

SATA RAID Function

(Only for chipset Sil3132 used)

User's Manual

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1 Welcome

Silicon Image's SATARAID5™ software provides Serial ATA RAID 0 (Striping) and RAID 1 (Mirroring) functionality to enhance the industry's leading PCI-to-SATA host controller products. Two major challenges facing the storage industry today are keeping pace with the increasing performance demands of computer systems by improving disk I/O throughput and providing data accessibility in the face of hard disk failures while utilizing full disk capacity. With Silicon Image Serial ATA host controller and SATARAID5, both of these problems are solved.

SATARAID5 software provides a Graphical User Interface (GUI) for easy-to-use configurations of the RAID Groups.

1.1 SATARAID5 Features

- RAID 0 and RAID 1 Groups are supported.
- Supported OS: Win2000/XP/Server 2003.
- RAID Groups can be created and deleted without exiting Windows.
- Hot Spare and On-line Rebuilding. The spare policy supports testing periodically for a health check of the spare disk. Spare drive can be global or dedicated to a specific RAID group.
- Supports Auto and Manual rebuild policy for a RAID group.
- System GUI Monitoring Utility:
 - Displays/Logs/Alerts Users to Vital RAID Group Information.
 - Manages RAID Group Functions (configures, rebuilds, etc.,).
- Supports the ability to partition and map a segment of disk to a virtual LUN or disk.
- Supports up to two RAID groups. Any excess capacity on disk drives can be formatted as independent logical drives.
- Adjustable Stripe Size for RAID 0.
- Uses the Self-Monitoring, Analysis, and Reporting Technology (SMART) feature in the attached drives for automatic notification of imminent drive failures.
- Employ RAID recovery algorithms to maintain data integrity in the event of a disk failure including bad block management.
- Automatically Selects Highest Available Transfer Speed for All SATA Devices. Supports the following:
 - Data transfer rate up to 150MB/Sec (Sil3114, Sil3124-1), and 300MB/Sec (Sil3124-2, Sil3132)
 - Support up to 4 SATA devices connected to a single controller.
 - ACPI, SATA 1.0 (Sil3114, Sil3124-1), and SATA 2.0 (Sil3124-2, Sil3132)
- Supports drive roaming capability allowing drives from one controller to be moved to another without loss of data.
- Employs a task manager for the scheduling of any RAID or disk management operations including RAID group creation, rebuild, and test.

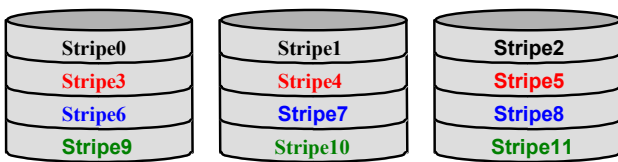
2 An Introduction to RAID

RAID - Redundant Array of Independent Disks

RAID technology manages multiple disk drives to enhance I/O performance and provide redundancy in order to withstand the failure of any individual member, without the loss of data. There are many different methods of implementation for RAID, with each having advantages and disadvantages. Raid levels or set types are given a numerical designator that defines its implementation such as RAID 0 or RAID 1. SATARAID5 provides support for two RAID Group types: Striped (RAID 0), and Mirrored (RAID 1). Other RAID types are not supported by SATARAID5 software and thus are not discussed.

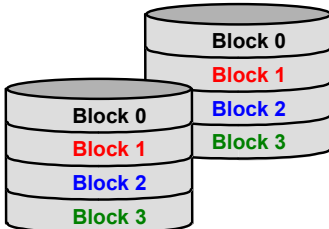
2.1 Disk Striping (RAID 0)

Striping is a performance-oriented, non-redundant data mapping technique. While Striping is discussed as a RAID Group type, it does not provide any fault tolerance. With modern SATA and ATA bus mastering technology, multiple I/O operations can be performed in parallel, enhancing data throughput. Striping arrays use multiple disks to form a larger virtual disk. The figure below illustrates a three-disk stripe set. Stripe one is written to disk one, stripe two to disk two, and so forth. RAID 0 sets can be comprised of two, three, or four drives.



2.2 Disk Mirroring (RAID 1)

Disk mirroring creates an identical twin for a selected disk by having the data simultaneously written to two disks. This redundancy provides instantaneous protection from a single disk failure. If a read failure occurs on one drive, the system reads the data from the other drive. RAID 1 sets are comprised of two drives. A third drive can be allocated as a spare in case one of the drives in the set fails.



2.3 CONCATENATION

The CONCATENATION is a virtual disk that can either be an entire disk drive or a segment of a single disk drive. Since BIOS no longer reports non-RAID drives to the system BIOS, if a non-RAID boot drive or data drive is desired, a CONCATENATION can be created so BIOS will report it to the system BIOS.

3 Installing Drivers

Before installing Windows 2000/XP onto a serial ATA hard disk on the Silicon Image Serial ATA controller, the Silicon Image Serial ATA controller driver must be installed. The following steps explain how to copy the Serial ATA controller driver from the motherboard driver CD-ROM to a floppy disk in MS-DOS mode and install the driver during OS installation. Please prepare a startup disk that has CD-ROM support and a blank formatted disk.

Step 1: Insert the prepared startup disk and motherboard driver CD-ROM in your system. Boot from the startup disk. Once at the A:\> prompt, change to the CD-ROM drive (example: D:\>). At the D:\> prompt, type the following two commands. Press ENTER after each command (Figure 1):

```
cd bootdrv
menu
```

Note: For users without a startup disk. Use an alternative system and insert the GIGABYTE motherboard driver CD-ROM. From the CD-ROM drive (example: D:) double-click the **MENU.exe** file in the **BootDrv** folder. A command prompt window will open similar to that in Figure 2.

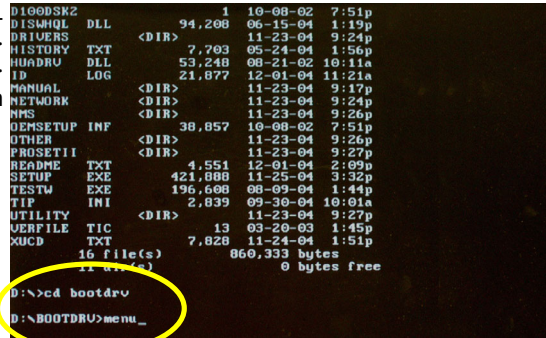


Figure 1

Step 2: When the controller menu (Figure 2) appears, remove the startup disk and insert the blank formatted disk. Select the **Si3132 RAID^(note) Driver** by pressing the corresponding letter from the menu. Your system will then automatically zip and transfer this driver file to the floppy disk. Press 0 to exit when finished.

(Note): If you wish to set up a non-RAID configuration, please select **Si3132 BASE Driver**.

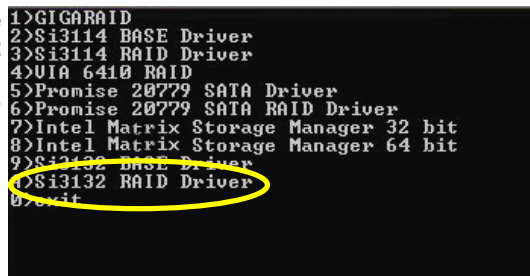


Figure 2

Step 3: To install an operating system, boot from the Windows installation disk. Press F6 as soon as you see the "Press F6 if you need to install a third party SCSI or RAID driver" message (Figure 3). In the next screen, press S to specify additional device(s) as instructed and supply the Serial ATA controller driver on the floppy disk.

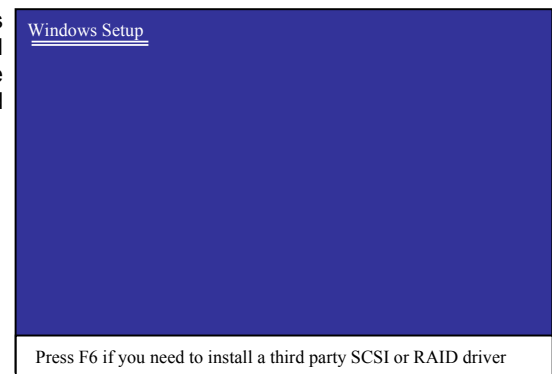


Figure 3

Step 4: When a controller menu appears (Figure 4), select a controller based on the operating system you wish to install and press ENTER. Press ENTER again in the next screen to begin installing the driver. When the driver installation is finished, proceed with the installation of the Windows operating system.

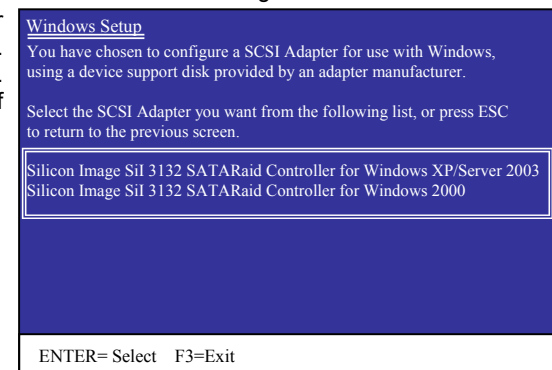
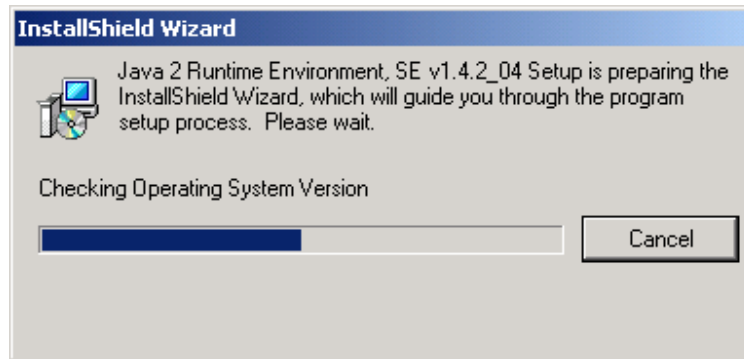


Figure 4
SATA RAID5 User's Manual

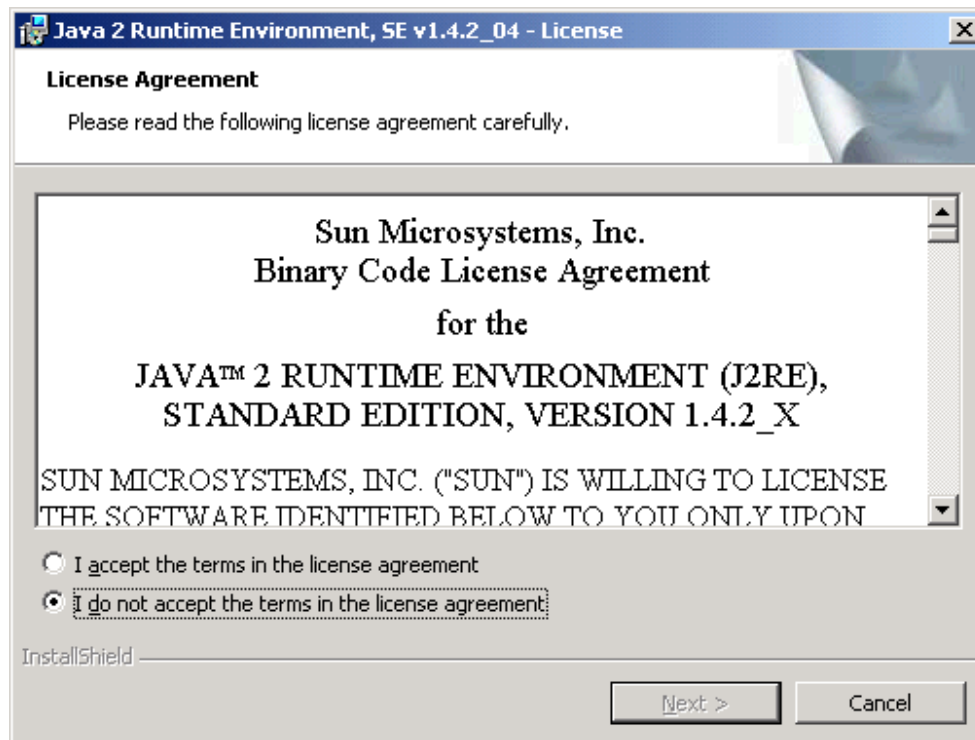
4 JAVA 2 Runtime Environment Installation

The Java 2 Runtime Environment is required for the SATARAID5 GUI. The Java 2 Runtime Installer and executable package must be downloaded from the Sun Microsystems website at <http://java.sun.com/j2se/downloads.html>. The computer must have an Internet connection set up before installation can proceed.

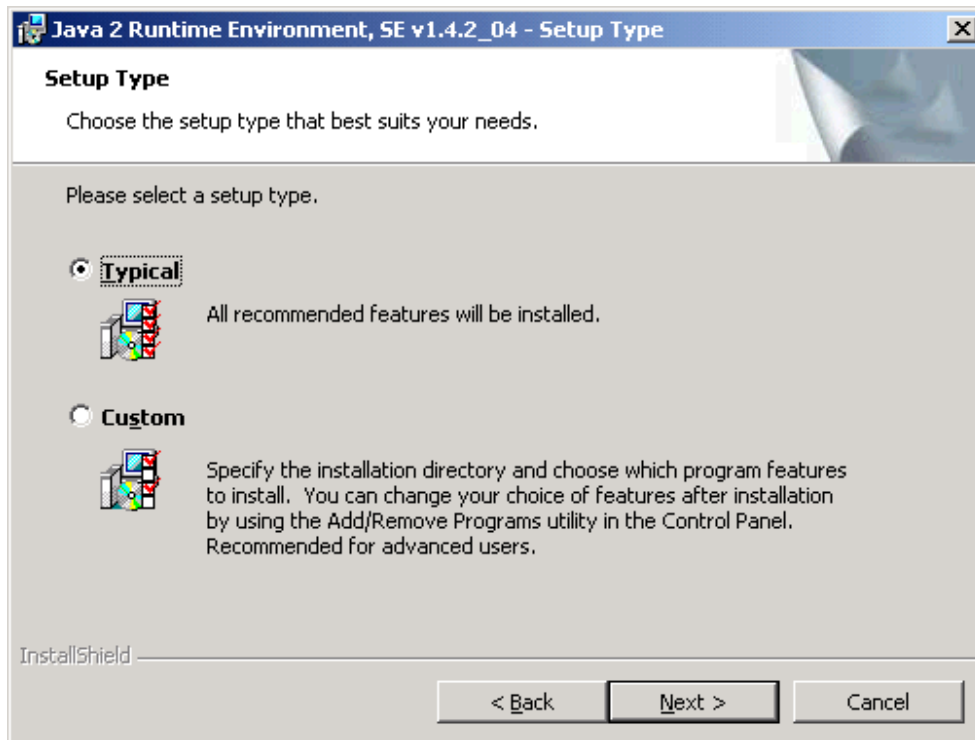
Save the installer file to a known location, such as the My Documents folder. Using Windows Explorer or by clicking on the My Computer icon on the desktop, select the installation file and open it. The installation will begin. The installer program will download the needed files from the Internet. (You may also install the J2RE from motherboard driver CD.)



When a window appears asking for acceptance the license agreement, select *I accept the terms of this license agreement* and click Next.



Choose the Typical setup type and click Next.

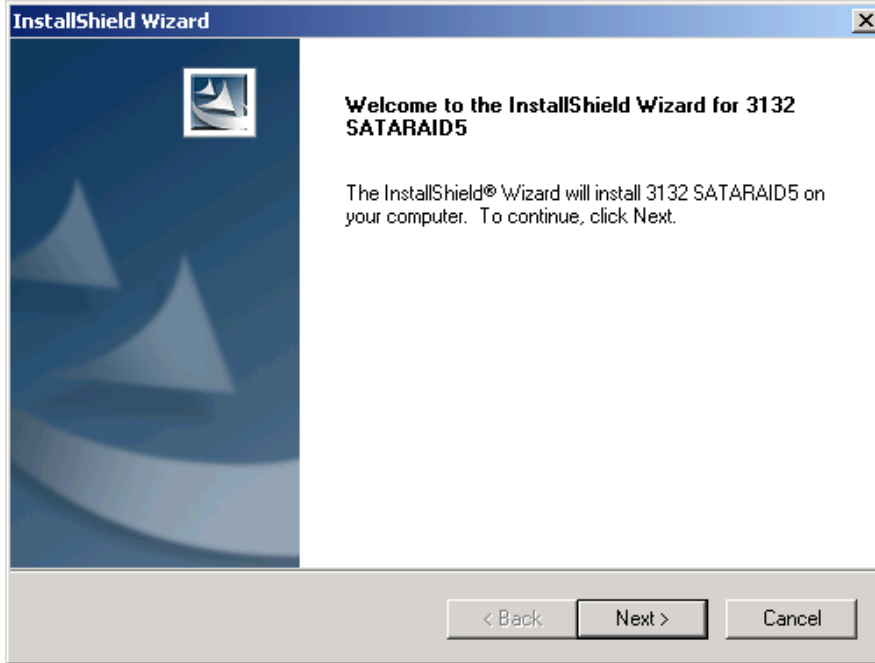


When the installation completes, click Finish. Restart the computer when prompted.

