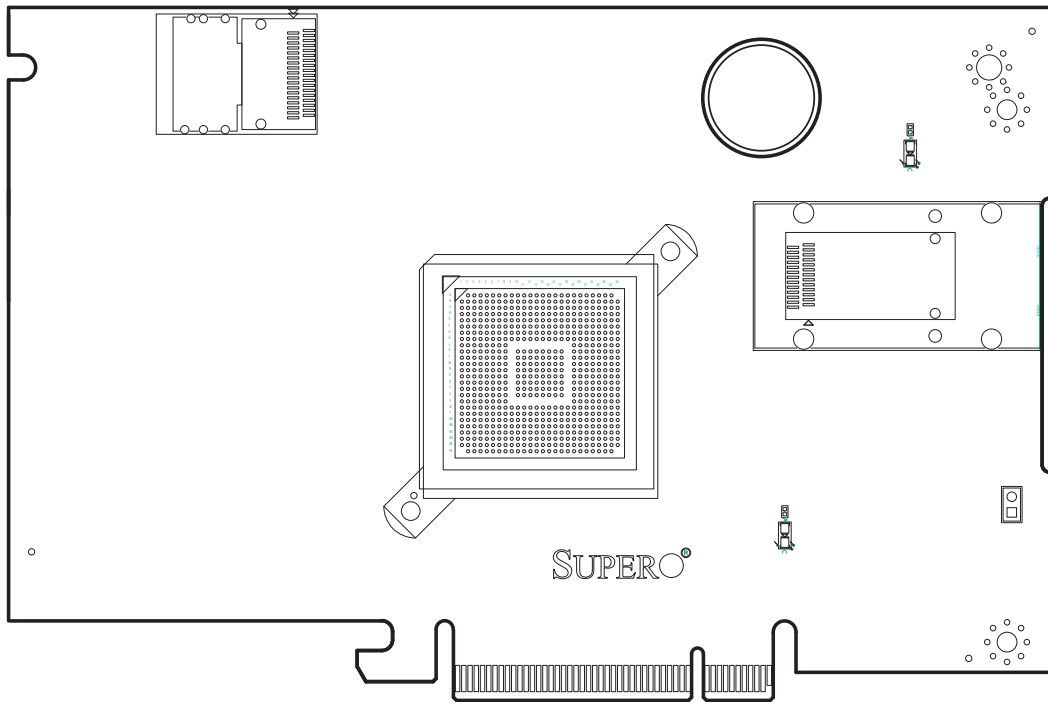


SUPERO®



AOC-USAS-H4ir

USER'S GUIDE

Rev. 1.0

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Introduction

Overview

This manual is written for system integrators, PC technicians and knowledgeable PC users who intend to integrate SuperMicro's USAS-H4ir Add on Card to their system.

Product Features

The AOC-USAS-H4ir offers the following features:

- UIO Form Factor
- One Internal "ipass" cable port
- One External "ipass" cable port
- Support for RAID 0, 1, 5, 6, 10, 50, and 60
- Preinstalled iButton

Operating Systems Supported

The AOC-USAS-H4ir support the following Operating Systems (OS):

- Windows 2000/Windows XP/Windows 2003
- Red Hat Enterprise Linux/SUSE Linux

Each operating system must include the latest patches, hot fixes, and at least, 256 MB of free hard drive space.

Manual Images

All images and layouts shown in this user's guide are based upon the latest PCB Revision available at the time of publishing. The card you have received may or may not look exactly the same as the graphics shown in this manual.

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Chapter 1

Safety Guidelines

To avoid personal injury and property damage, carefully follow all the safety steps listed below when accessing your system or handling the components.

1-1 ESD Safety Guidelines

Electric Static Discharge (ESD) can damage electronic components. To prevent damage to your system, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from ESD.

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing a component from the anti-static bag.
- Handle the add-on card by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the card and peripherals back into their antistatic bags when not in use.

1-2 General Safety Guidelines

- Always disconnect power cables before installing or removing any components from the computer.
- Disconnect the power cable before installing or removing any cables from the system.
- Make sure that the add-on card is securely and properly installed on the motherboard to prevent damage to the system due to power shortage.

1-3 An Important Note to Users

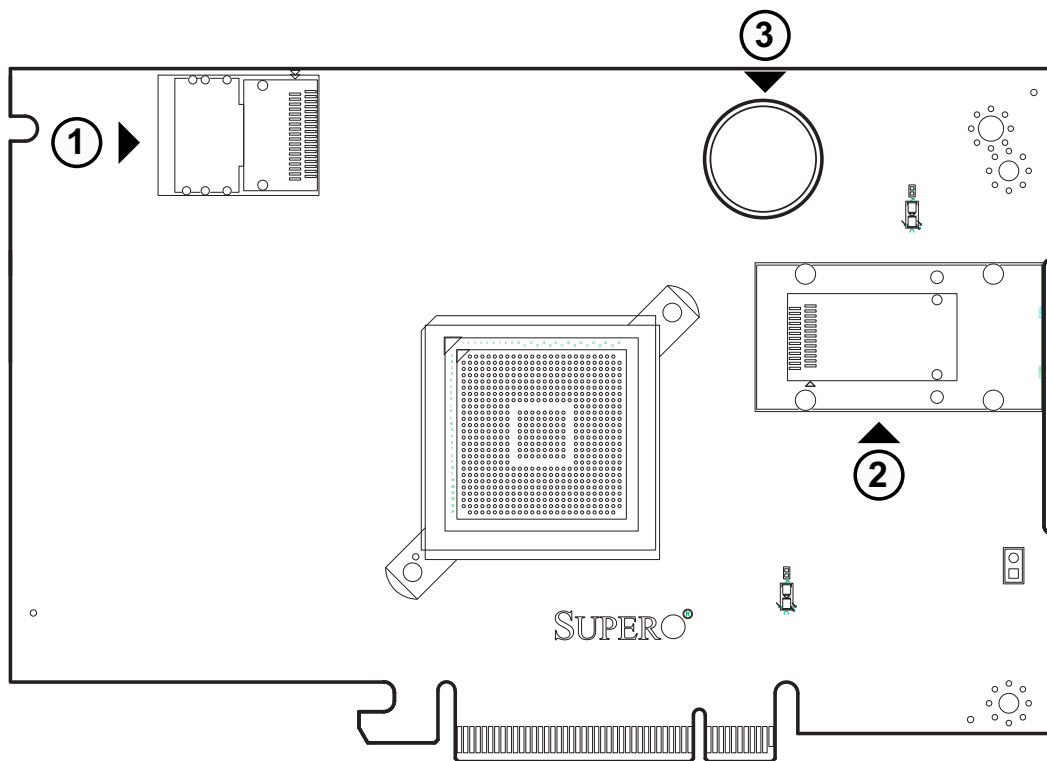
- All images and layouts shown in this user's guide are based upon the latest PCB Revision available at the time of publishing. The card you have received may or may not look exactly the same as the graphics shown in this manual.

Notes

Chapter 2

LED Indicators and Connectors

2-1 Front Connectors and Jumpers



Front Connectors

1. Internal SAS Connector
2. External SAS Connector
3. I-Button

2-2 Front Connector and Pin Definitions

1. Internal SAS Connector (Drive 0-3)

The Internal SAS port connects to the back-plane allowing the motherboard to access the hard drives. This connector supports up to four HDD ports. This card supports SAS, SATA1, and SATA2 drives.

Use a single port SAS "ipass" cable (Super Micro order number CBL - 0108L-02).

2. External SAS Connector (Drive 4-7)

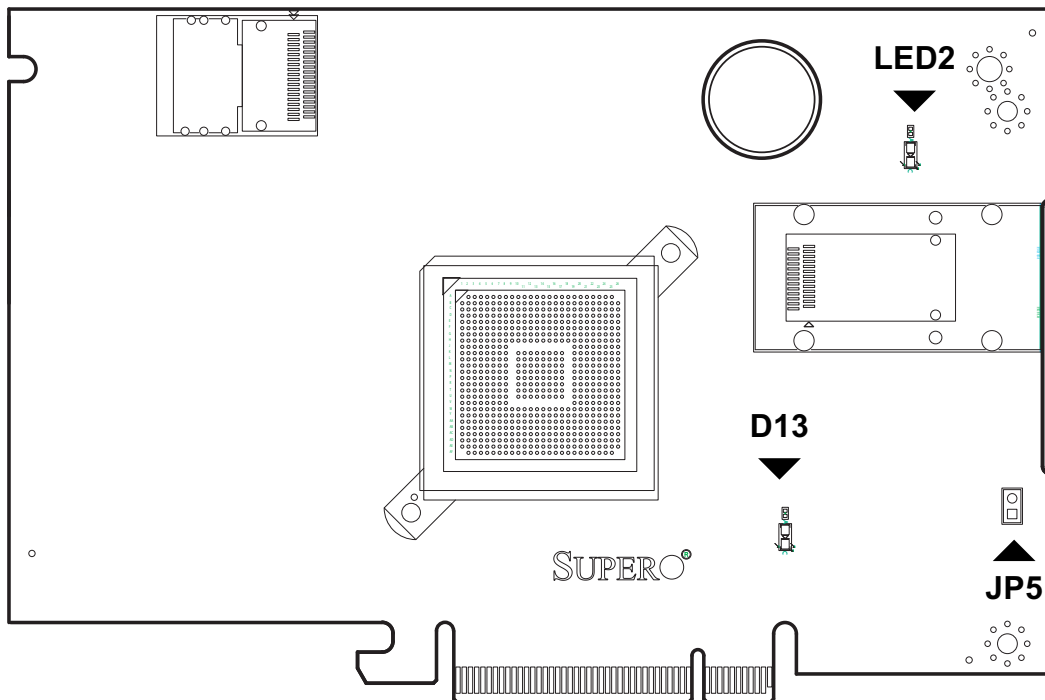
The External SAS port provides connection to servers. This connector supports up to four HDD ports. This card supports SAS, SATA1, and SATA2 drives.

