

4 MegaRAID Manager

Overview

MegaRAID Manager is a character-based, non-GUI utility that configures and monitors RAID systems. MegaRAID Manager runs under MS-DOS 3.2 or later and MS-DOS-compatible operating systems, including: IBM OS/2, Novell NetWare 3.x, Novell NetWare 4.x, SCO Unix, and SCO UnixWare.

Warning

If MegaRAID is installed in a computer that has the American Megatrends Series 758 MegaRUM motherboard, SCSI channel 2 appears as channel 1 and SCSI channel 1 appears as channel 2 in MegaRAID Manager.

In This Chapter The topics discussed in this chapter include:

- starting MegaRAID Manager
 - MegaRAID Manager menus
 - choosing a configuration method
 - designating drives as hot spares
 - creating physical arrays
 - defining logical drives
 - initializing logical drives
 - using logical drives in your operating system
 - rebuilding failed disk drives
-

Starting MegaRAID Manager

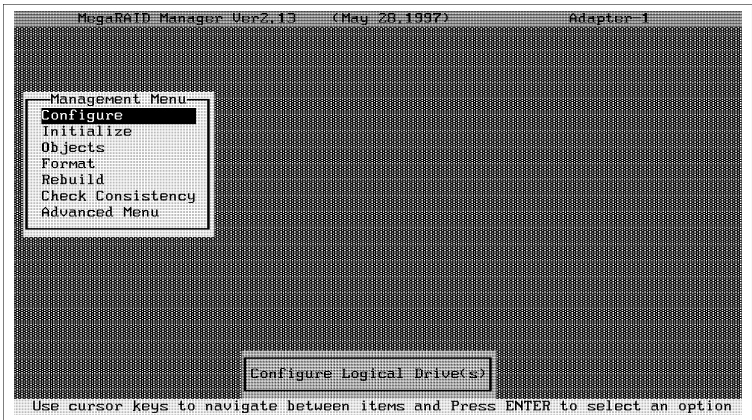
To start MegaRAID Manager, make sure the program file is in your file path. Type the command:

In...	Type this:
DOS	MEGACONF
NetWare	load megamgr
SCO Unix	megamgr
UnixWare	megamgr
OS/2	MEGACONF
Other	See the software guide for the operating system.

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Starting MegaRAID Manager, Continued

The first MegaRAID Manager screen is:



Main Menu Options The MegaRAID Manager options are:

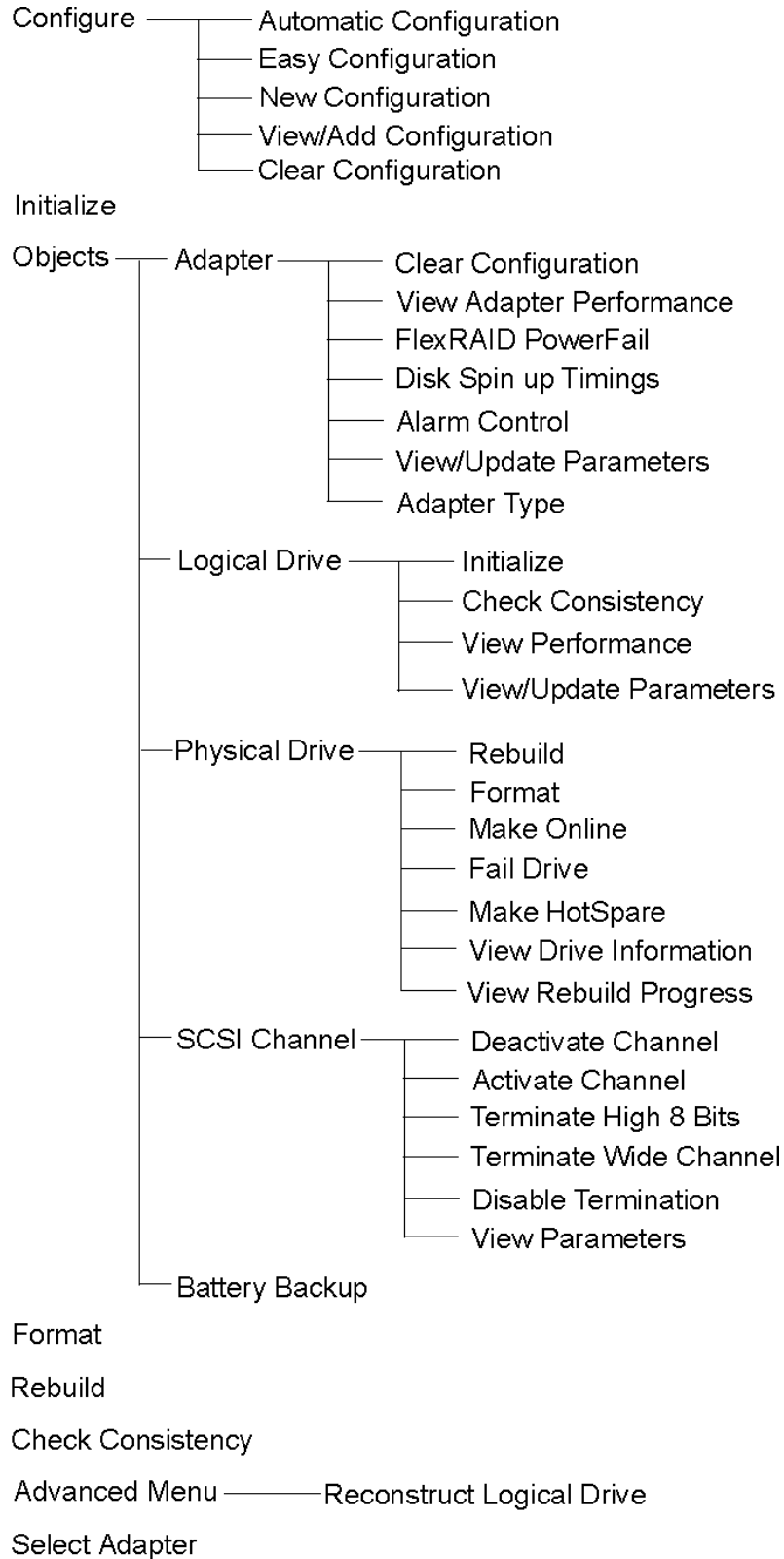
Option	Description
Configure	Configure arrays and logical drives.
Initialize	Initialize one or more logical drives.
Objects	Individually access controllers, logical drives, and physical drives.
Format	Low-level format hard disk drives.
Rebuild	Rebuild failed disk drives.
Check Consistency	Verify redundancy data in logical drives using RAID level 1, 3, or 5. MegaRAID automatically corrects any differences found in the data.
Advanced Menu	Run the Enclosure Management and Diagnostics functions (<i>the Diagnostics function is not yet implemented</i>).
Select Adapter	Select the adapter you want to configure. <i>This item displays only if more than one MegaRAID host adapter is installed in the computer.</i>

If Using MegaRAID Manager

To...	Use this menu	Turn to...
configure arrays and logical drives	Configure	page 75
initialize logical drives	Initialize	page 94
format a disk drive	Format	page 96
rebuild a disk drive	Rebuild	page 98

For information about other functions, see the following menu tree and menu descriptions.

MegaRAID Manager Menu Tree



The menu items are explained on the following pages.

MegaRAID Manager Configure Menu

Configure Choose the Configure option to select a method for configuring arrays and logical drives.

Option	Description
Auto Configuration	Select this method to have the MegaRAID controller automatically configure arrays and logical drives for you. See page 75 for additional information.
Easy Configuration	Select this method to perform a basic logical drive configuration where every physical array you define is automatically associated with exactly one logical drive. See page 76 for additional information.
New Configuration	Select this method to discard the existing configuration information and to configure new arrays and logical drives. In addition to providing the basic logical drive configuration functions, New Configuration allows you to associate logical drives with multiple or partial arrays. See page 76 for additional information.
View/Add Configuration	Select this method to examine the existing configuration and/or to specify additional arrays and logical drives. View/Add Configuration provides the same functions as New Configuration. See page 89 for additional information.
Clear Configuration	Select this option to erase the current configuration information from the MegaRAID controller non-volatile memory.

