



# Sun Blade™ 6000 Disk Module Installation Guide

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Sun Microsystems, Inc.  
[www.sun.com](http://www.sun.com)

Part No. 820-1702-12  
June 2009, Revision 01

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# Preface

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The *Sun Blade™ 6000 Disk Module Installation Guide* contains procedures for installing the disk module in a chassis and disk drives in the disk module.

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## Product Updates

For product updates that you can download for the Sun Blade 6000 Disk Module, visit the following web site:

(<http://www.sun.com/servers/blades/downloads.jsp#6000dm>)

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## Related Documentation

For a description of the document set for the Sun Blade 6000 Disk Module, see the *Where To Find Documentation* sheet that is packed with your system and also posted at the product's documentation site. Go to the following URL, then navigate to your product:

(<http://docs.sun.com/app/docs/coll/blade6000dskmod>)

Translated versions of some of these documents are available at the web site described above in French, Simplified Chinese, and Japanese. English documentation is revised more frequently and might be more up-to-date than the translated documentation.

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# Typographic Conventions

Typeface*	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
<b>AaBbCc123</b>	What you type, when contrasted with on-screen computer output	% <b>su</b> Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Command-line variables you need to replace with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm &lt;filename&gt;</code> .

\* The settings on your browser might differ from these settings.

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*Sun Blade 6000 Disk Module Installation Guide*, part number 820-1702-12





# Using Sun Blade 6000 Disk Modules with Server Modules: An Overview

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This chapter contains the following topics:

- [“Terminology” on page 1](#)
- [“Overview of the Sun Blade 6000 Disk Module” on page 2](#)
- [“The Server Module SAS Host Bus Adapter” on page 4](#)
- [“Server Modules and Disk Modules in a Chassis” on page 5](#)

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## Terminology

The following terminology is used in this document.

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<b>disk module or disk blade</b>	The Sun Blade 6000 Disk Module (blade), the subject of this document The terms “disk module” and “disk blade” are used interchangeably.
<b>server module or server blade</b>	Any server module (blade) that will inter-operate with the disk module. The terms “server module” and “server blade” are used interchangeably.
<b>chassis</b>	The Sun Blade 6000 Modular System blade enclosure.
<b>CMM</b>	Chassis Monitoring Module. An Integrated Lights Out Manager component of the Sun Blade 6000 Modular System used to access and manage blades in a chassis.
<b>NEM</b>	Any Network Express Module that plugs into a Sun Blade 6000 chassis

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<b>NEM 0, NEM 1</b>	The slots for Network Express Modules on the rear of the chassis. NEM 0 is the lower slot and NEM 1 is the upper slot.
<b>SAS-NEM</b>	A Network Express Module that supports SAS inter-connectivity. For example, the Sun Blade Multi-Fabric Network Express Module (abbreviated Multi-Fabric NEM) or the Sun Blade 10GbE Multi-Fabric Network Express Module (abbreviated 10GbE Multi-Fabric NEM).
<b>REM</b>	A RAID Expansion Module. Also referred to as a Host Bus Adapter (HBA). Supports the creation of RAID volumes on disks in the server and disk blades.

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**Note** – From time to time, this document refers to SAS-NEMs. SAS-NEM is a general category: it includes Sun Blade 6000 Multi-Fabric NEMs, as well as other NEMs with SAS connectivity such as the Sun Blade 6000 10GbE Multi-Fabric NEM. From the standpoint of connecting server blades with disk blades, all SAS-NEMs provide the same functionality.

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## Overview of the Sun Blade 6000 Disk Module

The Sun Blade 6000 Disk Module is a disk module for the Sun Blade 6000 Modular System.

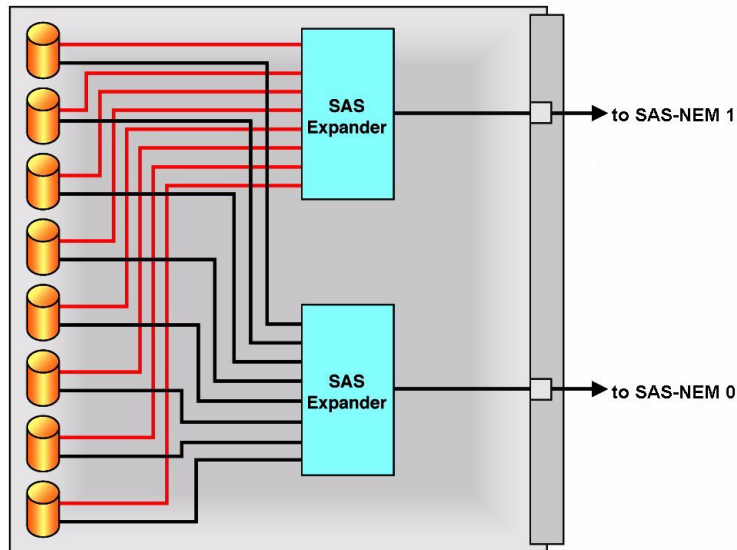
As a disk module, the Sun Blade 6000 Disk Module does not contain a CPU or Service Processor. It does, however, contain SAS expanders, which are switching circuits that can connect disks in complex patterns.

