USER'S GUIDE

ServeRAID-MR Device Driver Installation

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Preface

This manual is the primary reference for the operating system drivers provided with the ServeRAID devices. It describes the drivers for all supported operating systems and explains how to install them.

Audience

This document is intended for people installing an operating system driver for a ServeRAID-MR SAS/SATA Controller.

Organization

This document has the following chapters:

- Chapter 1, **Overview**, describes the ServeRAID-MR controller and lists the operating systems for which drivers are provided.
- Chapter 2, **Windows Driver Installation**, provides installation instructions for the following Microsoft® Windows® operating systems: Windows 2000, Windows Server 2003, and Windows 2008.
- Chapter 3, **Red Hat Enterprise Linux 4 and 5 Driver Installation**, provides installation instructions for the Red Hat® Linux™ operating system.
- Chapter 4, **SUSE Linux Enterprise Server 9 and 10 Driver Installation**, provides installation instructions for the SLES Linux operating system.
- Chapter 5, **Novell NetWare 6.5 Driver Installation**, provides installation instructions for the Novell® NetWare® 6.5 operating system.
- Chapter 6, **SCO OpenServer 6 and SCO UnixWare 7 Driver Installation**, provides installation instructions for the SCO®

OpenServer™ 6.0.0 operating system and the SCO UnixWare® 7.1.4 operating system.

- Appendix A, **Notices**, contains information about the warranty, patents, license inquiries, and trademarks.

ServeRAID-MR System Installation Sequences and Document Organization

The following table outlines the installation, configuration, and management sequences for a RAID system. Each sequence consists of a series of steps and operations that the reference manual explains. Perform the sequences in the order listed when you install and configure your system.

Sequence	Task	Reference Manual
1	Understand RAID system theory and operation.	*ServeRAID-MR Software User's Guide*
2	Install the ServeRAID-MR SAS/SATA Controller and the related hardware.	The *User's Guide* for your ServeRAID-MR controller
3	Configure the physical arrays and logical devices using either the MegaRAID Configuration Utility (CU) or the WebBIOS CU.	*ServeRAID-MR Software User's Guide*
4	Install the device drivers for the operating system.	*ServeRAID Device Driver Installation User's Guide*
5	Use the MegaRAID Storage Manager tool to configure, monitor, and maintain storage configurations on the ServeRAID-MR SAS/SATA Controller. The MegaRAID Storage Manager graphical user interface (GUI) makes it easy for you to create and manage storage configurations. This tool runs under an operating system and can manage RAID arrays while the system is operating.	*ServeRAID-MR Software User's Guide*

Related Publications

ServeRAID-MR Software User's Guide

IBM Document Number: 46M1381

This document explains how to use the MegaRAID Storage Manager, WebBIOS, and Command Line Interface (CLI) utilities to configure,

monitor, and maintain your ServerRAID-MR controller and the storage-related devices connected to them.

ServeRAID-MR10i User's Guide

IBM Document Number: 46W1377

This document explains how to install your ServeRAID-MR10i RAID controller in the host system. In addition, it provides the electrical and physical specifications, jumper definitions, and connector locations for the controller, and describes the intelligent Battery Backup Unit (iBBU).

ServeRAID-MR10il SAS/SATA Controller User's Guide

IBM Document Number: 43W7870

This document explains how to install your ServeRAID-MR10il RAID controller in the host system. In addition, it provides the electrical and physical specifications, jumper definitions, and connector locations for the controller, and describes the intelligent Battery Backup Unit (iBBU).

ServeRAID-MR10is VAULT SAS/SATA Controller User's Guide

IBM Document Number: 46M1378

This document explains how to install your ServeRAID-MR10is RAID controller in the host system. In addition, it provides the electrical and physical specifications, jumper definitions, and connector locations for the controller, and describes the intelligent Battery Backup Unit (iBBU).

