V	1.5 V	1.35 V	1.5 V	1.35 V				
	Intel	Oracle	Intel	Oracle	Intel	Oracle	Intel	Oracle	Intel	Oracle	Intel	Oracle
DR	1600	1600	1333	1600	1600	1600	1333	1600	1067	1067	N/A	1067

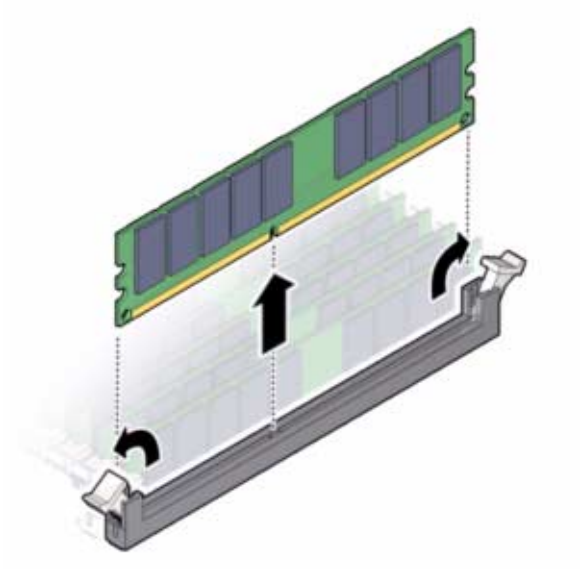
▼ Remove DIMMs

To remove DIMMs from the blade motherboard-mounted slots:

1. **Prepare the blade for service.**
   See "Preparing the Blade for Service" on page 15 .
2. **Identify faulty DIMMs, as required.**
   See "Identify Faulty DIMMs" on page 45.
3. **Remove DIMM filler panels, as required.**
   See "Remove DIMM Filler Panels" on page 54.
4. **Rotate both DIMM slot ejector tabs outward as far as they will go.**
   This action partially ejects the DIMM from the slot.

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

5. **Carefully lift the DIMM straight up to remove it from the slot.**
   Place the DIMM on an antistatic mat.



6. **Install a replacement DIMM or a filler panel.**

Related Information

- "Install DIMMs" on page 53
- "Insert DIMM Filler Panels" on page 55
- "Returning Blade to Operation" on page 85

▼ Install DIMMs

Always replace a DIMM with the same Oracle part number as the former DIMM.

- "DIMM Population Guidelines and Rules" on page 48
- "Remove DIMMs" on page 52.

To install DIMMs on the Netra Blade X3-2B motherboard:

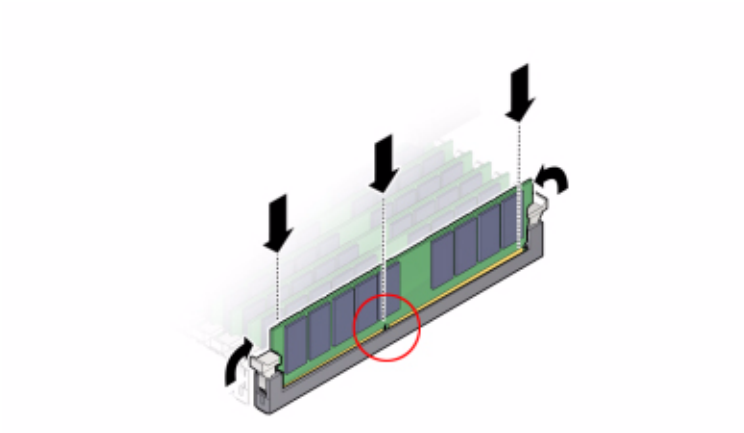
1. **Prepare the blade for service.**

   See "Preparing the Blade for Service" on page 15 .

2. **Unpack the replacement DIMMs and place them on an antistatic mat.**
3. **Ensure that the connector slot ejector tabs are in the open position.**

4. **Line up 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 – 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. **Repeat Step 3 through Step 5 until all replacement DIMMs are installed.**
7. **Prepare the blade for operation.**

   See "Returning Blade to Operation" on page 85 .

8. **Verify DIMM component information.**

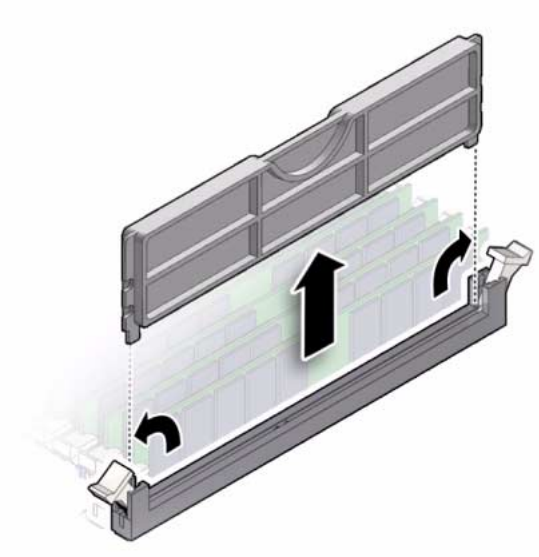
   Use the Oracle ILOM web interface or CLI to view DIMM component information. See the documentation at:

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

▼ Remove DIMM Filler Panels

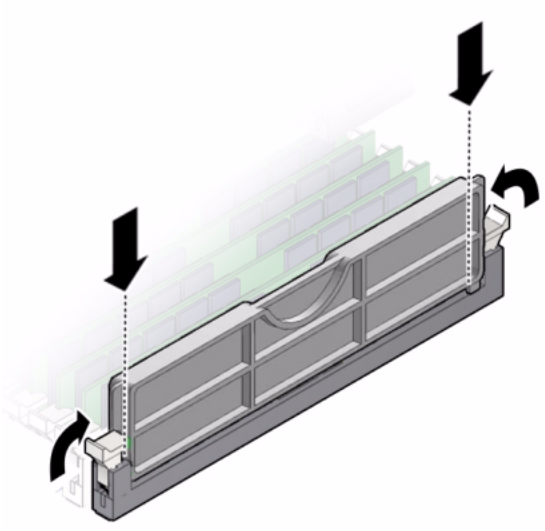
1. **Locate the memory module filler panel to be removed from the motherboard.**
2. **Simultaneously press down on both ejector lever tabs at the ends of the connector slot.**

3. **Lift the filler panel straight up to remove it from the connector socket.**



▼ Insert DIMM Filler Panels

1. **Locate the vacant DIMM slot on the motherboard.**
2. **Ensure that ejector lever tabs at both ends of the DIMM slot are in a fully opened position.**
3. **Align the DIMM filler panel with the empty slot, and then gently press the filler panel into the empty slot until both ejector lever tabs close, locking the filler panel in place.**



Related Information

- "Removing or Inserting Component Filler Panels" on page 33

Servicing the System Battery

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

- "Remove and Install the System Battery" on page 56

▼ Remove and Install the System Battery

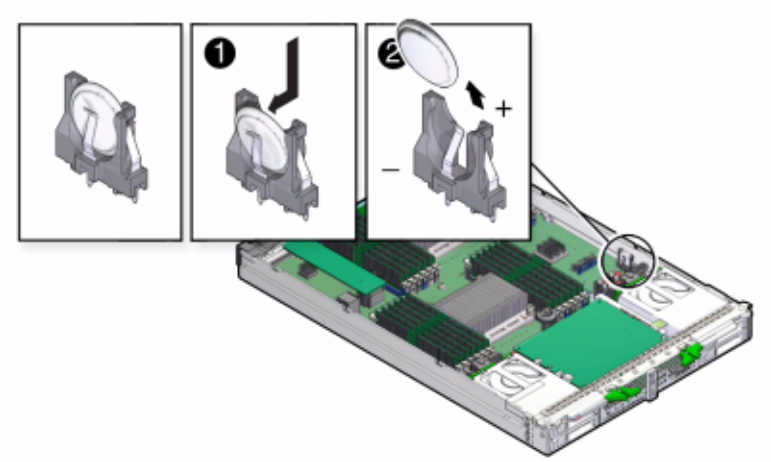
To remove and replace the system battery (type CR2032) on the Netra Blade X3-2B motherboard:

1. **Prepare the blade for service.**

   See "Preparing the Blade for Service" on page 15P.

2. **To dislodge the battery from its holder, gently push the top edge of the battery away from the battery holder [1].**

   See the following illustration.



3. **Remove the battery [2].**

Caution – Exercise caution when removing the battery. The battery is located near the blade side wall.

4. **Orient the new battery so that the + symbol faces towards the blade side wall.**
5. **Insert the battery into the holder, and then press the battery into position.**
6. **Clear CMOS NVRAM.**

   To clear CMOS NVRAM, press the white SW1801 button on the motherboard.

   The BIOS settings revert to the default settings.
7. **Access the BIOS Setup Utility to configure the BIOS time and date settings, as required.**

   See *Netra Blade X3-2B Administration Guide*, "Setting Up the Blade With BIOS Setup Utility" on page 133.
8. **Prepare the blade for operation.**

   See "Returning Blade to Operation" on page 85 .

Servicing USB Flash Drives

Two USB flash drive ports (P0 and P1) are located on the motherboard at the rear of the blade. A USB flash drive contains Oracle System Assistant software in rear USB port 0.

Use these procedures to remove and install USB flash drives:

- "Remove USB Flash Drives" on page 58
- "Install USB Flash Drives" on page 59

▼ Remove USB Flash Drives

To remove a USB flash drive from a USB port on the Netra Blade X3-2B motherboard rear:

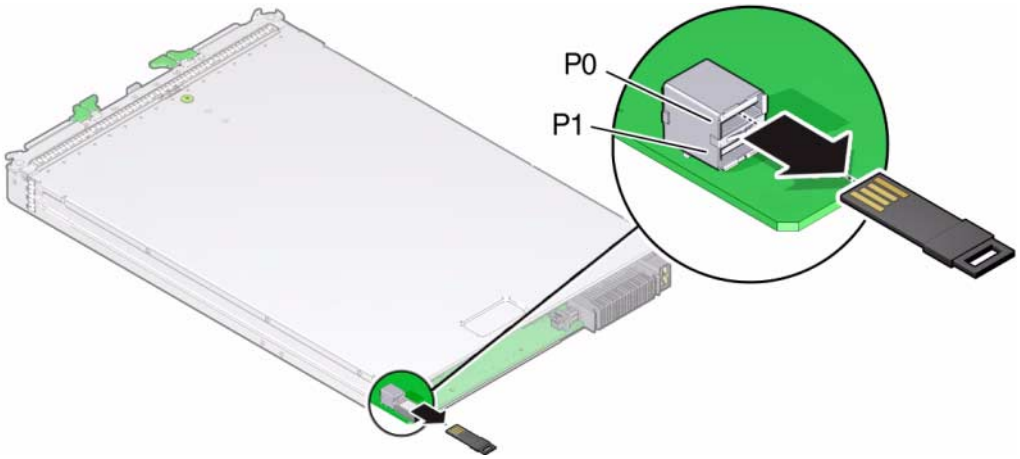
Caution – Oracle System Assistant (OSA) software might reside on the USB flash drive.