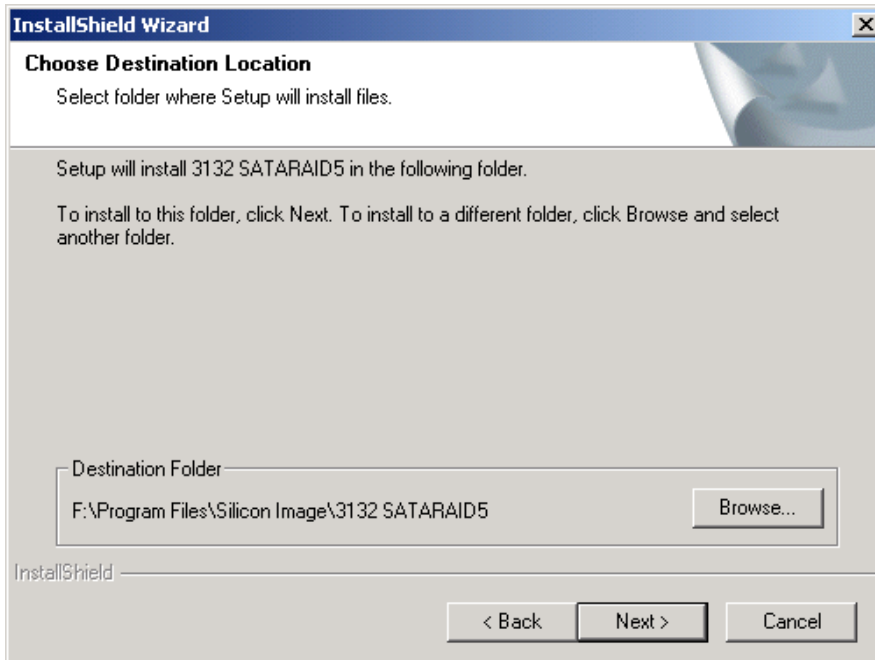
5 SATARAID5 GUI Installation

Insert the motherboard driver CD into the computer's CD-ROM drive. When the autorun window appears, click the SOFTWARE APPLICATIONS button at the left of the window. Find the Silicon Image SATA RAID Utility and install it.

Click the Next button when the Welcome window appears.



Click the Next button to install the SATARAID5 program in the default directory (recommended). An alternate directory may be selected if desired.

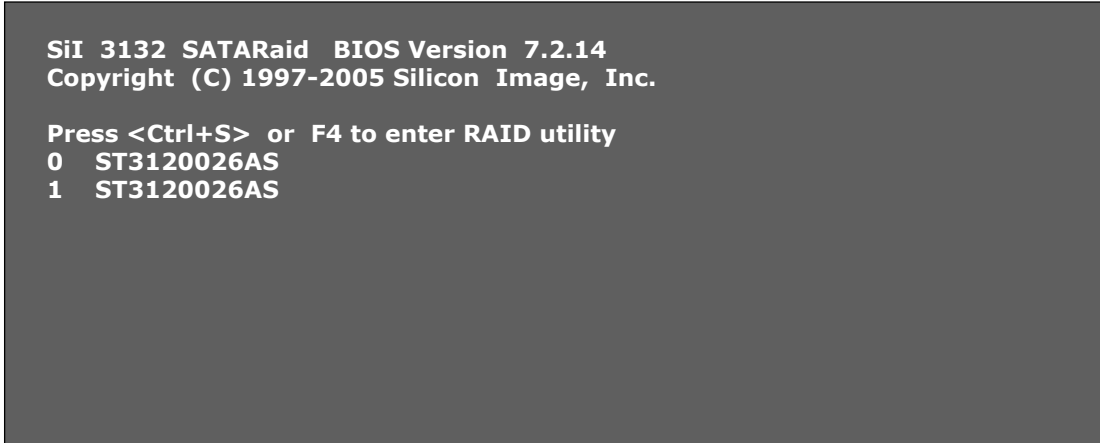


After installation is done, click the Finish button to complete the installation.

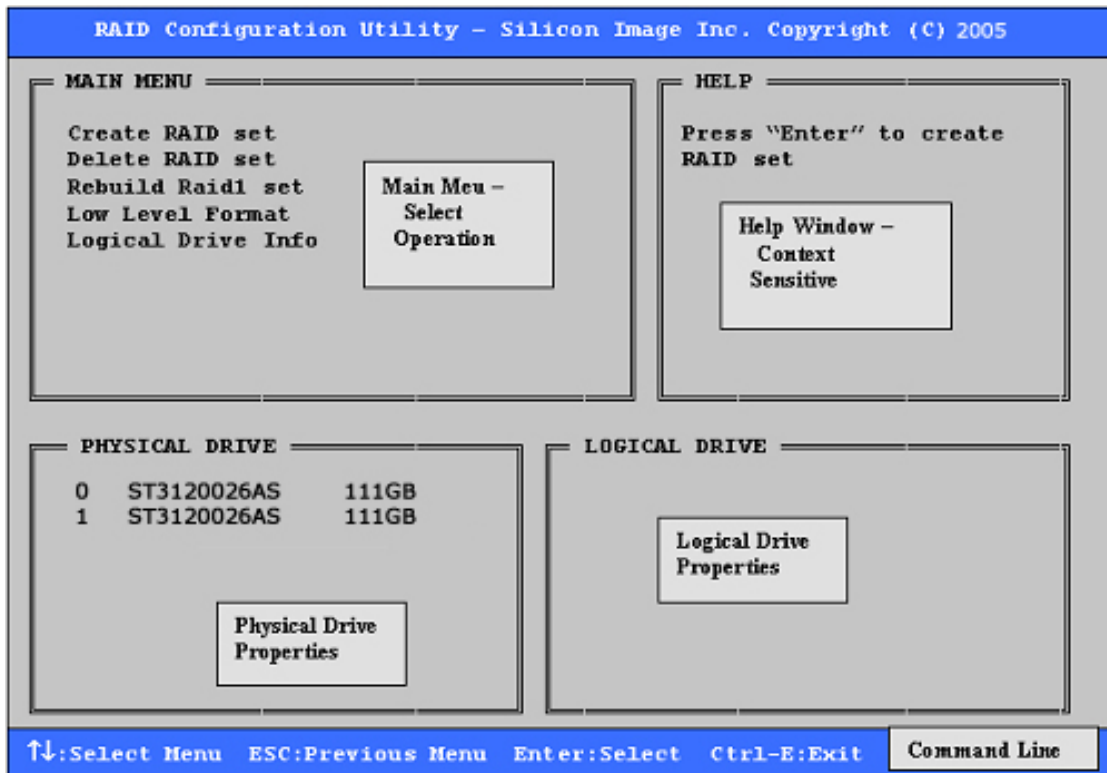
6 Creating and Deleting Legacy RAID Groups with BIOS Utility

Legacy RAID sets can be created and managed by either the BIOS utility or the SATARAID5 GUI. New RAID groups must be created and managed by the SATARAID5 GUI. See section 8 SATARAID5 GUI Overview for information on configuring RAID Groups using the SATARAID5 GUI.

During boot up, a screen similar to that below will appear for about 5 seconds. Press CTRL+S or the F4 key to enter the BIOS RAID utility.



The RAID Utility menu screen will be displayed. A brief description of each section is presented on the next page.



Main Menu

The Main Menu in the upper left corner is used to choose the operation to be performed. The selections are:

- Create RAID Group
- Delete RAID Group
- Rebuild RAID 1 Set
- Low Level Format
- Logical Drive Info

Create RAID Group is used to create a new legacy RAID Set or for allocating legacy spare drives.

Delete RAID Group is used to delete a legacy RAID Set or to deallocate a legacy spare drive.

Rebuild RAID 1 Set is used to initiate the rebuild of a RAID 1 set after, for example, a drive in the Group has been replaced.

Low Level Format allows a single drive to have its data completely wiped out. Drives assigned to Sets or allocated as spares cannot be low level formatted.

Logical Drive Info shows the current configuration of each RAID set, allocated spare, and unallocated physical drive attached to the SATA host adapter.

These operations are detailed in the pages that follow.

Help Window

This window displays context-sensitive help and status messages.

Physical Drive Information

This window displays the model number and capacities of the drives physically attached to the SATA host adapter.

Logical Drive Information

This window displays all logical drives connected to the controller. The upper part lists RAID sets and CONCATENATION drives reported to the system BIOS. The lower part lists spare drives, reserved drives, and invalid drives not reported to the system BIOS.

Command Line

The bottom line of the display lists the currently active command keys:

- Up and Down arrows select the menu item or action
- ESC takes the user to the previous menu
- Enter selects the highlighted choice
- Ctrl-E exits the utility

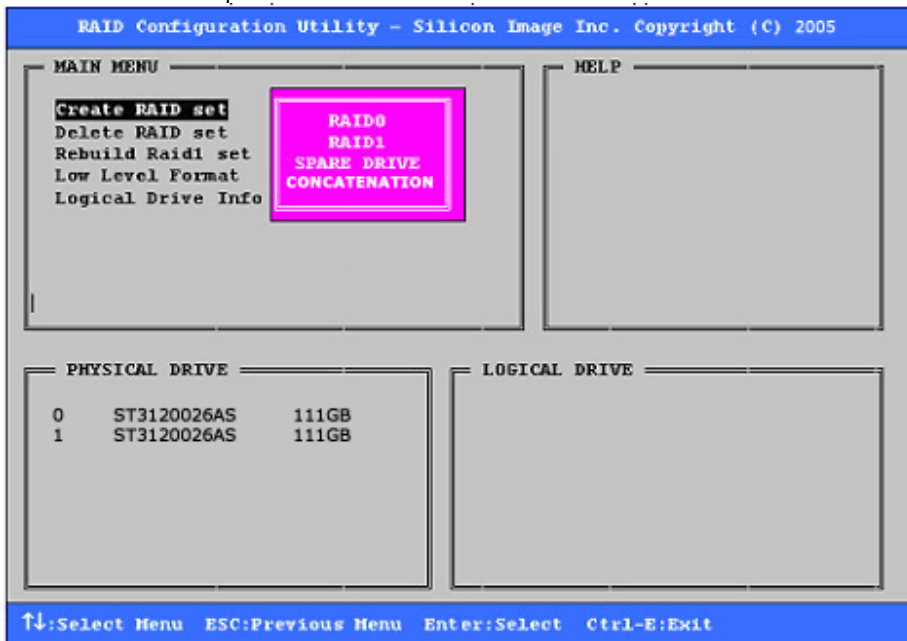
Other keys may be active depending upon the currently selected action.

6.1 Creating RAID Groups

As previously discussed, the Silicon Image SATA host adapter supports RAID 0 and RAID 1 configurations. The selection of the RAID level to be used should be based upon factors including performance, data security, and number of drives available. It is best to carefully consider the long-term role of the system and plan the data storage strategy appropriately.

Silicon Image has made the creation of RAID sets very simple. They can be created either automatically or to allow the greatest flexibility, manually.

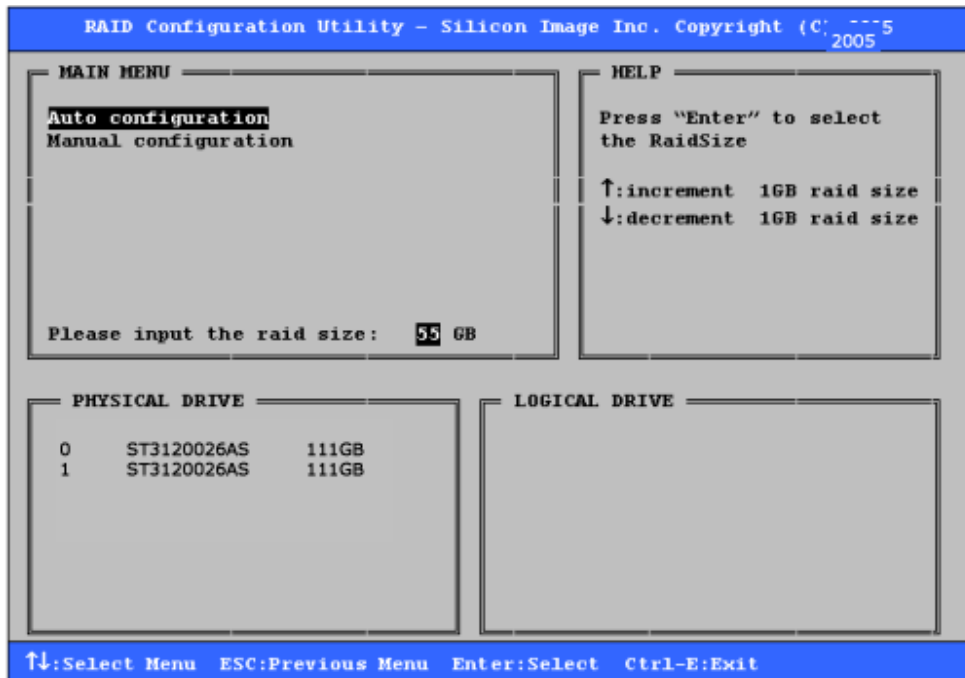
1. Select "Create RAID set"
2. Choose a RAID 0 Striped or a RAID 1 Mirrored set.



3. Select Automatically or Manually configuration of the RAID Set.



4. If manual configuration is selected, the chunk size of Striped Sets can be selected. For Mirrored Sets, the Source and Target drives can be selected.
5. If auto configuration is selected, BIOS will select RAID member drives automatically and the chunk size of Striped Sets is set to 64KB.
6. Select RAID set size with ↑ and ↓ keys. See section 6.8 for explanation on selecting size.



7. After the RAID set size is set, the message “Are You Sure?” will display before completing the configuration. Answer “N” to abort the creation of the new RAID set, or “Y” to proceed with the RAID set creation.
8. RAID sets can be created in both BIOS and in the SATARaid5 GUI. If you have excess capacity left on your hard drives after creating a RAID set in the BIOS, you can later go to the SATARaid5 GUI to create additional logical drives that fully utilize the capacity on all your hard drives

6.2 Creating Spare Drive

If there is a RAID 1, spare drive can be created. The spare drive can be allocated to the RAID 1 set in the event of a failure of one of the drives in the RAID 1 set.

1. To create a spare drive for RAID 1 set, Select “Create RAID set”
2. Select “Spare Drive” and press Enter.
3. Select spare drive from the physical drive list and press Enter.
4. Select spare drive size with ↑ and ↓ keys. See section 6.8 for explanation on selecting size.
5. After the spare drive size is set, the message “Are You Sure?” will display before completing the configuration. Answer “N” to abort the creation of the spare drive, or “Y” to proceed with the spare drive creation.

6.3 Creating CONCATENATION

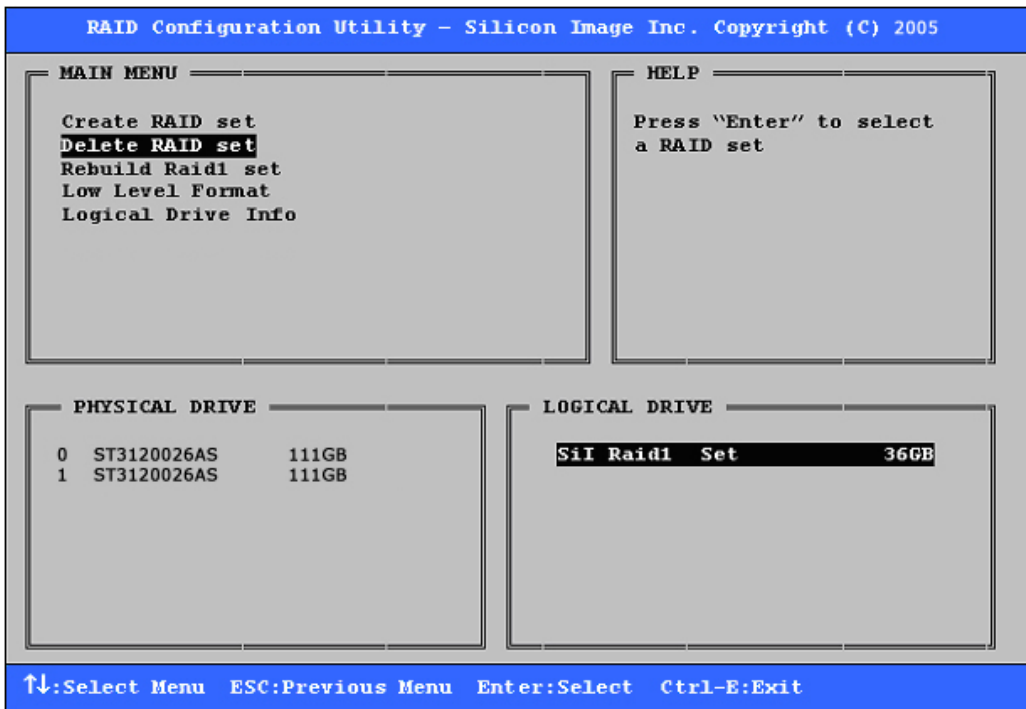
Since BIOS no longer reports non-RAID drives to the system BIOS, if a non-RAID boot drive or data drive is desired, a CONCATENATION can be created so BIOS will report it to the system BIOS.

1. To create a CONCATENATION, Select “Create RAID set”
2. Select “CONCATENATION” and press Enter.
3. Select the number of CONCATENATION drive (1~2) and press Enter.
4. Select CONCATENATION drive from the physical drive list and press Enter.

After the CONCATENATION drive(s) is set, the message "Are You Sure?" will display before completing the configuration. Answer "N" to abort the creation of the CONCATENATION, or "Y" to proceed with the CONCATENATION creation.

6.4 Deleting RAID Groups, Spare Drive, and Concatenation

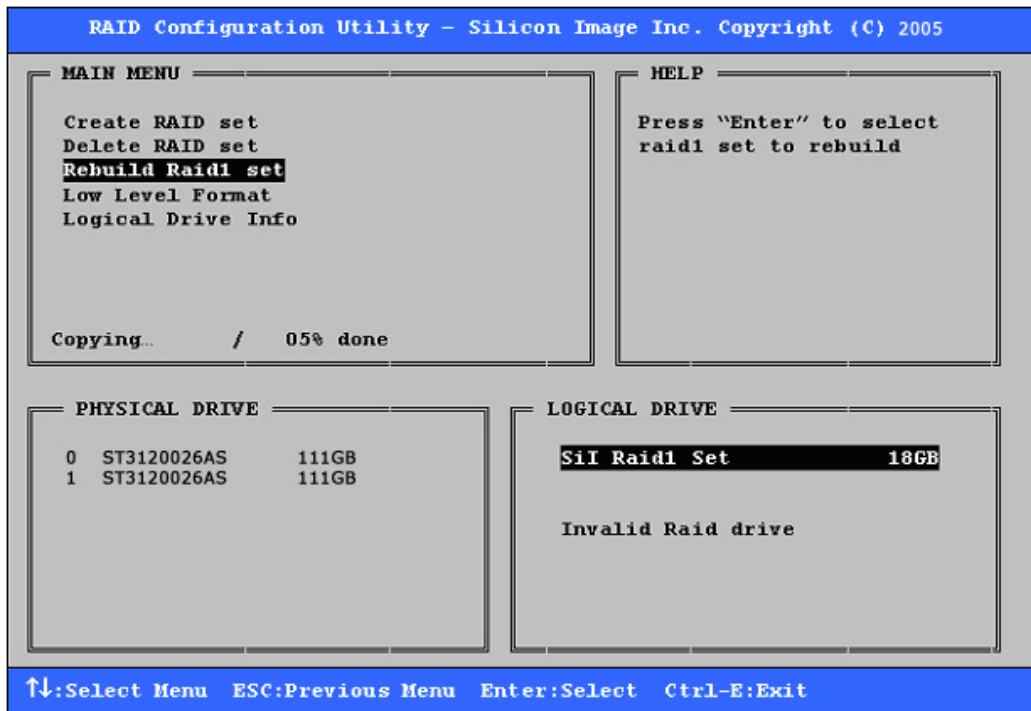
1. To remove one or more RAID sets, spare drives, and concatenations, select "Delete RAID set"
2. Select the desired item to delete from the logical drive list and press Enter.
3. Press "Y" when asked, "Are You Sure?"
4. The drives will be returned to the selection of logical drives from which a new RAID set can be created.