Use an external SAS cable (Super Micro order number CBL - 0166).

3. I-Button

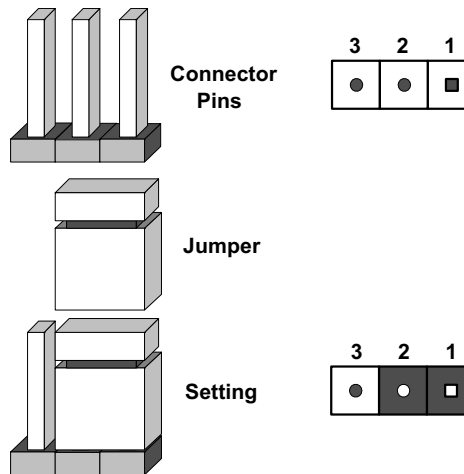
The I-Button allows RAID operation with Mega-RAID firmware.

2-3 Front Jumper Locations and Pin Definitions



Explanation of Jumpers

To modify the operation of the backplane, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. Note: On two pin jumpers, "Closed" means the jumper is on and "Open" means the jumper is off the pins.



Jumper Settings		
Jumper	Jumper Settings	Note
JP5	Open = OXAE Closed = OXA8	Read Boot Strap ROM from Address A8

Jumper Settings		
LED	NORMAL STATE	SPECIFICATIONS
Heartbeat LED (LED2)	ON	Blinks during normal operation
Overheat LED (D13)	OFF	Solid red when the 1078 chip is overheated

RAID Minimum Drive Requirements

Use the following chart to determine the minimum number of hard drives needed to set up a RAID environment.

RAID	Minimum Hard Drives
RAID 0	2
RAID 1	2
RAID 5	3
RAID 6	4
RAID 10	4 (2 RAID 1 Arrays)
RAID 50	6 (2 RAID 5 Arrays)
RAID 60	8 (2 RAID 6 Arrays)

Chapter 3

WebBios Configuration

3-1 Introduction

The WebBios Configuration manages RAID configurations on SAS controllers. The utility works independently of the operating system.

3-2 Accessing the WebBIOS

To start the WebBIOS Configuration:

1. When prompted during bootup, press *CTRL + H*.
2. In the **Adapter Selection** screen, select an adapter.
3. Click **Start**.

3-3 WebBIOS Configuration Wizard

The Configuration Wizard is used to setup RAID arrays and virtual disks. This section includes an overview of use. For more indepth information and descriptions, see the WebBIOS Help and other LSI documentation.

1. Click the **Configuration Wizard** link located on the left hand side on the main screen.
2. Select a configuration option: **Clear Configuration**, **New Configuration**, or **Add Configuration**. **Note: Clear Cofiguration** and **New Configuration** settings will delete exising data. Create a backup before choosing an option.
3. Click **Next**.
4. Select **Custom Configuration**, **Auto Configuration with Redundancy**, or **Auto Configuration without Redundancy** and click **Next**.

3-4 WebBIOS Configuration Wizard - Auto Configuration

When using either Auto Configuration setting, do the following:

1. When prompted to review the new configuration, review the settings.
2. Click **Accept** or **Back** to change any settings. (Auto Configuration with Redundancy creates a RAID 5 configuration if at least three disks are available. If only two disks are available, the setup creates RAID 1.)
3. Click **Yes** to save the configuration, and **Yes** again to initialize the new virtual disk.

WebBIOS CU will begin the initialization of the virtual drives.

3-5 WebBIOS Configuration Wizard - Custom Configuration

This section gives an overview of the WebBIOS Custom Configuration. When using the Custom Configuration setting, consult the WebBIOS disk Help file and other LSI documentation for more complete instructions.

1. The **Custom Configuration** window includes two sections: Physical Drives and Disk Groups. Press *CTRL* and select each ready desired physical drives from the group. Select two drives for RAID 1 and three drives for RAID 5.
2. Click **Accept DG**.
3. For other RAID levels, repeat steps 1 and 2 and do the following: for RAID 10 configuration, create a second RAID 1 disk group. For RAID 50 confirmation, select physical drives for a second RAID 5 disk group.
4. Click **Next** when you have completed selecting drives for disk groups.

The span definition screen appears. Select one of the available disk groups and click Add to Span and click Next.

5. In the Virtual Disk Definition screen, set the following:

RAID Level: To create a RAID 10 (spanned), add both disk groups you created earlier to SPAN. Then click Next and select the RAID level on the virtual disk definition. Do the same for RAID 50 and RAID 60.

Stripe Size

Access Policy: Select **Read/Write**, **Read Only**, or **Blocked**.

Read Policy: Use **Ahead**, **Normal**, or **Adaptive**.

Write Policy: Use **WBack**, **WThru**, or **Bad BBU**

IO Policy: Use this setting to read to a specific virtual disk. Cached mode reads to buffered in cached memory and in Direct mode reads are not buffered.

Disk Cache Policy: **Enable**, **Disable**, and **Unchanged**.

Disable BGI: Selecting **Yes** disables background initiation.

Select Size: Select the size for the virtual disk.

6. Click **Accept** or **Reset**.

7. Click **Next**.

8. Preview the configuration and click **Accept** to continue or **Back** to go to the previous screen, and then click **Yes** to continue.

3-6 Device Properties

This section gives an overview for the properties of the adapters, virtual disks, and drives.

Adapter Properties

Click the Adapter Properties to see the definitions for each adapter. There are two screens. The first screen is read-only. Click **Next** to see the second screen, which settings can be adjusted. For more information on these settings, see the application Help or LSI documentation.

Virtual Disk Properties

This section gives an overview of the virtual disk properties accessed in the WebBIOS Main screen.

The Properties panel shows the virtual disk RAID level and other defining information. Before changes settings, you should make a backup of the information. You can change the settings by doing any of the following:

Locate: Sets the designated LEDs on the physical drives of the virtual disk (requires SAFTE support).

Fast or Slow: Select either to initialize the virtual drives.

CC: runs a consistency check (not available for RAID 0).

Physical Drive Properties

This section gives an overview of the physical drive properties accessed in the WebBIOS Main screen.

The physical drive properties cannot be changed at this screen. The following information can be changed:

Select **MakeDriveOffline** to push the drive offline.

Select **Locate** to enable to drive LEDs. The drive must be in the enclosure.

Prepare for removal option may be available.

Battery Backup Unit

If the card has a battery backup, do the following to view the battery information.

1. Click **Adapter Properties** in the WebBIOS main screen.
2. Click **Next**.
3. Click the word **Present** in the Battery Backup field.

System Event Information

This section gives an overview of the System Event properties.

Do the following to view event information:

1. Click **Events** in the **WebBIOS** main screen.
2. Choose an **Event Locale** from the menu.
3. Select an **Event Class** of **Information**, **Warning**, **Critical**, **Fatal**, or **Dead** and choose the number of events to view, and then click **Go**.

Notes

Chapter 4

MegaRAID Storage Manager Software Overview and Installation

MegaRAID Storage Manager software is a configuration and monitoring utility used with the Embedded MegaRAID Software. This chapter provides a brief overview of the MegaRAID Storage Manager software and explains how to install it on the supported operating systems.

4-1 Overview

MegaRAID Storage Manager software enables you to configure, monitor, and maintain storage configurations created under Embedded MegaRAID Software. The MegaRAID Storage Manager graphical user interface (GUI) makes it easy for you to create and manage storage configurations.

Note: MegaRAID Storage Manager software can be used to manage a wide range of MegaRAID controllers. Some MegaRAID Storage Manager software features are not applicable for Embedded MegaRAID Software.

Creating Storage Configurations

MegaRAID Storage Manager software enables you to easily configure the controllers, disk drives, and virtual disks on your workstation or server. The Configuration Wizard greatly simplifies the process of creating arrays and virtual disks.

You can use the Configuration Wizard Auto Configuration mode to automatically create the best possible configuration with the available hardware. You can use the Guided Configuration mode, which asks you a few brief questions about the configuration, and then creates it for you. Or you can use the Manual Configuration mode, which gives you complete control over all aspects of the storage configuration.

Monitoring Storage Devices

MegaRAID Storage Manager software displays the status of virtual disks, physical disks, and other storage devices on the workstation or server that you are monitoring. System errors and events are recorded in an event log file and are displayed on the screen. Special device icons appear on the screen to notify you of disk failures and other events that require immediate attention.

Maintaining Storage Configurations

You can use MegaRAID Storage Manager software to perform system maintenance tasks such as running consistency checks on arrays that support redundancy.

