

Sun Storage 6 Gb SAS REM RAID HBA

Installation Guide For HBA Models SGX-SAS6-R-REM-Z and
SG-SAS6-R-REM-Z

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Using This Documentation

This installation guide describes how to install and remove Oracle's Sun Storage 6 Gigabit per second (Gb) Serial Attached SCSI/SATA (SAS) RAID Expansion Module (REM) RAID host bus adapter (HBA). It also explains how to install any drivers, patches, and firmware required by the HBA, and provides any known issues about the product.

The document is written for technicians, system administrators, application service providers (ASPs), and users who have advanced experience troubleshooting and replacing hardware.

This preface contains the following topics:

- “[Related Oracle Documentation](#)” on page 7
- “[Related Documentation](#)” on page 7
- “[Documentation Feedback](#)” on page 8
- “[Support and Accessibility](#)” on page 8

Related Oracle Documentation

To view, print, or purchase a broad selection of Oracle documentation, including localized versions, go to: <http://www.oracle.com/documentation>

To access HBA documentation, go to: <http://www.oracle.com/technetwork/documentation/oracle-storage-networking-190061.html>

Related Documentation

The documents listed as located online are available at:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

Application/Hardware	Title	Format	Location
MegaRAID graphical user interface (GUI)	<i>MegaRAID SAS Software User's Guide</i>	PDF	Online

Documentation Feedback

Application/Hardware	Title	Format	Location
	<i>MegaRAID SAS Software Release Notes</i>	PDF	Online
Intelligent battery backup unit	<i>MegaRAID iBBU08 Intelligent Battery Backup Unit Quick Installation Guide</i>	PDF	Online

Documentation Feedback

Provide feedback on this documentation at:

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Support and Accessibility

Description	Links
Access electronic support through My Oracle Support.	http://support.oracle.com
	For hearing impaired: http://www.oracle.com/accessibility/support.html
Learn about Oracle's commitment to accessibility.	http://www.oracle.com/us/corporate/accessibility/index.html

HBA Overview

This chapter provides an overview of Oracle's Sun Storage 6 Gigabit per second (Gb) Serial Attached SCSI/SATA (SAS) RAID Expansion Module (REM) RAID host bus adapter (HBA), which uses LSI technology. The chapter also describes the various operating systems, host platforms, storage, and infrastructure configurations that support the HBA.

This chapter contains the following topics:

- “Kit Contents” on page 9
- “HBA Features” on page 9
- “Valid Drive Mix Configurations With HDDs and SSDs ” on page 12
- “Operating System and Technology Requirements” on page 13
- “System Interoperability” on page 14
- “Boot Support” on page 15

Kit Contents

- Sun Storage 6 Gb SAS REM RAID HBA
- *Accessing Documentation* document

Note - The *Accessing Documentation* document in the HBA ship kit provides instructions on how to access Oracle HBA installation guides. For information about accessing non-Oracle documents that are related to this HBA, see “[Related Documentation](#)” on page 7.

HBA Features

The Sun Storage 6 Gb SAS REM RAID HBA (SGX-SAS6-R-REM-Z, SG-SAS6-R-REM-Z) is a RAID-on-Chip (ROC) PCI Express 2.0 RAID host bus adapter (HBA) based on the LSI SAS2108 ROC. The HBA hard disk drive (HDD) interface provides links for up to eight HDD ports.

Note - SATA II is the only type of SATA supported by this HBA.

The HBA interfaces with the host system through a 210-pin mezzanine plug connector that implements x8 lane PCI Express bus signaling. You can connect SAS hard disk drives or SATA hard disk drives to the HBA with the same mezzanine connector. The interface can provide links for up to eight HDD ports.

You can connect the LSI intelligent Battery Backup Unit 08 (LSIiBBU08) directly or remotely to the HBA. For more information about this battery backup unit, refer to the LSI document, *MegaRAID iBBU08 Intelligent Battery Backup Unit Quick Installation Guide*, located at the Oracle support area of the LSI web site:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

The HBA supports the following features:

- PCI Express host interface, as defined in the *PCI Express Specification*, revision 2.0, that is backward compatible with previous revisions of the PCI bus and PCI-X bus
- PCI Express x8 lane width (with support for x16 connection)
- Simplified cabling between devices with point-to-point, serial architecture
- PCI Express performance up to 5 Gbit/s per lane
- High performance through the MegaRAID Firmware Interface (MFI) architecture
- High throughput and low CPU utilization to offload the host processor

SAS/SATA Features

The following are the SAS/SATA features supported by the HBA:

- Serial SCSI protocol (SSP) and serial ATA tunneling protocol (STP), as defined in the *Serial Attached SCSI (SAS) Specification*, version 2.0
- ANSI, as defined in the *Serial Attached SCSI Standard*, version 2.0
- Serial ATA II protocol, as defined in the *Serial ATA Specification*, version 1.0a and the *Serial ATAII; Extension to the Serial ATA Specification*, version 1.1
- Transfer of data using SCSI information units
- Scalable interface that supports up to 248 devices through the use of expanders
- Wide port support: consisting of 2, 3, or 4 PHYs within a single quad port
- Narrow ports, consisting of a single PHY
- Eight fully independent PHYs
- 6 Gbit/s Serial Attached SCSI and SATA II data transfers per PHY

Note - While each PHY is capable of 6 Gb/s SAS and SATA link rates, only four of the eight PHYs can operate at 6 Gb/s link rates at one time. This is to accommodate platforms that are not designed for 6 Gb/s operation.

- Support for these SATA II features:
 - Configurable drive spin-up sequencing on a per-PHY basis
 - Hot plugging
 - Native command queuing
 - Activity and fault indicators for each PHY
 - Port selector (for dual-port drives)

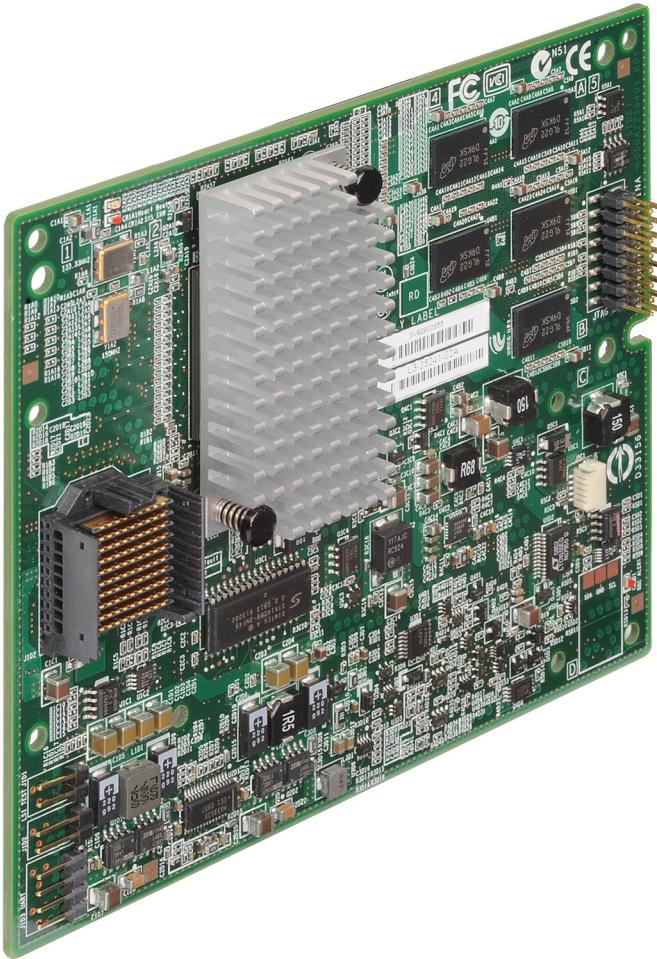
RAID Features

The following are the RAID features supported by the HBA:

- Full-featured, hardware-based RAID implementation
- Integration of a high-speed 512-Mbyte on-board DDR/DDR2 800-MHz SDRAM interface with a hardware RAID assist exclusive-OR (XOR) engine
- Data striping across multiple drives
- Data mirroring or parity block for backing up data
- Support for RAID levels 0, 1, 5, 6, 10, 50, and 60
- Support for several stripe sizes
- Load balancing
- Path failover
- Online RAID level migration
- Drive migration and roaming
- Media scan
- No reboot necessary after expansion
- More than 200 Qtags per drive group
- User-configurable rebuild rate
- 32-Kbyte nonvolatile random access memory (NVRAM) for storing RAID system configuration information; the MegaRAID SAS firmware is stored in flash ROM for easy upgrade

[Figure 1-1](#) shows the physical layout of the HBA.

FIGURE 1-1 Oracle's Sun Storage 6 Gb SAS REM RAID HBA



Valid Drive Mix Configurations With HDDs and SSDs

This HBA supports connectivity using SATA II drives, SAS drives, or both. The following are some basic rules about the types of drives you can use:

- **Within a logical volume:**
 - You can mix SAS and SATA drives (either all solid state drives (SSDs) or all hard disk drives (HDDs)).

Note - Though it is possible to mix SAS and SATA drives in a single RAID volume, Oracle does not support this configuration as it might cause performance issues with the drives.

- You cannot mix HDDs and SSDs of any type.
- **Within an enclosure (SAS expander or direct-connect SAS cable)**, you can mix any drive types, subject to any restrictions imposed by the enclosure.

Operating System and Technology Requirements

The HBA requires the operating system (OS) and technology levels, at minimum, listed in [Table 1-1](#).

TABLE 1-1 Supported Operating System/Technology Versions

Operating System/Technology	Recommended Versions (minimum) [†]
Oracle Solaris OS for the x86 (32-bit and 64-bit) platform	<ul style="list-style-type: none"> ■ Oracle Solaris 11.1 with SRU7 ■ Oracle Solaris 10 01/13 with patches 149176-02 and 145649-04, at minimum <p>To obtain the latest patches and SRUs, go to http://support.oracle.com</p>
Oracle Solaris OS for the SPARC (32-bit and 64-bit) platform	<ul style="list-style-type: none"> ■ Oracle Solaris 11.1 with SRU7 ■ Oracle Solaris 10 01/13 with patches 149175-02 and 145648-04, at minimum <p>To obtain the latest patches and SRUs, go to http://support.oracle.com</p>
Linux OS (64-bit)	<ul style="list-style-type: none"> ■ Red Hat Enterprise Linux (RHEL) 5.9 and 6.4 ■ SUSE Linux Enterprise Server (SLES) 11 SP2 ■ Oracle Enterprise Linux 5.9 and 6.4 (Red Hat Compatible Kernel (RHCK) and Unbreakable Enterprise Kernel (UEK) 2, at minimum)
Virtual Machine OS	Oracle VM 3.2.1
Microsoft Windows OS (64-bit)	<ul style="list-style-type: none"> ■ Window Server 2008 R2 including SP1 ■ Windows Server 2012
VMware Technology	<ul style="list-style-type: none"> ■ VMware ESX/ESXi 5.0 ■ VMware ESX/ESXi 5.1

[†]Oracle supports the Oracle Solaris 10 10/09 OS with patches 142676-02 (x86) and 143523-02 (SPARC) as the minimum Oracle Solaris OS level. However, if issues occur with the HBA, Oracle Support requires that you update to the recommended OS levels listed in [Table 1-1](#).

System Interoperability

This section provides host platform, storage, and software support information. This section contains the following topics:

- “[Host Platform Support](#)” on page 14
- “[Storage System Support](#)” on page 14
- “[Software Support](#)” on page 14

Host Platform Support

The HBA is supported by the platforms listed in [Table 1-2](#). For up-to-date information, see the product notes for your system.

TABLE 1-2 Host Platform Support

Platform	Supported OS/Technology
Sun Blade X3-2B	Oracle Solaris, Linux, Virtual Machine, VMware, and Windows
Sun Blade X4-2B	Oracle Solaris, Linux, Virtual Machine, VMware, and Windows
Sun Fire X4800	Oracle Solaris, Linux, Virtual Machine, VMware, and Windows
Sun Fire X6270 M2	Oracle Solaris, Linux, Virtual Machine, VMware, and Windows
Sun Server X2-8	Oracle Solaris, Linux, Virtual Machine, VMware, and Windows

Storage System Support

The HBA supports these storage systems:

- Internal disk drives
- Sun Blade 6000 Disk Module
- Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module (NEM)
- Sun Blade 6000 Disk Module M2
- Sun Blade 6000 Virtualized Multi-Fabric 10GbE NEM M2

Software Support

Install, Flash, and BIOS configuration utilities are provided. The HBA uses the MegaRAID Firmware Interface (MFI) architecture for all major operating systems, which allows for thinner

drivers for better performance. To obtain a device driver that supports your operating system, go to:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

Use the MegaRAID SAS Software to manage the HBA upon installation. For more information, see the *MegaRAID SAS Software User's Guide* at:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

Boot Support

Booting through the HBA is supported in the following operating system and technology environments:

- Oracle Solaris 10 01/13 OS for the SPARC and x86 platforms
- Oracle Solaris 10 11.1 OS for the SPARC and x86 platforms
- RHEL 5.9 and 6.4 OSes
- SLES 11 SP2 OS
- Oracle Linux 5.9 and 6.4 OSes
- Oracle VM 3.2.1 OS
- Windows Server 2008 R2 including SP1 OS
- Windows Server 2012 OS
- ESX and ESXi Server, version 5.0 and 5.1 technology

Hardware Installation and Removal

This chapter describes how to install and remove the HBA. For detailed instructions, see your storage system installation or service guide and the installation guide for the storage devices to be connected to the HBA.

This chapter contains the following topics:

- “[Observing ESD and Handling Precautions](#)” on page 17
- “[Installing the HBA](#)” on page 18
- “[HBA LEDs](#)” on page 22
- “[Next Steps](#)” on page 23
- “[Removing the HBA](#)” on page 23

Observing ESD and Handling Precautions



Caution - Damage to the HBA can occur as the result of careless handling or electrostatic discharge (ESD). Always handle the HBA with care to avoid damage to electrostatic sensitive components.

To minimize the possibility of ESD-related damage, use both a workstation antistatic mat and an ESD wrist strap. You can get an ESD wrist strap from any reputable electronics store or from Oracle as part number #250-1007.

Observe the following precautions to avoid ESD-related problems:

- Leave the HBA in its antistatic bag until you are ready to install it in the system.
- Always use a properly fitted and grounded wrist strap or other suitable ESD protection when handling the HBA and observe proper ESD grounding techniques.
- Always hold the HBA by the metal enclosure.
- Place the HBA on a properly grounded antistatic work surface pad when it is out of its protective antistatic bag.

Installing the HBA

- “To Prepare for Hardware Installation” on page 18
- “To Install the HBA” on page 18
- “To Connect the HBA to Drives” on page 20
- “To Complete the Installation” on page 20

▼ To Prepare for Hardware Installation

1. **Familiarize yourself with the physical features of the HBA and the RAID levels that it supports.**

See “HBA Features” on page 9.

2. **Ensure that you have the right quantity of initialized disk drives for the RAID level you want to use for the arrays.**

For optimal performance, use like drives (type, speed, and size) when creating logical drives. You can use different-sized disk drives in the array, but the array will be limited to the capacity of the smallest and slowest disk drive.