6.5 Rebuild RAID 1 Set

This menu selection is used to initiate the copying of data from an existing drive to a replacement drive that has been installed in a RAID 1 set after the failure of one of the members.

1. Select "Rebuild RAID 1 set"
2. Select the desired set and press Enter.
3. Press "Y" when asked, "Are You Sure?"
4. The set will be rebuilt. The status of the rebuild is displayed in the MAIN MENU window.

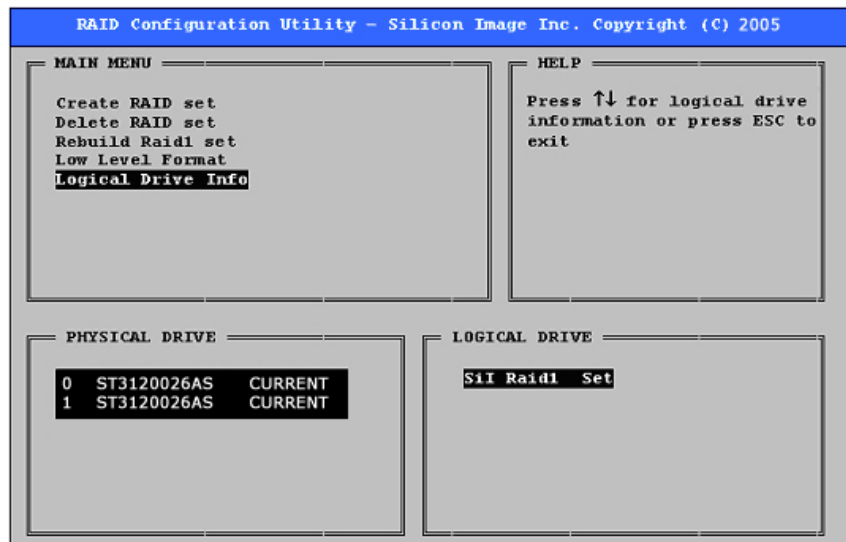
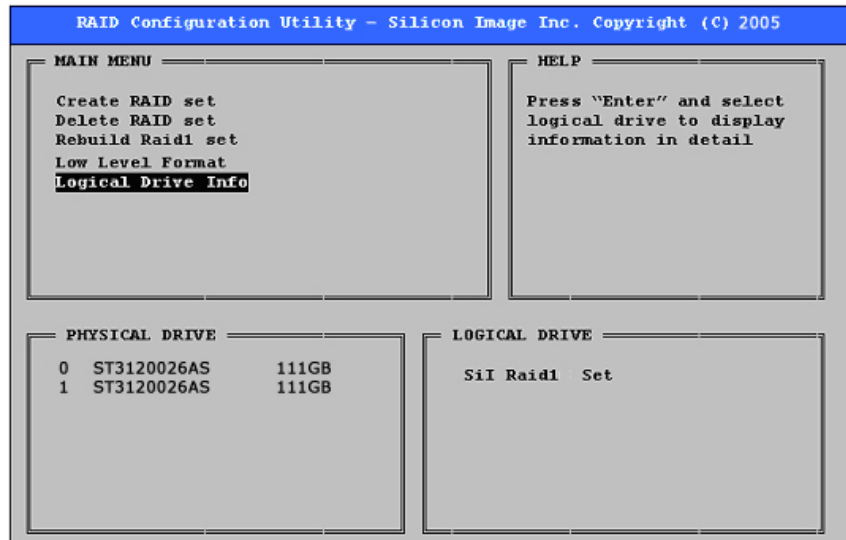


6.6 Low Level Formatting

The Low Level Format menu selection allows the complete erasure of data on a hard drive. This is not an action, which typically needs to be performed as formatting the drive under Windows is usually sufficient to prepare the drive for use.

6.7 Logical Drive Information

This menu item allows the display of the assignment of physical drives within a logical set (RAID set, RAID 1 spare, or unassigned). It is a display-only function. Use the up and down arrow keys to scroll between the drives in the Logical Drive Properties window. Press the ESC key when done viewing logical drive information.

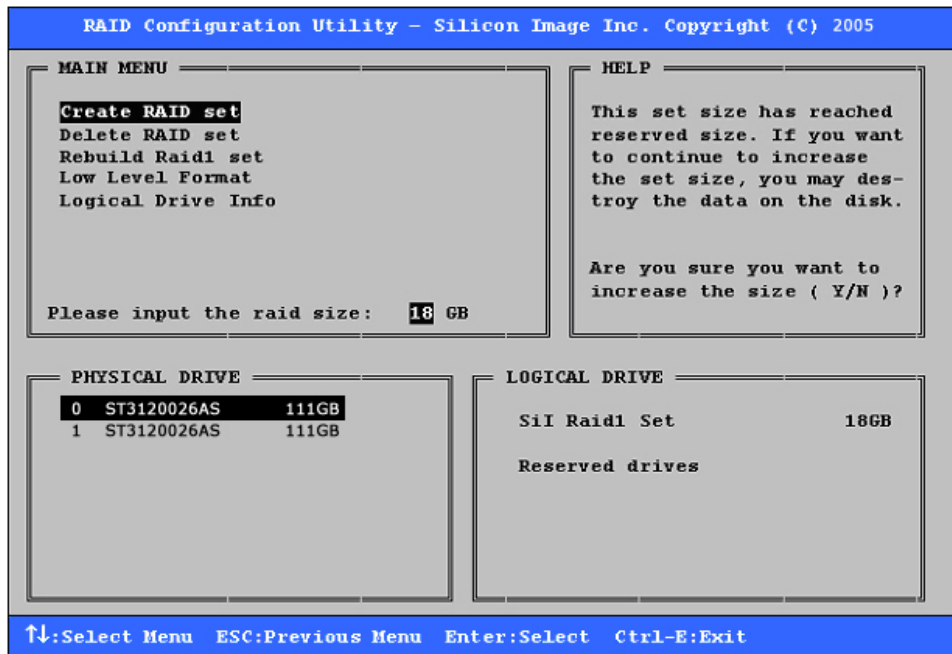


6.8 Reserved Drive and Setting Size for RAID Set or Spare Drive

Once a physical drive has been used to create a RAID set or spare drive by BIOS utility, BIOS saves user selected set or drive size in the reserved area of the physical drive. There is no way to remove the reserved area information even after the user deletes the set or drive. For this reason, after a set or drive is deleted, BIOS recognizes the physical drive as a reserved logical drive and it will not report the drive to the system BIOS.

When user selects to create a RAID set or spare drive, he or she has to select size for the set or drive. BIOS will set a default size for it and user can use the ↑ and ↓ keys to change the size. If the physical drive has never been used to create a set or drive by the BIOS before, the full size of the physical drive will be set as default size. Otherwise, BIOS will set default size to the size it saved in the reserved area of the physical drive before.

If the user wants to increase the default size, BIOS will display a warning message in the help window and for user's response before changing the default size.



7 Allocating Partitions in Windows

After the Raid groups have been created either using BIOS RAID utility or SATARAID5 GUI, the Raid group must have a partition defined on it, then the Raid group must be formatted in preparation for use under Windows.

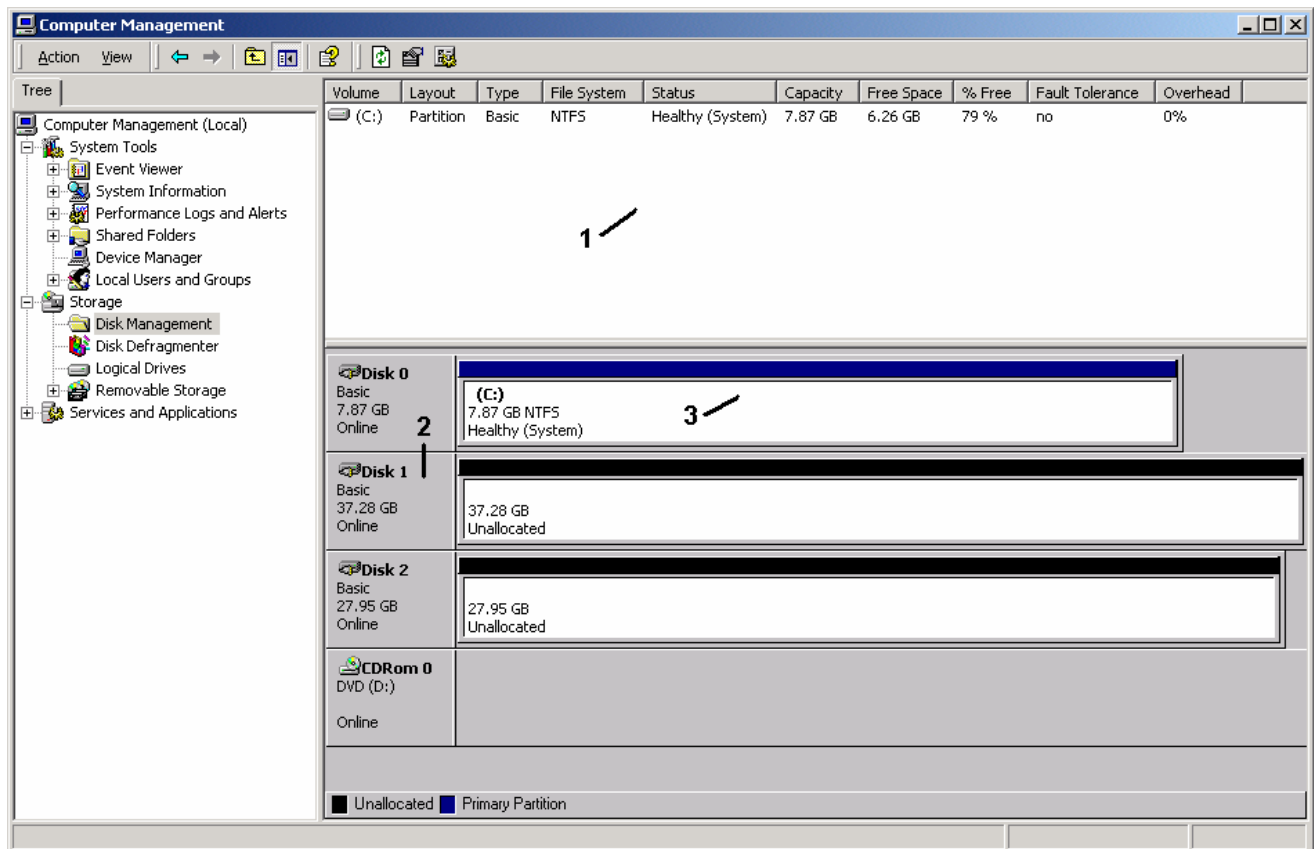
Windows XP, 2000, and Server 2003 use the Disk Management utility that is part of the Operating System. There are enough nuances that make it important to follow the procedure specific to the Operating System.

7.1 Windows Server 2003 & XP & 2000

Before creating any partitions, RAID groups must first be created using the BIOS RAID Utility or the SATARAID5 GUI. Once the sets have been created, allow the system to load Windows. Once Windows is running, open the Disk Management window located at:

Control Panel> Administrative Tools> Computer Management> Storage> Disk Management

A window similar to the following should appear:



This window has three main sections:

- 1) System listing of all formatted and available disks/RAID Groups.
- 2) Report of physical connection of disks/RAID Groups.
- 3) Report of partition status, disk letter, and volume name.

In the physical connection window, every disk should report as:

Basic

Disk Size (the actual available disk space will be reported here)

Online

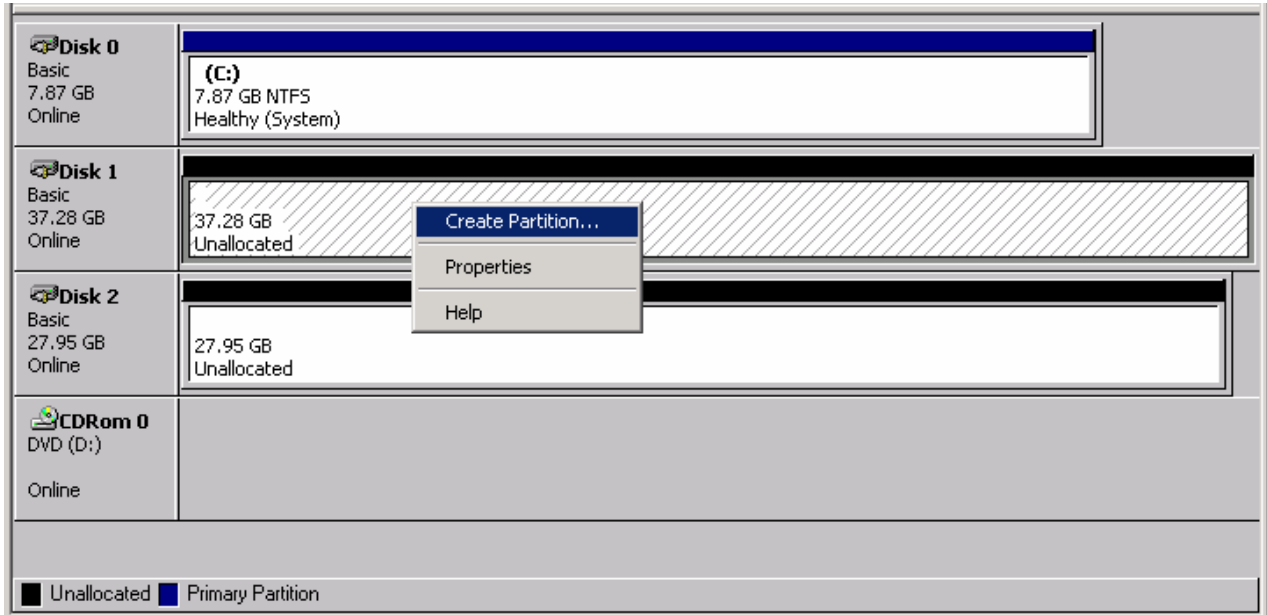
Instead of “Basic,” a disk may also report as either “Unknown” or “Dynamic.” If the disk reports as “Unknown” right-click on the disk icon and click “Write Signature.” A window will appear with the disk in question (all “Unknown” disks may appear in this window). Make sure the box next to each disk is checked, and then click OK. The disk should now report as “Basic.”

If a disk reports as “Dynamic,” right-click on the icon of that disk, and click on “Revert to Basic Disk...” Within seconds the disk should report as Basic.

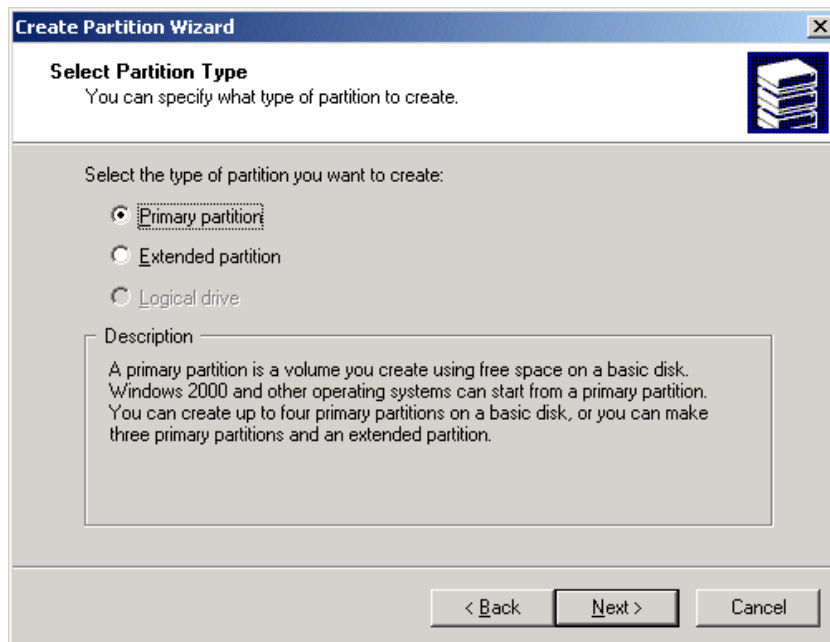
7.1.1 Creating the Partitions

In the Report of physical connection of disks/RAID Groups section, the order in which the drives are displayed corresponds directly to the order the Sets appear in the BIOS. Therefore, the first Unallocated Partition represents Set 1, and so on.

