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Marvell RAID Utility User Guide

December 6, 2006



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1 GETTING STARTED

This chapter describes how to get started with the Marvell Redundant Array of Independent Disks (RAID) Utility, including how to access and install this utility.

The topics included in this chapter are:

- Product Overview
- Setting Up the Software



1.1 Product Overview

The Marvell RAID Utility (MRU) software is a web-based graphical user interface (GUI) tool for the Marvell RAID adapter. The MRU GUI enables you to create and manage logical drives from the physical disk drives installed in your computer. RAID technology allows you to create logical drives based on one or more physical disk drives in combination for fault tolerance and improved performance.

For more information about RAID technology and how to determine a RAID level for your logical drive, see Chapter 4, Selecting a RAID Level.

Note: The terms adapter and controller are used interchangeably for the purpose of this document.

1.1.1 System Requirements

Before you begin, ensure that your computer meets the following requirements:

- Operating systems: Microsoft Windows® XP Media Center Edition 2005, Windows XP Professional, Windows 2003, and Windows 2000.
- Hardware: The Marvell RAID Adapter supports one PATA and a maximum of four SATA disk drives. Ensure the SATA and PATA drives are appropriately connected. For instructions on how to connect the SATA and the PATA drives, see Installing the Disk Drives on page 1-4.
- RAID adapter/controller driver
- Web service

1.1.2 Software Components

During a full installation, all of the following components, except the CLI, are automatically installed on your computer. A custom installation requires you to select individual components. The MRU software CD includes the following items:

- **Driver**. The driver is automatically installed on your system during MRU installation.
- Web service. The Apache server is automatically installed on your system during MRU installation.
- Marvell Command Line Interface (CLI). The CLI, for only Linux users, is available with custom installation of the software.

Note: The Linux operating system will be supported in a future release of the MRU.

■ Marvell RAID Utility software.

Note: The Marvell BIOS Configuration, a built-in component of the Marvell RAID controller, can create, initialize, and delete the logical drives. For instructions about using the Marvell BIOS Configuration, see Chapter 3, Configuring RAID Using the Basic Input/Output System (BIOS).



1.1.3 Supported RAID Levels

The Marvell RAID controller supports the following RAID levels:

- RAID 0 (striping). In this RAID system, identical drives can read and write data in parallel to increase performance.
- RAID 1 (mirroring). In this RAID system, mirroring increases read performance through load balancing and elevator sorting while creating a complete real-time backup of your files.
- RAID 10 (mirroring/striping). In this nested RAID system, combining mirroring with striping offers both high read/write performance and fault-tolerance.

For more information about RAID levels, see Comparing RAID Levels on page 4-39.



1.2 Setting Up the Software

This section describes how to install the disk drives and the MRU.

The topics included in this section are:

- Installing the Disk Drives
- Verifying Driver Installation
- Installing the Software

1.2.1 Installing the Disk Drives

Before installing the MRU, ensure that you have the required number of SATA and PATA disk drives connected to the appropriate ports on your computer's motherboard. We recommend installing SATA and PATA drives of similar capacity, which enhance performance.

To install the SATA and PATA disks

- 1. Connect one end of each data cable to the individual disk drives and connect the other end of each data cable to the connectors either on the motherboard or on the adapter.
- 2. Connect power to each of the disk drives.

Note: To create the logical drives, use only drives connected to a single adapter.

The following table lists the minimum number of drives required for each RAID level.

RAID Level	Number of Drives Required
RAID 0	Any number
RAID 1	2 only
RAID 10	4 only

1.2.2 Verifying Driver Installation

To run the MRU, install the driver specific to your operating system. The driver file is automatically installed on your computer during MRU installation.

To verify the driver installation

1. On the Desktop, right-click My Computer, and then select Manage.

The Computer Management window appears.

2. In the left pane, double-click System Tools, and then double-click Device Manager.

The left pane displays a list of devices for your computer. If the driver properly installed during the MRU installation, the right pane displays the Marvell RAID adapter under SCSI and RAID Controllers.



1.2.3 Installing the Software

This sections describes the MRU Setup Wizard windows. The recommended screen resolution for the MRU GUI is 1024 \times 768 pixels.

