Gadaptec®

INSTALLATION AND USER'S GUIDE

ADAPTEC SERIAL ATA II RAID 1420SA

Adaptec Customer Support

If you have questions about installing or using your Adaptec product, check this document first—you will find answers to most of your questions here. If you need further assistance, use the support options listed below.

Technical Support Identification (TSID) Number

■ Before contacting Technical Support, you need your unique 12-digit TSID number. The TSID number identifies your product and support status.

■ The TSID number is included on a white, bar-coded label, like the example below..

THIS TSID NUMBER WILL BE REQUIRED WHEN CONTACTING TECHNICAL SUPPORT.	TSID: **PTNNNNNNYYWW**
	(1P) PRODUCT P/N: PPPPPPPPPPPPPPPP
	‖‖‖‖‖‖ ‖‖‖ ‖‖‖ ‖‖‖ ‖‖‖ ‖‖‖ ‖‖‖
	(S) PRODUCT S/N: XXXXXXXXXXXXX
	‖‖‖‖‖ ‖‖‖ ‖‖ ‖‖‖‖‖ ‖‖‖ ‖‖‖ ‖‖‖ ‖‖

■ Affix a copy of the TSID label to the CD jacket so that you don't lose it.

Support Options

■ Search the Adaptec Support Knowledgebase (ASK) at ask.adaptec.com for articles, troubleshooting tips, and frequently asked questions for your product.

■ For support via Email, submit your question to Adaptec's Technical Support Specialists at ask.adaptec.com.

North America

■ Visit our Web site at www.adaptec.com.

■ For information about Adaptec's support options, call +1 408-957-2550, 24 hours per day, 7 days per week. To speak with a Technical Support Specialist,

   ■ For **Hardware** products call +1 408-934-7274, Monday to Friday, 3:00 A.M. to 5:00 P.M., Pacific Time.

   ■ For **RAID and Fibre Channel** products call +1 321-207-2000 , Monday to Friday, 3:00 A.M. to 5:00 P.M., Pacific Time.

To expedite your service, have your computer in front of you.

■ To order Adaptec products, including accessories and cables, call +1 408-957-7274. Or, you can order cables online at www.adaptec.com/buy-cables.

Europe

- Visit our Web site at www.adaptec-europe.com.
- **German:** To speak with a Technical Support Specialist, call +49 89 43 66 55 22, Monday to Friday, 9:00 to 17:00, CET. For support via e-mail, submit your question to Adaptec's Technical Support Specialists at ask-de.adaptec.com.
- **French:** To speak with a Technical Support Specialist, call +49 89 43 66 55 33, Monday to Friday, 9:00 to 17:00, CET. For support via e-mail, submit your question to Adaptec's Technical Support Specialists at ask-fr.adaptec.com.
- **English:** To speak with a Technical Support Specialist, call +49 89 43 66 55 44, Monday to Friday, 9:00 to 17:00, GMT. For support via e-mail, submit your question to Adaptec's Technical Support Specialists at ask.adaptec.com.
- You can order Adaptec cables online at www.adaptec.com/buy-cables.

Japan

- Visit our Web site at www.adaptec.co.jp.
- To speak with a Technical Support Specialist, call +81 3 5308 6120 Monday–Friday, 9:00 A.M. to 12:00 P.M and 1:00 P.M. to 6:00 P.M.

Regulatory Compliance Statements

Federal Communications Commission Radio Frequency Interference Statement

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. However, if this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

■ Reorient or relocate the receiving antenna.
■ Increase the separation between equipment and receiver.
■ Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
■ Consult the dealer or an experienced radio/television technician for help.
■ Use a shielded and properly grounded I/O cable and power cable to ensure compliance of this unit to the specified limits of the rules.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

Adaptec, Inc.	AAR-1420SA
FC Tested to Comply With FCC Standards	
FOR HOME OR OFFICE USE	

CE European Union Compliance Statement

This Information Technology Equipment has been tested and found to comply with EMC Directive 89/336/EEC, as amended by 92/31/EEC and 93/68/EEC, in accordance with:

■ EN55022 (1998) Emissions

■ EN55024 (1998) Immunity:
   – EN61000-4-2 (1998) Electrostatic discharge: ±4 kV contact, ±8 kV air
   – EN61000-4-3 (1998) Radiated immunity
   – EN61000-4-4 (1995) Electrical fast transients/burst: ±1 kV AC, ±0.5 kV I/O
   – EN61000-4-5 (1995) Surges ±1 kV differential mode, ±2 kV common mode
   – EN61000-4-6 (1996) Conducted immunity: 3 V
   – EN61000-4-11 (1994) Supply dips and variation: 30% and 100%

In addition, all equipment requiring U.L. listing has been found to comply with EMC Directive 73/23/EEC as amended by 93/68/EEC in accordance with EN60950 with amendments A1, A2, A3, A4, A11.

Australian/New Zealand Compliance Statement

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to the Australian/New Zealand standard AS/NZS 3548 set out by the Spectrum Management Agency.

Canadian Compliance Statement

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Japanese Compliance (Voluntary Control Council Initiative)

This equipment complies to class B Information Technology equipment based on VCCI (Voluntary Control Council for Interface). This equipment is designed for home use but it may causes radio frequency interference problem if used too near to a television or radio. Please handle it correctly per this documentation.

