

USER'S GUIDE

MegaRAID®
IDEal Software RAID for
ServerWorks CSB6 A1.2

June 2004

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LSI LOGIC®



DB15-000291-03

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Document DB15-000291-03, June 2004

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Preface

Package Contents

You should have received the following:

a MegaRAID[®] IDEal Software RAID for ServerWorks CSB6 A1.2 User's Guide

software license agreement

CD/diskette(s) with the MegaRAID IDEal Software RAID for ServerWorks CSB6 A1.2 software

This book is the primary reference and user's guide for the MegaRAID IDEal Software RAID for CSB6 A1.2.

The MegaRAID IDEal Software RAID for ServerWorks CSB6 A1.2 provides a cost-effective way to achieve higher transfer rates and reliability. The LSI Logic MegaRAID IDE controller supports two IDE channels and up to four drives. It supports the following drive modes: PIO 0-4, DMA 0-2, and Ultra DMA 0-5. The RAID levels supported are RAID 0, 1, and 10. The highest data transfer rate in UDMA mode 4 is 66 Mbytes/s, in UDMA mode 5 is 100 Mbytes/s, and in UDMA mode 6 is 133 Mbytes/s. This manual describes the MegaRAID IDE (ATA/66), MegaRAID IDE 100 (ATA/100) and MegaRAID IDE 133 (ATA/133) controller.

Audience

This document was prepared for users of the MegaRAID IDEal Software RAID for ServerWorks CSB6 A1.2. It is intended to provide an overview of the product and describe the software utilities and operating system installation.

Organization

This document has the following chapters:

Chapter 1, **Overview**

Chapter 2, **RAID Levels**

Chapter 3, **Hyper Configuration Utility**

Chapter 4, **BIOS Configuration Utility**

Chapter 5, **MegaRAID Configuration Console (MCC)**

Chapter 6, **Operating System Installation**

Chapter 7, **Troubleshooting**

Conventions Used in This Manual

The following is a list of notational conventions used throughout this manual:

Notation	Example	Meaning and Use
courier typeface	.nwk file	Names of commands, directories, file names, and on-screen text are shown in courier typeface.
bold typeface	fd1sp	In a command line, keywords are shown in bold, non-italic typeface. Enter them exactly as shown.
italics	<i>module</i>	In command lines and names, italics indicate user variables. Italicized text must be replaced with appropriate user-specified items. Enter items of the type called for, using lower case.
italic underscore	<i>full_pathname</i>	When an underscore appears in an italicized string, enter a user-supplied item of the type called for with no spaces.
Initial Capital letters	Undo Edit Apply	Names of menu commands, options, check buttons, text buttons, options buttons, text boxes, list boxes, etc., are shown in text with Initial Capital lettering to avoid misreading. These elements may appear on your screen in all lower case.
brackets	[<i>version</i>]	You may, but need not, select one item enclosed within brackets. Do not enter the brackets.
ellipses	option...	In command formats, elements preceding ellipses may be repeated any number of times. Do not enter the ellipses. In menu items, if an ellipsis appears in an item, clicking that item brings up a dialog box.

Notation	Example	Meaning and Use
vertical dots	Vertical dots indicate that a portion of a program or listing has been omitted from the text.
semicolon, and other punctuation		Use as shown in the text.

MegaRAID IDEal Software RAID Problem Report Form

Customer Information	MegaRAID IDEal Software CSB6 RAID Information
Name	Today's Date
Company	Date of Purchase
Address	Invoice Number
City/State	Serial Number
Country	Number of Channels
Email address	Cache Memory
Phone	Firmware Version
Fax	BIOS Version
System Information	
Motherboard:	BIOS manufacturer:
Operating System:	BIOS Date:
Operating System Version:	Video Adapter:
MegaRAID IDEal Software CSB6 RAID Driver Version:	CPU Type/Speed:
Network Card:	System Memory:
Other disk controllers installed:	Other adapter cards installed:

Customer Information	MegaRAID IDEal Software CSB6 RAID Information
Description of problem:	
Steps necessary to re-create problem:	
1.	
2.	
3.	
4.	

MegaRAID IDEal Software RAID Configuration

MegaRAID Primary Master	
MegaRAID Primary Slave	
MegaRAID Secondary Master	
MegaRAID Secondary Slave	
RAID Mode, Stripe Size	
Array #0 Configuration	
Array #1 Configuration	

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Chapter 1

Overview

This manual describes the MegaRAID IDEal Software RAID for ServerWorks CSB6 A1.2. This chapter provides an overview of the CSB6 and contains the following sections:

[Section 1.1, “RAID Description,” page 1-2](#)

[Section 1.2, “RAID Benefits,” page 1-2](#)

[Section 1.3, “Features,” page 1-3](#)

The MegaRAID IDEal Software RAID for ServerWorks CSB6 A1.2 provides two IDE channels with Ultra ATA/66 (MegaRAID IDE), Ultra ATA/100 (MegaRAID IDE 100) or Ultra ATA/133 (MegaRAID IDE 133) capability. The MegaRAID IDEal Software RAID for ServerWorks CSB6 A1.2 provides a simple and cost-effective way to improve the performance and reliability of your storage subsystems. CSB6 offers high transfer rates and fault-tolerant data redundancy during high performance applications by using low-cost Ultra ATA drives in desktops, workstations, or low-end servers.

CSB6 supports the following drive modes: programmable input/output (PIO) 0-4, direct memory address (DMA) 0-2, and Ultra DMA 0-5. In addition, it supports RAID levels 0, 1, and 10. You can use striping (RAID 0) to improve performance or mirroring (RAID 1) to improve data security. RAID 10 provides both RAID 1 (disk mirroring) and RAID 0 (data striping).

1.1 RAID Description

RAID (Redundant Array of Independent Disks) is an array of multiple independent hard drives that provide high performance and fault tolerance. A RAID disk subsystem improves I/O (input/output) performance and reliability. The RAID array appears to the host computer as a single storage unit or as multiple logical units. I/O is expedited because several disks can be accessed simultaneously.

RAID systems improve data storage reliability and fault tolerance compared to single-drive computers. Data loss resulting from a hard drive failure can be prevented by reconstructing missing data from the remaining hard drives.

1.2 RAID Benefits

RAID has gained popularity because it improves I/O performance and increases storage subsystem reliability. RAID provides data security through fault tolerance and redundant data storage.

1.2.1 Improved I/O

Although hard drive capabilities have improved drastically, actual performance has improved only three to four times in the last decade. Computing performance has improved over 50 times during the same time period. RAID allows you to access several disks simultaneously.

1.2.2 Increased Reliability

The electromechanical components of a disk subsystem operate more slowly, require more power, and generate more noise and vibration than electronic devices. These factors reduce the reliability of data stored on disks. RAID systems improve data storage reliability and fault tolerance compared to single-drive computers. The additional drives make it possible to prevent data loss from a hard drive failure. You can reconstruct missing data from the remaining data and parity drives.

1.3 Features

1.3.1 IDE Channels

CSB6 supports two IDE channels.

1.3.2 BIOS Features

The BIOS features include

- RAID support before operating system loads
- automatic detection and configuration
- drive roaming capability
- ability to handle configuration changes
- support for Interrupt 13, and Enhanced Disk Drive Specification
- support for PIO modes 0–4, DMA modes 0–2, and Ultra DMA modes 0–5 (0–5 for ATA/100 and ATA/133).
- support for RAID levels 0, 1, and 10
- multiple drive rebuilding
- special handling of error log, spare drive, and rebuilding
- support for BIOS boot specification (BBS)
- co-existence with SCSI, CD, and ARMD devices

1.3.3 Driver Features

The driver features include

- automatic negotiation of the highest mode of data transfer
- handling of both RAID and non-RAID drives
- special interface for configuration information, configuration changes, and manageability
- optimized disk access
- support for RAID levels 0, 1, and 10
- error logging in NT event log and on disks

- support for online mirror rebuilding
- support for consistency check for mirrored disks
- support for Stand-by and Hibernation in Windows 2000
- support for PIO modes 0–4, DMA modes 0–2, and Ultra DMA modes 0–5

1.3.4 Manageability/Disk Console

The manageability/disk console features include

- configuration information display
- online mirror rebuilding
- online consistency checks
- error logging and notification
- control panel, property sheet, and Microsoft Management Console (MCC) plug-in
- desktop management interface (DMI) agent
- support for power management features

Chapter 2

RAID Levels

There are six official RAID levels (RAID 0 through RAID 5). MegaRAID IDEal Software RAID for ServerWorks CSB6 A1.2 supports RAID levels 0, 1, and 10. These RAID levels are discussed in the following sections:

[Section 2.1, “RAID 0,” page 2-1](#)

[Section 2.2, “RAID 1,” page 2-2](#)

[Section 2.3, “RAID 10,” page 2-3](#)

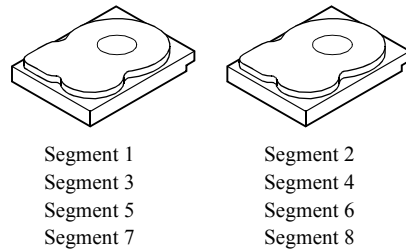
2.1 RAID 0

RAID 0 ([Figure 2.1](#)) provides disk striping across all configured drives in the RAID subsystem. RAID 0 does not provide any data redundancy, but does offer the best performance of any RAID level. RAID 0 breaks up data into smaller blocks and then writes a block to each drive in the array. The size of each block is determined by the stripe size parameter, which is set during the creation of the RAID set. RAID 0 offers high bandwidth.

By breaking up a large file into smaller blocks, MegaRAID IDEal Software RAID can use multiple IDE channels and drives to read or write the file faster. RAID 0 involves no parity calculations to complicate the write operation. This makes RAID 0 ideal for applications that require high bandwidth but do not require fault tolerance.

Uses	Provides high data throughput, especially for large files. Any environment that does not require fault tolerance.
Strong Points	Provides increased data throughput for large files. No capacity loss penalty for parity.
Weak Points	Does not provide fault tolerance. All data lost if any drive fails.
Drives	One to four

Figure 2.1 RAID 0 Array

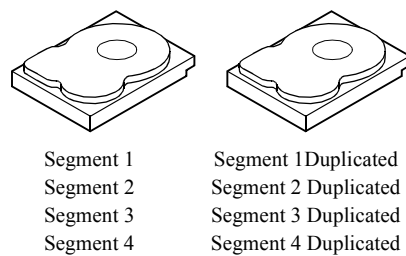


2.2 RAID 1

RAID 1 ([Figure 2.2](#)) duplicates all data from one drive to a second drive. RAID 1 provides complete data redundancy, but at the cost of doubling the required data storage capacity.

Uses	Small databases or any other environment that requires fault tolerance but small capacity.
Strong Points	Provides complete data redundancy. RAID 1 is ideal for any application that requires fault tolerance and minimal capacity.
Weak Points	Requires twice as many hard drives. Performance is impaired during drive rebuilds.
Drives	Two

Figure 2.2 RAID 1 Array

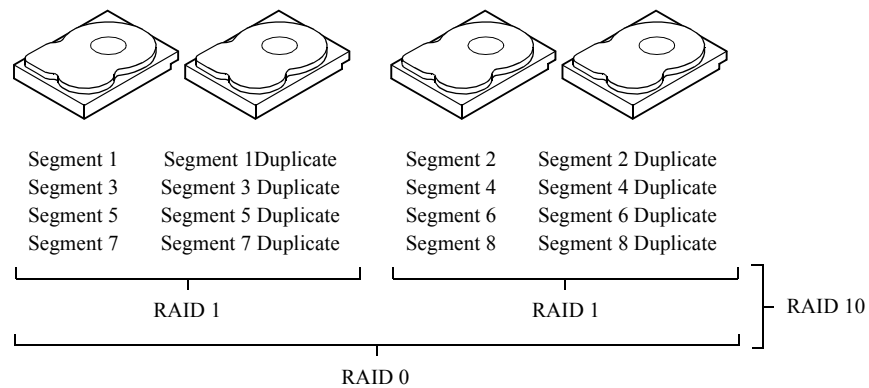


2.3 RAID 10

RAID 10 (Figure 2.3) provides both RAID 0 (data striping) and RAID 1 (disk mirroring). It requires two sets of RAID 1 drives (total of four drives). In RAID 10, data is striped across the two arrays and duplicated from one drive to the second drive in each RAID 1 array.