ServeRAID-MR10k SAS/SATA Controller User's Guide

IBM Document Number: 46M1379

This document explains how to install your ServeRAID-MR10k RAID controller in the host system. The ServeRAID-MR10k SAS/SATA Controller offers a flexible RAID-on-motherboard (ROMB), direct-attached storage (DAS) solution based on the LSI1078ROC (RAID-on-Chip).

ServeRAID-MR10M SAS/SATA Controller User's Guide

IBM Document Number: 46M1380

This document explains how to install your ServeRAID-MR10M RAID controller in the host system. In addition, it provides the electrical and physical specifications, jumper definitions, and connector locations for the controller, and describes the intelligent Battery Backup Unit (iBBU).

IBM Systems Safety Notices

IBM Document Number: G229-9054-01

This book contains safety notices from IBM Systems documentation. The safety notices include danger and caution notices.

Notices and Statements in This Document

The caution and danger statements in this document are also in the multilingual IBM Systems Safety Notices document, which is on the ServeRAID-MR Support CD. Each statement is followed by a reference number that you can use to locate the corresponding statement in your language in the IBM Systems Safety Notices document. The following notices and statements are used in this document:

Note: These notices provide important tips, guidance, or advice.

Important: These notices provide information or advice that might help you avoid inconvenient or problem situations.

Attention: These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.

Caution: These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.

DANGER: These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Revision History

IBM Document Number	Version/Date	Remarks
46M1382	Fourth Edition February 2009	Updated the information about the operating systems (OSes) and added the SCO OpenServer 6 OS and the SCO UnixWare 7 OS.
43W7844	Third Edition July 2008	Updated the information about the operating systems and added the Novell NetWare 6.5 OS.
43W7844	Second Edition April 2008	Added the Windows Server 2008 OS to the list of Microsoft Windows operating systems.
43W7844	First Edition November 2007	Initial release of document.

IBM Customer Support

Web site:

http://www.ibm.com/systems/support/

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Chapter 1
Overview

This chapter provides an overview of the operating system drivers provided with the ServeRAID-MR SAS/SATA Controllers. It describes the drivers for all of the supported operating systems and explains how to install them. This chapter consists of the following sections:

Subsequent chapters in this manual provide detailed installation instructions for the operating systems. Use the latest updates provided by the operating system manufacturer and review the `readme` file that accompanies the driver for any updated information.

1.1 Operating System Driver Description

You can install the ServeRAID-MR SAS/SATA Controller in IBM AT-compatible computers that support ServeRAID controllers. The RAID controller can run under various operating systems.

To use the controller with these operating systems, you must have software drivers installed. Some newer operating systems or updates have native drivers. IBM also provides software drivers for the following operating systems:

- Microsoft® Windows® 2000, Server 2003 (x86), Server 2003 (x64), Server 2008
- Red Hat® Enterprise Linux™ versions 4 and 5
- SUSE® Linux Enterprise Server versions 9 and 10
- Novell® NetWare® 6.5
- SCO® OpenServer™ 6.0.0 and SCO UnixWare® 7.1.4

Note: VMWare ESX Server is also supported, but the drivers are provided only natively in that operating system.

1.1.1 Driver Functions

IBM provides drivers for your ServeRAID-MR SAS/SATA Controllers. The controllers bring 6.0 Gbit/s Serial Attached SCSI and 3.0 Gbit/s SATA II performance to host adapter and server designs. The controllers support internal and external storage devices, which allows you to use a system that supports enterprise-class SAS and desktop-class SATA II drives.

The ServeRAID-MR controllers integrate eight high-performance SAS/SATA II PHYs and a PCI Express bus master DMA core. Each of the eight PHYs is capable of 3.0 Gbit/s SAS link rates, and 3.0 Gbit/s SATA II link rates.

The RAID controller supports the SAS protocol as described in the *Serial Attached SCSI Standard, version 1.1*. The controller also supports the Serial ATA II (SATA II) protocol defined by the *Serial ATA specification, version 1.0a*. SATA II is an extension to SATA 1.0a.