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1

Introduction

In this Chapter...

Overview

The Adaptec Serial ATA II RAID 1420SA is a four-port controller that provides high-performance storage connectivity and data protection for your computer. This controller features Adaptec HostRAID®, an integrated RAID technology that adds entry level RAID support. With HostRAID, you can add reliable performance and full data protection. For a description of features for your controller, see *Controller Features* on page 1-3.

Kit Contents

Your Adaptec controller kit includes:

■ Adaptec Serial ATA II RAID 1420SA controller

■ Installation CD

■ Low-profile bracket and full-size bracket (attached to controller)

■ Four Serial ATA interface cables

■ *Adaptec Serial ATA II RAID 1420SA Quick Install Guide (*printed*)*

■ *Adaptec Serial ATA II RAID 1420SA Installation and User's Guide (*this guide*)*

Operating System Compatibility

The following operating systems are supported:

■ Microsoft® Windows®
   – Windows 2000—Advanced Server
   – Windows 2003 Server—Enterprise
   – Windows XP Professional

■ Red Hat Linux
   – Advanced Server 2.1 x86, 32-bit
   – Enterprise Server 3.0 x86, 32-bit, and QU4 x86-AMD 64 bit
   – Enterprise Server 3.0, Athlon processor

■ SuSE Linux
   – Professional 9.1 x86, 32-bit and 64-bit
   – Enterprise Server 9.0 x86, 32-bit and 64-bit
   – United Linux 1.0, 32-bit

■ Novell NetWare 6.5

Hardware Requirements

The following list summarizes the hardware requirements:

■ Intel Pentium, or equivalent, processor

■ A motherboard that meets the following compatibility requirements:

– Complies with the *PCI Local Bus Specification,* Revision 2.2 and higher.

– Supports multifunction devices where one of the devices is a PCI bridge.

– Provides large memory-mapped address ranges.

■ At least 128 MB of RAM

■ An available 32- or 64-bit PCI or PCI-X slot

■ 20 MB of free drive space

■ 16-bit SVGA color monitor with a resolution of at least 800 x 600

■ CD drive (that is *not* part of the RAID you are installing)

Controller Features

Features Overview

The Adaptec Serial ATA II RAID 1420SA controller supports:

■ RAID levels 0, and 1 using Adaptec's HostRAID technology.

■ Supports *PCI Local Bus Specification*, Revision 2.2.

■ 64-bit, 66-133 MHz PCI-X interface compatible with 64-bit PCI slots.

■ RAID creation using Adaptec RAID Configuration (ARC).

■ Easy array configuration and status using Adaptec Storage Manager™.

Install Adaptec Storage Manager as described in Chapter 4, *Installing and Starting Adaptec Storage Manager*.

■ Flash ROM for easy updates of controller BIOS.

■ Hot swap rebuild of fault tolerant arrays through the operating system.

- Event logging and broadcasting, including messaging for alphanumeric pagers.

- Global hotspare protecting every array that the drive has enough available capacity to protect.

Features Summary

The following tables summarizes the features of the Adaptec Serial ATA II 1420SA controller.

	Adaptec 1420SA
Form factor	Low-profile
PCI compatibility	PCI/PCI-X
PCI bus width (max)	64-bit
PCI bus speed (max)	133 MHz
Cache, standard	64 MB
Ports	4
Drives per port	1
Total drives	4
Connectors, internal	4
Cables supplied	4
RAID levels	0, 1
Simple volume	Yes
Hotspares	Yes

About the Documentation

Documentation for your Adaptec RAID controller includes:

- **Quick Installation Guide** (printed)
- **Readme file**—Text file located in the root folder of the Installation CD. Contains technical information about device compatibility, operating system support, and drivers.
- **Installation and User's Guide**—PDF file on the Installation CD. Contains detailed procedures for installing the controller and software, and creating, configuring, and managing arrays.
- **Online Help**—Adaptec Storage Manager provides Help for creating and managing RAIDs, including embedded displays.

To view the PDF documents, you need Acrobat Reader or Viewer installed on your computer. Acrobat Reader is available from Adobe as a free download. For details, visit www.adobe.com.

Using the Installation CD

The installation CD contains software, drivers, and documentation. You can use the CD the following ways:

- *Booting from the CD with No Operating System*
- *Using the CD Autorun in Windows*

Booting from the CD with No Operating System

The installation CD is bootable. You can use it to start a computer that has no operating system and configure an array (provided your computer is set up to recognize bootable CDs).

> **Note:** Verify that your computer supports bootable CDs by entering system Setup and checking the settings.

Insert the installation CD into a computer with no operating system to boot from the CD, and follow the options.

Using the CD Autorun in Windows

To use the Autorun executable, autorun.exe, start Windows and insert the Adaptec installation CD. Your computer automatically reads the CD if it is set up to do so.

> **Note:** If your computer *does not* automatically read the CD, you can prompt it to read the CD by clicking on autorun.exe from the root directory.

Software Tools Overview

The Adaptec Serial ATA RAID 1420SA controller includes the following software tools to manage your storage subsystem:

■ **Adaptec Storage Manager**—A storage management application that provides you with an easy-to-use graphical interface to manage your storage subsystem. For details, see Chapters 4 and 5.

