MegaRAID® PCI SCSI Disk Array Controller Operating System Driver Installation Guide

MAN-MR-DRV
4/24/01

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Revision History

8/15/97	Initial release.
11/3/97	Added Windows NT Monolithic driver description.
1/16/98	Modified driver list.
3/17/98	Corrected minor formatting problems in manual.
5/22/98	Removed incorrect information about Windows NT v3.5x.
7/28/98	Removed Solaris, Banyan and Windows 95 driver references.
8/21/98	Added new Solaris driver information.
12/4/98	Added Linux driver, and updated Windows NT, and Novell NetWare information.
11/23/99	Added information about the drivers utilities being on CD.
7/25/00	Revised several chapters and added information for controllers that support 40 logical drives.
4/24/01	Revised Windows 2000 installation chapter.

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Preface

The MegaRAID RAID controllers support one, two, three, or four SCSI channels with data transfer rates up to 160 MB/s. This manual describes the software that is shipped with the controllers.

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1 Overview

The MegaRAID RAID controllers support one, two, three, or four SCSI channels with data transfer rates up to 160 MB/s. The basic MegaRAID documentation is contained in three manuals:

- the *MegaRAID Hardware Guide*
- the *MegaRAID Configuration Software Guide*
- the *MegaRAID Operating System Drivers Guide*

MegaRAID Configuration Software Guide This manual provides information about MegaRAID software utility programs. You will not need this manual until after you have planned your RAID system and have installed the MegaRAID controller.

RAID system planning, installation, and configuration information is provided in *the MegaRAID Hardware Guide.* Read the *MegaRAID Hardware Guide* before you read the *MegaRAID Configuration Software Guide.*

MegaRAID Hardware Guide The MegaRAID hardware guide for your controller contains information about installing the MegaRAID controller. It also contains general introductory information about RAID and RAID system planning and configuration information.

You must read the MegaRAID hardware guide for your controller before you read the *MegaRAID Configuration Software Guide.*

MegaRAID Operating System Drivers Guide This manual provides all the information you will need to install the appropriate operating system software drivers.

This is the manual you are now reading.

In this Manual

This manual is organized as follows:

Operating System Drivers The MegaRAID PCI SCSI Disk Array RAID Controller is installed in any IBM AT®-compatible computer with a PCI local bus. MegaRAID can operate under MS-DOS® or any DOS-compatible operating system using the standard AT BIOS INT 13h Hard Disk Drive interface.

To operate with other operating systems, you must install software drivers. MegaRAID provides software drivers for the following operating systems:

- MS-DOS version 6.xx or later
- Microsoft Windows NT V4.0, and 2000
- Novell NetWare 4.2, and 5.x
- OS/2 Warp Server 4.0, and e-business
- SCO UnixWare 7.x
- SCO Open Server 5.0x
- Sun Solaris 7, and 8 (x86)
- Linux Red Hat v6.2

Note: Be sure to use the latest Service Packs (updates) provided by the operating system manufacturer.

Also, see the readme file that comes with the driver for any updated information.

2 Installing the DOS ASPI Driver

The ASPI drivers for the LSI Logic Corporation MegaRAID PCI SCSI Disk Array Controller can be used in a DOS, Microsoft Windows™ 3.x, and Microsoft Windows 95™ environment.

Features

The DOS ASPI driver:

- supports up to six non-hard disk drive SCSI devices (each SCSI device must use a unique SCSI ID regardless of the SCSI channel it resides on - with the exception of SCSI ID = 0)
- supports up to six SCSI adapters (will be scanned for non-hard disk drive SCSI devices)
- provides virtual DMA services (VDS) for up to 40 logical drives (depending on which MegaRAID controller is used.)

 **Note:** See the readme file that comes with the driver for any updated information.

Getting the DOS ASPI Driver This driver is updated frequently. To make sure you have the current version of this driver, you can download the updated MegaRAID DOS ASPI driver from the LSI Logic web site: www.lsil.com.

Installing

Copy MEGASPI.SYS to the hard disk drive. Add the following line to CONFIG.SYS

```
device=C:\path\MEGASPI.SYS /v
```

Parameters

The MEGASPI.SYS parameters are:

Parameter	Description
/h	INT 13h support is not provided.
/v	Verbose mode. All messages are displayed on the screen.
/a	Physical drive access mode. Direct access to physical hard disk drives is enabled.
/q	Quiet mode. All messages except error messages are suppressed.

DOS CD-ROM Driver

With the MegaRAID adapter card, LSI Logic Corporation provides a device driver for CD-ROM drives operating under DOS. The driver is the AMICDROM.SYS file.

Installing

The MEGASPI.SYS ASPI manager must be added to the CONFIG.SYS file before you can install the CD-ROM device driver. See the instructions on the previous page for adding the MEGASPI.SYS driver.

Copy AMICDROM.SYS to the root directory of the C: drive in your computer. Using any DOS text editor, add the following to CONFIG.SYS:

```
DEVICE=C:AMICDROM.SYS /D:MSCD001
```

(if the CD-ROM drive letter is D). Add the following to AUTOEXEC.BAT. Make sure it is before the SMARTDRV.EXE line.

```
MSCDEX /D:MSCD001
```

MSCDEX is the Microsoft CD-ROM drive extension file that is supplied with MS-DOS® and PC-DOS® Version 6.0 or later.

DOS ASPI Driver Error Messages

Message	Corrective Action
LSI Logic Corporation ASPI Manager has NOT been loaded.	The ASPI manager is not loaded. One of the failure codes listed below is displayed next.
Controller setup FAILED error code=[0xab]	Correct the condition that caused the failure. The failure codes are: 0x40 No MegaRAID adapters found 0x80 Timed out waiting for interrupt to be posted 0x81 Timed out waiting for MegaRAID to respond. 0x82 Invalid command completion count. 0x83 Invalid completion status received. 0x84 Invalid command ID received. 0x85 No PCI BIOS support. 0x90 Unknown error.
No non-disk devices were located	The driver did not find any non-hard drive devices during scanning. A SCSI device that is not a hard disk drive, such as a tape drive or CD-ROM drive, must be attached to this SCSI channel. The SCSI ID must be unique for each adapter and cannot be SCSI ID 0. The supported SCSI IDs are 1, 2, 3, 4, 5, and 6.
'ERROR: VDS support is *INACTIVE* for MegaRAID logical drives	_ /h is appended to the driver command in CONFIG.SYS, or _ this driver is used with a BIOS that is earlier than v1.10, or _ no logical drives are configured on the MegaRAID controller.