MegaRAID Manager Initialize Menu

Initialize Choose this option from the MegaRAID Manager main menu to initialize one or more logical drives. This action typically follows the configuration of a new logical drive. See page 94 for additional information.

MegaRAID Manager Objects Menu

Objects Choose the Objects option from the MegaRAID Manager main menu to access the controllers, logical drives, physical drives, and SCSI channels individually, along with the battery backup. You can also change certain settings for each object. The Objects menu options are described below.

Adapter Choose the Adapter option from the Objects menu to select a MegaRAID controller if your computer has more than one and to modify parameters. You can install only one MegaRAID controller, but you can install other MegaRAID controllers in the computer.

Option	Description
Clear Configuration	Choose this option to erase the current configuration from the controller non-volatile memory.
View Adapter Performance	<i>This option is not yet supported.</i>
FlexRAID PowerFail	Choose this option to allow drive reconstruction to continue when the system restarts if a power failure occurs. This will reduce the size of the logical drive by (1 MB times the number of drives in the logical drive).
Disk Spin up Timings	Choose this option to set the method and timing for spinning up the hard disk drives in the computer.
Alarm Control	Choose this option to enable, disable, or silence the onboard alarm tone generator.
View/Update Parameters	Choose this option to display the firmware version number and the cache memory size. In addition, you can change the rebuild rate for the adapter through this option.
Adapter Type	Displays the type of adapter used. The adapter can be customized.

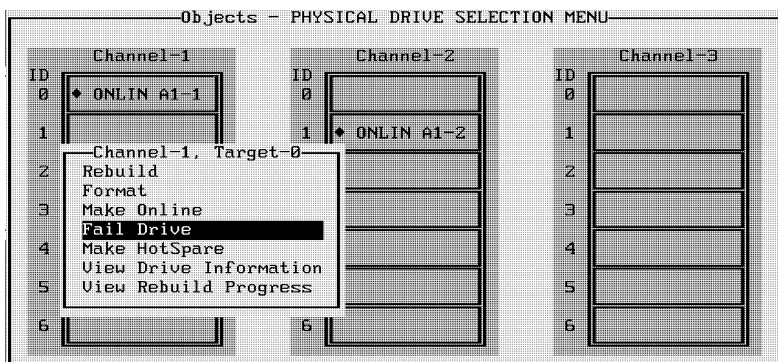
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MegaRAID Manager Objects Menu, Continued

Logical Drive Choose this option from the Objects menu to select a logical drive and to perform the listed actions.

Logical Drive Options	Description
Initialize	Choose this option to initialize the selected logical drive. This should be done for every logical drive you configure.
Check Consistency	Choose this option to verify the correctness of the redundancy data in the selected logical drive. This option is available only if RAID level 1, 3, or 5 is used. MegaRAID automatically corrects any differences found in the data.
View/Update Parameters	Choose this option to display the properties of the selected logical drive; you can modify the cache write policy, the cache read policy, virtual sizing, and the I/O policy from this menu. Set the virtual sizing option to <i>Enabled</i> before adding a physical drive to a logical drive. After you have created a logical drive set, the partition of the drive should be as large as the virtual size of the logical drive.

Physical Drive Choose this option from the Objects menu to select a physical device and to perform the operations listed below. When you choose this option, the physical drives in the computer are listed. Move the cursor to the desired device and press <Enter>. The following appears:



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MegaRAID Manager Objects Menu, Continued

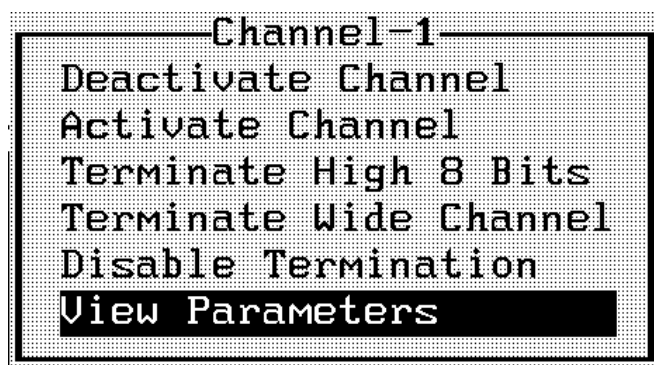
Physical Drive Menu

Physical Drive Options	Description
Rebuild	Choose this option to rebuild the selected disk drive.
Format	Choose this option to low-level format the selected harddisk drive.
Make Online	Choose this option to change the state of the selected hard disk drive to Online.
Fail Drive	Choose this option to change the state of the selected disk drive to Fail.
Make HotSpare	Choose this option to designate the selected disk drive as a hot spare.
View Drive Information	Choose this option to see the manufacturer data for the selected physical device.
View Rebuild Progress	Choose this option to see the progress of the rebuild process for the selected disk drive.

Cont'd

MegaRAID Manager Objects Menu, Continued

SCSI Channel Choose this option from the Objects menu to select a SCSI channel on the currently selected controller. You can perform the following operations on the selected channel.



Channel Options	Description
Termination Status	Choose this option to change the type of termination.
Activate Channel	Choose this option to activate the selected channel. Be sure that TermPWR is provided for all active channels.
Terminate High 8 Bits	Choose this option to enable termination on the selected channel for the upper eight bits and disable termination on the controller for the lower eight bits. This setting is required if the selected SCSI channel is terminated with 8-bit devices at both ends.
Terminate Wide Channel	Choose this option to enable Wide termination for the selected channel. This is required if the MegaRAID controller is at one end of the SCSI bus for the selected channel.
Disable Termination	Choose this option to disable termination on the MegaRAID controller for the selected channel. This option should be used if the selected SCSI channel is terminated with Wide devices at both ends.
View Parameters	Choose this option to view the termination and active status of the selected channel.

Battery Backup Choose this option from the Objects menu to view or update parameters for the battery backup module.

MegaRAID Manager Format Menu

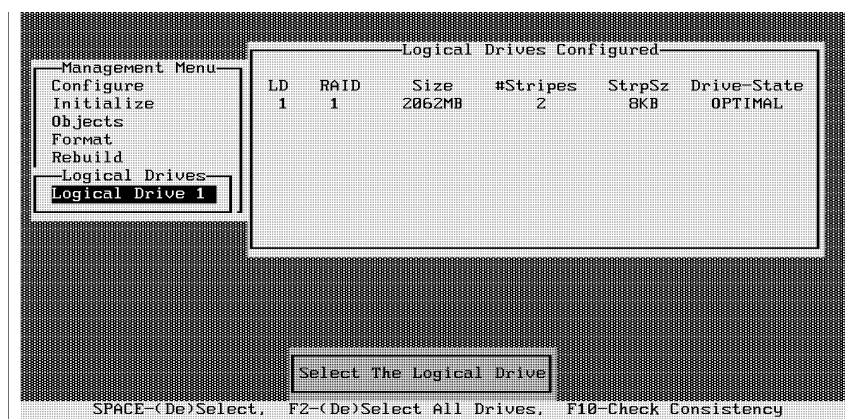
Format	<p>Choose the Format option from the MegaRAID Manager main menu to low-level format one or more physical drives.</p> <p>See 96 for additional information.</p>
Formatting	<p>Since most SCSI disk drives are low-level formatted at the factory, this step is usually not necessary. You typically must format a disk if:</p> <ul style="list-style-type: none">• the disk drive was not low-level formatted at the factory, or• an excessive number of media errors have been detected on the disk drive. <p>You do not need to use the Format option if you simply want to erase existing information on your SCSI disks, such as a DOS partition. That information is erased when you initialize the logical drive(s).</p>

MegaRAID Manager Rebuild Menu

Rebuild	<p>Choose the Rebuild option from the MegaRAID Manager main menu to rebuild one or more failed disk drives.</p> <p>See page 98 for additional information.</p>
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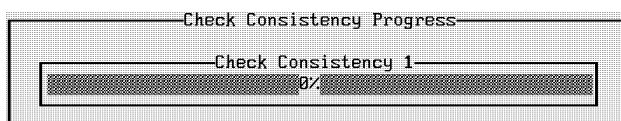
MegaRAID Manager Check Consistency Menu

Check Consistency Choose this option to verify the redundancy data in logical drives using RAID levels 1, 3, or 5. When you choose Check Consistency, the parameters of the existing logical drives on the current controller appear. The logical drives are listed by number. MegaRAID automatically corrects any differences found in the data.