■ **Adaptec RAID Configuration (ARC) Utility**—Part of the controller's built-in BIOS code that contains the following components:

– **Array Configuration Utility (ACU)**—Used to create, configure, and manage arrays.

– **SATA***Select*—Used to verify the hardware configuration of the controller and drives.

– **Disk Utilities**—Used to format and verify drives.

For details, see Chapter 6, *Adaptec RAID Configuration Utility*.

Safety Information

To ensure your personal safety, as well as the safety of you equipment:

■ Keep your work area and the computer clean and clear of debris.

■ Before opening the system cabinet, unplug the power cord.

■ Observe the safety information of the host system/disk cabinet.

Electrostatic Discharge

Electrostatic Discharge (ESD) is a natural by-product of human activity. ESD is produced by materials that accumulate and retain electrical charges which are transferred to people or other objects upon contact.

⚠️ **Caution:** ESD can damage electronic components when they are improperly handled and can result in total or intermittent failures. Always follow ESD-prevention procedures when removing and replacing components.

To prevent ESD damage:

■ Use an ESD wrist or ankle strap and ensure that it makes skin contact. Connect the equipment end of the strap to an unpainted metal surface on the chassis. If a wrist strap is not available, ground yourself by touching the metal chassis before handling the controller or any other part of the computer.

■ Avoid touching the controller against your clothing. The wrist strap protects components from ESD voltages present on the body only. ESD voltages on clothing can still cause damage.

■ Handle your controller by its bracket or edges only. Avoid touching the printed circuit board or the connectors.

■ When you need to put your controller down, use an antistatic surface such as the bag supplied in your kit.

If you plan to return the controller to Adaptec, put it back in its antistatic bag immediately.

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Installing the Controller

In this Chapter...

Overview

To install the controller and drives, all you need is one or two of the following:

■ Serial ATA hard disk drives

■ Serial ATA cables (supplied in this kit)

Configuration of Serial ATA devices is simple for the following reasons:

■ There are no jumpers or switches to set on the controller or disk drives.

■ The cable ends are identical, so you don't need to worry about which end to attach to the controller and which end to attach to the drive.

■ The interface cable connectors, controller connectors, and disk drive connectors are all keyed so that you can insert them in only one direction.

The Adaptec Controller

The following is a illustration of the Adaptec Serial ATA II RAID 1420SA controller. Note the position of the Serial ATA interface connectors necessary for attaching the Serial ATA disk drives.
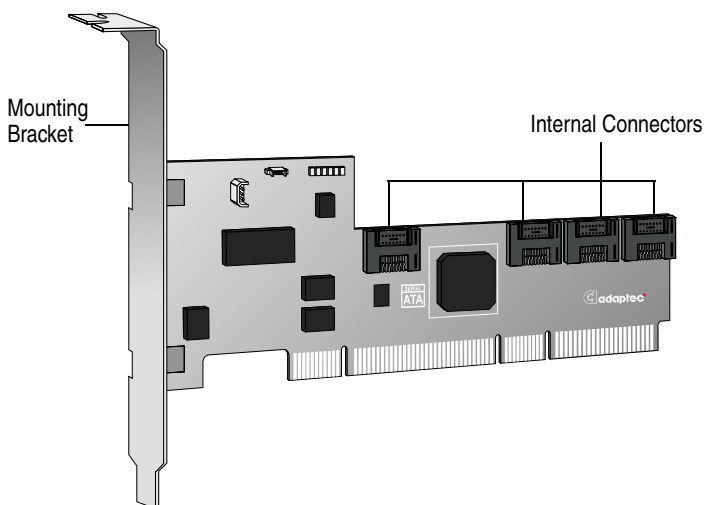
Installing the Controller

To install the controller in the system cabinet:

1 If you have a low-profile computer cabinet, replace the original full-height bracket with the low-profile bracket supplied in the controller kit.

2 Turn off your computer, unplug the power cord, and open the system cabinet.

3 Remove the cover from an available PCI or PCI-X slot that is 2.2 or higher compliant.

> **Note:** You'll get better performance if you use a 64-bit slot.

4 Install the controller in the PCI or PCI-X slot and secure the controller bracket to the chassis.

64-bit slot
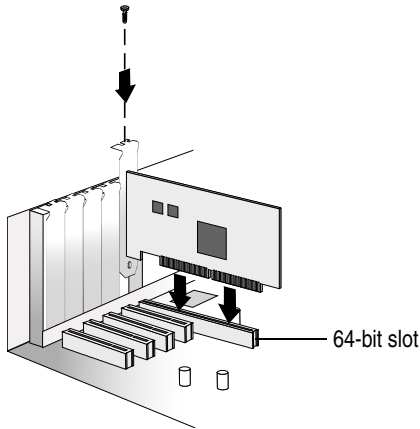
5 Install and connect any internal drives using the appropriate cable.

6 Close the computer cabinet and reattach the power cord.

Checking Your Controller and Devices

Now that you have installed your controller and connected your Serial ATA disk drives, you are ready to use the ARC utility to check your controller and devices, as described below:

1 Turn on your computer.

2 When the Adaptec banner appears, enter the ARC utility by pressing **Ctrl+A**.

3 If your drives have already been used in another system (even if not part of an array), select **Disk Utilities** and format the drive. Otherwise, skip to Step 4.