1. **If necessary, back up any data that is contained on the USB flash drives.**
2. **Prepare the blade for service.**

   See "Preparing the Blade for Service" on page 15 .

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

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



4. **Grasp the USB flash drive, and pull the drive out.**
5. **Repeat Step 4 for the second USB flash drive, as required.**
6. **Prepare the blade for operation.**

   See "Returning Blade to Operation" on page 85 .
7. **Install the flash drives.**

   See "Install USB Flash Drives" on page 59.

▼ Install USB Flash Drives

To install a USB flash drive in the rear USB ports on the Netra Blade X3-2B motherboard:

"Remove USB Flash Drives" on page 58.

1. **Prepare the blade for service.**

   See "Preparing the Blade for Service" on page 15 .

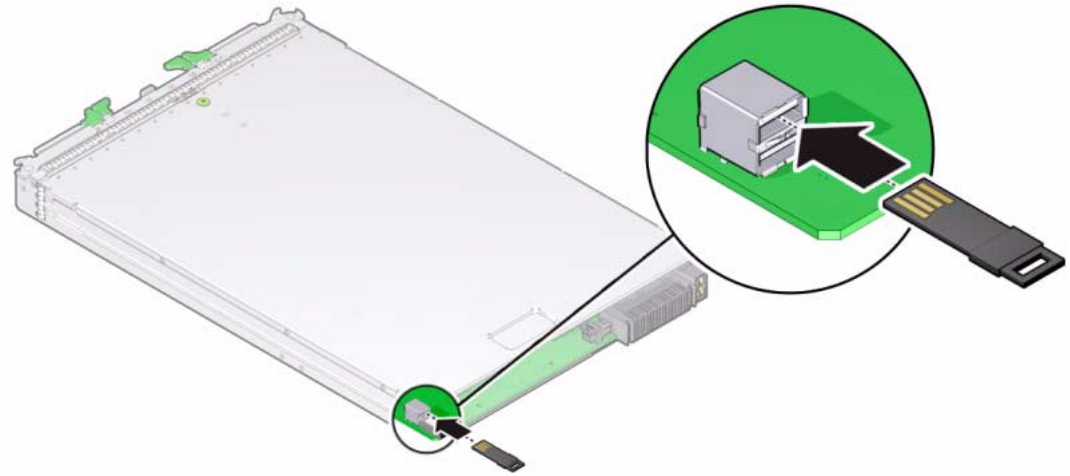
Note – You do not have to remove the blade top cover to access the rear USB ports.

---

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

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

Caution – Ensure the USB flash drive gold fingers are in the upright position.



4. **Prepare the blade for operation.**

   See "Returning Blade to Operation" on page 85 .

Caution – Flash drives extend past the rear of the blade. Handle the blade with care.

5. **Verify component information.**

   Use the Oracle ILOM web interface or CLI.

   See the

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

6. **Reimage the replacement USB drive, if the USB flash drive contains Oracle System Assistant software.**

   See *Netra Blade X3-2B Administration Guide,* "Maintaining Oracle System Assistant" on page 95.

Servicing a Fabric Expansion Module

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

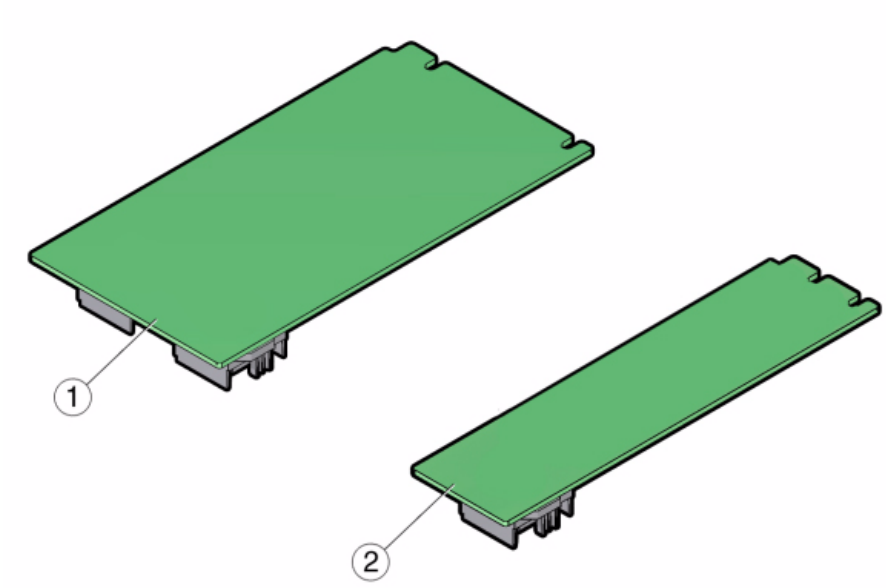


Figure Legend

1. Fabric expansion module (FEM) double width form factor.
2. Fabric expansion module (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 61
- "Install a FEM" on page 62

▼ Remove a FEM

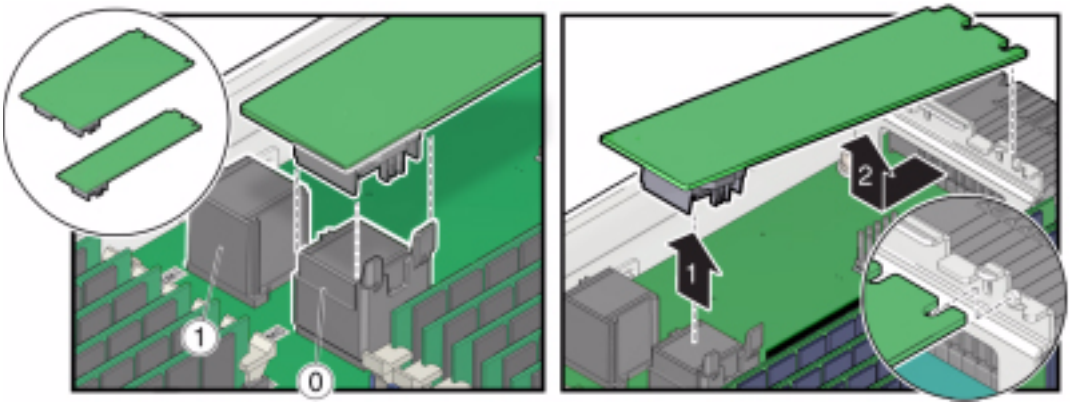
To remove a fabric expansion module (FEM) card option on the Netra Blade X3-2B motherboard:

1. **Prepare the blade for service.**

   See “Preparing the Blade for Service” on page 15 .

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

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



4. **Install a FEM.**

   See “Install a FEM” on page 62.

▼ Install a FEM

To replace or add the fabric expansion module (FEM) card option on the blade motherboard.

1. **Prepare the blade for service.**

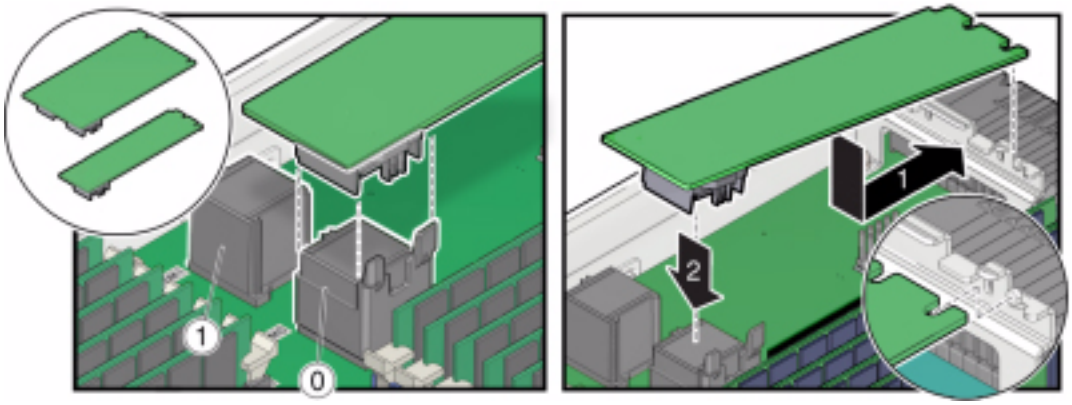
   See “Preparing the Blade for Service” on page 15 .

2. **Remove the existing FEM card, as required.**

   See “Remove a FEM” on page 61

3. **Slide the FEM card at an angle into the support bracket.**

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



4. **Press the FEM card carefully into the connector.**
5. **Prepare the blade for operation.**

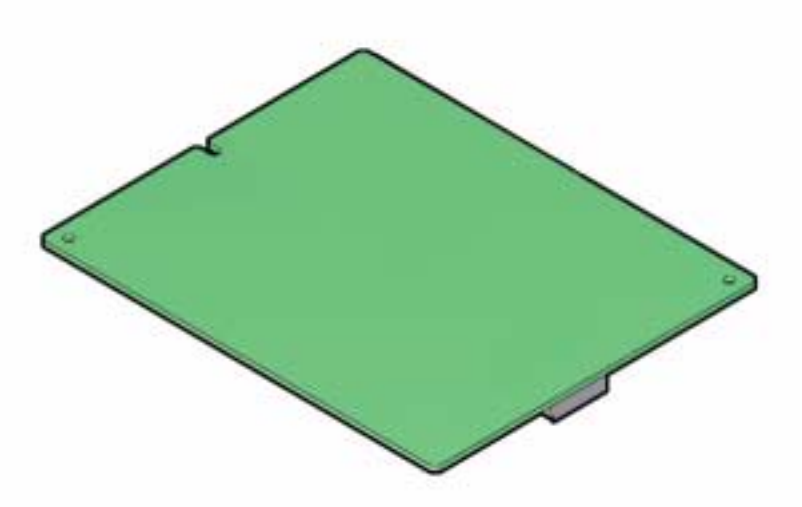
   See "Returning Blade to Operation" on page 85 .