A fully loaded Sun Blade 6000 Disk Module consists of eight SAS disks, with each disk connected to SAS expanders. The SAS expanders, in turn, connect to a Sun Blade 6000 Modular System chassis' SAS-NEMs.

The disk module works only with a SAS-NEM. It does not work with a NEM that lacks SAS connectivity. For the disk module to function, there must be a SAS-NEM in at least slot NEM 0.

**FIGURE 1-1** shows a schematic view of the disk module. Each SAS port connects to a single SAS-NEM module.

**FIGURE 1-1** The Main Components of the Sun Blade 6000 Disk Module



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**Note** – Solid State Drives (SSD) are supported for use in the disk module. SSDs perform as SATA disk drives and are single-ported devices. This means that they do not have the capability of providing alternate connection paths. They connect only through the SAS expander on the disk blade that is wired to SAS-NEM 0. Be sure to follow the rule for mixing SAS and SATA drives described in [“Compatible Disk Drives”](#) on page 13.

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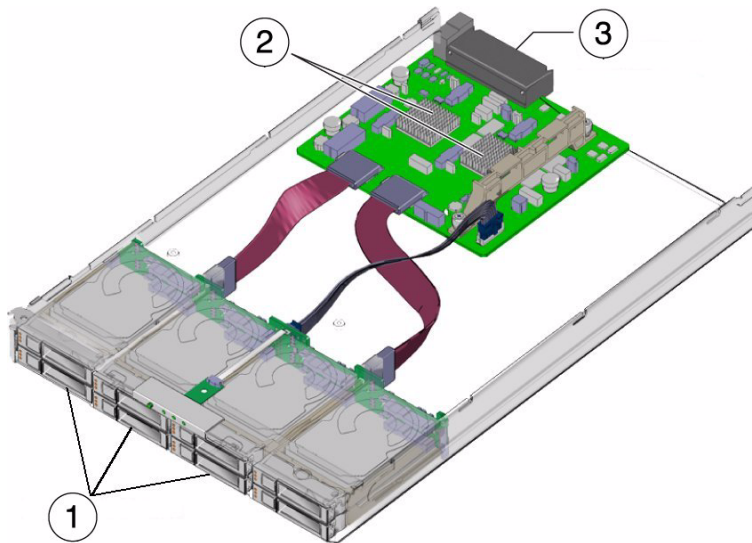
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**Caution** – If you are using SATA drives and SAS-NEM 0 fails, you lose all connectivity to your SATA drives.

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FIGURE 1-2 shows the interior of the disk module, fully loaded with eight SAS disks.

**FIGURE 1-2** The Interior of the Sun Blade 6000 Disk Module



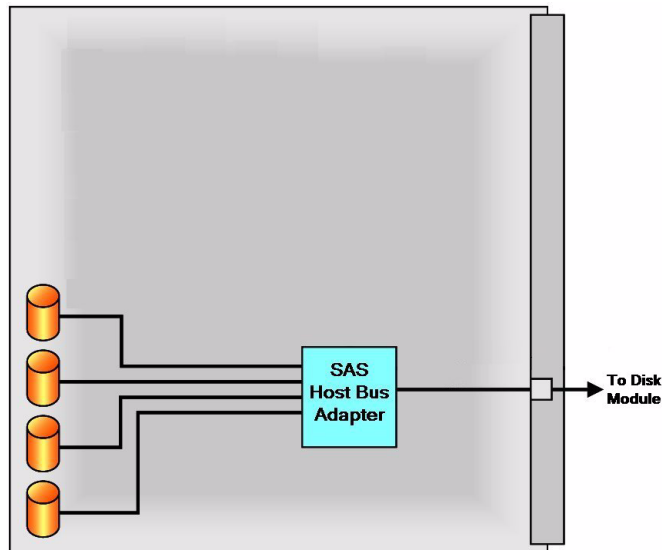
**Figure Legend**

- 
- 1 Disk drives
  - 2 SAS Expanders
  - 3 Connectors to chassis midplane
- 

## The Server Module SAS Host Bus Adapter

The disks on a Sun Blade 6000 Disk Module are controlled by a SAS host bus adapter on the server module. This adapter can be either an on-board chip or a RAID Expansion Module card. [FIGURE 1-3](#) shows the key components of a server that are used to control disks. Server modules can have either no disks, or up to four disks of their own. The SAS host bus adapter on the server module controls its own disks as well as disks on the disk module. The disks on the disk module are connected to the SAS host bus adapter through two SAS-NEM modules, providing a dual path to each SAS disk.

**FIGURE 1-3** Connection of SAS Host Bus Adapter for Sun Blade Servers



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## Server Modules and Disk Modules in a Chassis

The Sun Blade 6000 Disk Module can interoperate with any one of the supported server blades: X6220, X6240, X6250, X6270, X6440, X6450, T6300, T6320, and T6340.

