# SOFTWARE GUIDE

# Creating RAID 50 Volumes How to combine 2 or more MegaRAID SATA adapters into 1 OS RAID 50 volume

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LSI LOGIC <sup>®</sup>



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Document DB09-000127-00, First Edition (November 2003) This document describes the creation of RAID 50 volumes with LSI Logic Corporation's MegaRAID Serial ATA 150-4 and 150-6 adapters and will remain the official reference source for all revisions/releases of these products until rescinded by an update.

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# Chapter 1 Introduction

This chapter describes creating a RAID 50 volume with MegaRAID SATA 150-4 and 150-6 adapters and connected storage devices in Windows environments. The following topics are included:

- Section 1.1, "Overview," page 1-1
- Section 1.2, "RAID 50 Volume Creation Overview," page 1-1
- Section 1.3, "Related Publications," page 1-2

## 1.1 Overview

RAID 50 volumes allow you to utilize multiple logical drives and combine them to create one large RAID array at the operating system level. There are several types of RAID arrays including simple, spanned, striped, mirrored, and RAID5.

Utilizing multiple LSI Logic MegaRAID Serial ATA 150-4 or 150-6 adapters, you can scale your storage needs to meet the demands of today's data growth. Striping two logical drives at the operating system level, RAID 50, into a single array can provide you with a speed and fault tolerance advantage.

## 1.2 RAID 50 Volume Creation Overview

This user guide will provide the instructions on how to create RAID 50 volumes with Windows 2000. Utilizing LSI Logic's unique implementation of multiple SATA controllers doubles your data protection, data throughput, and increases overall performance.

# 1.3 Related Publications

#### MegaRAID SATA 150 Storage Adapters User's Guide

Document Number DB15-000272-01

This document explains how to install your MegaRAID SATA 150 storage adapter into the host system. It also provides the electrical and physical specifications, jumper definitions, and connector locations for the storage adapter.

# Chapter 2 Creating a RAID 50 Volume with Windows 2000

This chapter describes how to create a RAID 50 volume with Windows 2000 operating systems, and includes these topics:

- Section 2.1, "What is RAID 50 and How Does it Work?," page 2-1
- Section 2.2, "Creating a RAID 50 Volume with 2 SATA RAID Adapters," page 2-2

## 2.1 What is RAID 50 and How Does it Work?

This procedure describes how to create a striped RAID 50 volume using two RAID 5 logical drives and two or more MegaRAID SATA 150-4 or 150-6 adapters with multiple disk drives connected to each adapter. To gain the full advantage of our MegaRAID adapters, use 4 drives on the 150-4 or 6 drives on the 150-6 adapter. Then create your striped RAID 50 volume.

RAID 50 provides the features of both RAID 0 and RAID 5. RAID 50 includes both parity and disk striping across multiple drives.Data is "striped" across multiple drive groups (super drive group). For data redundancy, drives are encoded with rotated XOR redundancy.

RAID 50 is best implemented on two RAID 5 disk arrays with data striped across both disk arrays. RAID 50 breaks up data into smaller blocks, and then stripes the blocks of data to each RAID 5 raid set. The size of each block is determined by the stripe size parameter, which is set during the creation of the RAID set. RAID 50 can sustain a drive failure while maintaining data integrity if each failed disk is in a different RAID 5 array.

• **Benefits:** RAID 50 provides increased write performance, improved data protection, and faster rebuild even in the event of a drive failure. During a degraded mode with this setup, performance remains high overall because the other RAID 5 array is functioning fully.

- Uses: RAID 50 works best when used with data that requires high reliability, high request rates, and high data transfer and medium to large capacity.
- Drives: MegaRAID SATA 150-4 = 4 drives, MegaRAID SATA 150-6
   = 6 drives
- Fault Tolerance: Yes

## 2.2 Creating a RAID 50 Volume with 2 SATA RAID Adapters

In this example, we have configured the system using two LSI Logic MegaRAID SATA 150-6 adapters with three 80GB SATA drives connected to each adapter. On both adapters, we have created a RAID 5 volume. Ideally, the three 80GB drives would yield a 160GB logical drive, however, in this example with partitioning and other factors, the drive actually yields 149GB.



Figure 2.1 RAID 50 Configuration

1. From your computer Desktop, right-click the **My Computer** icon and select **Manage**.



#### Figure 2.2 Select My Computer Manage

The Computer Management window opens.

#### Figure 2.3 Disk Management



2. Click the **Disk Management** folder. After clicking the folder, the right lower pane will display all of the disks on your system.

- 3. Right-click unallocated space on one of the disks that you want to create the RAID 50 striped volume, select **Create Volume**.
- Note: If your disks are in basic mode, right-click the disk and change to dynamic mode.