Uses	Small databases or any other environment that requires fault tolerance and high data throughput, especially for large files.
Strong Points	Provides complete data redundancy. RAID 10 is ideal for any application that requires fault tolerance and increased data throughput.
Weak Points	Requires a minimum of four hard drives. Performance is impaired during drive rebuilds.
Drives	Four

Figure 2.3 RAID 10 Array



Chapter 3

Hyper Configuration Utility

HYPERCFG is a command line utility for MegaRAID software. This chapter details the product features in these sections:

[Section 3.1, “General Description,” page 3-1](#)

[Section 3.2, “Installing HyperCFG,” page 3-2](#)

[Section 3.3, “Using HyperCFG,” page 3-3](#)

[Section 3.4, “Configuration File,” page 3-6](#)

[Section 3.5, “RAID Information,” page 3-6](#)

[Section 3.6, “Logical Array Information,” page 3-7](#)

[Section 3.7, “Physical Drive Information,” page 3-7](#)

[Section 3.8, “Configuring Spare Drives,” page 3-8](#)

[Section 3.9, “Return Code,” page 3-8](#)

[Section 3.10, “Return Codes on Error Condition,” page 3-9](#)

3.1 General Description

HYPERCFG is a command line utility for IDE RAID. The main features supported in this utility are:

automatic configuration of RAID for RAID 0, 1 and 10

special RAID 0 configuration support

display of RAID configuration information

ability to save RAID configuration information to file

ability to configure RAID from file

ability to set/reset specified global RAID flags (Write Cache, Virus Protection and DMA)

display of RAID BIOS version
ability to read and display specified sector from drive
ability to dump specified sector to BIN file
ability to dump BIN file to specified sector
ability to add error code information
ability to dump ID command packet to BIN file
ability to reset MAX address to native max address
self-monitoring analysis and reporting technology (S.M.A.R.T.) option
option for saving and restoring configuration using BIN files
display of rebuild status of a logical drive if any of its physical drives is in rebuilding state

3.2 Installing HyperCFG

Perform the following steps to install HyperCFG:

Step 1. Copy the HyperCFG executable file from the CD to your hard drive.

The filenames in the various operating systems are:

◇ HYPERCFG.exe for DOS

◇ hypercfg for Linux

Step 2. Run the file from the hard drive.

The HyperCFG utility displays. Use the options in [Section 3.3, “Using HyperCFG,” page 3-3](#), to set the RAID configuration and other options.

3.3 Using HyperCFG

The following is a list of options for the utility:

Configuration options

Drive ID

Display options

Miscellaneous options

File name

Table 3.1 describes the attributes that you can set for these options.

Table 3.1 HyperCFG Options and Attributes

Options	Description		
/S	Silent Operation. When this option is set, the utility does not prompt the user.		
/F[File Name]	This option redirects the output to the specified file name. If the file name is not specified, then the file name defaults to HYPERCFG.DAT.		
Configuration Options	The following options are used to configure the RAID:		
	/A[m] [/!]	Automates the RAID configuration	
		The [m] field can be any of the following:	
		S[Stripe Size]	Configures RAID in STRIPE MODE(RAID 0) with specified STRIPE SIZE. STRIPE SIZE must lie within the range [32....4096]. If invalid STRIPE SIZE is specified, the utility assumes 64K STRIPE SIZE. Default STRIPE SIZE is 64K
		M	Configures RAID in MIRROR MODE (RAID 1)
		R[Stripe Size]	Configures RAID in RAID 10 mode with specified STRIPE SIZE. STRIPE SIZE must lie within the range [64...4096] in multiples of 4K.
		/!	When invoked with this option, only one drive is configured in RAID-0 mode and the other drive is added as a hot spare. This option works only when two drives are present in the system. This is invoked with the /AS option.
		/2	Enables a 2 MB size reduction for the drive size reported in the IRCD.
	Default option: If [m] is not specified, the utility configures RAID in RAID 0 (STRIPE) mode with 64K STRIPE SIZE.		

Table 3.1 HyperCFG Options and Attributes (Cont.)

Options	Description	
	/O[oooo]	Sets/resets the RAID global flags – Write Cache and Virus Protection The [oooo] field can be any of the following:
	B	Switches ON Virus Protection flag
	D	Switches ON DMA flag
	M	Sets RAID 0 > RAID 1 promotion flag. BIOS configures any new drives by promoting a single RAID 0 with one drive to RAID 1, adding the new drive in a rebuild state. Resetting this flag configures the new drives as spares.
	P	Set No-Pause-on-Prompt flag. BIOS does not pause on any messages if this flag is set.
	R	Resets specified flags; if no flags are specified, all flags are reset.
	W	Switches ON Write Cache flag
Default option: If [oooo] is not specified then the default option is [R]		
	/L <Drive-ID>	Displays the configuration sector of the specified drive <Drive-ID> Note: In the <Drive-ID>, the final two characters of a four-character code identify the channel ID and device ID. They indicate whether the channel is primary or secondary and the device ID master or slave. For the channel ID, “0” indicates primary and “1” indicates secondary. For the device ID, “0” indicates master and “1” indicates slave. The possible code combinations are: “0x00”: The final two digits are “00”, meaning the channel ID is primary and the device ID is master. “0x01”: The final two digits are “01”, meaning the channel ID is primary and the device ID is slave. “0x10”: The final two digits are “10”, meaning the channel ID is secondary and the device ID is master. “0x11”: The final two digits are “11”, meaning the channel ID is secondary and the device ID is slave.
	/E[o] <Drive-ID>	Erases the configuration/error log sector of specified drive <Drive-ID> The [o] field can be any of the following:
	C	Erases the configuration sector
	E	Erases the error log sector
	A	Erases both configuration and error log sector
	/@[configuration filename]	Configures the RAID from the specified configuration file. Default filename: If the filename is not specified, the default filename is HYPERCFG.CFG

Table 3.1 HyperCFG Options and Attributes (Cont.)

Options	Description	
Display Options	This option determines how the data displays. This option is valid only for /I and /E options.	
	/W[o]	Specifies display mode. The [o] field can be either of the following:
		V Display in verbose mode
		Default option: If [o] is not specified, then data displays as a HEX dump.
Drive-ID	Drive ID is specified by /C[n] /D[cd]	
	/C[n]	Specifies the card number. If n is not specified, then it defaults to 0.
	/D[cd]	Specifies the drive letter. Possible values are as follows:
		c Channel Number (0 – for Primary, 1 – for Secondary) – default is 0.
		d Master/Slave (0 – for Master, 1 – for Slave) – default is 0.
	/T[o] <Drive-ID>	Reads and updates the time stamp information in configuration. The possible values are as follows:
		I Inserts the current time stamp information into the configuration.
		R Reads and displays the time stamp information the following format: DD/MM/YYYY - HH:MM:SS. This option expects a valid <Drive-ID>.
		Default option: If [o] is not specified, then the default option is [I].
Miscellaneous Options	This attribute is reserved for miscellaneous options.	
	/P[S] <Drive-ID>	Switches the drive to specified state. The [S] field can be any of the following:
		S Drive is powered on in Suspend state.
		Default option: If [S] is not specified, then the drive is switched on in Active state.
	/V	Detects the presence of RAID BIOS and displays the version of BIOS.
	/R[n] [/\$[Filename]] [/B[Filename]] <Drive-ID>	Reads and displays the “nth” sector. If ‘n’ is not specified then the sector number is 0. /B dumps the specified sector to the specified file in BIN format. /\$ dumps the specified BIN file to the “nth” sector. The default filename is HYPERCFG.BIN.
	/I <Drive-ID>	Displays the information about the specified drive

Table 3.1 HyperCFG Options and Attributes (Cont.)

Options	Description
/M [r/<max-address>] <Drive-ID>]	This option allows the user to set the maximum accessible sectors on the hard drive that supports this feature. /Mr resets the maximum address to the native maximum address of the hard drive. The address is specified in hexadecimal format.
/X	Pauses and waits for a keystroke if an error occurs while executing HyperCFG.
/Z[/E/D]	Enables/disables S.M.A.R.T. feature. The default is ENABLE. S.M.A.R.T. monitors hard drives for drive failures.
Getstatus 'N'	Displays the rebuilding status of the logical drives in an adapter if any of its physical drives is in a rebuilding state. 'N' is the adapter number (1, 2, 3, 4).

3.4 Configuration File

This file is used for configuring the RAID array. The configuration file is not case sensitive and ignores white spaces and tabs. The configuration file contains three logical blocks in the specified order:

1. RAID INFO
2. LOGICAL DRIVE INFO
3. PHYSICAL DRIVE INFO

3.5 RAID Information

This logical block starts with the keyword TOTAL_LOGICAL_ARRAYS.

This block must be organized as follows:

```
TOTAL_LOGICAL_ARRAYS    :<Number of Arrays>

TOTAL_PHYSICAL_DRIVES   :<Number of Physical Drives>

OPTIONS :
                <+/-WRITE_CACHE
                +/-VIRUS_PROTECTION
                +/-DMA_ENABLED>
```

The valid choices for the OPTIONS field are as follows:

WRITE_CACHE
VIRUS_PROTECTION
DMA_ENABLED

A “+” prefix to the option value sets the option and a “-” resets the option.

3.6 Logical Array Information

This logical block starts with the keyword LOGICAL_ARRAY. This block must be organized as follows:

LOGICAL_ARRAY	:<Array Number>
RAID_MODE	:<STRIPE/MIRROR/RAID10>
STRIPE_SIZE	:<STRIPE SIZE>
TOTAL_STRIPES	:<Number of Stripes>
TOTAL_PHYSICAL_DRIVES	:<Number of Physical Drives in Array>

3.7 Physical Drive Information

This logical block starts with the keyword PHYSICAL_DRIVE. This block must be organized as follows:

PHYSICAL_DRIVE	:<Drive Number>
DRIVE_ID	:<Drive ID>
DRIVE_SIZE	:<Drive Size>

The logical blocks can be separated by blank lines. There can be any number of blank lines. The lines within the logical block must be consecutive. Blank lines are not allowed within the logical block. There are as many PHYSICAL DRIVE INFO blocks as the number of drives participating in the array. All the PHYSICAL DRIVE INFO blocks for a logical array must follow the LOGICAL ARRAY INFO block before the start of next LOGICAL ARRAY INFO block. SPARE ARRAY information cannot be included in the configuration file.

Drives other than those specified in the configuration file are configured as SPARE DRIVES. To force configuration of a SPARE DRIVE, do not include that drive in the configuration file. That drive will be automatically configured as SPARE.

Any other lines that do not contain keywords are regarded as comments.

3.8 Configuring Spare Drives

You cannot use the command line to configure a spare drive. Perform the following steps to add spares to an existing configuration:

- Step 1. Save the current configuration to a file using the `/L <Drive-ID> /[filename]` option.
- Step 2. Connect the new drives.
- Step 3. Create new configuration with the command `/@[filename]`.

The new drives are configured as SPARE drives.

Note: When you configure an odd number of drives, you can auto-configure one drive with the `/A[m]` option.

3.9 Return Code

The HYPERCFG utility returns a 16-bit code on an exit to the operating system. This code should be interpreted as follows:

Bits 7:0	–	Data Type returned
Bits 15:8	–	Data

When Data Type = 0, bits 15:8 contain the total number of arrays configured.

When Data Type = 1, bits 15:8 contain the error code depending on the last operation.

3.10 Return Codes on Error Condition

Table 3.2 lists the return codes that display when there are errors and provides the descriptions of those errors.