For more information, refer to the *MegaRAID SAS Software User's Guide* at:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

The HBA supports SAS disk drives and SATA II disk drives.

3. **Unpack the box containing the HBA in a static-free environment and inspect it for damage.**

Note - Leave the HBA in the protective bag until you are ready to install it. If there is damage, contact Oracle customer support.

▼ To Install the HBA

1. **Attach an antistatic wrist strap and remove the HBA from its protective bag.**
See “Observing ESD and Handling Precautions” on page 17.
2. **Ensure that the jumper settings on the HBA are in the desired position.**

The jumpers are set at the factory, and you usually do not need to change them. See “[HBA Card Layout](#)” on page 75 for information about the location of the jumpers on the HBA.

3. If a removable memory option is present, ensure that the module is seated firmly in the dual-inline memory module (DIMM) socket.

Note - This HBA has on-board DDR2 memory.

4. Refer to the service or installation manual for your particular system for instructions on how to locate the 210-pin mezzanine plug connector on the board of the system.
5. Insert the notch of the HBA into the bracket in the system (located near the mezzanine plug connector), and then connect the 210-pin mezzanine plug connector on the HBA to the 210-pin mezzanine plug connector on the system board, as shown in [Figure 2-1](#).

FIGURE 2-1 Installing Oracle's Sun Storage 6 Gb SAS REM RAID HBA

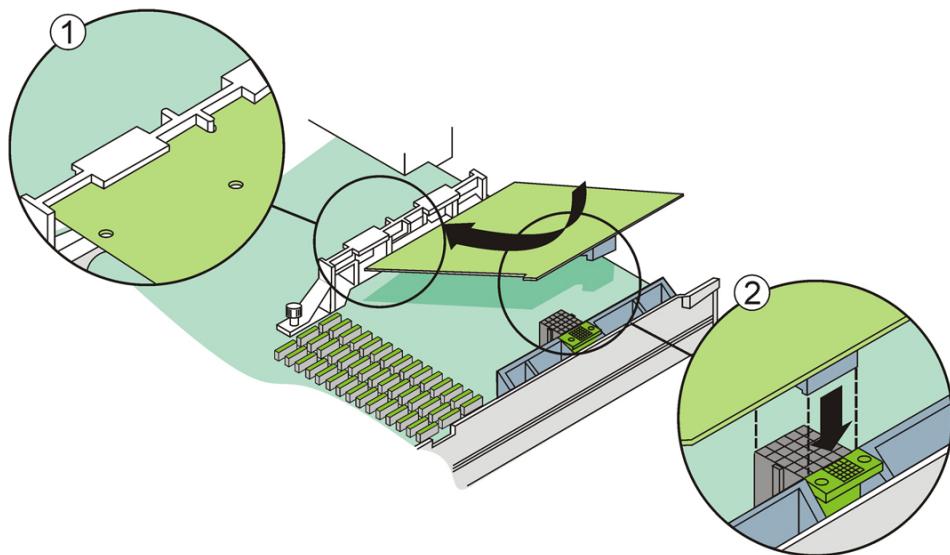


Figure Legend

- 1 Notch in the HBA and the bracket
- 2 210-pin mezzanine plug connectors on the system and the HBA

Note - The configuration of the enclosure might not be the same as shown in this illustration.

6. Press down gently and firmly to seat the HBA in the mezzanine plug connector.

▼ To Connect the HBA to Drives

The HBA interfaces with the host system through a 210-pin mezzanine plug connector that implements x8 lane PCI Express bus signaling. You can connect SAS or SATA II hard disk drives to the HBA with the same mezzanine connector. The interface can provide links for up to eight HDD ports.

- **Configure and install the SAS devices, SATA II devices, or both in the system.**

See the documentation for the devices for more information.

Note - You can connect one device per SAS PHY unless you use an expander.

Once the devices are configured and installed in the system, the HBA will be able to interface with the devices. You do not need to perform any additional steps.

▼ To Complete the Installation

1. Replace the system cover and reconnect the AC power cords, if required, as described in the system documentation.
2. If you needed to turn the system power off to install the HBA, return power on to the system.

Note - Ensure that the power is turned on to the SAS devices, SATA II devices, or both before or at the same time that the power is turned on to the host system. If the system is powered on before these devices, the devices might not be recognized.

3. If you need to install an OS on your system, complete the procedures in [Chapter 3, “Creating a Bootable Drive in a Preboot Environment”](#) and then go to the next step.

4. If you already have an OS installed on an x86 system, do the following:
 - a. During the power-up process of the system, review the BIOS bootup messages to ensure that you are prompted for the WebBIOS utility (by pressing **CTRL+H**) and the Preboot command-line (**pcli**) utility (by pressing **CTRL+Y**).
If you are prompted for these utilities, the BIOS has detected the HBA card.
 - b. Go to the Oracle support area of the LSI web site (<http://www.lsi.com/sep/Pages/oracle/index.aspx>) and download the MegaRAID Storage Manager software and the MegaCLI utility software, along with supporting documentation.
 - c. Install the MegaRAID software on the server that will manage your storage.
 - d. From the MegaRAID Storage Manager software or the MegaCLI utility software, create logical drives for the HBA.
5. If you already have an OS installed on a SPARC system, do the following:
 - a. During the power-up process of the system, use the **probe-scsi-all** command at the **ok** prompt to verify that the system recognizes the HBA.
The **probe-scsi-all** command displays the SCSI devices that are connected to the host, as shown in the following example.

```
{0} ok probe-scsi-all
 pci@0/pci@0/pci@8/pci@0/pci@0a/LSI,mrsas@0
 pci@0/pci@0/pci@1/pci@0/pci@1/pci@0/usb@0,2/storage@2
 Unit 0 Removable Read Only device TSSTcorpCD/DVDW TS-T632ASR03
 {0} ok
```

This example shows a SAS 2 controller (**LSI,mrsas@0**) and a CD-ROM drive (**storage@2**).
 - b. Go to the Oracle support area of the LSI web site (<http://www.lsi.com/sep/Pages/oracle/index.aspx>) and download the MegaRAID Storage Manager software and MegaCLI utility software, along with supporting documentation.
 - c. Install the MegaRAID Storage Manager software and MegaCLI utility software on the server that will manage your storage.
 - d. From the MegaRAID Storage Manager software or MegaCLI utility software, create logical drives for the HBA.

HBA LEDs

The HBA has two LEDs that are visible: the System Error LED and the System Heartbeat LED. [Figure 2-2](#) shows the LEDs.

FIGURE 2-2 LEDs on the HBA

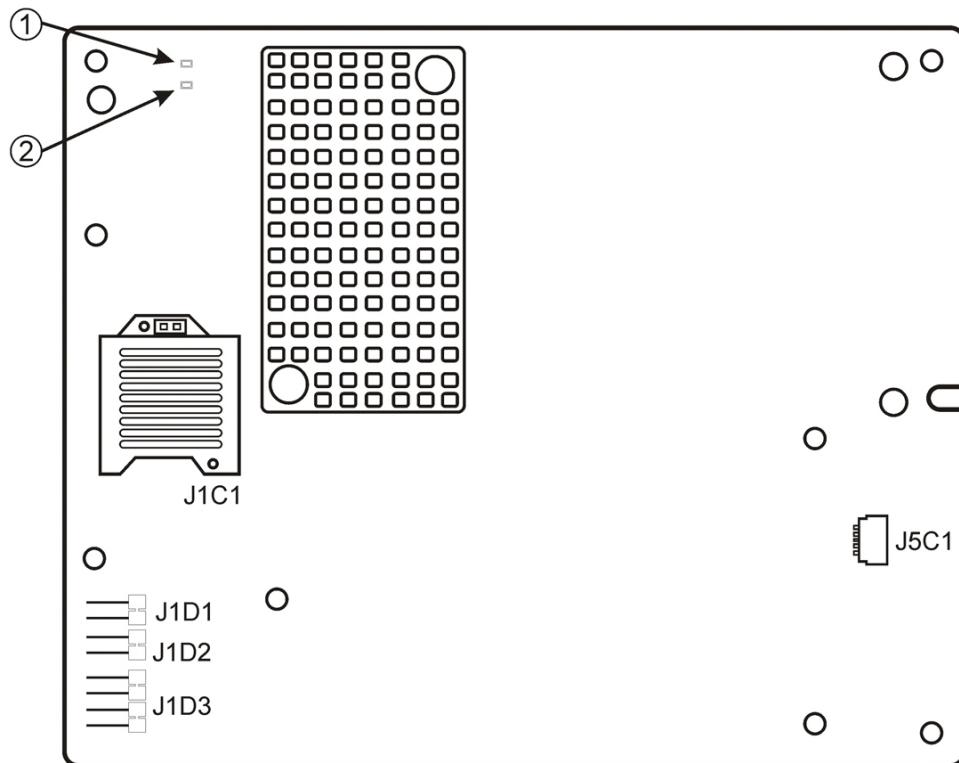


Figure Legend

- 1 CR1A1 - System Error LED
- 2 CR1A2 - System Heartbeat LED

A red System Error LED (CR1A1) provides an error status signal. A green System Heartbeat LED (CR1A2) indicates that the SAS2108 RAID-on-chip (ROC) ASIC is operating normally.

The different states of the System Heartbeat LED and the System Error LED are listed in [Table 2-1](#).

TABLE 2-1 System Heartbeat LED and System Error Status LED

State	Meaning
Heartbeat LED	
Off	The ASIC is not operating normally.
Blinking	The ASIC is operating normally.
Status Error LED	
Off	There is no system error.
On	There is a system error.

Next Steps

If you are using the Oracle Solaris OS, the installation is complete. You can obtain the latest patches for the Oracle Solaris OS at the system product web site.

If you are using a supported operating system other than the Solaris OS, install the HBA driver for your operating system, as described in [Chapter 4, “HBA Software Installation”](#).

Removing the HBA

If you need to remove the HBA from the system, for any reason, follow the steps in this section.

▼ To Remove the HBA

1. **Prepare your operating system for HBA removal.**
2. **Attach an antistatic wrist strap.**
See [“Observing ESD and Handling Precautions” on page 17](#).
3. **Turn off the power to the system, all drives, enclosures, and system components.**
4. **Disconnect the AC power cord and all other cords from the system.**
5. **Remove the cover from the chassis of the system, as described in the system documentation, and disconnect the system from any networks.**

To Remove the HBA

6. Pull up gently and firmly to unseat the 210-pin mezzanine plug on the HBA from the corresponding plug on chassis of the system, as shown in [Figure 2-3](#).

FIGURE 2-3 Removal of Oracle's Sun Storage 6 Gb SAS REM RAID HBA

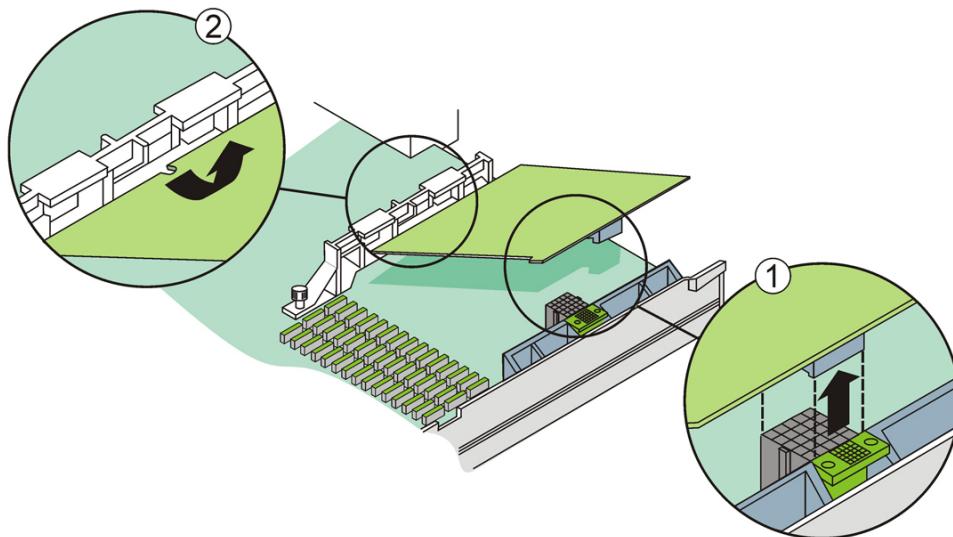


Figure Legend

- 1 Pull up to unseat the mezzanine plug.
- 2 Remove the notch of the HBA from the bracket.

7. Remove the notch on the other end of the HBA from the bracket.
8. Lift the HBA up and pull it away from the bracket.
9. (Optional) If you need to replace the battery on the HBA, do the following:
 - a. Gently pull the battery connector out of the 20-pin connector (J5C1) on the HBA (See [Figure A-2](#)).
 - b. With a Phillips-head screwdriver, loosen the three screws holding the battery to the HBA.
 - c. Place the three screws aside and remove the battery from the HBA.

- d. Insert the connector of the new battery into the 20-pin connector (J5C1) on the HBA (See [Figure A-2](#)).
 - e. Align the new battery up to the three holes in the HBA.
 - f. Tighten the three screws into the holes to attach the battery to the HBA.
 - g. To reinstall the HBA into the system chassis, follow the instructions in “[To Install the HBA](#)” on page 18.
10. Reconnect the system to any networks and reinstall the cover on the system.
 11. Reconnect the AC power cord and all other cords to the system.
 12. Power on the system, all drives, enclosures, and system components.

Creating a Bootable Drive in a Preboot Environment

This chapter describes how to use the HBA for your boot device prior to installing an operating system (OS) on the system.

Note - If you are installing the HBA into a system that already has an OS installed, do not perform any tasks in this chapter. Instead, complete the HBA installation, as described in “[To Complete the Installation](#)” on page 20.

This chapter contains the following topics:

- [“Overview of Creating a Bootable Drive in a Preboot Environment ” on page 27](#)
- [“Creating a Bootable Drive \(SPARC\)” on page 29](#)
- [“Creating a Bootable Drive \(x86\)” on page 35](#)
- [“Validating the Label of the HBA Logical Drive” on page 53](#)
- [“Installing the Oracle Solaris OS” on page 56](#)
- [“Next Steps” on page 56](#)

Overview of Creating a Bootable Drive in a Preboot Environment

As an installation option, you can choose to install the HBA into a system that does not yet have an OS installed. With this installation option, if you plan to use the HBA as your boot device, you can create a logical drive for the HBA to enable you to boot from the HBA. On a SPARC system, you would perform these actions through the Preboot Command-Line Interface (pcli) utility. On an x86 system, you would do so either through the Unified Extensible Firmware Interface (UEFI) Configuration Options menu of the BIOS Setup utility (UEFI booting) or, if your system is set to legacy BIOS booting, through a combination of the pcli utility and then the WebBIOS utility.

This section contains the following topics:

- “Utilities Overview” on page 28
- “Methods For Creating a Bootable Drive” on page 29

Utilities Overview

You can specify the HBA to be your boot device by using one of these utilities:

- **pcli utility** - A legacy utility that you can run on both SPARC and x86 systems only if you have set your system BIOS to boot in legacy mode (which you can specify through the Boot menu of the BIOS Setup utility). You can access this utility by issuing a break at a remote console (SPARC) or by pressing Ctrl+Y during bootup (x86). This utility is an implementation of RAID commands that you can execute from the Open Boot Prom (OBP) environment. Creating a logical drive through the pcli utility enables the HBA to expose the drive to the system.