3 Installing Windows NT 4.0 Driver

The MegaRAID Windows NT software driver is provided on the MegaRAID Universal Driver Suite CD. This is a miniport driver.

Features The MegaRAID Windows NT drivers support:

- four SCSI adapters per host system
- 8 or 40 logical drives per adapter, depending on the MegaRAID controller and firmware
- six non-disk devices per adapter. Use SCSI IDs 1 through 6 for non-disk devices
- the ability to see newly configured logical drivers in Disk Administrator without rebooting the system
- the ability to delete the last logical drive created using Power Console Plus (see the *MegaRAID Configuration Software Guide* for more information)
- the ability to use remaining capacity of an array using Power Console Plus

 **Note:** See the readme file that comes with the driver for any updated information.

Driver Files The MegaRAID Windows NT driver files are:

File	Description
MRAID35X.SYS	The Windows NT driver.
OEMSETUP.INF	Used by Windows NT Setup to add SCSI Drivers.
TXTSETUP.OEM	Used by Windows NT for fresh installation

Getting the Windows NT 4.0 Driver This driver is updated frequently. To make sure you have the current version of this driver, you can download the updated MegaRAID Windows NT 4.0 driver from the LSI Logic web site: www.lsil.com.

Driver Installation There are two methods for installing the MegaRAID Windows NT drivers:

- making a fresh installation
- adding to an existing installation

Cont'd

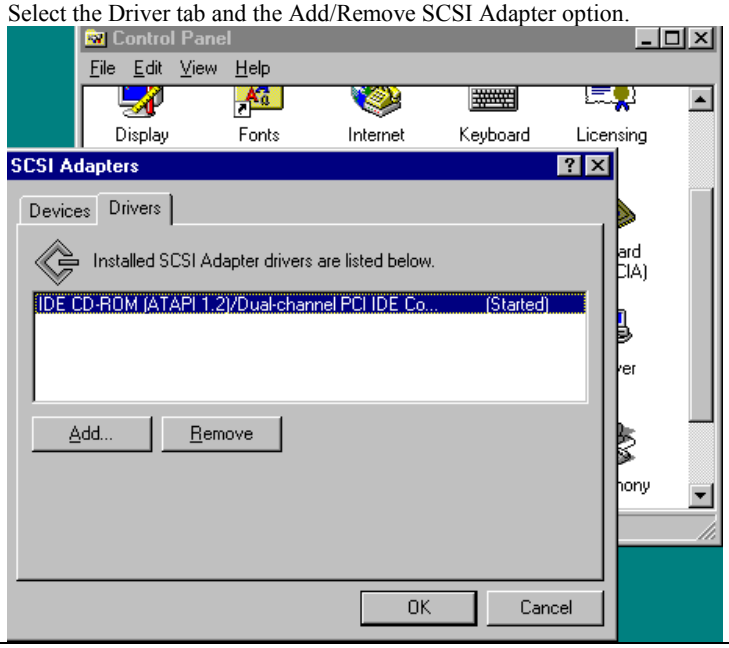
Installing Windows NT Drivers, Continued

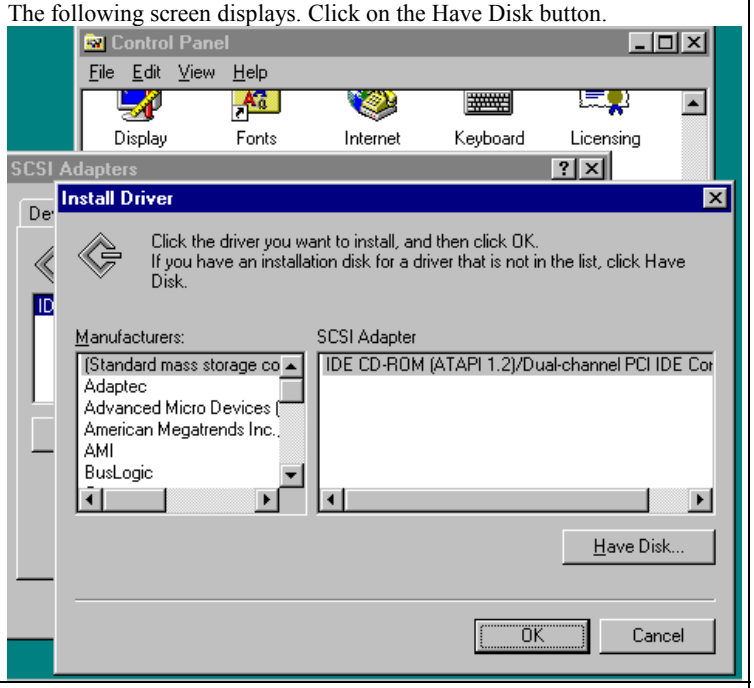
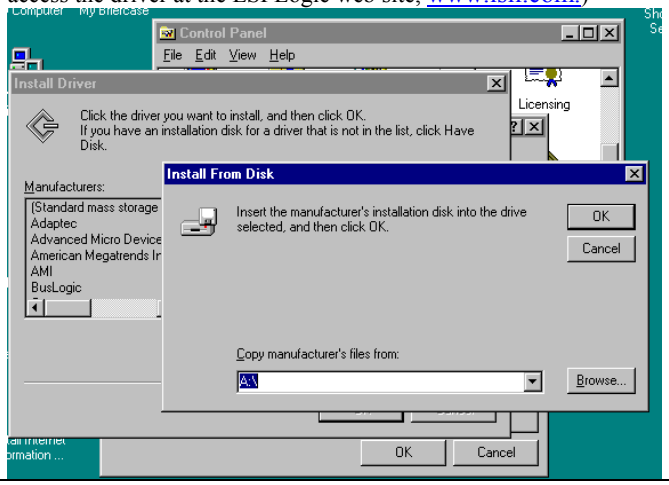
Fresh Installation Use fresh installation if you are installing Windows NT for the first time and want to include the MegaRAID drivers and utilities.