To install the MRU software

1. Insert the MRU CD into your computer's CD drive.

The MRU Setup Wizard starts.

Figure 1-1 MRU Setup Wizard: Main Window



2. Click NEXT.

The Choose Components window appears, as shown in Figure 1-2, with the Full install option pre-selected.



Figure 1-2 MRU Setup Wizard: Choose Components

1¥61XX MRU Setup		
Carter	Choose Components	
	Choose which features of Marvell 6	1XX MRU you want to install.
Check the components you	u want to install and uncheck the comp	onents you don't want to
Select the type of install:	Full	.
Or, select the optional components you wish to install:	MRU (required)	
Space required: 29.1MB	Description Position your mouse over a con	nponent to see its
lsoft Install System v2,18	description,	

3. Select the options you want for custom installation.

Web Service is preselected for both Full and Custom installation. If you deselect this option, the Apache server is not installed if the Web Service is unavailable on your computer. Web Service is required to run the MRU software.

4. Click NEXT.

The Choose Install Location window appears, as shown in Figure 1-3, with the default location displayed in the **Destination Folder** field.



MV61xx MRU Setup				_ 🗆 🗙
	Choose Insta Choose the fo	all Location older in which to inst	all Marvell 61XX I	MRU.
Setup will install Marvell 6 Browse and select anoth	51XX MRU in the fo er folder, Click Inst	llowing folder. To in: tall to start the insta	stall in a differen llation.	: folder, click
Destination Folder				
C:\Program Files\Ma	rvell\61xx		Bro	vse
Space required: 29.1MB				
Space available: 31.4GB				
Space available: 31.4GB Vullsoft Install System v2.18	8			
Space available: 31.4GB Julisoft Install System v2.18	8	< Back	Install	Cancel

Figure 1-3 MRU Setup Wizard: Choose Install Location

5. Click **Browse**, and then select the installation location.

6. Click Install.

The installation window appears for a few seconds, indicating that installation is in progress.

Afterwards, the installation wizard appears, indicating that the software installation is now complete, as shown in Figure 1-4.



MV61xx MRU Setup	
Fo	Completing the Marvell 61XX MRU Setup Wizard Marvell 61XX MRU has been installed on your computer. Click Finish to close this wizard.
	Visit the Marvell site for the latest news, FAQs and support
	< Back Finish Cancel

Figure 1-4 MRU Installation Wizard: Last Window

7. Click Finish.

A shortcut to the MRU software appears on the **Desktop**.



2 USING THE SOFTWARE

The Marvell RAID Utility (MRU) creates and manages logical drives on your computer by using RAID technology. RAID allows multiple physical drives to be combined together to create a logical drive. Logical drives can continuously protect critical data and improve performance depending on which RAID level you choose. For more information, see Comparing RAID Levels on page 4-39.

Although most functions pertaining to creating and managing logical drives can be performed using the Marvell BIOS Configuration or the Marvell CLI, the MRU GUI offers additional capabilities. The GUI is an easy-to-use customization tool for managing logical drives.

This chapter describes the options available in the MRU for creating and managing logical drives. The topics included in this chapter are:

- GUI Overview
- Viewing and Creating a Logical Drive
- Modifying a Logical Drive
- Deleting a Logical Drive
- Rebuilding a Logical Drive
- Initializing a Logical Drive
- Checking the Integrity of a Logical Drive



2.1 GUI Overview

The MRU GUI has a top and bottom pane, as shown in Figure 2-1. The top pane, with four tabs, is the interactive interface. The four tabs in this pane are Logical Drives, Physical Drives, Adapters, and System. Clicking on each tab brings up a window that lets you perform specific tasks and view configuration details specific to that tab.