> **Note:** If a drive appears to be missing, power down the computer and check the connections.

4 Select **SATA***Select* to verify the hardware configuration of the controller and the drives.

Verify that all drives and controllers are shown. If anything appears to be missing, power down the computer and check the connections.

Determining the Boot Controller

Your Adaptec Serial ATA II RAID 1420SA is a bootable controller. If your computer already contains a bootable disk drive with an installed operating system, you can set up your computer to boot a second operating system from the new controller.

To add a second bootable controller, you may need to enter Setup and change the hard disk boot sequence so that the Adaptec Serial ATA II RAID 1420SA heads the list. If Setup does not allow this change, your system BIOS may not be configurable to allow the Adaptec Serial ATA II RAID 1420SA controller to act as a second boot device.

3

Installing the Driver

In this Chapter...

Overview of the Driver Installation Process

Adaptec recommends the following driver installation procedure:

1 Create a driver disk.

2 Identify the appropriate installation procedure for your computer.

You need to know the operating system and whether you are installing the driver while also installing the operating system, or installing the driver onto a system that already has the operating system installed.

3 Select a RAID level during driver installation. See Appendix A, *About RAID* for a summary of the RAID levels.

> **Note:** See Appendix A, *About RAID* for RAID levels and the Adaptec Storage Manager online Help for details.

4 Read and understand the entire installation procedure.

5 Proceed with the installation.

> **Note:** You *must* have the most recent versions of Adaptec Storage Manager and the ARC utility installed to run the Adaptec RAID drivers.

Creating a Driver Disk

Before you install your driver, you will need to create a driver disk.
To create the driver disk:

1 Set your system BIOS so that your computer boots from the CD drive.

2 Insert the installation CD and turn on the computer.

3 Follow instructions and respond to prompts as necessary to get to the Adaptec Start Menu.

4 Click **Create Driver Disk**, then select the appropriate operating system.

5 *If you selected Linux*, you need to select one of the following architectures:

– **i586**—For Pentium I or II computers
– **i686**—For Pentium III, IV, or AMD K-6 computers
– **Athlon**—AMD Athlon computers
– **Athlon & Intel_x86_64**—AMD Opteron or AMD64 and Intel EM64T computers

6 When prompted, insert a floppy disk, then click **OK**.

The computer creates the driver disk.

7 When prompted, remove and label the driver disk then click **OK**.

Installing the Windows Driver

This section contains the following procedures:

■ *Installing the Driver in a New Windows System*

■ *Installing the Driver in an Existing Windows System*

Installing the Driver in a New Windows System

To install the driver while also installing the Windows operating system:

1 Install and configure the controller and disk drives as described in *Installing the Controller* on page 2-2.

2 Create a driver disk as described in *Creating a Driver Disk* on page 3-3. When finished, remove the driver disk.

3 If creating an array, press **Ctrl+A** when prompted to enter the ARC utility. For instructions on creating an array from the BIOS, see *Creating Arrays* on page 6-3. If installing a simple volume, skip to Step 4.

4 Insert the Windows setup CD and restart the computer to begin the Windows installation.

5 Press **F6** when prompted to install a third-party driver.

> ✔ **Note:** When F6 is active, a prompt appears at the bottom of the screen. Press **F6** immediately—you only have 5 seconds. If you miss your chance, restart this Windows installation to complete it correctly. Otherwise, Windows will not recognize your controller.

6 Insert the driver disk you created in Step 2 and wait until prompted to install a driver.

7 Press **S** to specify that the driver is on the floppy disk, then press **Enter**.

Windows searches the disk for a suitable driver.

8 When the Adaptec RAID driver is found, press **Enter**. Follow the remaining on-screen instructions to complete your installation.

Installing the Driver in an Existing Windows System

To install the driver in an existing operating system:

1 Install and configure the controller and disk drives as described in *Installing the Controller* on page 2-2.

2 Create a driver disk as shown in *Creating a Driver Disk* on page 3-3. When finished, remove the driver disk.

3 Start Windows. Windows launches the Found New Hardware Wizard, which searches for the controller driver.

4 Insert the driver disk you created in Step 2, select the floppy disk drive as the source, then click **Next**.

5 If necessary, select the appropriate driver for your operating system.

6 Click **Next** as needed to complete the controller installation.

7 Remove the driver disk.

8 If prompted, restart the computer.

9 Your installation is complete. If you want to create an array from the BIOS, see Chapter 6, *Adaptec RAID Configuration Utility*.

Installing the Red Hat or SuSE Linux Driver

This section contains the following procedures:

■ *Installing the Red Hat Driver in a New Linux System*

■ *Installing the SuSE Driver in a New Linux System*

■ *Installing or Updating the Driver in an Existing Red Hat or SuSE Linux System*

Installing the Red Hat Driver in a New Linux System

To install the driver while also installing the Red Hat operating system:

1 Install and configure the controller and disk drives as described in *Installing the Controller* on page 2-2.

2 Create a driver disk as shown in *Creating a Driver Disk* on page 3-3. When finished, remove the driver disk.

3 If creating an array, press **Ctrl+A** when prompted to enter the ARC utility. For instructions on creating an array from the BIOS, see *Creating Arrays* on page 6-3. If creating a simple volume, skip to Step 4.