4-2 Hardware and Software Requirements

The hardware requirements for MegaRAID Storage Manager software are as follows:

- PC-compatible computer with an IA-32 (32-bit) Intel Architecture processor or an EM64T (64-bit) processor and at least 128 Mbytes of system memory (256 Mbytes recommended)
- Hard disk drive with at least 50 Mbytes available free space

The supported operating systems for the MegaRAID Storage Manager software are as follows:

- Microsoft Windows 2000, Microsoft Windows Server 2003, and Microsoft Windows XP.
- Red Hat Linux 3.0 or 4.0
- SUSE SLES 9, with latest updates and service packs

Refer to your server documentation and to the operating system documentation for more information on hardware and operating system requirements.

4-3 Installation

This section explains how to install (or reinstall) MegaRAID Storage Manager software on your workstation or server for the supported operating systems: Microsoft Windows, Red Hat Linux, and SUSE Linux. 5.3.1 Installing MegaRAID Storage Manager Software on Microsoft Windows

Follow these steps if you need to install MegaRAID Storage Manager software on a system running Microsoft Windows 2000, Microsoft Windows Server 2003, or Microsoft Windows XP:

1. Insert the MegaRAID Storage Manager software installation CD in the CD-ROM drive. If necessary, find and double-click the setup.exe file to start the installation program.
2. When the Welcome screen appears, click **Next**. If MegaRAID Storage Manager software is already installed on this system, the Program Maintenance screen appears. Read the screen text and select **Modify**, **Repair**, or **Remove**.
3. When the next screen appears, read and accept the user license, and click **Next**. The **Customer Information** screen appears.

Customer Information

Please enter your information.

User Name:
Administrator

Organization:
MegaComputer

Allow availability of this application for:

All users

Only for current user (Administrator)

InstallShield

< Back Next > Cancel

Figure 4-1: Customer Information Screen

4. Enter your user name and organization name. In the bottom part of the screen, select an installation option:
 - If you select **All users**, any user with administrative privileges can use this version of MegaRAID Storage Manager software to view or change storage configurations.
 - If you select **Only for current user (Administrator)**, the MegaRAID Storage Manager shortcuts and associated icons will be available only to the user with this user name.
5. Click **Next** to continue.
6. On the next screen, accept the default Destination Folder, or click **Change** to select a different destination folder. Click **Next** to continue.

The Setup Type screen appears.

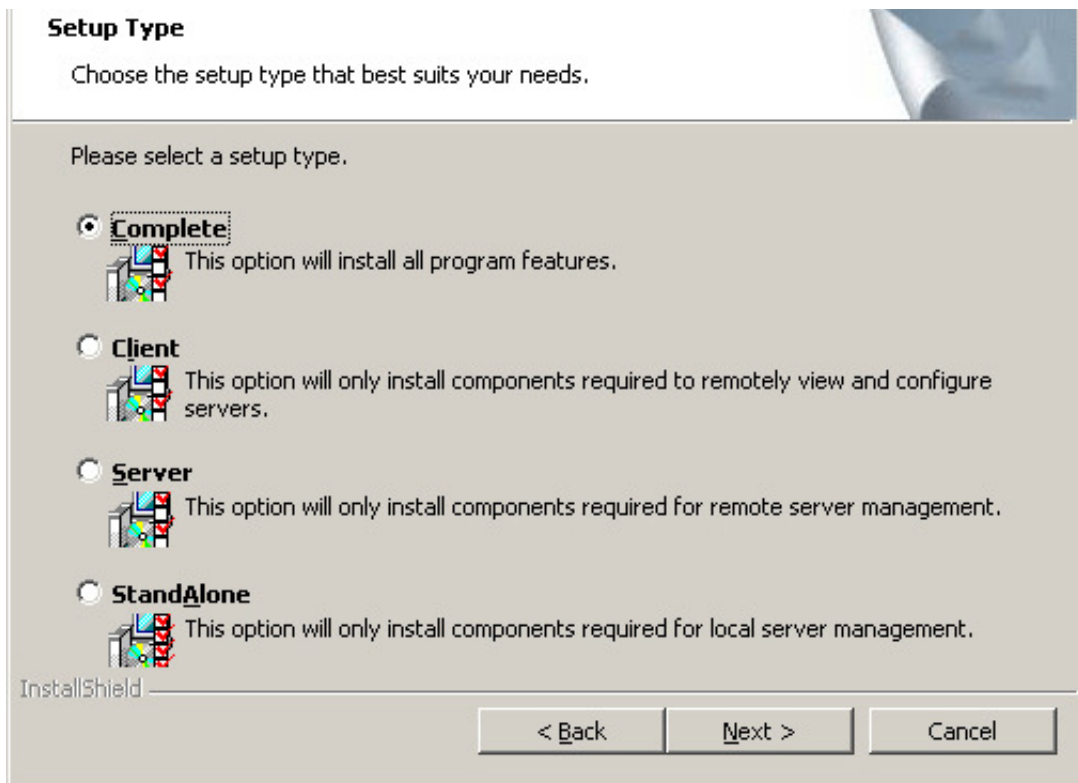


Figure 4-2: Customer Information Screen

7. Select one of the Setup options. The options are fully explained in the screen text.

– Normally, you would select **Complete** if you are installing MegaRAID Storage Manager software on a server.

– Select **Client** if you are installing MegaRAID Storage Manager software on a PC that will be used to view and configure servers over a network.

– Select **Server** to install only those components required for remote server management.

– Select **StandAlone** if you will use MegaRAID Storage Manager software to create and manage storage configurations on a standalone workstation.

8. Click **Next** to proceed.

9. Click **Install** to install the program.

10. Click **Finish** when the final **Configuration Wizard** screen appears.

If you select Client installation for a PC used to monitor servers, and if there are no available servers with a registered framework on the local subnet (that is, servers with a complete installation of MegaRAID Storage Manager software), you cannot

connect to a remote server unless you first edit the `startupui.bat` file. Specifically, you must add the IP address of the remote server to the end of the `startupui.bat` file.

For example, to connect to a remote framework on server 192.168.0.10, add the IP address to the end of `startupui.bat` as shown in this example: `start JRE\bin\javaw -classpath .;GUI.jar GUI.VivaldiStartupDialog ajsgyqkj=71244 192.168.0.10`

Be sure to include a space in front of the IP address, as shown in the example.

Installing MegaRAID Storage Manager Software for Linux

Follow these steps if you need to install MegaRAID Storage Manager software on a system running Red Hat Linux or SUSE Linux:

1. Copy the `SSM_linux_installer...tar.gz` file to a temporary folder.
2. Untar the `SSM_linux_installer...tar.gz` file using the following command:

```
tar -zxvf SSM_linux_installer...tar.gz
```

A new disk directory is created.

3. Go to the new disk directory.
4. In the disk directory, find and read the `readme.txt` file.
5. To start the installation, enter the following command:

```
./install.sh
```

If you select Client installation for a PC used to monitor servers, and if there are no available servers with a registered framework on the local subnet (that is, servers with a complete installation of MegaRAID Storage Manager software), you cannot connect to a remote server unless you first edit the `startupui.sh` file. Specifically, you must add the IP address of the remote server to the end of the `startupui.sh` file.

For example, to connect to a remote framework on server 192.168.0.10, add the IP address to `startupui.sh` as shown in this example:

```
start JRE\bin\javaw -classpath .;GUI.jar GUI.VivaldiStartupDialog ajsgyqkj=71244 192.168.0.10
```

Be sure to include a space in front of the IP address, as shown in the example.

Linux Error Messages

One or more of the following messages may appear while you are installing MegaRAID Storage Manager software on a Linux system:

- More than one copy of MegaRAID Storage Manager software has been installed.

This message indicates that the user has installed more than one copy of MegaRAID Storage Manager software. (This can be done by using the rpm-force command to install the rpm file directly, which is not recommended, instead of using the install.sh file.) In such cases, the user must uninstall all the rpm files manually before installing MegaRAID Storage Manager software with the procedure listed previously.

- The version is already installed.

This message indicates that the version of MegaRAID Storage Manager software you are trying to install is already installed on the system.

- The installed version is newer.

This message indicates that a version of MegaRAID Storage Manager software is already installed on the system, and it is a newer version than the version you are trying to install.

- Exiting installation.

This is the message that appears when the installation is complete.

- RPM installation failed.

This message indicates that the installation failed for some reason.

Additional message text explains the cause of the failure.

Notes

Chapter 5

MegaRAID Storage Manager Window and Menus

This chapter explains how to start MegaRAID Storage Manager software and describes the MegaRAID Storage Manager window and menus.

5-1 Starting MegaRAID Storage Manager Software

Follow these steps to start MegaRAID Storage Manager software and view the main window:

1. Start the program using the method required for your operating system environment:
 - To start MegaRAID Storage Manager software on a Microsoft Windows system, select **Start, Programs, MegaRAID Storage Manager, StartupUI**, or double-click the **MegaRAID Storage Manager** shortcut on the desktop.

Note: If a warning appears stating that Windows Firewall has blocked some features of the program, click Unblock to allow MegaRAID Storage Manager software to start. (The Windows Firewall sometimes blocks the operation of programs that use Java.)