The command-set of the pcli utility is identical to the command-set of the MegaCli utility. Therefore, to help determine the syntax and structure of the pcli commands referenced in this chapter, review the equivalent MegaCli commands, as described in the *MegaRAID SAS Software User's Guide*, located at:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

- **Configuration Options menu of the BIOS Setup utility** - A utility that you can run on an x86 system only if you have set your system BIOS to boot in Unified Extensible Firmware Interface (UEFI) BIOS mode (which you can specify through the Boot menu of the BIOS Setup utility). You can access this utility by pressing F2, when prompted, during bootup, and then using the right arrow key to navigate to the Configuration Options menu at the top of the screen. The Configuration Options menu provides a standard environment for booting an operating system, managing physical disks and RAID volumes, and running pre-boot applications.

Note - Some operating system versions do not support UEFI BIOS mode. For information about whether your operating system supports UEFI BIOS mode, see your system and operating system documentation.

- **WebBIOS utility** - A legacy utility that you can run on an x86 system only if you have set your system BIOS to boot in legacy mode. You can access this utility by typing **Ctrl+H** during system bootup. This utility consists of a graphical user interface (GUI) that enables you to manage physical disks and logical drives that you have created. Use this utility to specify the boot drive for your x86 system.

Methods For Creating a Bootable Drive

You must perform different procedures in this chapter, based on the type of system in which you are installing the HBA:

- **If you are installing the HBA into a SPARC system**, go to “[Creating a Bootable Drive \(SPARC\)](#)” on page 29.
- **If you are installing the HBA into an x86 system**, go to “[Creating a Bootable Drive \(x86\)](#)” on page 35.

Creating a Bootable Drive (SPARC)

This section describes how to create or import a logical drive and then create an alias for that drive on a SPARC system. You can then use the logical drive as your boot drive upon which you can install the Solaris OS. If you are an x86 system user, do not perform any steps in this section. Instead, go to “[Creating a Bootable Drive \(x86\)](#)” on page 35.

This section contains the following topics:

- “[To Create a Bootable Drive \(SPARC\)](#)” on page 29
- “[Using the pcli Utility to Create a Bootable Drive \(SPARC\)](#)” on page 30
- “[Importing an Existing Logical Drive Configuration \(SPARC\)](#)” on page 32
- “[Creating an Alias for a Bootable Drive \(SPARC\)](#)” on page 33

▼ To Create a Bootable Drive (SPARC)

1. Do one of the following:

- **Create a logical drive, as described in “[Using the pcli Utility to Create a Bootable Drive \(SPARC\)](#)” on page 30.**
Or:
 - **Import a logical drive configuration from a different MegaRAID controller, as described in “[Importing an Existing Logical Drive Configuration \(SPARC\)](#)” on page 32.**
2. **Create an alias for the drive, as described in “[Creating an Alias for a Bootable Drive \(SPARC\)](#)” on page 33.**

Using the **pcli** Utility to Create a Bootable Drive (SPARC)

This section describes how to use the **pcli** utility to create a logical drive on a SPARC system prior to installing the Oracle Solaris operating system (OS). This section contains the following topics:

- “To Prepare to Use the **pcli** Utility ” on page 30
- “To Create a Logical Drive With the **pcli** Utility ” on page 32

▼ To Prepare to Use the **pcli** Utility

1. Open an **xterm** or a **gnome terminal** window.

pcli commands can produce large amounts of detailed output. The **xterm** and **gnome** terminal windows provide scroll bar functionality, which helps with viewing such output.

Note - If you do not have access to a terminal window with scroll bars, such as the **xterm** or **gnome** windows, you can use the **pcli** pagination feature. This feature enables you to specify a number of lines to be printed on the screen before pausing, at which time you must hit a key to continue. For example, the following **pcli** command prints 20 lines at a time to the screen: {0} ok **cli -AdpAllInfo -page 20**

2. Enter the OBP environment by performing one of the following tasks:

- Press **STOP+A** on a Sun keyboard from Oracle.
- Issue a break from a remote console.

3. Use the **show-devs** command to list the device paths on the system and select the device path for the HBA.

```
{0} ok show-devs
<...>
/pci@1e,600000/pci@0/pci@3/LSI,mrsas@0
/pci@1e,600000/pci@0/pci@3/LSI,mrsas@0/disk
/pci@1e,600000/pci@0/pci@3/LSI,mrsas@1
<...>
```

4. Use the **select-dev** command to select the HBA on which the **pcli** commands that you issue will operate.

```
{0} ok "/pci@1e,600000/pci@0/pci@3/LSI,mrsas@0" select-dev
```

You have now selected the HBA upon which all `pcli` commands will operate. This means you do not need to specify the HBA in any `pcli` command that you issue, unlike with the `MegaCli` utility. For example, if you issue the `pcli` command, `-AdpAllInfo`, the command automatically applies to the selected HBA. However, the equivalent command through the `MegaCli` utility would apply only to the card that you specify (the `0` card, as shown here):

SPARC pcli: {0} ok cli -AdpAllInfo

MegaCli: MegaCli -AdpAllInfo -a0

5. If you were able to determine and select the card that you wanted in the previous step, skip to [Step 6](#). Otherwise, if more than one of the same RAID adapter card is displayed in the `select-dev` output, use the `-AdpAllInfo` command to determine which card you want and then select that card.

```
{0} ok cli -AdpAllInfo
Product Name      : LSI MegaRAID SAS 9261-8i
Product Name      : LSI MegaRAID SAS 9280-8e
```

The `-AdpAllInfo` command provides the product name of the HBA. The `8i` at the end of the HBA name, `LSI MegaRAID SAS 9261-8i`, indicates the card is an internal card. If the card is external, the name ends with `8e`.

6. Review the following table for useful `pcli` commands.

pcli Command	Description
<code>cli -PdList</code>	Lists all physical drives.
<code>cli -CfgLdAdd</code>	Creates a RAID logical drive.
<code>cli -CfgLdDel</code>	Deletes a logical drive.
<code>cli -LdPdInfo</code>	Displays information about logical drives.
<code>cli -AdpAllInfo</code>	Displays HBA configuration information.

You are now ready to use the `pcli` commands to create a logical drive, or `MegaRAID` virtual drive, on the HBA.

▼ To Create a Logical Drive With the `pcli` Utility

1. Use the `-PdList` command to list all the physical drives attached to the HBA.

Drives attached directly to the HBA are assigned an Enclosure Device ID number of 252 (only eight physical drives can be attached in this way). Drives connected to the HBA through a SAS expander or an external enclosure are assigned different Enclosure Device ID values. In the following example, the physical drive listed in the output is attached directly to the HBA (Enclosure Device ID value of 252).

```
{0} ok cli -PdList
Adapter #0
Enclosure Device ID: 252
Slot Number: 0
<...>
```

2. Use the `-CfgLdAdd` command to create a logical drive (MegaRAID virtual disk) from the physical disks.

```
{0} ok cli -CfgLdAdd -r0[252:0] -- for RAID 0, with Enclosure #252 and Slot 0 --
{0} ok cli -CfgLdAdd -r1[E0:S0,E1:S1] -- for RAID 1 --
```

3. Use the `format(1M)` utility to label the physical disks from which you created the logical drive.

All disks used by the HBA must be labeled, or contain a volume table of contents (VTOC). If you attempt to use an unlabeled disk with the HBA, the disk might not be recognized by the OS or the OS installation itself might fail. For more information about labeling disks, see the documentation for the physical disks.

4. Create an alias for the drive, as described in “[To Create an Alias for a Bootable Drive \(SPARC\)](#)” on page 33.

Importing an Existing Logical Drive Configuration (SPARC)

Instead of creating a logical drive, as described in “[Using the `pcli` Utility to Create a Bootable Drive \(SPARC\)](#)” on page 30, you might need to import an existing logical drive (MegaRAID virtual disk) configuration from a different MegaRAID controller. To import an existing configuration, complete the steps in this section.

▼ **To Import an Existing Logical Drive Configuration From a Different Controller (SPARC)**

Note - Only MegaRAID logical drives can be imported; Integrated RAID (IR) logical drives cannot be imported.

1. Use the **-LdPdInfo** command to ensure that the logical drive (virtual disk) on the existing controller is recognized by the system.

```
{0} ok cli -LdPdInfo  
Adapter #0  
Number of Virtual Disks: 1  
Virtual Disk: 0 (Target Id: 0)
```

2. Use the **-CfgForeign -Import** command to import the logical drive to the HBA.

```
{0} ok cli -CfgForeign -Import
```

3. Create an alias for the drive, as described in “[Creating an Alias for a Bootable Drive \(SPARC\)](#)” on page 33.

Creating an Alias for a Bootable Drive (SPARC)

After you have created or imported a bootable drive, as described in “[Using the pcli Utility to Create a Bootable Drive \(SPARC\)](#)” on page 30 or “[Importing an Existing Logical Drive Configuration \(SPARC\)](#)” on page 32, you can create an alias for that bootable drive. The alias helps to simplify the process of booting the drive.

▼ **To Create an Alias for a Bootable Drive (SPARC)**

1. Issue the **show-disks** command to list the disks on the system.

Note that, as shown in the following example, you can determine the HBA drives by looking for the **LSI,mrsas@number** label, where *number* is 0 for the first HBA detected, and increments for each additional HBA detected.

```
{0} ok show-disks  
<...>  
a) /pci@1e,600000/pci@0/pci@3/LSI,mrsas@0/disk  
b) /pci@1e,600000/pci@0/pci@3/LSI,mrsas@1/disk
```

```
c) /pci@1e,600000/pci@0/pci@3/LSI,mrsas@2/disk
<...>
q) NO SELECTION
Enter Selection, q to quit:
```

2. Select the bootable drive for which you want to create an alias.

```
a) /pci@1e,600000/pci@0/pci@3/LSI,mrsas@0/disk
b) /pci@1e,600000/pci@0/pci@3/LSI,mrsas@1/disk
c) /pci@1e,600000/pci@0/pci@3/LSI,mrsas@2/disk
<...>
q) NO SELECTION
Enter Selection, q to quit: c
 pci@1e,600000/pci@0/pci@3/LSI,mrsas@2/disk has been selected.
```

3. Use the `nvalias alias-name HBA-drive-path` command to create an alias for the bootable drive that you selected in Step 2 (you can press `Ctrl+Y` to paste the device path).

In the following example, the alias name is `mydev`.

```
{0} ok nvalias mydev /pci@1e,600000/pci@0/pci@3/LSI,mrsas@2/disk
```

4. You can now boot from the bootable drive by using the `boot alias-name` command.

```
{0} ok boot mydev
```

5. To optionally add the bootable drive to the boot-device list and then automatically boot from the drive by controlling the boot device order, issue the following commands, as shown.

```
{0} ok printenv boot-device
boot-device = disk0 disk1
{0} ok setenv boot-device mydev disk0
boot-device = mydev disk0
```

In this example, the `mydev` alias is set as `disk0`, the first disk in the boot device list. This results in the automatic booting of the bootable drive, `/pci@1e,600000/pci@0/pci@3/LSI,mrsas@2/disk`.

6. Validate the label of the bootable drive that you created (see “[Validating the Label of the HBA Logical Drive](#)” on page 53).

Creating a Bootable Drive (x86)

This section describes how to create or import a logical drive and then make that drive bootable on an x86 system. You can then use the logical drive as your boot drive upon which you can install an OS. If you are a SPARC system user, do not perform any steps in this section. Instead, go to [“Creating a Bootable Drive \(SPARC\)” on page 29](#).

▼ To Create a Bootable Drive (x86)

- Do one of the following:
 - Create a logical drive:
 - If you have set your system BIOS to boot in UEFI BIOS mode (which you can specify through the Boot menu of the BIOS Setup utility), create a new logical drive by performing the steps in [“Using the Configuration Options Menu to Create a Bootable Logical Drive \(x86\)” on page 36](#).
 - If you have set your system BIOS to boot in legacy mode, create a new logical drive by performing the steps in these sections: [“Using the pcI Utility to Create a Bootable Drive \(x86\)” on page 46](#) and then [“To Boot an x86 Server From an External Disk Drive” on page 49](#).
 - Import an existing logical drive configuration from a different controller:
 - If you have set your system BIOS to boot in UEFI BIOS mode (which you can specify through the Boot menu of the BIOS Setup utility), import a logical drive by performing the steps in [“To Import an Existing Logical Drive Configuration Using the Configuration Options Menu \(x86\)” on page 48](#).
 - If you have set your system BIOS to boot in legacy mode, import a logical drive by performing the steps in [“To Import an Existing Logical Drive Configuration in Legacy Booting Mode \(x86\)” on page 49](#).

Using the Configuration Options Menu to Create a Bootable Logical Drive (x86)

This section describes how to use the Configuration Options menu in the BIOS Setup utility to create a logical drive on an x86 system. You can then define the logical drive as bootable, and install an operating system onto that logical drive.

In order to create a logical drive through the Configuration Options menu, the HBA must have firmware version 2.120.203-1440 from firmware package 12.12.0-0079, at minimum, installed. Before performing the steps in this section, verify the firmware level on the HBA and perform any firmware updates, as necessary. For information about updating firmware, see .

Perform the following procedures, in the order listed below, to create a logical drive on an x86 system:

- “[To Verify the Drives and Their Slots \(x86\)](#)” on page 36
- “[To Create a Logical Drive \(x86\)](#)” on page 38
- “[To Confirm the Logical Drive Creation \(x86\)](#)” on page 42

▼ To Verify the Drives and Their Slots (x86)

This procedure helps you identify drives to be used in a logical drive configuration.

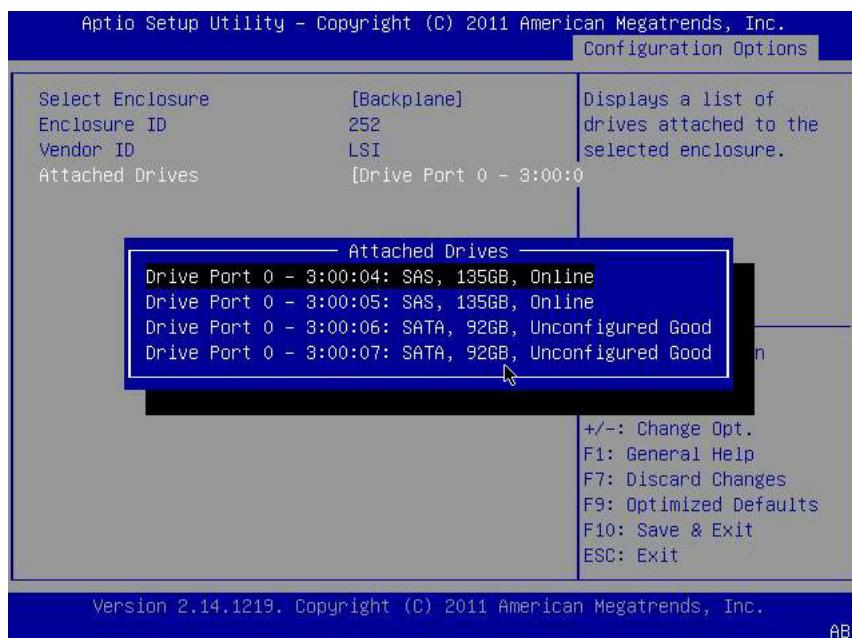
1. **From the Integrated Lights Out Manager (ILOM) software or Video Graphics Array (VGA) video port, access the system console.**
2. **Initiate a system boot.**
During the boot process, the BIOS initialization banner lists information about the discovered SAS adapters and devices that are attached to the discovered HBAs in the system.
3. **Press F2 during the boot process, when prompted, to launch the BIOS Setup utility, and then use the right arrow key to navigate to Configuration Options menu.**
4. **Use the arrow keys to navigate to the Enclosure Management menu option and press Enter.**

FIGURE 3-1 Enclosure Management Menu Option

5. **On the properties page that is displayed, use the arrow keys to navigate to the Attached Drives field, and press Enter.**

The Attached Drives popup window is displayed. In the following example, there are 4 drives in Slots 4, 5, 6, and 7. Slots 6 and 7 are not currently used (indicated by the Unconfigured Good text).