Press the arrow keys to select the desired logical drives. Press the spacebar to select or deselect a drive for consistency checking. Press <F2> to select or deselect all the logical drives.

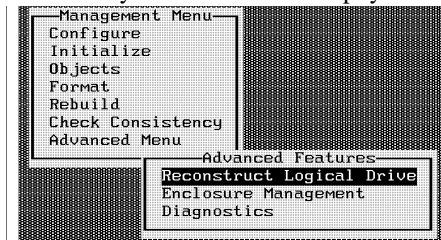
Press <F10> to begin the consistency check. A progress indicator for each selected logical drive appears, as shown below:



When the consistency check is finished, press any key to clear the progress display and press <Esc> to display the main menu.

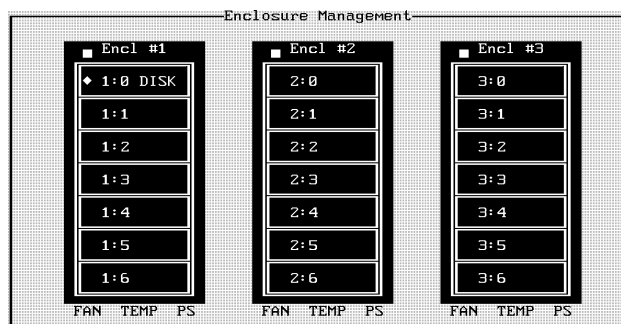
MegaRAID Manager Advanced Menu

Reconstruct Logical Drive You can select or deselect a logical drive to be recreated using this option. Choose this option before you add or remove a physical drive.



Enclosure Management This option is used to monitor an external enclosure containing SCSI devices. MegaRAID can monitor the fan speed, power supply voltage, and temperature, appropriate signals from the enclosure.

Beside each SCSI device listing, a diamond-shaped indicator shows the condition of that device. A green diamond indicates normal operation. A red diamond indicates failure. If the fan, temperature or power supply goes bad, the word for the device will change from green to red.



MegaRAID Manager Select Adapter Menu

This menu item appears only if more than one MegaRAID host adapter is installed in the computer. You can only install one MegaRAID controller, but you can install other MegaRAID controllers in the computer. The following appears when you choose the Select Adapter option:

<p>Sel. Adapter Adapter-1 Adapter-2 Adapter-3</p>

Select the MegaRAID adapter that you want to configure from this menu.

Configuring Arrays and Logical Drives

You can configure physical arrays and logical drives with MegaRAID Manager using:

- Auto Configuration
- Easy Configuration
- New Configuration
- View/Add Configuration

Each configuration method requires a different level of user input. The general flow of operations for array and logical drive configuration is:

Step	Action
1	Choose a configuration method.
2	Designate hot spares (optional).
3	Create arrays using the available physical drives.
4	Define logical drives using the space in the arrays.
5	Save the configuration information.
6	Initialize the logical drives.

Choosing the Configuration Method

Automatic Configuration In Automatic Configuration, the MegaRAID controller examines the physical drives connected to it and automatically configures them into arrays and logical drives.

If logical drives have already been configured when you select Auto Configuration, the configuration information is not disturbed. See page 79 for additional information.

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Choosing the Configuration Method, Continued

Easy Configuration In Easy Configuration, each physical array you create is associated with exactly one logical drive, and you can modify the following parameters:

- RAID level
- stripe size
- cache write policy
- read policy
- I/O policy

If logical drives have already been configured when you select Easy Configuration, the configuration information is not disturbed.

See page 80 for instructions on Easy Configuration.

New Configuration In New Configuration, you can modify the following logical drive parameters:

- RAID level,
- stripe size
- cache write policy,
- read policy,
- I/O policy,
- logical drive size, and
- spanning of arrays.

If you select New Configuration, the existing configuration information on the selected controller is *destroyed when the new configuration is saved*. See page 84 for instructions on New Configuration.

View/Add Configuration View/Add Configuration allows you to control the same logical drive parameters as New Configuration *without disturbing* the existing configuration information. See page 89 for additional information.

Reserved Disk Space during Configuration Up to 20.6 MB of disk space is reserved when a hard disk drive is being configured.

Designating Drives as Hot Spares

Hot Spares

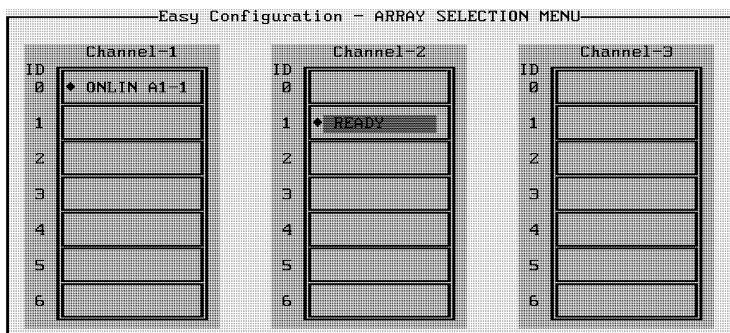
Hot spares are physical drives that are powered up along with the RAID drives and usually stay in a standby state. If a disk drive used in a RAID logical drive fails, a hot spare will automatically take its place and the data on the failed drive is reconstructed on the hot spare. Hot spares can be used for level 1, 3 and 5 RAID. Each MegaRAID controller supports up to eight hot spares. Refer to the MegaRAID hardware guide for your board for an explanation of hot spares.

The two methods for designating physical drives as hot spares are:

- press <F4> while creating arrays in Easy, New or View/Add Configuration mode, or
 - Highlight a drive using the space bar and press <Enter>. Select Make HotSpare.
-

Press <F4>

When you choose any configuration option in the Configure menu, all physical devices connected to the current controller appear:

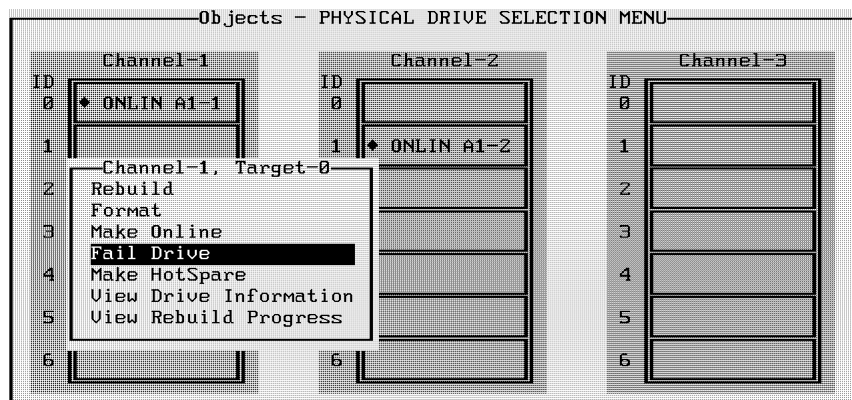


Press the arrow keys to select a disk drive that has a READY indicator and press <F4> to designate it as a hot spare. The indicator changes to HOTSP.

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Designating Drives as Hot Spares, Continued

Objects Menu Select Objects from the Configure menu, then select Physical Drive. A physical drive selection screen will appear. Press the spacebar to select a disk drive and press <Enter> to display the action menu for the drive.



Press the arrow keys to select *Make HotSpare* and press <Enter>. The indicator for the selected drive changes to HOTSP.

Using Auto Configuration

Configuration Guidelines In Auto Configuration, MegaRAID examines the physical drives connected to it and automatically configures them into arrays and logical drives. MegaRAID uses the following configuration guidelines in the following sequence:

Step	Action
1	Gather drives with the same capacity into groups of five, four, or three. These groups become arrays associated with RAID level 5 logical drives.
2	Gather pairs of drives with the same capacity together. These pairs become arrays associated with RAID 1 logical drives.
3	Configure any remaining single disk drives as arrays associated with RAID 0 logical drives.