- To start MegaRAID Storage Manager software on a Red Hat Linux system, select **Applications, System Tools, MegaRAID Storage Manager StartupUI**.
- To start MegaRAID Storage Manager software on a SUSE SLES 9 system, select **Start, System, More Programs, MegaRAID Storage Manager**.

When the program starts, the **Select Server** window appears.

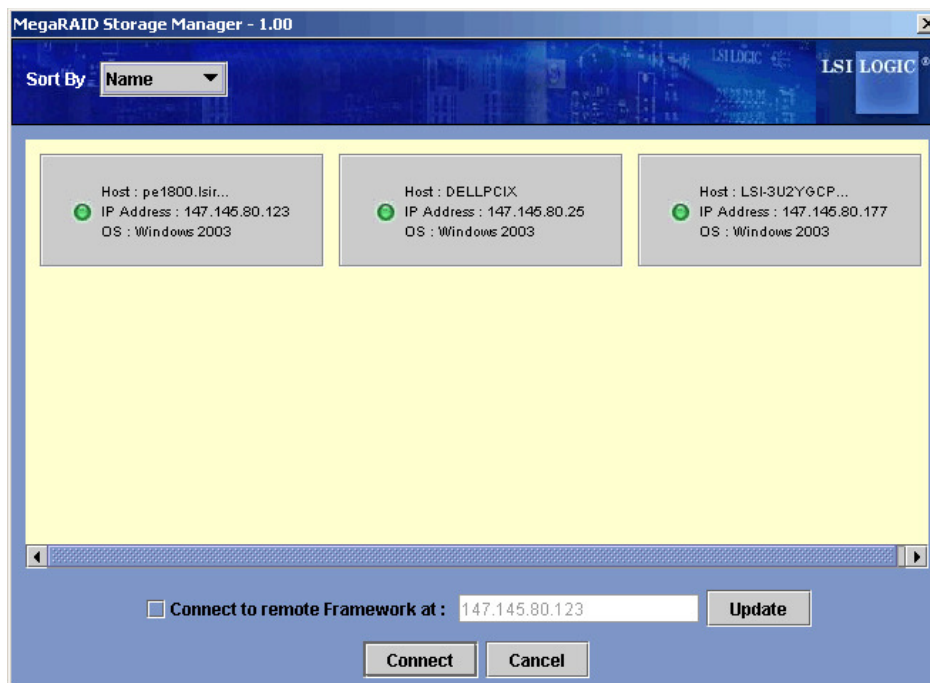


Figure 5-1: Select Server Window

If the circle in the server icon is yellow instead of green, it means that the server is running in a degraded state—for example, because a disk drive used in a virtual disk has failed. If the circle is red, the storage configuration in the server has failed.

Note: To access servers on a different subnet, type in the box at the bottom of the screen the IP address of a server in the desired subnet where MegaRAID Storage Manager software is running, and click Update. If you check the Connect to remote Framework box, you can also access a standalone installation of MegaRAID Storage Manager software, if it has a network connection.

2. Double-click the icon of the server that you want to access. The **Server Login** window appears.

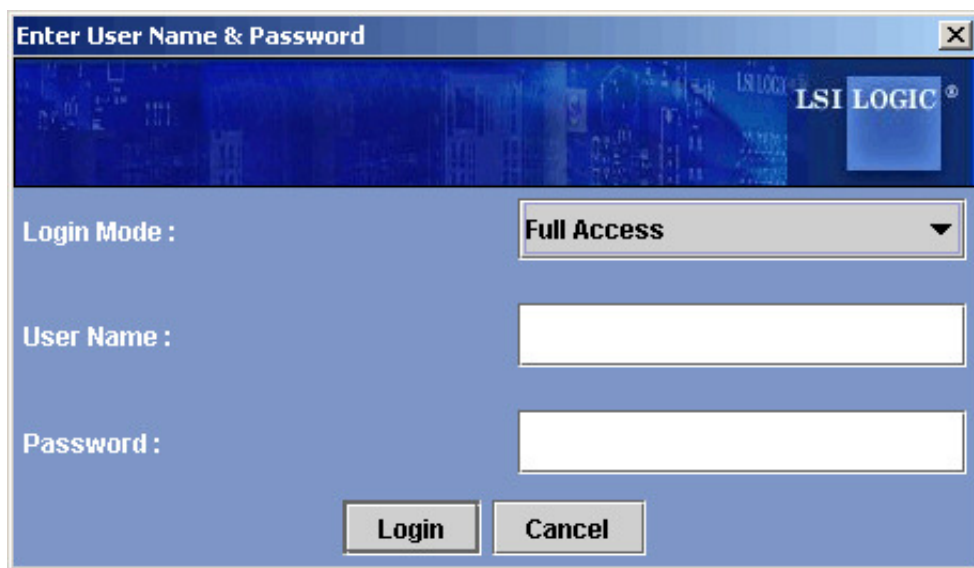


Figure 5-2: Select Server Window

3. Select an access mode from the drop-down menu.

– Select Full Access if you need to both view the current configuration and change the configuration.

– Select **View Only** if you need to only view and monitor the configuration.

4. Enter your user name and password, and click Login.

Note: If the computer is networked, this is the login to the computer itself, not the network login.

You must enter the root/administrator user name and password to use Full Access mode. If your user name and password are correct for the Login mode you have chosen, the main **MegaRAID Storage Manager** window appears.

5-2 MegaRAID Storage Manager Window

This section describes the **MegaRAID Storage Manager** window.

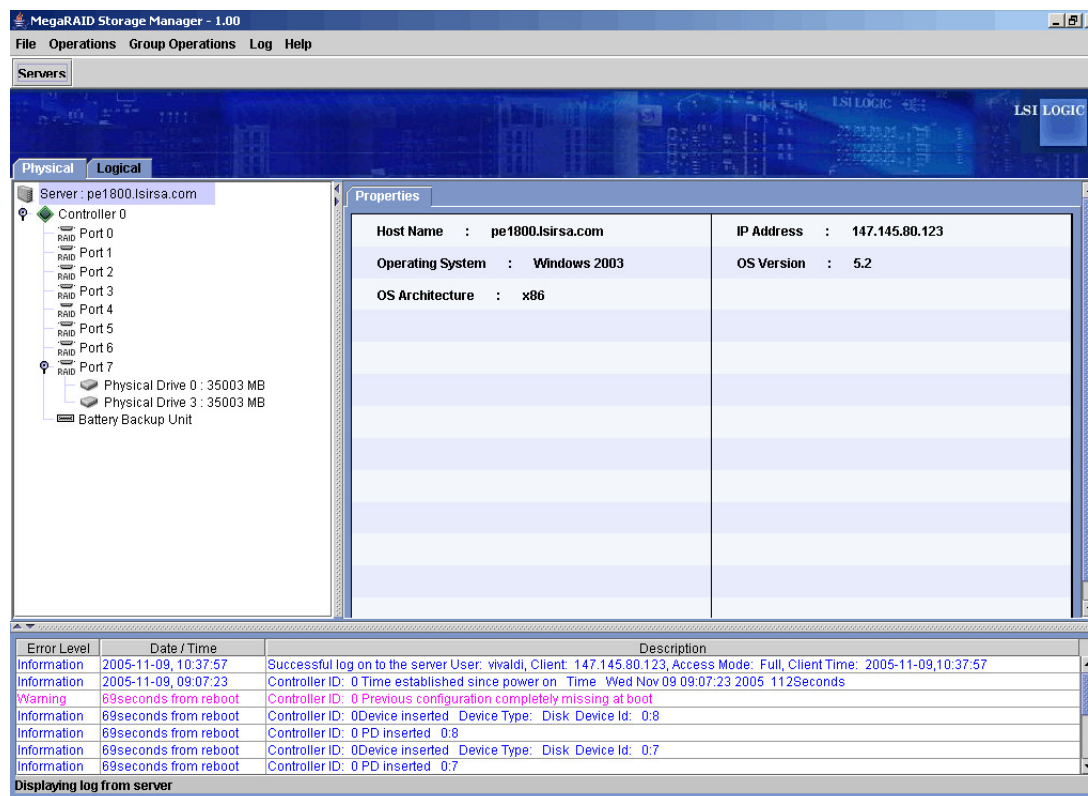


Figure 5-3: Storage Manager

The following topics describe the panels and menu options that appear in this window.

Physical/Logical View Panel

The left panel of the **MegaRAID Storage Manager** window displays either the Physical view or the Logical view of the system and the devices in it, depending on which tab is selected.

- The Physical view shows the hierarchy of physical devices in the system. At the top of the hierarchy is the system itself. One or more controllers are installed in the system. Each controller has one or more ports. Disk drives and other devices are attached to the ports.
- The Logical view shows the hierarchy of controllers, virtual disks, and disk groups that are defined on the system. (Physical drives also appear in the Logical view, so you can see which physical drives are used by each virtual disk.)

The following icons in the left panel represent the controllers, disk drives, and other devices:

- System
- Controller
- Port
- Array
- Virtual disk
- Physical drive

A red circle to the right of an icon indicates that the device has failed.

A yellow circle to the right of an icon indicates that a device is running in a degraded state.

Properties/Operations/Graphical View Panel

The right panel of the **MegaRAID Storage Manager** window has either two or three tabs, depending on what kind of device is selected in the left panel.