Table 3.2 Return Codes on Error Conditions

Serial Number	Return Code	Description
1	0	No error
2	2	Reserved
3	3	Reserved
4	4	Reserved
5	5	Reserved
6	6	Array not formed due to inadequate drives
7	7	Reserved
8	8	Reserved
9	9	Reserved
10	10	Hard disk(s) not found
11	11	RAID controller timed out on read/write
12	12	Reserved
13	13	Reserved
14	14	Error opening array information file
15	15	Array information file format incorrect
16	16	Error opening log file
17	17	Reserved
18	18	Array not formed as required drives not found
19	19	Array not formed, excess drives found
20	20	Reserved
21	21	Reserved
22	22	Invalid configuration present
23	23	Configuration mismatch in drives
24	24	Error reading file
25	25	Error writing file

Table 3.2 Return Codes on Error Conditions (Cont.)

Serial Number	Return Code	Description
26	26	Warning! Truncating file as file size > 512 bytes
27	27	RAID BIOS not found
28	28	Feature not available in IDE drive
29	29	Invalid command line arguments
30	30–31	Reserved

Chapter 4

BIOS Configuration Utility

This chapter explains how to configure MegaRAID IDE and arrays, assign RAID levels, plan the array configuration, optimize storage, and use the MegaRAID IDE Setup Utility. This information is presented in the following sections:

- Section 4.1, “Configuring Arrays,” page 4-2
- Section 4.2, “Configuration Strategies,” page 4-2
- Section 4.3, “Assigning RAID Levels,” page 4-2
- Section 4.4, “Selecting a RAID Level,” page 4-3
- Section 4.5, “Configuring RAID Arrays,” page 4-4
- Section 4.6, “Creating a Mirrored Array From an Existing Drive,” page 4-4
- Section 4.7, “Using the MegaRAID IDE Setup Utility,” page 4-5
- Section 4.8, “Switch Windows (TAB),” page 4-8
- Section 4.9, “Auto Configure Stripe (F1),” page 4-8
- Section 4.10, “Auto Configure Mirror (F2),” page 4-8
- Section 4.11, “Auto Configure RAID 10 (F3),” page 4-8
- Section 4.12, “Create Array (F4),” page 4-8
- Section 4.13, “Delete Array (F5),” page 4-11
- Section 4.14, “Restore Old Configuration (F6),” page 4-11
- Section 4.15, “Edit Options (F7),” page 4-11
- Section 4.16, “Save and Exit (F10),” page 4-12

4.1 Configuring Arrays

Organize the physical disk drives in arrays after the drives are connected to MegaRAID IDE. An array can consist of one to four physical disk drives, depending on the RAID level.

4.2 Configuration Strategies

The most important factors in RAID array configuration are drive availability (fault tolerance), and drive performance.

Maximizing Drive Availability

You can maximize the drive availability by increasing fault tolerance. Use RAID 1 or mirror configuration to attain this objective.

Maximizing Drive Performance

You can optimize drive performance by using striping. Select RAID 0 or striping to configure an array for optimal performance.

Performance and Availability

You can achieve both drive performance and availability. Select RAID 10 for this configuration. You need four drives to configure RAID 10.

4.3 Assigning RAID Levels

Only one RAID level can be assigned to each array. [Table 4.1](#) displays the drives required per RAID level.

Table 4.1 Physical Drives Required per RAID Level

RAID Level	Minimum Number of Physical Drives	Maximum Number of Physical Drives
0	One	Four
1	Two	Two
10	Four	Four

4.4 Selecting a RAID Level

To ensure the best performance, you should select the optimal RAID level when you create a system drive. The optimal RAID level for your disk array depends on the following factors:

Number of drives in the disk array

Capacity of the drives in the array

Need for data redundancy

Disk performance requirements

The factors you need to consider when selecting a RAID level are listed in [Table 4.2](#).

Table 4.2 Factors to Consider When Selecting the Optimal RAID Level

Level	Description and Use	Pros	Cons	Number of Drives	Fault Tolerant
0	Data divided in blocks and distributed sequentially (pure striping). Use for non-critical data that requires high performance.	High data throughput for large files	No fault tolerance. All data lost if any drive fails.	One to Four	No
1	Data duplicated on another disk (mirroring). Use for read-intensive, fault-tolerant systems.	100 percent data redundancy, providing fault tolerance.	More disk space required. Reduces usable disk space to the size of the smallest drive. Reduced performance during rebuilds.	Two	Yes
10	Data divided in blocks and distributed sequentially and each block is duplicated to another disk.	100 percent data redundancy, providing fault tolerance. High data throughput.	Four hard drives required.	Four	Yes

4.5 Configuring RAID Arrays

After you have installed the MegaRAID IDE controller in the system and have attached all physical disk drives, perform these actions to prepare a RAID disk array.

- Step 1. Press <Ctrl><M> to run the MegaRAID IDE Manager.
- Step 2. Create and configure one or more logical drives and select the RAID level, write cache policy, boot sector virus protection, and DMA transfers.
- Step 3. Save the configuration.
See [Section 4.16, “Save and Exit \(F10\),” page 4-12](#) for more information.
- Step 4. Initialize the system drives.

After initialization, you can install the operating system.

Note: MegaRAID IDE does not support RAID arrays across different cards under Microsoft Windows 95/98 Millennium and Microsoft 2000.

4.6 Creating a Mirrored Array From an Existing Drive

To build a new mirrored array from an existing drive, connect the current drive and a new drive to the MegaRAID IDE card. Perform the following steps:

- Step 1. Turn on the computer and press <Ctrl><M> to start the MegaRAID IDE Setup Utility while the computer starts up.
- Step 2. Create an array by using F4 option.
- Step 3. Change the array type to Mirror.
- Step 4. Include the existing drive and the new drive in this array.
You can identify the existing drive and the new drive by where they are connected.
- Step 5. Start the rebuilding process by pressing <Enter>.
The setup prompts you for the target drive name.

Step 6. Select the newly connected drive as the target drive by pressing <Space Bar>, then <Enter>.

The rebuilding process then starts. If there are any errors during the building of the array, you are prompted with a message box. You can choose to ignore the error and proceed, or stop the rebuilding process.

Note: To make the rebuilding process faster, enable DMA Read/Write using the <F7> key.

4.7 Using the MegaRAID IDE Setup Utility

4.7.1 Setup Window

The Setup window ([Figure 4.1](#)) has three sections:

Array information

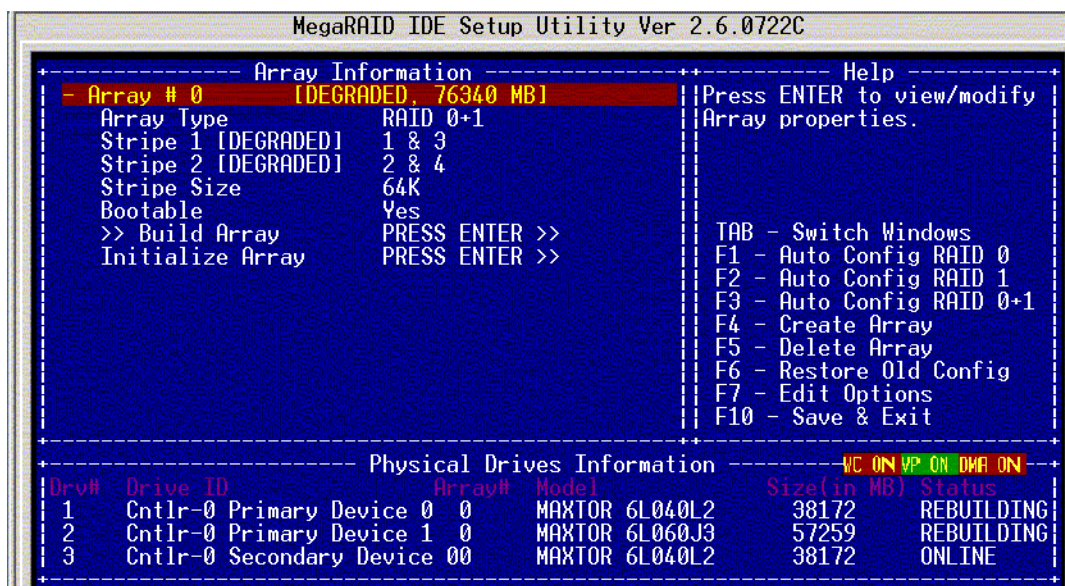
Physical drive information

Help information

Only the Array Information window and Physical Drives Information window are active. The Array Information window can be edited; the Physical Drives Information window cannot.

To access this screen, press <Ctrl> <M> during boot-up.

Figure 4.1 MegaRAID IDE Setup Utility Screen



4.7.2 Array Information

This section of the screen displays all the disk arrays configured. Use this section to create, delete, or edit the existing configurations. The disk arrays display as a node in a tree, as in Windows Explorer. When opened, each node displays the properties of the array. Press the <Up Arrow> and <Down Arrow> keys to navigate the properties, then press <Enter> to edit your selection.

Array configuration type or RAID level (stripe, mirror, RAID 10, or spare pool)

Drive numbers of the physical drives included in the array

Stripe size (32 Kbytes to 4 Mbytes), valid for stripe and RAID 10 configurations only

Whether the system is bootable from one of the configured arrays

Build Array function, which is valid for mirror and RAID 10 arrays. This option is used to build one drive from another.

Note: The minimum stripe size allowed for RAID 10 configuration is 64 Kbytes.

4.7.3 Physical Drive Information

This section displays all the physical drives connected to the IDE channels and their properties. The <Up Arrow> and <Down Arrow> keys are used to navigate the Physical Drive Information window. The menus are as follows:

Channel ID (Primary or Secondary)

Connection ID (Master or Slave)

Disk array that the physical drive is a part of

Model number

Size in Mbytes of each drive

The status of each drive (online, failed, or rebuilding)

Note: Information listed in the Physical Drive Information window cannot be edited. Only the <TAB>, <Up Arrow>, and <Down Arrow> keys work when the control is in the Physical Drive Information window.

4.7.4 Physical Drive Options

In the top right corner of the Physical Drive Information are the physical drive options. The available options are as follows:

Enable/disable write cache

Boot sector virus protection

DMA transfers

Note: These options apply to all drives attached to MegaRAID IDE.

4.7.5 Help Section

The Help section of the Setup window screen displays hints on available options. The Help section also provides a list of keys that you can use to perform tasks, such as auto configuring, creating, or deleting an array.

4.8 Switch Windows (TAB)

The <Tab> key is used to switch the control back and forth between the Array Information and the Physical Drive Information windows.

4.9 Auto Configure Stripe (F1)

Press the <F1> key to auto configure a stripe array. When you do this, MegaRAID IDE automatically creates a stripe based array based on the available physical drives attached. The stripe size is set for the optimum level (64 Kbytes).

4.10 Auto Configure Mirror (F2)

Press the <F2> key to run auto configuration. When you do this, MegaRAID IDE automatically creates arrays based on the available physical drives. A minimum of two free physical drives are required for mirroring.

4.11 Auto Configure RAID 10 (F3)

Press the <F3> key to auto configure the drives for a RAID 10 array. A minimum of four free physical drives are required for the RAID 10 auto configuration.

Note: All previous settings are lost when running Auto Configuration for Striping, Mirroring, or RAID 10.

4.12 Create Array (F4)

Press the <F4> key to create a disk array. When you create an array, a default array template is created. You must edit the array properties to complete the array creation. Use arrow navigation keys to highlight a property field and press <Enter> to edit that property. See the following sections for information about setting each property field.

4.12.1 Array Type

By default an array is created in stripe mode. When you select this field, a pop-up window displays the following options:

<u>RAID MODE</u> STRIPE MIRROR RAID 10 SPARE POOL

Select the intended RAID mode by using the arrow navigation keys and pressing <Enter>. The SPARE POOL option is not a RAID mode, but a way to assign physical drives as hot spares to be used in case of a mirror failure. When a mirror configured array experiences a drive failure, a spare drive can be used to replace the failed drive and rebuild the array.