4 Insert the Red Hat CD Disk 1 in the CD drive then restart the system.

5 When the Red Hat Welcome screen appears, type `expert` or `linux dd` at the boot prompt.

6 When prompted, insert the driver disk you created in Step 2, then select **OK**.

7 Follow the prompts to set up your preferred environment.

8   If you intend to install other third-party devices, proceed with the installation of those devices. Otherwise, select **Done**.

9   Continue with the Linux installation according to the Red Hat documentation.

Installing the SuSE Driver in a New Linux System

To install the driver while also installing the SuSE operating system:

1   Install and configure the controller and disk drives as described in *Installing the Controller* on page 2-2.

2   Create a driver disk as shown in *Creating a Driver Disk* on page 3-3. When finished, remove the driver disk.

3   If creating an array, press **Ctrl+A** when prompted to enter the ARC utility. For instructions on creating an array from the BIOS, see *Creating Arrays* on page 6-3. If installing a simple volume, skip to step Step 4.

4   Insert the SuSE CD Disk 1 in the CD drive, then restart the system.

5   When the SuSE Installation menu appears, do the following:

–   **For UL 1.0**—press the **Alt** key to have it prompt for a driver disk, then select installation option from the Menu, then press **Enter**.

–   **For SLES 9, SuSE 9.x**—press the **F6** key, select installation option from the Menu, then press **Enter**.

6   When prompted, insert the driver disk you created in Step 2, then press any key to continue.

7   Follow the prompts to set up your preferred environment.

8   Continue with the Linux installation according to the SuSE documentation.

Installing or Updating the Driver in an Existing Red Hat or SuSE Linux System

To install the driver in an existing Red Hat or SuSE Linux system:

1 Insert the installation CD into the CD device and wait for the system to automount the cd, or manually mount it from a shell by typing:

for Red Hat   `mount /dev/cdrom /mnt/cdrom`

for SuSE   `mount /dev/cdrom /media/cdrom`

2 Then type:

for Red Hat   `cd /mnt/cdrom`

for SuSE   `cd /media/cdrom`

3 Type:

```
cd /<directory of rpm files>
```

4 Type:

`rpm -ivh <rpmfile>` (for a new install, or)

`rpm -Uvh --force <rpmfile>` (for an updated install)

`cd`

for Red Hat   `umount /mnt/cdrom`

for SuSE   `umount /media/cdrom`

or

`eject` (to eject disc)

5 Reboot the system to enable the new/updated driver.

Installing the NetWare Driver

This section contains the following procedures:

■ *Installing the NetWare Driver in a New NetWare System*

■ *Installing or Updating Device Drivers After Installing NetWare*

Installing the NetWare Driver in a New NetWare System

> **Note:** For information about installing drivers if you use the NetWare CD to install your operating system, see your Novell documentation.

To install the driver in a new Novell NetWare 6.5 system:

1 Install and configure the controller and hard drives as described in *Installing the Controller* on page 2-2.

2 Use the instructions provided in the NetWare manual to begin the installation.

3 When the No storage device was detected in this system. Load the appropriate driver (HAM) prompt appears, press **Enter**, then **Esc**.

4 On the Device Type screen, select **Storage adapters**, then press **Enter**.

5 If the list contains the HostRAID SATA driver (AAR81XX.HAM), select the driver, then press the **Delete** key to delete it.

6 Press the **Insert** key twice to **Add an unlisted driver**.

7 Insert the support disk for Novell NetWare.

8 Press **F3** to specify a path, then type a:\ (where a is the diskette drive letter), then press **Enter**.

> **Note:** The driver and support files will be copied to the system volume: AAR81XX.HAM.

9 Verify that the driver name displays in the list of device drivers that appears in the window (for example, AAR81XX.HAM) then select **Return to Driver Summary,** then press **Enter**.

10 Select **Continue,** then press **Enter**.

11 Follow the instructions in the NetWare manual to complete the installation.

Installing or Updating Device Drivers After Installing NetWare

To update the driver in an existing NetWare 6.5 system see *Updating the Device Drivers* on page 3-9. To install the driver in an existing NetWare system, see *Installing the Device Drivers* on page 3-9.

Updating the Device Drivers

1 Reboot your system to DOS.

2 At the prompt, copy the drivers (AAR81XX.DDI, AAR81XX.HAM) to:

```
c:\NWSERVER\DRIVERS\XXXX
```

where *XXXX* is the name of the driver.

3 Restart your system.

Installing the Device Drivers

1 Start the NetWare hdetect utility program. From the system console, type the following, then press **Enter**:

```
load hdetect
```

2 Insert the HostRAID driver disk for Novell NetWare into the floppy disk drive.

3 If you see the prompt Sys volume not mounted. Load driver anyway?, select **Yes,** then press **Enter** to continue.

4 When the next window appears, select, then press Enter.

5 The device driver window opens, select **Continue**, then press **Enter**.

6 Highlight the driver under Storage adapters, then press **Enter**.

7 Select **Modify**, then press **Enter**.

8 If the driver AAR81XX exists, select the driver, then press the **Delete** key to delete it.

9 Press the **Insert** key twice to add a driver.

10 When the next window opens, press **F3** to specify a different path.

11 In the **Specify a directory path** field, type a:\ (where a is the disk drive letter), then press **Enter**.

12 After the installation program copies all the files, select **Return to driver summary,** then press **Enter**.

13 When the next window opens, select **Load** to load the driver.

14 After the driver is loaded, press **Alt+F10** to exit the hdetect Utility.

Note: If you want NetWare to load the HostRAID device driver automatically during startup, you must add the appropriate LOAD command to the NetWare startup command file (usually C:\NWSERVER\STARTUP.NCF). The command has the form:
```
load [pathname]driverslot=number [options]
```

For example:

```
load c:\nwserver\aar81xx.ham slot=1
```

4

Installing and Starting Adaptec Storage Manager

In this Chapter...