- The **Properties** tab displays information about the selected device. For example, if a controller icon is selected in the left panel, the Properties tab lists information such as the controller name and the device port count.
- The **Operations** tab lists the operations that can be performed on the device that is selected in the left panel. Some types of devices, such as arrays and ports, do not have operations associated with them.
- The **Graphical View** tab can be selected in the right panel if a physical drive or virtual disk is selected in the left panel. In graphical view, the device's storage capacity is color coded according to the legend shown on the screen. For example, on a physical drive configured space is blue, available space is white, and reserved space is red.

Event Log Panel

The lower part of the **MegaRAID Storage Manager** window displays the system event log entries. New event log entries appear during the session. Each entry has a timestamp and date, an error level indicating the severity of the event, and a brief description of the event.

Menu Bar

Here are brief descriptions of the main selections on the **MegaRAID Storage Manager** menu bar.

File Menu

The File menu has an Exit option for exiting from the **MegaRAID Storage Manager** software. It also has a Rescan option for updating the display in the **MegaRAID Storage Manager** window. (Rescan is seldom required; the display normally updates automatically.)

Operations Menu

The **Operations** menu is available when a controller, physical drive, or logical drive is selected in the **MegaRAID Storage Manager** window. The **Operations** menu options vary depending on what type of device is selected in the left panel of the **MegaRAID Storage Manager** window. The options also vary depending on the current state of the selected device. For example, if you select an offline physical drive, the Make Drive Online option appears in the **Operations** menu.

You can also view the Operations selections on the main window on the Operations tab in the right panel. If an operation requires user inputs before it can be executed, it appears in the Operations tab but not in the **Operations** menu. A device-specific Operations menu pops up if you right-click a device icon in the left panel.

An Advanced Operations submenu is also available. This is where you access the Configuration Wizard and other configuration-related commands. To access this menu, select **Operations, Advanced Operations**.

Group Operations Menu

The Group Operations menu options include **Check Consistency**, **Initialize**, and **Show Progress**.

Log Menu

The Log menu includes options for saving and clearing the message log.

Help Menu

On the Help menu you can select **Help**, Help to view the MegaRAID Storage Manager software online help file. You can select **Help**, **About** to view version information for the MegaRAID Storage Manager software.

Note: When you use the MegaRAID Storage Manager software online help, you may see a warning message that Internet Explorer has restricted the file from showing active content. If this warning appears, click on the active content warning bar and enable the active content.

Chapter 6

Configuration

You use MegaRAID Storage Manager software to create and modify storage configurations. RAID 0, RAID 1, RAID 5, RAID 6, RAID 10, RAID 50, and RAID 60 storage configurations are supported.

Important: LSI recommends that you do not use both SAS and SATA drives in the same array. Using different drive interfaces in this way could cause unpredictable behavior, decreased performance, an increased error count, and decreased MTBF.

Note: You cannot create or modify a storage configuration unless you are logged on with administrator privileges.

6-1 Creating a New Storage Configuration

You can use the MegaRAID Storage Manager Configuration Wizard to create new storage configurations. To open the MegaRAID Storage Manager Configuration Wizard, select a controller in the left panel of the MegaRAID Storage Manager window and then select **Operations, Advanced Operations, Configuration, Configuration Wizard**.

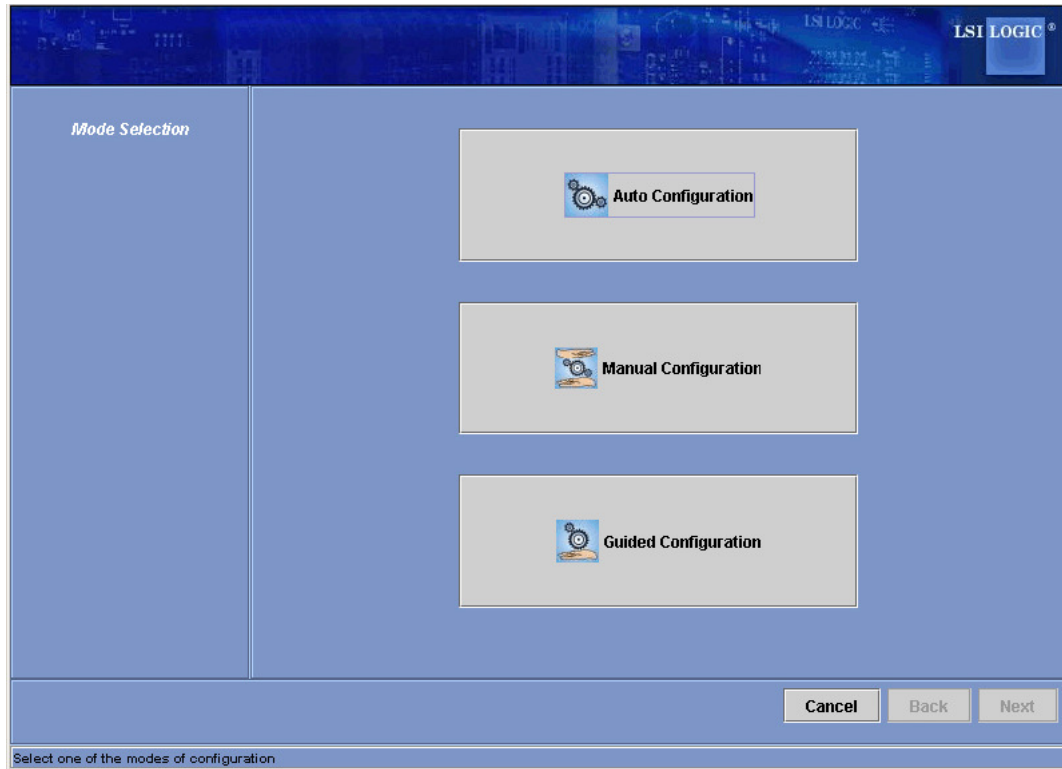


Figure 6-1: First Screen Configuration Wizard

The menu lists three configuration modes:

- **Auto Configuration** automatically creates an optimal configuration from the available disk drives.
- **Manual Configuration** gives you the greatest level of control in creating a new virtual disk.
- **Guided Configuration** asks you a few simple questions about what kind of configuration you want and then automatically creates it from the available disk drives.

Note: You can use Auto, Guided, or Manual mode to create a RAID 0, or RAID 1 configuration. To create a RAID 10 configuration, you must use the Manual Configuration mode.

Understanding Virtual Disk Parameters

This section describes the Virtual Disk Parameters that you can set when you use the Guided Configuration or Manual Configuration modes of the Configuration Wizard. You should change these parameters only if you have a specific reason for doing so. It is usually best to leave them at their default settings.

- **Stripe Size:** A stripe size of 64 Kbytes is supported.

- **Disk Cache Policy:** Select a cache setting for this disk: Unchanged, Enabled, or Disabled.

- **Init State**
 - **No Initialization:** The new configuration is not initialized and the existing data on the disks is not overwritten.

 - **Fast Initialization:** MegaRAID Storage Manager software quickly writes zeroes to the first and last 8 Mbyte regions of the new virtual disk.

 - **Full Initialization:** A complete initialization is done on the new configuration. This may take a long time if the disks are large.

Using Auto Configuration

Auto Configuration is the quickest and simplest way to create a new storage configuration. When you select **Auto Configuration** mode on the first **Configuration Wizard** screen, the Configuration Wizard creates the best configuration possible using the available physical disks.

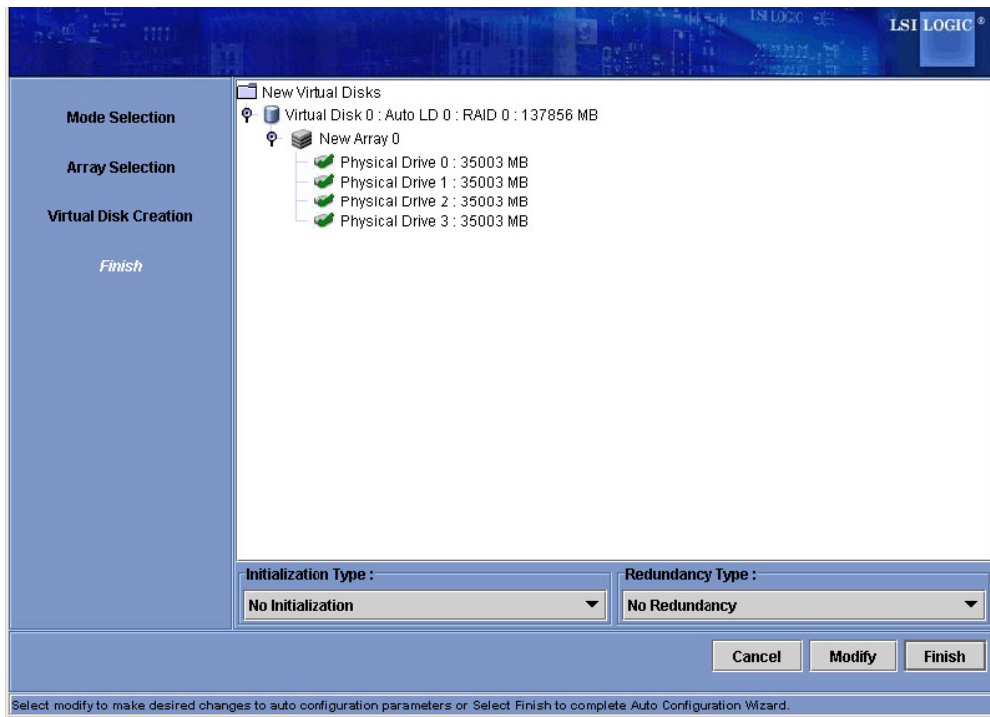


Figure 6-2: Auto Configuration Screen

Follow these steps to create a new storage configuration in Auto Configuration mode:

1. Select a redundancy option from the drop-down menu at the bottom of the **Auto Configuration** window:

- **No Redundancy:** The new configuration will have no data redundancy (RAID 0). If a physical disk in the configuration fails, all data will be lost.