Logical Drive Settings The logical drive settings will be:

Parameter	Setting
Stripe size	64 KB
Write Policy	Write-through
Read Policy	Readahead
Cache Policy	Direct I/O
Spanning	Off

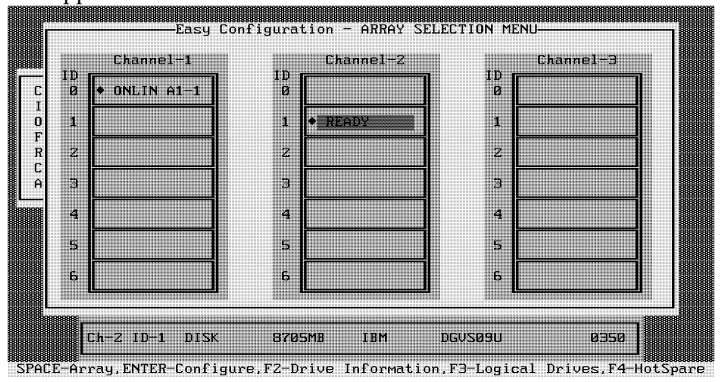
The write policy, read policy, and cache policy can be changed after configuration is complete.

User Actions Perform the following steps when using auto configuration:

Step	Action
1	Designate hot spares (optional, but if chosen, should be done first).
2	Choose Configure from the MegaRAID Manager main menu.
3	Choose Auto Configuration from the Configure menu and respond to the confirmation prompt. The logical drives that result from Auto Configuration are displayed on the screen with a save prompt. Choose <i>Yes</i> to save the configuration.
4	If you chose <i>Yes</i> at the save prompt, initialize the logical drives. See page 94 for additional information.

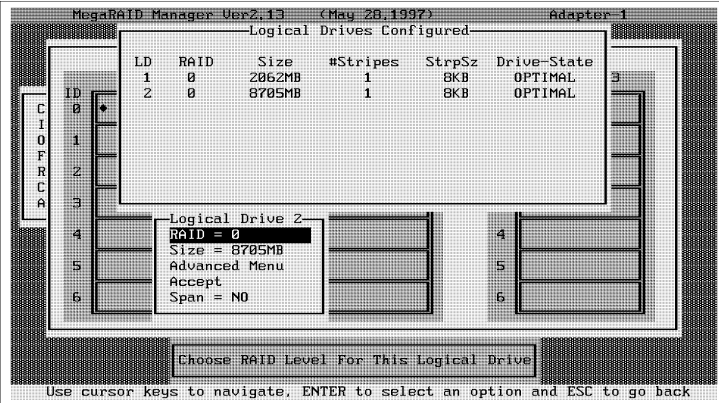
Using Easy Configuration

In Easy Configuration, each array is associated with exactly one logical drive. Follow the steps below to create arrays using Easy Configuration:

Step	Action
1	Choose Configure from the MegaRAID Manager main menu.
2	<p>Choose Easy Configuration from the Configure menu. The array selection menu appears:</p>  <p>The hot key information appears at the bottom of the screen. The hot key functions are:</p> <ul style="list-style-type: none"> <F2> Display the manufacturer data and MegaRAID error count for the selected drive. <F3> Display the logical drives that have been configured. <F4> Designate the selected drive as a hot spare.
3	<p>Press the arrow keys to select specific physical drives. Press the spacebar to associate the selected physical drive with the current array. The indicator for the selected drive changes from READY to ONLIN A[<i>array number</i>]-[<i>drive number</i>]. For example, ONLIN A2-3 means disk drive 3 in array 2.</p> <p>Add physical drives to the current array as desired. Try to use drives of the same capacity in a specific array. If you use drives with different capacities in an array, all the drives in the array is treated as though they have the capacity of the <i>smallest</i> drive in the array.</p>

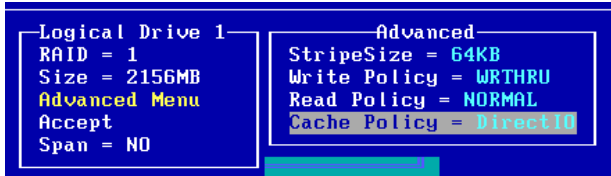
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Using Easy Configuration, Continued

Step	Action												
3 cont'd	<p>The number of physical drives in a specific array determine the RAID levels that can be implemented with the array.</p> <p>RAID 0 requires one or more physical drives, RAID 1 requires 2, 4, 6, or 8 physical drives, RAID 3 requires at least three physical drives, and RAID 5 requires at least three physical drives.</p>												
4	<p>Press <Enter> when you are finished creating the current array. The logical drive configuration screen appears.</p>  <p>The window at the top of the screen shows the logical drive that is currently being configured as well as any existing logical drives. The column headings are:</p> <table> <tr> <td>LD</td><td>The logical drive number</td></tr> <tr> <td>RAID</td><td>The RAID level</td></tr> <tr> <td>Size</td><td>The logical drive size</td></tr> <tr> <td>#Stripes</td><td>The number of stripes (physical drives) in the associated physical array</td></tr> <tr> <td>StrpSz</td><td>The stripe size</td></tr> <tr> <td>Drive-State</td><td>The state of the logical drive</td></tr> </table>	LD	The logical drive number	RAID	The RAID level	Size	The logical drive size	#Stripes	The number of stripes (physical drives) in the associated physical array	StrpSz	The stripe size	Drive-State	The state of the logical drive
LD	The logical drive number												
RAID	The RAID level												
Size	The logical drive size												
#Stripes	The number of stripes (physical drives) in the associated physical array												
StrpSz	The stripe size												
Drive-State	The state of the logical drive												
5	<p>Set the RAID level for the logical drive. Highlight <i>RAID</i> and press <Enter>. The available RAID levels for the current logical drive are displayed. Select a RAID level and press <Enter> to confirm. See the <i>MegaRAID Hardware Guide</i> for your board for an explanation of the RAID levels.</p>												

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Using Easy Configuration, Continued

Step	Action
6	<p>Set the stripe size, cache write policy, Read policy, and I/O (cache) policy from the Advanced Menu.</p>  <p>Stripe size This parameter specifies the size of the segments written to each disk in a RAID 1, 3, 5, 10, 30, or 50 logical drive. You can set the stripe size to 2 KB, 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB. The default stripe size is 64 MB.</p> <p>A larger stripe size provides better read performance, especially if your computer does mostly sequential reads. However, if you are sure that your computer does random read requests more often, choose a small stripe size.</p> <p>Write policy This parameter specifies the cache write policy. You can set the write policy to <i>Write-back</i> or <i>Write-through</i>. The default is <i>Write-through</i>.</p> <p>In <i>Write-back</i> caching, the controller sends a data transfer completion signal to the host when the controller cache has received all the data in a transaction. <i>If WriteBack is enabled and the system is quickly turned off and then on, MegaRAID may hang when flushing cache memory. Adapters that contain a battery backup will default to WriteBack caching. Adapters which contain a battery will default to WriteBack.</i></p> <p>In <i>Write-through</i> caching, the controller sends a data transfer completion signal to the host when the disk subsystem has received all the data in a transaction. This is the default setting.</p> <p>Write-through caching has a data security advantage over write-back caching, whereas write-back caching has a performance advantage over write-through caching. <i>You should not use write-back for any logical drive that is to be used as a Novell NetWare volume.</i></p> <p>Read-ahead This parameter enables the SCSI read-ahead feature for the logical drive. You can set this parameter to <i>Normal</i>, <i>Read-ahead</i>, or <i>Adaptive</i>. The default setting is <i>Normal</i>.</p> <p><i>Normal</i> specifies that the controller does not use read-ahead for the current logical drive.</p> <p><i>Read-ahead</i> specifies that the controller uses read-ahead for the current logical drive.</p> <p><i>Adaptive</i> specifies that the controller begins using read-ahead if the two most recent disk accesses occurred in sequential sectors. If all read requests are random, the algorithm reverts to Normal; however, all requests are still evaluated for possible sequential operation.</p>

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Using Easy Configuration, Continued