Note: To rebuild a drive from the SPARE POOL, the size of the physical drive in SPARE POOL must be greater than or equal to the smallest drive in the array.

4.12.2 Drive(s)

There is no default setting for this field. You must select the drives for the configured array. When this field is selected, a pop-up window displays all the available physical drives with check-boxes.

<u>DRIVE SELECTION BOX</u> [] Cntlr 0-Primary Master [] Cntlr 0-Primary Slave [] Cntlr 0-Secondary Master [] Cntlr 0-Secondary Slave
--

Use the arrow navigation keys and press the Spacebar to select or deselect the drives to be part of the array. Press <Enter> when you are done. If you select mirror mode as the array type, you must select two drives to be in the array. This pop-up window appears only when configuring RAID 0 (Stripe) and RAID 1 (Mirror) arrays. A RAID 10 array contains drives in each stripe of the array, and only two drives are allowed in each stripe. The maximum number of stripes is limited to four.

4.12.3 Stripe Size

The stripe size field applies to stripe mode arrays only. By default, an array is set up with 64 Kbyte stripes. Edit this field to change the default stripe size. The options for the size of the stripes are listed in the table below.

<u>STRIPE</u>
32 KB
64 KB
128 KB
256 KB
512 KB
1024 KB
2048 KB
4096 KB

Note: You cannot change the stripe size of an array that is already configured.

4.12.4 Bootable

This determines which of the configured arrays should be used for booting the system when MegaRAID IDE is selected as the boot device. The options are *Yes* or *No*.

<u>BOOT OPTION</u>
YES
NO

You can select the boot device from the system BIOS setup. Only one array is allowed to be bootable in a system.

4.12.5 Drive Size

This field cannot be edited. It displays the size of the array. For a RAID 0 (stripe) array, the drive size is the total of all the drives selected (one or more drives.) For a RAID 1 array, drive size is shown by individual drive. For a drive designated as SPARE POOL, drive size shows the total drive capacity.

4.12.6 Build Array

The Build Array option is valid only for RAID 1 (Mirror) and RAID 10 arrays. It is used to rebuild the array using a drive from the SPARE POOL. When Build

Array starts, it prompts the user to select the target drive. It does this because both drives can be still online. After you select the target drive, the rebuild starts.

Note: A drive rebuild can take a long time depending on the size of the drive. A two Gbyte (UDMA 5) drive takes two minutes to rebuild when DMA mode is enabled.

4.13 Delete Array (F5)

Press the <F5> key to delete a currently configured array. Use arrow keys to highlight the array you want to delete and then press <F5>.

Caution: Use this option with caution. When you delete an array, you lose the array configuration and the data saved in the array.

4.14 Restore Old Configuration (F6)

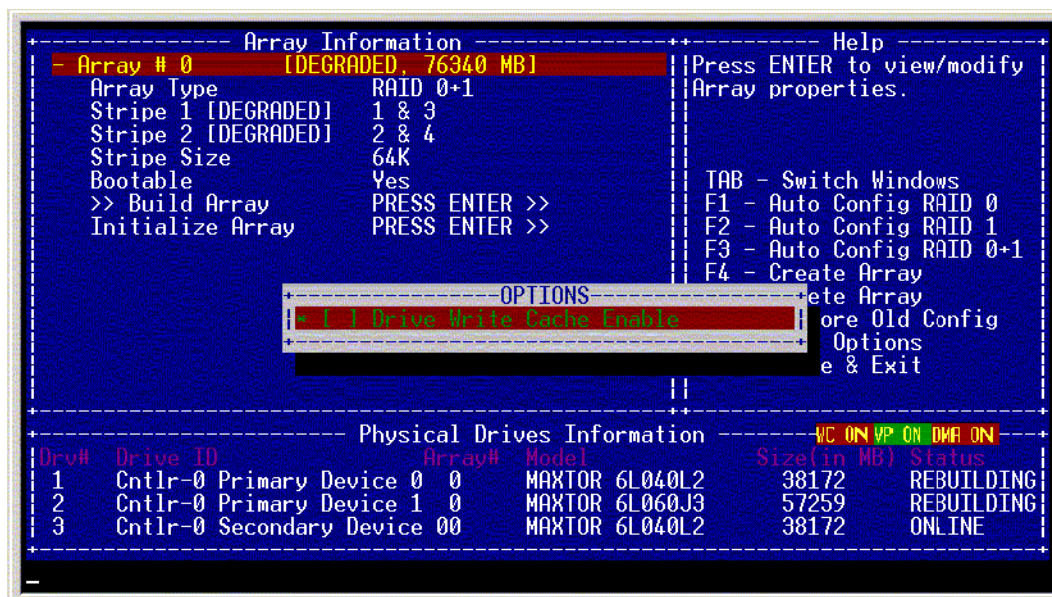
Press the <F6> key to restore the configuration that existed before you entered the MegaRAID IDE setup utility.

4.15 Edit Options (F7)

Press the <F7> key to set the options to enable/disable Drive Write Cache, Boot Sector Virus Protection, and DMA transfers. To select an option, move the cursor to the desired option and press the spacebar. This puts a check by the option. Press <Enter> to activate the new option.

A status box for each item displays in the Physical Drives Information section of the screen. The box shows whether the option is on or off. The Write Cache displays WC-ON or WC-OFF, the Virus Protection box displays VP-ON or VP-OFF, and the DMA Read/Write box displays DMA ON or DMA-OFF. When you turn the option on, the color of the status box changes from red to green. The window for the Write Cache, Virus Protection, and DMA options is shown in [Figure 4.2](#).

Figure 4.2 Edit Options Screen (F7)



4.16 Save and Exit (F10)

When you have completed the array configuration, press <F10> to save the configuration and exit. If you do not want to save the configuration or any changes that you have made, press <Esc>. Subsequent message boxes display for confirmation; respond to them appropriately. Note that when a new array is configured, its partition record is invalidated.

Chapter 5

MegaRAID Configuration Console (MCC)

This chapter describes the MegaRAID Configuration Console (MCC) and contains the following sections:

[Section 5.1, “Features and Architecture,” page 5-1](#)

[Section 5.2, “Installation,” page 5-9](#)

[Section 5.3, “Using the MCC Software Utility,” page 5-18](#)

MCC is a software utility that can be run using LSI Logic RAID-aware custom web server. Because of this, no third-party software is required, and the entire code is in JAVA, making MCC platform independent.

5.1 Features and Architecture

You would typically configure and administer the arrays and drives using a configuration utility. MCC enables you to connect to a host system and perform the following operations:

- Getting information about the configuration
- Tracking the health of the arrays
- Tracking status changes and errors in physical drives
- Logging events to internal and system logs
- Tracking S.M.A.R.T. (self-monitoring analysis and reporting technology) status of the physical drives to monitor drive performance and reliability
- Rebuilding an array
- Performing a consistency check on an array
- Checking the error log in which all drive failures are reported
- Providing RAID data and error log

Changing drive status to Online or Failed

Note: You need to use the <Ctrl><M> BIOS Configuration Utility to configure arrays, but you can use the MCC to monitor the configuration and perform rebuilds and other operations.

A host system has a suite of software running that is controller- and host operating system-dependent. These are (starting from low level and going to high level) the firmware, the drivers, the RAID API, and finally the RAID Server. Any configuration utility resides above this stack of software.

MCC is a web-enabled solution for RAID array and drive administration. A user with just a web browser and Internet connection can connect to a host system using LSI Logic custom RAID-aware WebServer or by a WebServer/JSP configuration.

Multiple RAID systems can exist on a LAN. The WebServer can be a part of a LAN, which routes the user to the desired RAID system, though the system can work in a Standalone mode, also.

Note: JRE is already embedded in the MCC package. If your system does not have Java installed, the MCC package displays a message and installs Java first, then continues the MCC installation. The link to the appropriate download for Java is <http://java.sun.com/j2se/1.4/download.html>.

5.1.1 Features

The following is a list of the characteristics of MCC:

User-friendly and Web-accessible through an HTML-based graphic user interface (GUI)

Internet browser required (Internet Explorer 5 or higher recommended)

Operating system independent (Client side)

Client side works on all major Internet browsers

Supported operating systems: Microsoft Windows 2000, XP, 2003, and Red Hat Linux 8.0, 9.0, and SuSE Linux 8.0, 8.2, and 9.0

Support for IDE MegaRAID

RAID configuration management

Standard RAID operation management

- Alerts and notification management
- Co-existence with and enhancement of existing management environment, such as Power Console Plus
- Dynamic screen updates
- Ability to run both in Network and in Standalone modes
- Support for all the latest MegaRAID products
- Hardware dependent. See the hardware user manual for more information.

5.1.2 Architecture

5.1.2.1 Registration Server (REGSERV)

The Registration Server contains a database of all computers that have registered as users of the RAID Server. Before any computer running RAID Server can use the MCC, it must be registered in the Registration Server. This application runs on Red Hat Linux and Windows 2000.

5.1.2.2 Registering the Host Machine for Remote Management

In order to manage several MegaRAID controllers in different machines on the network, the MegaRAID controller must register with the Registration Server database. The MegaRAID Console Server internet protocol (IP) address is located in the following files:

Windows: %Winbootdir%\System32\Drivers\Etc\Regserv.dat

Linux: /etc/regserv.dat

Note: If MCC is running in Stand-alone mode, 'localhost' must be added to the file mentioned above.

5.1.2.3 Web Server

This application runs on MegaRAID Console Server and responds to Internet browser requests. The browser connects directly to LSI Logic specialized RAID-aware Web Server that has the Java Bean built in. By default, installation sets the Web Server port number to 3570.

Note: LSI Logic Web Server can co-exist with any other Web Server that you might currently have in your machine. LSI Logic Web

Server can be configured to listen to any port you choose, helping to avoid any potential conflict.

This solution does not need any third-party software and is totally platform independent.

5.1.2.4 RAID Server

This is the system that has MegaRAID controllers and their monitoring applications, such as RAID_SERVER. RAID_SERVER is a communication layer between MegaRAID Monitoring Console and the IDE software utility and driver. RAID_SERVER is required in all IDE RAID configurations. For IDE, RAID_SERVER communicates with the MCC and Spy software utilities to get data about RAID.

The RAID_SERVER software runs in any server that has at least one MegaRAID controller and is registered with the Registration Server.

5.1.2.5 Spy Service

Spy Service, a daemon that runs in the background, looks for errors, failed drives, and status changes. It can mark drives as failed after the error threshold is reached and start automatic rebuilds.

When operating under Windows and Linux, Spy enables the self-monitoring analysis and reporting technology (S.M.A.R.T.) on all of the hard drives at startup and polls for S.M.A.R.T. status changes at 60 minute intervals. S.M.A.R.T. monitors hard drives for drive failures.

Info, Warning and error messages from Spy Service –

The Linux version of Spy Service logs messages to /var/log/Spy.log file and displays some error messages in Console.

The Windows version of Spy Service logs messages under IDE_RAID_SYS in the Application folder. [Table 5.1](#) describes the Spy log messages in Windows.

