USER'S GUIDE

MegaRAID®
IDEal Software RAID for
ServerWorks CSB6 A1.2

August 2003

LSI LOGIC ®

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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 A1.2IDE. 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:

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	*module*	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	*full_pathname*	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	[*version*]	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 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:
Op. Sys. Version:	Video Adapter:
MegaRAID IDEal Software CSB6 RAID Driver Ver.:	CPU Type/Speed:
Network Card:	System Memory:
Other disk controllers installed:	Other adapter cards installed:
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:

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

- simple network management protocol (SNMP) 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:

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

Segment 1   Segment 2
Segment 3   Segment 4
Segment 5   Segment 6
Segment 7   Segment 8
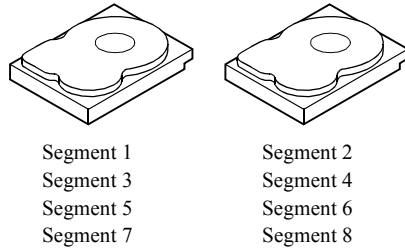
2.2   RAID 1

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

Segment 1   Segment 1 Duplicated
Segment 2   Segment 2 Duplicated
Segment 3   Segment 3 Duplicated
Segment 4   Segment 4 Duplicated
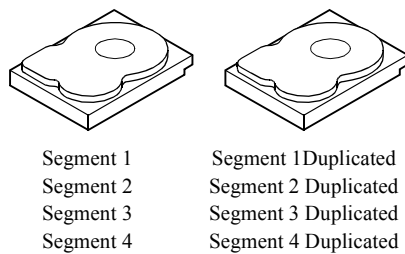
2.3   RAID 10

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

Segment 1   Segment 1Duplicate   Segment 2   Segment 2 Duplicate
Segment 3   Segment 3 Duplicate   Segment 4   Segment 4 Duplicate
Segment 5   Segment 5 Duplicate   Segment 6   Segment 6 Duplicate
Segment 7   Segment 7 Duplicate   Segment 8   Segment 8 Duplicate

RAID 1   RAID 1   RAID 10

RAID 0

RAID Levels
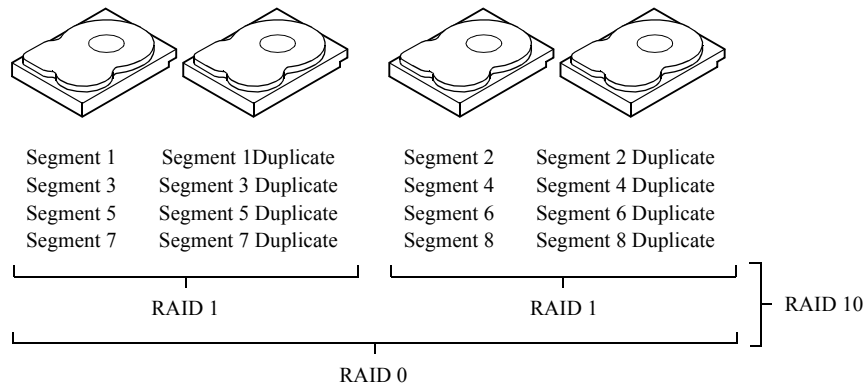
Chapter 3
Hyper Configuration Utility

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

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 filename in the various operating systems is:

- HYPERCFG.exe for DOS

- hypercfg for Linux

- HyperWin.exe for Windows NT

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

describes the attributes that you can set for these options.

Table 3.1   HyperCFG Options and Attributes

Options	Description		
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>	
	/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.	
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

Table 3.1   HyperCFG Options and Attributes (Cont.)

Options	Description		
	/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	
	/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 hexidecimal 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

Hyper Configuration Utility

Table 3.2   Return Codes on Error Conditions

Serial Number	Return Code	Description
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
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

Hyper Configuration Utility

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:

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   Physical Drives Required per 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 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.   Define and configure one or more logical drives.

See Section 4.1, "Configuring Arrays," page 4-2 for more information.

Step 3.   Create and configure one or more system drives (logical drives) and select the RAID level, write cache policy, boot sector virus protection, and DMA transfers.

Step 4.   Save the configuration.