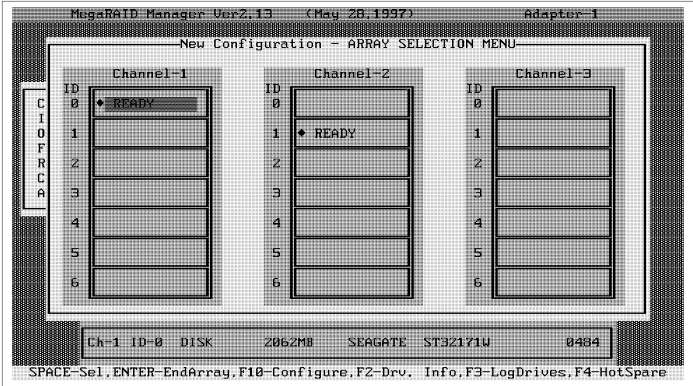
Step	Action																								
6, cont'd	<p>Cache policy This parameter applies to reads on a specific logical drive. It does not affect the Read-ahead cache. The default setting is <i>Direct I/O</i>.</p> <p><i>Cached I/O</i> specifies that all reads are buffered in cache memory. <i>Direct I/O</i> specifies that reads are not buffered in cache memory. Direct I/O does not override the cache policy settings. Data is transferred to cache and the host concurrently. If the same data block is read again, it comes from cache memory. Press <Esc> to exit the Advanced Menu.</p>																								
7	When you are finished defining the current logical drive, select <i>Accept</i> and press <Enter>. The array selection screen appears if any unconfigured disk drives remain.																								
8	<p>Repeat steps 3 through 7 to configure another array and logical drive. If you are finished configuring logical drives, press <Esc> to exit Easy Configuration. A list of the currently configured logical drives appears:</p> <div><div><div>Configure</div><div>Automatic Configuration</div><div>Configuration</div><div>Configuration</div></div><div><div>Save Configuration?</div><div>YES</div><div>NO</div></div></div> <table><tr><th colspan="6">Logical Drives Configured</th></tr><tr><th>LD</th><th>RAID</th><th>Size</th><th>#Stripes</th><th>StrpSz</th><th>Drive-State</th></tr><tr><td>1</td><td>0</td><td>2062MB</td><td>1</td><td>8KB</td><td>OPTIMAL</td></tr><tr><td>2</td><td>0</td><td>8705MB</td><td>1</td><td>8KB</td><td>OPTIMAL</td></tr></table>	Logical Drives Configured						LD	RAID	Size	#Stripes	StrpSz	Drive-State	1	0	2062MB	1	8KB	OPTIMAL	2	0	8705MB	1	8KB	OPTIMAL
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2	0	8705MB	1	8KB	OPTIMAL																				
	After you respond to the Save prompt, the Configure menu appears.																								
9	Initialize the logical drives you have just configured. See <i>Initializing Logical Drives</i> on page 94.																								

Using New Configuration

The New Configuration option allows you to associate logical drives with partial and/or multiple physical arrays (the latter is called spanning of arrays).

Erases Configuration Choose the New Configuration option to *erase* the existing configuration information about the selected controller.

To use the spanning feature and keep the existing configuration, use View/Add Configuration (see page 89).

Step	Action
1	Choose Configure from the MegaRAID Manager main menu.
2	Choose New Configuration from the Configure menu. An array selection window is displayed showing the devices connected to the current controller. <div></div>

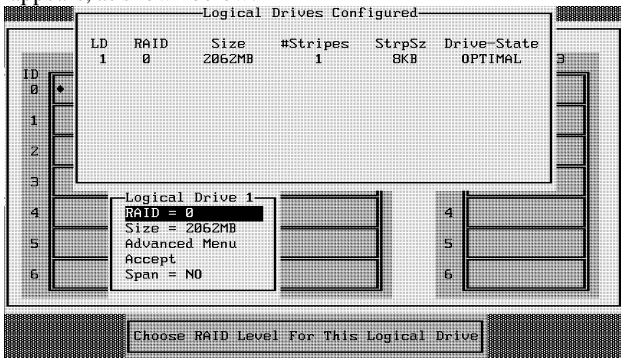
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Using New Configuration, Continued

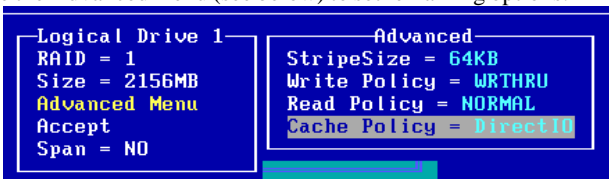
Step	Action
3	<p>Press the arrow keys to select specific physical drives. Press the spacebar to associate the selected physical drive with the current array. The indicator for the selected drive changes from READY to ONLIN A[<i>array number</i>]-[<i>drive number</i>]. For example, ONLIN A2-3 means disk drive 3 in array 2.</p> <p>Add physical drives to the current array as desired. Try to use drives of the same capacity in a specific array. If you use drives with different capacities in an array, all the drives in the array is treated as though they have the capacity of the <i>smallest</i> drive in the array.</p> <p>The number of physical drives in a specific array determine the RAID levels that can be implemented with the array.</p> <p>RAID 0 requires one or more physical drives per array. RAID 1 requires 2, 4, 6, or 8 physical drives per array. RAID 3 requires at least three physical drives per array. RAID 5 requires at least three physical drives per array.</p>
4	<p>Press <Enter> when you are finished creating the current array. To continue defining arrays, repeat step 3. To begin logical drive configuration, go to step 5.</p>

Cont'd

Using New Configuration, Continued

Step	Action												
5	<p>Press <F10> to configure logical drives. The logical drive configuration screen appears, as shown below:</p>  <p>The window from the top of the screen shows the logical drive that is currently being configured as well as any existing logical drives. The column headings are:</p> <table> <tr> <td>LD</td><td>The logical drive number</td></tr> <tr> <td>RAID</td><td>The RAID level</td></tr> <tr> <td>Size</td><td>The logical drive size</td></tr> <tr> <td>#Stripes</td><td>The number of stripes (physical drives) in the associated physical array</td></tr> <tr> <td>StrpSz</td><td>The stripe size</td></tr> <tr> <td>Drive-State</td><td>The state of the logical drive</td></tr> </table>	LD	The logical drive number	RAID	The RAID level	Size	The logical drive size	#Stripes	The number of stripes (physical drives) in the associated physical array	StrpSz	The stripe size	Drive-State	The state of the logical drive
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StrpSz	The stripe size												
Drive-State	The state of the logical drive												
6	<p>Set the RAID level for the logical drive. Highlight <i>RAID</i> and press <Enter>. The available RAID levels for the current logical drive are listed. Select a RAID level and press <Enter> to confirm. See the <i>MegaRAID Hardware Guide</i> for an explanation of the RAID levels.</p>												
7	<p>Set the spanning mode for the current logical drive. Highlight <i>Span</i> and press <Enter>. The choices are:</p> <p>CanSpan Array spanning is enabled for the current logical drive. The logical drive can occupy space in more than one array.</p> <p>NoSpan Array spanning is disabled for the current logical drive. The logical drive can occupy space in only one array.</p>												

Cont'd

Step	Action
7, cont'd	<p>For two arrays to be spannable, they must have the same stripe width (they must contain the same number of physical drives) and the arrays must be consecutively numbered. For example, assuming Array 2 contains four disk drives, it can be spanned only with Array 1 and/or Array 3, and only if Arrays 1 and 3 also contain four disk drives. If the two criteria for spanning are met, MegaRAID allows spanning. If the criteria are not met, the Span setting makes no difference for the current logical drive. Highlight the spanning option and press <Enter>.</p> <p>Configuring RAID 10, RAID 30, or RAID 50 Logical Drives</p> <p>Configure RAID 10 by spanning two contiguous RAID 1 logical drives. The RAID 1 logical drives must have the same stripe size.</p> <p>Configure RAID 30 by spanning two contiguous RAID 3 logical drives. The RAID 3 logical drives must have the same stripe size.</p> <p>Configure RAID 50 by spanning two contiguous RAID 5 logical drives. The RAID 5 logical drives must have the same stripe size.</p>
8	<p>Set the logical drive size. Move the cursor to Size and press <Enter>. By default, the logical drive size is set to all available space in the array(s) being associated with the current logical drive, accounting for the <i>Span</i> setting and for partially used array space. For example, if the previous logical drive used only a part of the space in an array, the current logical drive size is set to the remaining space by default.</p>
9	<p>Choose the Advanced menu (see below) to set remaining options.</p>  <p>Stripe size This parameter specifies the size of the segment written to each disk in a RAID 1, 3, 5, 10, 30, or 50 logical drive. You can set the stripe size to 2 KB, 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB. The default stripe size is 64 MB.</p> <p>A larger stripe size produces better read performance, especially if your computer does mostly sequential reads. If you are sure that your computer does random reads more often, select a small stripe size.</p>