FIGURE 3-2 Attached Drives Popup Window



6. Review the attached drives and note their respective slots for future reference.

You can use these drives to be part of your logical drive configuration. See “[To Create a Logical Drive \(x86\)](#)” on page 38.

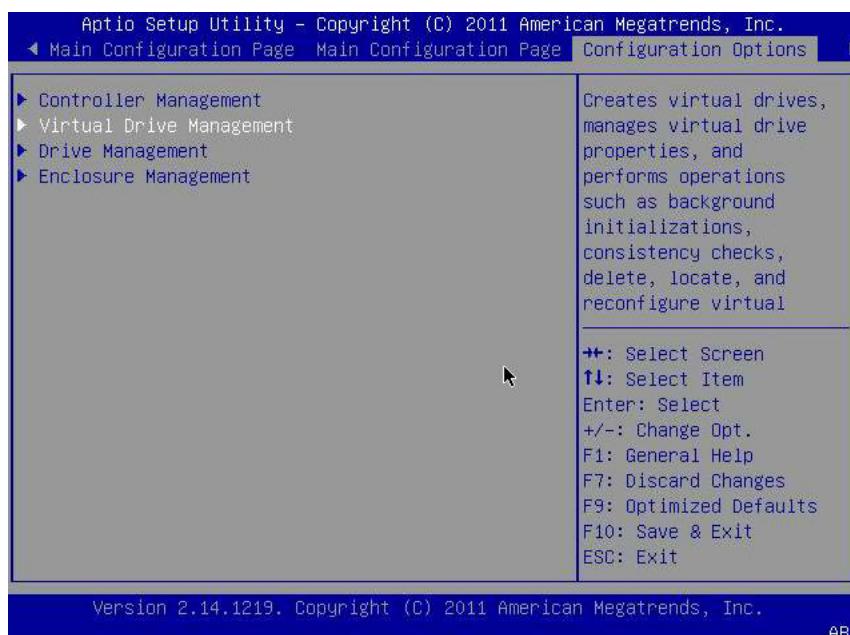
▼ To Create a Logical Drive (x86)

After you have verified which drives are available for logical drive configuration, as described in “[To Verify the Drives and Their Slots \(x86\)](#)” on page 36, you can use those drives to create a logical drive. In the following procedure, drives 6 and 7 from Step 5 (3:00:06, 3:00:07) are being used to create a RAID 1 volume.

Before You Begin The HBA must have firmware version 2.120.203-1440 from firmware package 12.12.0-0079, at minimum, installed.

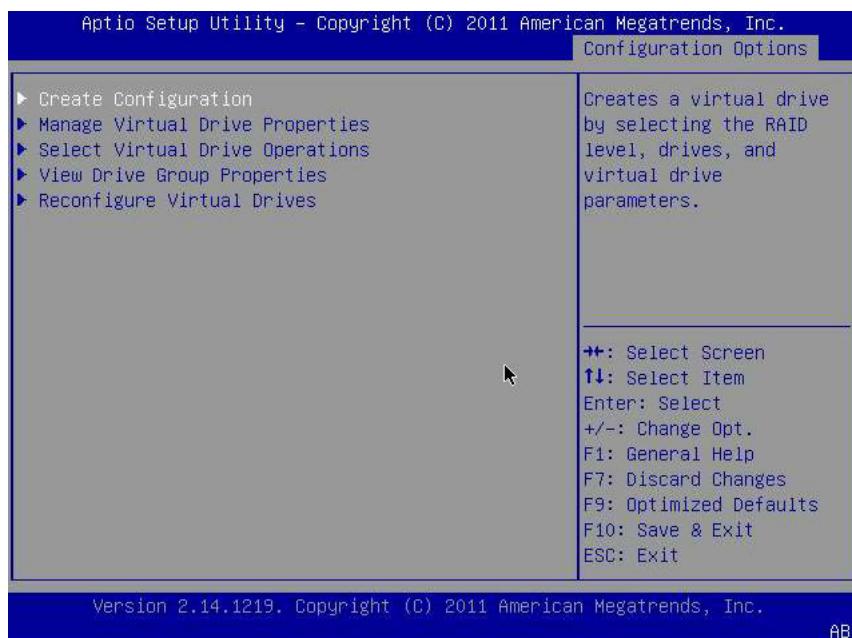
1. From the Attached Drives pop-up window (Figure 3-2), use the Esc key to return to the Configuration Options page, navigate to the Virtual Drive Management menu option, and press Enter.

FIGURE 3-3 Selecting the Virtual Drive Management Menu Option



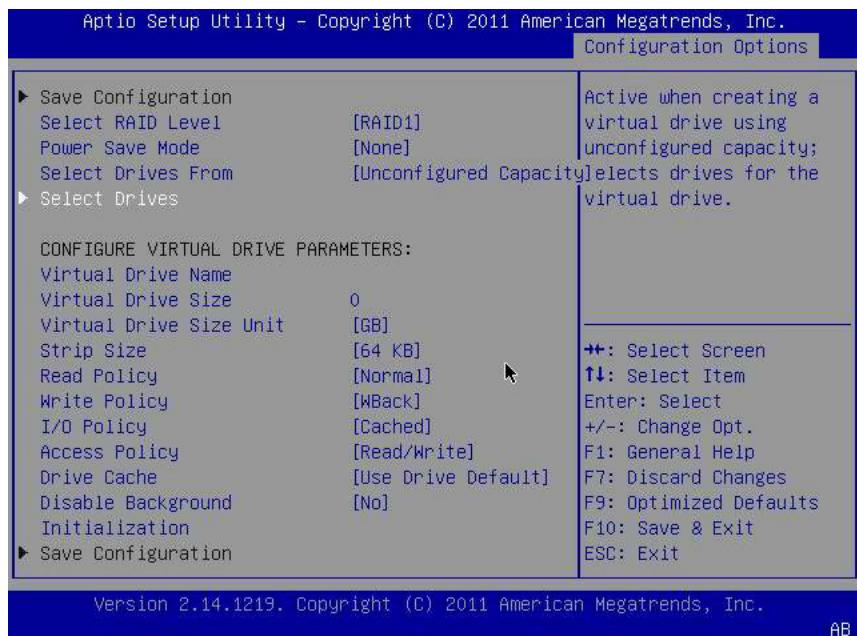
2. From the menu options that are displayed, use the arrow keys to navigate to the Create Configuration menu option and press Enter.

FIGURE 3-4 Selecting the Create Configuration Menu Option



3. **From the page that is displayed, navigate to the Select RAID Level field and choose RAID1, and then navigate to the Select Drives field and press Enter.**

In the following example, note that the RAID 1 level is selected. You might want to create a different level of RAID volume, based on your requirements.

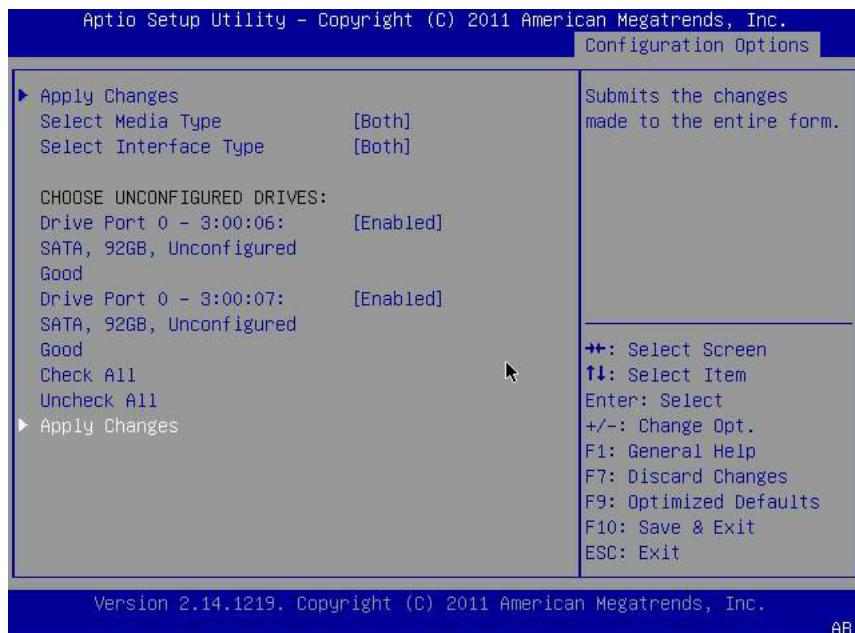
FIGURE 3-5 Selecting the RAID 1 Level and Selecting Drives

4. For each drive that you want in the RAID volume configuration, do the following:

- Use the arrow keys to navigate to the drive.**
- Use the arrow key to navigate to the Enabled or Disabled field associated with the drive.**
- Use the plus (+) or minus (-) key to change the value of the field to Enabled and press Enter.**

The drive is now listed as Enabled. In the following example, drives 6 and 7 are enabled.

FIGURE 3-6 Enabling the Drives for RAID Volume 1 Configuration



5. After you have enabled all the drives that you want to be part of the logical drive, use the arrow keys to navigate to the **Apply Changes** field on the same page, and press Enter.

The logical drive is now created with the drives that you enabled, and the Confirmation page is displayed.

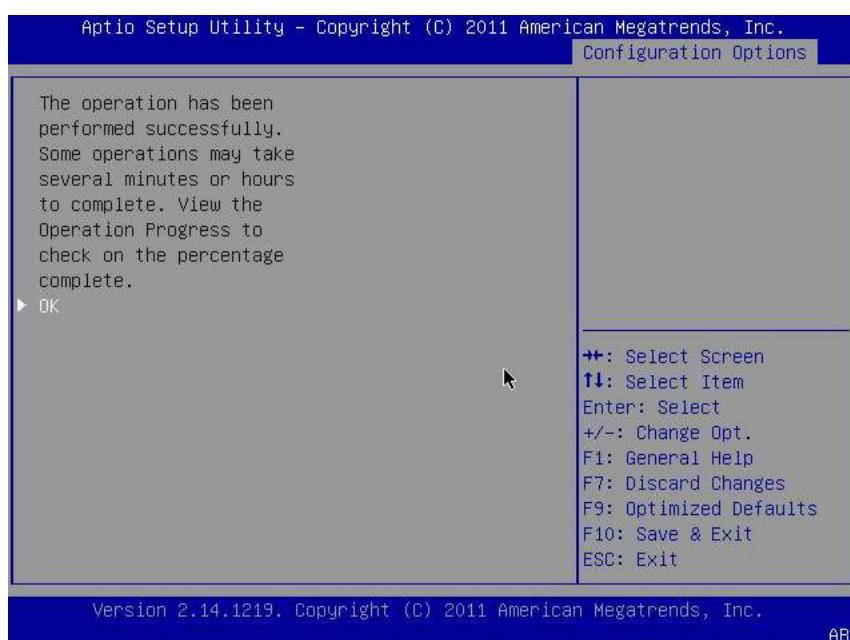
6. Complete the steps in “[To Confirm the Logical Drive Creation \(x86\)](#)” on page 42.

▼ To Confirm the Logical Drive Creation (x86)

Before You Begin Before performing this procedure, verify the drives and their slots (“[To Verify the Drives and Their Slots \(x86\)](#)” on page 36) and create a logical drive (“[To Create a Logical Drive \(x86\)](#)” on page 38).

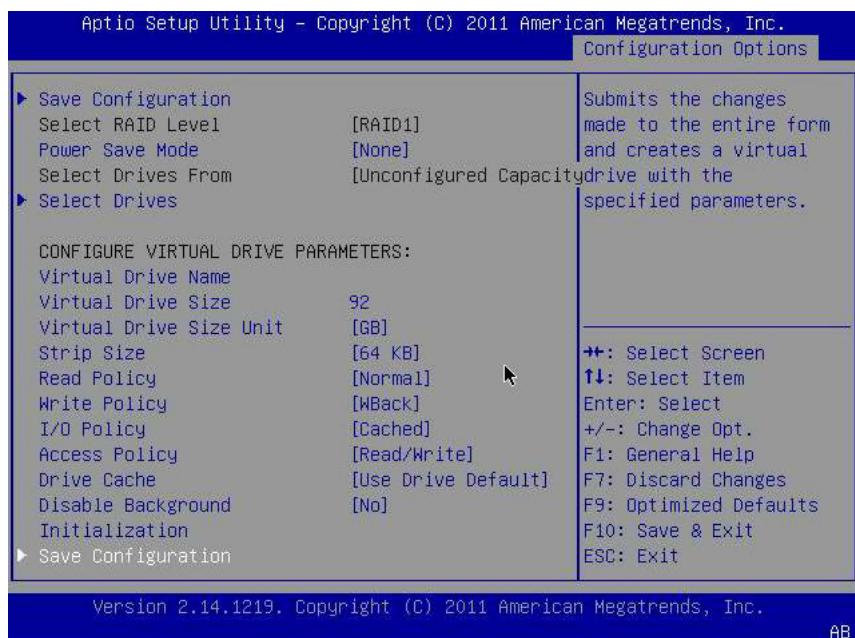
1. After enabling the drives that you want in your logical drive configuration ([Step 4](#)), confirm the configuration by using the arrow keys to navigate to the **OK** field on the Confirmation page, and by then pressing Enter.