After you have installed your Adaptec RAID controller and driver, you are ready to install and use Adaptec Storage Manager—a user-friendly graphical user interface (GUI) that makes it easy for you to create and manage arrays without having to restart the computer and use the BIOS utility.

Note: You need administrator or root privileges to install Storage Manager. For details on verifying privileges, refer to your operating system documentation.

Installing Storage Manager on Windows

Notes:

■ With Windows, Adaptec Storage Manager supports up to 16 Adaptec RAID controllers.

■ If a previous version of Adaptec Storage Manager is installed, you must remove it before upgrading. To remove Adaptec Storage Manager, use the Add/Remove Programs option in your Windows Control Panel.

■ For the latest on Adaptec's support of Windows, visit www.adaptec.com.

To install Storage Manager:

1 Insert the product installation CD and wait for the Autorun executable to start the installation. If this does not occur, browse the CD and click **Autorun**.

2 When the installation wizard starts, follow the on-screen instructions to complete the installation.

Note: When prompted to install SNMP (Simple Network Management Protocol), accept the default (*do not install*) unless you have a specific requirement for Storage Manager to work with SNMP gets and traps.

Installing Storage Manager on Linux

> **Notes:**
> - With Linux, Storage Manager supports up to 12 Adaptec RAID controllers.
> - Storage Manager includes the Java Runtime Environment (JRE).
> - If a previous version of Storage Manager is already installed and you are upgrading, you must first remove that version. Any customization files you may have created when you used the previous version are saved and used in the upgrade. To remove Storage Manager, type the `rpm --erase StorMan` command.
> - For the latest on Adaptec's support of Linux, visit www.adaptec.com.

To install Storage Manager:

1 Insert the product installation CD.

2 Mount the product installation CD:

```
for Red Hat    mount /dev/cdrom /mnt/cdrom
for SuSE       mount /dev/cdrom /media/cdrom
```

3 Change to the cdrom directory:

```
for Red Hat  cd /mnt/cdrom/xxx/manager
for SuSE     cd /media/cdrom/xxx/manager
```
where: *xxx* is the name of the linux driver folder

4 Extract the RPM package and install it:

```
rpm --install ./StorMan*.rpm
```

5 Unmount the product installation CD:

```
for Red Hat    umount /mnt/cdrom
for SuSE       umount /media/cdrom
```

Installing Storage Manager on NetWare

Notes:

- With NetWare, Adaptec Storage Manager supports up to 16 Adaptec RAID controllers.

- You need the latest Support Pack for your operating system so you can run the supported Java Virtual Machine (JVM).

- You need JVM version 1.3 or later. To check your JVM version, load JVM, type `JAVA -VERSION`.

- For the latest updates from Novell, visit www.novell.com.

To install Adaptec Storage Manager:

1 Insert the product installation CD.

2 From the command prompt, type `load cddvd` and press **Enter**.

3 From the command prompt, type:

`xx_yy_zz:\netware\manager\install`

where `xx` is the product CD, `yy` is the version number, and `zz` is the release number. For example:

`adptcd_v1_00`

The installation program starts.

4 Follow the on-screen instructions to complete the installation.

Starting Storage Manager

Note: You need root privileges to run Storage Manager.

To start Adaptec Storage Manager, use the following procedures for your operating system.

Windows Operating Systems

1 To run Adaptec Storage Manager as a standalone application, click **Start > Programs > Adaptec Storage Manager**. To run Adaptec Storage Manager in a browser, open the browser, then type in the IP address, colon (:), and 34572 as the port number.

First the application flash screen will appear briefly, then the Adaptec Storage Manager window will open with a login dialog box superimposed.

2 Enter a valid user name and password for a user on the system, then click **Connect**.

Notes: Adaptec Storage Manager permissions vary according to your operating system permisssions:

- **Administrator**—Logging in as an Administrator allows you to view and modify the RAID configuration. You can create and delete logical drives, verify logical drives, perform migrations, and add and remove hotspare drives. To log in as an Adminstrator, enter a valid user name and password for the Administrator or an Administrative User on the system.

  The Administrative User is any member of the local Administrators group, which can (in a Domain configuration) include Domain Administrators.

- **User**—Logging in as a User allows you to view the RAID configuration, verify logical drives, and add and remove hotspares. You cannot create or delete logical drives or perform migrations. To log in as a User, use your normal network user name and password.

- **Guest**—Logging in as a Guest allows you to view the RAID configuration only. You cannot make any changes. To log in as Guest, click **Cancel** on the Login window.

Linux Operating Systems

1 Type the following command to change to the Adaptec Storage Manager installation directory:

```
cd /usr/StorMan
```

2 Type the following command, then press **Enter**:

```
./StorMan.sh
```

First the application flash screen will appear briefly, and then the Adaptec Storage Manager window will open with a log in dialog box superimposed.