The drivers do the following:

- Support the PCI Express protocol
- Support multiple SAS/SATA controllers
- Provide the ability to see newly configured virtual disks in the configuration software utility without rebooting the system
- Allow random deletion of virtual disks created using the MegaRAID Storage Manager (see the *ServeRAID-MR Software User's Guide* for more information)
- Support use of the remaining array capacity by MegaRAID Storage Manager

1.1.2 Device Driver Updates

There might be a feature added to your driver that is not included in the most recent manual publication. If you have a question about a feature, consult the `readme` file that accompanies the driver, or contact your ServeRAID-MR support representative. Be sure to use the latest Service Packs provided by the operating system manufacturer.

You can download the latest drivers at http://www.ibm.com/support/. For updates, click **Downloads and drivers** on this page.

1.2 Device Driver Filenames

Table 1.1 lists the device driver files for your ServeRAID-MR controller. The driver files are available on the *ServeRAID-MR Support* CD that accompanied your ServeRAID-MR controller. Device driver updates are made available periodically. To ensure that you have the current version of this driver, download the latest drivers at http://www.ibm.com/support/. See the `readme` file that accompanies the driver for any updated information.

To make the driver diskette, download the driver files from http://www.ibm.com/support/ and extract them to an empty floppy diskette. Label the diskette as the ServeRAID-MR driver diskette for the given operating system.

Table 1.1 ServeRAID Device Driver Files

Operating System	SCSI Driver Filenames	Installation Reference
Windows 2000	`megasas.cat`, `megasas.sys`, `NODEV.INF`, `OEMSETUP.INF`, `TXTSETUP.OEM`	Chapter 2
Windows Server 2003	`msas2k3.cat`, `msas2k3.sys`, `NODEV.INF`, `OEMSETUP.INF`, `TXTSETUP.OEM`	
Windows Server 2003 (x64)	`msas2k3.cat`, `msas2k3.sys`, `NODEV.INF`, `OEMSETUP.INF`, `TXTSETUP.OEM`	
Windows Server 2008	`megasas.cat`, `megasas.sys`, `NODEV.INF`, `OEMSETUP.INF`, `TXTSETUP.OEM`	
Red Hat Enterprise Linux 4	`megaraid_sas.ko`	Chapter 3
Red Hat Enterprise Linux 5	`megaraid_sas.ko`	
SUSE Linux Enterprise Server 9	`megaraid_sas.ko`	Chapter 4

Table 1.1 ServeRAID Device Driver Files (Cont.)

Operating System	SCSI Driver Filenames	Installation Reference
SUSE Linux Enterprise Server 10	`megaraid_sas.ko`	
Novell NetWare 6.5	`mega_sas.ham`, `mega_sas.ddi`	Chapter 5
SCO OpenServer 6.0.0 SCO UnixWare 7.1.4	`driver.o`	Chapter 6

Chapter 2
Windows Driver Installation

This chapter describes the installation of device drivers for the following Microsoft® Windows® operating systems:

- Microsoft Windows 2000
- Windows Server 2003 (x86)
- Windows Server 2003 (x64)
- Windows Server 2008

This chapter consists of the following sections:

2.1 Installing the Windows System Driver in a New Windows System

Perform the following steps to install the ServeRAID-MR device driver in a new Windows operating system. The Windows operating system automatically adds the driver to the registry and copies the driver to the appropriate directory.

Step 1. Start the Windows installation by booting from the appropriate Windows CD-ROM.

The system BIOS must support booting from a CD-ROM. BIOS settings might require changes to allow CD-ROM booting. See your system documentation.

Step 2. Press F6 when the following displays at the bottom of the screen:

```
"Press F6 if you need..."
```

Note: For the system to recognize the new driver for Windows Server 2003, you must press F6.

Step 3. Select “S” to specify an additional device when the screen displays:

```
"Setup could not determine the type of one or more
mass storage devices..."
```

The system prompts for the manufacturer-supplied hardware support disk.

Note: If the screen does not display this message after you press F6, then the setup program did not recognize the F6 command. Reboot the system and return to step 2.