Table 5.1 Spy Log Messages

Message	Severity	NT Event Log ID	Reason
MegaRAID IDE monitoring started	Info	6000	Spy daemon started

MegaRAID IDE monitoring is shutting down	Info	6001	Spy daemon stopped
No MegaRAID IDE adapter found	Error	6004	No controller found
Error. Cannot allocate memory space.	Error	6005	Not enough memory
Logical Drive < logical drive ID > is critical	Warning		The specified logical drive is in critical status. This message is unused.
Logical Drive < logical drive ID > is degraded	Warning	6007	The specified logical drive is in degraded status. One drive is inaccessible in a RAID 1 array. A maximum of one drive in each mirror is inaccessible in a RAID 10 array. The logical drive can still be used.
Logical Drive < logical drive ID > is Off-line	Warning	6008	The specified logical drive is off line. The logical drive cannot be used.
New media error found on controller <controller> channel <channel> drive <drive ID>. Total number of errors for this drive is equal to <total error count>"	Warning	6009	A new read/write error on physical drive occurs.
Rebuilding is started on < logical drive name>	Info	6100	The rebuilding operation has been started on a specified logical drive.
Consistency is started on < logical drive name>	Info	6100	The consistency check operation has been started on a specified logical drive.
Rebuilding. Source drive <drive ID>, Target drive <drive is>	Info	6101	When a rebuilding operation starts, this specifies the source and target drive
Consistency. Source drive <drive ID>, Target drive <drive is>	Info	6101	When a consistency check operation starts, this specifies the source and target drive
Rebuilding stopped on < logical drive name >	Info	6103	The user stopped the rebuilding operation on the specified logical drive.
Consistency stopped on < logical drive name >	Info	6103	The user stopped the consistency check operation on a specified logical drive.
Rebuilding aborted on < logical drive name >	Info	6102	The rebuilding operation has been aborted on a specified logical drive.

Consistency aborted on < logical drive name >	Info	6102	The consistency check operation has been aborted on a specified logical drive.
Rebuilding completed successfully on < logical drive name>	Info	6104	The rebuilding operation has been completed successfully on a specified logical drive.
Consistency completed successfully on < logical drive name>	Info	6104	The consistency check operation has been completed successfully on a specified logical drive.
Rebuilding completed with <error count> errors on < logical drive name>	Error	6105	The rebuilding operation has been completed with errors on a specified logical drive.
Consistency completed with <error count> errors and <mismatch count> mismatches (Un corrected) on < logical drive name>	Error		The consistency check operation on a specified array has been completed and the errors and mismatches have not been corrected.
Consistency completed with <error count> errors and <mismatch count> mismatches (Corrected) on < logical drive name>	Error	6109	The consistency check operation on a specified array has been completed and the errors and mismatches have been corrected.
Too many errors encountered to proceed with consistency. Consistency stopped	Info	6106	The consistency check stopped due to error threshold being reached. (not in the NT Event Log)
Driver is not loaded	Error		Could not locate the driver. (not in NT Event Log)
Error in own process ID creation	Error		Could not create its own process ID. (not in NT Event Log)
Error in recreate database. Exiting Spy	Error		Could not create its internal repository. (not in NT Event Log)
Internal error #n	Error		Internal error #n occurs where n can be 2, 3, or 5. (not in NT Event Log). The error numbers are 2 - When call GetPhysicalDrive fails (in Linux) 3 - When call GetPhysicalDrive Fails (in Novell) 5 - When the consistency check or rebuild is occurring and progress percentage is more than 100

Physical drive '<drive name>' reached error threshold <threshold limit>	Warning		The named physical drive reached the error threshold limit. (not posted in NT Event Log)
Physical drive <drive name> status : Failed	Error		The specified physical drive status is 'Failed'. (not in NT Event Log)
New SMART error found on controller <controller> channel <channel> drive <drive ID>	Warning	6006	A new SMART error on drive is found.
Logical Drive <drive no.> is optimal	Info	6110	Displays when the logical drive status turns to optimal.
New configuration. <Configuration detail>	Info	6111	Displays when a new configuration is written.
Add Configuration<Configuration detail>	Info	6112	Displays when a configuration is added to the existing configuration.
Configuration cleared	Info	6113	Displays when a configuration is cleared.
Logical Drive <Drive ID> is deleted	Warning	6114	Displays when a logical drive is deleted.
Physical Drive <Drive ID> is removed	Warning	6115	Displays when a physical drive is removed.
Physical Drive <Drive ID> is inserted	Warning	6116	Displays when a physical drive is inserted.

Linux Spy Error Messages Posted to Console –

[Table 5.2](#) describes the error messages that can display when running Spy under Linux.

Table 5.2 Linux Spy Error Messages

Message	Reason
Try as root	Tried to run/start Spy from any user other than root.
Spy is already running. Run 'Spy - stop' to stop	Tried to run/start Spy while it is running.

Message	Reason
Spy communication failure	Tried to access/stop Spy while it is not running.
Error in sending message. Socket ID <ID> packet no <packetno>	There is a communication problem for the specified socket ID and packet number.
Physical Drive <drive name> status : <drive status>	Occurs when physical drive status is changed for the specified drive.

5.1.2.6 CheckSpy

Checkspy is monitoring software that runs between the system bootup and your login to Linux. This application informs you if any physical drives failed or reached the error threshold limit before you logged in. When you log in, CheckSpy posts all messages to the console, then exits. CheckSpy is installed when you install `Spy-rh-x.y-z.i386.rpm` using the Red Hat Package Manager (RPM).

[Table 5.3](#) describes the CheckSpy messages that post to Console.

Table 5.3 CheckSpy Messages Posted to Console

Message	Reason
Unable to get error threshold from option setup	This is an error message. CheckSpy application could not able “talk” to ‘Spy’ properly. In most of the cases this happens because Spy is not running.
Physical drive <drive name> reached error threshold <error count>	The named physical drive reached the error threshold limit.
Physical drive <drive name> status : Failed	The named physical drive is failed

Linux – The Linux service setup file is `/etc/rc.d/init.d/spy`. It is used to start Spy Service every time the machine boots. The file is installed when you install `Spy-rh-x.y-z.i386.rpm` using the Red Hat Package Manager (RPM). Spy Service is automatically started in run level 2, 3, 4, and 5. The startup priority is 80 and the shutdown priority is 30.

Novell – In Novell NetWare, an installation program named `install.nlm` performs the Spy installation. This program installs `Spy.nlm` and the “options” file under the directory `SYS:\ETC`. It also installs an uninstall program, `uinsspy.nlm`, in the same directory.

The installation program adds the following entry at the end of the `AUTOEXEC.NCF` so that Spy can start automatically at bootup:

```
#LSI Logic Spy startup

SEARCH ADD SYS:\\ETC

LOAD SYS:\\ETC\\SPY
```

5.2 Installation

This section describes the following:

- Items required for installation and supported operating systems
- Installation procedures for Windows 2000, XP, and Server 2003
- Installation procedures for Red Hat Linux

The system must have the items listed in [Table 5.4](#). Some of the operating systems require that the items be installed before you install the MCC.

Table 5.4 Items Required for Installation

	Service Pack	Internet Browser	Java Run-time Environment (JRE)
Windows 2000	No	Yes	JRE 1.3 or greater
Windows XP	SP1	Yes	JRE 1.3 or greater
Windows Server 2003	N/A	Yes	JRE 1.3 or greater
Red Hat Linux	No	Yes	JRE 1.3 or greater

MCC supports the following browsers:

- Internet Explorer 5.x or greater
- Netscape 4.7 or greater

5.2.1 Installing on Windows Systems

Perform the following steps to install MCC in Windows.

Step 1. Insert the CD in your computer and run the Setup.EXE program, using the following directory:

```
CD-ROM Drive Letter>:/Setup.EXE
```

Setup.EXE installs the required components listed in [Table 5.5](#) if they are not already installed. When the first installation screen displays, follow the instructions on the installation screens.

- Step 2. For local administration of a system, install MegaRAID Web Server and MegaRAID Server. For remote administration of different machines, install MegaRAID Web Server, MegaRAID Server, and MegaRAID Registration Server.

MegaRAID Registration Server must be installed on only one machine in the network.

- Step 3. Click Install to begin the installation, Back to review or change any installation settings, or Cancel to exit the Wizard.

This screen displays the progress of the installation.

- Step 4. Click Finish to complete the installation.

5.2.2 Installing on Linux Systems

This section describes the installation procedure for Red Hat Linux and SuSE Linux.

Note: The Java Run-time Environment (JRE) must be installed before MCC for Linux® and Windows® is installed. JRE is already embedded in the MCC package. If your system does not have Java installed, the MCC package displays a message and installs Java first, then continues the MCC installation. The link to the appropriate download for Java is <http://java.sun.com/j2se/1.4/download.html>.

Table 5.5 lists the MCC features and the conditions necessary to use them.

Table 5.5 MCC Features and Requirements

Feature	Requirement
MegaRAID Web Server	The TCP stack must be running for the Web Server to function. There is no requirement for installing Web Server. Web Server is installed in the /opt/LSI directory. There are no RPMs required. The .jar files and directories are simply copied to the /opt/LSI directory.
MegaRAID Registration Server	The TCP stack must be running for the Registration Server to function. There is no requirement for installing Registration Server. It is installed in /usr/sbin. RegSvr-x.y-z.i386.rpm
IDE RAID	IDE RAID can be installed only if the “megaraid” driver is detected by the system as loaded. The system checks whether the directory /proc/megaraid exists and is readable. RAID Server: <ul style="list-style-type: none"> RAID Server can be installed only if the “megaraid” driver is detected by the system as loaded. RSLinux-x.y-z.i386.rpm Spy-rh- x.y-z.i386.rpm

5.2.2.1 Installing JRE in Red Hat Linux and SuSE Linux Systems

Perform the following steps to install JRE in Red Hat Linux 8.0, 9.0, 2.1 AS, and 2.1 ES, SuSE 8.0 and 8.2, and later versions:

Note: Linux is case sensitive, so type all commands exactly as shown.

Step 1. Place the CD-ROM into the CD-ROM drive.

Step 2. To run the installation package, which creates an RPM file, type:

```
./<bin name>
```

for example, ./j2re-1_4_0_02-linux-i586-rpm.bin. This creates a file with a similar name with an RPM extension. For example, ./j2re-1_4_0_02-linux-i586-rpm.bin creates a file named j2re-1_4_0_02-fcs-linux-i586.rpm.

Step 3. To get a list of files, type:

```
ls
```

Next, you install the RPM package.

Step 4. In the directory in which the RMP package was created, type:

```
rpm -ivh <RPM filename>
```

for example, rpm -ivh j2re-1_4_0_02-fcs-linux-i586.rpm

Step 5. Open `.bash_profile` or `/etc/profile` to add Java to the path.
You need to edit `.bash_profile` for Red Hat Linux and `/etc/profile` for all versions of SuSE Linux for the path statement. The following steps explain how to do this.

Step 6. Select either PICO or VI as your text editor.

Step 7. To edit the `.bash_profile` or `/etc/profile` using PICO, type the following for Red Hat Linux:

```
cd /root
```

or the following for SuSe Linux:

```
cd /etc
```

then type the following for `.bash_profile`:

```
pico .bash_profile
```

or the following for `/etc/profile`:

```
pico /etc/profile
```

Step 8. To edit the `.bash_profile` or `/etc/profile` using VI, type the following for Red Hat Linux:

```
cd /root
```

or the following for SuSe Linux:

```
cd /etc
```

then type the following for `.bash_profile`:

```
vi .bash_profile
```

or the following for `/etc/profile`:

```
vi /etc/profile
```

The following displays on the screen for `.bash_profile`, regardless of the text editor you use:

```
# .bash_profile
# Get the aliases and functions
if [ -f ~/.bashrc ]; then
. ~/.bashrc
fi
# User specific environment and startup programs
```

```
PATH=$PATH:$HOME/bin
BASH_ENV=$HOME/.bashrc
USERNAME="root"
export USERNAME BASH_ENV PATH
```

Note: For /etc/profile, add the following at the end of the file:

```
PATH=/usr/java/j2re1.4.0_02/bin:$PATH:$HOME/bin
export PATH
```

Step 9. Move the cursor to the line that starts with PATH=.

Step 10. After PATH=, type:

```
/usr/java/j2re1.4.0_02/bin:
```

This changes PATH=\$PATH:\$HOME/bin to

```
PATH=/usr/java/j2re1.4.0_02/bin:$PATH:$HOME/bin.
```

Step 11. Save the file and exit.

- a. If using PICO, press <Ctrl><X> to save the file. When prompted to save the file with changes, click Yes, then press <Enter> to save as .bash_profile.
- b. If using VI, type the following to save the file:

```
:wq
```

Step 12. Close the terminal window and reboot.

The Java installation is complete.