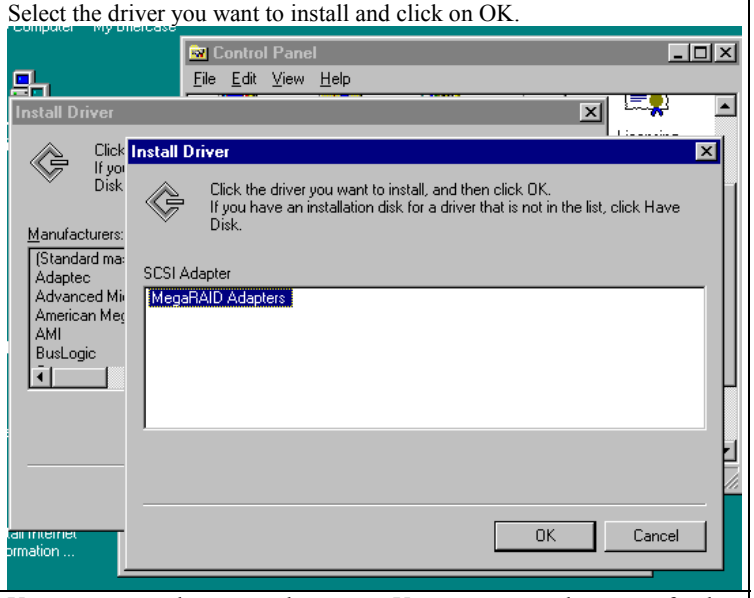
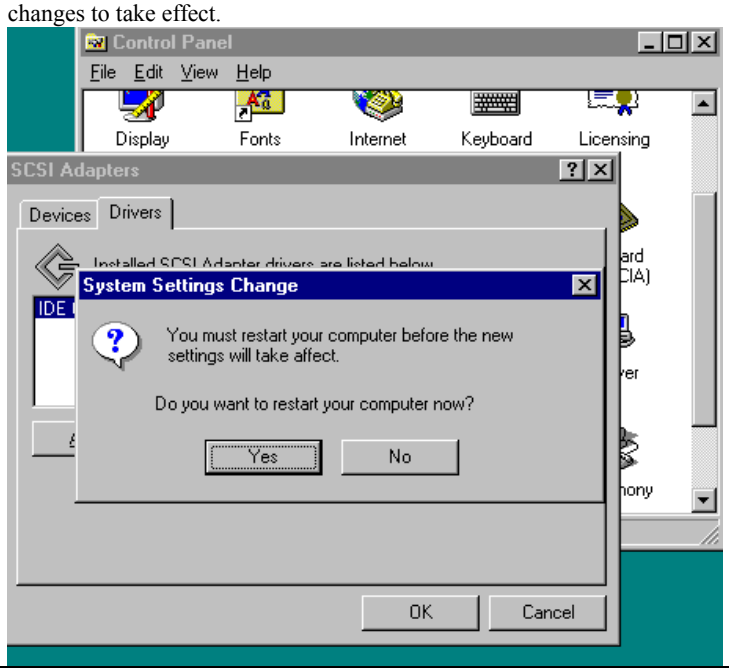
Installing NT with Bootable CD-ROM or Installation Floppy Diskettes The following instructions are for all MegaRAID controllers. Perform the following steps to do a fresh installation if running Windows NT V4.x.

Step	Action
1	Boot your system and place the Windows NT CD in the CD-ROM drive.
2	The blue screen for NT Setup displays. Press <F6>.
3	At the next menu, press <S> to specify an additional SCSI adapter.
4	Choose the Other option from the list.
5	Insert a floppy disk that contains the LSI Logic NT driver. (The NT driver comes with the Universal Driver Suite that accompanies the controller. You can also access the driver at the LSI Logic web site, www.lsil.com.)
6	Press <Enter>.
7	Select the MegaRAID NT SCSI driver. Press <Enter>.
8	Continue with NT installation.

Adding to an Installation If you are already running Windows NT and want to add the MegaRAID Windows NT Driver and Utilities, perform the following procedure.

Step	Action
1	Click on the Start button.
2	Select Control Panel, then SCSI Adapter. 
3	Select the Driver tab and the Add/Remove SCSI Adapter option. 

Step	Action
4	The following screen displays. Click on the Have Disk button. 
5	Insert the CD with the LSI Logic NT driver. (The NT driver is on the Universal Driver Suite CD that accompanies the controller. You can also access the driver at the LSI Logic web site, www.lsil.com.) 
6	Browse the CD to find the following directory: MS Windows > Driver > Nt40

Step	Action
7	Select the driver you want to install and click on OK. 
8	You are prompted to restart the system. You must restart the system for the changes to take effect. 

4 Installing Windows 2000 Drivers

Overview This chapter contains the procedures for installing Cluster Service for servers running the Windows 2000 server operating system.

Clusters Physically, a cluster is a grouping of two independent servers that can access the same data storage and provide services to a common set of clients. With current technology, this usually means servers connected to common I/O buses and a common network for client access.

Logically, a cluster is a single management unit. Any server can provide any available service to any authorized client. The servers must have access to the same data and must share a common security model. Again, with current technology, this generally means that the servers in a cluster will have the same architecture and run the same version of the same operating system.

The Benefits of Clusters Clusters provide three basic benefits:

- improved application and data availability
- scalability of hardware resources
- simplified management of large or rapidly growing systems

Software Requirements

The software requirements for cluster installation are:

- MS Windows 2000 Advanced Server or Windows 2000 Datacenter Server must be installed.
- You must use a name resolution method, such as Domain Naming System (DNS), Windows Internet Naming System (WINS), or HOSTS.
- Using a Terminal Server for remote cluster administration is recommended.

Hardware Requirements

The hardware requirements for the Cluster Service node can be found at the following web site: http://www.microsoft.com/windows2000/upgrade/compat/default.asp.