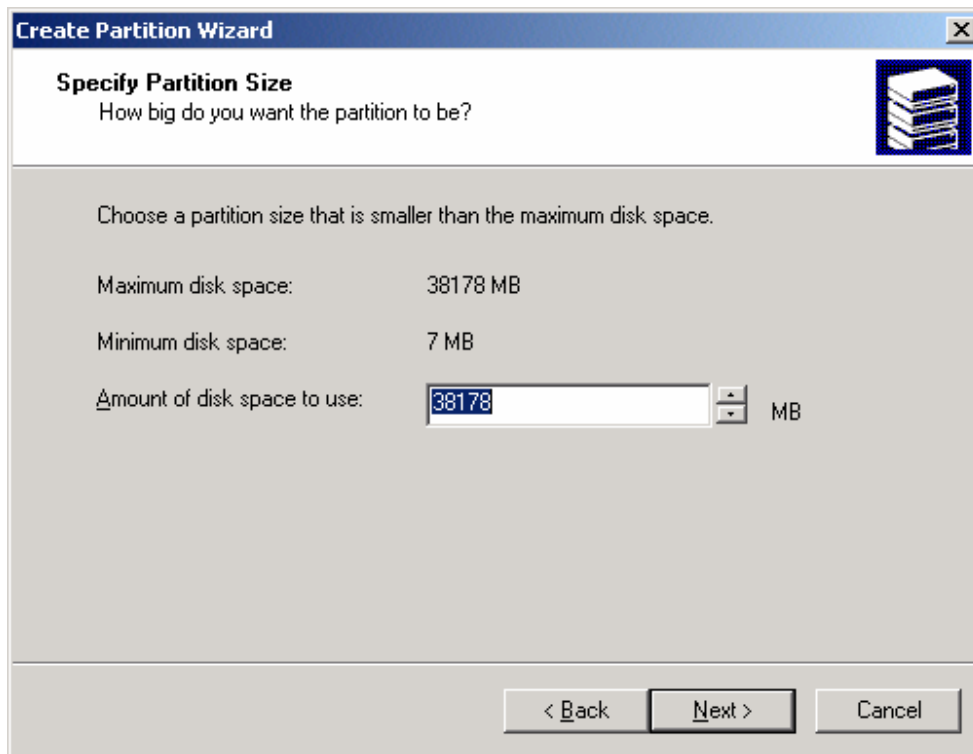
1. In this example, there are two disks with unallocated partitions. Right-click on the partition of the first disk and click on “Create Partition...”



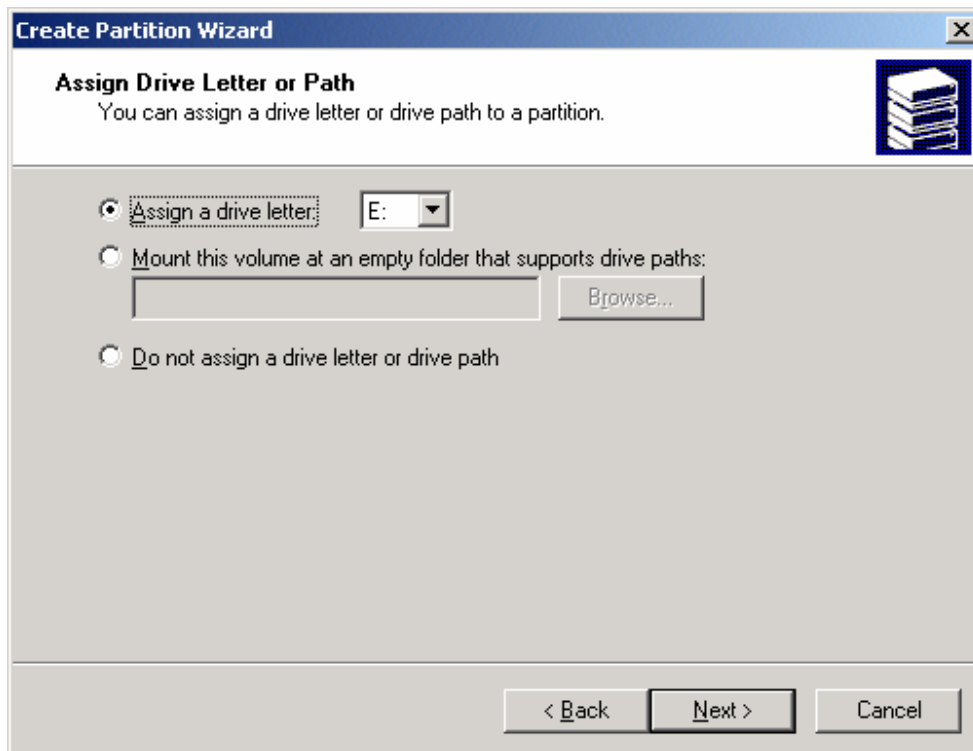
2. The “Create Partition Wizard” should appear. The first window is an introductory window to the Wizard. Click Next.
3. The second window designates the partition type. Choose primary partition and click Next.



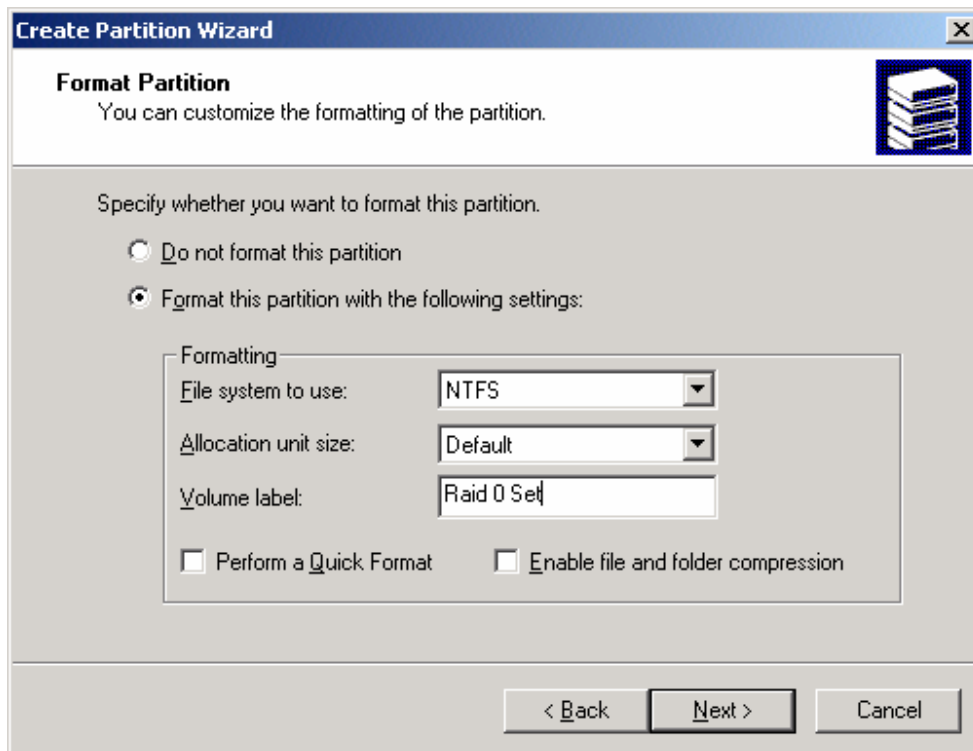
4. The third window designates the partition size. Since this is a Striped RAID set utilizing 2 disk drives, the size of the partition will be approximately twice the size of the smallest single disk drive. Click Next.



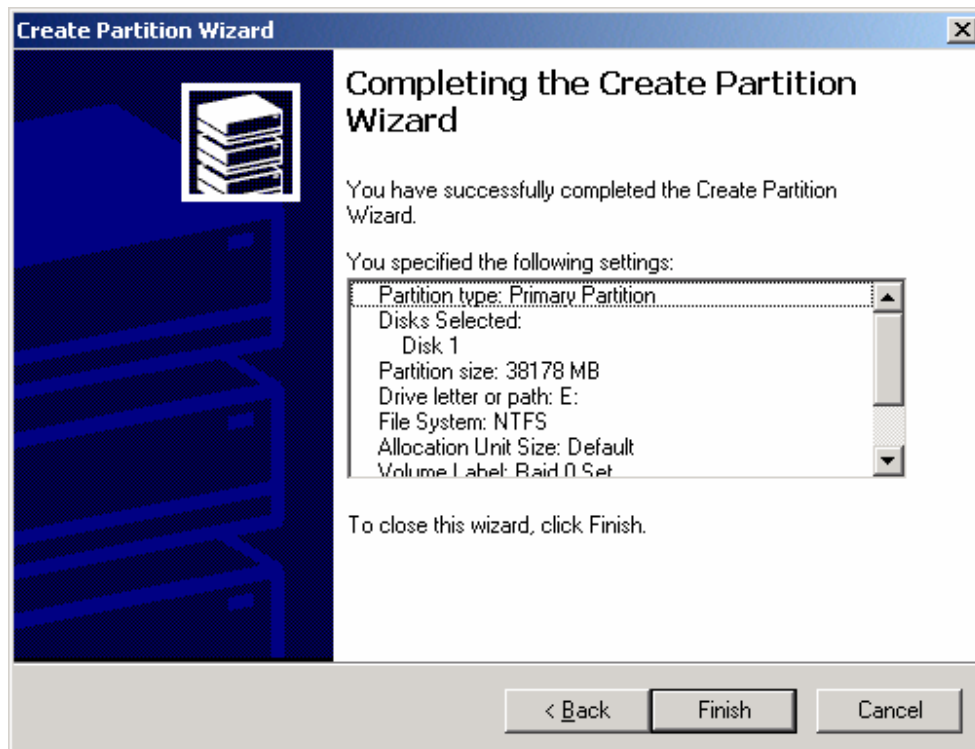
5. The fourth window designates the drive letter of the partition. Change the drive letter if desired. Click Next.



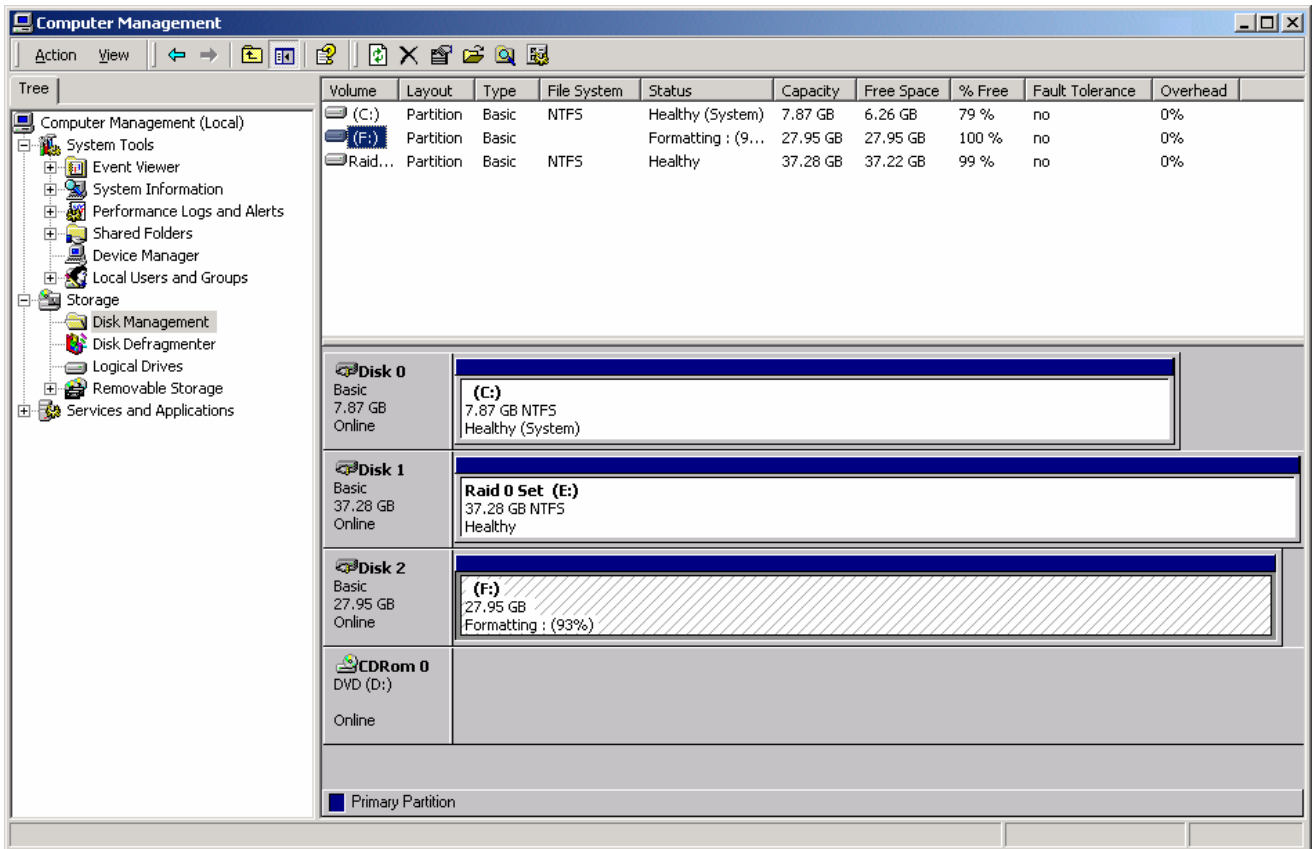
6. The next window allows the volume label to be set and selection of the type of formatting to take place upon the creation of the partition. Make sure the *Format this partition. . .* radio button is selected. Name the volume as desired (suggestions are generic names such as STRIPED SET or something specific to use such as FINANCIAL, CRITICAL, MISCELLANEOUS, etc.). It is recommended to use the default NTFS for the file system. Click Next.



7. The last window is a summary window listing all of the selections made. After verifying that everything is correct, click Finish.



The status of the newly created partition in the Disk Management window should change to Formatting and the percentage complete will be displayed. Depending upon the size of the partition, the format process may take several minutes. When complete, the status will change to "Healthy" and the name and drive letter will be updated. Once the disk reports Healthy, it appears in the listing in System Listing section with all of its pertinent information as well.

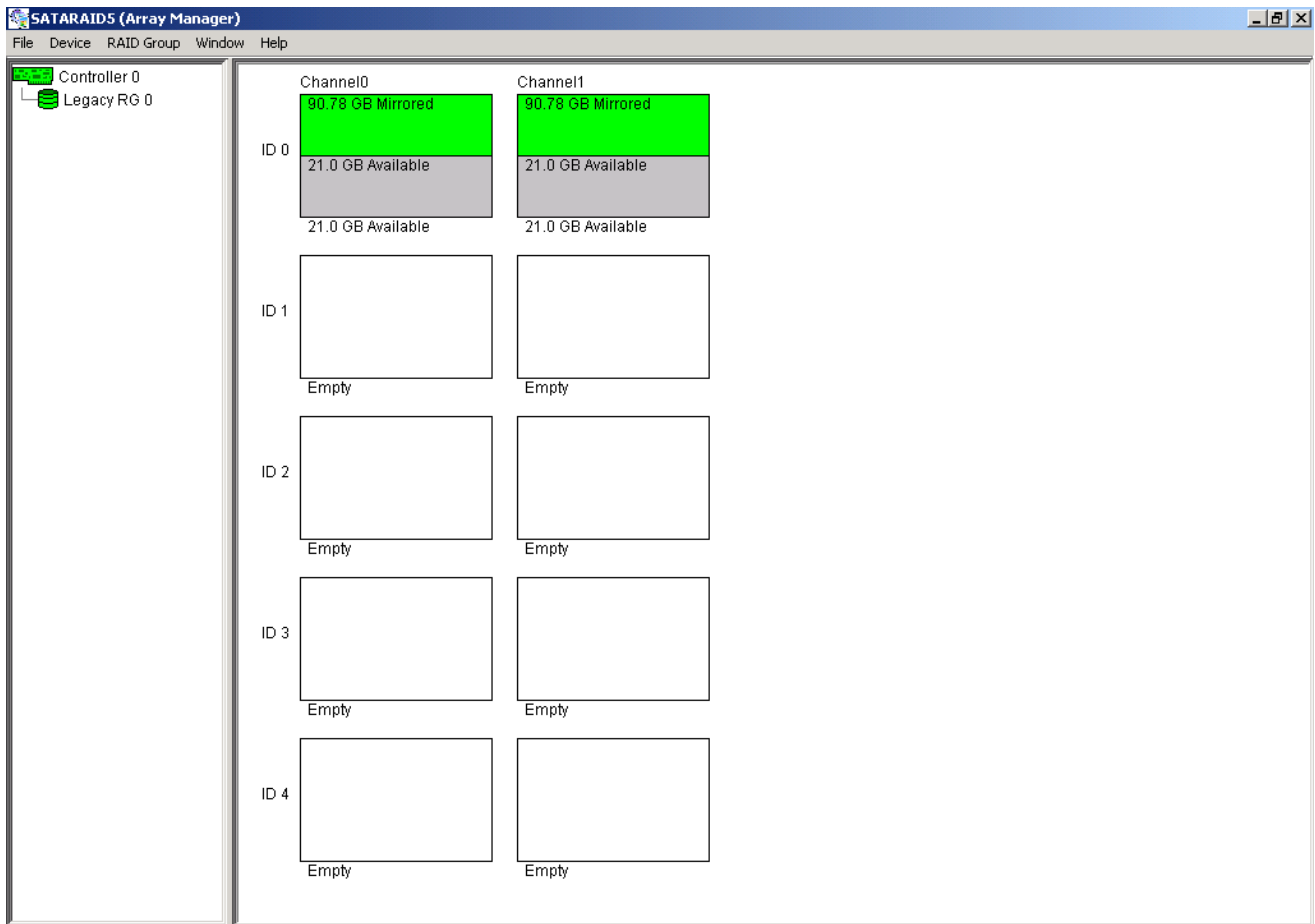


Repeat the above procedure as needed for any other partitions. Close the Data Management window by clicking on the small boxed "X" in the top right corner of the window. Click on the "My Computer" icon on the Desktop. The new drives will be visible and properly named. The new disks are available for use.

8 SATARAID5 GUI Overview

The SATARAID5 GUI Installation program configures the SATARAID5 GUI to automatically start when Windows is started. If the SATARAID5 GUI does not automatically start or is closed by the user, choose the SATARAID5 program from the Start Menu to launch the GUI.

The SATARAID5 GUI monitors the system's RAID Group. The main window will display:



8.1 RAID Groups and Device Configuration Windows

The RAID Groups window identifies SATA host adapters and configured RAID groups. Selecting each RAID group in the RAID Groups window, members consisting of the RAID group will be highlighted in the Device Configuration window.

Right clicking on each node in the RAID Group window, a popup menu will be displayed to let user select action to be performed for the selected controller or RAID group.

The Device Configuration window identifies all physical drives and their partitions. A physical drive can be partitioned to several portions and each portion can be a RAID group member, a spare drive, or a virtual drive.