Step 4. Insert the driver diskette containing the Windows device driver and press ENTER.

Step 5. Select the appropriate ServeRAID-MR controller from the menu by using the arrow key to highlight it, and then press ENTER to proceed.

Step 6. Press ENTER again to proceed.

Step 7. Return to the Windows Setup screen.

Windows displays a “Welcome to Setup” window.

Step 8. Press ENTER to continue.

Step 9. Press C to continue the Microsoft Windows installation procedure.

Step 10. Follow the Windows installation procedure.

Step 11. Repeat this process for all the controllers on your system.

2.2 Installing or Updating the ServeRAID-MR Driver in an Existing Windows System

Perform the following steps to install or update the ServeRAID-MR device driver in an existing Windows system:

Step 1. Boot the Windows operating system.

The Found New Hardware Wizard starts.

Step 2. Click the Next button and insert the driver diskette into the A:\ drive.

Step 3. Click the Search for a Suitable Driver... button, and click Next.

Step 4. Click the Next button.

In some cases, a message displays saying that this driver is not digitally signed. This message informs you that a nonsigned driver is being installed. If this message displays, click Continue Anyway.

Step 5. Select Floppy only, and then click the Next button in the Driver Files Search Results window.

Step 6. Click the Finish button to complete the driver installation, and then repeat this process for all the adapters on your system.

Chapter 3
Red Hat Enterprise Linux 4 and 5 Driver Installation

This chapter describes the installation of the device driver in new Red Hat® Enterprise Linux™ 4 and 5 systems, and the update to the Red Hat Enterprise Linux driver on an existing Red Hat Enterprise Linux system. It consists of the following sections:

- Section 3.1, “Installing the Driver in a New Red Hat Enterprise Linux System”
- Section 3.2, “Adding the Red Hat Enterprise Linux 4 or 5 Driver to an Existing Installation”

Refer to the release notes that accompanied the driver for information on an existing Red Hat Enterprise Linux system.

3.1 Installing the Driver in a New Red Hat Enterprise Linux System

You can install the driver in a new Red Hat Enterprise Linux 5 system from the Red Hat Enterprise Linux installation CD. In addition, you can install the driver in a new Red Hat Enterprise Linux 4 or 5 system from a driver update diskette.

3.1.1 Installing from CD

To install the MegaSAS device driver in a new Red Hat Linux 5 system from the Red Hat Enterprise Linux installation CD, perform the following steps:

Step 1. Insert the Red Hat Enterprise Linux installation CD in the CD drive.

Step 2. Follow the installation procedure for Red Hat Enterprise Linux 5.

3.1.2 Installing from a Driver Update Diskette

To install the device driver in a new Red Hat Enterprise Linux 4 or 5 system from a driver update diskette, create the diskette using the Linux driver image on the Red Hat Enterprise Linux installation CD. Perform the following steps:

Step 1. Boot to CD-ROM with Disk 1.

Step 2. Type:

`linux dd`

Step 3. Insert the driver diskette.

The utility locates and loads the driver for your device.

Step 4. Press ALT+CTRL+F4 to verify the driver is loaded.

Step 5. Follow the Red Hat Enterprise Linux installation procedure to complete the installation.

3.2 Adding the Red Hat Enterprise Linux 4 or 5 Driver to an Existing Installation

Perform the following procedure to add the Red Hat Enterprise Linux 4 or 5 driver to an existing installation:

Step 1. Turn on the power to the system.

The system will initialize hardware. The system then detects the controller and invokes Kudzu, the Red Hat Enterprise Linux hardware configuration utility.

The following RAID controller is added to your system:

`LSI Logic / Symbios Logic MegaSAS`

Step 2. Select the option `Configure the device`.

Step 3. Highlight the Configure tab, and press ENTER.

The system configures the controller and installs the appropriate driver in the kernel.

Step 4. The system boots and displays the devices connected or configured on the controller.