- The cluster hardware must be on the Cluster Service Hardware Compatibility List (HCL). To see the latest version of the Cluster Service HCL, go to the following web site:

  http://www.microsoft.com/hcl/default.asp

  and search using the word "Cluster."

- Two HCL-approved computers, each with the following:

  - A boot disk that has Windows 2000 Advanced Server or Windows 2000 Datacenter Server installed. You cannot put the boot disk on the shared storage bus described below.

  - A separate PCI storage host adapter (SCSI or Fibre Channel) is required for the shared disks. This is along with the boot disk adapter.

  - Each machine in the cluster needs two PCI network adapters.

  - An HCL-approved external disk storage unit connected to all the computers in the cluster. This is used as the clustered disk. RAID (redundant array of independent disks) is recommended for this storage unit.

  - Storage cables are needed to attach the shared storage device to all the computers in the cluster.

  - Make sure that all hardware is identical, slot for slot, card for card, for all nodes. This will make it easier to configure the cluster and eliminate potential compatibility problems.

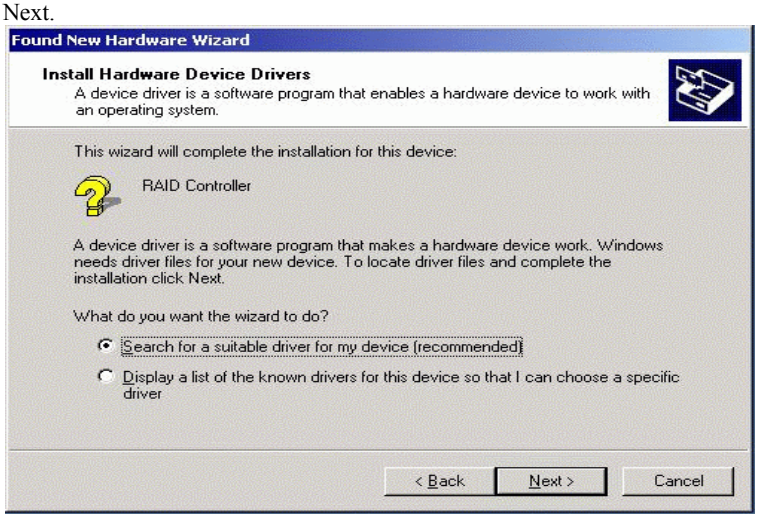
Installation and Configuration

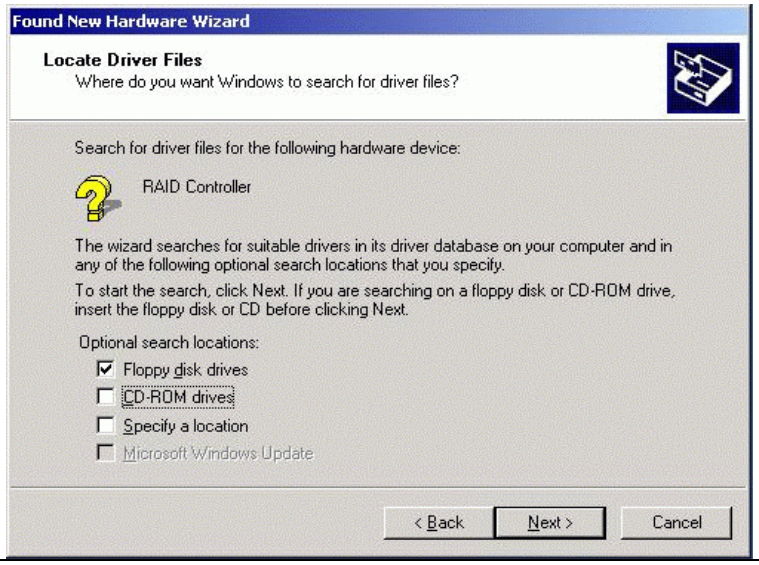
Use the following procedures to install and configure your system as part of a cluster.

Step	Action
1	Unpack the controller following the instructions in the hardware guide for your board.
2	Set the hardware termination for the controller as “always on”. Refer to the jumper settings in the hardware guide for your board for more information.
3	Configure the IDs for the drives in the enclosure. See the enclosure configuration guide for information.
4	Install one controller at a time. Press <Ctrl> <M> at BIOS initialization to configure the options in the steps 5 – 11. Do not attach the disks yet.
5	Set the controller to Cluster Mode in the Objects > Adapter > Cluster Mode menu.
6	Disable the BIOS in the Objects > Adapter > Enable/Disable BIOS menu.
7	Change the initiator ID in the Objects > Adapter > Initiator ID menu.
8	Power down the first system.
9	Attach the controller to the shared array.
10	Configure the first controller to the desired arrays using the Configure > New Configuration menu.
11	Follow the on-screen instructions to create arrays and save the configuration. Initialize the logical drives before powering off the system.
12	Power down the first system.
13	Repeat steps 4 – 7 for the second controller. **Note:** Do not have the cables for the second controller attached to the shared enclosure yet.
14	Power down the second server.
15	Attach the cables for the second controller to the shared enclosure and power up the second system.
16	If a configuration mismatch occurs, enter the <Ctrl> <M> utility. Go to the Configure > View/Add Configuration > View Disk menu to view the disk configuration. Save the configuration.
17	Proceed to the driver installation for a Microsoft cluster environment.

Driver Installation Instructions under Microsoft Windows 2000 Advanced Server

After the hardware is set up for the MS cluster configuration, perform the following procedure to configure the driver.

Step	Action
1	When the controller is added to an existing Windows 2000 Advanced Server installation, the operating system detects the controller.
2	**Note: Step 2 is for the 471 board only. It is not for the 475 or 493 board.** Click on Cancel on all detected devices and reboot. After you reboot, install the drivers for the new hardware.
3	The following screen displays the detected hardware device. Click on Next. 
4	The following screen appears. This screen is used to locate the device driver for the hardware device. Select Search for a suitable driver… and click on Next. 