Servicing a RAID Expansion Module

The RAID expansion module (REM), if ordered, might not arrive installed on the Netra Blade X3-2B. In some cases, this option is shipped separately for customer installation. The REM enables the RAID functionality for SAS drives. The Netra Blade X3-2B supports RAID 0, 1, 5, and 6.

See *Netra Blade X3-2B Administration Guide,* "Configuring RAID" on page 129 for additional information.

Note – When adding a REM to a server, you must install one or more storage drives (hard disk drive) in the server disk slots 0 through 3.



Use these procedures to service a REM card option:

- "Remove a REM Card" on page 64
- "Install a REM Card" on page 65
- "Remove and Replace a REM Battery on the REM Card" on page 66

▼ Remove a REM Card

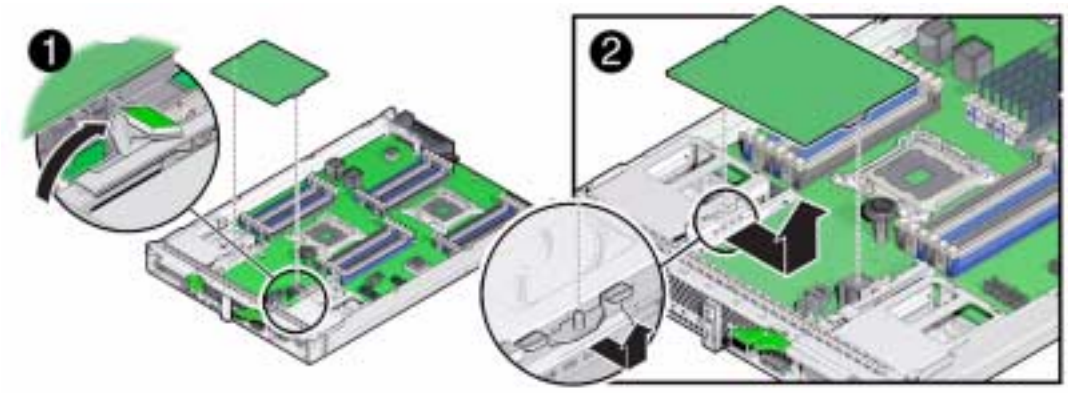
To remove the RAID expansion module (REM) card option on the Netra Blade X3-2B motherboard.

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

1. **Prepare the blade for service.**

   See "Preparing the Blade for Service" on page 15.

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 [1].**
4. **Pull the REM card carefully out of the connector [2].**



5. **Install a REM.**

   See "Install a REM Card" on page 65.

▼ Install a REM Card

To replace or add a REM card on the Netra Blade X3-2B motherboard.

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

1. **Prepare the blade for service.**

   See "Preparing the Blade for Service" on page 15 .

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

   See "Insert Blade Filler Panels" on page 32.

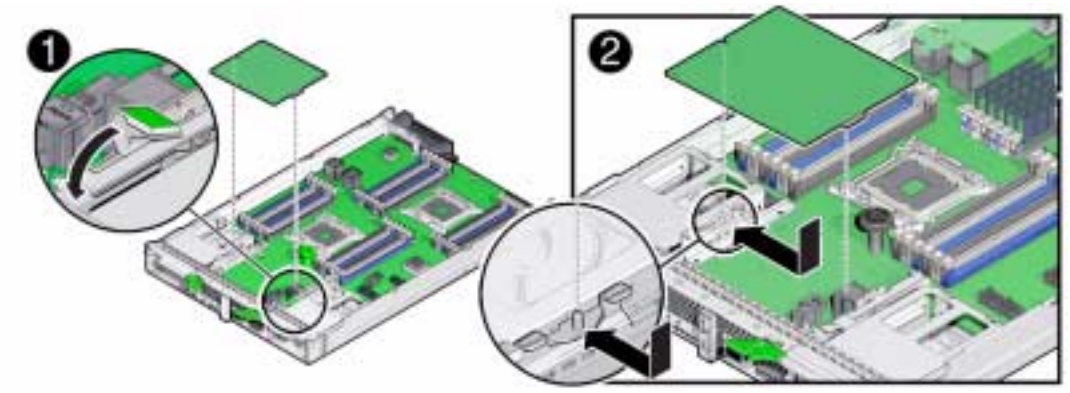
3. **Remove the existing REM card.**

   See "Remove a REM Card" on page 64.

4. **Locate the REM support bracket on the motherboard.**

5. **Close the REM handle [1].**

6. **Slide the REM card at an angle into the support bracket, then push the REM card carefully into the connector [2].**



7. **If you are adding a REM to a blade without an existing REM, perform the following sub-steps.**

   Perform the following substeps 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	*Netra Blade X3-2B Installation Guide for Linux Operating Systems*
Solaris	*Netra Blade X3-2B Installation Guide for the Oracle Solaris Operating System*
Windows	*Netra Blade X3-2B Installation Guide for Windows Operating Systems*
VM	*Netra Blade X3-2B Installation Guide for ESX Software*
OVM	*Netra Blade X3-2B Installation Guide for Oracle VM Operating System*

8. **Prepare the blade for operation.**

   See "Returning Blade to Operation" on page 85 .

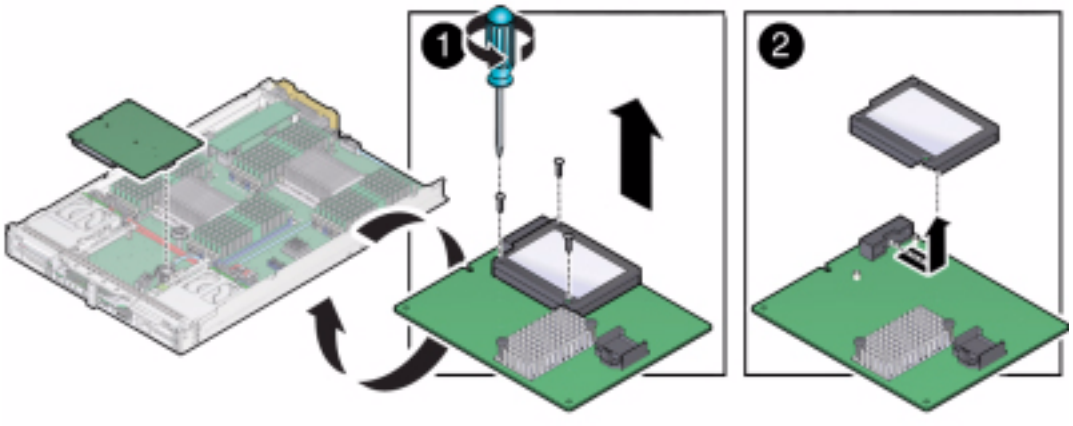
▼ Remove and Replace a REM Battery on the REM Card

1. **Remove the REM card from the chassis.**

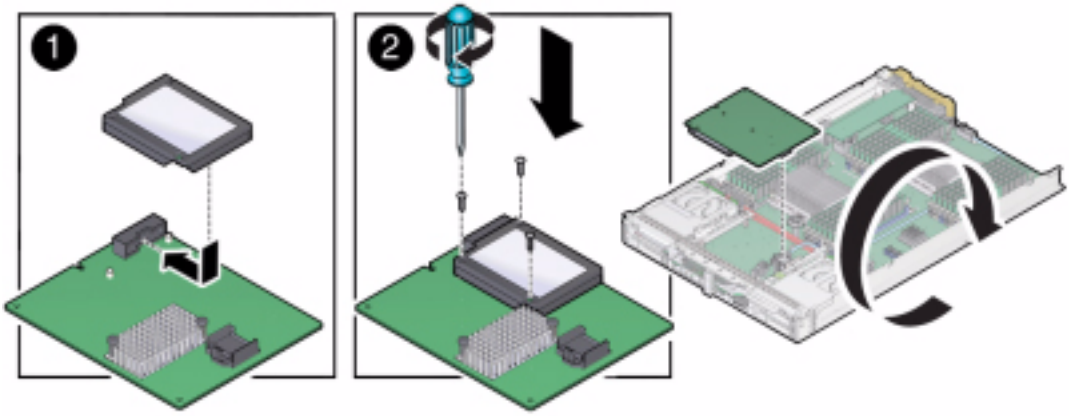
   See "Remove a REM Card" on page 64

2. **Unplug the battery connector from the REM card.**

3. **Remove the three screws securing the old REM battery to the card [1].**



4. **Remove the REM battery from the REM card [2].**
5. **Attach the new battery to the REM card [1].**



6. **Secure the battery to the REM card with three screws [2].**
7. **Plug the battery connector in to the REM card.**
8. **Attach the REM card to the blade.**

See"Install a REM Card" on page 65.