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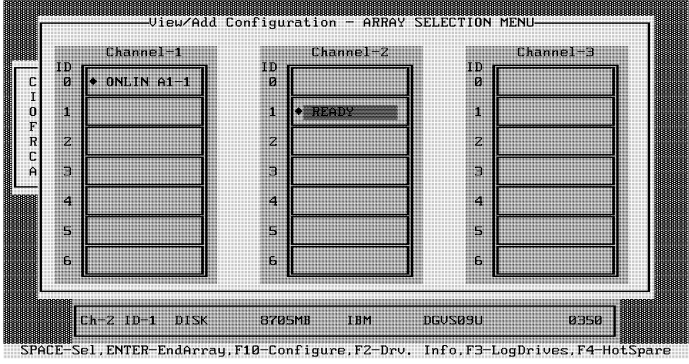
Using New Configuration, Continued

Step	Action
9, cont'd	<p>Write Policy This parameter specifies the cache write policy. You can set the write policy to <i>Write-back</i> or <i>Write-through</i>. The default setting is <i>Write-through</i>.</p> <p>In <i>Write-back</i> caching, the controller sends a data transfer completion signal to the host when the controller cache has received all the data in a transaction. <i>If WriteBack is enabled and the system is quickly turned off and then on, MegaRAID may hang when flushing cache memory. Adapters that contain a battery backup will default to WriteBack caching.</i></p> <p>In <i>Write-through</i> caching, the controller sends a data transfer completion signal to the host when the disk subsystem has received all the data in a transaction. This is the default setting.</p> <p>Write-through caching has a data security advantage over write-back caching. Write-back caching has a performance advantage over write-through caching. <i>You should not use write-back for any logical drive that is to be used as a Novell NetWare volume.</i></p> <p>Read-ahead This parameter specifies that the SCSI read-ahead feature is used for the logical drive. You can set this parameter to <i>Normal</i>, <i>Read-ahead</i>, or <i>Adaptive</i>. The default setting is <i>Normal</i>.</p> <p><i>Normal</i> specifies that the controller does not use read-ahead for the current logical drive. This is the default setting.</p> <p><i>Read-ahead</i> specifies that the controller uses read-ahead for the current logical drive.</p> <p><i>Adaptive</i> specifies that the controller begins using read-ahead if the two most recent disk accesses occurred in sequential sectors. If all read requests are random, the algorithm reverts to <i>Normal</i>, however, all requests are still evaluated for possible sequential operation.</p> <p>Cache Policy This parameter applies to reads on a specific logical drive. It does not affect the Read-ahead cache. The default setting is <i>Direct I/O</i>.</p> <p><i>Cached I/O</i> specifies that all reads are buffered in cache memory.</p> <p><i>Direct I/O</i> specifies that reads are not buffered in cache memory. This is the default setting. Direct I/O does not override the cache policy settings. Data is transferred to cache and the host concurrently. If the same data block is read again, it comes from cache memory. Press <Esc> to exit the Advanced Menu.</p>
10	<p>After the current logical drive is defined, select <i>Accept</i> and press <Enter>. If space remains in the arrays, the next logical drive to be configured appears. Repeat steps 6 to 9 to configure another logical drive. If all array space has been used, a list of the existing logical drives appears. Press any key to continue and respond to the Save prompt.</p>
11	<p>Initialize the logical drives you have just configured. See <i>Initializing Logical Drives</i> on page 94.</p>

Using View/Add Configuration

View/Add Configuration allows you to associate logical drives with partial and/or multiple physical arrays. This is called array spanning.

The existing configuration is left intact, so you can also use View/Add Configuration simply to look at the current configuration.

Step	Action
1	Choose Configure the MegaRAID Manager main menu.
2	Choose View/Add Configuration from the Configure menu. An array selection window (shown below) is displayed showing the devices connected to the current controller. <div></div>
	Hot key information appears at the bottom of the screen. The hot key functions are <ul style="list-style-type: none"><F2> Display the manufacturer data and MegaRAID error count for the selected drive.<F3> Display the logical drives that have been configured.<F4> Designate the selected drive as a hot spare .<F10> Display the logical drive configuration screen.

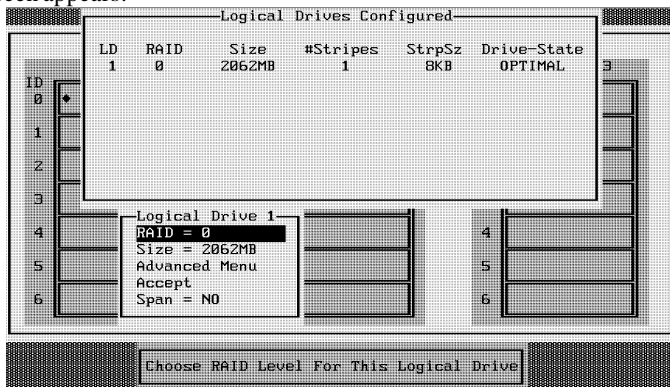
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Using View/Add Configuration, Continued

Step	Action
3	<p>Press the arrow keys to select the physical drives. Press the spacebar to select physical drives to be associated with the current array. The indicator for the selected drive changes from READY to ONLIN A [array number]-[drive number]. For example, ONLIN A2-3 means disk drive 3 in array 2.</p> <p>Add physical drives to the current array as desired. Try to use drives of the same capacity in a specific array. If you use drives with different capacities in an array, all drives in the array are treated as if they have the capacity of the <i>smallest</i> drive in the array.</p> <p>The number of physical drives in a specific array determine the RAID levels that can be implemented with the array.</p> <p>RAID 0 requires one or more physical drives per array. RAID 1 requires 2, 4, 6, or 8 physical drives per array. RAID 3 requires at least three physical drives per array. RAID 5 requires at least three physical drives per array.</p>
4	<p>Press <Enter> to end the selection process. To continue defining arrays, repeat step 3. To begin logical drive configuration, go to step 5.</p>

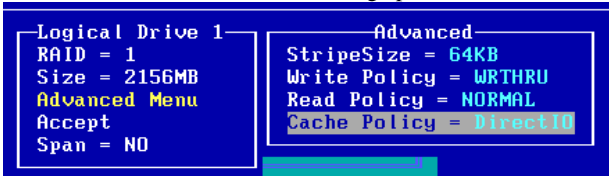
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Using View/Add Configuration, Continued

Step	Action												
5	<p>Press <F10> to configure logical drives. The logical drive configuration screen appears:</p>  <p>The window at the top of the screen shows the logical drive that is currently being configured as well as any existing logical drives. The column headings are:</p> <table> <tr> <td>LD</td><td>The logical drive number</td></tr> <tr> <td>RAID</td><td>The RAID level</td></tr> <tr> <td>Size</td><td>The logical drive size</td></tr> <tr> <td>#Stripes</td><td>The number of stripes (physical drives) in the associated physical array</td></tr> <tr> <td>StrpSz</td><td>The stripe size</td></tr> <tr> <td>Drive-State</td><td>The state of the logical drive</td></tr> </table>	LD	The logical drive number	RAID	The RAID level	Size	The logical drive size	#Stripes	The number of stripes (physical drives) in the associated physical array	StrpSz	The stripe size	Drive-State	The state of the logical drive
LD	The logical drive number												
RAID	The RAID level												
Size	The logical drive size												
#Stripes	The number of stripes (physical drives) in the associated physical array												
StrpSz	The stripe size												
Drive-State	The state of the logical drive												
6	<p>Set the RAID level for the logical drive. Highlight <i>RAID</i> and press <Enter>. The available RAID levels for the current logical drive are displayed. Select a RAID level and press <Enter> to confirm. See the <i>MegaRAID Hardware Guide</i> for an explanation of the RAID levels.</p>												
7	<p>Set the spanning mode for the current logical drive. Highlight <i>Span</i> and press <Enter>. The choices are:</p> <p><i>CanSpan</i> Array spanning is enabled for the current logical drive. The drive can occupy space in more than one array.</p> <p><i>NoSpan</i> Array spanning is disabled for the current logical drive. The drive can occupy space in only one array.</p>												