Tree	Volume	Lavout	Type	File System	Status
Computer Management (Local) System Tools System Tools System Information System Information Forformance Logs and Alerts Shared Folders Device Manager Stored Users and Groups	- (C:) - (D:)	Simple Simple	Dynamic Dynamic	FAT NTFS	Healthy (System) Healthy (Boot)
Storage     Disk Management     Disk Defragmenter     Logical Drives     Removable Storage     Services and Applications	Dynamic     19.08 GB     Online	(C:) 2.00 GB FAT Healthy (System	(D:) 6.00 GB NTFS Healthy (Boot)	11.08 GB Unallocated	
	Contraction Contractico Contra	149.05 GB Unallocated	Create	olume	2
	Cisk 2 Dynamic 149.05 GB Online	149.05 GB Unallocated	Propertie Help		
	CDRom 0 CDRom (E:)				
		o:			

Figure 2.4 Create Volume Wizard

The Create Volume Wizard opens.

### Figure 2.5 Create Volume Wizard

Tree	Volume	Layout	Type	File System	Status	
Computer Management (Local) System Tools Google Event Viewer System Information Performance Logs and Alerts Shared Folders Device Manager Stacal Jeses and Groups	- (C:) - (D:)	Simple Simple	Dynamic Dynamic	FAT NTFS	Healthy (System) Healthy (Boot)	
Disk Management	•				<u>.</u>	
Logical Drives     Control Drives     Removable Storage     Services and Applications	CPDisk 0 Dynamic 19.08 GB Online	(C:) 2.00 GB FAT Healthy (System)	Create ¥olum	e Wizard	elcome to the Create \	Volume
	CPDisk 1 Dynamic 149.05 GB Online	149.05 GB Unallocated		W	lizand	dynamic disks.
	CPDisk 2 Dynamic 149.05 GB Online	149.05 GB Unallocated		A v tre file lett	volume is a portion of one or more hard, ated as a separate disk. You can forma system. You gain access to a volume t er or mount point.	disk drives that is I a volume with a hrough a drive
	CDRom (E:)			То	continue, click Next	
	Unallocated	Simple Volume				

4. Click Next. The Select Volume Type window opens.

#### Figure 2.6 Select Volume Type

Tree	Volume	Layout	Туре	File System	Status	Capa	
J Computer Management (Local)	(C:)	Simple Simple	Dynamic Dynamic	FAT NTFS	Healthy (System) Healthy (Boot)	2.00	
System Information     System Information     System Informance Logs and Alerts     Shared Folders     Device Manager     Could Users and Groups     Storage     Storage				40 <sup>-7</sup> 9962 4			
Bisk Defragmenter	-			WORKSTON OF LEVEL			
Cogical Drives     Bemovable Storage     Services and Applications	Clisk 0 Dynamic 19.08 GB Online (Errors)	(C:) 2.00 GB FAT Healthy (System)	Create Volun Select Volun What	ne Wizard blume Type type of volume do you	want to create?		
	CPDisk 1 Dynamic 149.05 GB Online	149.05 GB Unallocated	Volume type C Simple volume C Second units				
	CPDisk 2 Dynamic 149.05 GB Online	149.05 GB	Striped volume				
	Unallocated	nore dynamic disks. A striped					
						a vengeo or opannica rosens.	

 Select Striped volume, this will enable you to use the capacity of all disks connected to your SATA adapter. In this example, we are demonstrating 6 drives connected to two MegaRAID 150-6 adapters. However, you can scale up to 6 drives on each adapter (or 4 drives on each 150-4 adapter).

You also have the opportunity to select different array types including (options vary depending on the version of Windows you are running):

- RAID 5 volume: Data and parity striped across three or more disks.
- Simple volume: Single or multiple linked regions on one disk.
   Contains no fault tolerance, but can be mirrored.
- Striped volume: Data striped evenly on two or more disks.
   Contains no fault tolerance and cannot be mirrored.
- Mirrored volume: Data duplicated on two disks.
- Spanned volume: Data is spanned across multiple disks or parts of multiple disks. No fault tolerance or mirroring.
- 6. Click **Next**, the Create Volume window opens. All available disks will display, select Disk 1 and Disk 2.

Figure 2.7 Create a Volume

ree	Volume	Lavout	Type	File System	Sahus	Т
	- (C:)	Simple	Dypamic	FAT	Healthy (System)	
Computer Management (Local)     Kostem Tools     Google Event Viewer     System Information     Min Performance Logs and Alerts     Shared Folders     Shared Folders	(D:)	Simple	Dynamic	NTFS	Healthy (Boot)	
Storage     Disk Management     Disk Definationships	•				1	
Logical Drives	ØDisk 0				-	·
Removable Storage     Services and Applications	Dynamic 19.08 GB Online	(C:) 2.00 GB FAT Healthy (System	Create Volume Select Dis			
	@Disk 1		Tou car	volume.		
	Dynamic 149.05 GB Online	namic 19.05 GB 149.05 GB Unallocated	Select to	vio or more disks.		Colorited dupping disks
	Conline	149.05 GB Unallocated	Disk 0	11351 MB	Add>>> <td>Disk 1 152625 MB Disk 2 152625 MB</td>	Disk 1 152625 MB Disk 2 152625 MB
	CDRom 0 CDRom (E:)				<< Remove All	
	Unallocated	Simple Volume	-		Total	I volume size: 305250 MB
			For s	elected disks:	MB	Maximum: 152625 MB

The Assign a Drive Letter or Path window opens.