Chapter 4
SUSE Linux Enterprise Server 9 and 10 Driver Installation

This chapter describes how to install the SUSE Linux Enterprise Server 9 or 10 driver in RAID-configured drives. It consists of the following sections:

4.1 Installing the Driver in a New SUSE Linux Enterprise Server System

You can install the ServeRAID device driver in a new SUSE Linux Enterprise Server 10 system from the SUSE Linux Enterprise Server CD. In addition, you can install the device driver in a new SUSE Linux Enterprise Server 9 or 10 system from a floppy diskette.

4.1.1 Installing from CD

Perform the following steps to install the driver in a new SUSE Linux Enterprise Server 10 system from the SUSE Linux Enterprise Server installation CD:

Step 1. Boot the server with the SUSE Linux Enterprise Server SP CD-ROM Disk 1.

The system BIOS must support booting from a CD-ROM. BIOS settings might require changes to allow CD-ROM booting. See your system documentation.

Step 2. At the installation message, press ENTER. The driver is then installed from the CD.

4.1.2 Installing from a Driver Update Diskette

To install the driver in a new SUSE Linux Enterprise Server 9 or 10 system from a driver update diskette, perform the following steps:

Step 1. Boot the server with the SUSE Linux Enterprise Server SP CD-ROM Disk 1.

The system BIOS must support booting from a CD-ROM. BIOS settings might require changes to allow CD-ROM booting. See your system documentation.

Step 2. At the installation message, do one of the following:

a. Press F6 for SUSE Linux Enterprise Server 9.

b. Press F5 for SUSE Linux Enterprise Server 10.

Step 3. Select `Installation` and press ENTER.

The driver is then installed from the CD.

Note: Follow screen instructions to switch between operating system CDs and operating system CD service packs.

Step 4. Put the driver update diskette in the drive bay and install normally.

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

Step 5. Press ALT+CTRL+F4 to see whether the driver is loaded.

4.2 Updating the SUSE Linux Enterprise Server 9 or 10 Driver

The CD contains a KPM package with RPM (package manager) files used to update the SUSE Linux Enterprise Server Linux 9 or 10 driver. (You do not need Dynamic Kernel Module Support (DKMS) to update the driver.) Each KPM has binary RPMs for each flavor. Perform the following procedure to update the driver:

Step 1. Run RPM (program manager).

Step 2. Follow the update instructions on the screen to update the driver.

Chapter 5
Novell NetWare 6.5
Driver Installation

This chapter provides installation instructions for the Novell® NetWare® 6.5 driver and consists of the following sections:

- Section 5.1, “Novell NetWare 6.5 Driver Files”
- Section 5.2, “Installing the NetWare 6.5 Driver in a New NetWare System”
- Section 5.3, “Installing or Updating the NetWare 6.5 Driver in an Existing NetWare System”

5.1 Novell NetWare 6.5 Driver Files

The Novell NetWare driver and utilities support virtual disks configured on the ServeRAID controller. This driver supports up to 12 ServeRAID controllers.

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

Table 5.1 describes the Novell NetWare driver files.

Table 5.1 Novell NetWare Driver Files

Filename	Description
`mega_sas.ham`	This file is the ServeRAID host adapter module (HAM). This driver supports the NPA Diagnostics option by using the NWDIAG flag, which is specified on the command line when the driver loads. The driver is a re-entrant module. It registers one adapter when you issue the Novell NetWare `LOAD` command to load the driver.
`mega_sas.ddi`	This file is the device driver installation file. It is needed to install the ServeRAID HAM driver.

All utilities and ASPI drivers expect the MegaRAID driver to pass the requests to the adapter.

5.2 Installing the NetWare 6.5 Driver in a New NetWare System

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

Step 1. Boot from Novell NetWare.

Step 2. Follow the instructions on the screen until you reach the Device Driver screen, which is used to modify drivers.

Step 3. Select Modify, and press ENTER.

Step 4. Select Storage Adapters on the Storage Driver Support screen, and press ENTER.

Step 5. Delete any existing MegaRAID adapter listings.

Step 6. Press INSERT to add unlisted drivers.