The server blades and disk blades must be placed in the chassis in pairs. The pairs must be in slots 0+1, 2+3, 4+5, 6+7, or 8+9. No other combination of slots can be used. When (facing the front of the system chassis) the server blade is on the left, a server blade in slot  $n$  ( $n$  is an even number) sees its own on-blade disks and all the disks in a disk blade in slot  $n+1$ , but no other disks.

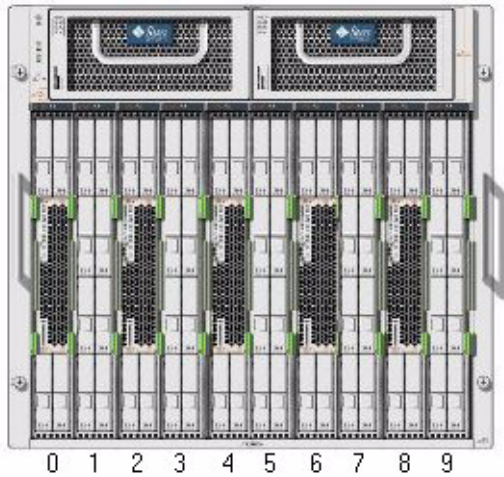
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**Note** – The server blade should be placed on the left.

---

**FIGURE 1-4** shows a Sun Blade 6000 Modular System chassis, fully loaded with server modules and disk modules:

**FIGURE 1-4** Front View of Chassis Filled with Server and Disk Module Blade Pairs



Counting from the left, server blades are in slots 0, 2, 4, 6, and 8. Disk blades are in slots 1, 3, 5, 7, and 9.

# Setting Up the Disk Module Hardware

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This chapter contains the following topics:

- “Important Notice” on page 7
- “Installation Overview” on page 7
- “Inserting the Disk Module” on page 8
- “The Sun Blade 6000 Disk Module Front Panel” on page 10

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## Important Notice

Before installing your disk module, please read the *Sun Blade 6000 Disk Module Configuration Guide* (part number 820-6547). There is a checklist of steps that need to be performed when you are configuring a chassis with server and disk blade pairs. It also contains important information about using the disk blade with different servers, operating systems, and host bus adapters.

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## Installation Overview



**Caution** – Server modules that use LSI host bus adapters and that are intended for use with a disk module should be inserted *before* the disk module. Then, prior to inserting the disk module for the first time, you must erase the “non-present” mappings in the host bus adapter using the `lsiutil` utility described in the *Sun*

*Blade 6000 Disk Module Administration Guide* (part number 820-4922).

If the server blade uses an Adaptec host bus adapter, this procedure is not necessary.

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You should insert the server modules in even-numbered slots. Then, insert the companion disk modules in the odd-numbered slot to the right of the server modules. The 10 chassis slots are numbered 0 through 9 from the left to the right, viewed facing the front of the chassis. See [“Server Modules and Disk Modules in a Chassis”](#) on page 5.

You can insert the disk module into the chassis whether or not the chassis is powered on. The Sun Blade 6000 Disk Module is hot-pluggable.

The disk module receives its power directly from the chassis. There is no power switch on the module itself.

If the service processor software on the chassis, called the Chassis Management Module (CMM) Integrated Lights Out Manager (ILOM), is already configured, it should automatically recognize the disk module and the state of the disk module LEDs.

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## Inserting the Disk Module



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**Caution** – Before handling components, attach an electrostatic discharge (ESD) wrist strap to bare metal on the chassis. Both the front and back of the chassis have grounded locations. The system’s printed circuit boards and disk drives contain components that are extremely sensitive to static electricity.

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### ▼ To Insert the Disk Module

1. **Locate the desired slot in the chassis.**
2. **Remove the filler panel.**

Pull the lever out and eject the filler panel.



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**Caution** – If the chassis is powered on, insert the disk module within 60 seconds of removing the filler panel. Otherwise chassis cooling may be compromised.