Step	Action
5	The following screen displays. Insert the floppy diskette with the appropriate driver disk for Windows 2000. Select Floppy disk drives in the screen below and click on Next. 
6	The Wizard detects the device driver on the diskette and the "Completing the upgrade device driver" wizard displays the name of the controller. Click on Finish to complete the installation.

5 Installing Novell NetWare 4.2, and 5.x Drivers

The Novell NetWare driver and utilities support logical drives configured on the MegaRAID SCSI Adapter. This driver supports up to 12 MegaRAID Adapters. It also supports Hot Plug PCI.

Important

The logical drives configured on the host adapter are registered with the operating system as separate logical units on Target ID 0 (TID).

Getting the Novell NetWare Driver This driver is updated frequently. To make sure you have the current version of this driver, you can download the updated MegaRAID Novell NetWare driver from the LSI Logic web site: www.lsil.com.

Driver/Utility Files The MegaRAID Novell NetWare driver files are:

File	Description
MEGA4_XX.HAM	The MegaRAID host adapter module (HAM). It conforms to the Novell NetWare 4.x NPA architecture. *This driver supports the NPA Diagnostics option via the NWDIAG flag, specified on the command line when the driver is loaded.* The driver is a reentrant module. It registers one adapter when the NetWare LOAD command is issued to load the driver.
MEGA4XX.DDI	This is the device driver installation file that is required to install the MegaRAID host adapter module driver.
MEGAMMIO.NLM	This is the Media Manager Interface module for the MEGA4_XX.HAM driver.
MEGAMGR.NLM	This is the MegaRAID Configuration and Management utility. *Do not unload this NLM using the UNLOAD console command.* See the *MegaRAID Configuration Software Guide* for additional information about MegaRAID Manager.
MEGAMON.NLM	This is the monitor program for NetWare. The MegaRAID Monitor reports events on the adapter. Event categories are Severe, Warning, and Information. The notification is broadcast to the supervisor, displayed locally on the console, and displayed remotely.

Note: See the readme file that comes with the driver for any updated information.

Cont'd

Fresh Installation of the 4.2 and 5.x Driver All utilities and ASPI drivers expect the driver to pass the requests to the adapter. The driver must be loaded before it can load the NLMs. Install utilities and drivers in this order:

1	DRIVER – HAM.
2	Load MEGAMMIO.NLM, MEGAMGR.NLM and MEGAMON.NLM in any order after the above modules are loaded.

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

Step	Action
1	Create a DOS partition with the CD-ROM driver.
2	Bring up the NetWare CD-ROM drive at the command prompt.
3	At the command prompt, type `Install` and press <Enter>.
4	Follow the instructions on the screen until you reach the Storage Driver Support screen. (This screen is used to add, change, or delete drivers.)
5	Select the Storage Adapters option on the Storage Driver Support screen.
6	Delete any existing MegaRAID adapters.
7	Press <Insert> to add unlisted drivers. Press <Insert> again. A path displays.
8	Insert the driver diskette into the floppy drive and press <Enter>.
9	The system finds the MEGA4_XX.HAM driver.
10	Return to the Driver Summary screen. Continue installation.

Adding the 4.2 Driver to an Existing Installation Follow the instructions to add the 4.2 driver to an existing installation.

Step	Action
1	At the root prompt, type `Load Install` and press <Enter>.
2	The Installation Options screen displays. Select Drive Options and press <Enter>. A window displays.
3	Select Configure Disk and Storage Device Options and press <Enter>.
4	Select one of the following options display in the window: • Discover and load an additional driver • Select an additional driver
5	If you select the option to discover and load an additional driver, the system discovers the extra unit. You are prompted to select a driver from the list. Press <Insert> to insert the driver. This completes the procedure.
6	If you choose the option to select an additional driver, the Select a Driver screen displays. Press <Insert>. Read the instructions that display.
7	Put a floppy disk in the floppy drive and press <Enter>.
8	The system will find a driver and install it.

Adding the 5.x Driver to an Existing Installation The only difference between 4.2 installation, and 5.x installation is that you type

NWCONFIG

in step 1, instead of Load Install. Perform the other steps as shown in the table above.

6 Installing the SCO Unix Driver

The MegaRAID software driver and utilities for SCO Unix can also be used for OSR 5.05. When installing with ODT, some of the responses are different.

Getting the SCO Unix Driver This driver is updated frequently. To make sure you have the current version of this driver, you can download the updated MegaRAID SCO Unix driver from the LSI Logic web site: www.lsil.com.

Unix Driver Features The MegaRAID SCO Unix driver (**amird**) is an MSCSI (Modular SCSI) host adapter driver. It supports: up to six host adapters per host system, up to 40 logical drives per adapter (depending on controller type), up to six non-disk devices per adapter, and IOCTLS for managing the adapter environment

SCO Unix Driver Files The following files are added:

File	Description
/etc/megamgr	Megamgr is an executable file that provides an object-oriented interface. It configures new drives, rebuilds failed disks (if they are part of the redundant logical drives), displays adapter and disk performance, and manages channels and adapters. See the *MegaRAID Configuration Software Guide* for information.
/etc/amirdmon	A monitoring utility activated when in multi-user mode. It tracks adapter state changes, displays the state change messages, and posts mail to *root.*
/etc/conf/pack.d/ amird/Driver.o	Driver.o is the MegaRAID SCO Unix driver.
/etc/conf/pack.d/ amird/Space.c	Space.c contains the MegaRAID driver configurable parameters
System Files	The MegaRAID driver entries are added to the following directories: /etc/conf/cf.d/mscsi, /etc/conf/cf.d/mdevice, and /etc/conf/sdevice.d/amird

Note: See the readme file that comes with the driver for any updated information.

Installing SCO Open Server V5.05

Step	Action
1	Make sure that a CD-ROM drive is connected to the system. The example is conducted with SCSI CD-ROM connected to the MegaRAID Controller. Be prepared to totally erase the contents of the primary IDE hard disk drive to make room for the new operating system.
2	Turn power on with the SCO Open Server boot diskette in the system floppy drive.

3	At the boot: prompt, type
	
	`Link`
	
	and press <Enter>.
	