All L	ogical Dr	ives			
	Name	stat	us Size	RAID Level	Activity
	Logical Drive 1 (Id: 0)	Functio	onal 18 GB	RAID 1	
	Logical Drive 1 (Id: 1)	Functio	onal 100 GB	RAID 0	
	Logical Drive 1 (Id: 2)	Functio	onal 28 GB	RAID 0	
	Logical Drive 1 (Id: 3)	Degra	ded 185 GB	RAID 1	
Eve	nt Log (Tot	al Events: 16)			
	Class Code	Time		Description	
	1 C.S. 1 CAAN	and the second se	AND REAL PROPERTY AND REAL PROPERTY AND REAL PROPERTY.	1 completed	
0	1 14	07/20/06 02:03 pm	Integrity check on LD (o completed	
0	1 14 1 15	07/20/06 02:03 pm 07/20/06 02:02 pm	Integrity check on LD (Integrity check on LD () is 90% done	

Figure 2-1 MRU Main Window



The bottom pane displays the status and severity of events in the RAID system. The following table describes the three kinds of events.

Symbol	Name	Description
()	Info	This is for information only.
Δ	Warning	This is to notify that the user may need to take an action.
∞	Major	This is to notify that an action is urgently required.

The following sections describe the items in the top pane and the options available under each tab.

2.1.1 Logical Drives

The Logical Drives window, shown in Figure 2-2, lets you perform the following tasks:

- View the existing logical drives and their configurations.
- Create a new RAID.
- View the properties for individual logical drives, as shown in Figure 2-3.

Figure 2-2 MRU Logical Drives

Logical Drive 1 Functional 18 GB F	RAID 1
Logical Drive 1 Functional 100 GB F	RAID 0
Logical Drive 1 Functional 28 GB	RAID 0
Logical Drive 1 Degraded 185 GB	RAID 1



Figure 2-3 MRU Logical Drive Details



The Logical Drive Details window performs the following tasks: Delete, Modify, Restore, Rebuild, Check integrity, and Initialize.

2.1.2 Physical Drives

The Physical Drives window displays the SATA and PATA drives on your computer and indicates the status for each physical drive, as shown in Figure 2-4,



Note: Click LEGEND at the bottom corner for a quick overview of the drive icons.



Figure 2-4 MRU All Physical Drives



Click on an individual drive to view the Physical Drive Details window, as shown in Figure 2-5.



The Physical Drive Details window displays the properties for the specific physical drive and the available resources for creating a logical drive.

Figure 2-5 MRU Physical Drive Details

Physical Drive Details	CLEAR SPARE OMODIEY OREST
Properties	Values
ID	0
Technology	SATA
Model	ST3160812AS
Size	160 GB
Hot-Spare	Yes
Adapter ID	0
Parent Device	HBA Port
Parent Device Port ID	0
Phy ID	0
PIO Mode	4
MDMA Mode	2
UDMA Mode	6
Feature Support	NCQ TCQ 1.5G
Serial Number	5LS2H74
Firmware Version	3.AAE
Write Cache	O OFF O ON

You can perform the following tasks from this window:

- View the properties for each physical drive connected to the RAID controller.
- Set a physical drive as a spare drive for use while rebuilding a logical drive.



2.1.3 Adapters

The Adapters window, as shown in Figure 2-6, provides information about each adapter, including the Driver Version, Vendor Device ID, Sub Vendor Device ID, Port Count, Background Activity Rate, and Auto-Rebuild.

Note: Your computer can have a maximum of two adapters.

Figure 2-6	MRU	Adapters
------------	-----	----------

Adapter 0	(Modier) (Ore
Properties	Values
Driver Version	1.1.0.38
Vendor Device ID	11ab
Sub Vendor Device ID	6121
Port Count	3
Background Activity Rate	128
Auto-Rebuild	C OFF C ON

You can perform the following tasks from this window:

- Turn the alarm on or off.
- Set Auto-Rebuild on or off.
- Cancel the changes and restore the configuration.



2.1.4 System

The System window, as shown in Figure 2-7, provides information about the system-level components of the MRU software.

Figure 2-7 MRU System

System		
Properties	Values	
RAID API Version	1.0.0.17	
Extension API Version	1.0.0.14	
RAID XML Version	1.0.0.21	
RAID Service Agent Version	1.0.0.7	



2.2 Viewing and Creating a Logical Drive

You can view details about an existing logical drive and create a new logical drive from the Logical Drives window of the MRU.

To view the logical drive details

- 1. Start the MRU.
- 2. Click the Logical Drives tab, as shown in Figure 2-2, and then click the icon for the individual logical.

The Logical Drive Details window appears, as shown in Figure 2-8.