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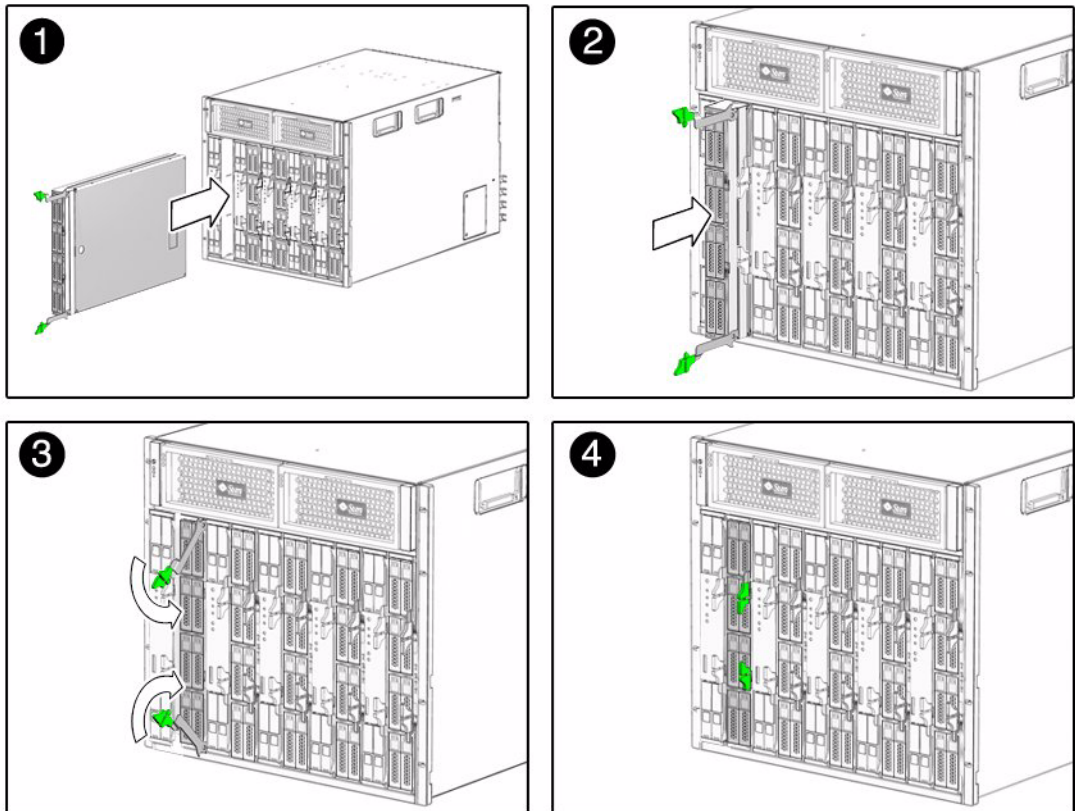
**Note** – Filler panels should remain in any *unused* slots because they ensure that the chassis maintains the proper cooling and complies with FCC limits on electromagnetic interference (EMI).

---

3. Open the ejectors as far as possible without forcing them.
4. Position the disk module vertically so that the ejectors are on the right, as seen from the front of the module.

The following illustrations show the disk module being inserted into the Sun Blade 6000 Modular System. Your chassis might differ (see [FIGURE 2-1 \[1\]](#)).

**FIGURE 2-1** Inserting the Disk Module Into the Chassis



5. Push the disk module into the slot until the disk module stops (see [FIGURE 2-1 \[2\]](#)).

**6. Rotate the ejectors down until they snap into place.**

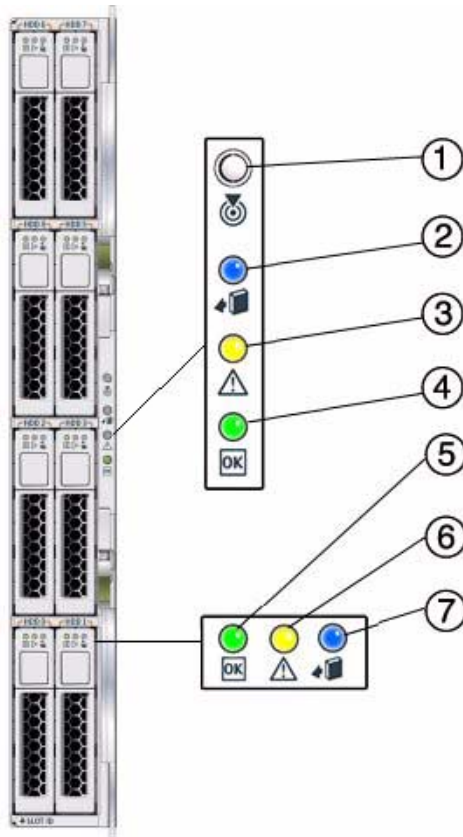
The disk module should now be flush with the chassis (although the disk drives stick out about 1.5 mm) and the ejectors are locked (see [FIGURE 2-1](#) [3, 4]).

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## The Sun Blade 6000 Disk Module Front Panel

The front panel of the Sun Blade 6000 Disk Module is shown in [FIGURE 2-2](#).

**FIGURE 2-2** Sun Blade 6000 Disk Module Front Panel



Refer to [TABLE 2-1](#) for descriptions of the LED behavior.