- **With Redundancy:** The new configuration will have data redundancy via mirrored data (RAID 1) or via parity data (RAID 5). If a physical disk fails, data is still protected.

2. Select an initialization option from the drop-down menu at the bottom of the window:
 - **No Initialization:** The new configuration is not initialized, and the existing data on the disks is not overwritten.
 - **Fast Initialization:** MegaRAID Storage Manager software quickly writes zeroes to the first and last 8 Mbyte regions of the new virtual disk.
 - **Full Initialization:** A complete initialization is done on the new configuration. This may take a long time if the disks are large.
3. (Optional) Click **Modify** if you want to switch to Manual Configuration mode so you can modify the suggested Auto Configuration.

When you click **Modify**, the **Virtual Disk Creation** screen appears. Select the new virtual disk, and click **Reclaim**. Then select the new array from the Arrays with Free Space list, and change the virtual disk parameters as needed.

4. Click **Finish**. The new storage configuration will be created and initialized (unless you selected No Initialization).

Using Guided Configuration

Guided Configuration provides an easy way to create a new storage configuration. Based on the information that is provided, the Configuration Wizard uses the available disk drives to create an optimal storage configuration.

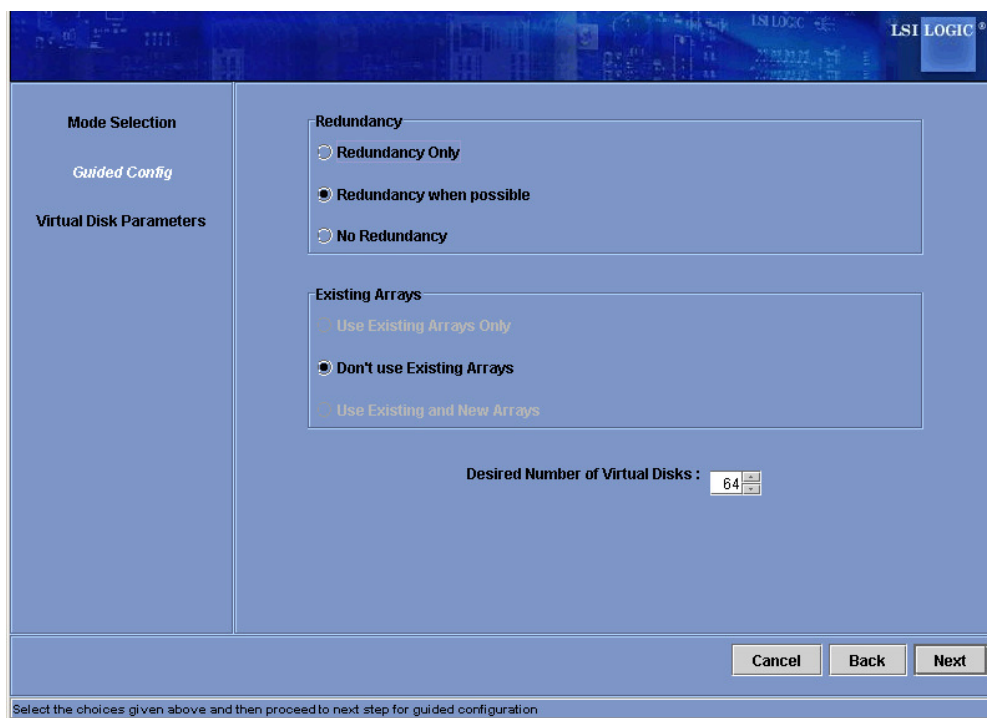


Figure 6-3: First Guided Conguration Screen

Follow these steps to create a new storage configuration in Guided Configuration mode:

1. Select a redundancy option at the top of the **Guided Configuration** window:
 - **Redundancy Only:** Create a configuration only if redundancy (RAID 1 or RAID 5) is possible.
 - **Redundancy when possible:** Create a redundant configuration if possible. Otherwise, create a non-redundant configuration.
 - **No Redundancy:** Create a non-redundant configuration.
2. Choose whether you want to use existing arrays in the new virtual disk. The options are:
 - Use Existing Arrays Only
 - Don't Use Existing Arrays
 - Use Existing and New Arrays

The first and third options are disabled if there are no available existing arrays.

3. Select a maximum number of virtual disks to be created. The Configuration Wizard may not be able to create as many virtual disks as you want, depending on the current configuration and the number of virtual disks that have already been created.
4. Click **Next** to continue to the next window.

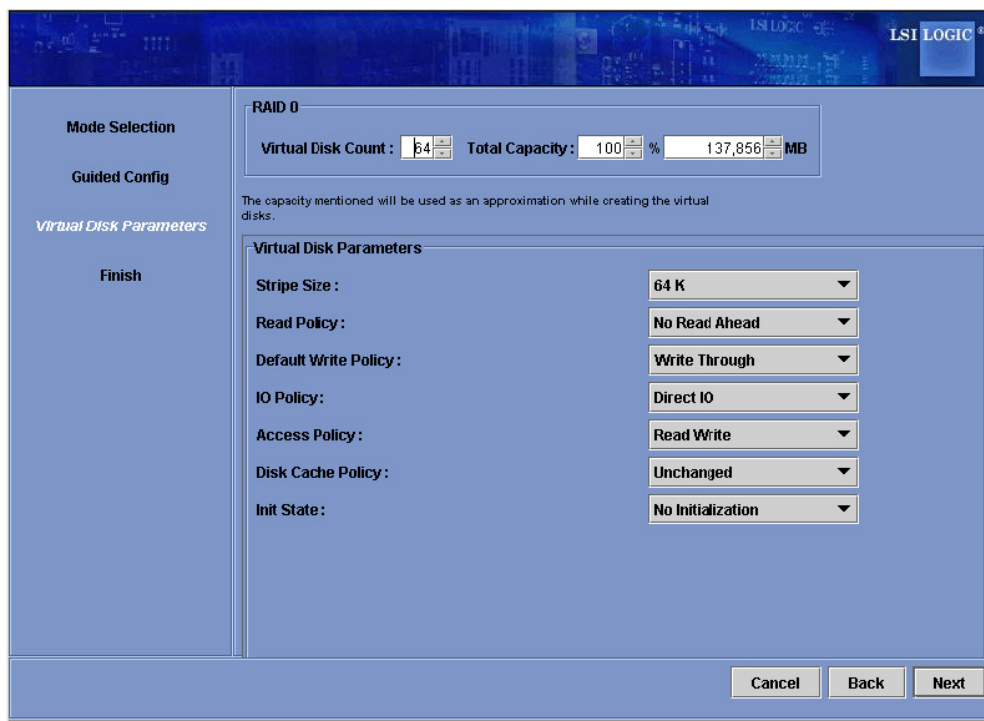


Figure 6-4: Second Guided Configuration Screen

5. Change the default volume parameters in this window, if needed. In the top section of the window you can specify the number of virtual disks to create. You can also choose to use less than the full capacity of this array for the virtual disk(s). (You could do this to leave capacity available for other virtual disks that you create later.)
6. Click **Next** to continue to the next window.
7. Check the configuration that you have just defined. If it is acceptable, click **Finish**. If you want to change something, click **Back** to return to the previous windows.

Using Manual Configuration: RAID 0

Follow these steps to create a RAID 0 storage configuration using the Manual Configuration mode of the Configuration Wizard.

Figure 6-5 shows the first screen that appears when you select Manual Configuration.