Figure 2-8 MRU Logical Drive Details

Logical Drive	Details			
Logical Drive	Details	Calls (Modify) (SRESTORE)		
REBUILD	Member Drives			
CHECK INTEGRITY	Adapter 0			
INITIALIZE	SATA PATA 250 G 204 G (18 G) (18 G) ID: 4 ID: 8			
	Properties	Values		
	Name	Logical Drive 1		
3	ID	0		
18 GB	RAID Level	RAID 1		
Functional	Status	Functional		
	Background Activity Status	None		
	Size	18 GB		
	Member Count	2		
	Stripe Size	128 K		
	Write Cache Mode	• Write Through C Write Back		
	Read Cache Mode	C Look Ahead C None		
	Auto Rebuild	C OFF @ ON		

You can determine the status of each logical drive by its icon, which are listed in the following table.

Symbol	Name	Description
	Functional logical drive	This logical drive operates at its optimal strength.
	Offline logical drive	This logical drive is not functional, either due to a disk failure or a disk being unplugged.



Symbol	Name	Description
	Degraded logical drive	This logical drive is no longer reliable. Therefore, you must either rebuild the drive or delete it. If you have a degraded logical drive, the alarm goes on. To turn off the alarm, click on the Adapters tab.

Note: Click LEGEND at the bottom corner for a quick overview of the logical drive types.

To create a logical drive

- **1.** Start the MRU.
- 2. Click the Logical Drives tab.
- 3. At the upper right side of the screen, click **Create New RAID**.

The Create Logical Drive window appears, as shown in Figure 2-9. This window displays the physical drives available for creating new logical drives.

Figure 2-9 MRU Create Logical Drive

LC	GICAL DRIVES	PHYSICAL DRIVES	ADAPTERS	SYSTEM	1	
6			PHONE INT			-
	Create	Logical Drive				
-	RAID Level	RAID 1 💌		Adapter		
100	Adapter	- 0				100
	SATA 160 G (160 G) ID: 0	SATA 250 G (250 G) ID: 4				
	PATA 200 G (200 G) ID: 8					
131						
101						
					LEGEND	
	Selected RAII Available Cap) Level acity for selected Drive s	et		1 Select Drive	
1010					1	-
				@ PREV		
			THE PARTY OF	SALL BURNERS		



4. In the **RAID Level** box, select a level.

Table 2-1 lists the minimum number of drives required for each RAID level.

Table 2-1 Raid Level

RAID Level	Number of Drives Required
RAID 0	Any number
RAID 1	2 only
RAID 10	4 only

- 5. In the Adapter box, select the appropriate adapter.
- 6. Click on the specific SATA and PATA drives to create the RAID of your choice.
- 7. Click NEXT.

Note: If the combination of selected drives is not supported by the particular RAID level, an error message appears reminding you to select the appropriate number of drives.

The second Create Logical Drive window appears, as shown in Figure 2-10, and for setting the properties.



Figure 2-10 MRU Create Logical	Drive	(second	window)	
--------------------------------	-------	---------	---------	--

Name	Logical Drive 1	RAID Set Size 101 GB	
Stripe Size	64K 💌		
Cache	Write Through 💌 Look Ahead 💌		
Initialize	Quick		
Selected RAI Available Ca	D level pacity for selected Drive set	0 101	

8. Enter the desired value in each field, and then click **SUBMIT** at the bottom of the screen.

Note: You have three options for initializing a logical drive: Quick, Full, and None. You can initialize the logical drive while creating it or afterwards.

A window appears with a message about formatting the new logical drive.

9. Click OK.

The All Logical Drives window appears, displaying the new logical drive.



2.3 Modifying a Logical Drive

You can change the configuration of an existing logical drive to enhance its performance.

To modify a logical drive

- 1. Start the MRU.
- 2. Click the Logical Drives tab, and then click the icon for the logical drive.

The Logical Drive Details window appears, as shown in Figure 2-11.