**TABLE 2-1** Front Panel LED Functions

	<b>LED Name</b>	<b>Description</b>
1	Combined Locate button and LED (white)	This LED helps you to identify which module you are working on in a chassis full of servers. <ul style="list-style-type: none"><li>• Push and release this button to make the Locate LED blink for 30 minutes.</li><li>• When the Locate LED is blinking, push and release this button to make the Locate LED stop blinking.</li><li>• Hold down the button for 5 seconds to initiate a “push-to-test” mode that illuminates all other LEDs for 15 seconds.</li><li>• This LED can also be made to blink from a remote system using the CMM ILOM. Refer to the <i>Sun Blade 6000 Disk Module Administration Guide</i> for details.</li></ul>
2	Ready-to-Remove LED (blue)	<ul style="list-style-type: none"><li>• Not used.</li></ul>
3	Module Fault LED (amber)	This LED has two states: <ul style="list-style-type: none"><li>• On: An event has been acknowledged, and service action is required.</li><li>• Off: Normal operation.</li></ul>
4	Module Activity LED (green)	This LED has three states: <ul style="list-style-type: none"><li>• On: Module is configured and online.</li><li>• Off: Module is not configured or is offline.</li><li>• Blinking: Module is configuring or a firmware flash update is in progress.</li></ul>
5	Disk Drive Activity LED (green)	This LED has three states: <ul style="list-style-type: none"><li>• On: Power is on and disk is online.</li><li>• Off: Disk is offline.</li><li>• Blinking: Irregular blinking means normal disk activity; steady, slow blink means RAID activity.</li></ul>
6	Disk Drive Fault and Locate LED (amber)	This LED has four states: <ul style="list-style-type: none"><li>• On: Disk fault. Service action required.</li><li>• Off: Normal operation.</li><li>• Slow blink: Disk failure predicted.</li><li>• Fast blink: Locate function activated.</li></ul>
7	Ready-to-Remove LED (blue)	<ul style="list-style-type: none"><li>• Not used.</li></ul>



## Installing and Uninstalling Disks

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This chapter contains these sections:

- “Compatible Disk Drives” on page 13
  - “Inserting a Disk Drive” on page 14
  - “Replacing a Disk Drive” on page 17
- 

### Compatible Disk Drives

TABLE 3-1 lists the disk drives that have been tested for use in the Sun Blade 6000 Disk Module.

**TABLE 3-1** Supported Disk Drives

Capacity (GB)	Speed (RPM)	Part Number (With Bracket)	Manufacturer	Type	SAS/SATA
32	N/A	540-7841-xx	Intel	SSD	SATA
73	10K	540-7354-xx	Fujitsu	mecahnical	SAS
73	10K	540-7354-xx	Hitachi	mechanical	SAS
73	10K	540-7354-xx	Seagate	mechanical	SAS
73	15K	540-7361-xx	Seagate	mechanical	SAS
146	10K	540-7355-xx	Fujitsu	mechanical	SAS
146	10K	540-7355-xx	Hitachi	mechanical	SAS
146	10K	540-7355-xx	Seagate	mechanical	SAS
146	10K	540-7864-xx	Hitachi	mechanical	SAS

**TABLE 3-1** Supported Disk Drives (*Continued*)

Capacity (GB)	Speed (RPM)	Part Number (With Bracket)	Manufacturer	Type	SAS/SATA
146	10K	540-7868-xx	Seagate	mechanical	SAS
300	10K	540-7868-xx	Seagate	mechanical	SAS
300	10K	540-7869-xx	Hitachi	mechanical	SAS

The following rules apply when mixing drives in the disk blade:

- You can mix SAS disk drives with different specifications in a disk blade.
- You can have up to eight SSD drives in the disk blade (for HBA requirements when using SSDs, see the *Sun Blade 6000 Disk Module Administration Guide*, 820-4922).

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**Note** – Currently, the X4620A Sun Blade RAID 5 Expansion Module (Intel/Adaptec) does not support SSDs. Check the *Sun Blade 6000 Disk Module Product Notes* (820-1709) for the latest information.

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- Do not mix SSD and mechanical drives in a single RAID volume.
- Do not mix SATA and SAS drives in a single RAID volume
- Hot spares assigned to a volume must be of the same type as disks in the RAID volume (SAS or SATA; mechanical or SSD)

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## Inserting a Disk Drive



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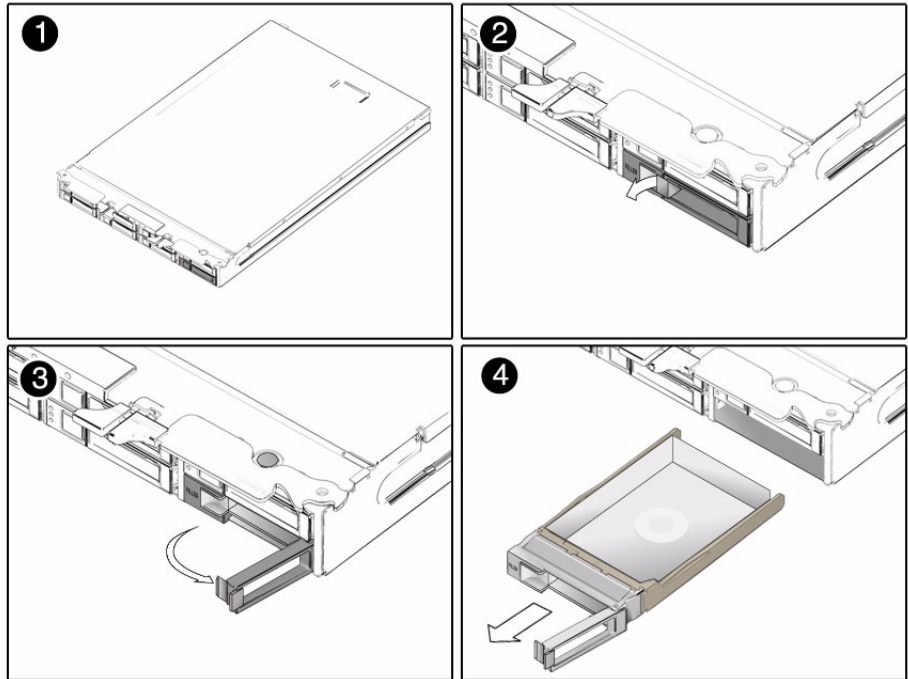
**Caution** – Before handling components, insert an antistatic wrist strap into the antistatic grounding receptacle on the front of the chassis. The system's disk drives contain components that are extremely sensitive to static electricity.