Servicing a Processor and Heat Sink Assembly

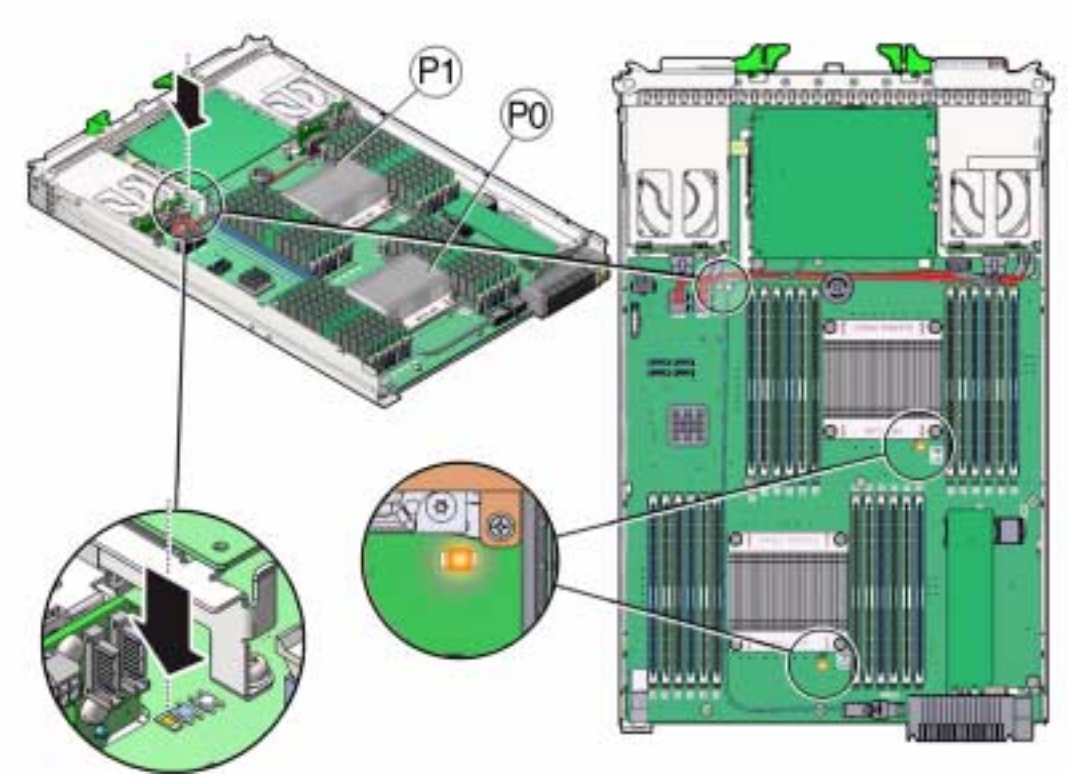
When replacing processors, the processors (CPUs) must be of the same speeds on the same motherboard.

Note – This component must be serviced by an Oracle-qualified service technician.

An Oracle-qualified service technician will use these procedures to remove and install processor and heat sink assemblies:

▼ Identify a Faulty Processor

The following illustration and table show the locations of processor Fault LEDs, the Charge Status LED, and the Fault Remind button.



Use the following items to diagnose processor faults:

Item	Description	More information
Processor Fault LED	Located on the blade motherboard adjacent to each processor. An amber Service Action Required LED lights if the blade detects a processor fault.	"Using the DIMM and Processor Test Circuit" on page 95
Fault Remind button (SW3001)	Located on the motherboard next to the Charge Status LED. Pressing the blue Fault Remind Button lights up the processor Fault LED to indicate that a processor is in a fault state.	
Charge Status LED (CR3002)	Indicates the usability of the processor test circuit. When the Fault Remind button is pressed, a Charge Status LED located next to the Fault Remind button lights green to indicate that there is sufficient voltage present in the fault remind circuit to light any fault LEDs that were set due to a failure.	

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

Note – If the green Charge Status LED fails to light when you press the Fault Remind button, it is likely that the capacitor powering the fault remind circuit has lost its charge. This can happen if the Fault Remind button is pressed for a long time with fault LEDs lit or if power has been removed from the server for more than 15 minutes.

To identify a faulty processor:

1. **Prepare the blade for service.**

   See "Preparing the Blade for Service" on page 15 .

Caution – 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 antistatic practices. See "Performing ESD and Antistatic Prevention Measures" on page 22.

2. **Press the Fault Remind button on the motherboard to illuminate a processor Fault LED .**

Note – Do not hold the Fault Remind button down longer than necessary.

A failed processor is identified by a lit amber processor Fault LED, as indicated in the following table.

LED State	Processor Status
Off, if the test circuit is ready to use	Operating properly.
On (amber)	Faulty and must be replaced.

3. **Remove the heat sink.**

   See "Remove a Processor Heat Sink Assembly" on page 71.

▼ Remove a Processor Heat Sink Assembly

To remove a faulty processor (CPU) and heat sink assembly on the Netra Blade X3-2B motherboard, or for a processor upgrade.

Note – This component must be serviced by an Oracle-qualified service technician.

Caution – 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.

"Preparing the Blade for Service" on page 15 , as required.

"Identify a Faulty Processor" on page 68, as required.

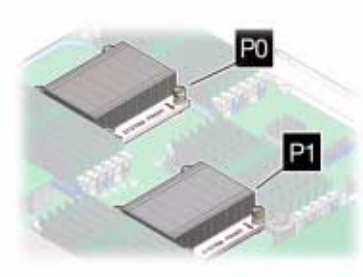
1. **Inspect the heat sink for dust and lint.**

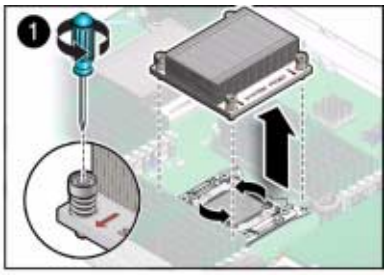
   Clean heat sink if necessary. Remove any dust from the heat sink fins, as required.

2. **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.**

   Loosen the four Phillips captive screws in the heat sink for the faulty processor. Turn the screws counterclockwise alternately one and one half turns until they are fully removed.

   Use a No. 2 Phillips screwdriver to *alternately* loosen each of the four spring-loaded mounting screws that secure the heat sink to the motherboard.





3. **To separate the heat sink from the top of the processor, gently wiggle 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.**
5. **Use an alcohol pad to completely clean all thermal compound from the underside of the heat sink.**
6. **Remove the processor.**

   See "Remove a Processor" on page 72.

▼ Remove a Processor

To remove a faulty processor (CPU) and heat sink assembly on the Netra Blade X3-2B motherboard, or for a processor upgrade.

Note – This component must be serviced by an Oracle-qualified service technician.

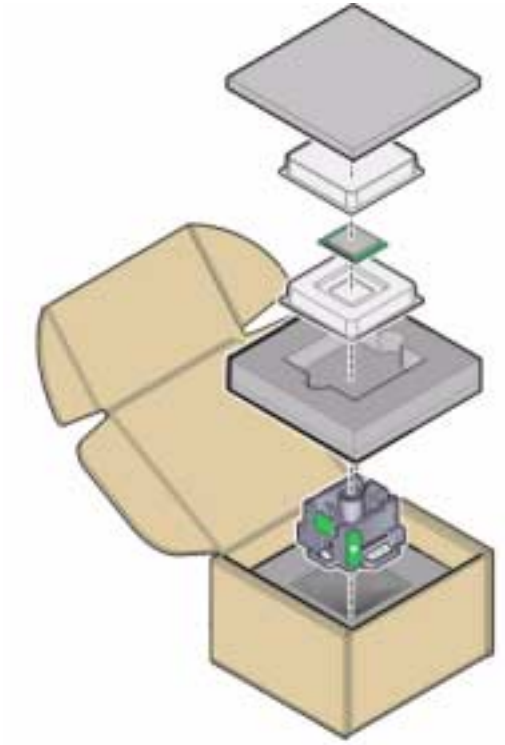
Caution – Handle processor socket pins with extreme care. Processor and socket pins are very fragile. A light touch can bend the processor socket pins and damage the board beyond repair.

"Remove a Processor Heat Sink Assembly" on page 71

A processor removal/insertion tool is required.

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

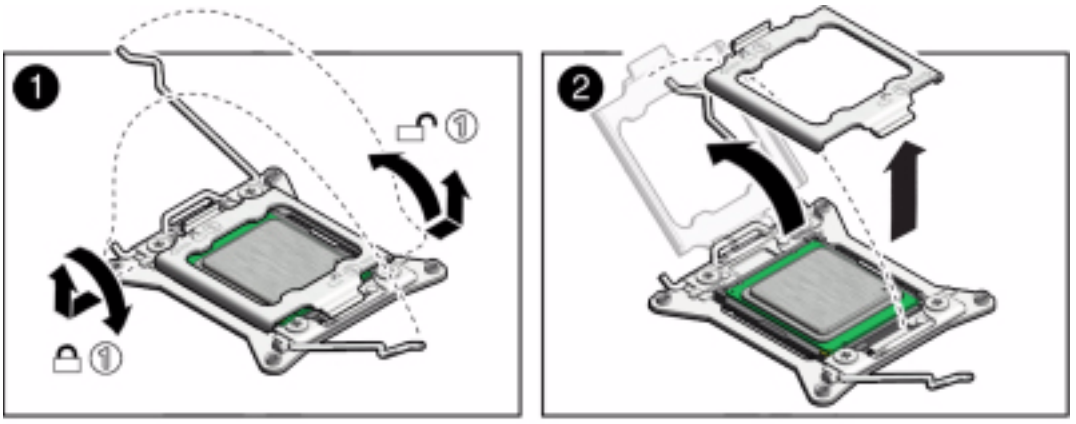
   Leave the processor in the anti-static tray until it is ready to be installed.



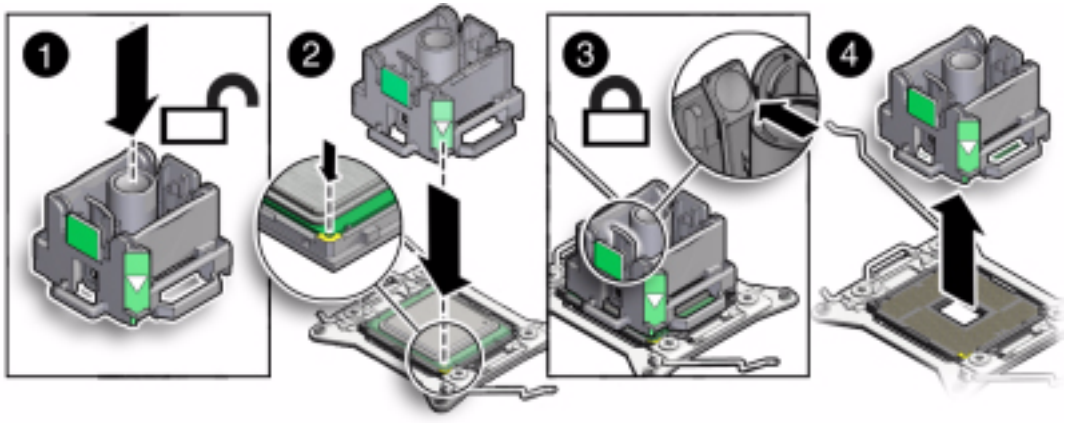
2. **Release the two processor pressure frame retaining levers on the blade motherboard [1].**

   a. **Disengage the processor release lever on the right side of the processor socket (viewing the server from the front) by pushing down and moving it to the side away from the processor, and then rotating the lever upward.**

   b. **Disengage the processor release lever on the left side of the processor socket (viewing the server from the front) by pushing down and moving it to the side away from the processor, and then rotating the lever upward.**



3. **Lift the processor pressure frame up to the fully open position [2].**
4. **Push the removal/insertion tool button [1].**



5. **Place the removal/insertion tool on top of the processor [2].**

   Properly position the tool over the processor socket and lower it into place over the processor socket. Ensure that the tool and processor key corners are aligned. To properly position the tool over the processor socket, rotate the tool until the green triangle on the side of the tool is facing the front of the server and it is over the left side of the processor socket when viewing the server from the front.