Figure 2-11 MRU Logical Drive Details

Logical Drive	Details	
(REBUILD)		
	Member Drives	LEGE
INITIALIZE	SATA PATA 250 G 204 G (18 G) (18 G) ID: 4 ID: 8	
	Properties	Values
	Name	Logical Drive 1
	ID	0
18 GB	RAID Level	RAID 1
Functional	Status	Functional
	Background Activity Status	None
	Size	18 GB
	Member Count	2
	Stripe Size	128 K
	Write Cache Mode	• Write Through C Write Back
	Read Cache Mode	Look Ahead C None
	Auto Rebuild	C OFF CON

3. Change the properties as needed, and then click **MODIFY** at the top of the screen.

Note: To return the editable properties to their original values, click RESTORE.



2.4 Deleting a Logical Drive

If you want to change the size of a logical drive, you must delete that logical drive and create a new one with the desired configuration.

To delete a logical drive

- 1. Start the MRU.
- 2. Click the Logical Drives tab, and then click the icon for the logical drive.

The Logical Drive Details window appears.

3. Click Delete.

A message appears confirming the deletion of the logical drive.

4. Click OK.

After deleting the logical drive, the additional free space is shown in the space available on the physical drives. Any physical drive that is not used as part of a logical drive is available through the Windows Storage Manager.



2.5 Rebuilding a Logical Drive

The MRU can rebuild the logical drive by reconstructing data from a failed drive onto one of its spare physical drives. Rebuilding is available for logical drives created using RAID level 1 and 10, which have the capability of mirroring data.

RAID 0 excludes rebuild capabilities. Therefore, the entire stripe is lost if one of the physical drive fails.

When a logical drive fails and is degraded, you are notified in two ways:

- Triggering of the alarm. You can turned it off in the **Adapters** window.
- Displaying the logical drive red icon with a warning symbol next to it.

You have the option to rebuild the logical drive either automatically or manually. To use the auto-rebuild process, there must be a spare drive available. Go to the Physical Drive Details window to set a physical drive as a spare. Any physical drive that is fully or partially configured cannot be set as a spare drive.

2.5.1 Auto-Rebuild

If the Auto-Rebuild option is on when creating the logical drive, the rebuilding process begins automatically if there is a degraded drive.

2.5.2 Manual Rebuild

Follow these steps to manually rebuild a logical drive:

- **1.** Start the MRU.
- 2. Click the **Physical Drives** tab, and then select a physical drive as the target spare drive.
- 3. Click the Logical Drives tab, and then select the logical drive to rebuild.

4. Click **REBUILD**.

The Event Log pane displays the rebuilding status.



2.6 Initializing a Logical Drive

There are two methods for initializing a logical drive:

- Quick initialization. Use this method if the logical drive consists one or more disk drives. This
 method erases only the Master Boot Record (MBR) in all of the selected disk drives.
- Full Background initialization. In this method, data synchronization occurs in the background while the operating system continues to have access to the logical drive. Full initialization is available for RAID 1 and RAID 10 logical drives.

Note: This option is not available in the Marvell RAID BIOS Configuration.

To initialize a logical drive

- 1. Start the MRU.
- 2. Click the Logical Drives tab, and then click the icon for the logical drive.
- 3. In the Logical Drive Details window, click INITIALIZE.

The Initialize window appears, as shown in Figure 2-12.

Figure 2-12 MRU Initialize Window

LOC	GICAL DRIVES ADAPTERS SYSTEM
	Initialize
	This operation will destroy all data on the Logical Drive named " Logical Drive 1 " (Id: 3).
	Initialize Options:
	@SUBMIT @CANCEL

- 4. In the Initialize Options box, select an initialization method.
- 5. Click SUBMIT.

The Logical Drive Details window reappears and the Event Log pane displays the status of initialization.



2.7 Checking the Integrity of a Logical Drive

This feature enables the software to check and fix the data parity in the logical drives using RAID levels 1 and 10. Checking the integrity of data on your logical drive is performed as a housekeeping function.

Note: Perform this task when the logical drive you want to check is not performing RAID activities.

To check integrity of a logical drive

- 1. Start the MRU.
- 2. Click the Logical Drives tab, and then click the icon for the logical drive.

The Check Integrity window appears.

- 3. Click CHECK INTEGRITY.
- **4.** Select one of the following options:
 - **Check**. This option checks and reports data inconsistencies.
 - Check and Fix. This option checks, reports, and resolves data inconsistencies.