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### ▼ To Insert a Disk

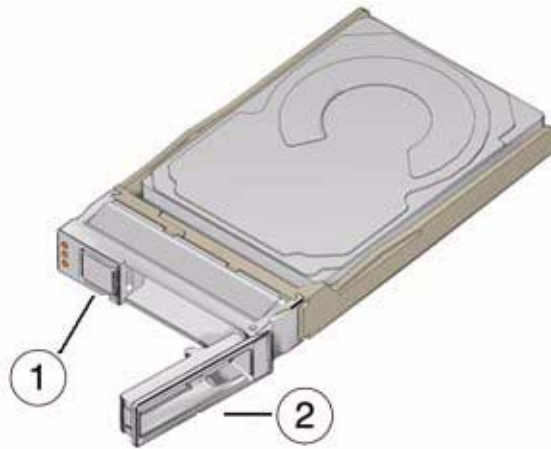
1. Remove the filler bracket from the disk drive slot (see [FIGURE 3-1](#)).

**FIGURE 3-1** Removing a Disk Drive Slot Filler



**2.** Press the release button on the face of the disk drive to open the spring-loaded securing latch (see [FIGURE 3-2](#)).

**FIGURE 3-2** Sun Blade 6000 Disk Module Drive



**Figure Legend**

- 
- 1 Release button
  - 2 Spring-loaded securing latch
- 

**3. Firmly push the disk drive into its bay in the disk module until it stops and the securing latch partially closes.**

---

**Caution** – Do not force the securing latch. When you have pushed the disk drive into its bay in the disk module far enough, the securing latch will partially close and you should be able to finish closing the latch *easily*. If the securing latch does not close easily, firmly push the drive in further until the latch does close easily.

---

**4. Close the securing latch all the way to complete the insertion.**



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# Replacing a Disk Drive

On occasion, a disk drive might fail. The status of the drive is indicated by its LEDs, as shown in [TABLE 3-2](#).

**TABLE 3-2** Drive Status LED Indicators

LED Name	Description
Disk Drive Activity LED (green)	This LED has three states: <ul style="list-style-type: none"><li>• On: Power is on and disk is present.</li><li>• Off: Disk is offline or absent.</li><li>• Blinking: Irregular blinking means normal disk activity. Steady, slow blink means RAID activity.</li></ul>
Disk Drive Fault and Locate LED (amber)	This LED has four states: <ul style="list-style-type: none"><li>• On: Disk fault. Service action required.</li><li>• Off: Normal operation.</li><li>• Slow blink: Disk failure predicted.</li><li>• Fast blink: Locate function activated.</li></ul>
Ready-to-Remove LED (blue)	<ul style="list-style-type: none"><li>• Not used.</li></ul>

A single disk failure does not cause a data failure when disks are configured as a mirrored RAID volume. When there is no hot-spare assigned to the mirror, the failed disk can be hot-swapped; when the new disk is inserted, the contents are automatically rebuilt from the rest of the array with no need to reconfigure the RAID parameters.

If the mirror was configured with a hot-spare, the mirror is automatically rebuilt with the hot-spare.



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**Caution – Possible data loss:** You can remove the failed disk while the mirror is rebuilt to the hot-spare, but you *must not* insert a new disk in its place until the rebuilding of the mirror is completed. While data is being rebuilt, the green LED on the remaining drives will blink slowly. The rebuild process can take a number of hours for large mirrors.

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**Caution – Possible data loss:** You must not insert a disk that has been previously configured with a RAID volume into a new RAID volume. Before permanently removing a disk that is part of an active RAID volume, use the appropriate RAID tool to delete the RAID volume from the disk.

---

## ▼ To Replace a Disk

The Sun Blade 6000 Disk Module disks can be replaced by users. Follow these steps to remove and replace a disk drive:

1. **Observe the front panel disk drive LEDs and identify the defective disk as indicated by its fault LED (see “The Sun Blade 6000 Disk Module Front Panel” on page 10).**
2. **Execute software commands, if appropriate, to isolate and prepare the disk drive for removal.**
3. **Press the button on the face of the disk to release the spring-loaded securing latch. See FIGURE 3-3 and FIGURE 3-4.**
4. **Grasp the securing latch and remove the disk from the drive bay.**

You can always remove a disk drive when it is out of the chassis (see FIGURE 3-3). Disks in the Sun Blade 6000 Disk Module are hot-pluggable, so you can also remove a disk when the disk module is installed in the chassis (see FIGURE 3-4).