FIGURE 3-7 Selecting OK on the Confirmation Page



2. **Optionally specify a drive name and make any other changes, and then navigate to the Save Configuration field and press Enter.**

FIGURE 3-8 Selecting Save Configuration

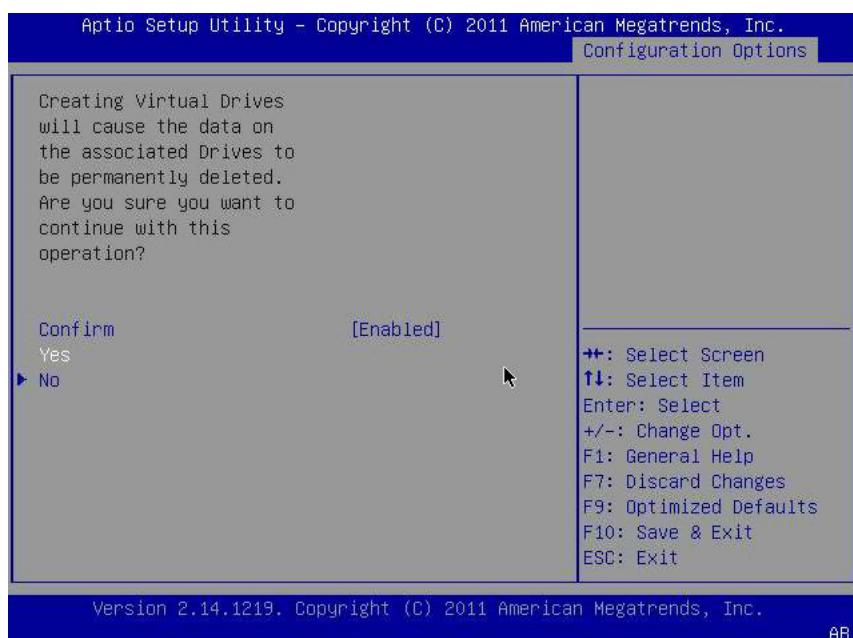


A page is displayed that asks if you would like to continue with the virtual drive creation.

3. Confirm the drive creation by doing the following:

- a. **Use the arrow keys to navigate to the Confirm field.**
- b. **Change the value of the Confirm field to Enabled and press Enter.**
Yes and No fields are displayed.
- c. **Use the arrow key to navigate to the Yes field and press Enter.**
This completes the logical drive creation process.

FIGURE 3-9 Confirming the Logical Drive Creation



4. To verify that the logical drive (virtual drive) was created, use the arrow keys to navigate to the Virtual Drive Group Properties menu option ([Figure 3-4](#)), press Enter, and review the logical drive information on the page that is displayed.

FIGURE 3-10 Viewing the Newly Created RAID Volume



5. **Exit the Setup utility and reboot into the Oracle System Assistant utility to install an OS on that logical drive or to manipulate the boot drive.**

Using the **pcli** Utility to Create a Bootable Drive (x86)

If you have set your system BIOS to boot in legacy mode, you must perform the steps in this section to create a logical drive on an x86 system prior to installing an OS.

Note - If you would prefer, in legacy BIOS boot mode, to create a bootable drive on an x86 system through a graphical user interface, you can do so through the WebBIOS utility. To access the WebBIOS utility, boot the system and press **ctrl+H**, when prompted. For more information about the WebBIOS utility, see the *MegaRAID SAS Software User's Guide*, located at: <http://www.lsi.com/sep/Pages/oracle/index.aspx>

▼ To Create a Logical Drive With the pcli Utility (x86)

1. Follow the procedures in “[Using the pcli Utility to Create a Bootable Drive \(SPARC\)](#)” on page 30, but keep the following x86 system considerations in mind:
 - To access the pcli utility from an x86 system, boot the system and press **ctrl +Y**, when prompted.
 - From an x86 system, you must specify the HBA in any pcli command that you issue. For example, to use the pcli pagination feature, as described in the note in [Step 1](#), you must specify the HBA in the command, such as **-a0** or **-a1**, depending on the HBA that you want. This is different from the same command issued from a SPARC system.


```
$-AdpAllInfo -a0 -page 20 -- Issued from an x86 system --
{0} ok cli -AdpAllInfo -page 20 -- Issued from a SPARC system --
```

 - In this example, the HBA, **-a0** (controller 0), is specified in the command issued from an x86 system. Because you must specify an HBA in each pcli command on an x86 system, you must skip all steps in the “[To Prepare to Use the pcli Utility](#)” on page 30 section that tell you to select an HBA prior to issuing pcli commands.
 - When issuing pcli commands, you do not need to type **cli** before each pcli command, as shown in the previous example.
 - The prompt on an x86 system is a dollar sign (\$).
 - To label physical disks on an x86 system, as described in [Step 3](#), issue the **fdisk** command for your specific operating system.

2. Make the logical drive bootable by performing the steps in “[To Boot an x86 Server From an External Disk Drive](#)” on page 49.

Importing an Existing Logical Drive Configuration (x86)

Instead of creating a logical drive (MegaRAID virtual disk), you might need to import an existing logical drive configuration from a different MegaRAID controller. Based on your

system BIOS booting mode, use one of the following methods to import an existing logical drive configuration:

- “[To Import an Existing Logical Drive Configuration Using the Configuration Options Menu \(x86\)](#)” on page 48
- “[To Import an Existing Logical Drive Configuration in Legacy Booting Mode \(x86\)](#)” on page 49

▼ To Import an Existing Logical Drive Configuration Using the Configuration Options Menu (x86)

Perform this procedure only if you have set your system BIOS to boot in UEFI mode.

Note - Only MegaRAID logical drives can be imported; Integrated RAID (IR) logical drives cannot be imported.

1. **From the Integrated Lights Out Manager (ILOM) software or Video Graphics Array (VGA) video port, access the system console.**
2. **Initiate a system boot.**
During the boot process, the BIOS initialization banner lists information about the discovered SAS adapters and devices that are attached to the discovered HBAs in the system.
3. **Press F2 during the boot process, when prompted, to launch the BIOS Setup utility, and then use the right arrow key to navigate to Configuration Options menu.**
4. **Use the arrow keys to navigate to the Manage Foreign Configuration field and press Enter.**
5. **Use the arrow keys to navigate to the Preview Foreign Configuration menu option and press Enter.**
6. **Use the arrow keys to navigate to the bottom of the Preview Foreign Configuration menu and do one of the following:**
 - **If you want to clear the existing foreign configuration, navigate to the Clear Foreign Configuration field and press Enter. This will destroy all data in that configuration.**

- If you want to import a new foreign configuration, navigate to the Import Foreign Configuration field and press Enter.
7. Use the arrow keys to navigate to the Confirm Enabled field, navigate to Yes, and press Enter.

▼ To Import an Existing Logical Drive Configuration in Legacy Booting Mode (x86)

Perform this procedure only if you have set your system BIOS to boot in legacy mode.

Note - Only MegaRAID logical drives can be imported; Integrated RAID (IR) logical drives cannot be imported.

1. Use the **-LdPdInfo** command to ensure that the RAID volume (virtual disk) on the existing controller is recognized by the system.

```
$-LdPdInfo -a0
Adapter #0
Number of Virtual Disks: 1
Virtual Disk: 0 (Target Id: 0)
```

2. Use the **-CfgForeign -Import** command to import the logical drive to the HBA.
\$-CfgForeign -Import -a0
3. Define the logical drive as the boot drive for your system, as described in “[To Boot an x86 Server From an External Disk Drive](#)” on page 49.

▼ To Boot an x86 Server From an External Disk Drive

After you have created or imported a logical drive, assuming your system BIOS is set to boot in legacy mode, you can use the drive to boot through the HBA. Only one logical drive can be set as the boot drive for this HBA at any time.

This section describes how to boot through the HBA using the WebBIOS utility on an x86 system.

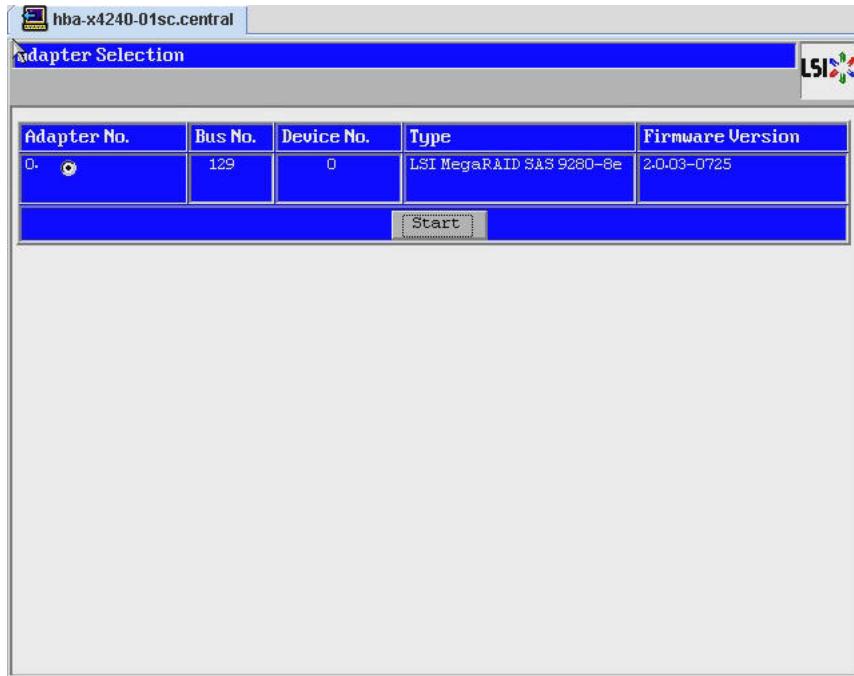
1. Initiate a system boot.

A message is displayed that gives you the option to press **CTRL+H** to access the WebBIOS configuration utility.

2. Press **CTRL+H to access the WebBIOS utility.**

The Adapter Selection screen is displayed.

FIGURE 3-11 Adapter Selection Screen

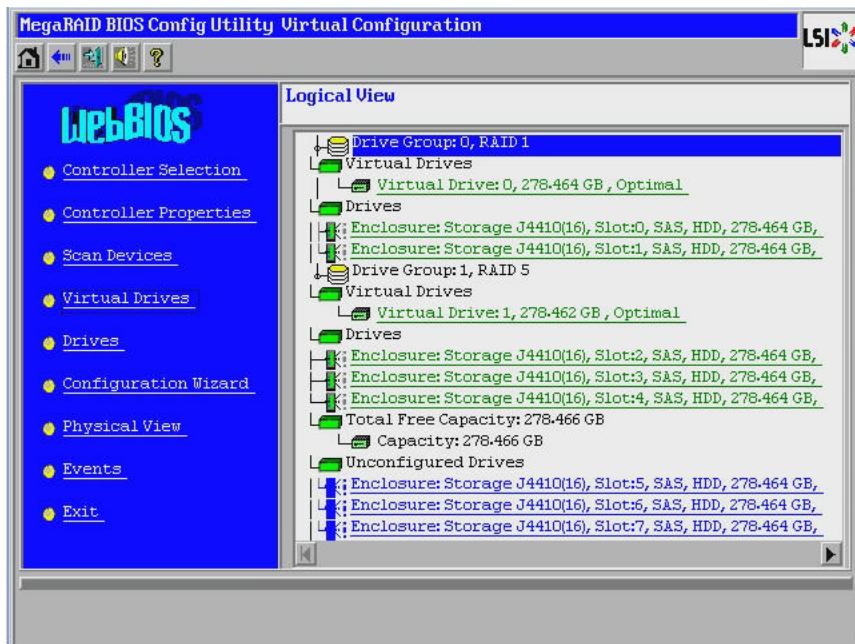


3. Use the Tab key to navigate to the adapter that you want, and press Enter.

4. Use the Tab key to navigate to the Start button, and press Enter.

The MegaRAID BIOS Config Utility Virtual Configuration screen is displayed.

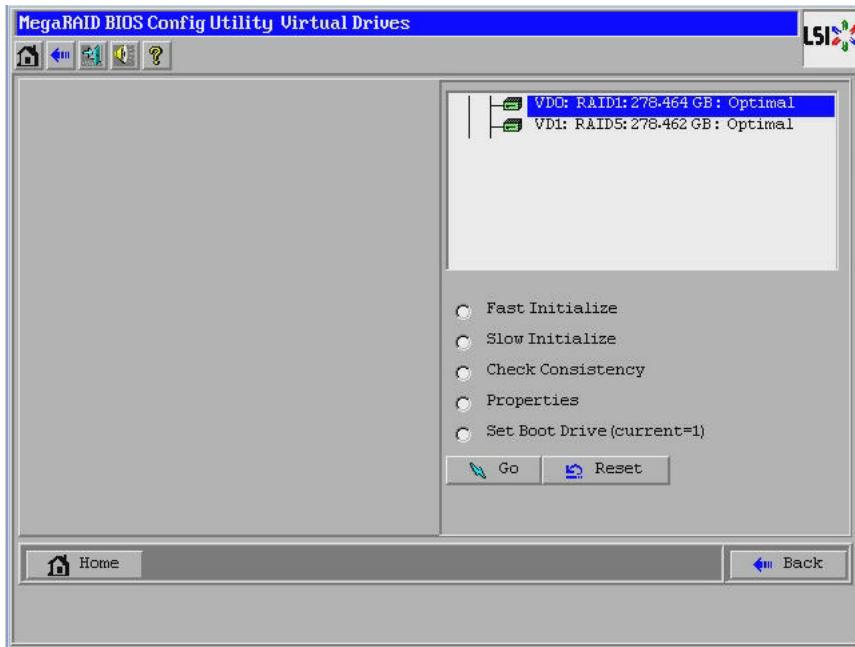
FIGURE 3-12 MegaRAID BIOS Config Utility Virtual Configuration Screen



5. In the navigational menu on the left, use the Tab key to navigate to the Virtual Drives menu option, and press Enter.

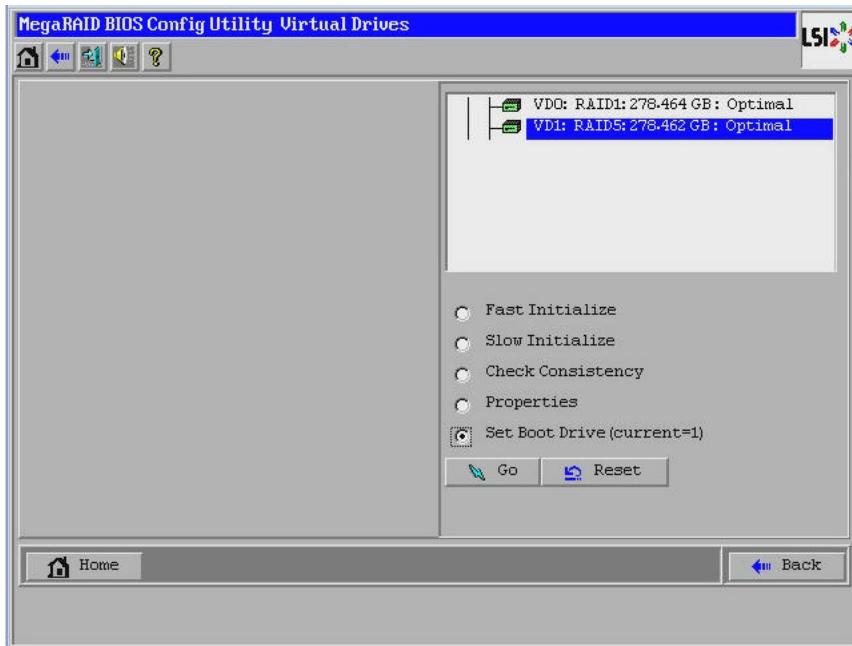
The MegaRAID BIOS Config Utility Virtual Drives screen is displayed.