See Section 4.16, "Save and Exit (F10)," page 4-12 for more information.

Step 5.   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 Windows NT/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. Change the array type to Mirror.

Step 3.   Now include the existing drive and the new drive to this array. You can identify the existing drive and the new drive by where they are connected.

Step 4.   Start the rebuilding process by pressing <Enter>. The setup prompts you for the target drive name. Select the newly connected drive as the target drive by pressing <Space Bar> and 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


```
          MegaRAID IDE Setup Utility Ver 2.6.0722C
+-------------- Array Information ------------++-------- Help ----------+
|- Array # 0        [DEGRADED, 76340 MB]      ||Press ENTER to view/modify|
| Array Type          RAID 0+1                ||Array properties.        |
| Stripe 1 [DEGRADED]  1 & 3                  ||                         |
| Stripe 2 [DEGRADED]  2 & 4                  ||                         |
| Stripe Size         64K                     ||                         |
| Bootable            Yes                     ||                         |
| >> Build Array      PRESS ENTER >>          || TAB - Switch Windows    |
| Initialize Array    PRESS ENTER >>          || F1 - Auto Config RAID 0 |
|                                             || F2 - Auto Config RAID 1 |
|                                             || F3 - Auto Config RAID 0+1|
|                                             || F4 - Create Array       |
|                                             || F5 - Delete Array       |
|                                             || F6 - Restore Old Config |
|                                             || F7 - Edit Options       |
|                                             || F10 - Save & Exit       |
+----------- Physical Drives Information -----WC ON VP ON DMA ON--+
|Drv# Drive ID           Array#  Model           Size(in MB)  Status |
| 1   Cntlr-0 Primary Device 0   0   MAXTOR 6L040L2   38172   REBUILDING|
| 2   Cntlr-0 Primary Device 1   0   MAXTOR 6L060J3   57259   REBUILDING|
| 3   Cntlr-0 Secondary Device 00    MAXTOR 6L040L2   38172   ONLINE   |
+----------------------------------------------------------------+
```

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 are

displayed as a node in a tree, like Windows Explorer. When opened, each node displays the properties of the array. Press the <Up Arrow> and <Down Arrow> to navigate the properties and then press <Enter> to edit your selection.

- Array configuration type or RAID level (stripe, mirror, RAID10, 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> 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:

```
RAID MODE
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.

```
DRIVE SELECTION BOX
[ ] 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.

```
STRIPE
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*.

```
BOOT OPTION
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 RAID0 (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)
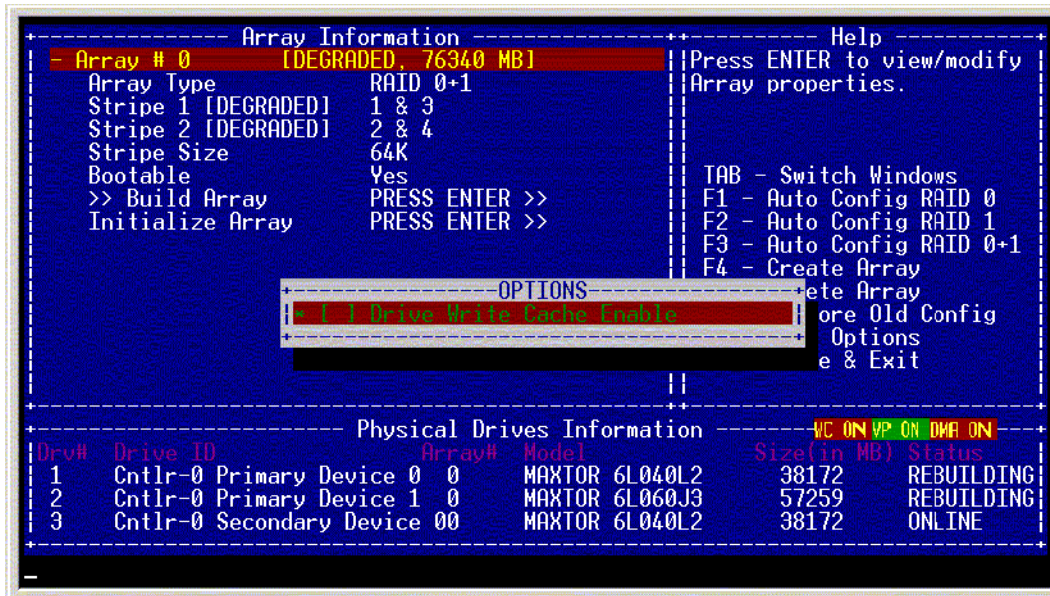
4.16   Save and Exit (F10)