5.2.2.2 Installing MCC in Red Hat Linux and SuSE Linux Systems

You must install Java Run-time Environment (JRE) before you install the MCC for Linux systems. The MCC installation for Linux systems installs only in the Xterminal screen and does not execute properly in full screen shell (Ctrl-Alt-F1). Make sure you install from the GUI Xterminal screen *only*.

Perform the following steps to install MCC in Red Hat Linux 8.0, 9.0, 2.1 AS, and 2.1 ES, SuSE Linux 8.0 and 8.2, and later versions:

Note: Linux is case sensitive, so type all commands exactly as shown.

Step 1. Place the CD-ROM into the CD-ROM drive.

Step 2. If the CD-ROM is not already mounted, mount it by typing:

eject

then place the CD-ROM into the CD drive, and type:

```
mount /mnt/cdrom
```

Step 3. To copy the files from your CD to your hard drive, type:

```
cp * /<destination>
```

where destination is the directory on the hard drive you are copying to.

For example, `cp * /root` would copy all the files on the CD-ROM to the directory `/root`.

Step 4. Perform the following steps to switch directories to the CD-ROM drive, and then copy the files to the directory on the hard drive. (Perform these steps in order).

a. To switch to the CD-ROM drive, type:

```
mount /mnt/cdrom
```

b. To see a listing of files on the CD, type:

```
ls
```

c. To copy the files from your CD to your hard drive, type:

```
cp * /<destination>
```

where destination is the directory on the hard drive you are copying to.

For example, `cp * /root` would copy all the files on the CD-ROM to the directory `/root`.

Step 5. Change to the directory you just copied the files into, then look at the files in the directory.

Step 6. Type:

```
cd /<destination>
```

Step 7. Type:

```
ls
```

Step 8. Install the .JAR package by typing:

```
java -jar <.JAR package name>
```

For example, `java -jar MCCLinux_1.28-7.jar`

Step 9. Reboot the system so the Java program will take effect.

Step 10. Go to the Xterminal window or console, and type:

`SetPass`

Step 11. Enter a password.

This is your MMC full access password. This is a case sensitive password, as are all passwords and commands in Linux.

Step 12. Close the Xterminal window.

Step 13. Open up Netscape Communicator.

Note: You need to install Netscape for this step. MCC under Linux does not support Konqueror or Mozilla.

Step 14. Go to the following URL:

`http://[machinename]:3570,`

where the machine name is `localhost` if running on the same machine and the default port is 3570. This displays as:

`http://localhost:3570.`

Your MegaRAID configuration screen displays. The installation procedure is complete.

5.2.2.3 Uninstalling MCC in Linux Systems

Perform the following steps to uninstall MCC in Linux:

Step 1. Switch to a graphical user interface (GUI).

Access the directory `/opt/LSI/_uninst.`

Step 2. At the shell prompt, type:

`java -jar uninstall.jar`

Note: MCC installation does not support component updates. You can uninstall a package and reinstall it.

5.2.2.4 Configuring Web Server and RAID Servers

There are two ways to run MCC. The first is locally, where all the components are in a single machine. The second is in the network, with multiple systems running RAID servers. The following description applies to both.

- The Web server is unaware of the registration server. It knows only about RAID servers.
- RAID servers are unaware of the Web server. They know only about the Registration server.
- Registration server is unaware of both – Web server and RAID servers.

There must be only one Registration Server running in the network. It can co-exist with either Web Server or any RAID Server. Of course, in the LOCAL setup, all the components run on a same machine. Perform the following steps to configure Web Server and RAID Servers.

Step 1. Registration Server must be running before the RAID Servers are started. Start Registration Server by typing the following at the prompt:

```
/usr/sbin/RegSvr
(/usr/sbin/RegSvr -stop to stop)
```

Step 2. Next, make a RAID Server aware of the Registration Server. To do this perform the following steps:

- Open `/etc/regserv.dat`.
- Type either the Internet Protocol (IP) address or the name of the server running the Registration Server.
- If you are using the name instead of the IP address, make sure the name is resolvable. (Try pinging the server using name.)
- If the name is not resolved, you can add the name to “hosts” file (`/etc/hosts`).
- If everything is running locally, you can type `localhost` or `127.0.0.1` in the first line of `/etc/regserv.dat`.

The steps above must be done in each machine where RAID Server is running. After that is done, all RAID Servers can be started.

Step 3. To start a RAID Server, type the following at the prompt:

```
/usr/sbin/RSLinux
```

Type `/usr/sbin/StopServer` to stop a RAID Server.

- Step 4. Web Server must now be made to point at any of the RAID Servers. Perform the following steps to point Web Server to a RAID Server.
- Open the file `/opt/LSI/mcc.properties`.
This file contains many NAME=VALUE pairs.
 - Locate the name `RAID_SERVER_NAME`.
 - Type either the name or IP of a RAID Server.
 - If you are using the name, make sure it is resolvable. (Try pinging the machine using the name.)
If the name is not resolved, you can add the name to “hosts” file (`/etc/hosts`).
 - If everything is running locally, you may type
`RAID_SERVER_NAME=localhost`.
- Step 5. To start WebServer, run:
`/opt/LSI/startup.sh`

5.2.3 Setting and Modifying the Full Access Password

The password must be set on every machine that runs RAID Server (RSLinux). Perform the following steps to set the password for the first time.

- Step 1. Type `/usr/sbin/SetPass` at the shell prompt.
The SetPass utility prompts you to enter a new password and confirm it.
- Step 2. If a password has already been set, you can use SetPass to modify it.
The password is maintained in the file `/etc/raidpass.val`.

Note: The password needs to be set every time you uninstall and install MCC.

5.2.3.1 Accessing Log File Information

Log files log messages whose severity value is equal or more than the value set in the file `/etc/rslinux.cfg`. The log files, `RSMessages.log` and `PollMessages.log`, are created in the directory `/var/log`. The file `/usr/sbin/RSLinux -ver` prints version information.

5.2.4 Limiting the Size of Log Files

MCC contains a feature to limit the size of log files. Perform the following steps to use this feature.

Step 1. Open the file `/etc/rslinux.cfg`.

This is basically an INF type of file with parameters in the form of NAME=VALUE.

Step 2. Set the maximum size (in bytes) that the log file can be, using the NAME “max_log” field.

RAID Server periodically examines the file size and reduces the file to half the maximum size set. For example, if the maximum size is 2 Mbytes, then when the file exceeds 2 Mbytes, it is truncated to roughly 1 Mbyte in size. The default value is 1 Mbyte.

Step 3. Use the NAME “trim_interval” field to specify the length of time until the next check of the log size.

This check is to determine whether the log file needs to be reduced in size. The default value is 120 minutes. The oldest messages are deleted first.

5.3 Using the MCC Software Utility

This section describes the MCC software utility. You can use the software utilities that come with MCC to perform the following actions:

- Get information about the configuration.
- Track the health of the arrays and physical drives.
- Track S.M.A.R.T. status of the physical drives.
- Rebuild an array.
- Perform a consistency check on array.
- Check error log where all drive failures are reported.

5.3.0.1 Logging onto the RAID Server

Perform the following steps to log on to the RAID Server.

Step 1. Enter the IP address in the Internet browser, followed by the port number.

The following is an example: *http://196.0.0.100:3570*.

Step 2. Press <Enter>.

The MCC screen displays.

Step 3. Click the name of the RAID Server you want to configure.

Continue the log-on procedure by selecting View Only or Full Access. [Table 5.6](#) describes the access options.

Table 5.6 Access Options

Option	Description
View Only	Allows you to only view the RAID configuration. It does not allow you to perform rebuilds or check consistency.
Full Access	This allows you to view, configure, and manage the RAID configuration. This option requires you to supply the Full Access Password.

[Table 5.7](#) displays the contents of MCC main screen. It is broken up into five frames.

Table 5.7 Main Screen Contents

Frame	Description
Top	The top frame displays the following information: <ul style="list-style-type: none">• Server ID that you are logged on to.• Mode you are logged on in.• Type of RAID you are using.
Left	This frame lists the following options (described in Table 5.8): <ul style="list-style-type: none">• Scan Devices• Configuration View• Device Progress• Log Data• Advanced• Back Plane• Close Server

Table 5.7 Main Screen Contents

Frame	Description
Middle Upper	This frame displays the Physical Disk Drive View.
Middle Lower	This frame displays the Logical Disk Drive View.
Right	This frame displays the type of actions you can perform. It also displays extended options and links when certain links are selected.

[Table 5.8](#) describes the options in the left frame. You can click the options to perform actions or display the related screens.

Table 5.8 Options on the Main Screen

Name	Description
Scan Devices	Rescans the system for new hard drives. After you click this button, the driver rescans all PCI devices. You will notice a significant decrease in system performance for a few seconds.
Configuration View	Displays the RAID configuration, media errors, and status of the drives and arrays. It also allows you to start activity on a particular array. <ul style="list-style-type: none"> • Logical View – displays information about the arrays. • Physical View – displays all hard drives attached.
Device Progress	Displays the progress bar for the MegaRAID current activity. The progress bar displays the time left and percentage complete. Possible actions include the following: <ul style="list-style-type: none"> • Rebuild • Consistency check
Log Data	Displays activity log information. All actions add records to the activity log file. The size of this file can be modified by clicking the Advanced button.
Advanced	Allows you to modify the parameters for the RAID system.
Back Plane	Some systems can have built-in back plane devices. MCC supports several types of back planes. See the user manual for your system.
Close Server	Returns you to the list of available servers. Note: The proper way to exit MCC is to click the Close Server button. If you exit any other way, there is a two-minute window in which you cannot log back in with full access.

A small browser window runs in the background as soon as you log on to the RAID Server. It constantly refreshes the view so you have the most current information.

5.3.1 RAID Properties

To view the RAID properties, click the button next to the RAID controller.

After you click the button, the RAID ID displays in the right frame, and the link to the RAID Properties page displays below the ID. Click on the word Properties. The Property Description screen then displays.

Table 5.9 provides a description of each field. To exit this screen, click Config View or Scan Devices.

Table 5.9 RAID Properties

Field	Description
Model	Specifies the model number.
Driver Version	Specifies the driver version.
ROM Version	Specifies the ROM version.
Revision	Specifies the revision.
Interrupt	Specifies the interrupt.
Bus Master Base Address	Specifies the Bus Master Base Address.
PCI Bus ID	Specifies the PCI Bus ID.
Device ID	Specifies the Device ID.
Primary Channel Base Address	Specifies the Primary Channel Base Address.
Primary Channel Control Address	Specifies the Primary Channel Control Address.
Secondary Channel Base Address	Specifies the Secondary Channel Base Address.
Secondary Channel Control Address	Specifies the Secondary Channel Control Address.

5.3.2 Physical Drive

To view the Physical Drive Properties and Error Status, click the button next to physical drive you want to view.

After you click the button, the Physical Drive ID displays in the right frame. The links to the RAID Properties and Error Status page are listed as shown below. Click on the link Properties to display the Physical Drive Properties. Click the Error Status to display the Physical Drives Error Status.

5.3.2.1 Physical Drive Properties

This screen displays the physical drive properties. [Table 5.10](#) provides a description of each field. To exit this screen, click on Config View or Scan Devices.

Table 5.10 Physical Drive Properties

Field	Description
Firmware	Specifies the firmware version of the physical drive.
Status	Specifies the status of the physical drive (online or offline).
Errors	Specifies the number of errors in the physical drive.
S.M.A.R.T. Status	<p>Specifies the S.M.A.R.T. (self-monitoring analysis and reporting technology) status of the physical drive. S.M.A.R.T. helps monitor and predict the reliability and performance of the hard drive.</p> <p>The options for this are Disabled, OK, or Error.</p> <ul style="list-style-type: none">• Disabled means S.M.A.R.T. is off and physical drive does not collect statistical data.• OK means S.M.A.R.T. is on and no errors found.• Error status means S.M.A.R.T. is on and some errors found; this is a serious warning that means the drive has to be replaced.
Logical Drive	Specifies the logical drive information about this physical drive (by drive letter or volume).
Capacity	Specifies the capacity of this physical drive.
Transfer Mode	Specifies the type of transfer mode used on this physical drive.
Part of Array	Specifies the part of the array which this physical drive belongs to. The RAID mode for a striped array (RAID 0) is called performance, and for a mirrored array (RAID 1) is called reliability.
Connection	Specifies the type of IDE connection that is used to connect this drive to the RAID controller (primary or secondary, master or slave).
Model	Specifies the model number of the physical drive.
Serial Number	Specifies the serial number of the physical drive.