8.2 SATARAID5 Menu Commands

The Main menu commands are shown below

File	Device	RAID Group	Window	Legacy Support	Help
Configuration ...	Create Spare	Create RAID Group	Task Manager	Create Legacy RAID Group	Help Topics
Exit	Delete Spare	Rebuild RAID Group	Event Log	Rebuild Legacy RAID Group	About
	Delete Member	Delete RAID Group	Resources	Delete Legacy RAID Group	
	Delete Orphan	RAID Group Summary		Convert Legacy RAID Group	
	Device Summary			Create Legacy Spare	
				Delete Legacy Spare	
				Convert Legacy Spare	

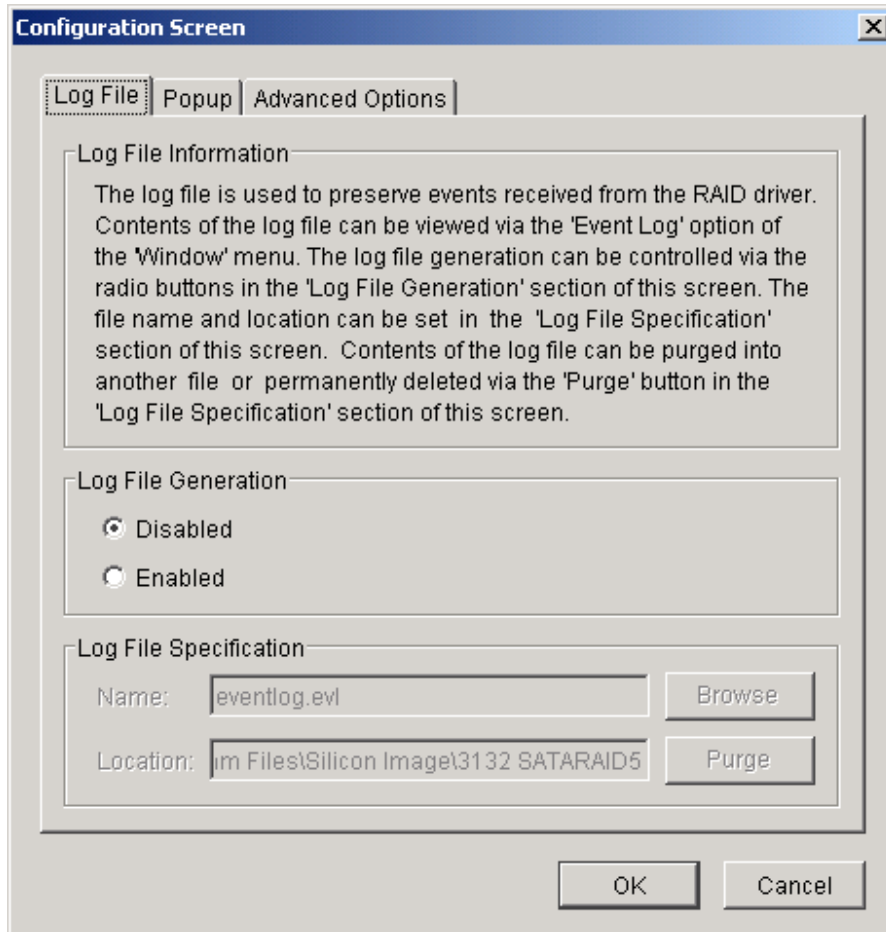
The commands are documented on the pages that follow.

8.2.1 Configuration

SATARAID5 configuration options include customization of the settings for Log File, Popup, and Advanced Options. This command displays a dialog box to let user set different configurations for SATARAID5 with the following three tabs:

Log File Tab

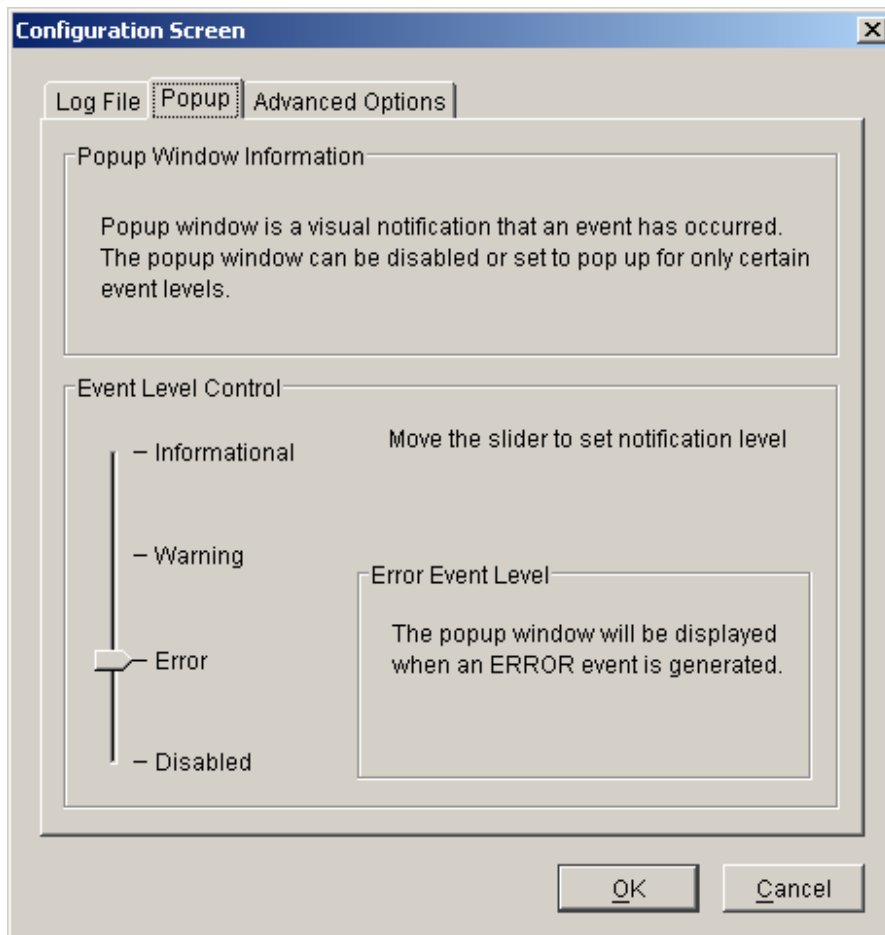
The log file is used to store event information received from all Silicon Image RAID drivers. The log file is a text file and can be viewed with any text viewer (such as Notepad) or with the Event Log window of SATARAID5. Use the Log File tab to set location and the desired filename for the log file.



Popup Tab

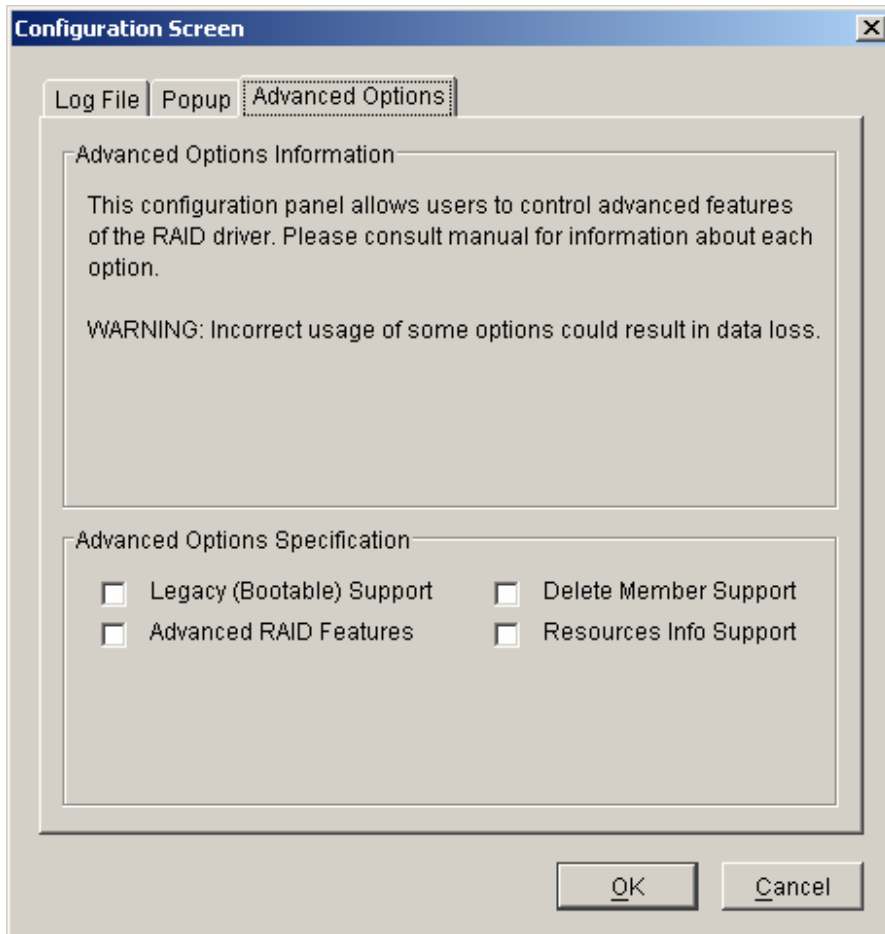
SATARAID5 can be configured to notify the user of events using messages in popup windows. Use the slider control to set the event level for popups to occur:

- Error Level - The following events will trigger a popup window:
 - Errors
- Warning Level - The following events will trigger a popup window:
 - Warnings
 - Errors
- Information Level - The following events will trigger a popup window:
 - Informational
 - Warnings
 - Errors
- Disable All - No events will trigger a popup window.



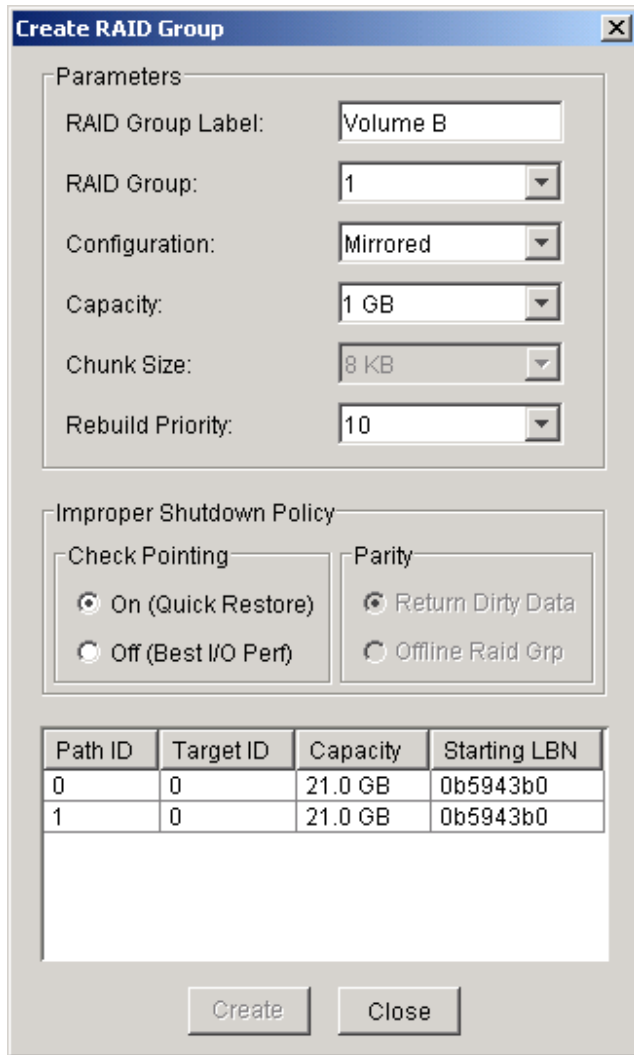
Advanced Options

The Advanced Options tab is used to control advanced features of the RAID driver. By default, all these advanced options are disabled.



The following features are supported:

1. Legacy (Bootable) Support – When this feature is selected, Legacy Support menu will be available in the menu bar. The Legacy Support Menu includes a list of menu items to support RAID functions for legacy RAID groups. For detailed Legacy Support features, refer to sections from 8.2.15 Create Legacy RAID Group to 8.2.21 Convert Legacy Spare.
2. Delete Member Support – When this feature is selected, Delete Member menu item will be available under the Device menu. The Delete Member menu item allows the user to delete a member from RAID 1 (Mirroring) group. For detailed Delete Member feature, refer to section 8.2.5 Delete Member.
3. Advanced RAID Features – When this feature is selected and user selects to create RAID group, if the RAID group to be created is fault tolerance group (RAID 1), user will be able to select Improper Shutdown Policy in the Create RAID Group dialog box. The Advanced RAID Features are not supported for Legacy RAID groups.



For RAID 1 Group

- Resources Info Support – When this feature is selected, Resources menu item will be available under the Window menu. This feature is for debugging purpose only. For detailed Resources feature, refer to section 8.2.14 Resources.

8.2.2 Exit

This command terminates the SATARAID5 program.

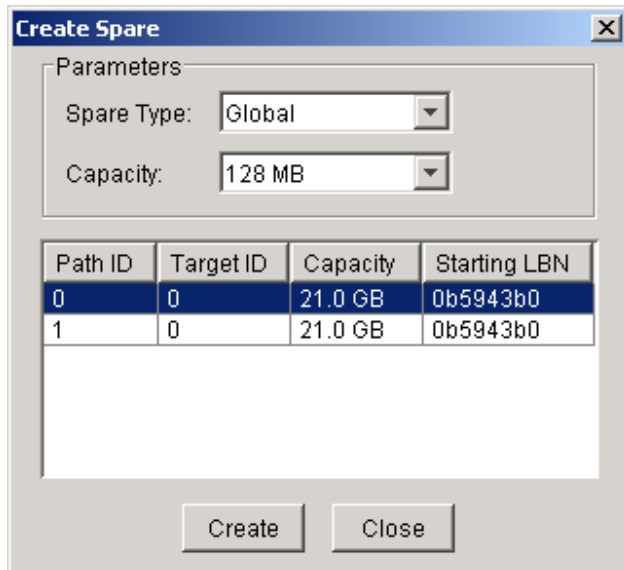
8.2.3 Create Spare

This command displays a dialog box to let user create Spare Drive, user needs to select the following parameters:

Spare Type: Global -- the spare drive is for all RAID groups in the system.

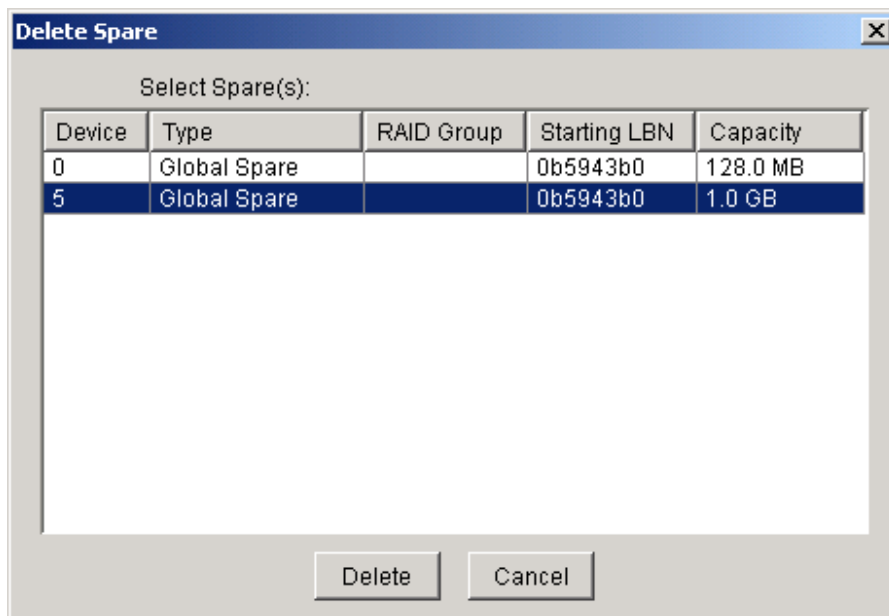
Capacity: Select from a list of spare drive size, current options are from 128 MB to 100 GB and MAX.

Device: Select one device segment from the available device segment list



8.2.4 Delete Spare

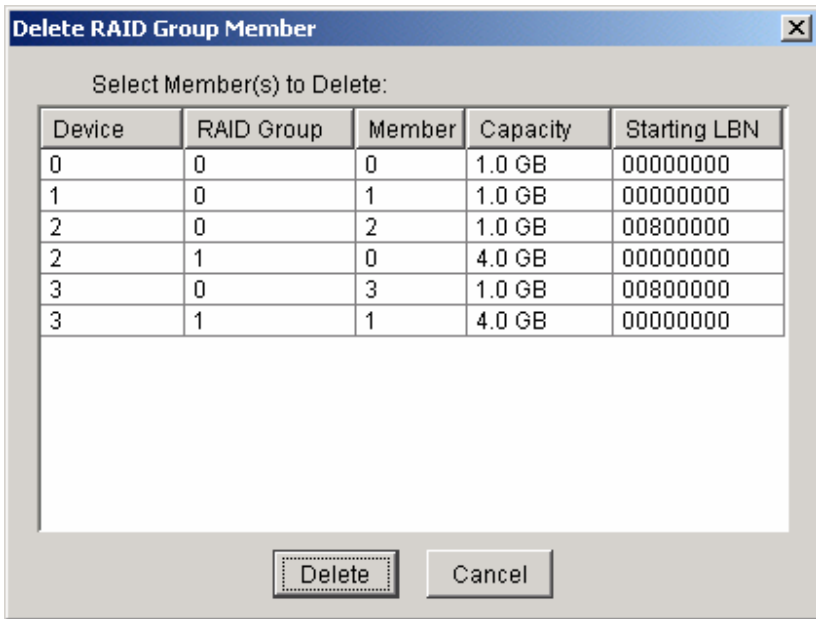
This command displays a dialog box to let user choose one or more Spare Drives to delete.



8.2.5 Delete Member

This command displays a dialog box to let user choose RAID groups' members to delete. Since RAID 0 is not fault-tolerant, RAID 0 members will not be shown in the list.