FIGURE 3-13 MegaRAID BIOS Config Utility Virtual Drives Screen



6. **Use the Tab key to move to the list of drives and use the arrow keys to select the drive that you want to set as the boot drive.**
7. **With the drive highlighted in blue, use the Tab key to navigate to the Set Boot Drive (current=*number*) field, and press Enter to select the radio button next to the field.**

FIGURE 3-14 Designating a Virtual Drive to Be the Boot Drive for the HBA



8. **Use the Tab key to navigate to the Go button, and press Enter.**
The selected drive is now the boot drive for the HBA.
9. **Exit the utility by using the Back button to return to the main menu, navigating to the Exit menu option, and pressing Enter.**
10. **Reboot the system and then validate the label of the logical drive, as described in “[Validating the Label of the HBA Logical Drive](#)” on page 53.**

Validating the Label of the HBA Logical Drive

With this HBA, no drives will be visible to the OS until you have created at least one logical drive. This section describes how to verify that the logical drive you created for the HBA has a valid Oracle Solaris label, and therefore can be recognized by the OS. Sometimes, logical drives need to be relabeled using the `format` command (in the case of SPARC systems) or the `fdisk` command (in the case of x86 systems) in order to be recognized.

▼ To Verify That the Label of a Logical Drive Is Valid

Note - For your reference, this section provides an example procedure for a SPARC system that runs the Oracle Solaris OS. For an x86 system that runs the supported OS, you would use the fdisk command for that OS to verify the label of a disk. For more information about labeling disks using the fdisk command, see the documentation for your OS.

1. **Become a root user and issue the `format` command.**

```
# format
Searching for disks...done
AVAILABLE DISK SELECTIONS:
 0. c1t0d0 <DEFAULT cyl 24611 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@a/pci17c2,10@4/sd@0,0
 1. c1t1d0 <DEFAULT cyl 24810 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@a/pci17c2,10@4/sd@1,0
 2. c3t8d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@8,0
 3. c3t9d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@9,0
 4. c3t10d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@a,0
 5. c3t11d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@b,0
 6. c3t12d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@c,0
 7. c3t13d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@d,0
Specify disk (enter its number):
```

2. **When prompted, type the number of the disk drive that is attached to the HBA card you just installed, and press Enter.**

The Format menu is displayed.

```
# format
Searching for disks...done
AVAILABLE DISK SELECTIONS:
 0. c1t0d0 <DEFAULT cyl 24611 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@a/pci17c2,10@4/sd@0,0
 1. c1t1d0 <DEFAULT cyl 24810 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@a/pci17c2,10@4/sd@1,0
 2. c3t8d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@8,0
 3. c3t9d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@9,0
 4. c3t10d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
```

```
/pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@a,0
5. c3t11d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@a,0
6. c3t12d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@c,0
7. c3t13d0 <DEFAULT cyl 24619 alt 2 hd 27 sec 107>
  /pci@0,0/pci1022,7450@b/pci1000,10c0@1,1/sd@d,0
Specify disk (enter its number): 2
selecting c3t8d0
[disk formatted]
```

3. Type `q` at the two prompts to quit the test and the Format menu.

```
analyze> q
FORMAT MENU:
disk - select a disk
type - select (define) a disk type
partition - select (define) a partition table
current - describe the current disk
format - format and analyze the disk
fdisk - run the fdisk program
repair - repair a defective sector
label - write label to the disk
analyze - surface analysis
defect - defect list management
backup - search for backup labels
verify - read and display labels
save - save new disk/partition definitions
inquiry - show vendor, product and revision
scsi - independent SCSI mode selects
cache - enable, disable or query SCSI disk cache
volname - set 8-character volume name
!<cmd> - execute <cmd>, then return
quit
format> q
#
```

Next Steps

If you are installing the HBA in a SPARC system, install the Oracle Solaris OS, as described in “[Installing the Oracle Solaris OS](#)” on page 56.

If you are installing the HBA in an x86 system, install a supported OS (for a list of supported OSes, see). If you plan to install the Oracle Solaris OS on an x86 system, follow the instructions in “[Installing the Oracle Solaris OS](#)” on page 56

Installing the Oracle Solaris OS

You can install the Oracle Solaris 10 01/13 OS, at minimum, on the bootable drive that you created or imported, as described in this chapter. Starting with the Oracle Solaris 10 01/13 OS, the driver required by the HBA is provided with the Oracle Solaris OS.

▼ To Prepare to Install the Oracle Solaris OS

- Create or import a bootable drive upon which to install the Oracle Solaris OS, as described in this chapter.

▼ To Install the Oracle Solaris OS

1. Obtain the Oracle Solaris 10 01/13 OS, at minimum, from the Oracle download site:

<http://www.oracle.com/technetwork/server-storage/solaris10/overview/index.html>

2. Perform a normal installation, as described in Oracle's Solaris 10 installation documentation.

3. Apply any patches that are specifically required for the system.

You can obtain these Oracle Solaris patches at:

<http://support.oracle.com>

4. Reboot the system.

```
# reboot
```

The system can now see, and boot from, the logical drive on which you installed the Oracle Solaris OS.

Next Steps

Continue with the HBA installation, as described in “[To Complete the Installation](#)” on page 20.

HBA Software Installation

After you have completed the hardware installation and powered on the system, follow the instructions in this chapter for your operating system to install the HBA driver and any other utilities required for the installation.

This chapter contains the following topics:

- “[Installing the Solaris Driver and Firmware](#)” on page 57
- “[Installing the Linux Driver and Firmware](#)” on page 58
- “[Installing the Windows Server Driver and Firmware](#)” on page 59
- “[Installing the VMware Driver and Firmware](#)” on page 59
- “[Installing the RAID Configuration Utilities](#)” on page 60

Installing the Solaris Driver and Firmware

The latest driver (`mpt_sas`) for this HBA is included as part of the Oracle Solaris 10 01/13 OS and the Oracle Solaris 11.1 OS. You can obtain the latest version of the Oracle Solaris OS at:

<http://www.oracle.com/technetwork/server-storage/solaris10/overview/index.html>

The HBA requires the the following patches and SRUs, at minimum, for the driver to work:

- **Oracle Solaris 10 01/13 (for the SPARC environment):** patches 149175-02 and 145648-04
- **Oracle Solaris 10 01/13 (for the x86 environment):** patches 149176-02 and 45649-04
- **Oracle Solaris 11.1:** SRU 7

You can obtain these Solaris patches at:

<http://support.oracle.com>

Firmware Updates

The Solaris firmware and boot code update for the HBA, along with any accompanying documentation, are available for download at:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

Installing the Linux Driver and Firmware

Consult the Oracle hardware platform document to determine which Linux releases are supported on your specific host platform.

The Linux driver required to run the HBA with the Linux OS is available for download at the Oracle designated web page at:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

▼ To Install the Linux Driver

1. Log in to the host.
2. In a browser, go to <http://www.lsi.com/sep/Pages/oracle/index.aspx>.
3. Select the type and then model of the HBA that you want (SG(X)-SAS6-R-REM-Z).
4. Select and download the Linux driver that is supported by the Linux release (Red Hat Enterprise Linux or SuSE Linux Enterprise Server) on your hardware platform.
5. Select and download the corresponding Readme file for the Linux driver, and follow the instructions in the Readme file to complete the driver installation.

▼ To Download and Update the Linux Firmware

- The Linux firmware and boot code update for the HBA, along with any accompanying documentation, are available for download at:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

Installing the Windows Server Driver and Firmware

Consult the Oracle hardware platform document to determine which Windows releases are supported on your specific host platform.

The Windows Server driver required to run the HBA is available for download at the Oracle designated web page at:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

▼ To Install the Windows Driver

1. Log in to the host.
2. In a browser, go to <http://www.lsi.com/sep/Pages/oracle/index.aspx>.
3. Select the type and then model of the HBA that you want (SG(X)-SAS6-R-REM-Z).
4. Select and download the specific Windows driver that is supported by the Windows release on your hardware platform.
5. Select and download the corresponding Readme file for the Windows driver, and follow the instructions in the Readme file to complete the driver installation.

▼ To Download and Update the Windows Firmware

- The Windows firmware and boot code update for the HBA, along with any accompanying documentation, are available for download at:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

Installing the VMware Driver and Firmware

The HBA driver is included as part of the VMware ESX Server installation. The VMware ESX Server installation requires no further driver installation.

Installing the RAID Configuration Utilities

The HBA can be configured for RAID 0, 1, 5, 6, 10, 50, and 60. The following RAID configuration utilities are available for the HBA:

- **MegaRAID SAS Software** - A graphical user interface from which you can create RAID volumes for the HBA.
- **MegaCLI utility** - A command-line utility from which you can create RAID volumes for the HBA.

These utilities, and their associated documentation, are available for download at:

<http://www.lsi.com/sep/Pages/oracle/index.aspx>

Known Issues

This chapter provides supplementary and workaround information about the HBA. Specific bug identification numbers are provided for service personnel.

This chapter contains the following topics:

- “[MegaRAID Storage Manager-Related Issues](#)” on page 61
- “[Utility-Related Issues](#)” on page 67
- “[Storage-Related Issues](#)” on page 70

MegaRAID Storage Manager-Related Issues

This section contains the following topics:

- “[BackingStoreException Error Messages Occur When Trying to Start the GUI](#)” on page 62
- “[Error Message Occurs After Issuing the MegaCli64 -AdpAlILog -aALL Command](#)” on page 69
- “[Debug Messages Are Displayed in the Terminal Window](#)” on page 62
- “[Error Messages Are Displayed When Attempting to Connect to Another Host](#)” on page 62
- “[Cannot Enter the Login Password for the GUI and CLI](#)” on page 63
- “[Administrative Actions Are Inaccessible Through the MSM GUI](#)” on page 64
- “[Cannot Create a Drive Group Through the MSM GUI](#)” on page 64
- “[Connection Refusal Error Messages Occur When Trying to Start the MSM GUI](#)” on page 65
- “[Connection Refusal Error Messages Occur When Trying to Start the MSM GUI](#)” on page 65
- “[Monitoring System Is Displayed as a MegaRAID Server in the MSM GUI](#)” on page 66
- “[MSM GUI Is Not Starting After Becoming the root User](#)” on page 66
- “[Application Event Notifications Are Not Displaying in the MSM GUI](#)” on page 67

- “Cannot Locate a Disk Because the Blue Ready-to-Remove LED Is Not Illuminated” on page 67

▼ BackingStoreException Error Messages Occur When Trying to Start the GUI

Bug 15568174

Issue: You will encounter these Java error messages if you are a non-root user attempting to start the MegaRAID Storage Manager (MSM) graphical user interface (GUI).

Workaround: Because only the root user can start the MSM GUI, do the following:

1. **Stop the existing MSM GUI process.**
2. **Log out of the system and then log in again to the system as the root user.**
3. **Start a new session of the MSM GUI.**

Debug Messages Are Displayed in the Terminal Window

Bug 15569066

Issue: The terminal window from which the MSM GUI is started might display a large number of non-error, debug messages.

Workaround: None. These messages do not require any action from the user. Unless a message is clearly labeled as an error or exception, you can ignore the message.

Error Messages Are Displayed When Attempting to Connect to Another Host

Bug 15584190

Issue: If you attempt, through the MSM GUI, to connect to a host that does not have the MSM GUI software installed on it, the following Java exception and error messages might be displayed in the terminal from which you started the MSM GUI.

```
Socket connection to xxx.xxx.xxx.xxx failed once..try again
  Socket connection to xxx.xxx.xxx.xxx failed on retry
  Fatal Error : Can not create SASKernel object !
  java.net.ConnectException: Connection refused
    at java.net.PlainSocketImpl.socketConnect(Native Method)
    at java.net.PlainSocketImpl.doConnect(Unknown Source)
    at java.net.PlainSocketImpl.connectToAddress(Unknown Source)
    at java.net.PlainSocketImpl.connect(Unknown Source)
    at java.net.SocksSocketImpl.connect(Unknown Source)
    at java.net.Socket.connect(Unknown Source)
    at com.oracle.net.ssl.internal.ssl.SSLSocketImpl.connect(Unknown Source)
    at com.oracle.net.ssl.internal.ssl.SSLSocketImpl.<init>(Unknown Source)
    at com.oracle.net.ssl.internal.ssl.SSLSocketFactoryImpl.createSocket(Unknown
Source)
    at Framework.Network.CachedSSLocketFactory.createSocket(Unknown Source) at
KernelNetwork.RAIDSocket.processCommand(Unknown Source)
    at SASKernel.SASKernel.queryServerList(Unknown Source)
    at GUI.RemoteServerPanel.scanRemoteServers(Unknown Source)
at GUI.RemoteServerPanel$8.doInBackground(Unknown Source)
    at GUI.RemoteServerPanel$8.doInBackground(Unknown Source)
    at javax.swing.SwingWorker$1.call(Unknown Source)
    at java.util.concurrent.FutureTask$Sync.innerRun(Unknown Source)
    at java.util.concurrent.FutureTask.run(Unknown Source)
    at javax.swing.SwingWorker.run(Unknown Source)
    at java.util.concurrent.ThreadPoolExecutor$Worker.runTask(Unknown Source)
.....Continued on next page.....
```



```
at java.util.concurrent.ThreadPoolExecutor$Worker.run(Unknown Source)
    at java.lang.Thread.run(Unknown Source)
Terminating ....
```



```
set: KEY=PERSISTENT_Rem_FW_IP    VAL=xxx.xxx.xxx.xxx
```

(where "xxx.xxx.xxx.xxx" is the IP address of the non-MSM host.)

Workaround: Avoid connecting to a host that does not have the MSM GUI software installed on it. If you inadvertently attempt such a connection through the MSM GUI, type the IP address of a known MSM GUI host in the IP Address text box, and click Discover Host. You can now safely ignore the error messages that are generated.

Cannot Enter the Login Password for the GUI and CLI

Bug 15614882

Issue: When using the MSM GUI or MegaCLI utility on a system that is running the RedHat 5.4 OS, you might not be able to enter a password in the login dialog box without first selecting a login mode. This can occur unless, during the installation of the RedHat 5.4 OS, you selected the "All Languages" option.

Workaround: If you have already installed the RedHat OS, select a login mode from the Login Mode list box (Full Access or View Only), and then enter your login password.

If you need to install the RedHat 5.4 OS, during the installation process, select the "All Languages" option, when prompted.

Administrative Actions Are Inaccessible Through the MSM GUI

Bug 15625059

Issue: After rebooting a server that is running the SLES 11 OS, and upon launching the MSM GUI, the MSM GUI might detect the server, but the hostname/OS type data might not be visible, and administrative actions might be inaccessible (grayed out).

Workaround: Close all MSM GUI windows and issue the following command to restart the vivaldiframeworkd service:

```
# service vivaldiframeworkd restart
```

You can now restart the MSM GUI and administrative actions will be accessible.

Cannot Create a Drive Group Through the MSM GUI

Bug 15637746

Issue: When using the MSM GUI to create drive groups over multiple sessions, the MSM GUI assumes that Drive Group 0 is the drive group to be created, even though Drive Group 0 might have already been created. This results in a failure to create a drive group at all.