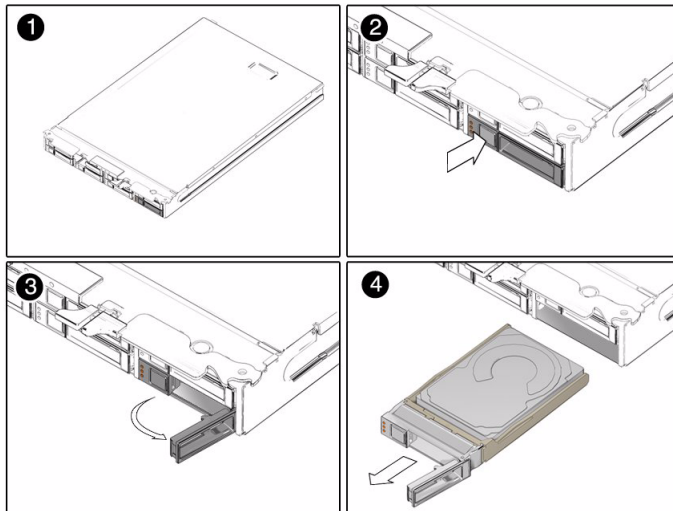


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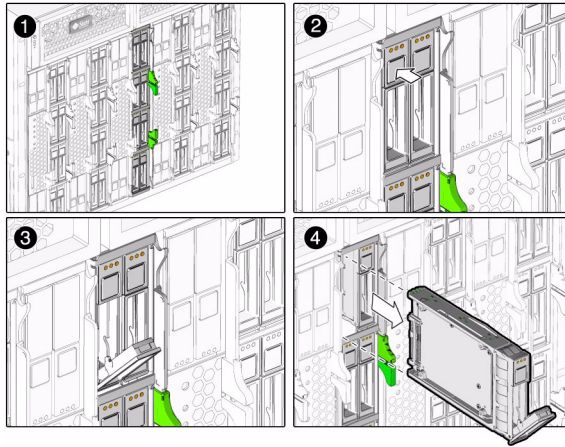
**Caution** – Slots should always contain either a disk drive or a filler in order to maintain adequate air flow. Do not operate the system with slots that are empty. Always insert a filler when you remove a disk drive from a slot.

---

**FIGURE 3-3** Removing the Disk Drive After Removing the Disk Module



**FIGURE 3-4** Removing the Disk Drive Without Removing the Disk Module





## The SAS-NEM

---

This chapter describes the functionality of a SAS-NEM as it pertains to connecting server and disk modules.

Installation of SAS-NEMs is covered briefly in this manual because a Sun Blade 6000 Disk Module does not work without the presence of a SAS-NEM.

SAS-NEMs are fully described in their own documentation. Refer to the *Sun Blade 6000 Disk Module Administration Guide* (820-4922) for a complete list of supported SAS-NEMs.

This chapter contains these topics:

- [“Overview of the SAS-NEM” on page 21](#)
- [“Inserting a SAS-NEM” on page 22](#)
- [“Removing a SAS-NEM” on page 23](#)
- [“Replacing a SAS-NEM” on page 25](#)

---

## Overview of the SAS-NEM

There are various Network Express Modules that can be plugged into the Sun Blade 6000 Modular System chassis. SAS-NEMs are those that contain circuitry to provide multiple SAS connections to disk drives. All Network Express Modules, including SAS-NEMs, plug into the Network Express Module slots on the back of the chassis and are hot-pluggable.

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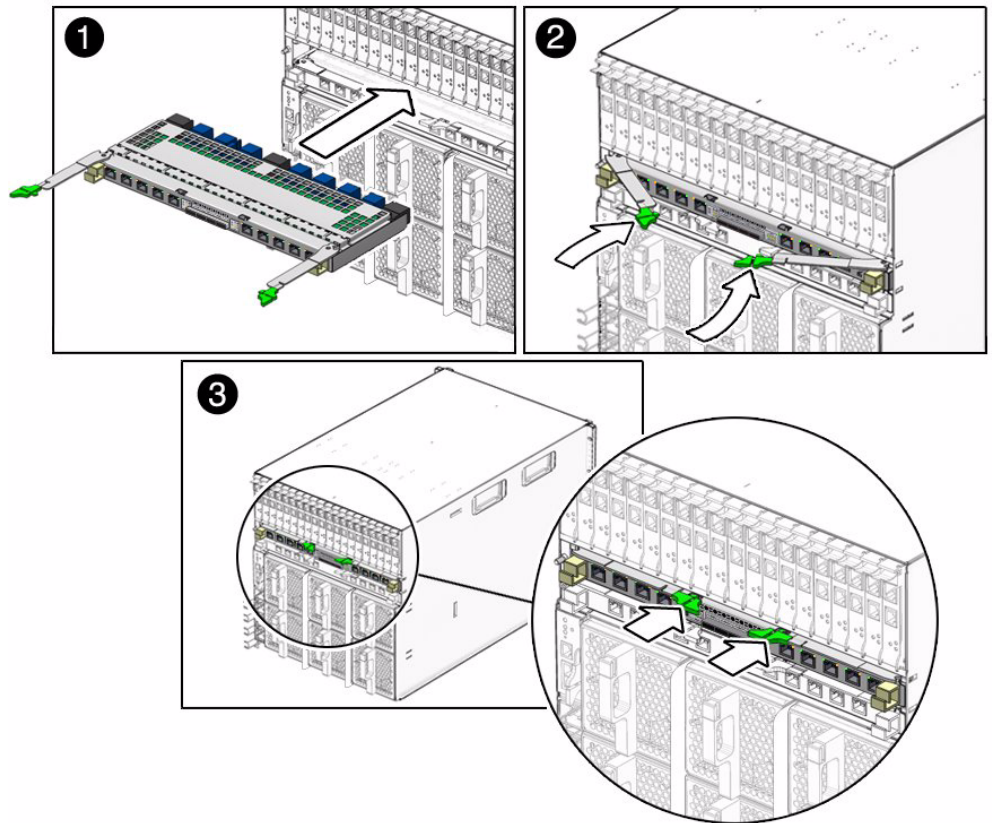
# Inserting a SAS-NEM