3 Enter a valid user name and password for a user on the system, then click **Connect**.

> **Notes:** Adaptec Storage Manager permissions vary according to your operating system permisssions:
>
> ■ **Administrator**—Logging in as an Administrator allows you to view and modify the RAID configuration. You can create and delete logical drives, verify logical drives, perform migrations, and add and remove hotspare drives. To log in as an Adminstrator, enter root for the user name and enter the root password.
>
> ■ **User**—Logging in as a User allows you to view the RAID configuration, verify logical drives, and add and remove hotspares. You cannot create or delete logical drives or perform migrations. To log in as a User, use your normal network user name and password.
>
> ■ **Guest**—Logging in as a Guest allows you to view the RAID configuration only. You cannot make any changes. To log in as Guest, click **Cancel** on the Login window.

NetWare Operating System
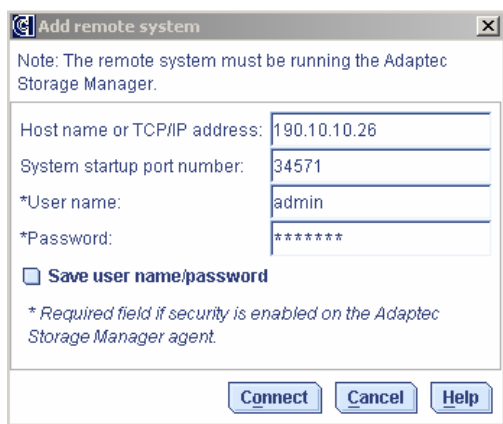
To start Adaptec Storage Manager on the NetWare operating system, type the LOAD RAIDMAN command in the system console.

Logging into Remote Systems

To log into a remote system:

1 Click **Remote** > **Add remote system**.

Storage Manager displays the login screen, as shown below.

2 Type the IP address.

The default System startup port number, 34571, is supplied for you.

3 For User name, type admin

4 For Password, type adaptec

> **Note:** The user name and password are case sensitive.

Once you are logged in for the first time, you can add new accounts and change account passwords. For details, refer to the online Help.

5

Understanding Adaptec Storage Manager

In this Chapter...

Introduction

This chapter provides an overview of Adaptec Storage Manager, the user-friendly GUI that you use to easily create and manage arrays. For more details on using Adaptec Storage Manager to set up and manage arrays, refer to the online Help.

Features

You can use Adaptec Storage Manager to:

■ Create and delete arrays

■ Verify arrays

■ Add and remove hotspares

■ View the RAID configuration

- View information about managed systems and subsystems such as arrays, logical drives, hotspare drives, physical drives

- Notify systems of all events occurring on the local system

- Add or remove a remote system

- Configure, administer, and monitor controllers that are installed locally or remotely in your servers or external storage

- Fine tune controller settings for optimal performance

Note: Some of these features may not be available on your system. Check with your vendor, product documentation, or online Help for supported features.

Overview

Adaptec Storage Manager provides an expandable tree view of the systems and controllers you are managing. You can perform most configuration and management tasks by selecting a controller from the tree and working with related objects. The figure below shows how Adaptec Storage Manager displays information about Physical and Logical devices.
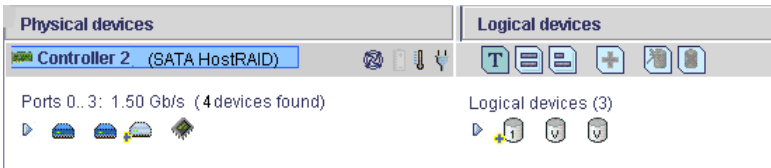
Using the buttons in the Physical devices and Logical devices views, you can:

- Change how drives are displayed

- Collapse and expand a view

- Identify components of a logical device

- Create and delete hotspares

Physical Devices View

This view displays information about the drives, enclosures, and other physical devices attached to the controller. The devices are organized numerically. The display for each channel or port includes information on maximum speed, the number of the channels on the controller, and the number of devices attached to the controller.

Indicators, next to the controller name, report status of the fan and temperature modules on SAF-TE (enclosure management) devices and other devices that monitor these conditions. The indicator colors are:

- **Blue**—Normal
- **Yellow**—Warning
- **Red**—Error
- **Gray**—Not applicable to the devices

For example, the fan indicator changes to yellow when one fan fails; it changes to red when a second fan fails and cooling is no longer adequate.

Logical Devices View

This view displays information about the logical devices created using the physical devices, including the number of logical devices, the RAID level of each device, and whether a logical device is protected by a hotspare.

You can create and delete logical devices in the Logical devices view by selecting the **Create** option and using the Create wizard.

Changing How Drives are Displayed

You can choose how information is displayed in the Physical devices view by clicking one of the following buttons in the Logical devices view.

T — Displays physical device information in text format. This is the default view.

Displays physical device information in full size capacity format. A full-length bar is displayed for each drive, regardless of capacity. A small segment on each drive is reserved for the *RAID signature*; this area is indicated by a gray *cap* at the end of each bar. **Note:** A drive shaded in light blue is not part of any disk group.

Displays physical device information in relative size capacity format. A full-length bar is displayed for the largest drive; proportionally shorter bars are displayed for other drives.