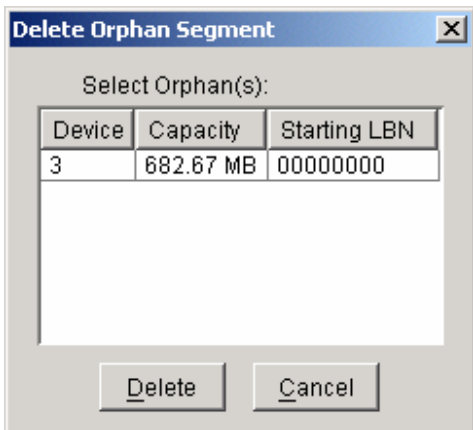
Note: delete RAID group member will reduce the RAID group to be a non-fault-tolerant RAID group.



8.2.6 Delete Orphan

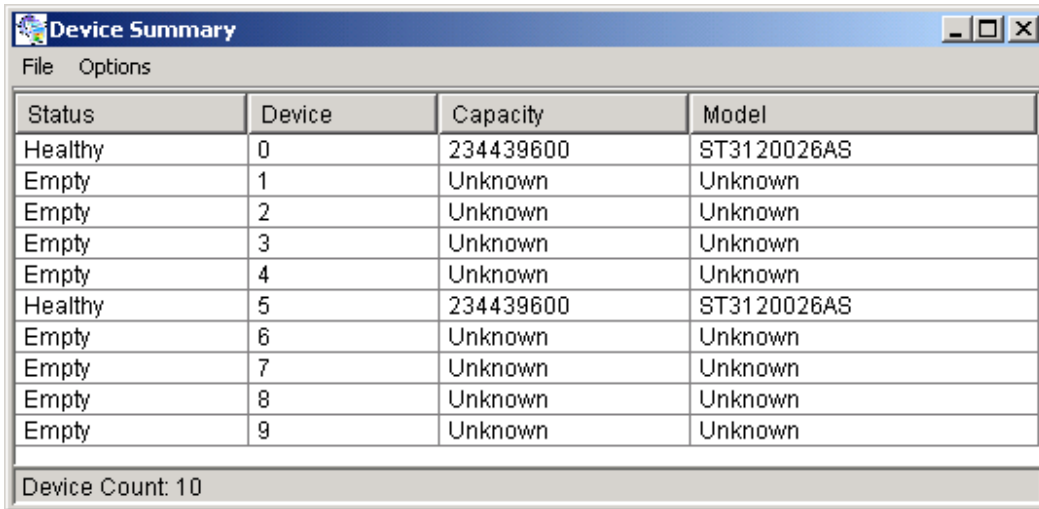
An orphan device segment is part of a RAID group that cannot access another device segment within the same RAID group. When a member of a RAID group fails in a sever manner (such as a loss of power or a complete hard disk failure), it becomes an orphan.

This command displays the Delete Orphan Segment window to show all orphan segments and allow user to delete selected orphan segments.



8.2.7 Device Summary

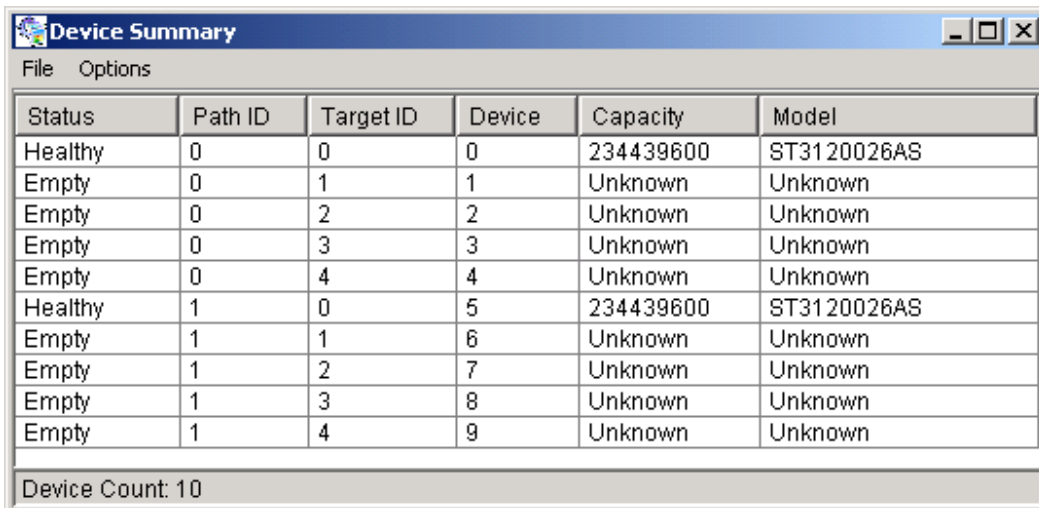
This command displays the Device Summary window to show all physical devices' information.



The screenshot shows a window titled "Device Summary" with a menu bar containing "File" and "Options". Below the menu bar is a table with the following data:

Status	Device	Capacity	Model
Healthy	0	234439600	ST3120026AS
Empty	1	Unknown	Unknown
Empty	2	Unknown	Unknown
Empty	3	Unknown	Unknown
Empty	4	Unknown	Unknown
Healthy	5	234439600	ST3120026AS
Empty	6	Unknown	Unknown
Empty	7	Unknown	Unknown
Empty	8	Unknown	Unknown
Empty	9	Unknown	Unknown

Below the table, it says "Device Count: 10".



The screenshot shows a window titled "Device Summary" with a menu bar containing "File" and "Options". Below the menu bar is a table with the following data:

Status	Path ID	Target ID	Device	Capacity	Model
Healthy	0	0	0	234439600	ST3120026AS
Empty	0	1	1	Unknown	Unknown
Empty	0	2	2	Unknown	Unknown
Empty	0	3	3	Unknown	Unknown
Empty	0	4	4	Unknown	Unknown
Healthy	1	0	5	234439600	ST3120026AS
Empty	1	1	6	Unknown	Unknown
Empty	1	2	7	Unknown	Unknown
Empty	1	3	8	Unknown	Unknown
Empty	1	4	9	Unknown	Unknown

Below the table, it says "Device Count: 10".

The Device Summary window has its own menu bar. All options available via the menu bar are shown below

File **Options**
Exit Sorting...
 Fields...

Exit

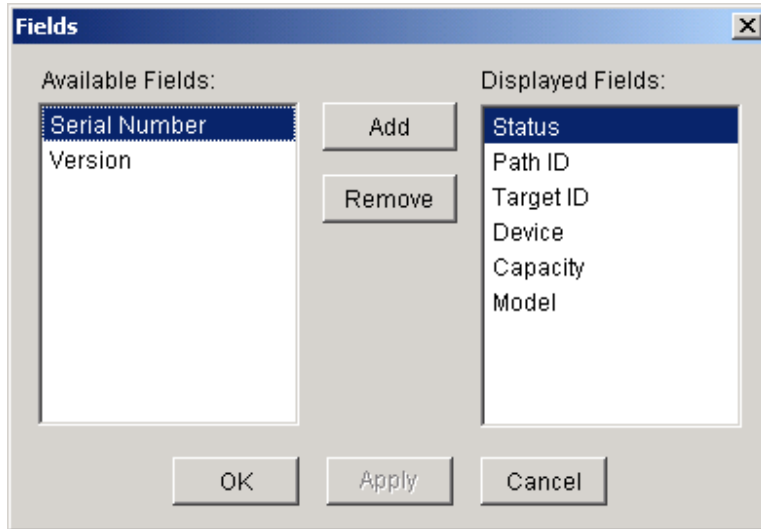
This command closes the Device Summary window.

Sorting

This command sorts the rows based on the selected field.

Fields

This command displays a dialog box to let user choose which fields will be shown in the Device Summary window.



8.2.8 Create RAID Group

This command displays a dialog box to let user create RAID group, user needs to specify the following parameters:

RAID Group Label: Provide a name for the RAID group

RAID Group: Select a group ID from the available ID list. Since the maximum number of RAID groups is limited to 9 so group ID can be from 1 to 9.

Configuration: Contiguous (for virtual disk)
Concatenated
Striped (for RAID 0)
Mirrored (for RAID 1)

Capacity: Select from a list of RAID group size, current options are from 1G to 100 GB, and MAX. Selecting MAX will create the largest RAID set possible with the drive(s) selected.

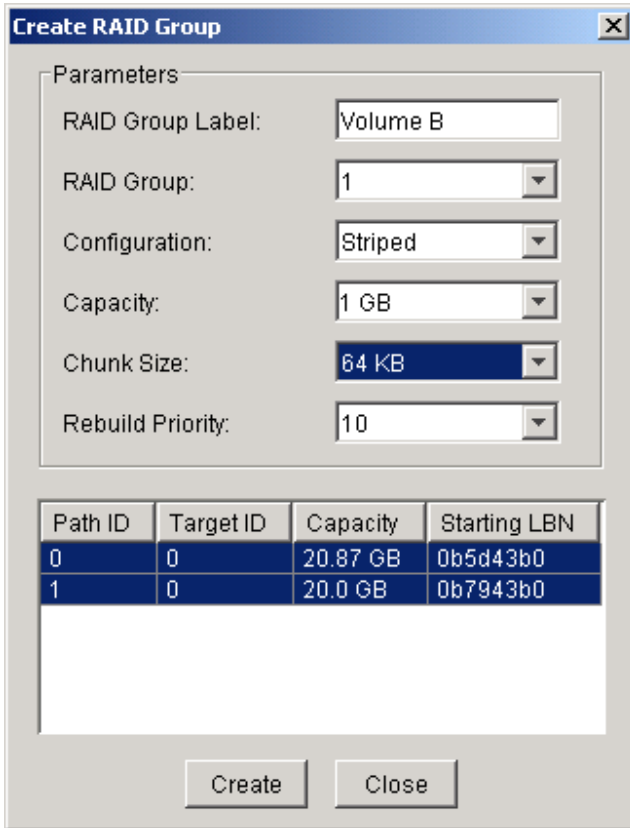
Chunk Size: Select one from the available list: 8, 16, 32, 64, 128 (KB). RAID 1 set and virtual disk do not require this. Chunk size is also known as stripe size.

Rebuild Priority: Select one from the available list: 1 to 10. RAID 0 set and virtual disk do not require this. 10 is a higher level of rebuild priority which means that rebuild times will be faster but will take more CPU resources in order to rebuild a failed RAID member. In contrast, selecting 1 will result in slower rebuild times but will take the least amount of CPU resources to complete a rebuild.

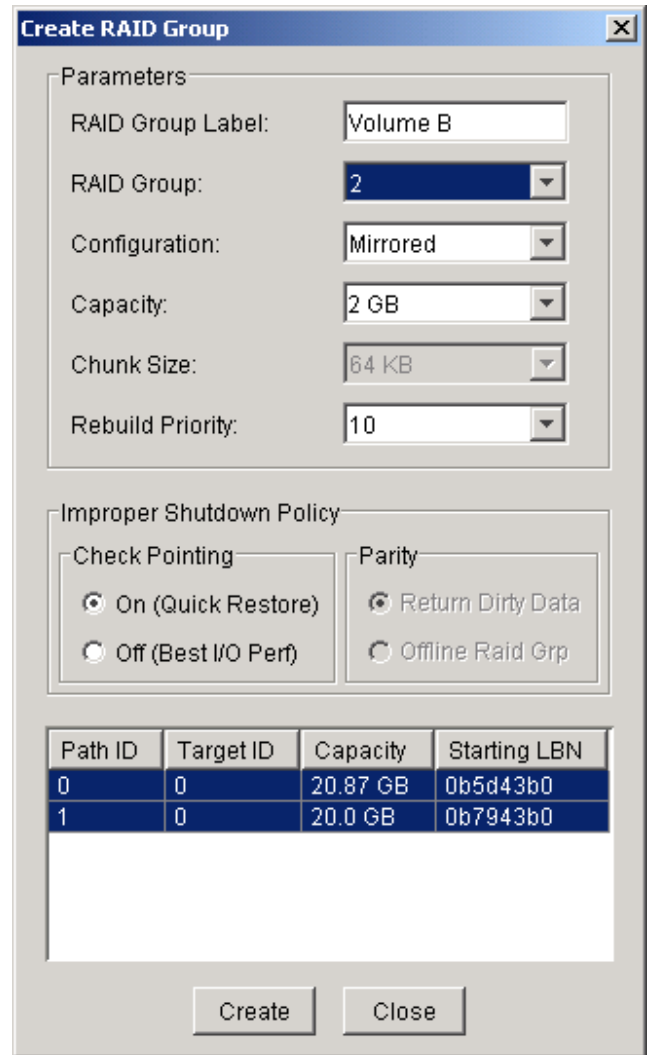
After parameters are set, click on the Create button on the bottom to create the RAID array. The array will appear in the Device Configuration Window of the SATARaid5 GUI.

If no other RAID sets are to be created, then click Cancel to exit the RAID creation window.

Go to the Disk Management Utility in Windows to initialize and format the newly created RAID set. Please refer to Chapter 7 Allocating Partitions in Windows for instructions on initialization and formatting.



Example 1



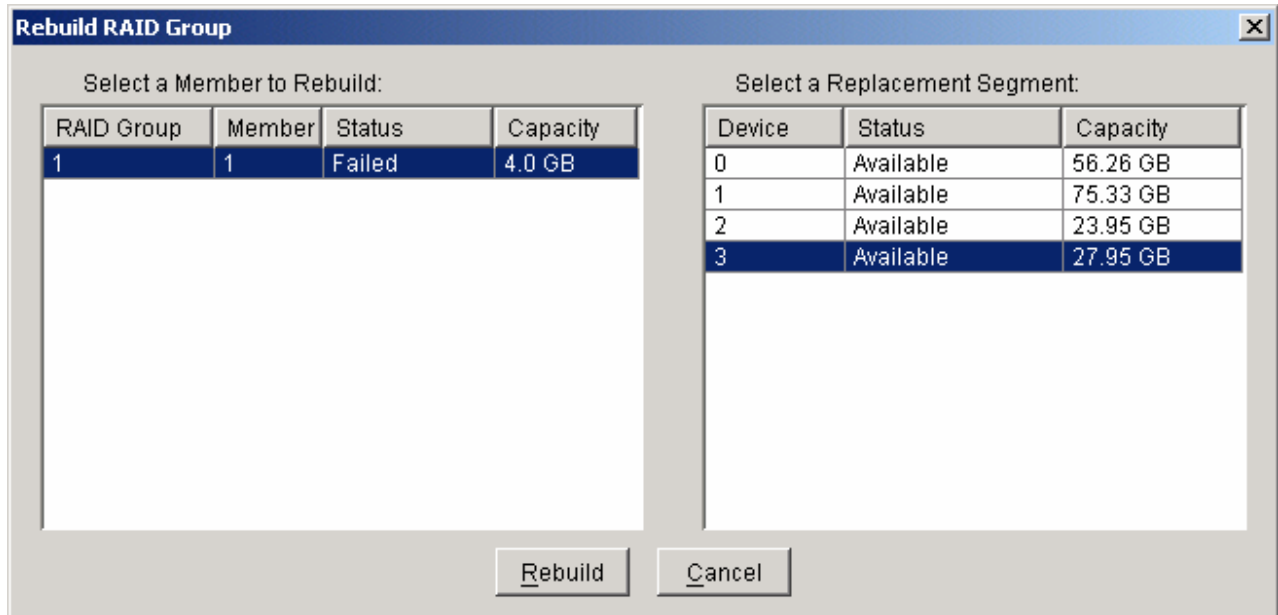
Example 2

In Example 1, a RAID 0 (Striped) array called Volume B – RAID Group 1 with capacity of 1GB with 64KB chunk size (stripe size) is created over hard drive 0 and 1.

In Example 2, a RAID 1 (Mirrored) array called Volume B- RAID Group 2 with capacity of 2GB with rebuild priority of 10 is created over hard drive 0 and 1.

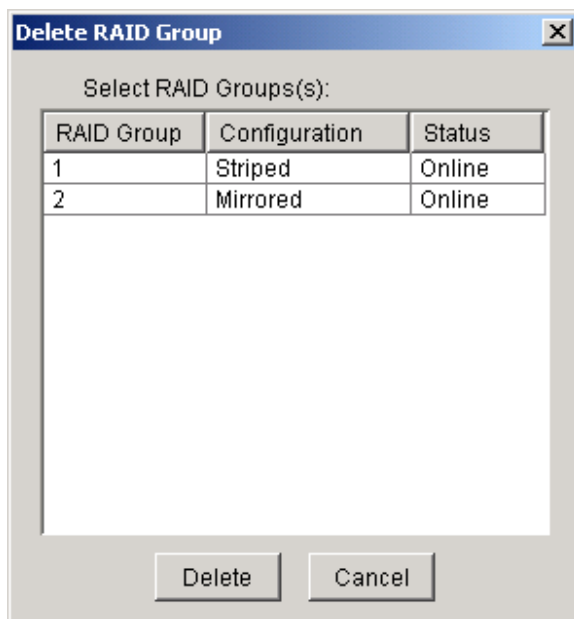
8.2.9 Rebuild RAID Group

This command displays a dialog box to let user choose a replacement segment to rebuild a non-fault tolerant RAID group.