Step 7. Press INSERT again.

A path displays.

Step 8. Press F3.

Step 9. Insert the driver diskette into the floppy drive, and press ENTER.

The system finds the `.HAM` driver.

Step 10. Press TAB.

Step 11. Select the Driver Summary screen, and press ENTER.

Step 12. Continue the Novell NetWare installation procedure.

5.3 Installing or Updating the NetWare 6.5 Driver in an Existing NetWare System

Perform the following steps to add the Novell NetWare driver to an existing installation:

Step 1. Type at the root prompt:

nwconfig

and press ENTER.

The Configuration Options screen displays.

Step 2. Select Drive Options, and press ENTER.

A window displays.

Step 3. Select Configure Disk and Storage Device Options, and press ENTER.

Step 4. Select one of the following options displayed in the window:

- Discover and Load an Additional Driver

  If you select Discover and Load an Additional Driver, the system discovers the extra unit. The system prompts you to select a driver from the list. Press INSERT to insert the driver. This completes the procedure.

- Select an Additional Driver

  If you select Select an Additional Driver, the Select a Driver screen displays. Press INSERT. Follow the instructions that appear.

  Insert a floppy diskette into the floppy drive, and press ENTER.

  The system finds the driver and installs it.

Chapter 6
SCO OpenServer 6 and SCO UnixWare 7 Driver Installation

This chapter describes the installation of the SCO® OpenServer™ 6.0.0 driver and the SCO UnixWare® 7.1.4 driver, and consists of the following sections:

6.1 Installing the Driver in a New SCO OpenServer 6 or SCO UnixWare 7 System

When you install the SCO OpenServer 6 operating system or the SCO UnixWare 7 operating system, insert the megasas Driver Supplement media before you insert any HBA drivers supplied with your media kit.

Use the following steps on a SCO OpenServer 6 system or a SCO UnixWare 7 system to create an HBA driver diskette from the HBA diskette image file.

Step 1. Go to the root directory, and create a new directory by typing the following command:

```
$ su
```

Password: <*type your root password*>

```
# mkdir /tmp/hba
# cd /tmp/hba
```

Step 2. Download the `hba.megasas.1.0.image` file to the newly created `/tmp/hba` directory on your system.

Step 3. Make a megasas HBA diskette from the image file by typing the following command:

```
# dd if=hba.megasas.1.0.image of=/dev/dsk/f0t
obs=36b
```

Step 4. Use the megasas HBA diskette during system installation.

Use the following steps on a SCO OpenServer 6 system or a SCO UnixWare 7 system to create an HBA CD from the HBA ISO image file.

Step 1. Go to the root directory and create a new directory by typing the following command:

```
$ su
```

Password: <*type your root password*>

```
# mkdir /tmp/hba
```

```
# cd /tmp/hba
```

Step 2. Download the `hba.megasas.1.0.iso` file to the newly created `/tmp/hba` directory on your machine.

Step 3. Make a megasas HBA CD from the ISO file by using this command:

```
# cdrecord -v -dev=c,b,t -dao -driveropts=burnfree -
speed=99 hba.megasas.1.0.iso
```

where c,b,t is taken from the output of `cdrecord --scanbus`.

Step 4. Use the megasas HBA CD during system installation.

6.2 Upgrading the Driver on an Existing SCO OpenServer 6 or SCO UnixWare 7 System

The following procedure updates the megasas device driver in an existing SCO OpenServer or SCO UnixWare system. You can use the megasas HBA diskette to upgrade the megasas driver on your system by using the following step.

Step 1. Insert the HBA driver diskette, and type the following command:

```
# pkgadd -d diskette1 all
```

or

```
# pkgadd -d diskette1 megasas
```

You can use the megasas HBA CD to upgrade the megasas driver on your system using the following step.

Step 1. Insert the HBA driver CD, and type the following command:

```
# pkgadd -d cdrom1 all
```

or

```
# pkgadd -d cdrom1 megasas
```

Appendix A Notices

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