You can insert either one or two SAS-NEMs in the Sun Blade 6000 chassis. If you insert only one, it must go in the lower slot (NEM 0).

## ▼ To Insert a SAS-NEM

1. **From the rear of the chassis, remove the NEM filler panel.**
2. **Align the SAS-NEM with the vacant NEM slot.**  
Ensure that:
  - The SAS-NEM ejector levers are on the top of the module, facing you.
  - The SAS-NEM ejector levers are fully opened.
3. **Slide the SAS-NEM into the vacant NEM chassis slot until you feel it stop.**  
[FIGURE 4-1](#) shows how to install a SAS-NEM.

**FIGURE 4-1** Installing a SAS-NEM



4. Complete the installation by closing the ejector levers to secure the SAS-NEM in the chassis.

---

## Removing a SAS-NEM

If a Network Express Module (SAS-NEM) fails, you need to replace it. You can remove and replace a SAS-NEM from a powered-on chassis using a hot-plug operation, as well as from a powered-off chassis.



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**Caution** – Make sure that none of the server blades are actively accessing Ethernet ports or disk drives in a disk module before you remove the SAS-NEM.

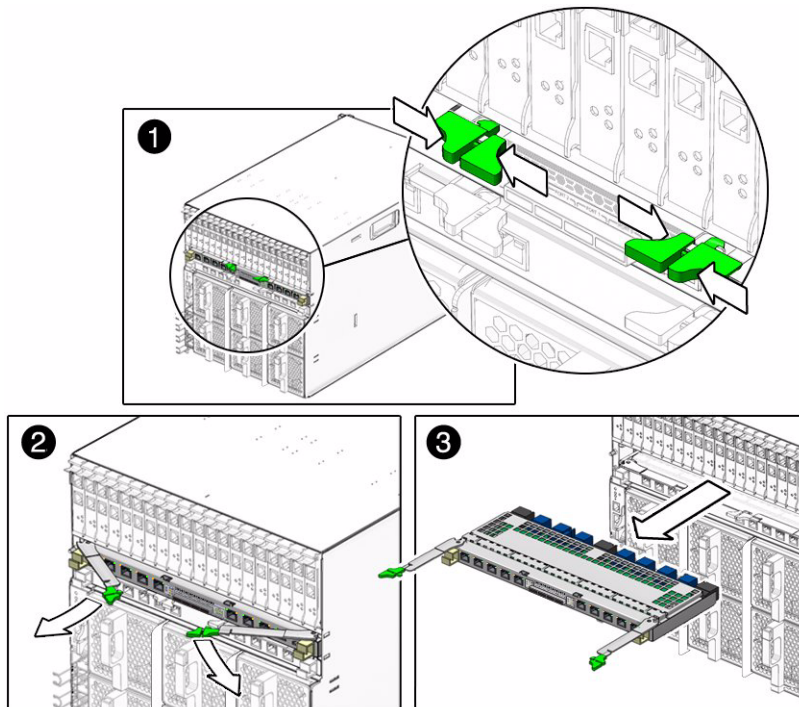
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## ▼ To Remove a SAS-NEM

1. In the rear of the chassis, locate the SAS-NEM that you want to remove.
2. Remove all cables that are plugged into the SAS-NEM.
3. Press together and hold the ejector buttons on both the right and left ejector levers.

FIGURE 4-2 shows how to remove a SAS-NEM.

FIGURE 4-2 Removing a SAS-NEM



4. To unlatch the SAS-NEM from the chassis, open the ejector levers by extending them outward.
5. Holding the opened ejector levers, pull the SAS-NEM toward you until you can pull the rest of the module out by hand.



**Caution** – If the chassis is powered on and you are not replacing the SAS-NEM within 60 seconds, install a NEM filler panel to ensure proper system operation.



---

# Replacing a SAS-NEM

If a SAS-NEM fails it must be replaced immediately. You cannot simply replace the failed SAS-NEM with a new one. You must follow the procedure as described in the SAS-NEM documentation.



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