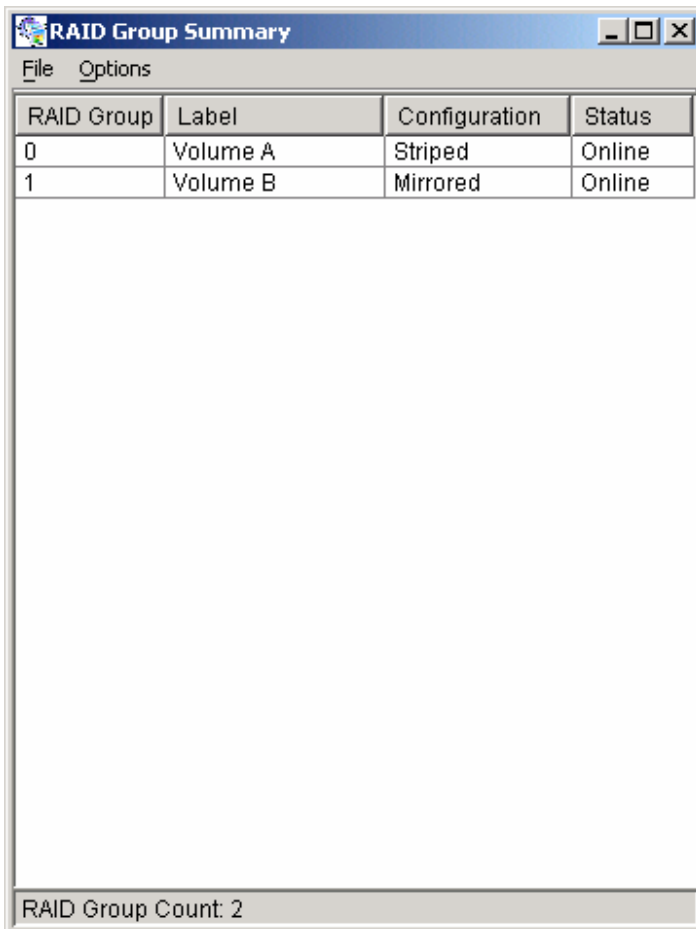
8.2.10 Delete RAID Group

This command displays a dialog box to let user choose RAID groups to delete.



8.2.11 RAID Group Summary

This command displays a dialog box to show all RAID groups' group ID, configuration, and status.



RAID Group	Label	Configuration	Status
0	Volume A	Striped	Online
1	Volume B	Mirrored	Online

RAID Group Count: 2

The RAID Group Summary window has it's own menu bar. All options available via the menu bar are shown below

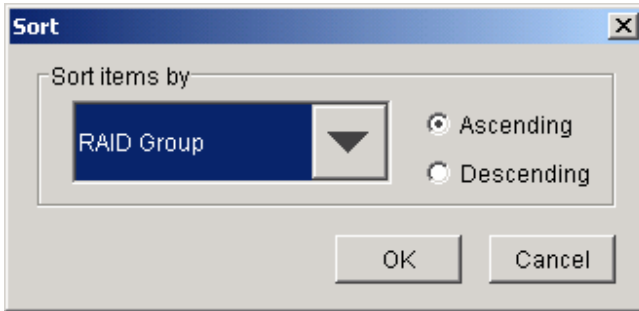
File	Options
Exit	Sorting...
	Fields...

Exit

This command closes the RAID Group Summary window.

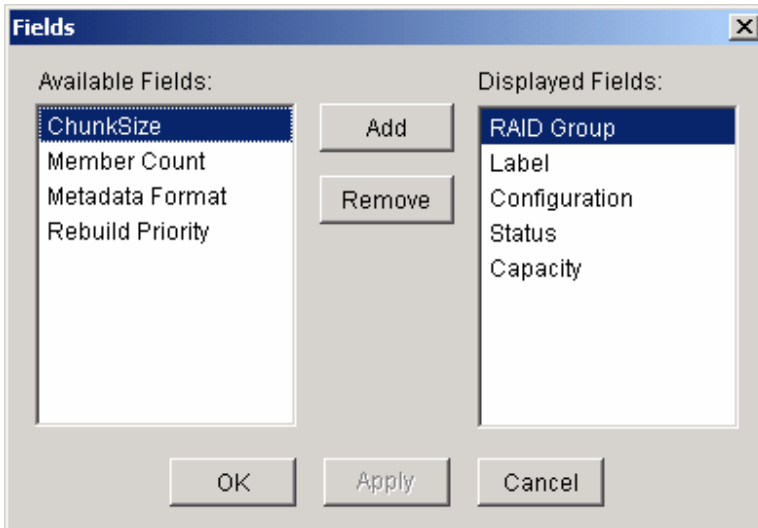
Sorting

This command displays a dialog box to let user choose an item to sort RAID group items in the RAID Group list.



Fields

This command displays a dialog box to let user choose which fields will be shown in the RAID Group Summary window.



8.2.12 Task Manager

This command displays the Task Manager window. The Task Manager window lists all RAID and disk management tasks that have been started and/or done. This window provides user the ability to schedule any RAID and disk management operations including RAID group creation, rebuild, and test.

Operation	Parameters	Start Time	End Time
Create RAID Group	Raid Group 0	4/7/04 2:25:32 PM	4/7/04 2:25:32 PM
Create Spare	Raid Group 0	4/7/04 2:26:38 PM	4/7/04 2:26:38 PM
Delete RAID Group	Raid Group 0	4/7/04 2:27:34 PM	4/7/04 2:27:34 PM
Delete Spare	Raid Group 0	4/7/04 2:27:39 PM	4/7/04 2:27:39 PM
Create RAID Group	Raid Group 0	4/7/04 2:30:31 PM	4/7/04 2:30:31 PM
Delete RAID Group	Raid Group 0	4/7/04 2:32:21 PM	4/7/04 2:32:21 PM
Create RAID Group	Raid Group 0	4/7/04 2:34:31 PM	4/7/04 2:34:31 PM
Delete RAID Group	Raid Group 0	4/7/04 2:34:48 PM	4/7/04 2:34:48 PM
Create RAID Group	Raid Group 0	4/7/04 2:40:53 PM	4/7/04 2:40:54 PM
Create Spare	Raid Group 0	4/7/04 2:41:59 PM	4/7/04 2:41:59 PM
Delete RAID Group	Raid Group 0	4/7/04 2:42:34 PM	4/7/04 2:42:34 PM
Delete Spare	Raid Group 0	4/7/04 2:42:45 PM	4/7/04 2:42:45 PM
Create RAID Group	Raid Group 0	4/7/04 2:43:02 PM	4/7/04 2:43:02 PM
Create Spare	Raid Group 0	4/7/04 2:43:40 PM	4/7/04 2:43:40 PM
Delete Spare	Raid Group 0	4/7/04 2:44:24 PM	4/7/04 2:44:24 PM
Delete RAID Group	Raid Group 0	4/7/04 2:44:30 PM	4/7/04 2:44:30 PM
Create RAID Group	Raid Group 0	4/7/04 2:46:08 PM	4/7/04 2:46:08 PM
Create RAID Group	Raid Group 1	4/7/04 2:46:35 PM	4/7/04 2:46:35 PM
Create Spare	Raid Group 0	4/7/04 2:48:09 PM	4/7/04 2:48:09 PM
Delete RAID Group	Raid Group 0	4/7/04 2:48:59 PM	4/7/04 2:48:59 PM
Delete RAID Group	Raid Group 0	4/7/04 2:48:59 PM	4/7/04 2:48:59 PM
Delete Spare	Raid Group 0	4/7/04 2:49:05 PM	4/7/04 2:49:05 PM
Create RAID Group	Raid Group 0	4/7/04 2:52:01 PM	4/7/04 2:52:01 PM
Create RAID Group	Raid Group 1	4/7/04 2:52:36 PM	4/7/04 2:52:36 PM

Task Count: 44

The Task Manager window has it's own menu bar. All options available via the menu bar are shown below

File	Options	Task
Open...	Sorting...	Modify...
Save...	Fields...	Suspend...
Print...		Resume...
Exit		Cancel...
		Delete...

Open

This option will be available in future revisions.

Save

This option will be available in future revisions.

Print

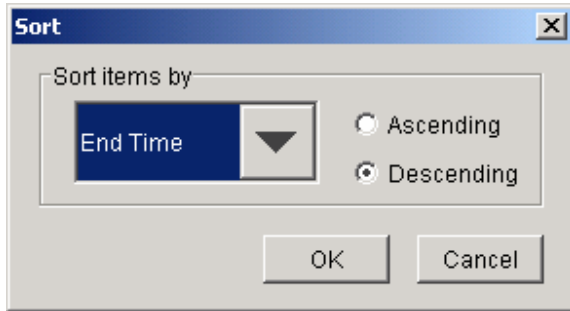
This option will be available in future revisions.

Exit

This command closes the Task Summary window.

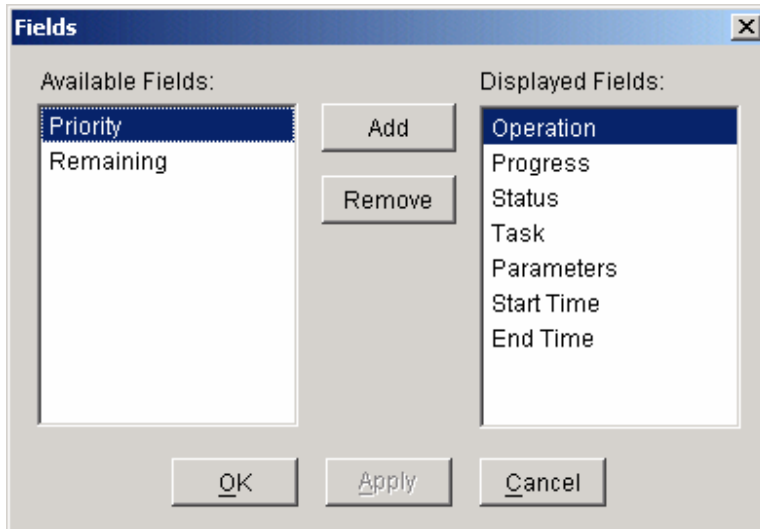
Sorting

This command displays a dialog box to let user choose an item to sort task items in the task list.



Fields

This command displays a dialog box to let user choose which fields will be shown in the task list.



Modify

This command allows user to modify parameters of the selected task items. The following is an example of changing rebuild priority for a rebuild task.

The screenshot shows a 'Task Summary' window with a menu bar (File, Options, Task) and a table of operations. A 'Modify Task Parameters' dialog box is open over the table, showing 'Dynamic Priority' set to 10. The table lists various RAID operations with their status, parameters, start times, and end times. The last row in the table is highlighted in blue.

Operation	Status	Parameters	Start Time	End Time
Create RAID Group	Comple...	Raid Group 0	4/30/04 9:51:03 AM	4/30/04 9:51:03 AM
Create RAID Group	Comple...	Raid Group 1	4/30/04 9:51:15 AM	4/30/04 9:51:15 AM
Create RAID Group	Comple...	Raid Group 2	4/30/04 10:00:56 AM	4/30/04 10:00:56 AM
Delete RAID Group	Comple...	Raid Group 0	4/30/04 10:01:06 AM	4/30/04 10:01:06 AM
Delete RAID Group Me...	Comple...	Raid Group 0	4/30/04 10:04:04 AM	4/30/04 10:04:04 AM
Delete RAID Group Me...	Failed	Raid Group 0	4/30/04 10:04:04 AM	4/30/04 10:04:04 AM
Create RAID Group	(C)		AM	4/30/04 10:22:43 AM
Delete RAID Group	(C)		AM	4/30/04 10:23:49 AM
Delete RAID Group	(C)		AM	4/30/04 10:23:57 AM
Delete RAID Group	(C)		AM	4/30/04 10:23:57 AM
Create RAID Group	(C)		AM	4/30/04 10:24:11 AM
Create RAID Group	(C)		AM	4/30/04 10:24:21 AM
Delete RAID Group Me...	(C)		AM	4/30/04 10:24:50 AM
Rebuild RAID Group	(C)		AM	4/30/04 10:33:06 AM
Delete RAID Group Me...	(C)		AM	4/30/04 10:53:36 AM
Rebuild RAID Group	(C)		AM	4/30/04 10:54:48 AM
Rebuild RAID Group	Active	Raid Group 1	4/30/04 10:58:49 AM	

Task Count: 17

Suspend

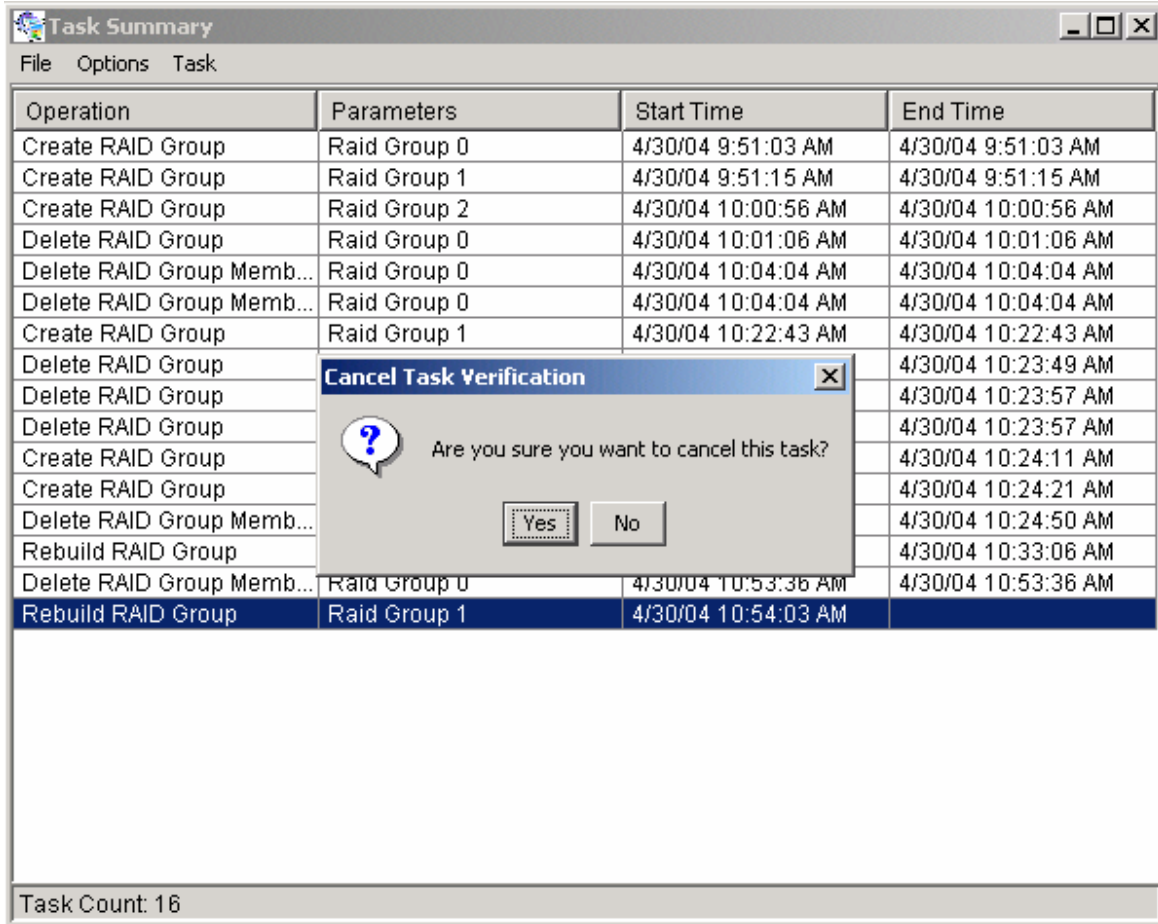
This command allows user to suspend the selected task items.

Resume

This command allows user to resume the suspended task items.

Cancel

This command allows user to cancel the selected task items.



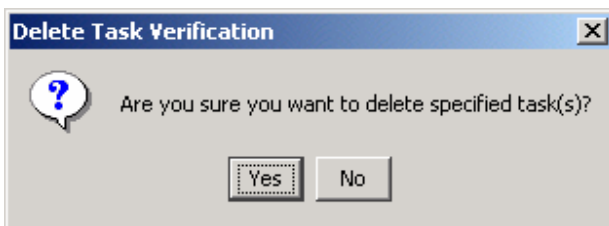
The screenshot shows the 'Task Summary' window with a menu bar (File, Options, Task) and a table of tasks. A dialog box titled 'Cancel Task Verification' is overlaid on the table, asking 'Are you sure you want to cancel this task?' with 'Yes' and 'No' buttons.

Operation	Parameters	Start Time	End Time
Create RAID Group	Raid Group 0	4/30/04 9:51:03 AM	4/30/04 9:51:03 AM
Create RAID Group	Raid Group 1	4/30/04 9:51:15 AM	4/30/04 9:51:15 AM
Create RAID Group	Raid Group 2	4/30/04 10:00:56 AM	4/30/04 10:00:56 AM
Delete RAID Group	Raid Group 0	4/30/04 10:01:06 AM	4/30/04 10:01:06 AM
Delete RAID Group Memb...	Raid Group 0	4/30/04 10:04:04 AM	4/30/04 10:04:04 AM
Delete RAID Group Memb...	Raid Group 0	4/30/04 10:04:04 AM	4/30/04 10:04:04 AM
Create RAID Group	Raid Group 1	4/30/04 10:22:43 AM	4/30/04 10:22:43 AM
Delete RAID Group			4/30/04 10:23:49 AM
Delete RAID Group			4/30/04 10:23:57 AM
Delete RAID Group			4/30/04 10:23:57 AM
Create RAID Group			4/30/04 10:24:11 AM
Create RAID Group			4/30/04 10:24:21 AM
Delete RAID Group Memb...			4/30/04 10:24:50 AM
Rebuild RAID Group			4/30/04 10:33:06 AM
Delete RAID Group Memb...	Raid Group 0	4/30/04 10:53:36 AM	4/30/04 10:53:36 AM
Rebuild RAID Group	Raid Group 1	4/30/04 10:54:03 AM	

Task Count: 16

Delete

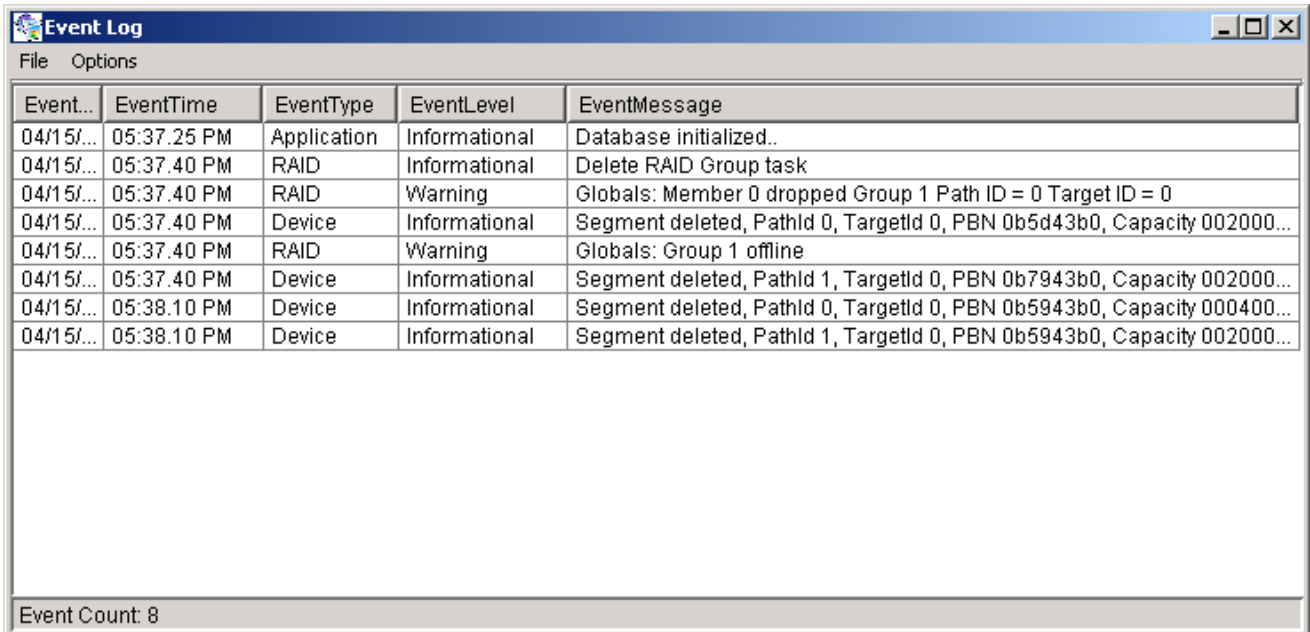
This command displays a dialog box to let user delete the selected task items from the task list in Task Summary window. The following dialog box will pop up to get confirmation from the user.