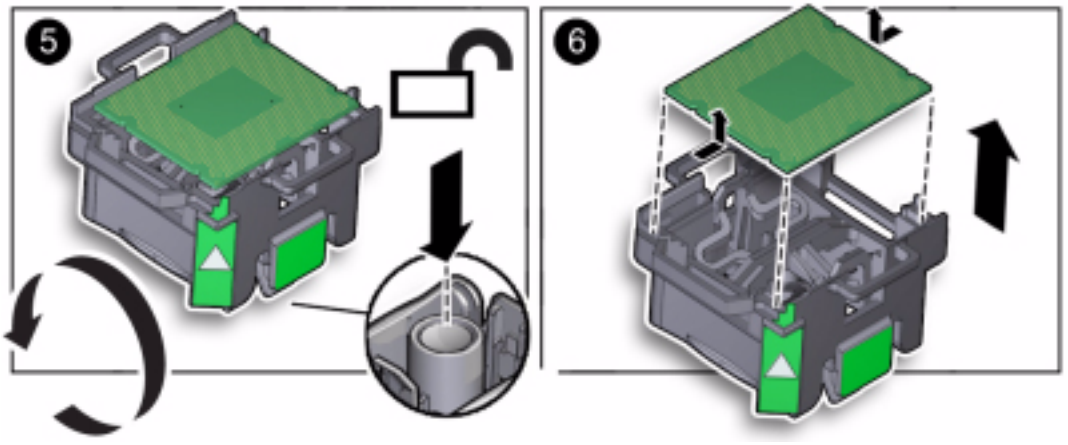
6. **Click the tab on the removal/insertion tool to secure the tool to the processor [3].**

   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 [4].**

   Grasp the tool by its sides and remove it from the server.

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

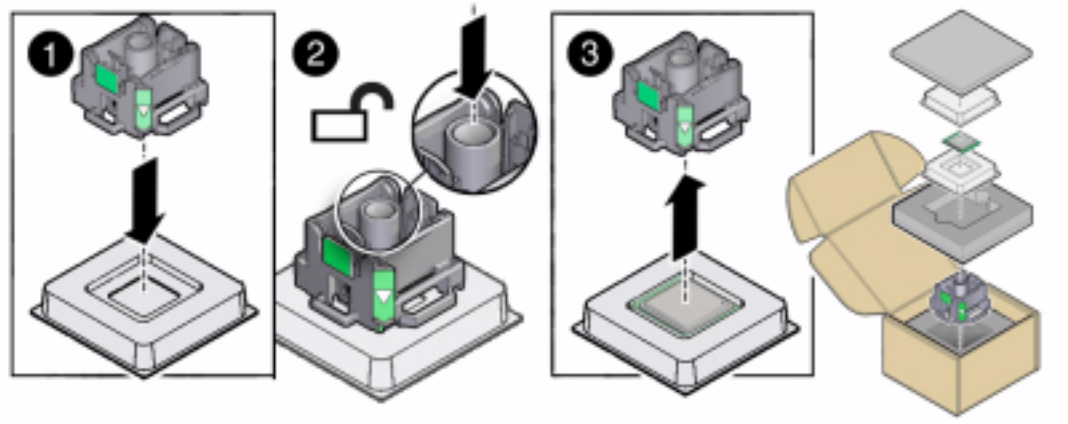


9. **While holding the processor tool up side down, press the center button on the tool to release the processor [5].**

10. **Carefully grasp the processor on the front and back edges, lift it out of the tool and place it with its circuit side down (the installed orientation) on an antistatic mat [6].**

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

12. **Place the removed processor into an antistatic container.**



13. **Install a processor.**

    See "Install a Processor" on page 76.

▼ Install a Processor

To replace a faulty processor (CPU) or upgrade a processor on the Netra Blade X3-2B motherboard.

Note – This component must be serviced by an Oracle-qualified service technician.

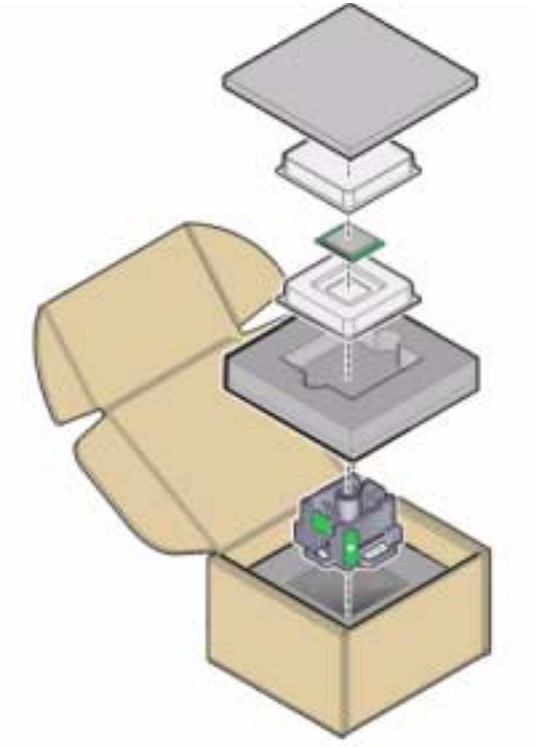
"Preparing the Blade for Service" on page 15

"Remove a Processor Heat Sink Assembly" on page 71

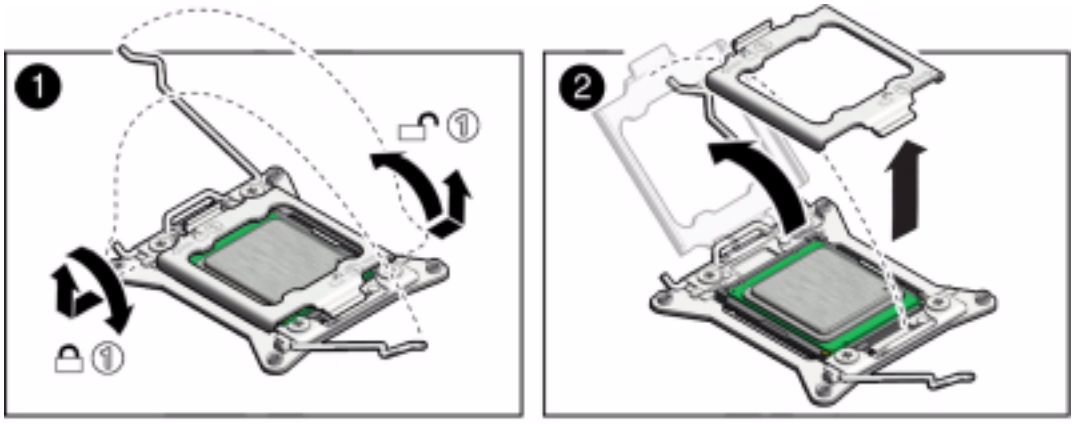
"Remove a Processor" on page 72

A processor removal/insertion tool is required.

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



2. **Ensure that the two processor socket release levers are in the fully open position [1].**



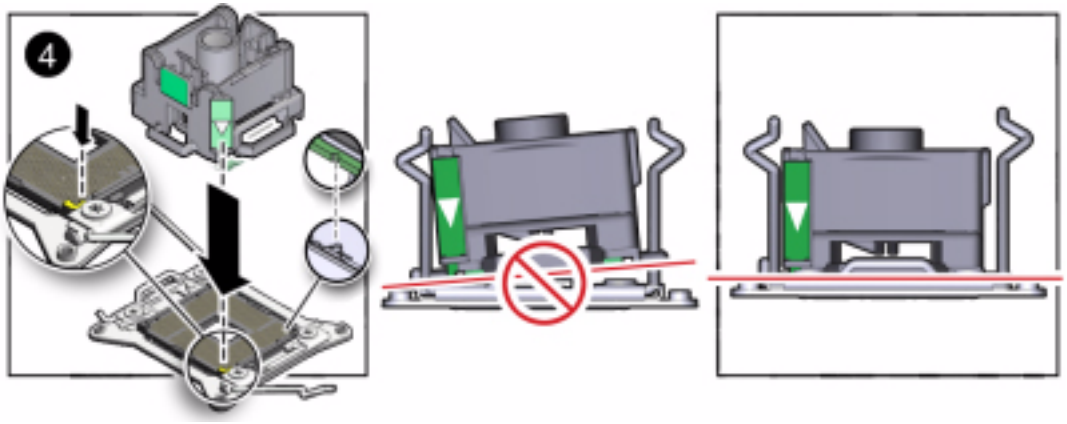
3. **Ensure that the processor pressure frame is in the fully open position [2].**
4. **Press the button in the center of the tool to the down position [1].**
5. **Turn the tool upside down, grasp the processor by its front and back edges and position the processor (circuit side up) in the tool [2].**

   Ensure that the triangle on the corner of the processor aligns with the triangle on the side of the processor removal/replacement tool [2].
6. **Lower the processor into the tool. Then press the tool release lever to release the center button and engage the processor [3].**

   An audible click indicates that the processor is locked in place.
7. **Properly position the tool over the processor socket and lower it into place [4].**

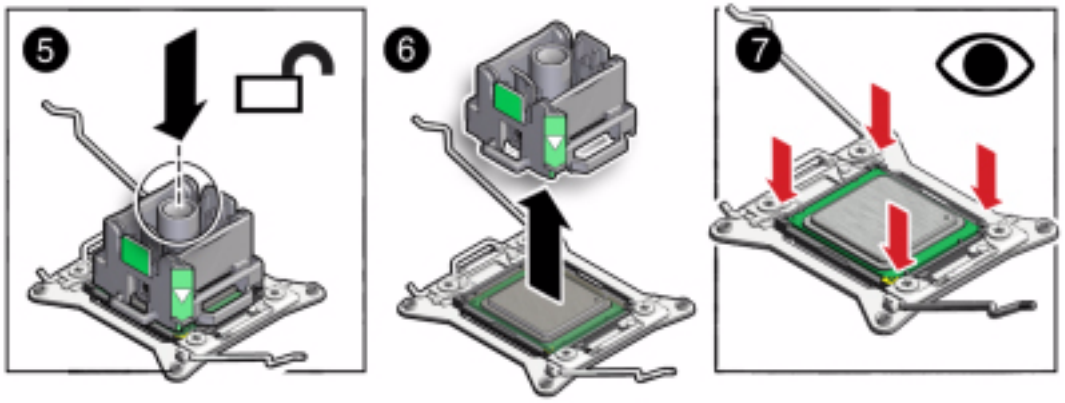
   Carefully align the processor over processor socket 0 or 1. Ensure that the notches on the sides of the processor align with the keys on the socket.