	`What packages do you need linked in the system?`
	
	appears. Type
	
	`Amird`
	
	and press <Enter>. The system will load.

4	You will be prompted to insert the package disk. Insert the MegaRAID SCO Open Server diskette in drive A: and press <Enter> Follow the instructions on the screen. Choose the device the operating system is loaded from. Choose the option for SCSI CD-ROM. Make sure that you have inserted the SCO Open Server CD in the CD-ROM drive. Type the use name and password when prompted. Follow all other instructions on the screen.
5	If the CD-ROM drive is properly configured for MegaRAID, the operating system will be loaded to the primary hard drive. A RAID disk array does not have to be configured at this time. You can configure a RAID array after successful operating system installation. A successful install displays the graphical interface of the SCO Open Server Desktop Login Screen. Login as 'root' and type the five-character password that you created earlier in the installation when prompted.

7 Installing the UnixWare Drivers

Follow the standard installation procedure as specified in the *SCO UnixWare Installation Handbook* to install the MegaRAID UnixWare drivers. The MegaRAID UnixWare driver supports UnixWare V7.x.

Getting the UnixWare Driver This driver is updated frequently. To make sure you have the current version of this driver, you can download the updated MegaRAID UnixWare driver from the LSI Logic web site: www.logic.com.

Unix Driver Features The MegaRAID UnixWare driver is a PDI SCSI host adapter driver. It supports:

- up to six host adapters per host system
- up to 40 logical drives per adapter (depending on adapter type)
- up to five non-disk devices per adapter (SCSI ID 0 and SCSI ID1 are reserved for SCSI disk devices)
- IOCTL for managing the adapter environment

Fresh Installation Insert the MegaRAID UnixWare HBA diskette 1 of 1 when the UnixWare installation prompts for an HBA diskette. Follow the screen instructions to complete the installation

Upgrade Installation Insert the MegaRAID UnixWare diskette and type

```
pkgadd -d diskette1
```

at the command line prompt. Follow the screen instructions to complete the installation.

UnixWare Files

File	Description
/etc/megamgr	The megamgr utility provides an object-oriented hierarchical interface. Megamgr configures new drives, reconstructs failed disks (if they are part of the redundant logical drives), displays adapter and disk performance, and manages channels and adapters. See the *MegaRAID Configuration Software Guide* for additional information.
/etc/amirdmon	The amirdmon monitoring utility is activated when the computer enters multi-user mode. It tracks the adapter state changes, displays state change messages, and posts mail to *root* and */dev/console.*

Note: See the readme file that comes with the driver for any updated information.

Installing the SCO UnixWare V7.x Driver

Software Installation

Note: You must configure your drives and arrays using the MegaRAID BIOS Configuration Utility before you start UnixWare installation.

Step	Action
1	Reboot the server with the UnixWare installation diskette in the floppy drive, and the installation CD-ROM in the CD drive. Press <Enter> from the UnixWare Welcome screen.
2	From the Keyboard Selection screen, select the keyboard type and press <Enter>. From the Licensing screen, enter the software serial number and the activation key number. These items are on the first UnixWare installation diskette. From the License Confirmation screen, press <Enter> to continue the installation.
3	From the Install Host Bus Adapters screen, insert the MegaRAID UnixWare Drivers and Utilities diskette in the floppy drive and press <Enter>. If additional HBA diskettes must be installed, install them now, otherwise continue the installation.
4	From the Device Configuration Utility screen, let UnixWare identify and configure settings for the hardware device drivers. Press <Enter> to continue installation.
5	From the Installation Selection screen, choose the installation method and press <Enter>. From the Confirmation screen, choose Continue the Installation. From the Type of Installation screen, choose to change the disk configuration or use the entire hard disk drive for UnixWare. See the *UnixWare Installation Guide* for additional information about changing the disk configuration.
6	Type the System Node Name and press <Enter>. Type the correct date, time, hour, minute, time zone, and press <F10>. From the Install Confirmation screen, press <Enter>.
7	From the Install Menu screen, you can change any setting, or add and delete packages to be installed. See the *UnixWare Installation Guide* for additional information about this menu. If all settings are correct and all packages to be installed are chosen, highlight Accept all settings and Install Now and press <Enter>.
8	After the installation is complete, you are prompted to reinsert the MegaRAID UnixWare Drivers and Utilities diskette in the floppy drive and press <Enter>. From the Installation Complete screen, make sure both boot drives, (floppy and CD-ROM) are empty. Press <Enter> to reboot the server.

8 Installing the OS/2 Driver

Installing the OS/2 Warp E-Business Drivers

Getting the OS/2 Driver This driver is updated frequently. To make sure you have the current version of this driver, you can download the updated MegaRAID OS/2 driver from the LSI Logic web site: www.lsil.com.

Installing the OS/2 Warp E-Business Drivers

Step	Action
1	Make a copy of the IBM OS/2 Install Disk 1.
2	Copy the MRAID.ADD and MRAID.SYM files to the root directory on the copy of the IBM OS/2 Install Disk 1 that you just made.

3	Edit the config.sys file on the IBM OS/2 Install Disk 1. Replace the line:
	
	`Basedev=ibmint13.i13`
	
	with the following:
	
	`Rem basedev=ibmint13.i13.`
	
	Add
	
	`Basedev=mraid.add`
	
	Note: If there is not enough space on the disks, you can delete the driver.