The screenshot shows a dialog box titled 'Delete Task Verification' with a question mark icon and the text 'Are you sure you want to delete specified task(s)?'. It has 'Yes' and 'No' buttons.

8.2.13 Event Log

This command displays the Event Log window. The Event Log window displays SATA device-related events that occur while SATARAID5 is running.



The screenshot shows a window titled "Event Log" with a menu bar containing "File" and "Options". Below the menu bar is a table with the following columns: EventTime, EventType, EventLevel, and EventMessage. The table contains 8 rows of event data. At the bottom of the window, it says "Event Count: 8".

EventTime	EventType	EventLevel	EventMessage
04/15/... 05:37.25 PM	Application	Informational	Database initialized..
04/15/... 05:37.40 PM	RAID	Informational	Delete RAID Group task
04/15/... 05:37.40 PM	RAID	Warning	Globals: Member 0 dropped Group 1 Path ID = 0 Target ID = 0
04/15/... 05:37.40 PM	Device	Informational	Segment deleted, Pathid 0, Targetid 0, PBN 0b5d43b0, Capacity 002000...
04/15/... 05:37.40 PM	RAID	Warning	Globals: Group 1 offline
04/15/... 05:37.40 PM	Device	Informational	Segment deleted, Pathid 1, Targetid 0, PBN 0b7943b0, Capacity 002000...
04/15/... 05:38.10 PM	Device	Informational	Segment deleted, Pathid 0, Targetid 0, PBN 0b5943b0, Capacity 000400...
04/15/... 05:38.10 PM	Device	Informational	Segment deleted, Pathid 1, Targetid 0, PBN 0b5943b0, Capacity 002000...

The Event Log window has its own menu bar. All options available via the menu bar are shown below

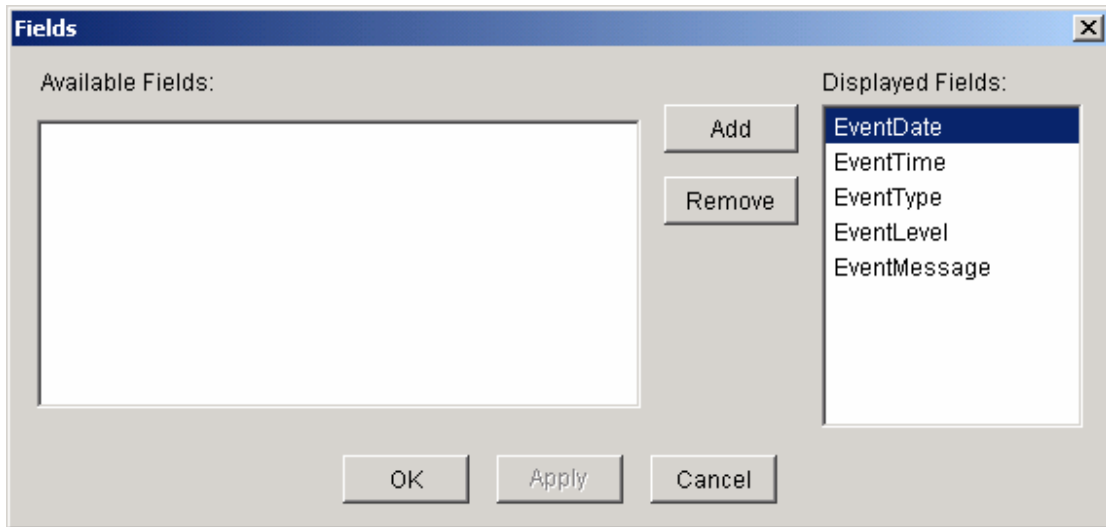
File **Options**
Exit Fields...

Exit

This command closes the Event Log window.

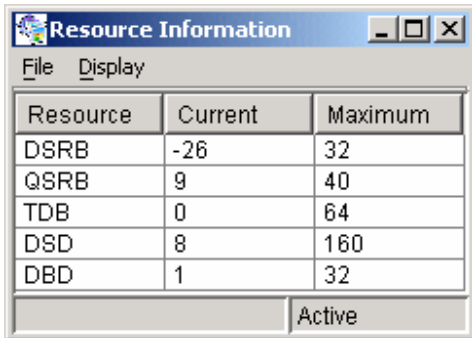
Fields

This command displays a dialog box to let user choose which fields will be shown in the event log.



8.2.14 Resources

This command displays the Resource Information window. This feature is for debugging purpose only.



Resource	Current	Maximum
DSRB	-26	32
QSRB	9	40
TDB	0	64
DSD	8	160
DBD	1	32

Active

8.2.15 Create Legacy RAID Group

This command displays a dialog box to let user create legacy RAID group. This item is disabled if new RAID groups exist.

User needs to select the following parameters:

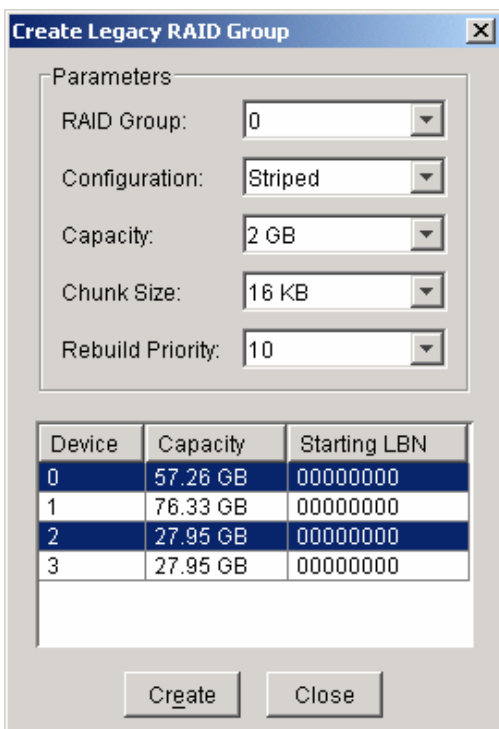
RAID Group: Select a group ID from the available ID list

Configuration: Striped (for RAID 0)
Mirrored (for RAID 1)

Capacity: Select from a list of RAID group size, current options are from 256 MB to 100 GB, and MAX.

Chunk Size: Select one from the available list: 8, 16, 32, 64, 128 (KB). RAID 1 set does not require this.

Devices: Select RAID member devices from the available device segment list



Parameters

RAID Group: 0

Configuration: Striped

Capacity: 2 GB

Chunk Size: 16 KB

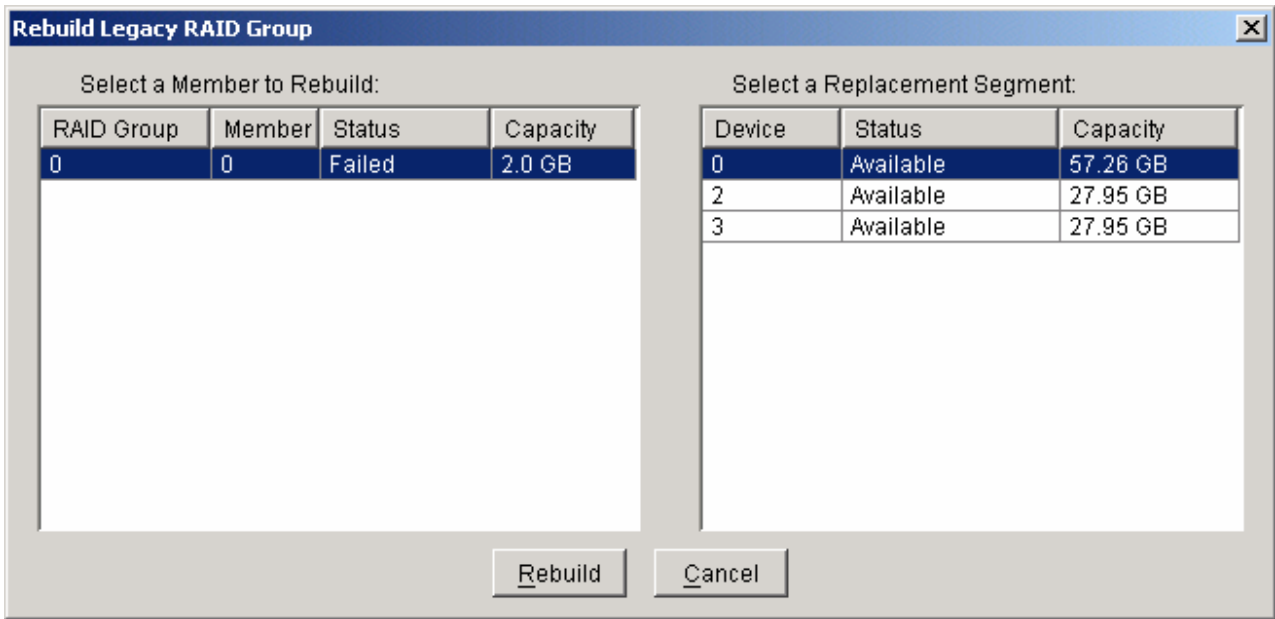
Rebuild Priority: 10

Device	Capacity	Starting LBN
0	57.26 GB	00000000
1	76.33 GB	00000000
2	27.95 GB	00000000
3	27.95 GB	00000000

Create Close

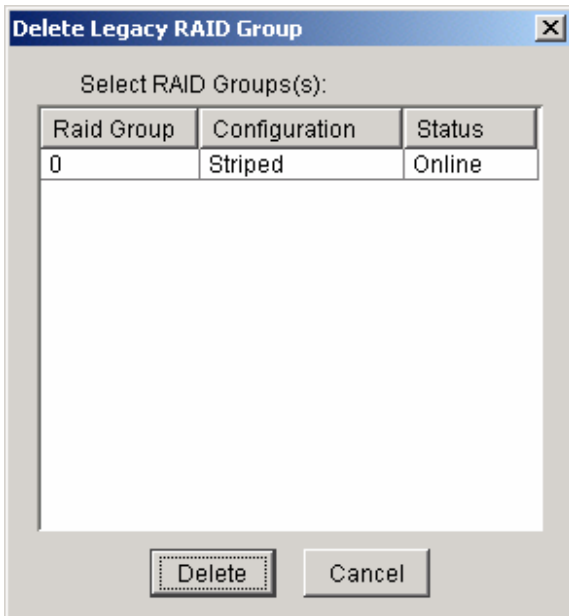
8.2.16 Rebuild Legacy RAID Group

This command displays a dialog box to let user choose a replacement segment to rebuild a non-fault tolerant legacy RAID group.



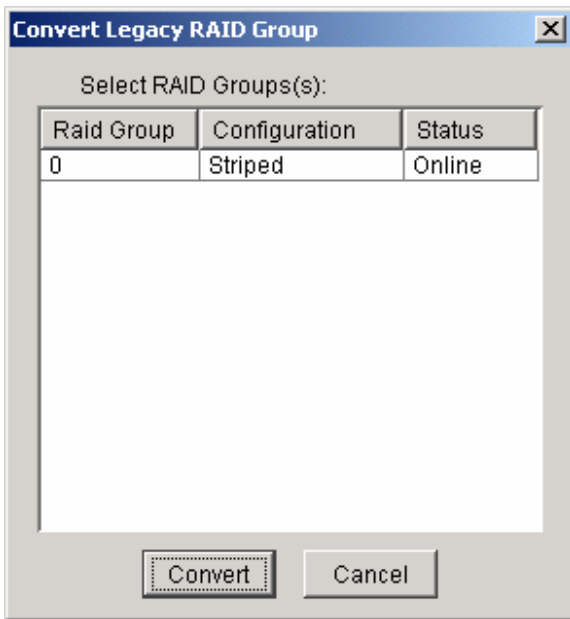
8.2.17 Delete Legacy RAID Group

This command displays a dialog box to let user choose legacy RAID groups to delete. This item is disabled if no legacy RAID groups exist.



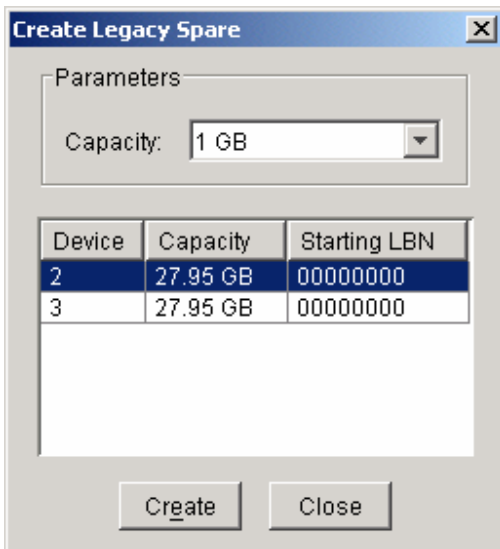
8.2.18 Convert Legacy RAID Group

This command displays a dialog box to let user choose legacy RAID groups to convert to new RAID groups of the same RAID type (configuration). This item is disabled if no legacy RAID groups exist.



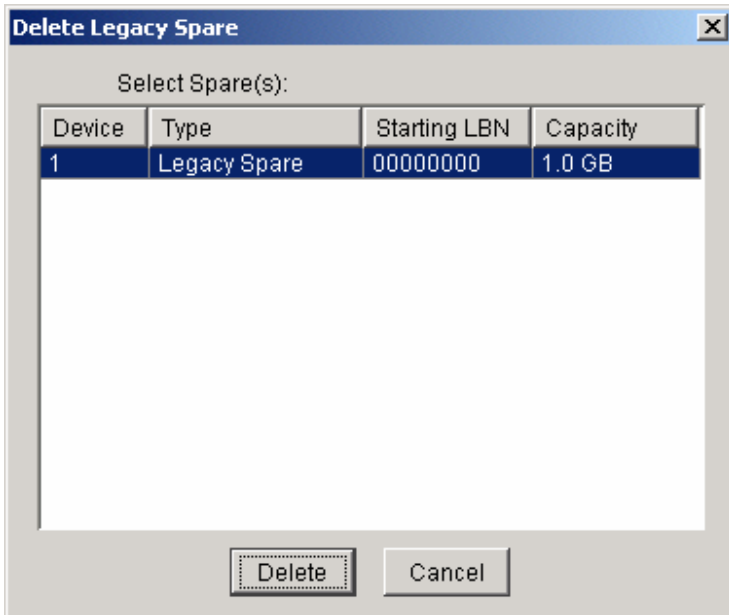
8.2.19 Create Legacy Spare

This command displays a dialog box to let user create legacy spare drive. This item is disabled if new RAID groups exist.



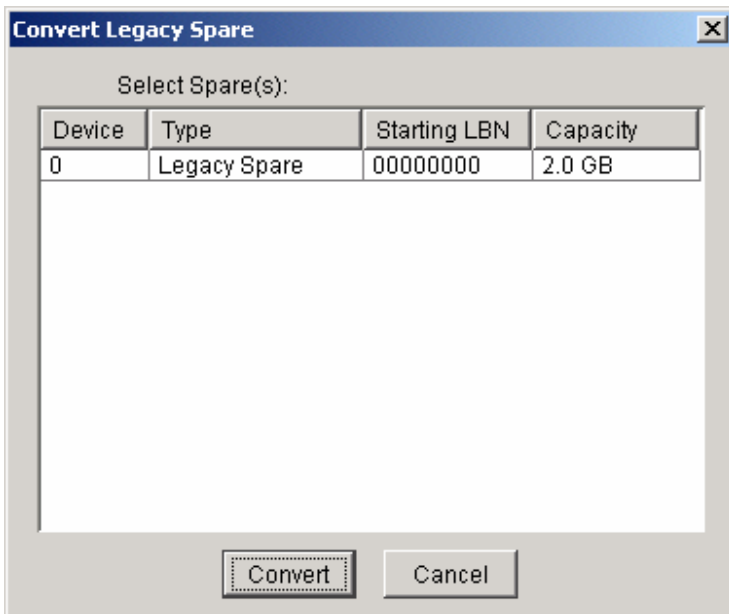
8.2.20 Delete Legacy Spare

This command displays a dialog box to let user delete legacy spare drive. This item is disabled if no legacy spare drive exists.



8.2.21 Convert Legacy Spare

This command displays a dialog box to let user choose legacy spare drives to convert to new spare drives. This item is disabled if no legacy spare drives exist.



8.2.22 Help Topics

This command opens an interactive help dialog using the standard Windows help interface.

This option will be available in future revisions.

8.2.23 About

This command displays a dialog box with more information about the SATARAID5 program, including the revision level.