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3 CONFIGURING RAID USING THE BASIC INPUT/OUTPUT SYSTEM (BIOS)

The Marvell RAID BIOS Configuration, which is built into the Marvell RAID controller, creates logical drives.

Note: For extended capabilities in creating and managing logical drives, run the MRU. For information about using the MRU, see Chapter 2, Using the Software.

The topics included in this chapter are:

- Accessing the BIOS
- Using the BIOS



3.1 Accessing the BIOS

The main BIOS configuration screen displays three main functions, a set of keyboard commands, and configuration information about the physical disk drives and the logical drives, if any.

The functions are:

- Adapter. Displays the physical drives installed on your computer.
- Create. Lets the user create logical drives.
- **Delete**. Lets the user delete an existing logical drive.

The keyboard commands are:

- Arrow keys. Use the arrow keys to navigate the screens.
- **ENTER/SPACE**. Use these keys to select an item and execute a command.
- **ESC**. Use the escape key to go back one screen or exit the program.

The configuration information for the physical and logical drives are:

- ID. This displays the identification number assigned to each logical drive by the BIOS.
- Level. This displays the RAID level configuration of the logical drive.
- Size. This displays the data capacity of the logical drive in Megabytes (MB).
- Members. This displays the disks that are included in a logical drive.
- **Status**. This displays one of the following logical drive conditions:
 - **Online**: The logical drive is functioning at the optimal level.
 - Degraded: The logical drive is functional but does not perform fault tolerance. For RAID levels 1 and 10, the logical drive contains a drive that has stopped functioning. If set to auto-rebuild, the logical drive rebuilds itself on the spare drive, if available on your computer. Identify and replace the failed disk drive.
 - Offline: The logical drive is not functional and cannot be rebuilt. Therefore, replace the failed drive and create a new logical drive to copy over your data.

To access the MRU through the BIOS

- 1. Reboot your computer.
- 2. Before Windows starts, press CTRL+M to enter the BIOS, as shown in Figure 3-1.



Figure 3-1 BIOS Main Screen

- [Ada	-[Adapter] [Create] [Delete]						
Ada	Adapter 1						
Arr	Arrays Information:						
	No array is defined?						
Dis	ks Info	rmation:					
ID	Port	Disk Name		Size	Speed		
1	1	SATA: HDT722516D	LA380	164.6GB	SATA 1		
5	2	SATA: HDT722516D	LA380	164.6GB	SATA 1		
9	3	SATA: HDT722516D	LA380	164.6GB	SATA 1		
13	4	SATA: HDT722516D	LA380	164.6GB	SATA 1		
17	5	PATA: ST3400832A		400GB	UDMA-5		
18	5	PATA: Maxtor 6L2	00P0	203.9GB	UDMA-6		
	N. Martha						
▼ < -	->:Navig	ate, ENTER/SPACE	:Select, ESC:Ba	ack/Exit			



3.2 Using the BIOS

This section describes the menus and related screens for configuring the MRU through the BIOS.

3.2.1 Adapter

Figure 3-1 shows the main BIOS menu screen, which displays the physical drives and related information installed on your computer.

From the Adapter screen, you can navigate to the Create and Delete screens.

3.2.2 Create

Follow these steps to create a logical drive:

1. Start the BIOS.

See Accessing the BIOS on page 3-28.

2. At the top of the screen, select the **Create** tab, and then press **ENTER**.

The Create screen appears. This screen lets you select the disk drives for the logical drive.

Figure 3-2 Select Disks to Create, Screen 1

Selec	Select from disks to create					
ID	Port	Disk Name	Size	Speed		
1	1	SATA: HDT722516DLA380	164.6GB	SATA 1		
5	2	SATA: HDT722516DLA380	164.6GB	SATA 1		
9	3	SATA: HDT722516DLA380	164.6GB	SATA 1		
13	4	SATA: HDT722516DLA380	164.6GB	SATA 1		
17	5	PATA: ST3400832A	400GB	UDMA-5		
18	5	PATA: Maxtor 6L200P0	203.9GB	UDMA-6		
NEX	T					



3. Select a drive, and then press ENTER.

An asterisk appears next to the selected drive.