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 these sections:

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:

- Get information about the configuration.
- Track the health of the arrays and physical drives.
- Track S.M.A.R.T. (self-monitoring analysis and reporting technology) status of the physical drives to monitor drive performance and reliability.
- Rebuild an array.
- Perform a consistency check on an array.
- Check the error log where all drive failures are reported.

Note that 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: You must install Java Run-time Environment (JRE) before you install the MCC for Linux and Windows. The MCC package for Linux is based on JRE and cannot be launched without it. 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.
- RAID Server works on the following servers: Whistler, Windows NT, Windows 2000, and Linux.
- Support for IDE MegaRAID
- RAID configuration management
- Standard RAID operation management
- Alerts and notification management
- Co-exists with and enhances existing management environment, such as Power Console Plus.
- Dynamic screen updates

- Remote adapter/disk firmware installation

- Ability to run both in Network and in Standalone modes

- Support for all the latest MegaRAID products

- Depends on hardware. See the hardware user manual for more information.

5.1.2   Architecture

5.1.2.1   MegaRAID Console Server

This server holds databases for all registered RAID servers and responds to Internet browser requests. MegaRAID Console server runs WEBRAID and REGSERV programs.

5.1.2.2   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, Windows NT, and Windows 2000.

5.1.2.3   Registering the Host Machine in MegaRAID Console Server

In order to manage several MegaRAID controllers in different machines on the network, the MegaRAID Console Server maintains an internal database of all MegaRAID locations. Each MegaRAID controller must register with the MegaRAID Console 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/host
```

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

5.1.2.4   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.

5.1.2.5   RAID Server

This is the system that has MegaRAID controllers and their monitoring applications, such as RaidServ.

RaidServ (called RAID_SERV in Windows NT Service Manager) is a communication layer between MegaRAID Monitoring Console and the IDE software utility and driver. RaidServ is required in all IDE RAID configurations. For IDE, RAIDSERV 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.

5.2   Installation

This section describes the following:

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

The system must have the items listed in Table 5.1. Some of the operating systems require that the items be installed before you install the MCC.

Table 5.1   Items Required for Installation

	Service Pack	Internet Browser*	Java Runtime Environment (JRE)
Windows NT 4	5 or greater	Yes	JRE 1.2 or greater
Windows 2000	No	Not required	JRE 1.2 or greater

Table 5.1   Items Required for Installation

	Service Pack	Internet Browser*	Java Runtime Environment (JRE)
Windows XP	SP1	Yes	JRE 1.2 or greater
Windows Server 2003	N/A	Yes	JRE 1.2 or greater
Red Hat Linux	No	Yes	JRE 1.2 or greater

MCC supports the following browsers:

- Internet Explorer 5.x or greater

- Netscape 4.0 or greater

- Opera 5.2 or greater

5.2.1   Installation Steps for Windows Systems

MCC Release 1.x supports only Microsoft Windows NT and Windows 2000 operating systems.

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 5.2 if they are not already installed. When the first installation screen displays, follow the instructions on the installation screens.

To install MCC software utilities, follow the instructions on the installation screens.

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.

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.

Click Finish to complete the installation.

5.2.2   Installation for Linux Systems

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

Note: You must install Java Run-time Environment (JRE) before you install the MCC for Linux. The MCC package for Linux is based on JRE and cannot be launched without it. The link to the appropriate download for Java is http://java.sun.com/j2se/1.4/download.html.

Table 5.2 lists the MCC features and the conditions necessary to use them.

Table 5.2   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: 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

	Simple network management protocol (SNMP):
	
	 SNMP can be installed only if the "**megaraid**" driver is detected by the system as loaded.
	
	 `Spy-rh- x.y-z.i386.rpm`
	 `exsnmp- x.y-z.i386.rpm`
	
	 1. Note: See Section 5.2.6, "How to Install and Extend snmp Agent," page 5-18 for further detail on this feature.

5.2.2.1 Installing JRE in Red Hat Linux Systems

Perform the following steps to install JRE in Red Hat Linux 7.2, 7.3, 8.0, 2.1 AS, and 2.1 ES:

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.   If the CD-ROM is already mounted, type:

```
umount /mnt/cdrom
```

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

```
mount /mnt/cdrom
```

The files on the CD-ROM must be copied to a directory on the hard drive. You can copy these files to an existing directory or create a new directory.

Step 4.   To create a new directory, type:

```
cd /
```

Then type:

```
mkdir <directory name>,
```

for example, `mkdir java`.

Step 5. Perform the following steps to switch directories to the CD-ROM drive, and then copy the files to the directory on the hard drive you want to install into. (Perform these steps in order).

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

```
mount /mnt/cdrom
```

    b.   To display a list of the 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 6. Change to the directory you just copied the files into, and then look at the files in the directory

Step 7. Type:

```
cd /<destination>
```

Step 8. Type:

```
ls
```

In the directory, you should see a file that ends with ".`bin`". This is the installation package that you want to run.

Step 9. 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 10. To get a list of files, type:

```
ls
```

Next, you install the RPM package.

Step 11. 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 12.   Open .bash_profile to add Java to the path.

Step 13.   Choose either **PICO** or **VI** as your text editor.

Step 14.   To edit the .bash_profile using PICO, type:

`cd /root`

then type:

`pico .bash_profile`

Step 15.   To edit .bash_profile using VI, type:

`cd /root`

then type:

`vi .bash_profile`

The following displays on the screen, 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`

Step 16.   Move the cursor to the line that starts with `PATH=`.

Step 17.   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 18.   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 19.   Close the terminal window and reboot.

Step 20.   During reboot, log on to Linux.

The Java installation is complete.

5.2.2.2   Installing JRE in SuSE Linux 8.0 Systems

Perform the following steps to install JRE in SuSE Linux 8.0:

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.   If the CD-ROM is already mounted, type:

```
umount /mnt/cdrom
```

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

```
mount /mnt/cdrom
```

The files on the CD-ROM must be copied to a directory on the hard drive. You can copy these files to an existing directory or create a new directory.

Step 4.   To create a new directory, type:

```
cd /
```

Then type:

```
mkdir <directory name>,
```

for example, `mkdir java`.

Step 5.   Perform the following steps to switch directories to the CD-ROM drive, and then copy the files to the directory on the hard drive you want to install into. (Perform these steps in order).

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

   ```
   mount /mnt/cdrom
   ```

   b.   To display a list of the 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 6.   Change to the directory you just copied the files into, and then look at the files in the directory

Step 7.   Type:

```
cd /<destination>
```

Step 8.   Type:

```
ls
```

In the directory, you should see a file that ends with ".`bin`". This is the installation package that you want to run.

Step 9.   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 10.   To get a list of files, type:

```
ls
```

Next, you install the RPM package.

Step 11.   In the directory in which the RPM package was created, type:

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

Installation   *5-11*

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

Step 12. Open `/etc/profile` to add Java to the path.

Step 13. Choose either **PICO** or **VI** as your text editor.

Step 14. To edit the `/etc/profile` using PICO, type:

```
cd /root
```

then type:

```
pico /etc/profile
```

Step 15. To edit `/etc/profile` using VI, type:

```
cd /root
```

then type:

```
vi /etc/profile
```

Step 16. Move the cursor to the end of the file.

Step 17. Type:

```
PATH=/usr/java/jre[version]/bin:$PATH
```

Step 18. On the next line type:

```
export PATH
```

Step 19. 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 `/etc/profile`.

    b. If using VI, type the following to save the file:

```
:wq
```

Step 20. Close the terminal window and reboot.

Step 21. During reboot, log on to Linux.

The Java installation is complete.

5.2.2.3   Installing MCC in Red Hat Linux Systems

Perform the following steps to install MCC in Red Hat Linux 7.2, 7.3, 8.0, 2.1 AS, and 2.1 ES, and SuSE Linux 8.0:

<u>Note:</u>   Linux is case sensitive, so type all commands exactly as shown.

MegaRAID Configuration Console (MCC)

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 the from the GUI Xterminal screen *only*.

> <u>Note:</u> To install in Red Hat Linux 2.1 AS, you must boot from a floppy diskette instead of the CD. The boot floppy image is in the `images` file on the first CD of the install pack. Copy the file `boot.img` to the floppy and boot from it. Enter `linux.dd` and follow the on-screen installation steps to complete the installation.

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.   If the CD-ROM is already mounted, type:

```
umount /mnt/cdrom
```

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

```
mount /mnt/cdrom
```

The files on the CD-ROM must be copied to a directory on the hard drive. You can copy these files to an existing directory or create a new directory.

Step 4.   To create a new directory, type:

```
cd /
```

then type:

```
mkdir <directory name>,
```

for example, `mkdir java`.

Step 5.   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 6.   Change to the directory you just copied the files into, then look at the files in the directory.

Step 7.   Type:

```
cd /<destination>
```

Step 8.   Type:

```
ls
```

In the directory, you should see a file that ends with "jar.zip", for example, a file such as `MCCLinux_1.28-7.jar.zip`. You need to rename this package so that it only ends with .jar. For example, `MCCLinux_1.28-7.jar.zip` becomes `MCCLinux_1.28-7.jar`.

Step 9.   To change the filename, type:

```
mv <old filename> <new filename>
```

For example,
`mv MCCLinux_1.28-7.jar.zip MCCLinux_1.28-7.jar`.

Step 10. Install the .JAR package by typing:

```
java –jar <.JAR package name>
```

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

Step 11. Go to the Xterminal window or console, and type:

`SetPass` (with the letters "S" and "P" capitalized).

Step 12.   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 13.   Close the Xterminal Window.

Step 14.   Go to the Main Menu/Gnome Menu (the button on the bottom left).

Next, if you are using Linux Red Hat 7.2 and 7.3, go to Programs >
Start MegaRAID Web Server. If using Linux Red Hat 8.0, go to
Extras > Other > Start MegaRAID Server. The MCC displays the
version number and which port the console is listening on (it should
be port 3570). Leave this program running.

Step 15.   Open up Netscape Communicator (or Mozilla if you are using Red
Hat Linux 8.0).

Step 16.   Go to URL `http://localhost:3570`.

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

5.2.2.4   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 feature and reinstall it.

5.2.2.5   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:

a.   Open /etc/regserv.dat

b.   Type either the Internet Protocol (IP) address or the name of the server running the Registration Server.

c.   If you are using the name instead of the IP address, make sure the name is resolvable. (Try pinging the server using name.)

d.   If the name is not resolved, you can add the name to "hosts" file. (/etc/hosts)

e.   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:

/user/sbin/RSLinux

(Type /usr/sbin/StopServer to stop a RAID Server)

MegaRAID Configuration Console (MCC)

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.

    a. Open the file `/opt/LSI/mcc.properties`

       This file contains many NAME=VALUE pairs.

    b. Locate the name "RAID_SERVER_NAME"

    c. Type either the name or IP of a RAID Server.

    d. 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`)

    e. 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 How to Set and Modify 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. Length of the password must not be more than 40 characters.

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`

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

5.2.4 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.

5.2.5   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 1Mbyte 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.

5.2.6   How to Install and Extend snmp Agent

To install and extend the snmp (simple network management protocol) agent, perform the following steps:

Step 1.   Get the source code of standard snmp and copy it in your machine.

a.   Download the file 'ucd-snmp-4.2.1.tar.gz' from the download section on the site 'http://net-snmp.sourceforge.net/'.

b.   Copy the file under '/usr' directory.

c.   Uncompress it using 'tar –zxvf'.

This creates a directory 'ucd-snmp-4.2.1'

Step 2. Compile the source and install the standard snmp agent.

    a. Go to the directory '/usr/ ucd-snmp-4.2.1'.

    b. Run configuration using './configure' (you may need to press enter 4-5 times).

    c. Run 'make' to build the agent.

    d. Run 'make install' to install it

    Note: The step2 installs the snmp agent (i.e. snmpd) under '/usr/local/sbin/'. In Linux you may have another snmp agent (i.e. snmpd) under '/usr/sbin/' with standard distribution. Don't confuse it with this.

Step 3. Extend the snmp agent for 'Spy' support.

Install the rpm file exsnmp-2.0-9.i386.rpm using "rpm –i exsnmp-2.0-9.i386.rpm" which will do the following:

    a. Copy the file 'MegaRaid.so', which is a dynamic link library to communicate with spy, under /lib

    b. Copy a proper snmp configuration file spysnmpd.conf under /etc/snmp/.

The file spysnmpd.conf contains an entry "dlmod MegaRaid /lib/MegaRaid.so" (at the very last line). You can use this to obtain IDERAID information can through the 'Spy' daemon.

Step 4. Run the extended snmp agent

    Note: If the snmp agent is already installed in the machine (e.g. in Red Hat Linux you may have it already) then step 1-2 is not required.

    a. Make sure 'Spy' is running before starting the snmpd agent. Then stop and start the agent using '/etc/rc.d/init.d/snmpd –c /etc/snmp/ spysnmpd.conf'

    b. You can test the agent using:

```
'snmpwalk localhostpublic.iso.org.dod.internet
.private.enterprises.3582.1'
```

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.

To log onto the RAID Server, enter the Internet address in the Internet browser. The MCC screen displays. Click the server name to select the RAID Server you want to configure.

Continue the log-on procedure by selecting View Only or Full Access. Table 5.3 describes the access options.

Table 5.3   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 5.4 displays the contents of MCC main screen. It is broken up into five frames.

Table 5.4   Main Screen Contents

Frame	Description
Top	The top frame displays the following information: • 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 5.5): • Scan Devices • Configuration View • Device Progress • Log Data • Advanced • Back Plane • Close Server
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 5.5 describes the options in the left frame. You can click the options to perform actions or display the related screens.

Table 5.5   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.
Config 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. • Logical View – displays information about the arrays. • Physical View – displays all hard drives attached.
Device Progress	Displays the progress bar for the current activity on the MegaRAID. The progress bar displays the time left and percentage complete. Possible actions include the following: • Rebuild • Consistency check

Table 5.5 Options on the Main Screen

Name	Description
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. 1. 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 5.6 provides a description of each field. To exit this screen, click Config View or Scan Devices.

Table 5.6 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.

Table 5.6   RAID Properties (Cont.)

Field	Description
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 5.7 provides a description of each field. To exit this screen, click on Config View or Scan Devices.

Table 5.7   Physical Drive Properties

Field	Description
Firmware	Specifies the firmware version of the physical drive.
Status	Specifies gives the status of the physical drive. (online or offline)
Errors	Specifies gives the number of errors in the physical drive.
S.M.A.R.T. Status	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. The options for this are Disabled, OK, or Error. 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.

Table 5.7   Physical Drive Properties

Field	Description
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 wo which this physical drive belongs. 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 5.8 provides a description of each field.

Table 5.8   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 5.9 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 5.9 provides a list and description of the error codes.

Table 5.9   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 RAID1 and RAID10 arrays.

After you click Check Consistency, the options in Table 5.10 display in the right frame.

Table 5.10   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 5.11 provides a description of each field.

Table 5.11   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 5.12 provides a description of each field.

Table 5.12   Array Rebuild Device Progress Field Descriptions

Field	Description
Array	This field gives the array number being rebuilt.
Operation	This field gives the type of operation being performed. Example: Rebuild.
Percentage	This field gives the percentage complete.
Time Left	This field gives the estimated time left to complete the task.
Progress	This gives 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 5.13 provides field descriptions.

Table 5.13   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: 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.

Table 5.13   Array Property Field Descriptions

Field	Description