Workaround: If you must create additional drive groups in a subsequent working session, use the MegaCLI utility or WebBIOS utility to do so.

sas_snmp and sas_ir_snmp Errors Occur During the MSM GUI Installation

Bug 15643382

Issue: During the installation of the MSM GUI software on a system that is running the Linux OS, you might encounter the following errors when the sas_snmp and sas_ir_snmp files are being installed:

```
Installing sas_snmp-3.17-1080
Preparing...          ##### [100%]
 1:sas_snmp          ##### [100%]
ldconfig: /usr/lib/libsassmp.so.0 is not a symbolic link

/etc/snmp/snmpd.conf file not found. Please check the filepath
Exiting .....
error: %post(sas_snmp-3.17-1080.i386) scriptlet failed, exit status 1
Installing sas_ir_snmp-3.17-1081
Preparing...          ##### [100%]
 1:sas_ir_snmp        ##### [100%]
ldconfig: /usr/lib/libsassmp.so.0 is not a symbolic link

/etc/snmp/snmpd.conf file not found. Please check the filepath
Exiting .....
error: %post(sas_ir_snmp-3.17-1081.i386) scriptlet failed, exit status 1
```

Similarly, uninstalling either file might cause the following error to occur:

```
# rpm -e sas_ir_snmp
Unregistering Service
error: %preun(sas_ir_snmp-3.17-1081.i386) scriptlet failed, exit status 1
```

Workaround: To prevent these errors, uninstall the `sas_snmp` and `sas_ir_snmp` files prior to installing the MSM GUI:

```
# rpm -e --noscripts sas_snmp
# rpm -e --noscripts sas_ir_snmp
```

▼ Connection Refusal Error Messages Occur When Trying to Start the MSM GUI

Bug 15568181

Issue: If `xhost` access control is enabled on the system on which the MSM GUI is to be displayed, the following Java exception might occur when you start the GUI:

```
# /var/opt/MegaRaidStorageManager/startupui.sh
Xlib: connection to ":0.0" refused by server
Xlib: No protocol specified

Exception in thread "main" java.lang.NoClassDefFoundError: Could not initialize class oracle.awt.X11GraphicsEnvironment
  at java.lang.Class.forName0(Native Method)
  at java.lang.Class.forName(Unknown Source)
  at java.awt.GraphicsEnvironment.getLocalGraphicsEnvironment(Un
```

```
known Source)
    at oracle.awt.X11.XToolkit.<clinit>(Unknown Source)
    at java.lang.Class.forName0(Native Method)
    at java.lang.Class.forName(Unknown Source)
    at java.awt.Toolkit$2.run(Unknown Source)
    at java.security.AccessController.doPrivileged(Native Method)
    at java.awt.Toolkit.getDefaultToolkit(Unknown Source)
    at oracle.swing.SwingUtilities2$AATextInfo.getAATextInfo(Unknown
Source)
    at javax.swing.plaf.metal.MetalLookAndFeel.initComponentDefault
s(Unknown Source)
    at javax.swing.plaf.basic.BasicLookAndFeel.getDefaults(Unknown
Source)
    at javax.swing.plaf.metal.MetalLookAndFeel.getDefaults(Unknown
Source)
    at javax.swing.UIManager.setLookAndFeel(Unknown Source)
    at javax.swing.UIManager.setLookAndFeel(Unknown Source)
    at javax.swing.UIManager.initializeDefaultLAF(Unknown Source)
    at javax.swing.UIManager.initialize(Unknown Source)
    at javax.swing.UIManager.maybeInitialize(Unknown Source)
```

Workaround: To avoid this Java exception, do the following:

1. **Disable xhost access control by issuing the xhost + command.**
2. **Log in to the MSM server and set the DISPLAY variable as appropriate for your system.**
3. **Start the MSM GUI.**

Monitoring System Is Displayed as a MegaRAID Server in the MSM GUI

Bug 15584191

Issue: If the MSM GUI is installed on a system (the “monitoring system”) in order to monitor other MegaRAID systems, the monitoring system itself might be displayed as a MegaRAID server, even if there is no MegaRAID hardware on it.

Workaround: None. You can safely ignore this display.

MSM GUI Is Not Starting After Becoming the root User

Bug 15587630

Issue: The MSM GUI might not start up if you are logged in to the system as a normal user and then you issue the `sudo` or `su root` commands just before you issue the `startupui.sh` command.

Workaround: Before issuing the `sudo` or `su root` commands, disable access control by issuing the `xhost +` command. Either that, or initially log in to the system as the root user.

Application Event Notifications Are Not Displaying in the MSM GUI

Bug 15625268

Issue: In the event of a Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module (NEM) failure, an application event notification might take as much as 10 minutes to reach the MSM GUI.

Workaround: None. Check for the availability of a patch to address this issue.

Cannot Locate a Disk Because the Blue Ready-to-Remove LED Is Not Illuminated

Bug 15625166

Issue: When you use the MSM GUI on a system with eight or fewer drives, if you right-click on a disk through the GUI and select Prepare for Removal, the GUI might report that disk as Ready to Remove, but the blue Ready-to-Remove disk LED might illuminate momentarily, or not at all.

Workaround: After the MSM GUI reports that the disk is ready to remove, you can safely remove that disk. If you need help finding the disk in order to do so, use the Locate function from the MSM GUI, the MegaCLI utility, or the WebBIOS utility.

Utility-Related Issues

This section contains the following topics:

- “[Cannot Clear Controller Events From the UEFI HII Menu](#)” on page 68
- “[MegaCLI Log Files Are in the /tmp Directory](#)” on page 68
- “[Unsupported RAID Levels Are Displayed in the MegaCLI Utility](#)” on page 68
- “[Error Message Occurs After Issuing the `MegaCli64 -AdpAllLog -aALL` Command](#)” on page 69

- “The Advanced Software Options Feature on the WebBIOS Utility Menu Is Not Supported” on page 69
- “Mouse Clicks Are Not Detected by the WebBIOS Utility” on page 69
- “Cannot Tell, Through the WebBIOS Utility, When the Copyback Process Is Completed” on page 70

Cannot Clear Controller Events From the UEFI HII Menu

Bug 15777030

Issue: After selecting Clear controller events from the UEFI HII menu for this HBA, it appears that events do not get cleared after rebooting the host and checking the controller events file.

Workaround: This behavior occurs because the default setting in the UEFI HII menu for saving the latest controller events is to save the last ten events. So, if you choose to clear events, you will still see the last ten events listed in the controller events file.

To prevent this from occurring, specify in the UEFI HII menu that the number of events you want to save is one, or whichever number meets your requirements. Clearing events does not actually clear the event log, but moves the pointer for the latest event to the first one in the list.

MegaCLI Log Files Are in the /tmp Directory

Bug 15585065

Issue: The MegaCLI utility might incorrectly place its log files in the /tmp directory.

Workaround: Move the log files from the /tmp directory to the /var/opt/LSImegacli directory. This enables the log files to persist across subsequent reboots of the system.

Unsupported RAID Levels Are Displayed in the MegaCLI Utility

Bug 15598545

Issue: When reviewing the RAID levels supported in the output of the `MegaCli -Adpallinfo -ainstance-number-of-adapter` command (For example: `MegaCli -Adpallinfo -a1`), the following non-supported RAID levels might be displayed:

- PRL 11
- PRL 11 with spanning

- SRL 3

Workaround: None. You can ignore these RAID levels.

Error Message Occurs After Issuing the MegaCli64 -AcpAlILog -aALL Command

Bug 15621333

Issue: If you issue the MegaCli64 -AcpAlILog -aALL command during the rebuild of a system that is running the Oracle Enterprise Linux (OEL) 5.3 OS, the following error messages might be displayed, although the messages might be separated by several lines of output:

```
sh: :cat: command not found
Segmentation fault
```

Workaround: Issue the MegaCli64 -AcpAlILog -aALL command before you start the rebuild or after the rebuild is completed.

The Advanced Software Options Feature on the WebBIOS Utility Menu Is Not Supported

Bug 15690187

Issue: If you select the Advanced Software Options feature on the main WebBIOS utility menu, you are prompted for an activation code to enable additional software features. Oracle does not support this feature, and therefore will not provide activation codes for entry on this screen.

Workaround: Ignore this menu item, as this feature is not supported by Oracle.

Mouse Clicks Are Not Detected by the WebBIOS Utility

Bug 15585928

Issue: On multiple Sun Blade 6000 system configurations, when using a mouse connected to a USB connector on a dongle that is connected to the CMM ILOM software, occasionally you must repeat your mouse clicks three or more times before they are recognized by the WebBIOS utility. Sometimes down-clicks are recognized, but up-clicks are not.

Workaround: Repeat the selection or use the MegaCLI utility.

Cannot Tell, Through the WebBIOS Utility, When the Copyback Process Is Completed

Bug 15598979

Issue: When you start the Copyback process from the WebBIOS utility, there is no feedback to inform you of the progress of the process.

Workaround: You can monitor the Copyback process through the MegaRAID Storage Manager GUI.

Storage-Related Issues

This section contains the following topics:

- ““Invalid SAS Topology Detected” Error Occurs, Preventing the System From Booting” on page 70
- “Cannot Boot the Operating System” on page 71
- “NEM Removal Causes Virtual Disk Members to Be Displayed as (FOREIGN) Unconfigured Bad” on page 71
- “Blue Ready-to-Remove LED Is Illuminated After Reinserting a Drive” on page 72
- “An Unusual Message Is Displayed After Rebooting the System” on page 73

“Invalid SAS Topology Detected” Error Occurs, Preventing the System From Booting

Bug 15798254

Issue: If this HBA is installed in a Sun Fire X6270 M2 system, you might receive the following error message:

Invalid SAS topology detected. Please check your cable configurations, repair the problem, and restart the system.

After receiving this error message, you might be unable to boot up the system.

Workaround: All Sun Storage 6 Gb SAS REM RAID HBAs in the chassis must have the same firmware version installed. If you encounter this error, remove the card from the chassis, insert the card into another system, and upgrade the card to the firmware level of the other Sun Storage 6 Gb SAS REM HBAs in the chassis. Once updated to the same firmware level as the other Sun Storage 6 Gb SAS REM HBAs in the original chassis, reinsert the card into the original chassis. You can now reboot the system.

Cannot Boot the Operating System

Bug 15692815

Issue: After initiating a system reboot of a system in which the HBA is installed, the operating system fails to boot. This might occur if the HBA has more than 50 virtual drives configured on it.

Workaround: Do not configure more than 50 virtual drives on the HBA. Doing so might prevent the system BIOS from identifying the correct booting device, thus preventing the operating system from booting.

▼ NEM Removal Causes Virtual Disk Members to Be Displayed as (FOREIGN) Unconfigured Bad

CR 6932663

Issue: If you remove and then reinsert all NEMs to and from a system that is powered-on, all of the physical disks that are members of a virtual disk will be displayed in the WebBIOS utility in the (FOREIGN) Unconfigured Bad state. This ultimately causes no virtual disks to be displayed in the utility.

Workaround: This is expected behavior because, when you remove the NEMs from a powered-on system, the HBA can no longer detect the physical drives. Because the HBA cannot detect the drives, the HBA considers the drives to have failed.

To remove the (FOREIGN) Unconfigured Bad state from the physical drives and bring the virtual disks back online, do the following:

1. **Boot the system, and when prompted, type `Ctrl+H` to access the WebBIOS utility.**
2. **If the WebBIOS utility is not displaying the Physical View, click Physical View in the left panel.**

The MegaRAID BIOS Config Utility Physical Configuration screen is displayed.

Note - Perform [Step 3](#) only if the physical drives are listed in the utility in the (FOREIGN) Unconfigured Bad state (in black text). Otherwise, if the disks are listed in the (FOREIGN) Unconfigured Good state (in blue text), skip to [Step 4](#).

3. **For each drive that is listed in the (FOREIGN) Unconfigured Bad state, do the following:**

- a. **Click a drive in the (FOREIGN) Unconfigured Bad state.**
The MegaRAID BIOS Config Utility Drive *number* screen is displayed.
 - b. **Navigate to the Make UnconfGood radio button, select the radio button, and click Go.**
Clicking Go enables the utility to change the state of the drive.
 - c. **Click Back to return to the MegaRAID BIOS Config Utility Physical Configuration screen.**
The drive is now listed in the (FOREIGN) Unconfigured Good state.
 - d. **Repeat Step 3.a-Step 3.c for the remaining drives that have the (FOREIGN) Unconfigured Bad state.**
4. **When all physical drives have the (FOREIGN) Unconfigured Good State displayed, click Scan Devices in the left panel.**
After the device scan completes, the Foreign Configs Found screen is displayed.
 5. **From the Foreign Configs Found screen, click Preview.**
The Foreign Configs Preview screen is displayed.
 6. **From the Foreign Configs Preview screen, click Import.**
When the import process is finished, all virtual disks will be back online and ready for use.

Blue Ready-to-Remove LED Is Illuminated After Reinserting a Drive

CR 6904623

Issue: From the WebBIOS utility, when you execute a Prepare Removal command on a drive in a system that has more than eight physical drives, if the drive is pulled out and then re-inserted in a different slot, the blue Ready-to-Remove LED might illuminate in that new/different slot.

Workaround: To extinguish the blue LED, undo the Prepare Removal command by doing one of the following:

- **From the WebBIOS utility**, select Undo Removal > OK for the slot in which the drive is now located.
- **From the MSM GUI**, right-click on the drive and select the Undo Prepare for Removal menu option.

- **From the MegaCLI utility**, type the following:

```
MegaCli -PdPrpRmv -UnDo -physdrv[enclosure-number:slot-number] -anumber-of-adapter-that-is-controlling-the-drive
```

An Unusual Message Is Displayed After Rebooting the System

CR 6912681

Issue: During the reboot process, you might encounter a message that states:

my-space = number.

Workaround: None. You can safely ignore this message.

◆ ◆ ◆ APPENDIX A

HBA Specifications

This appendix contains the specifications for the HBA.