5.3.2.2 Physical Drive Error Status

This screen displays the physical drive error status. [Table 5.11](#) provides a description of each field.

Table 5.11 Physical Drive Error Status

Field	Description
Time and Date	Specifies the time and date the error was logged.
Error	Specifies the error type. See Table 5.12 for the error codes.
Sector	Specifies the sector that contains the error.

Error codes for the physical drives display when you select the Error Log view. [Table 5.12](#) provides a list and description of the error codes.

Table 5.12 Physical Drive Errors

Code	Description
Error 01	Media read error. The disk surface is damaged.
Error 02	Media write error. The disk surface is damaged.
Error 03	Media verify error.
Error 04	Missing drive type.

5.3.2.3 Array

To display the Array Properties, perform a Check Consistency, or rebuild the array, click the icon in the lower middle frame next to Array.

After you click the icon, the Array ID displays in the right frame. The links to the Array Properties, Check Consistency, and Rebuild display as shown on the screen. Click the word Properties to view the Array Properties. The Array operations are described in the following information.

Note: Due to high resource usage during Rebuild and Consistency Check operations in the Windows operating system, only one action per RAID Server is allowed in Windows.

Check Consistency and Rebuild menu items appear only for the appropriate array (see the [subsection entitled “Array Check Consistency”](#) and the [subsection entitled “Array Rebuild Device Progress”](#)).

Array Check Consistency – Click Check Consistency to check the correctness of the redundant data in an array. You can choose to make the data on both drives identical. This function can be performed only on RAID 1 and RAID 10 arrays.

After you click Check Consistency, the options in [Table 5.13](#) display in the right frame.

Table 5.13 Check Consistency Options

Code	Description
Check All Partitions	Check this option to perform the consistency check on all valid partitions (logical drives). Option is valid only for Windows RAID Servers.
Abort Check Consistency	When the Check Consistency begins, the words Checking Consistency flash next to the array that is being checked. You can abort the Check Consistency by clicking Abort Check Consistency in the right frame. You can view the progress of the Check Consistency by clicking Device Progress in the left frame.
Check Consistency Device Progress	This screen displays the progress of the Check Consistency. Table 5.14 provides a description of each field.

Table 5.14 Check Consistency Progress Field Descriptions

Field	Description
Array	Specifies the array number being checked.
Operation	Specifies the type of operation being performed. Example: Check Consistency.
Percentage	Indicates the percentage completed.
Time Left	Indicates the estimated time left to complete the task.
Progress	Displays graphical representation of the progress.

To exit this screen, click Config View or Scan Devices.

Array Rebuild Device Progress – The Array Rebuild Device Progress screen displays the Array Rebuild Progress. [Table 5.15](#) provides a description of each field.

Table 5.15 Array Rebuild Device Progress Field Descriptions

Field	Description
Array	This field specifies the array number being rebuilt.
Operation	This field specifies the type of operation being performed. Example: Rebuild.
Percentage	This field specifies the percentage complete.
Time Left	This field specifies the estimated time left to complete the task.
Progress	This field specifies a graphical representation of the progress.

To exit this page, click on Config View or Scan Devices.

Array Properties – This screen displays the Array Properties. [Table 5.16](#) provides the field descriptions.

Table 5.16 Array Property Field Descriptions

Field	Description
Mode	Displays the RAID level. IDE RAID supports RAID 0, 1, and 10.
Status	Displays the health of the array. The array health status can be one of the following: <ul style="list-style-type: none"> • On Line - Working within normal parameters. • Off Line - All drives have failed. • Deteriorated - One of the drives has failed.
Logical Drive	Displays the logical drive letters or volume names.
Stripe Size	Displays the stripe size. A stripe size is the minimal amount of data that can be written to the drive in one write. Note: RAID 1 does not have a stripe size parameter. Stripe size parameters are available for RAID 0 and RAID 10 array sets only. The stripe size parameter can be set only when the array is created. See Chapter 2, “RAID Levels,” for more information.
Capacity	Displays the actual size of the array. This size is reported to Operating System.
Error Threshold	This parameter is user defined. Users can define the error threshold on each drive. For more information on how to set the error threshold, see the Advanced menu description.
Constituent Physical Drives	Displays the physical drives joined to an array.

To exit this page, click on Config View or Scan Devices.

5.3.2.4 Log Data

This screen displays the Log Data screen. Use the scroll bar to view the log. To exit this page, click on Config View or Scan Devices.

5.3.2.5 Advanced Settings

This screen displays the Advanced Settings of the MCC. [Table 5.17](#) provides a description of each field.

Table 5.17 Advanced Settings

Field	Description
Fail Physical Drive if Error Threshold Reached	Marks drive as Failed when the error threshold is reached. After this drive is marked as Failed, it can't be used anymore. Drive status can be changed only from the BIOS Configuration Utility (<Ctrl><M>). This option is not set by default.
Start Rebuilding if Error Threshold Reached	MCC begins an automatic rebuild if the array has more than a specified number of errors. If so, it starts an automatic rebuild. This option is valid only for arrays set for reliability mode (RAID 1 mirrored arrays).
Check Array for Rebuild at Startup	MCC checks the number of errors in the arrays to see if they need rebuilding.
Stop Rebuilding if Rebuilding Error Threshold Reached	If the maximum number of errors allowed is found in an array during rebuild, MCC will stop the rebuild.
Make Contents of Array Drives Identical after Check Consistency error found	If MCC finds mismatches between two mirrored (RAID 1) arrays, it will copy the data from one drive to the other to make them identical. This option is valid only for arrays set for reliability mode (RAID 1 mirrored arrays).
Delete Activity Log Files when it reaches maximum Allowed Size	This deletes the activity log file if it reaches the maximum allowable size (as set in the box below this item). If checked, the activity log file is overwritten when it reaches the maximum size. If not checked, the file stops updating when it reaches the maximum size and is not updated anymore.
Activity Log File Size	Use this box to select the maximum size for the activity log file.
Enable S.M.A.R.T. on Physical Drive	If this option is checked, it enables S.M.A.R.T. monitoring of all physical drives. S.M.A.R.T. Poll Interval: This setting allows you to set the time interval that S.M.A.R.T. status is checked. Note: S.M.A.R.T. stands for self-monitoring, analysis, and reporting technology. This feature is built into the hard drive that checks for potential problems that can crash the hard drive. Not all hard drives have this feature.

To exit this page, click on Config View or Scan Devices.

Backplane – This screen displays the backplane information of the RAID array. Different backplanes can have different features. This application shows the following:

- Current temperature inside the backplane
- Error log
- Fan speed

To exit this page, click Config View or Scan Devices.

Close Server – To exit this RAID server, click Close Server in the left frame. |

Chapter 6

Operating System Installation

This chapter contains the procedures for installing the Windows 2000, Red Hat Linux, and Novell NetWare operating systems when using the MegaRAID IDEal Software RAID for ServerWorks CSB6 A1.2. The chapter contains the following sections:

- [Section 6.1, “Windows 2000 Driver Installation,” page 6-1](#)
- [Section 6.2, “DOS Driver Installation,” page 6-3](#)
- [Section 6.3, “Red Hat Linux Driver Installation on a New System,” page 6-3](#)
- [Section 6.4, “SuSE Linux Enterprise Server \(SLES\) 8.0 Installation,” page 6-4](#)
- [Section 6.5, “SuSE Linux 8.2 Driver Installation,” page 6-7](#)
- [Section 6.6, “Novell NetWare Driver Installation,” page 6-10](#)

6.1 Windows 2000 Driver Installation

Perform the following steps to install the Windows 2000 driver onto the RAID-configured drives.

- Step 1. Boot the system with the Windows 2000 Boot Installation CD or diskette.

The following message displays:

Setup is inspecting your computers hardware configuration.

- Step 2. When a prompt displays, press <F6>.

- Step 3. When installation prompts for a key after copying some files, press <S> to add an IDE adapter.

- Step 4. In Windows 2000, you are prompted for the driver diskette.
- Step 5. Insert the MegaRAID IDEal Software RAID for ServerWorks CSB6 A1.2 driver CD and press <Enter>.
- Step 6. Scroll down the list to the LSI MegaRAID driver, then click <OK>.
- Step 7. Continue with the installation procedure.

6.1.1 Updating the Windows 2000 Driver

Perform the following steps to update the Windows 2000 driver or install the Windows 2000 driver into an existing system booted from a standard IDE drive.

- Step 1. Click the Windows Start button.
The Windows menu displays.
- Step 2. Select Settings.
The Settings menu displays to the right.
- Step 3. Click Control Panel.
The Control Panel window displays.
- Step 4. Select Adapters.
- Step 5. Select the Drivers tab.
- Step 6. Scroll down the list until the appropriate selection for your system which contains the CSB6 IDEal RAID and for your operating system displays, then click <OK>.
- Step 7. Select it, then remove it by clicking the Remove button.
- Step 8. Click the Add button.
- Step 9. Select the Have Disk button.
- Step 10. Insert the diskette into the floppy drive.
- Step 11. Select drive letter A: and click on <OK>.
- Step 12. Select LSI Logic MegaRAID IDE Controller and click OK.
- Step 13. After Windows 2000 copies the driver, reset the system.

6.1.2 Confirming the Windows 2000 Driver Installation

Perform the following steps to confirm that the Windows 2000 driver is installed properly.

- Step 1. Click the Windows Start button. The Windows menu displays.
- Step 2. Select Settings.
The Settings menu displays to the right.
- Step 3. Click Control Panel. The Control Panel window displays.
- Step 4. Select Adapters.
- Step 5. Select the Drivers tab.
The controller appears in the list as LSI Logic MegaRAID IDE Controller.
- Step 6. Select the Devices tab.
One or more entries display as LSI Logic MegaRAID IDE #xx under LSI Logic MegaRAID IDE Controller.

6.2 DOS Driver Installation

For DOS, no driver installation is required. The ROM BIOS contains the low-level driver for MegaRAID that is necessary for MS-DOS.

6.3 Red Hat Linux Driver Installation on a New System

This section describes the installation of the device driver on new Red Hat Linux 7.3, 8.0, 9.0, or 2.1AS/ES systems. Refer to the release notes that accompanied the driver for information on updating the Red Hat Linux driver on an already existing Red Hat Linux system. Perform the following steps to install the driver:

Note: Copy the driver image for Linux from the Universal Driver Suite CD to diskette.

- Step 1. Boot to CD-ROM (Disk 1).
- Step 2. Type the following at the prompt:

```
linux dd
```
- Step 3. Press <Enter> at the boot prompt on the Welcome screen.
- Step 4. Insert the diskette with the driver image.
- Step 5. Select Yes.

- Step 6. If using the SuSE Linux operating system, scroll down to select LSI Logic MegaRAID adapter driver; otherwise, the operating system sees the driver automatically.
- Step 7. The utility locates and loads the driver for your device.
- Step 8. Follow the Red Hat Linux installation procedure to complete the installation.
- Step 9. Reboot the system.

6.4 SuSE Linux Enterprise Server (SLES) 8.0 Installation

Perform the following procedures to install the Megaide driver for SuSE United Linux 1.0 with Service Pack 2a:

- Obtaining the driver image file
- Creating the installation disks under Windows or Linux operating systems
- Performing a fresh installation

6.4.1 Preparing the Installation Disk(s)

To prepare the installation disks, you must obtain the necessary driver image files, then create the installation disk(s).