4	If there is still not enough space, you can delete the following files: Type of computer: Files to delete: ISA/EISA IBM2.* IBM PS/2 IBM1.*
5	When you install IBM OS/2, use the modified copy of the IBM OS/2 Install Disk 1 that you made in step 1 and modified in steps 2 – 4.
6	Reboot the computer with the IBM OS/2 Install Disk 1 in the floppy drive.
7	At the blue IBM logo screen, you are prompted to insert Install Disk 2 in the floppy drive. Insert the disk and press <Enter>.
8	At the next blue IBM logo screen, you are prompted to insert Install Disk 2 in the floppy drive. Insert the disk and press <Enter>.
9	The Welcome screen displays. Press <Enter>.
10	The OS/2 Warp Server for e-business Installation screen displays. Press <Enter>.
11	If the Volumes Too Small screen appears, press <Enter>. Otherwise, go through the installation process to install OS/2.
12	The Modifying Volumes screen displays. Press <Enter>.
13	The Logical Volume Management Tool – Logical View screen displays. Press <Enter>.
14	Select Create a New Volume That Can Be Made Bootable, and a drive letter. Enter the volume name.
15	The Choose a Disk screen displays. Press <Enter>. Highlight the disk you put the bootable volume on and press <Enter>. Press <Enter> again. Enter the name for the partition and press <Enter>. Enter the size of the partition and press <Enter>.
16	Highlight the new volume that was created and press <Enter>.
17	Press F3 to exit. Select Save Changes. Reboot the system.
18	Follow the OS/2 installation manual's instructions for the remainder of the install. Use the disks that you modified to install.

Note: See the readme file that comes with the driver for any updated information.

Configuring an Array

Step	Action
1	Click on the MegaRAID Software Manager icon. The MegaRAID Manager main menu should appear. From the MegaRAID Manager main menu, select Configure.
2	From the Configure menu, select New Configuration. `Proceed?` appears. Highlight Yes and press <Enter>. The system will check the SCSI channels. The attached SCSI devices should appear on the Array Selection menu. Hot key information is displayed at the bottom of the screen. The hot key functions are: <F2> Display the manufacturer data and MegaRAID error count for the highlighted drive. <F3> Display the logical drives that have already been configured. <F4> Designate the highlighted drive as a hot spare. <F10> Display the logical drive configuration screen.
3	Press the arrow keys to highlight specific physical drives. Press the spacebar to associate the highlighted physical drive with the current array. The indicator for the selected drive changes from READY to ONLIN A[array number]- [drive number]. Add drives to the current array as desired. Try to use drives that are the same size in a specific array. If different drive capacities are used in a specific array, all the drives in the array are treated as if they have the capacity of the smallest drive in the array. The number of physical drives in a specific array determines the RAID levels that can be used in that array. After all the drives are highlighted for the array being configured, press <Enter>.
4	Press <F10> to display the Logical Drive Configuration screen. This screen shows the logical drive that is currently being configured, as well as any existing logical drives. The column headings are: 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 Set the desired RAID level for the logical drive. Highlight RAID and press <Enter>. A list of the available RAID levels for the current logical drive appears. Select a RAID level and press <Enter> to confirm. Do not use RAID 3 for any logical drive to be used as a DOS volume.

Step	Action
5	Set the Spanning mode for the current logical drive, if you have at least four drives configured into two RAID arrays. Highlight Span and press <Enter>. The choices are: CanSpan Array spanning is enabled for the current logical drive. The logical drive can occupy space in more than one array. NoSpan Array spanning is disabled for the current logical drive. The logical drive can occupy space in only one array. For two arrays to be spannable, they must have the same stripe width (they must contain the same number of physical drives) and they must be consecutively numbered. If the two criteria are met, MegaRAID will allow spanning. If the two criteria are not met, the Span setting makes no difference for the current logical drive. If both criteria are met, and spanning is desired, highlight a spanning option and press <Enter>.
6	To set the logical drive size, highlight 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, thus accounting for the span setting and for partially used array space.
7	Select the Advanced menu to set the remaining options: 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. Write Policy — This option sets the caching method to writeback or write-through. Do not use write-back for any logical drive to be used as a Novell NetWare volume. Read-ahead — This option enables the SCSI read-ahead feature for the logical drive. You can set this parameter to Normal, Read-ahead, or Adaptive. Cache Policy — This parameter enables the controller cache during data transfers involving the selected logical drive. Press <Esc> to exit the Advanced Menu. When you are finished defining the current logical drive, highlight Accept and press <Enter>. Repeat the above steps to configure another logical drive. If there is array space left, the next logical drive to be configured appears. If there is no array space left, a list of the existing logical drives appears. Press any key to continue and respond to the Save prompt.
8	The MegaRAID Manager main menu appears. Choose Initialize to initialize each new logical drive you create. There are two ways to initialize drive: Batch Initialization, and Individual Initialization. After initialization is complete, press any key to continue and then press <Esc> to return to the main menu.
9	Exit MegaRAID Manager by pressing <Esc> and then choosing Yes. The OS/2 Desktop appears. Shutdown the system, and reboot.

Cont'd

Installing the MegaRAID Manager

Step	Action
1	After the system reboots and the OS/2 Desktop appears, insert the MegaRAID Universal Driver Suite CD for OS/2 in the CD-ROM drive. Click on the Command Prompts icon and then click on the OS/2 Full screen icon.
2	Copy MEGACONF.EXE from the MegaRAID Universal Driver Suite CD for OS/2 to the root directory of the boot drive. At the command prompt, type `EXIT` and press <Enter> to return to the OS/2 desktop.
3	Click on the Templates icon and create a folder for the MegaRAID Software manager. See the *OS/2 User's Guide* for instructions on creating a folder.
4	After the MegaRAID Software Manager folder is active, move it anywhere you want.

9 Installing the Solaris Driver

The MegaRAID Solaris driver supports Solaris Intel x.86 Version 7.0 and 8.0. The MegaRAID controller can act as a primary boot adapter or as a secondary adapter.

Note: See the readme file that comes with the driver for any updated information.

Modules The MegaRAID Sun Solaris drivers modules are:

File	Description
mega_bef	BEF driver. A boot driver for Solaris.
mega.conf	Solaris SCSI host bus adapter driver.
Mega	SCSA Driver configuration file
megamgr	MegaRAID host adapter configuration utility for Solaris.

Installing MegaRAID As A Primary Boot Adapter Follow the Sun Solaris SCSI RAID Host Adapter procedures to install MegaRAID as a primary boot adapter.

No Sun Support Sun does not provide third-party adapter support for Sun Solaris drivers, but the MegaRAID SCSA and BEF drivers do not have any additional constraints as long as you have patched the Sun Solaris operating system for third party adapter support.