This appendix contains the following topics:

- “Physical Dimensions” on page 75
- “HBA Card Layout” on page 75
- “Environmental Specifications” on page 78
- “Fault Tolerance” on page 79
- “Electrical Characteristics” on page 79

Physical Dimensions

The HBA card size is as follows:

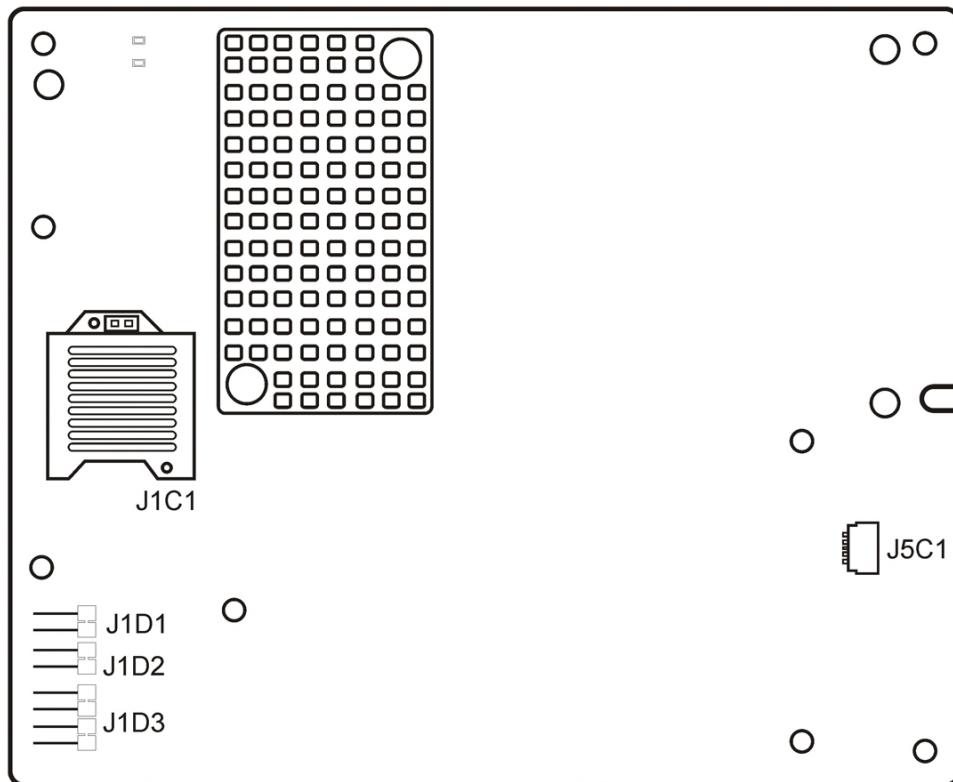
Height: 94.31mm (2.731 inches)

Length: 167.64mm (6.6 inches)

HBA Card Layout

The HBA hard disk drive (HDD) interface through a 210-pin mezzanine plug provides links for up to eight HDD ports.

[Figure A-1](#) shows the jumpers and connectors on the HBA.

FIGURE A-1 Card Layout of the HBA

HBA Jumpers and Connectors

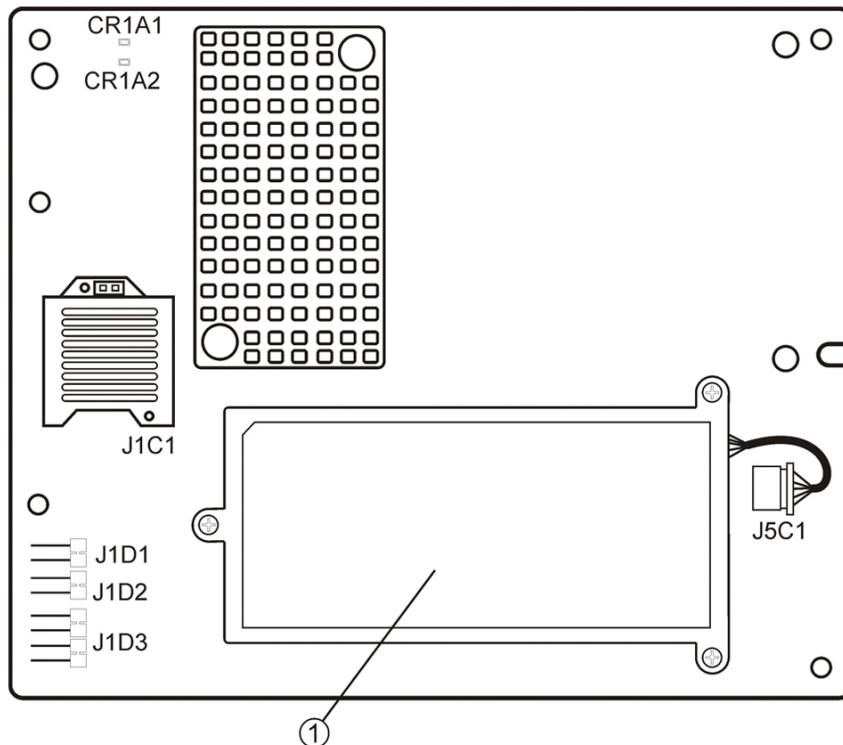
[Table A-1](#) describes the jumpers and the connectors on the HBA.

TABLE A-1 HBA Jumpers and Connectors

Connector	Description	Comments
J1C1	Host PCIe Interface	210-pin mezzanine plug connector This is the PCI Express interface to the host system and the SAS/SATA interface to the hard disk drives.

Connector	Description	Comments
J1D1	LSI Test header	2-pin connector Reserved for Oracle use.
J1D2	SBR Firmware Recovery header	2-pin connector The SBR firmware recovery header is used when SBR corruption is suspected. Installing the jumper allows the unit to boot while bypassing the SBR information. The EEPROM can then be reprogrammed using external utility software.
J1D3	Universal Asynchronous Receiver/Transmitter (UART) debugging	4-pin connector Reserved for Oracle use.
J5C1	Battery Backup connector	20-pin connector Connects the LSiBBU08 intelligent Battery Backup Unit directly to the RAID controller.

[Figure A-2](#) shows the HBA with the LSI intelligent Battery Backup Unit 08 (LSiBBU08) installed.

FIGURE A-2 Intelligent Battery Backup Unit 08 (LSIiBBU08) on the HBA**Figure Legend**

1 LSIiBBU08 - LSI Intelligent Battery Backup Unit 08

Environmental Specifications

The HBA environmental requirements are listed in [Table A-2](#).

TABLE A-2 HBA Environmental Specifications

Specification	Operating	Non-Operating
Temperature	<ul style="list-style-type: none"> ■ +10°C to +60°C without battery backup unit ■ +10°C to +44.8°C with iBBU battery backup 	<ul style="list-style-type: none"> ■ -30°C to +80°C without battery backup unit ■ 0°C to +45°C with iBBU battery backup
Humidity	5% to 90% RH, noncondensing, 40°C max, 27°C max wet bulb, 16 hour dwells at extreme	93% RH, noncondensing, 40°C max, 120 hours

Specification	Operating	Non-Operating
Altitude	3200m at 40°C, 4 hour dwell	12,200m at 0°C, 4 hour dwell
Vibration	0.25G in all axes swept for 5-500-5 Hz, 5 sweeps in all at 1 octave/min	1.2G in all axes swept for 5-500-5 Hz, 5 sweeps in all at 1 octave/min
Shock	5.5G, 11 ms half-sine, 10 shocks in x-, y-, and z-axes	33G, 11 ms half-sine, 3 shocks in x-, y-, and z-axes
Airflow	At least 200 linear feet per minute (LFPM)	At least 200 linear feet per minute (LFPM)

Fault Tolerance

Table A-3 lists the fault tolerance features for the HBA.

TABLE A-3 Fault Tolerance Features

Specification	HBA
Support for SMART [†]	Yes
Optional battery backup for cache memory	LSIiBBU08 battery backup. <3.7V/1350mAH battery pack; up to 48 hours of data retention for 512 Mbytes
Drive failure detection	Automatic
Drive rebuild using hot spares	Automatic
Parity generation and checking	Yes

[†]The Self Monitoring Analysis and Reporting Technology (SMART) detects up to 70 percent of all predictable drive failures. In addition, SMART monitors the internal performance of all motors, heads, and drive electronics.

Electrical Characteristics

All power is supplied to the HBA through the PCI Express 3.3V rails and the 12V rail. Onboard switching regulator circuitry operating from the 3.3V rails and the 12V rail provide the necessary voltages. The following states determine the typical current consumption of the controller:

- State 1: During a hard reset
- State 2: During a disk stress test
- State 3: While sitting idle at the DOS prompt

The supply voltages are 12V 8 percent (from PCI edge connector only) and 3.3V 9 percent (from PCI edge connector only). Table A-4 lists the power supply information for the controller for each of the three states at the different voltages.

Electrical Characteristics

TABLE A-4 Power Supply for the HBA

PCI Edge Connector	State 1	State 2	State 3
3.3V supply	330mA	330mA	330mA
+12V supply	1.00A	1.81A	1.53A
3.3V auxiliary supply	30mA	30mA	30mA

+12V is used in the charging circuitry for the battery pack on the optional iBBU battery-backed daughter card. If the iBBU daughter card is mounted, the following power consumption figures apply: During fast charging of the battery pack: 230mA in +12V current

Glossary

A, B

BIOS Acronym for Basic Input/Output System. Software that provides basic read/write capability. Usually kept as firmware (ROM-based). The system BIOS on the motherboard of a computer boots and controls the system. The BIOS on your host adapter acts as an extension of the system BIOS.

C

configuration Refers to the way a computer is set up, the combined hardware components (computer, monitor, keyboard, and peripheral devices) that comprise a computer system, or the software settings that enable the hardware components to communicate with each other.

D

device driver A program that enables a microprocessor (through the operating system) to direct the operation of a peripheral device.

domain validation A software procedure in which a host queries a device to determine its ability to communicate at the negotiated data rate.

drive group A group of physical drives that combines the storage space on the drives into a single segment of storage space. A hot-spare drive does not actively participate in a drive group.

E

EEPROM Acronym for electronically erasable programmable read-only memory. It is a memory chip that typically stores configuration information, as it provides stable storage for long periods without electricity and can be reprogrammed. Refer to NVRAM.

external SAS device A SAS device installed outside the computer cabinet. These devices are connected using specific types of shielded cables.

F

Fusion-MPT architecture An acronym for Fusion-Message Passing Technology architecture. Fusion-MPT consists of several main elements: Fusion-MPT firmware, the Fibre Channel and SCSI hardware, and the operating system level drivers that support these architectures. Fusion-MPT architecture offers a single binary, operating system driver that supports both Fibre Channel and SCSI devices.

G, H

host The computer system in which a RAID adapter is installed. It uses the RAID adapter to transfer information to and from devices attached to the SCSI bus.

host adapter board A circuit board or integrated circuit that provides a device connection to the computer system.

host bus adapter A piece of hardware that connects a host to network and storage devices.

hot spare An idle, powered-on, standby drive that is ready for immediate use in case of drive failure. A hot spare does not contain any user data. A hot spare can be dedicated to a single redundant array or it can be part of the global hot-spare pool for all arrays managed by the adapter.

When a drive fails, the adapter firmware automatically replaces and rebuilds the data from the failed drive to the hot spare. Data can be rebuilt only from virtual drives with redundancy (RAID levels 1, 5, 6, 10, 50, and 60; not RAID level 0), and the hot spare must have sufficient capacity.

I

internal SAS device A SAS device installed inside the computer cabinet. These devices are connected using a shielded cable.

J, K, L, M

main memory The part of computer memory that is directly accessible by the CPU (usually synonymous with RAM).

N

NVRAM	Acronym for nonvolatile random access memory. An EEPROM (electronically erasable read-only memory) chip that stores configuration information. Refer to EEPROM.
--------------	---

O, P

PCI	Acronym for Peripheral Component Interconnect. A high-performance, local bus specification that enables the connection of devices directly to computer memory. The PCI Local Bus enables transparent upgrades from 32-bit data path at 33 MHz to 64-bit data path at 33 MHz, and from 32-bit data path at 66 MHz to 64-bit data path at 66 MHz.
------------	---

PCI Express	Acronym for Peripheral Component Interconnect Express. A high-performance, local bus specification that enables the connection of devices directly to computer memory. PCI Express is a two-way, serial connection that transfers data on two pairs of point-to-point data lines. PCI Express goes beyond the PCI specification in that it is intended as a unifying I/O architecture for various systems: desktops, workstations, mobile, server, communications, and embedded devices.
--------------------	--

peripheral devices	A piece of hardware (such as a video monitor, drive, printer, or CD-ROM) used with a computer and under the control of the computer. SCSI peripherals are controlled through a Sun StorageTek 6 Gb/s SAS PCIe RAID HBA (host adapter).
---------------------------	--

PHY	The interface required to transmit and receive data packets transferred across the serial bus.
------------	--

Each PHY can form one side of the physical link in a connection with a PHY on a different SATA device. The physical link contains four wires that form two differential signal pairs. One differential pair transmits signals, while the other differential pair receives signals. Both differential pairs operate simultaneously and enable concurrent data transmission in both the receive and the transmit directions.

Q, R, S

SAS	Acronym for Serial Attached SCSI. A serial, point-to-point, enterprise-level device interface that leverages the proven SCSI protocol set. The SAS interface provides improved performance, simplified cabling, smaller connections, lower pin count, and lower power requirements when compared to parallel SCSI. SAS adapters leverage a common electrical and physical connection interface that is compatible with Serial ATA. The SAS adapters support the ANSI Serial Attached SCSI Standard, Version 2.0. In addition, the adapter supports the Serial ATA II (SATA II) protocol defined by the Serial ATA Specification, Version 1.0a. Supporting both the SAS interface and the SATA II interface, the SAS adapter is a versatile adapter that provides the backbone of both server and high-end workstation environments. Each port on the SAS RAID adapter supports SAS devices, SATA II devices, or both.
------------	---

SAS device	Any device that conforms to the SAS standard and is attached to the SAS bus by a SAS cable. This includes SAS RAID adapters (host adapters) and SAS peripherals.
SATA	Acronym for Serial Advanced Technology Attachment. A physical storage interface standard, SATA is a serial link that provides point-to-point connections between devices. The thinner serial cables enable better airflow within the system and permit smaller chassis designs.
SMP	Acronym for Serial Management Protocol. SMP communicates topology management information directly with an attached SAS expander device. Each PHY on the adapter can function as an SMP initiator.
spanning	A method for combining multiple drives into a single logical drive. If you want to have all of the drive capacity in one drive group, you can span (merge) the drives so that the operating system sees just one large drive. For more information, refer to the MegaRAID SAS Software User's Guide, located at: http://www.lsi.com/sep/Pages/oracle/index.aspx .
SSP	Acronym for Serial SCSI Protocol. SSP enables communication with other SAS devices. Each PHY on the SAS adapter can function as an SSP initiator or SSP target.
STP	Acronym for Serial Tunneling Protocol. STP enables communication with a SATA II device through an attached expander. Each PHY on the SAS adapter can function as an STP initiator.
stripe size	The total drive space consumed by a stripe not including a parity drive. For example, consider a stripe that contains 64 Kbytes of drive space and has 16 Kbytes of data residing on each drive in the stripe. In this case, the stripe size is 64 Kbytes and the stripe element size is 16 Kbytes. The stripe depth is four (four drives in the stripe). You can specify stripe sizes of 8 Kbytes, 16 Kbytes, 32 Kbytes, 64 Kbytes, 128 Kbytes, 256 Kbytes, 512 Kbytes, or 1 Mbyte for each logical drive. A larger stripe size produces improved read performance, especially if most of the reads are sequential. For mostly random reads, select a smaller stripe size.
striping	Drive striping writes data across two or more drives. Each stripe spans two or more drives but consumes only a portion of each drive. Each drive, therefore, may have several stripes. The amount of space consumed by a stripe is the same on each drive that is included in the stripe. The portion of a stripe that resides on a single drive is a stripe element. Striping by itself does not provide data redundancy; striping in combination with parity provides data redundancy.

T, U, V, W, X, Y, Z

virtual drive	A storage unit created by a RAID controller from one or more drives. Although a virtual drive may be created from several drives, it is seen by the operating system as a single drive. Depending on the RAID level used, the virtual drive can retain redundant data in case of a drive failure.
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