Figure 3-3 Select Disks to Create, Screen 2

Selec	t from	disks to create		
ID	Port	Disk Name	Size	Speed
*1	1	SATA: HDT722516DLA380	164.6GB	SATA 1
5	2	SATA: HDT722516DLA380	164.6GB	SATA 1
9	3	SATA: HDT722516DLA380	164.6GB	SATA 1
13	4	SATA: HDT722516DLA380	164.6GB	SATA 1
17	5	PATA: ST3400832A	400GB	UDMA-5
18	5	PATA: Maxtor 6L200P0	203.9GB	UDMA-6
NEX	T			

4. Select **NEXT**, and then press **ENTER**.

The Create Array screen appears, as shown in Figure 3-4.

Figure 3-4 Create Array Screen

Create Array —	
Raid level	: RAIDO
Array Name	:
Disks ID	: 1 5 9 13 17 18
Max Size(MB)	987776
Capacity(MB)	: 987776
Strip Size	64KB
Init Mode	: No
Cache Mode	: Write Through
NEXT	

5. View the options available by clicking in each field.



- 6. Enter values for the following logical drive properties:
 - RAID Level (RAID 0, RAID 1, RAID 10)
 - Array Name
 - Capacity
 - Stripe Size (16K, 32K, 64K, 128K)
 - Init Mode (Initialization: None or Quick)
 - Cache Mode (Write Through or Write Back)
- 7. Select NEXT, and then press ENTER.

The BIOS main screen appears and displays the new logical drive.

Figure 3-5 Logical Drive Display

)	Arr <u>a</u>	y N	lame	Size	Le	evel	Status	Stripe	Members
	New	- arr	ay	293.8G	B RA	AID10	Online	64KB	1.5.9.13.17.18
is	ks I	nfo	rmatio	on:					
D	Port	;	Disk	Name				Size	Speed
	1		SATA:	HDT7225	516DI	LA380		164.6GB	B SATA 1
	2		SATA:	HDT7225	516DI	LA380		164.6GB	SATA 1
	3		SATA:	HDT7225	516DI	LA380		164.6G	SATA 1
3	4		SATA:	HDT7225	516DI	LA380		164.6G	B SATA 1
7	5		PATA:	ST34008	332A			400GB	UDMA-5
8	5		PATA:	Maxtor	6L2	00P0		203.9GE	UDMA-6



3.2.3 Delete

Follow these steps to delete a logical drive:

1. Start the BIOS.

See Accessing the BIOS on page 3-28.

2. At the top of the screen, select the **Delete** tab, and then press **Enter**.

The Delete Array screen appears.

Figure 3-6 BIOS Delete, Screen 1

Delet	e array ———					
ID	Array Name	Size	Level	Status	Stripe	Members
1	new array	293.8GB	RAID10	Online	64KB	1.5.9.13.17.18
NEX	Т					

3. Select the logical drive to delete.

An asterisk appears next to the selected logical drive.

Figure 3-7 BIOS Delete, Screen 2

```
Delete array
ID Array Name Size Level Status Stripe Members
*1 new array 293.8GB RAID10 Online 64KB 1.5.9.13.17.18
NEXT
```

4. Select **NEXT**, and the press **ENTER**.

A message appears at the bottom of the BIOS screen about deleting the Master Boot Record (MBR).

5. Press Y to delete the MBR.

The BIOS main screen appears and the deleted logical drive is no longer displayed.



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4 SELECTING A RAID LEVEL

Redundant array of independent disks (RAID) is a storage technology consisting of one or more disks working in parallel. RAID technology allows an array of physical disks to be combined together to form a logical drive, which appears as a single storage device to the user.

You can configure a RAID logical drive in several different ways, with each configuration offering its own benefits. The Marvell RAID controller supports RAID 0, RAID 1, and RAID 10.

This chapter provides information about the properties of each RAID level and how to choose a suitable RAID level.