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



8. **Press the center button in the tool down to release the processor so that it is placed in processor socket 0 or 1 [5].**

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



9. **Remove the processor removal/replacement tool [6].**

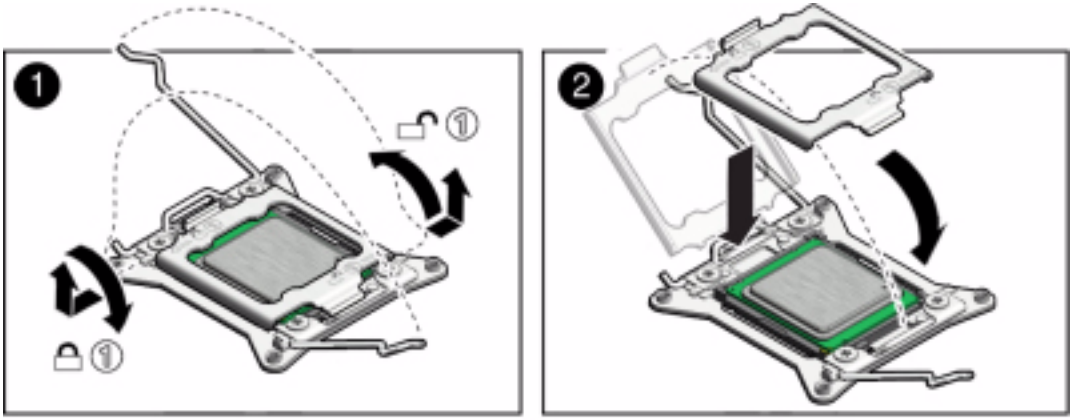
   Lift the empty insertion/removal tool off of the motherboard.

10. **Visually check the alignment [7].**

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

11. **Place the old processor in the packaging.**

12. **Close the processor pressure frame cover [1].**
13. **Lower the first retaining lever and secure it under the retaining clip [2].**
14. **Lower the second retaining lever and secure it under the retaining clip [2].**
    This action secures the processor in the socket.



15. **Install a heat sink.**
    See "Install a Processor Heat Sink Assembly" on page 79.

▼ Install a Processor Heat Sink Assembly

Note – This component must be serviced by an Oracle-qualified service technician.

To replace a processor heat sink assembly on the Netra Blade X3-2B motherboard.

"Preparing the Blade for Service" on page 15

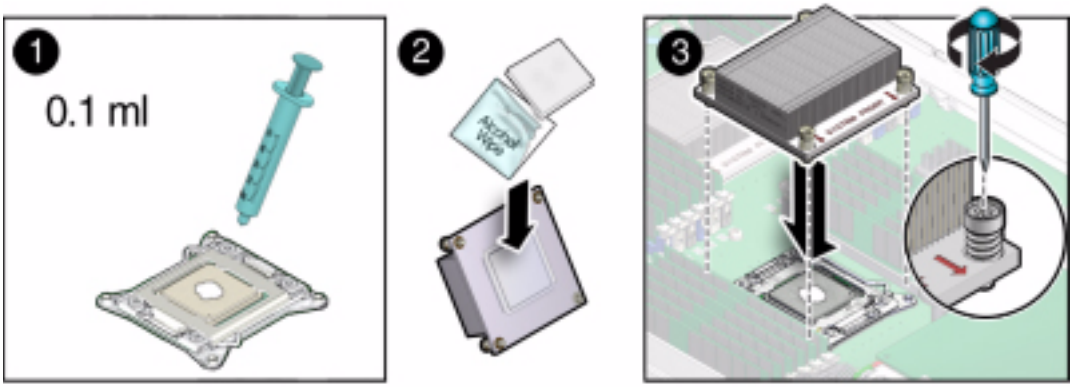
"Remove a Processor Heat Sink Assembly" on page 71

"Remove a Processor" on page 72

"Install a Processor" on page 76

1. **Use the syringe (supplied with the new or replacement processor) to apply approximately 0.1 ml of thermal grease to the center of the top of the processor [1].**
   To measure 0.1 ml of thermal grease, use the graduated scale on the thermal grease syringe.

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



2. **Clean all thermal compound residue off the heat sink [2]. Use an alcohol wipe.**
3. **Carefully position the heatsink on the processor, aligning it with the mounting posts to reduce movement after it makes initial contact with the layer of thermal grease [3].**

   Ensure that the heat sink is oriented correctly. Orient the heatsink so that the screws line up with the mounting studs. The processor heatsink is not symmetrical.

Caution – When handling the heat sink, be careful not to get the thermal compound grease on your fingers so as not to transfer the grease to other server components.

4. **Lower the heat sink onto the processor [3].**

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

5. **Tighten the Phillips screws alternately one-half turn until fully seated [3].**

   Use a No. 2 Phillips screwdriver to alternately tighten each screw clockwise, 180 degrees, one at a time, until tight.

6. **Prepare the blade for operation.**

   See "Returning Blade to Operation" on page 85 .

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

   See the *Netra Blade X3-2B Administration Guide* and *Netra Blade X3-2B Installation Guide*.

8. **Clear the faults.**

   See "Clear Blade Processor Faults" on page 81.

▼ Clear Blade Processor Faults

Use Oracle ILOM command-line interface commands to view Netra Blade X3-2B faults, and to clear server faults.

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

   See *Netra Blade X3-2B Administration Guide,* "Accessing Oracle ILOM" on page 22.

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

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

   The server lists all known faults, for example:

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

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

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

   For example:

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

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

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

Servicing the Blade and Motherboard Assembly

Blade replacement is required for motherboard or disk backplane replacement.

Note – This component must be serviced by an Oracle-qualified service technician.

Use these procedures to remove and install a motherboard assembly:

- "Blade Replacement" on page 82
- "Update FRUID" on page 84

▼ Blade Replacement

The motherboard is shipped installed in a blade enclosure assembly. Do *not* remove the motherboard from the blade enclosure. Remove components from the old blade enclosure, and install these components into the new enclosure and motherboard assembly.

Note – This component must be serviced by an Oracle-qualified service technician.

For the location of components, see "Replaceable Blade Components" on page 12.

1. **Update or downgrade the blade system firmware package to the version compatible with the SP.**

   When the replacement of either a motherboard or service processor results in an incompatibility between the hardware revision of the component and the firmware version of either the SP or the BIOS, the recommendation is to maintain compatibility with the SP firmware.

2. **Before removing the blade, back up the FRUID information.**

   See the *Netra Blade X3-2B Administration Guide*.

3. **Prepare the blade for service.**

   See "Preparing the Blade for Service" on page 15 .

4. **Insert a blade filler panel into the empty slot.**

   See "Insert Blade Filler Panels" on page 32.

5. **Remove reusable components from the old blade motherboard.**

   a. **Perform the following component removal procedures, as required:**

   - "Remove a Storage Drive" on page 41

     Note the storage drive positions (0, 1, 2, 3).
   - "Remove DIMMs" on page 52

     Note the DIMM positions.
   - "Remove a Processor Heat Sink Assembly" on page 71

     Note the processor positions (0 and 1).
   - "Remove a Processor" on page 72
   - "Remove USB Flash Drives" on page 58

     Note the flash drive positions (0 and 1).
   - "Remove a REM Card" on page 64
   - "Remove a FEM" on page 61

   b. **Perform the following filler removal procedure, as required:**

   - "Remove Storage Drive Filler Panels" on page 43
   - "Remove DIMM Filler Panels" on page 54

6. **Install the components on the *new* blade motherboard assembly.**

   a. **Perform the following component installation procedures, as required:**

   - "Replace a Storage Drive" on page 42
   - "Install a Processor" on page 76
   - "Install DIMMs" on page 53
   - "Install a REM Card" on page 65
   - "Install a FEM" on page 62
   - "Install USB Flash Drives" on page 59

   b. **Perform the following filler installation procedure, as required:**

   - "Insert Storage Drive Filler Panels" on page 44
   - "Insert DIMM Filler Panels" on page 55

Caution – The position of each filler panel must match the position in the original blade.

7. **Prepare the blade for operation.**

   See "Returning Blade to Operation" on page 85 .

Note – Do *not* power on the server.

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

   See "Update FRUID" on page 84.

▼ Update FRUID

Note – This procedure requires access to ServiceMode.

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

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

   See "Graceful Shutdown and Power Off" on page 18.

2. **To restore FRUID information, log in to ServiceMode.**

   The ServiceMode command-line prompt is displayed: #

3. **Note the previous blade serial number.**

4. **To update the FRUID/MAC address for the new motherboard, type:**

   # **`setpsnc ?m NEW_MAC_ADDRESS`**

   where NEW_MAC_ADDRESS is the MAC address of the new motherboard.

5. **To back up the updated FRUID information, type:**

   # **`copypsnc BACKUP1 PRIMARY`**

6. **Power on the blade.**

   See "Apply Full Power" on page 89.

Returning Blade to Operation

This section describes how to return the Netra Blade X3-2B to operation after you have performed service procedures. Procedures for preparing to return the server to operation, power information and procedures related to powering on the blade are included.