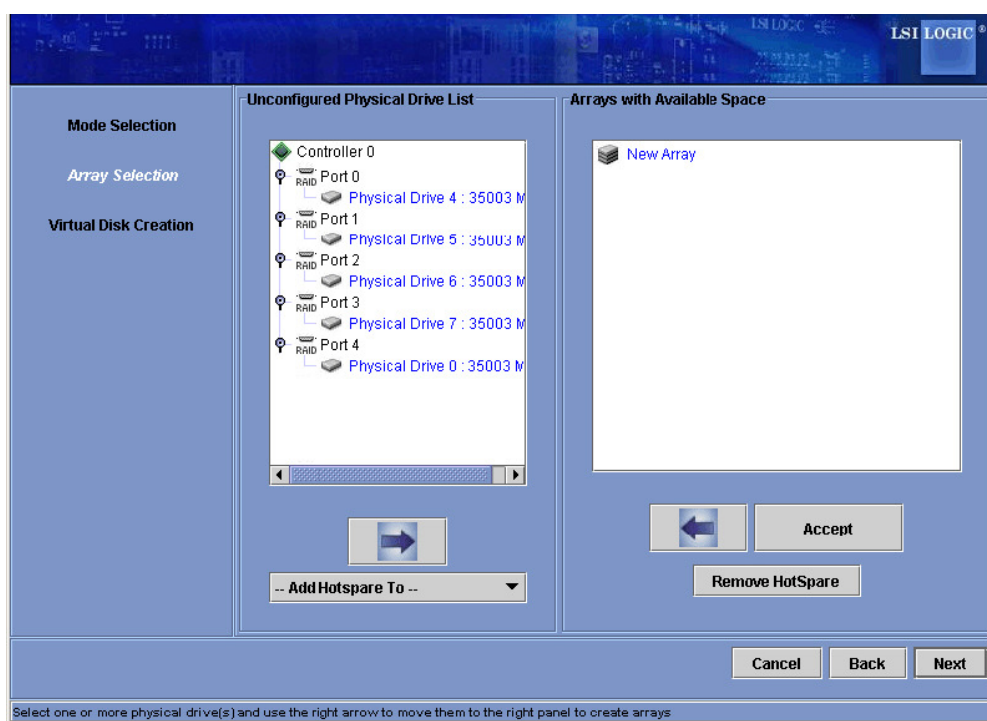


Figure 6-5: Manual Configuration - First Manual Configuration Screen

1. In the first **Manual Configuration** window, select two or more available drives in the left panel. Click the **Right Arrow** button to move the selected drives to the right panel.

Note: MegaRAID Storage Manager software will not allow you to select the disk drive on which the operating system is installed or any other drives that are already part of a configuration.

2. Click **Accept** to accept these drives for the new RAID 0 array.

Note: To remove a single drive from a proposed new array, select the drive icon in the right panel and click the Left Arrow button.

3. Click **Next**.

The next Configuration Wizard window appears, as shown in Figure 6-6.

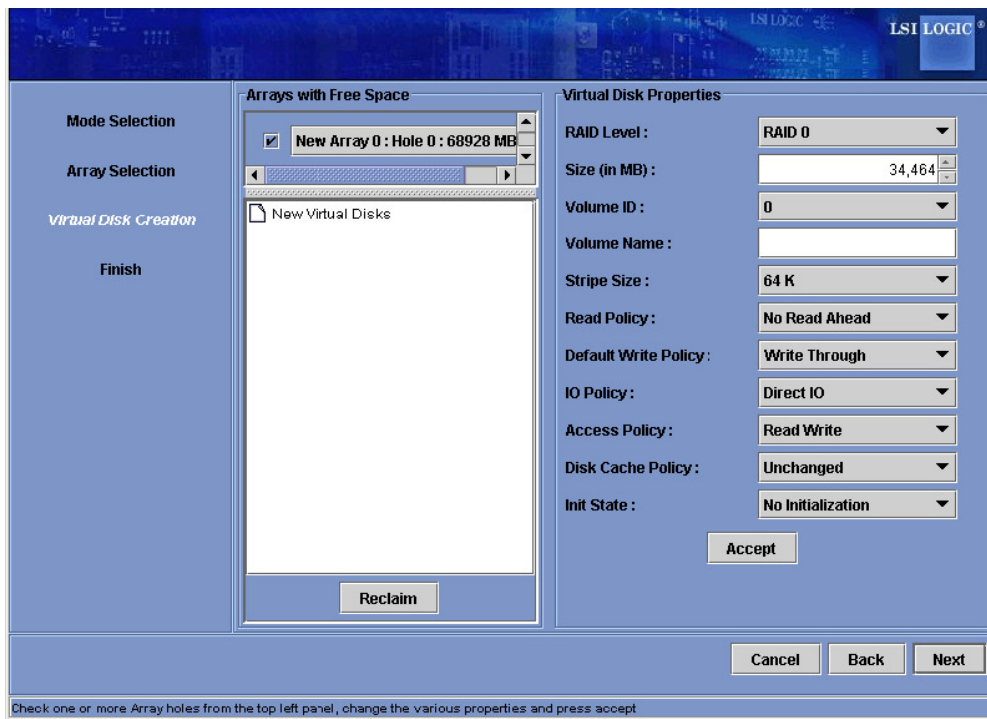


Figure 6-6: Manual Configuration - Defining a Virtual Disk

The Arrays with Free Space menu lists the new array that you just defined, plus any existing arrays with holes (free space) that could be used for a new configuration.

4. From the **Arrays with Free Space** menu, select the array to use for the new virtual disk.
5. In the right panel, select **RAID 0** as the RAID level.
6. (Optional) Set Size (in MB) to a lower number if you do not want to use the entire available capacity for the new virtual disk.
7. (Optional) Change the other **Virtual Disk Properties**, if necessary.
8. Click **Accept** to accept the configuration of the new virtual disk.

Note: Click the Reclaim button if you want to undo a virtual disk that you just defined.

9. Click **Next** to continue with the next configuration step. The **Virtual Disk Summary** window appears.
10. Review the configuration shown in the **Virtual Disk Summary** window. If you want to change something, click **Back** and change the configuration parameters.
11. Click **Finish** to accept the configuration and start the initialization process (unless you selected No Initialization earlier).

Using Manual Configuration: RAID 1

Follow these steps to create a RAID 1 storage configuration using the **Manual Configuration** mode of the Configuration Wizard:

1. In the first **Manual Configuration** window, shown in Figure 6-5, select two available drives in the left panel. Click the Right Arrow button to move the selected drives to the right panel.

Note: MegaRAID Storage Manager software will not allow you to select the disk drive on which the operating system is installed or any other drives that are already part of a configuration.

2. Click **Accept** to accept these drives for the new RAID 1 array.
3. To add a hotspare to an array, select an available drive in the left panel. Select the array from the drop-down menu, and click **Add Hotspare To**, as shown in Figure 6-7.

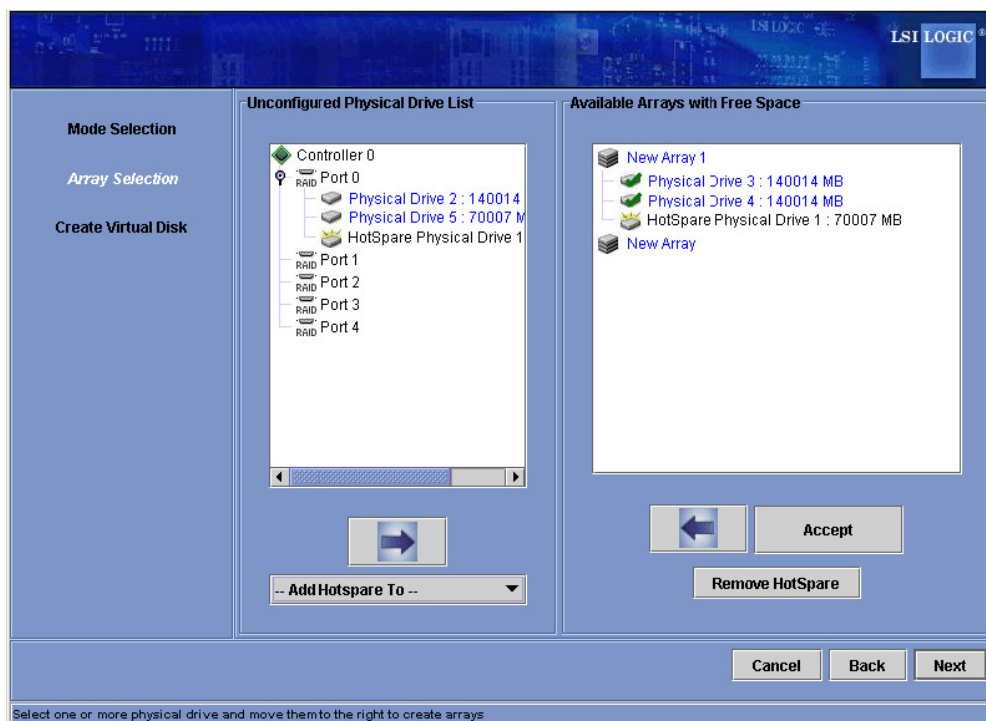


Figure 6-7: Manual Configuration - Adding a Hotspare

4. To remove a hotspare from an array, select it in the right panel and click **Remove HotSpare**.

5. Click **Next**.

The next **Configuration Wizard** window appears, as shown in Figure 6-6.

The **Arrays with Free Space** menu lists the new array(s) that you just defined, plus any existing arrays with holes (free space) that could be used for a new configuration.

6. Select the array to use for the new virtual disk.

7. In the right panel, select **RAID 1** as the RAID level.

8. (Optional) Set Size (in MB) to a lower number if you do not want to use the entire available capacity for the new virtual disk.

9. (Optional) Change the other **Virtual Disk Properties**, if necessary.

10. Click **Accept** to accept the configuration of the new virtual disk.

Note: Click the **Reclaim** button if you want to undo a virtual disk that you just defined.

11. Click **Next** to continue with the next configuration step.

The **Virtual Disk Summary** window appears.

12. Review the configuration shown in the window. If you want to change something, click **Back** and change the configuration parameters.

13. Click **Finish** to accept the configuration and start the initialization process (unless you selected No Initialization earlier).