The topics included in this chapter are:

- RAID 0 (Striping)
- RAID 1 (Mirroring)
- RAID 10 (Mirroring and Striping)
- Comparing RAID Levels



4.1 RAID 0 (Striping)

RAID 0 is known as striping because data stripes of equal size on the logical drive are divided among an even number of physical disks, as shown in Figure 4-1. Consequently, the speed at which data is read and written is increased because data stored on multiple drives can be read and written simultaneously. However, it is important to remember that data is divided between multiple disk drives, so data is not recoverable if one of the physical disks fails.

Figure 4-1 RAID 0: Striping

Logical Drive



RAID 0 is ideally suited in situations where all of the physical disk drives have the same capacity. However, you can create a logical drive if the selected disk drives have different capacities, but it will have a maximum capacity equal to the size of the smallest disk multiplied by the total number of disks in the array. For example, a logical drive consisting of two disks, an 80 Gb physical disk and a 100 Gb physical disk, can only create a logical drive up to a maximum of 160 Gb (2 x 80 Gb).



4.2 RAID 1 (Mirroring)

RAID1 is known as mirroring because the data on the logical drive is written to a pair of physical disks, which ensures that identical data appears on both of the physical disks. See Figure 4-2 for more detail.

Figure 4-2 RAID 1: Mirroring

Logical Drive



RAID 1 can increase Read performance. Data is identical on both of the physical disks, so a read command can be sent to the disk that is not busy, rather than wait for the primary drive to finish an in-process read. However, RAID 1 does incur a slight drop in Write performance because both drives must be written to when sending data to the logical drive.

RAID 1 also incorporates fault-tolerance, which allows access to the data even if one physical disk fails. In addition, if you replace the failed disk with a new physical disk, the rebuild begins recreating the mirror set of drives, which can be accomplished while the system continues to function normally.

Note: Mirroring is a technique used for redundancy, so it is important to remember that, for example, two 80 Gb physical disks (a total of 160 Gb) would only store 80 Gb of original data because the remaining 80 Gb is required to mirror the original data.



4.3 RAID 10 (Mirroring and Striping)

RAID 10 is a combination of the mirroring (RAID 1) and striping (RAID 0) techniques. At least four physical disks (two pairs) are needed to configure a RAID 10 logical drive. Both pairs of physical disks make separate RAID 0 stripes, and then the first RAID 0 drive is mirrored to the second RAID 0 drive. See Figure 4-3 for more detail.

RAID 10 provides the read and write performance of RAID 0, while providing the redundancy protection of RAID 1.

Also, in the event of a disk failure, the logical drive can rebuild itself while the system continues to function normally.



Figure 4-3 RAID 10: Mirroring and Striping

Note: Like RAID 1, RAID 10 uses the mirroring technique for redundancy, so it is important to remember that, for example, two 80 Gb physical disks (a total of 160 Gb) would only store 80 Gb of original data because the remaining 80 Gb is required to mirror the original data.



4.4 Comparing RAID Levels

Each RAID level has features that may or may not be suitable in certain situations, so it is important to carefully consider which RAID level is best suited for a particular purpose.

4.4.1 RAID 0 (striping)

RAID 0 is simple to implement and provides increased reading and writing speed by spreading the transfer of data across multiple channels and drives. However, RAID 0 does not provide fault-tolerance, so all of the data is lost if one or more physical disks fail.

4.4.2 RAID 1 (mirroring)

RAID 1 is simple to implement and features automatic fault-tolerance. RAID 1 also provides increased read performance because data can be requested in parallel. However, write performance is decreased because two writes are required for each write command. Also, RAID 1 uses just 50 percent of the total disk capacity.

4.4.3 RAID 10 (mirroring and striping)

RAID 10 features automatic fault-tolerance and provides increased reading and writing speed by spreading the transfer of data across multiple channels and drives. However, RAID 10 uses just 50 percent of the total disk space and scalability is limited at a high inherent cost.

4.4.4 Overview of RAID Levels

Table 4-1 gives an overview of the features for each RAID level.

Table 4-1 RAID Features

Features	RAID 0	RAID 1	RAID 10
Simple implementation			
Improved read speed	Ń	Ń	Ń
Improved write speed	Ń		Ń
Fault-tolerance		Ń	Ń
Efficient use of disk capacity	Ń		
Scalable	Ń	Ń	
Automatic rebuild		Ń	Ń
Minimum number of drives	2	2	4



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