Cont'd

Using View/Add Configuration, Continued

Step	Action
7, cont'd	<p>For two arrays to be spannable, they must have the same stripe width (they must contain the same number of physical drives) and must be consecutively numbered. For example, assuming Array 2 contains four disk drives, it can be spanned only with Array 1 and/or Array 3, and only if Arrays 1 and 3 also contain four disk drives. If the two criteria for spanning are not met, the <i>Span</i> setting makes no difference for the current logical drive. Highlight a spanning option and press <Enter>.</p> <p>Configuring RAID 10, RAID 30, or RAID 50 Logical Drives</p> <p>Configure RAID 10 by spanning two contiguous RAID 1 logical drives. The RAID 1 logical drives must have the same stripe size.</p> <p>Configure RAID 30 by spanning two contiguous RAID 3 logical drives. The RAID 3 logical drives must have the same stripe size.</p> <p>Configure RAID 50 by spanning two contiguous RAID 5 logical drives. The RAID 5 logical drives must have the same stripe size.</p>
8	<p>Set the logical drive size. Move the cursor to <i>Size</i> and press <Enter>. By default, the logical drive size is set to all available space in the array(s) being associated with the current logical drive, accounting for the <i>Span</i> setting and for partially used array space. For example: if the previous logical drive used only a part of the space in an array, the current logical drive size is set to the remaining space by default.</p>
9	<p>Open the Advanced menu to set the remaining options.</p>  <p>Stripe size This parameter sets the size of the segment written to each disk in a RAID 0, 1, 3, or 5 logical drive. You can set the stripe size to 2 KB, 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB. The default stripe size is 64 MB.</p> <p>A larger stripe size produces better read performance, especially if your computer does mostly sequential reads. However, if you are sure that your computer does random reads more often, select a small stripe size.</p>

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Using View/Add Configuration, Continued

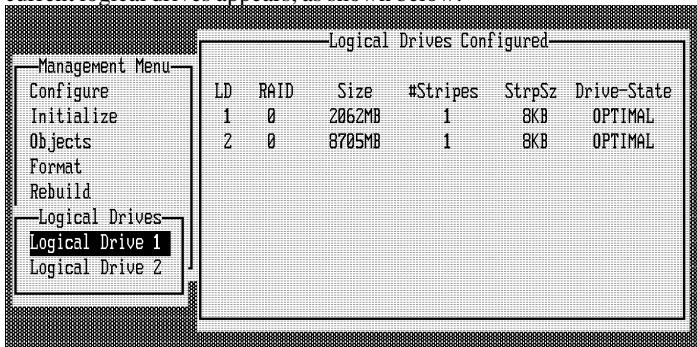
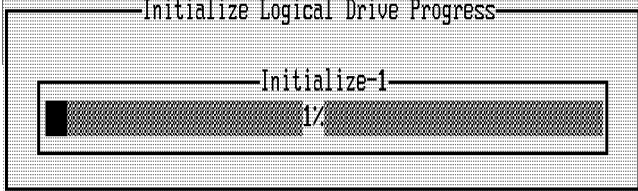
Step	Action
9, cont'd	<p>Write Policy This parameter sets the cache write policy. You can set the write policy to <i>Write-back</i> or <i>Write-through</i>. The default setting is <i>Write-through</i>.</p> <p>In <i>Write-back</i> caching the controller sends a data transfer completion signal to the host when the controller cache has received all the data in a transaction. <i>If WriteBack is enabled and the system is quickly turned off and then on, MegaRAID may hang when flushing cache memory.</i></p> <p>In <i>Write-through</i> caching, the controller sends a data transfer completion signal to the host when the disk subsystem has received all the data in a transaction. This is the default setting.</p> <p>Write-through caching has a data security advantage over write-back caching, whereas write-back caching has a performance advantage over write-through caching. <i>You should not use write-back for any logical drive to be used as a Novell NetWare volume.</i></p> <p>Read-ahead This parameter enables the SCSI read-ahead feature for the logical drive. Set this parameter to <i>Normal</i>, <i>Read-ahead</i>, or <i>Adaptive</i>. The default setting is <i>Normal</i>.</p> <p><i>Normal</i> specifies that the controller does not use read-ahead for the current logical drive. This is the default setting.</p> <p><i>Read-ahead</i> specifies that the controller uses read-ahead for the current logical drive.</p> <p><i>Adaptive</i> specifies that the controller begins using read-ahead if the two most recent disk accesses occurred in sequential sectors. If all read requests are random, the algorithm reverts to <i>Normal</i>, however, all requests are still evaluated for possible sequential operation.</p> <p>Cache Policy This parameter applies to reads on a specific logical drive. It does not affect the Readahead cache. The default setting is <i>Direct I/O</i>.</p> <p><i>Cached I/O</i> specifies that all reads are buffered in cache memory.</p> <p><i>Direct I/O</i> specifies that reads are not buffered in cache memory. This is the default setting. Direct I/O does not override the cache policy settings. Data is transferred to cache and the host concurrently. If the same data block is read again, it comes from cache memory. Press <Esc> to exit the Advanced Menu.</p>
10	<p>When you are finished defining the current logical drive, select Accept and press <Enter>. If space remains in the arrays, the next logical drive to be configured appears. Repeat steps 6 to 9 to configure another logical drive. If the array space is used, a list of the existing logical drives appears. Press any key to continue. Respond to the Save prompt.</p>
11	<p>Initialize the logical drives you have just configured. See <i>Initializing Logical Drives</i> on page 94.</p>

Initializing Logical Drives

You should initialize each new logical drive you configure. You can initialize the logical drives in two ways:

- *Batch Initialization.* The Initialize option in the main menu lets you initialize logical drives simultaneously.
- *Individual Initialization.* The Objects/Logical Drive action menu for an individual logical drive has an Initialize option.

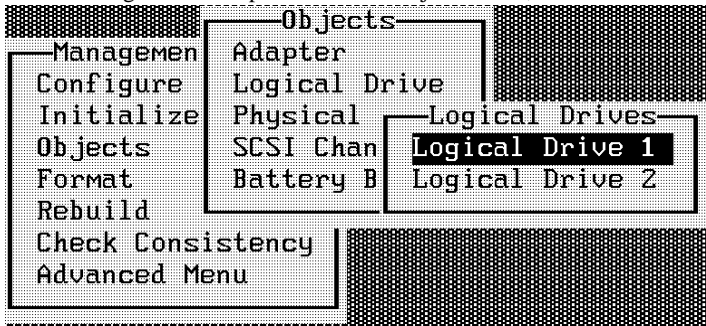
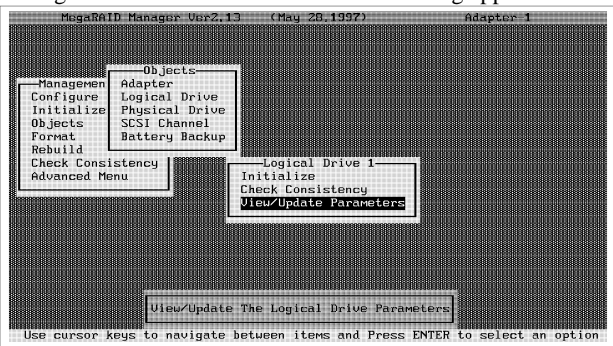
Batch Initialization

Step	Action
1	<p>Choose Initialize from the MegaRAID Manager main menu. A list of the current logical drives appears, as shown below:</p> 
2	<p>Press the arrow keys to select all drives to be initialized. Press the spacebar to select the selected logical drive for initialization. Press <F2> to select or deselect all the logical drives.</p>
3	<p>When you have selected the logical drives, press <F10> and choose <i>Yes</i> at the confirmation prompt. The progress of the initialization for each drive is shown in bar graph format.</p> 
4	<p>When initialization is complete, press any key to continue. Press <Esc> to display the main menu.</p>

Cont'd

Initializing Logical Drives, Continued

Individual Initialization

Step	Action
1	<p>Choose the Objects option from the MegaRAID Manager main menu. Choose the Logical Drive option from the Objects menu, shown below:</p> 
2	<p>Select the logical drive to be initialized. The following appears:</p> 
3	<p>Choose Initialize from the Action menu. The progress of the initialization appears as a graph on the screen.</p>
4	<p>When initialization completes, press any key to display the previous menu.</p>

Using Logical Drives in the Operating System

For information on an operating system other than DOS, see the software manual accompanying the drivers for that operating system. To use the logical drive(s) in DOS:

Step	Action
1	Exit MegaRAID Manager and reboot the computer.
2	Run DOS FDISK and configure one or more partitions using the logical drives.
3	Format the partitions using the FORMAT command.