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. 1. Note: RAID level 1 does not have a stripe size parameter. Stripe size parameters are available for RAID level 0 and RAID level 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 5.14 provides a description of each field.

Table 5.14   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.

Table 5.14   Advanced Settings

Field	Description
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. 1. 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
Spy Service

This chapter describes the Spy Service program and contains the following sections

The Spy Service program looks for errors, failed drives, and status changes. It can mark drives as failed after the error threshold is reached and start automatic rebuilds. It runs in the background of the MegaRAID IDE Console.

When operating under Windows, 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 any status changes in the drives every 60 minutes. S.M.A.R.T. monitors hard drives for drive failures.
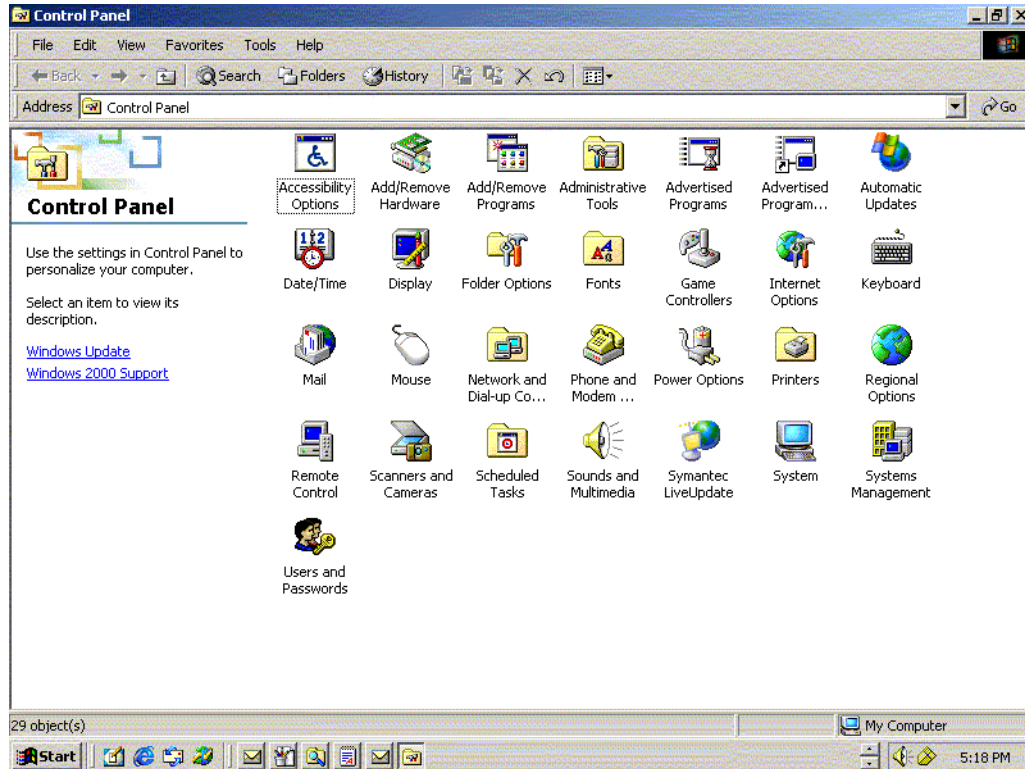
6.1 Starting or Stopping Spy Service under Windows 2000 or Windows 2003

You can use the Control Panel to access the option to start or stop Spy Service. Perform the following steps to start or stop Spy Service.

Step 1.   Click on Start > Settings > Control Panel.

The screen shown in Figure 6.1 displays.

Figure 6.1   Control Panel Screen

Step 2.   Click on Administrative Tools > Services icon > Spy Ser.

A dialog window displays with the start and stop options.

Step 3.   Click on the Start or Stop button.

This starts or stops the Spy Service program, depending on your selection.

> Note: You can right-click on the Spy Service icon and select "Stop Spy" to stop the Spy program. The Spy icon displays on the right side of the taskbar. See Section 6.3, "Spy Service Icon" for more information about the icon.

6.2   Uninstalling Spy Service

Perform the following steps to uninstall Spy Service.

Step 1.   Stop the Spy Service program.

See "Section 6.1, "Starting or Stopping Spy Service under Windows 2000 or Windows 2003," page 6-1" for instructions on stopping Spy Service.

Step 2.   Click on Start > Control Panel.

The Control Panel Displays.

Step 3.   Click on Add/Remove Programs.

The list of currently installed programs displays.

Step 4.   Click on the Spy Service program and select Remove.

6.3   Spy Service Icon

The icon for the Spy Service displays in the bottom right corner of the MegaRAID IDE Console screen (in the tray bar). The icon is a round figure wearing sunglasses.

The icon is color-coded. Green means that there are no problems. Yellow means that there is a rebuild in progress or there are media errors and a possible drive failure. Red warns of a critical problem that could cause the system to fail.

Hold the cursor over the icon ("mouseover") and a short text displays that describes the system status. Right click on the icon and the following options display:

Stop monitor media error	The program stops searching for media errors.
Erase error log	The program deletes the errors that were recorded on the error log.
Stop Spy	This stops the program and deletes the icon from the taskbar. You can start the program again using the instructions in "Section 6.1, "Starting or Stopping Spy Service under Windows 2000 or Windows 2003"

Do the following to place the Spy icon on the Taskbar when operating under Windows 2000:

Click on Start > Programs > MegaRAID IDE > MegaRAID IDE Spy.

This places the Spy icon on the Taskbar.

> Note: The Spy icon displays on the Taskbar automatically under the
> Windows Server 2003 operating system.

Chapter 7
Operating System Installation

This chapter contains the procedures for installing the Windows NT, 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:

7.1   Windows NT 4.0 and Windows 2000/2003 Driver Installation

Perform the following steps to install the Windows NT 4.0 or the Windows 2000 driver onto the RAID-configured drives.

Step 1.   Boot the system with the Windows NT or Windows 2000 Boot Installation CD or diskette. The following message displays:

```
Setup is inspecting your computers hardware
configuration.
```

Step 2.   For Windows NT 4.0, press <F6> immediately when the message displays.

For Windows 2000/2003, a prompt displays. After the prompt, 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. In Windows NT, select the driver from the list that displays.

Step 5.   Insert the MegaRAID IDEal Software RAID for ServerWorks CSB6 A1.2 driver CD and press <Enter>.

Step 6.   Select **LSI Logic MegaRAID IDE driver** for the appropriate operating system from the list and click <OK>.

Step 7.   Continue with the installation procedure.

7.1.1   Updating the Windows NT 4.0 or Windows 2000 Driver

Perform the following steps to update the Windows NT 4.0 or the Windows 2000 driver or install the Windows NT 4.0 or 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.

The MegaRAID controller appears in the list as **LSI Logic MegaRAID IDE Controller**.

Step 6.   Select it, then remove it by clicking the **Remove** button.

Step 7.   Click the **Add** button.

Step 8.   Select the **Have Disk** button.

Step 9.   Insert the diskette into the floppy drive.

Step 10.   Select drive letter A: and click on <OK>.

Step 11.   Select **LSI Logic MegaRAID IDE Controller** and click **OK**.

Step 12.   After Windows NT or Windows 2000 copies the driver, reset the system.

7.1.2 Confirming the Windows NT 4.0 or Windows 2000 Driver Installation

Perform the following steps to confirm that the Windows NT 4.0 or 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**.

7.2 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.

7.3 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.

7.4   SuSE Linux Enterprise Server (SLES) 8.0 Installation

Perform the following steps to install the SuSE Linux Enterprise Server 8.0 driver onto the RAID-configured drives.

Step 1.   Boot the server with the SLES CD-ROM Disk 1.

Step 2.   At the first screen, press <Alt> immediately.

Step 3.   Put the driver update diskette in the drive bay and install normally.

The installation process should pick up the new driver from the floppy diskette.

Step 4.   Switch to console 4 to verify the correct driver.

Note: United Linux has install issues on some Dell servers. While the MegaRAID driver is being installed, switch to console 4 by pressing <Alt><F4>. If there are error messages, the ACPI needs to be disabled on this server. To disable ACPI, reboot the machine with CD 1 and press <Alt> immediately. Next, type the following kernel parameters:

```
acpi=off
```

and install normally.

7.5   Novell NetWare Driver Installation

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

Operating System Installation

7.5.1 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 7.1 describes the MegaRAID Novell NetWare driver files.

Table 7.1   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.

7.5.2 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.

7.5.3   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>.

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

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Chapter 8
Troubleshooting

Table 8.1 describes the problems you might encounter, along with suggested solutions.

Table 8.1   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.	• 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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