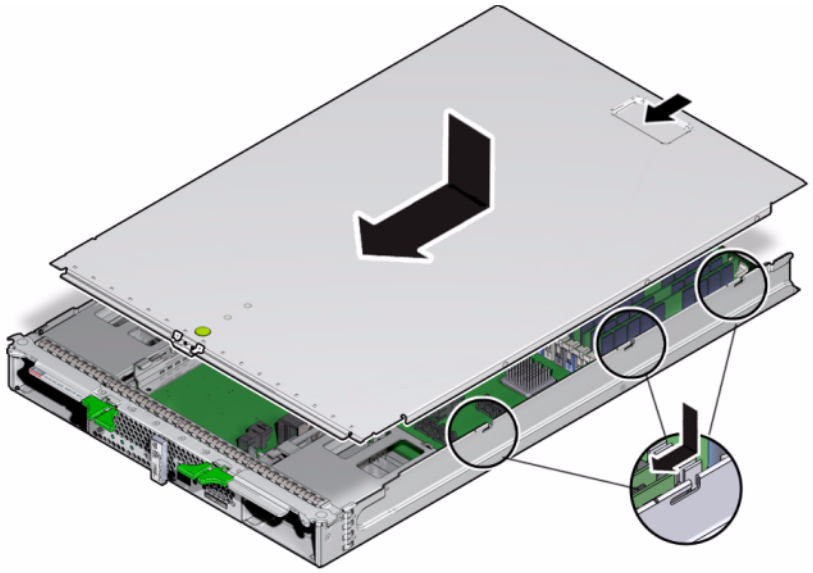
The following topics are covered:

▼ Install the Blade Top Cover

Caution – The blade cover must be in place for proper airflow. Never attempt to run the blade with the cover removed. Equipment damage possible. Hazardous voltage present.

If you removed the blade top cover for service, replace the cover:

1. **Grasp the blade cover by its rear edge and place it down on the blade chassis.**



2. **Slide the top cover toward the front of the blade chassis approximately 0.5 inch (12 mm).**

   Slide the cover under the tabs at the front of the blade.

3. **Gently press down on the blade cover to engage it with the blade chassis.**
4. **Remove antistatic measures.**
5. **Install the blade.**

   See "Install the Blade in the Chassis" on page 86.

▼ Install the Blade in the Chassis

If you removed the blade from the chassis, replace it:

1. **Remove the blade filler panel, as required.**

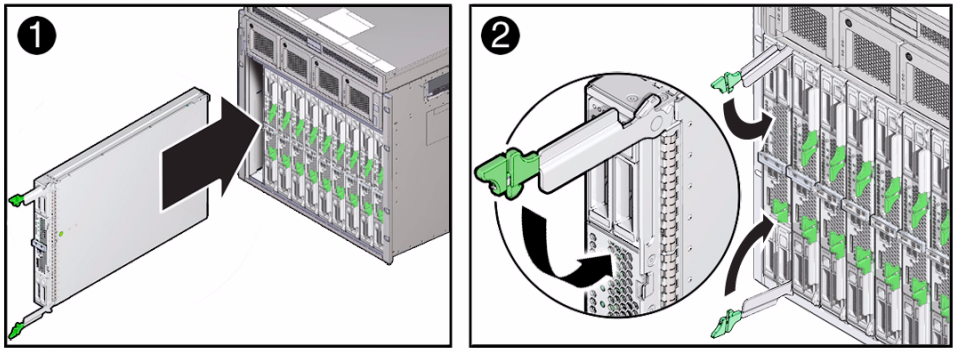
   Pull the lever out and eject the blade filler panel.

   Do not discard the blade filler panel.

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

2. **Position the blade vertically so that the ejectors are on the right.**

   The following illustration shows the blade being inserted into the Sun Netra 6000 chassis. Your chassis might differ.



3. **Push the blade into the slot until the blade stops. [1]**
4. **Rotate both ejectors in until they snap into place. [2]**

   The blade is now flush with the chassis, and the ejectors are locked.

   If the chassis is powered on, the blade comes up to standby power. The green OK LED on the front panel blinks (0.2 seconds on, 2.8 seconds off).

5. **Power on the blade.**

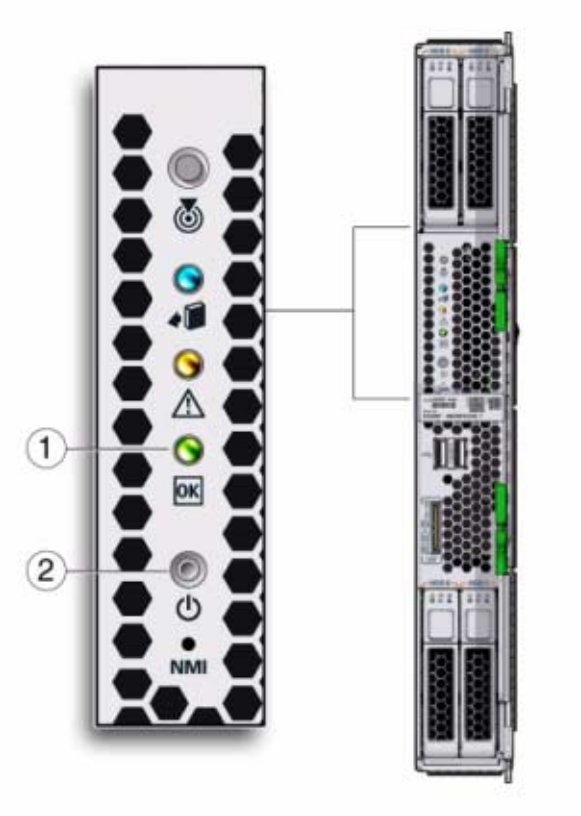
   See "Powering On the Blade" on page 87.

Powering On the Blade

Before powering on your blade for the first time, follow the installation and cabling instructions provided in the *Netra Blade X3-2B Installation Guide*, "Cabling the Blade" on page 19.

To apply power to the blade after installation, choose one of the following methods.

- "Apply Standby Power" on page 88
- "Apply Full Power" on page 89



Legend			
1	Power OK LED	2	Power button

▼ Apply Standby Power

1. **Insert the blade fully into the chassis.**

   The blade green OK LED on the front panel blinks rapidly for several minutes, indicating that the blade SP is booting up.

   See "Install the Blade in the Chassis" on page 86.

2. **Verify that the blade standby power is on and full power is off.**

   The blade green OK LED on the front panel blinks once every three seconds, indicating that the blade is in standby power mode.

   See the illustration in "Powering On the Blade" on page 87.

▼ Apply Full Power

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

   The blade green OK LED on the front panel blinks once every three seconds, indicating that the blade is in standby power mode.

   See the illustration in "Powering On the Blade" on page 87.

2. **Use a pen, or other non-conductive pointed object, to press and release the recessed Power button on the blade front panel.**

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

   Alternate methods:

   - Oracle ILOM SP CLI: Type the command at the Oracle ILOM prompt.

     See "Power On from Oracle ILOM SP (CLI)" on page 89.

   - Oracle ILOM SP web interface.

     See "Power On From Oracle ILOM SP (Web)" on page 90

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

▼ Power On from Oracle ILOM SP (CLI)

You can use the service processor Oracle ILOM command-line interface (CLI) to apply full power to the blade host.

1. **Log in as a superuser or equivalent to the blade host OS.**
2. **Open an SSH session to the SP.**
3. **Log in to the service processor Oracle ILOM.**

   The default user name is **root**, and the password is **changeme**.

   See *Netra Blade X3-2B Administration Guide*, "Accessing Oracle ILOM" on page 22.

4. **Type:** `start /System`

   See the operating system documentation for additional information.

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

▼ Power On From Oracle ILOM SP (Web)

You can use the service processor web interface to apply full power to the blade host.

1. **Log in as a superuser or equivalent to the blade host OS.**
2. **Open a web browser, and type the SP IP address in the location bar.**

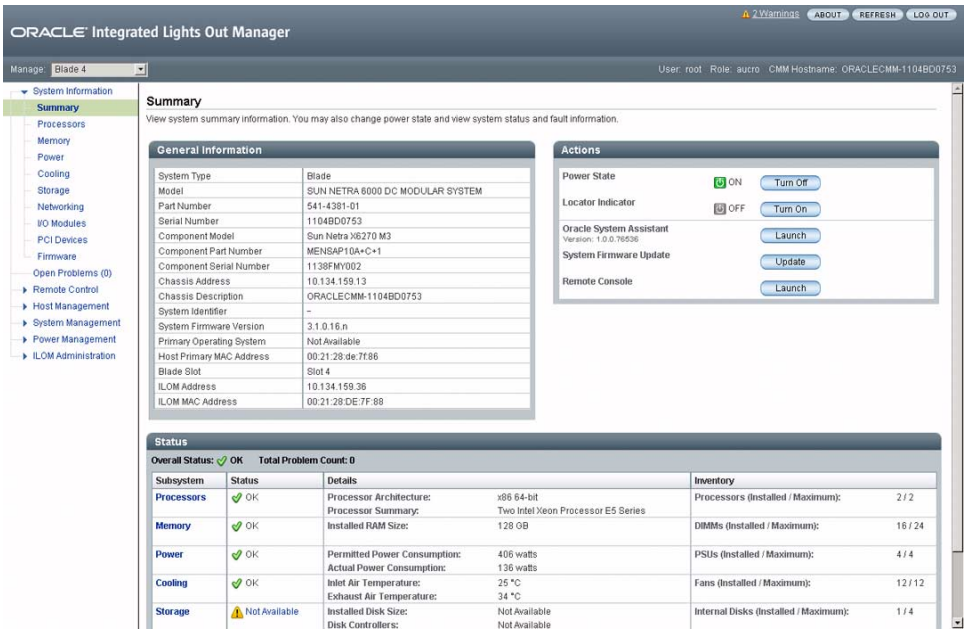
   See *Netra Blade X3-2B Administration Guide,* "Access Oracle ILOM (Web)" on page 23.

   The Oracle ILOM log in screen is displayed.
3. **Log in to the service processor Oracle ILOM web interface.**

   The default user name is **root**, and the password is **changeme**.

   The Oracle ILOM Summary screen is displayed.
4. **Verify that the Power State on the Summary screen is OFF.**
5. **Click Turn On.**

   See the host operating system documentation for additional information.



Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

Troubleshooting the Blade

This section contains maintenance-related information and procedures that you can use to diagnose and correct blade hardware issues. This section also describes how to restore the service processor (SP) password and serial connection defaults in Oracle ILOM, as well as how to restore your Oracle ILOM SP firmware.