Tree	Volume	Lavout	Type	File System	Status			
Computer Management (Local) Computer Management (Local) System Tools System Information System Information System Information System Conference of Alerts System Conference of Alerts Device Manager System Users and Groups	(C:) (D:)	Simple Simple	Dynamic Dynamic	FAT NTF5	Healthy (Boot)			
- 🌆 Storage	4				•			
Disk Defragmenter	@Disk 0	1			<b></b>			
🗄 🚰 Removable Storage	Dynamic 19.08 GB Online	(C:)	Create Volum	e Wizard				
E 🥵 Services and Applications		2.00 GB FAT Healthy (System)	Assign Drive Letter or Path You can assign a drive letter or drive path to this volume.					
				1. C.		S		
	Dynamic 149.05 GB Online	149.05 GB Unallocated	You can access your volume though the drive letter or path you assign to it.					
	CDisk 2 Dynamic 149.05 GB		( A	ian a drive letter	F. V			
		149.05.68	C Ma	in this volume at an e	motu folder that supports drive nath	he		
	Online	Unallocated	_		Browse	1		
	CDRom 0 CDRom (E:)		C Do not assign a drive letter or drive path					
	Unallocated	Simple Volume						

Figure 2.8 Assign a Drive Letter or Path

7. Select the Assign a Drive Letter radio button. From the drop-down list select the desired drive letter. Click **Next** and the Format Volume window opens.

Tree	Volume	Lavout	Type	File System	Status			
Computer Management (Local)  System Tools  System Tools  System Information  System Information  Shared Folders  Could Users and Groups  Succel Users  Succel Users	(c;)	Simple Simple	Dynamic Dynamic	FAT NTFS	Healthy (Boot)			
	•				×			
	Coloick 0		1					
🗉 🗃 Removable Storage	Dynamic	(C:)	Create Volum	e Wizard				
Services and Applications	19.08 GB Online	Online 2.00 GB FAT Healthy (System)		Format Volume You can customize the formatting of the partition				
	CPDisk 1 Dynamic 149.05 GB Online	149.05 GB Unallocated	Specify	whether you want to f	ormat this volume.			
	CPDisk 2 Dynamic 149.05 GB Online Unallocated	149.05 GB Unallocated	•	Format this volume as I	iollows:	7		
	CDRom 0 CDRom (E:)		-	Allocation unit size:	Default	- -		
	Unallocated	Simple Volume		Volume label:	New Volume			
			3	Perform a Quick	Format Enable file and f	older compression		

Figure 2.9 Formatting a Volume

8. You can modify the file system type, allocation size, and change the volume label here if needed. If not, Keep the default selections and click **Next**. The Completing the Create Volume window opens.



### Figure 2.10 Verify Striped Volume Settings

 Verify that the settings you have selected are correct and click Finish. The Computer Management window will reflect the changes you have made.

Tree	Volume	Layout	Туре	File System	Status
Computer Management (Local)  Computer Management (Local)  System Tools  Computer Viewer  System Information  System Informatio	(C:) (D:) New Volume (	Simple Simple . Striped	Dynamic Dynamic Dynamic	FAT NTFS NTFS	Healthy (System) Healthy (Boot) Healthy
S Local Users and Groups     Storage     Disk Management     Disk Defragmenter     Disk Defragmenter     Logical Drives     Removable Storage     Services and Applications	Dynamic     19.08 GB     Online (Errors)	(C:) 2.00 GB FAT Healthy (Systerr	(D:) 6.00 GB NTF5 Healthy (Boot)	11.08 GB Unallocated	
	CPDisk 1 Dynamic 149.05 GB Online	New Volume (F: 149.05 GB NTF5 Healthy	)		
	CPDisk 2 Dynamic 149.05 GB Online	New Volume (F: 149.05 GB NTF5 Healthy	)		

Figure 2.11 One Volume with Double Capacity

Verify that the system has striped the two volumes together as one big operating system volume.

10. Go to the Windows Explorer and click the local disk that you just created.



Figure 2.12 Operating System Volume

The operating system sees the double capacity as one striped volume.

11. Go to Power Console Plus to view the RAID 5 OS volume (see Figure 2.13). Select the volume that you just created. Click the Logical Drive Properties Icon or select Logical Drive->Properties from the menu bar. The Logical Drive Properties window opens.



#### Figure 2.13 Power Console Plus RAID Volume