Using Manual Configuration: RAID 5

Follow these steps to create a RAID 5 storage configuration using the Manual Configuration mode of the Configuration Wizard.

1. In the first **Manual Configuration** window, select three available drives in the left panel. Click the **Right Arrow** button to move the selected drives to the right panel.

Note: MegaRAID Storage Manager software will not allow you to select the disk drive on which the operating system is installed or any other drives that are already part of a configuration.

2. Click **Accept** to accept these drives for the new RAID 5 array.

Note: To remove a single drive from a proposed new array, select the drive icon in the right panel and click the Left Arrow button.

3. Click **Next**.

The next Configuration Wizard window appears.

The Arrays with Free Space menu lists the new array that you just defined, plus any existing arrays with holes (free space) that could be used for a new configuration.

4. From the **Arrays with Free Space** menu, select the array to use for the new virtual disk.
5. In the right panel, select **RAID 5** as the RAID level.
6. (Optional) Set Size (in MB) to a lower number if you do not want to use the entire available capacity for the new virtual disk.
7. (Optional) Change the other Virtual Disk Properties, if necessary.
8. Click **Accept** to accept the configuration of the new virtual disk.

Note: Click the **Reclaim** button if you want to undo a virtual disk that you just defined.

9. Click **Next** to continue with the next configuration step. The **Virtual Disk Summary** window appears.
10. Review the configuration shown in the **Virtual Disk Summary** window. If you want to change something, click **Back** and change the configuration parameters.
11. Click **Finish** to accept the configuration and start the initialization process (unless you selected No Initialization earlier).

Using Manual Configuration: RAID 10

Follow these steps to create a RAID 10 storage configuration using the Manual Configuration mode of the Configuration Wizard:

1. In the first Manual Configuration window, shown in Figure 6-5, select two available drives in the left panel. Click the **Right Arrow** button to move the selected drives to the right panel.
2. Click **Accept** to accept these drives for a new RAID 1 array.
3. Select two more drives for a second RAID 1 array, and click **Accept**.
4. To add a hotspare, select an available drive in the left panel. Select the array from the drop-down menu, and click **Add Hotspare To**, as shown in Figure 6-7.
5. To remove a hotspare from an array, select it in the right panel and click **Remove HotSpare**.
6. Click **Next**.

The next Configuration Wizard window appears, as shown in Figure 6-6.

The **Arrays with Free Space** menu lists the new arrays that you just defined, plus any existing arrays with holes (free space) that could be used for a new configuration.

7. In the left panel, select the two RAID 1 arrays from the menu.
8. In the right panel, select RAID 10 as the RAID level.

10. Click **Accept** to accept the configuration of the new virtual disk.

Note: Click the Reclaim button if you want to undo a virtual disk that you just defined.

11. Click **Next** to continue with the next configuration step. The Virtual Disk Summary window appears.

12. Review the configuration shown in the window. If you want to change something, click **Back** and change the configuration parameters.

13. Click **Finish** to accept the configuration and start the initialization process (unless you selected No Initialization earlier).

Using Manual Configuration: RAID 50

Follow these steps to create a RAID 50 storage configuration using the Manual Configuration mode of the Configuration Wizard:

1. In the first **Manual Configuration** window, shown in Figure 6-5, select two available drives in the left panel. Click the Right Arrow button to move the selected drives to the right panel.
2. Click **Accept** to accept these drives for a new RAID 5 array.
3. Select two more drives for a second RAID 5 array, and click **Accept**.
4. To add a hotspare, select an available drive in the left panel. Select the array from the drop-down menu, and click Add Hotspare To, as shown in Figure 6-7.
5. To remove a hotspare from an array, select it in the right panel and click **Remove HotSpare**.
6. Click **Next**.

The next **Configuration Wizard** window appears, as shown in Figure 6-6.

The **Arrays with Free Space** menu lists the new arrays that you just defined, plus any existing arrays with holes (free space) that could be used for a new configuration.

7. In the left panel, select the two RAID 5 arrays from the menu.

8. In the right panel, select RAID 50 as the RAID level.

For a RAID 10 array, the entire capacity of the array is automatically used for the new virtual disk. You cannot define another virtual disk on this array.

9. (Optional) **Change the other Virtual Disk** Properties, if necessary. For more information, see Section , “Understanding Virtual Disk Parameters.”

6-2 Adding Hotspare Disks

Hotspares are disk drives that are available to automatically replace failed drives in a RAID 1, RAID 5, RAID 6 RAID 10, RAID 50, and RAID 60 virtual disk. Each virtual disk can have one dedicated hotspare.

For more information, see the LSI documentation and software Help file for more information.

To add a global hotspare disk, follow these steps:

1. In the left panel of the **MegaRAID Storage Manager** window, right click the icon of any unused disk drive.
2. Select **Make Global Hotspare**.

6-3 Changing Adjustable Task Rates

Follow these steps if you need to change the adjustable rates for rebuilds and other system tasks that run in the background:

Note: LSI recommends that you leave the adjustable task rates at their default settings to achieve the best system performance. If you raise the task rates above the defaults, foreground tasks will run more slowly and it may seem that the system is not responding. If you lower the task rates below the defaults, rebuilds and other background tasks may run very slowly and may not complete within a reasonable time. If you decide to change the values, record the original default value here so you can restore them later, if necessary:

Rebuild Rate: _____

Background Initialization (BGI) Rate: _____

Check Consistency Rate: _____

1. Select the Physical View tab in the left panel of the **MegaRAID Storage Manager** window, and select a controller icon.
2. In the right panel of the **MegaRAID Storage Manager** window, select the **Operations** tab, and select **Set Adjustable Task Rates**.

The task rates appear in the right panel.

3. Enter changes, as needed, to the task rates for Rebuild Rate, Background Initialization (BGI) Rate (for fast initialization), and Check Consistency Rate (for consistency checks). Each task rate can be set from 0 to 100. The higher the number, the faster the activity will run in the background, possibly impacting other system tasks.
4. Click **Go** to accept the new task rates.
5. When the warning message appears, click **OK** to confirm that you want to change the task rates.

6-4 Changing Virtual Disk Properties

You can change a virtual disk's Read Policy, Write Policy, and other properties at any time after the virtual disk is created. To do this, follow these steps:

1. Select a virtual disk icon in the left panel of the **MegaRAID Storage Manager** window.
2. In the right panel, select the **Properties** tab, and then select **Set Virtual Disk Properties**.

A list of Virtual Disk Properties appears in the right panel.

3. Change the virtual disk properties as needed in the right panel. For information on these properties, see Section "Understanding Virtual Disk Parameters"

Note: Only the Disk Write Cache and Read Ahead functions are supported in Embedded MegaRAID Software.

4. Click **Go** to accept the changes.

6-5 Deleting a Virtual Disk

Caution: Be sure to back up the data on the virtual disk before you delete it. Be sure that the operating system is not installed on this virtual disk.

You can delete virtual disks to rearrange the storage space. To delete a virtual disk, follow these steps:

1. Back up all user data that is on the virtual disk you intend to delete.
2. In the left panel of the **MegaRAID Storage Manager** window, select the **Logical** tab, and click the icon of the virtual disk you want to delete.
3. In the right panel, select the **Operations** tab, and select **Delete Virtual Disk**.
4. Click **Go**.
5. When the warning message appears, click Yes to confirm that you want to delete the virtual disk.

6-6 Saving a Storage Configuration to Disk

You can save an existing controller configuration to a file so you can apply it to another controller. To save a configuration file, follow these steps:

1. Select a controller icon in the left panel of the MegaRAID Storage Manager window.
2. On the menu bar, select **Operations, Advanced Operations, Configuration, Save Configuration**.

The Save dialog box appears.

3. In the **Save** dialog box, type a name for the configuration file, or accept the default name (hostname.cfg).
4. Click **Save** to save the configuration file.

6-7 Clearing a Storage Configuration from a Controller

You can use the Add New Configuration option to add a new storage configuration while keeping the existing configuration. Alternatively, you can clear the existing storage configuration from a controller and then create a totally new configuration or load a previously saved configuration file.

Caution: Before you clear a configuration, be sure to save any data that you want to keep. Clearing a configuration deletes all data from the disks of the existing configuration. Be sure that the operating system is not installed on this configuration.

To clear a configuration from a controller, follow these steps:

1. Select a controller icon in the left panel of the **MegaRAID Storage Manager** window.
2. On the menu bar, select **Operations, Advanced Operations, Configuration, Clear Configuration**. A Warning message appears.
3. Click **Yes** to clear the configuration or **No** to cancel the operation.

6-8 Adding a Saved Storage Configuration

When you replace a controller, or when you want to duplicate an existing storage configuration on a new controller, you can add a saved configuration to the controller.

Caution: When you add a saved configuration to a replacement controller, be sure that the number and size of the physical disks connected to the controller are exactly the same as when the configuration was saved.

To add a saved configuration, follow these steps:

1. Select a controller icon in the left panel of the **MegaRAID Storage Manager** window.
2. On the menu bar, select **Operations, Advanced Operations, Configuration, Add Saved Configuration**. A Warning message appears.
3. Click **Yes**.
4. When the Open dialog box appears, select the configuration file, and click **Open**.
5. View the configuration detail, then select **Apply**.
6. Confirm the new configuration when prompted.

Notes