The following topics are covered:

Diagnosing Hardware Faults

The following table lists diagnostic-related procedures and references.

Procedure	Description	Link
View power-on self test (POST) checkpoint codes.	Monitor the status of a functioning system by viewing the system display.	"BIOS POST Checkpoints" on page 101
View front panel LED status indicators.	View the front panel LEDs to identify system status.	"Front Panel LEDs" on page 4 "Using LED Indicators" on page 94

Procedure	Description	Link
Identify faulty DIMMs.	Use the internal DIMM test circuit to identify the failed DIMM component.	"Identify Faulty DIMMs" on page 45 "Using the DIMM and Processor Test Circuit" on page 95
Identify faulty processors.	Use the internal processor test circuit to identify the failed processor component.	"Identify a Faulty Processor" on page 68 "Using the DIMM and Processor Test Circuit" on page 95
View the system event log (SEL).	Use Oracle ILOM system event log (SEL) files and messages to identify a problem's possible source.	*Netra Blade X3-2B Administration Guide*
View sensor information and set up traps.	Use Oracle ILOM to identify a faulted component after a fault occurs..	*Netra Blade X3-2B Administration Guide*
Recover from corrupted service processor firmware.	Recover the Oracle ILOM firmware image.	"Recover the SP Firmware (Preboot Menu)" on page 98
Run firmware-based tests.	Use U-Boot or Pc-Check to exercise the system and isolate subtle hardware-related problems.	x86 Servers Diagnostics Guide (http://download.oracle.com/docs/cd/E23161_01/index.html)
Run x86 diagnostic software on your blade.	Use a comprehensive validation test suite in a stand-alone software package.	x86 Servers Diagnostics Guide (http://download.oracle.com/docs/cd/E23161_01/index.html)

Using LED Indicators

You can use the blade's LEDs to view the status of the server and diagnose server issues. See the following topics:

- "Using the DIMM and Processor Test Circuit" on page 95
- "Front Panel LEDs" on page 4
- "Identify Storage Drive LED Status" on page 39

Using the DIMM and Processor Test Circuit

If a DIMM or processor fails, the front panel Service Action Required LED lights. A lit Service Action Required LED indicates that immediate service action is required. You can use the internal DIMM or processor test circuit to identify the failed DIMM or processor component. Remove the blade from the server, open the top cover, and press the DIMM or processor test circuit Fault Remind button on the motherboard as soon as possible.

The test circuitry power charge has a time-limited window of usability (30 - 60 minutes). When the Fault Remind button is pressed, a Charge Status LED lights if the circuit is usable. If too much time has elapsed between removing the blade and viewing the test circuit LEDs, the charge can discharge completely. If the test circuit charge is completely depleted, the test circuit becomes unusable, the Charge Status LED turns off, and the Fault Remind error information is lost. To use the test circuit again, install the blade into the chassis, and let the error occur again.

For more information about how to identify faulty DIMMs or processors using on-board fault test circuits, see:

- "Identify Faulty DIMMs" on page 45
- "Identify a Faulty Processor" on page 68

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, see the *Netra Blade X3-2B Administration Guide*.

Using Diagnostic Tools

The Netra Blade X3-2B includes a wide selection of diagnostic tools that allow you to troubleshoot server issues efficiently. Each tool used to diagnose blade hardware faults has specific strengths and applications. Supported diagnostic applications and utilities can be found on the server's Tools and Drivers CD, or CD image.

Common server diagnostic tools include:

- hd Utility
- Hardware Error Report and Decode (HERD)
- Disk Control and Monitor Utility (DCMU)
- IPMItool
- RAID Utilities

For more information about which tool to use, see the *x86 Servers Diagnostics Guide*.

Troubleshooting Power States

Each time a blade powers on in the Sun Netra 6000 Series Chassis, the blade queries the CMM to ensure that sufficient power is available from the chassis power supply units (PSUs) to power on the server. If the PSUs can not supply enough power to power on the blade, the CMM SP prevents the blade from receiving power (standby and full), and the blade front panel OK/Power LED blinks and does not display solid.

▼ Troubleshoot Blade Power Issues

1. **Verify that the OK/Power LED on the front panel of the blade is not blinking and displays solid.**

   If the OK/Power LED is blinking after full power-on, see the system chassis documentation for information about powering on chassis components.

2. **Review the Oracle ILOM system event log (SEL) messages. Confirm that the server has system chassis permission to power on.**

   A message is generated in the SEL if the chassis cannot supply adequate power to the blade.

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

   Access the Oracle ILOM CMM.

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

   For more information about SEL messages and power management, see the *Netra Blade X3-2B Administration Guide*.

   For more information about the Oracle ILOM system event log or monitoring power consumption, see:

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

Firmware and Software Troubleshooting

The following topics are covered:

Recovering from Corrupted Service Processor Firmware

If the service processor (SP) firmware becomes corrupted, you can recover by using one of the following procedures:

Recover the SP Firmware (Oracle ILOM)

You can update the SP firmware using Oracle ILOM CLI or Oracle ILOM web interface. See Netra Blade X3-2B Product Notes.

For more information about Oracle ILOM, see:

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

▼ Recover the SP Firmware (Preboot Menu)

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

1. **Obtain a valid `.flash` firmware image file on a TFTP server.**

   This file is available on the Oracle MOS download site.

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

---

2. **Restart the SP.**

   See the *Netra Blade X3-2B Administration Guide* for detailed preboot menu and Oracle ILOM information.

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

   Choose one of the following methods:

   - Press the Locate button during the SP boot process. See "Using the Locate LED to Identify the Blade" on page 24 .
   - Wait for a pause in the bootstrap process, and then type **`xyzzy`**.

   The preboot prompt is displayed.

```
Preboot>
```

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

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

   Where *IPaddress* is the IP address of a TFTP server and *path* is the path to the file relative to `/tftpboot`.

   For example:

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

   After a series of messages, the preboot prompt is displayed.

```
Preboot>
```

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

```
Preboot> reset
```

The preboot menu exits and Oracle ILOM boots.

Related Information

- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

BIOS POST Checkpoints

This section explains power-on-self-test (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.

About POST Code Checkpoint Memory Testing

The system BIOS provides a basic power-on self-test (POST) during start up. When the blade 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` is displayed 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 (Web)" on page 102
- "View BIOS POST Code Checkpoints (CLI)" on page 102

▼ View BIOS POST Code Checkpoints (Web)

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

   For information about how to obtain the IP address of the SP, see 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 is displayed.**

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

5. **Click the Redirection tab.**

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

   The JavaRConsole window is displayed and prompts you for your user name and password again, and then the current POST checkpoint screen is displayed.

7. **To view POST checkpoint codes, reboot the server.**

Related Information

- "View BIOS POST Code Checkpoints (CLI)" on page 102
- Oracle ILOM Documentation Library (http://www.oracle.com/pls/topic/lookup?ctx=ilom31)

▼ View BIOS POST Code Checkpoints (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 node SP.

3. **To start the serial console, type:**

   `-> start /HOST/console`

Related Information

- "View BIOS POST Code Checkpoints (Web)" on page 102

▼ Configure Boot Settings

1. **Access the BIOS Setup Utility.**

   See *Netra Blade X3-2B Administration Guide*, "Setting Up the Blade With BIOS Setup Utility" on page 133.

   The BIOS Main Menu screen is displayed.

2. **Select the Boot menu.**

   The Boot Settings screen is displayed.

3. **Select Boot Settings Configuration.**

   The Boot Settings Configuration screen is displayed.

4. **Configure the following settings by selecting Enable or Disable:**

   - **Quiet Boot:** This option is disabled by default. If you enable this option, the Oracle logo is displayed instead of POST Checkpoint codes.
   - **Wait for F1 if Error:** This option is enabled by default. The system pauses if an error is found during POST Checkpoint and resumes only when you press the F1 key.
   - **Retry Boot List:** Automatically retries the boot list when all devices have failed. This option is enabled by default.
   - **IB gPXE Boot First:** Sets the on-board Infiniband gPXE to always boot first. This option is disabled by default.

5. **Save and exit the BIOS Setup Utility.**

POST Code Checkpoint Reference

From the point that the host subsystem is powered on and begins executing code, BIOS code is executed. The sequence BIOS goes through from the first point that code is executed to the point that the operating system booting begins is referred to as POST (power-on self-test). POST works in conjunction 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 the service processor (SP) for analysis and logging.

Checkpoint Ranges

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 is displayed 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 is displayed 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 is displayed 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.

TABLE: 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)

SEC-Phase Standard Checkpoints

TABLE: Standard Checkpoints: SEC Phase

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

TABLE: Standard Checkpoints: SEC Phase *(Continued)*

SEC Phase	
Status Code	**Description**
0x09	South Bridge initialization after microcode loading
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	

PEI-Phase Standard Checkpoints

TABLE: Standard Checkpoints: PEI Phase

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)

TABLE: Standard Checkpoints: PEI Phase *(Continued)*

PEI Phase	
Status Code	**Description**
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
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

TABLE: Standard Checkpoints: PEI Phase *(Continued)*

PEI Phase	
Status Code	**Description**
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.
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

TABLE: Standard Checkpoints: PEI Phase *(Continued)*

PEI Phase	
Status Code	**Description**
0xF5 - 0xF7	Reserved for future AMI progress codes
	Recovery Error Codes
0xF8	Recovery PPI is not available
0xF9	Recovery capsule is not found
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

DXE-Phase Standard Checkpoints

TABLE: Standard Checkpoints: DXE Phase

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)

TABLE: Standard Checkpoints: DXE Phase *(Continued)*

DXE Phase	
Status Code	**Description**
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)
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

TABLE: Standard Checkpoints: DXE Phase *(Continued)*

DXE Phase	
Status Code	**Description**
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
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

TABLE: Standard Checkpoints: DXE Phase *(Continued)*

DXE Phase	
Status Code	**Description**
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
	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 Standard Checkpoints

TABLE: ACPI/ASL Checkpoints

ACPI/ASL Checkpoints	
Status Code	**Description**
0x01	System is entering S1 sleep state
0x02	System is entering S2 sleep state
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 Standard Checkpoints

TABLE: OEM-Reserved Checkpoint Ranges

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

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