Formatting Physical Drives

You can do low-level formatting of SCSI drives using MegaRAID Manager.

Since most SCSI disk drives are low-level formatted at the factory, this step is usually not necessary. You typically must format a disk if:

- the disk drive was not low-level formatted at the factory, or
 - an excessive number of media errors have been detected on the disk drive.
-

Media Errors Check the properties screen for the drive you wish to format. You can check this screen by choosing Objects from the Physical Drive menu, pressing the arrow keys to select the selected drive and pressing <F2>.

The error count appears at the bottom of the properties screen. If you feel that the number of errors is excessive, you should probably format the disk drive. If more than 32 media errors were detected, MegaRAID automatically puts the drive in FAIL state. In cases such as this, formatting the drive can clear up the problem.

You do not have to use the Format option to erase existing information on your SCSI disks, such as a DOS partition. That information is erased when you initialize logical drives.

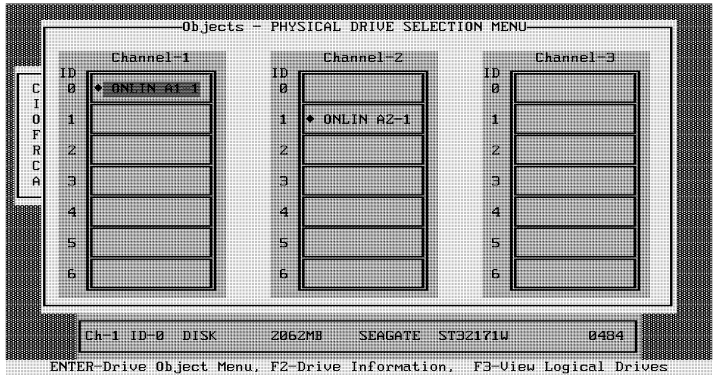
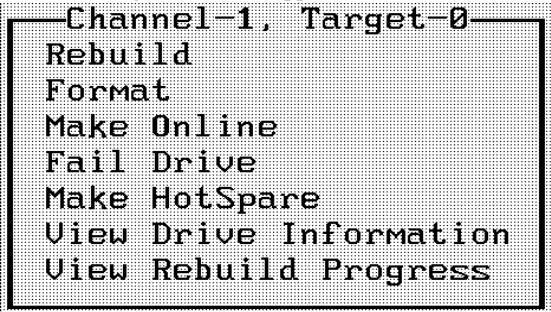
Formatting Drives You can format the physical drives using:

- *Individual Formatting.* Choose the Format option from Objects on the Physical Drive action menu for an individual disk drive.
-

Cont'd

Formatting Physical Drives, Continued

Individual Formatting

Step	Action
1	<p>Choose the Objects option from the MegaRAID Manager main menu. Choose the Physical Drive option from the Objects menu. A device selection window is displayed showing the devices connected to the current controller, as shown below:</p> 
2	<p>Press the arrow keys to select the physical drive to be formatted and press <Enter>. The following action menu appears:</p> 
3	<p>Choose the Format option from the action menu and respond to the confirmation prompt. Formatting can take some time, depending on the drive capacity.</p>
4	<p>When formatting completes, press any key to display the previous menu.</p>

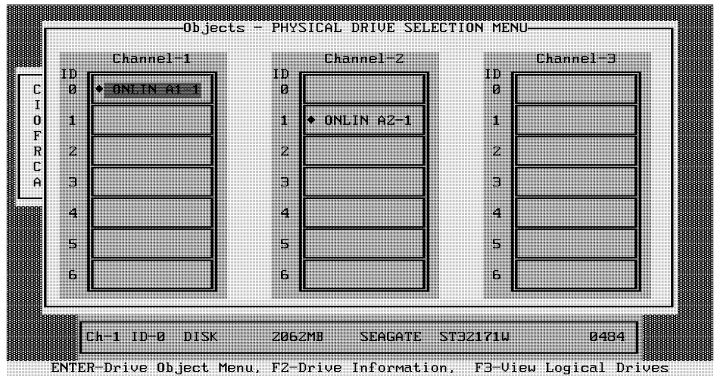
Rebuilding Failed Disk Drives

If a disk drive fails in an array configured as a RAID 1, 3, or 5 logical drive, you can recover the lost data by rebuilding the drive. If a rebuilding spare fails, a new rebuild is started using a second spare, if available. The capacity of the second spare must be equal to or greater than the failed drive.

Rebuild Types The rebuild types are:

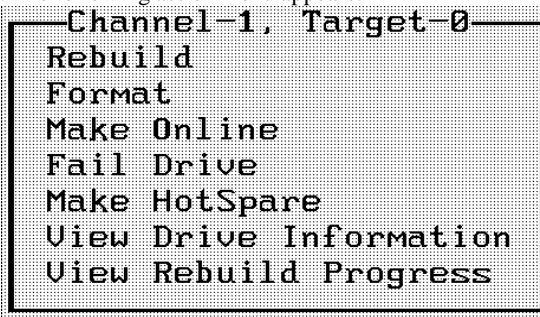
Type	Description
Automatic Rebuild	If you have configured hot spares, MegaRAID automatically tries to use them to rebuild failed disks. Display the Objects/Physical Drive screen while a rebuild is in progress. The drive indicator for the hot spare disk drive has changed to REBLD A[<i>array number</i>]-[<i>drive number</i>], indicating the disk drive being replaced by the hot spare.
Manual Rebuild	Manual rebuild is necessary if no hot spares with enough capacity to rebuild the failed drives are available. Select the MegaRAID Manager main menu Rebuild option or the Rebuild option on the Objects/Physical Drive menu.

Manual Rebuild – Rebuilding an Individual Drive

Step	Action
1	<p>Choose the Objects option from the MegaRAID Manager main menu. Choose Physical Drive from the Objects menu. A window appears that shows the devices connected to the current controller:</p> 

Cont'd

Rebuilding Failed Disk Drives, Continued

Step	Action
2	<p>Press the arrow keys to select the physical drive to be rebuilt and press <Enter>. The following action menu appears:</p> 
3	<p>Choose the Rebuild option from the action menu and respond to the confirmation prompt. Rebuilding can take some time, depending on the drive capacity.</p>
4	<p>When rebuild completes, press any key to display the previous menu.</p>

Manual Rebuild– Batch Mode

Step	Action
1	<p>Choose Rebuild from the MegaRAID Manager main menu. A device selection window is displayed showing the devices connected to the current controller. The failed drives have FAIL indicators.</p>
2	<p>Press the arrow keys to select all drives to be rebuilt. Press the spacebar to select the selected physical drive for rebuild.</p>
3	<p>After selecting the physical drives, press <F10> and type Yes at the confirmation prompt. The indicators for the selected drives changes to <i>REBLD</i>. Rebuilding can take some time, depending on the number of drives you have selected and their capacities.</p>
4	<p>When rebuild is complete, press any key to continue. Press <Esc> to display the main menu.</p>

Exiting MegaRAID Manager

To exit MegaRAID Manager, press <Esc> from the main menu and choose *Yes* at the prompt. A message appears if uninitialized logical drives remain in the system.