Installing the Solaris Driver

Getting the Solaris Driver This driver is updated frequently. To make sure you have the current version of this driver, you can download the updated MegaRAID Solaris driver from the LSI Logic web site: www.lsil.com.

The instructions for Solaris 7 and Solaris 8 driver installation are on the following pages.

Solaris 7 Driver Installation

Step	Action
1	Insert the Solaris 7 CD into the CD-ROM drive.
2	Insert the Solaris 7 DCA (Device Configuration Assistant) diskette into the floppy drive.
3	Power on the computer.
4	An options screen displays. Press <F4> to select the Add Driver option.
5	The Install Supplemental Drivers screen displays. It prompts you to replace the DCA diskette with a supplemental driver diskette. Replace the DCA Boot diskette with the MegaRAID driver diskette. Press <F2> to choose the Continue option.
6	At the Select Solaris System Version screen, press the down arrow once to highlight Solaris 2.7. Press the space key to select it, then press <F2> to select the Continue option.
7	At the Continue Supplemental Driver Installation screen, replace the MegaRAID Driver Diskette with the Solaris DCA diskette. Press <F4> to choose the Done option.
8	At the Identified Device Drivers screen, verify that MegaRAID is loaded. Press <F2> to choose the Continue option.
9	The Device Configuration Assistant screen displays. Continue with normal installation.

Solaris 8 Driver Installation

Step	Action
1	Insert the Solaris 8 CD into the CD-ROM drive.
2	Power on the computer.
3	An options screen displays. Press <F4> to select the Add Driver option.
4	The Install Supplemental Drivers screen displays. It prompts you to insert a supplemental driver diskette. Insert the MegaRAID driver diskette and press <F2> to choose the Continue option.
5	At the Select Solaris System Version screen, press the down arrow once to highlight Solaris 2.8. Press the space key to select it, then press <F2> to select the Continue option.
6	At the Continue Supplemental Driver Installation screen, press <F4> to choose the Done option.
7	At the Identified Device Drivers screen, verify that MegaRAID is loaded. Press <F2> to choose the Continue option.
8	The Device Configuration Assistant screen displays. Continue with normal installation.

Mega Manager

Mega Manager is the version of the MegaRAID Configuration utility that operates under the operating system. It can be obtained from LSI Logic, for example from the LSI Logic FTP site,or by calling LSI Logic for an e-mailed copy of it. To install Mega Manager from diskette:

Make a directory for the megamgr by typing

```
mkdir mega
```

at the command prompt and pressing <Enter>. Insert the diskette with Mega Manager in the diskette drive. At the command prompt, type

```
volcheck
```

and press <Enter>. Next, type

```
cd floppy/floppy0
```

and press <Enter>. Type

```
ls
```

and press <Enter> to display the directories. The contents of the diskette are listed, including at least one subdirectory (for example: app or script) and some files. If the megamgr file is not listed here, it is in the subdirectory. Type ls again on that subdirectory to find megamgr. Type cp to copy the megamgr file to the /mega directory. For example:

```
cp app/megamgr /mega
```

and press <Enter>. After the copy is complete, change to the megamgr directory by typing

```
cd /mega
```

and pressing <Enter>. Type

```
eject
```

and press <Enter> to unload the diskette volume.

Running Mega Manager Finally, to run Mega Manager, type

```
./megamgr /devices/pci@0,0
```

and press <Enter>.

10 Installing the Linux Driver

Linux-RedHat 6.2 Installation Procedure

Getting the Linux RedHat Driver This driver is updated frequently. To make sure you have the current version of this driver, you can download the updated MegaRAID Linux driver from the LSI Logic web site: www.lsil.com.

Installing Linux-RedHat 6.2 Use the following procedure to install Linux-RedHat 6.2 for MegaRAID controllers that support 40 logical drives. For other installation instructions, see the readme files that accompany the driver on the CD.

Note: This installation is only for controllers that support 40 logical drives. For other controllers, you do not have to perform this installation procedure.

Step	Action
1	Boot to CD-ROM with Disk 1.
2	Type `Expert` At the boot prompt on the Welcome screen. Press <Enter>.
3	Copy the driver image for Linux from the Universal Driver Suite CD to diskette.
4	Insert the diskette with driver image.
5	Select English as the default language. Click on OK.
6	Select US as the type of system keyboard. Click on OK.
7	Select Local CD-ROM as the type of media that contains the packages to be installed. Click on OK.
8	Select Add Device to add SCSI devices. Click on OK>
9	Select SCSI. Click on OK.
10	Scroll down to select LSI Logic MegaRAID Adapter Driver. This will locate and load the driver for your SCSI device. Click on OK.
11	The Mouse Configuration screen displays. Select the type of system mouse that you use. Click on OK.
12	The GUI Welcome screen displays. Click on Next.
13	The Install Options screen displays. Select Custom. Click on Next.
14	Initialize drives.
15	At the Partitions screen, select Add to make partitions.
16	Type a forward slash (/) for the mount point.
17	Tab down to Size (MB) and type the size of the array that you want to use. Press <Enter>. **Note:** Make sure that you enter a number larger than 1515 Mb or it will not allow you to install. Notice that the highlighted Partition Type is Linux Native. This means that you are choosing the hard disk space.
18	The Partitions screen displays. Select Add to make another partition.
19	Select Linus Swap as the Partition Type.
20	Tab down to size (Mb). Type `125` and click on OK.
21	At the next screen, click on OK.

Step	Action
22	The LILO Configuration screen displays. Deselect Create boot disk. Click on OK. This is a user preference option; it is not necessary to make a boot disk for the installation to continue.
23	The Time Zone Select screen displays. Select the time zone that your system is in. Click on OK.
24	The Account Configuration screen displays. Select and type a root password, then confirm. Click on Next.  **Note:** Be sure to remember the password so you can log in after installation is completed.
25	The Authentication Configuration screen displays. Click on Next.
26	The Select Package Group screen displays. Scroll down and select Everything. Click on Next.
27	The X-Configuration screen displays. Select the appropriate monitor and video card. Click on Next.
28	Click on Next to begin installation of Linux 6.2.
29	Click Exit to complete installation.
30	The system will now reboot.

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