6.4.1.1 Obtaining the Driver Image File

The Megaide driver is offered in the form of a driver update disk. The required file is `dud-<driver version>.img`, which is the MegaRAID IDEal software RAID stack driver update disk.

You can obtain the latest driver files from the LSI Logic FTP site at:
`ftp://www.megaraid.lsillogic.com`

6.4.1.2 Creating the Installation Disks

You need a Microsoft Windows- or UNIX-based operating system and blank floppy diskettes to create the installation disks. The following sections contain the procedures for creating the disks under Windows- or a UNIX-based system.

Using a Windows Operating System –

Under Windows, you can use the rawrite floppy image writer utility to create disk images from image files. The image writer can be downloaded from the Internet. Perform the following steps to build installation diskettes:

- Step 1. Copy the driver update disk image `dud-<driver version>.img` and the file `rawrite.exe` to a directory.
Confirm that the files are in the selected directory.
- Step 2. After you confirm the files, you might need to change the filename of the driver update disk to a smaller name with less than eight characters.
- Step 3. Copy `dud-<driver version>.img` `dud.img`.
- Step 4. Type the following command to create two installation diskettes:

`RAWRITE`

then press <Enter>.

You are prompted to enter the name of the boot image file.
- Step 5. Type:

`dud.img`

You are prompted for the target drive diskette.
- Step 6. Insert a floppy diskette into the floppy disk drive and type:

`A:`

then press <Enter>.
- Step 7. After the command prompt returns and the floppy disk drive LED goes out, remove the diskette.
- Step 8. Label the diskette `SuSE UL10 SP2a dud<driver version>`.

Using a Linux Operating System –

Under Linux, you can use a driver diskette utility to create disk images from image files. Perform the following steps create the driver update disk:

- Step 1. Copy the driver update disk image `dud-<driver version>.img` to a Linux system.
- Step 2. Insert a fresh floppy diskette in floppy drive.
Confirm that the files are in the selected directory.

- Step 3. Create the driver update disk using the following command:
- ```
#dd if=dud-<driver version>.img of=/dev/fd0
```
- Step 4. After the command prompt returns and the floppy disk drive LED goes out, remove the diskette.
- Step 5. Label the diskette SuSE UL10 SP2a dud<driver version>.

## 6.4.2 Performing a Fresh Installation

Use this method if you want to perform a new installation of the operating system and want to include the drivers. Fresh installation uses the driver update disk at the beginning of the installation and the installer updates the system with MegaRAID driver images for the required kernels. Perform the following steps to install the MegaRAID IDEal Software RAID Stack during the fresh installation:

- Step 1. Create a RAID array using the MegaRAID IDE BIOS Configuration Utility (<Ctrl><M>).
- See [Chapter 4, “BIOS Configuration Utility”](#) for information about using the BIOS Configuration Utility to configure RAID arrays.
- Step 2. Boot your system using the SuSE United Linux SP2a CD.
- Step 3. When the first screen displays, press <Alt> and type the following at the boot prompt:
- ```
hda=noprobe hdb=noprobe hdc=noprobe hdd=noprobe acpi=off
```
- This is to avoid the CSB6 driver loading in Linux kernel.
- Step 4. Insert the driver update disk when prompted.
- Step 5. When prompted for installation disk 1, insert the SuSE United Linux CD 1 in the CD drive.

- Step 6. To make the mouse work, perform the following steps:
- At the installation menu, press <Alt><C>.
A new menu displays.
 - Select the mouse option from the menu that displays.
A new menu displays.
 - Select USB mouse from the menu and press the Accept button to continue with the installation.
You can use the arrow keys to make the selection.
- Step 7. Continue the installation, then reboot the system.
- Step 8. Perform the following steps:
- Press <Ctrl><Alt><F2>.
 - At the command prompt, type:


```
/sbin/modprobe mousedev  
echo "/sbin/modprobe mousedev" >> /etc/init.d/boot.local
```
 - Press <Alt><F7>.
- Step 9. Complete the installation steps.

6.5 SuSE Linux 8.2 Driver Installation

Perform the following procedures to install the Megaide driver for SuSE 8.2 Linux:

- Obtaining the driver image file
- Creating the installation disks under Windows or Linux operating systems
- Performing a fresh installation

6.5.1 Preparing the Installation Disk(s)

To prepare the installation disks, you must obtain the necessary driver image files, then create installation disk(s).

6.5.1.1 Obtaining the Driver Image File

The Megaide driver is offered in the form of a driver update disk. The required file is `dud-<driver version>.img`, which is the MegaRAID IDEal software RAID stack driver update disk.

You can obtain the latest driver files from the LSI Logic FTP site at:
`ftp://www.megaraid.lsillogic.com`

6.5.1.2 Creating the Installation Disks

You need a Microsoft Windows- or UNIX-based operating system and blank floppy diskettes to create the installation disks. The following sections contain the procedures for creating the disks under Windows- or a UNIX-based system.

Using a Windows Operating System –

Under Windows, you can use the rawrite floppy image writer utility to create disk images from image files. The image writer can be downloaded from the Internet. Perform the following steps to build installation diskettes.

Step 1. Copy the driver update disk image `dud-<driver version>.img` and the file `rawrite.exe` to a directory.

Confirm that the files are in the selected directory.

Step 2. After you confirm the files, you might need to change the filename of the driver update disk to a smaller name with less than eight characters.

Step 3. Copy `dud-<driver version>.img` `dud.img`.

Step 4. Type the following command to create the two installation diskettes:

`RAWRITE`

then press <Enter>.

You are prompted to enter the name of the boot image file.

Step 5. Type:

`dud.img`

You are prompted for the target drive diskette.

Step 6. Insert a floppy diskette into the floppy drive and type:

`A :`

then press <Enter>.

- Step 7. After the command prompt returns and the floppy disk drive LED goes out, remove the diskette.
- Step 8. Label the diskette SuSE 82 dud<driver version>.

Using a Linux Operating System –

Under Linux, you can use a driver diskette utility to create disk images from image files. Perform the following steps create the driver update disk:

- Step 1. Copy the driver update disk image dud-<driver version>.img to a Linux system.
- Step 2. Insert a fresh floppy diskette in floppy drive.
Confirm that the files are in the selected directory.
- Step 3. Create the driver update diskette using the following command:

```
#dd if=dud-<driver version>.img of=/dev/fd0
```
- Step 4. After the command prompt returns and the floppy disk drive LED goes out, remove the diskette.
- Step 5. Label the diskette SuSE 82 dud<driver version>.

6.5.2 Performing a Fresh Installation

Use this method if you want to perform a new installation of the operating system and want to include the drivers. Fresh installation uses the driver update disk at the beginning of the installation and the installer updates the system with MegaRAID driver images for the required kernels. Perform the following steps to install the MegaRAID IDEal Software RAID Stack during the fresh installation:

- Step 1. Create a RAID array using the MegaRAID IDE BIOS Configuration Utility (<Ctrl><M>).
See [Chapter 4, “BIOS Configuration Utility”](#) for information about using the BIOS Configuration Utility to configure RAID arrays.
- Step 2. Boot your system using the SuSE 82 CD.
- Step 3. When the first screen displays, press <F3> and select the installation menu option with the acpi disabled option.
- Step 4. Insert the driver update disk when prompted.

Step 5. Complete the installation steps.

6.6 Novell NetWare Driver Installation

The section provides installation instructions for the MegaRAID Novell Netware driver.

6.6.1 Novell NetWare Driver Files Description

The MegaRAID Novell NetWare driver and utilities support logical drives configured on the MegaRAID controller. This driver supports up to 12 MegaRAID controllers, as well as Hot Plug PCI.

Important: The logical drives configured on the host adapter are registered with the operating system as separate logical units.

[Table 6.1](#) describes the MegaRAID Novell NetWare driver files.

Table 6.1 Novell NetWare Driver Files

Filename	Description
MEGA4_XX.HAM	This file is the MegaRAID host adapter module (HAM). This driver supports the NPA Diagnostics option by using the NWDIAG flag, which is specified on the command line when the driver loads. The driver is a re-entrant module. It registers one adapter when you issue the NetWare LOAD command to load the driver.
MEGA4XX.DDI	This file is the device driver installation file. It is needed to install the MegaRAID host adapter module driver.
MEGAMMIO.NLM	This file is the Media Manager Interface module for the MEGA4_XX.HAM driver.
MEGAMGR.NLM	This file is the MegaRAID Configuration and Management utility. Do not unload this file using the UNLOAD console command.
MEGAMON.NLM	This file is the monitor program for NetWare, which the MegaRAID Monitor uses to monitor and report events on the adapter. The event categories are Severe, Warning, and Information. The notification is broadcast to the supervisor, displayed locally on the console, or displayed remotely.

All utilities and ASPI drivers expect the MegaRAID driver to pass the requests to the adapter. You must load the .HAM driver files first, so that it can load the .NLM files.

6.6.2 New Novell NetWare System Driver Installation

Follow the instructions in the *Novell NetWare Installation Guide* to install NetWare on the server. Follow these steps to install Novell NetWare using the MegaRAID controller as a primary adapter:

- Step 1. Boot with the NetWare 5.1/6.0 CD-ROM.
- Step 2. Follow the instructions on the screen until you reach the Storage Driver Support screen, which you can use to modify drivers.
- Step 3. Select the Storage Adapters option on the Storage Driver Support screen and press <Enter>.
- Step 4. Delete any existing MegaRAID adapter listings.
- Step 5. Press <Insert> to add unlisted drivers.
- Step 6. Press <Insert> again.
A path displays.
- Step 7. Insert the driver diskette into the floppy drive and press <Enter>.
The system finds the .HAM driver.
- Step 8. Press <Enter>.
- Step 9. Return to the Driver Summary screen and Continue the Novell NetWare installation.

6.6.3 Existing Novell NetWare System Driver Installation

Follow these steps to add the NetWare driver to an existing installation.

- Step 1. For NetWare 5.1 and higher, type the following at the root prompt:
`nwconfig`
- Step 2. Press <Enter>.
- Step 3. The Configuration Options screen displays.
- Step 4. Select Drive Options and press <Enter>. A window displays.
- Step 5. Select Configure Disk and Storage Device Options and press <Enter>.
- Step 6. Select one of the following options that display in the window:
 - Discover and load an additional driver
 - Select an additional driver

Step 7. If you select Discover and load an additional driver, the system discovers the extra unit and prompts you to select a driver from the list.

Step 8. Press <Insert> to insert the driver.

This completes the procedure.

If you choose Select an additional driver, the Select a Driver screen displays.

Step 1. Press <Insert>.

Step 2. Read and follow the instructions that appear.

Step 3. Insert a floppy disk into the floppy drive and press <Enter>.

Step 4. The system finds the driver and installs it.

Chapter 7

Troubleshooting

Table 7.1 describes the problems you might encounter, along with suggested solutions.

Table 7.1 Problems and Suggested Solutions

Problem	Suggested Solution
Drives are not detected OR The system hangs when MegaRAID IDEal Software CSB6 RAID adapter ROM scans the IDE channels.	<ul style="list-style-type: none">• Make sure the jumpers/drive IDs are set correctly. The system does not detect the drives if two drives have the same ID.• Make sure the Ultra ATA-100 or ATA-133 cables are used.• Make sure that the cable ends are connected properly.• Make sure that the power cables to the drives are connected properly.• Change cables.• If everything fails, change the drive(s).
BIOS reports that a mirrored array is in degraded mode.	Make sure all physical drives are properly connected and are powered on. Reconnect, replace, or rebuild any drive that has failed.
One of the hard drives in a mirrored array has failed.	Replace the drive with another drive that has the same capacity.
If this message displays while booting: “NO ROM BASIC SYSTEM HALTED”	There are no active partitions. Run FDISK to set the active partition.
Operating system does not boot.	Check the system BIOS configuration for PCI interrupt assignments. Make sure some Interrupts are assigned for PCI. Make sure that you have properly selected the Boot Device in the system BIOS setup (CMOS Setup).

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