Collapsed and Expanded Views

You can display a collapsed or expanded view of the system configuration. Initially, Storage Manager displays a collapsed textual view of the configuration information in both the Logical devices and Physical devices views.
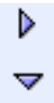
In the Logical devices view...
Click to expand and collapse information about disk groups and logical devices. The expanded display shows the following information about each logical device:

- Disk group name and capacity (if available)
- Logical device size
- Logical device state
- Build progress
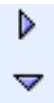
In the Physical devices view...
Click to expand and collapse information about physical drives. The expanded display shows the following information about each drive:

- Capacity of the drive
- Drive ID
- Drive state

Component Views

When you click a physical or logical device in the device views, the related components are highlighted in the other view.

■ When you click a logical device in the Logical devices view, the physical drives that make up the logical device are highlighted in the Physical devices view, and vice-versa.

■ When you click a hotspare, the logical devices protected by that spare are highlighted.

■ In the graphical views, if the logical device uses only part of the available storage, only those segments are highlighted (in dark blue).

6
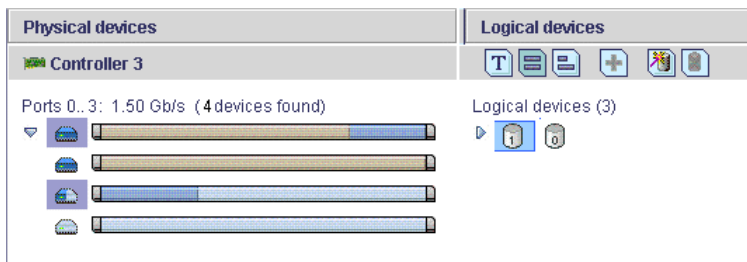
Adaptec RAID Configuration Utility

In this Chapter...

The Adaptec RAID Configuration (ARC) utility is an embedded BIOS utility that includes:

■ **Array Configuration Utility (ACU)**—Used to create, configure, and manage arrays.

■ **SATA*Select* Utility**—Enables changing Serial ATA (SATA) device and controller settings.

– **Controller Configuration**—Enables you to modify controller BIOS boot and display options.

– **SATA Configuration**—Enables you to modify the SATA channel interface definitions and SATA device configuration options.

■ **Disk Utilities**—Used to format or verify disks.

To run ARC, press **Ctrl+A** when prompted by the following message during the system startup:

> Press <Ctrl><A> for Adaptec RAID Configuration Utility

If your computer contains two or more controllers, a list of controllers is displayed. Use the arrow keys to select the controller you want to configure, then press **Enter**.

The ARC menu appears, presenting these options:

■ Array Configuration Utility (ACU)

■ SATA*Select* Utility

■ Disk utilities

To select an option from this menu, or from any of the menus within ARC, browse with the arrow keys, then press **Enter**. In some cases, selecting an option displays another menu. To return to the previous menu at any time, press **Esc**.

Using the ACU

With ACU, you can perform these tasks:

■ *Creating Arrays*

■ *Managing Arrays*

■ *Adding/Deleting Hotspares*

■ *Configuring Disk Drives*

■ *Rebuilding Arrays*

■ *Verifying Drives*

Creating Arrays

Before creating arrays, make sure the disks for the array are connected and installed in your system. Note that disks with no usable space are shown in gray and cannot be used. See *Configuring Disk Drives* on page 6-7.

To create an array:

1 Turn on your computer and press **Ctrl+A** when prompted to access the ARC utility.

2 From the ARC menu, select **Array Configuration Utility (ACU)**.

3 From the ACU Main menu, select **Create Array**.

4 Select the disks for the new array, then press **Insert**. To deselect any disk, highlight the disk, then press **Delete**.

5 Press **Enter** when both disks for the new array are selected. The Array Properties menu displays.

Assigning Array Properties

> ✅ **Note:** Once the array is created and its properties are assigned, you cannot change the array properties using the ACU. Instead, use Adaptec Storage Manager (See Chapter 5, for details.)

To assign properties to the new array:

1 In the Array Properties menu, select an array type, then press **Enter**.

Only the available array types, RAID 0 and RAID 1 are displayed. RAID 0 and RAID 1 requires a minimum of two drives.

2 Type in an *optional* label of no more than 15 characters for the array, then press **Enter**.

3 For RAID 0, select the desired stripe size. Available stripe sizes are 16, 32, and 64 KB (default).

> **Note:** Adaptec recommends that you *do not* change the default.

4 The options under **Create RAID via** allows you to select between the different creation methods for RAID 0, and RAID 1. The following table gives examples of when each is appropriate.

RAID Level	Create RAID via	When Appropriate
RAID 0	No Init	Creating a RAID 0 on new drives.
RAID 0	Migrate	Creating a RAID 0 and you want to preserve data on an existing drive. You will be asked to select the source drive. The contents of the source drive are preserved and any data on the new drive is lost.
RAID 1	Build	Creating a RAID 1 and you want to preserve data on an existing drive. You will be asked to select the source drive. The contents of the source drive are preserved and any data on the new drive is lost.
RAID 1	Clear	Creating a RAID 1 on new drives, or when you want to ensure that the new array contains no existing data.
RAID 1	Quick Init	Fastest way to create a RAID 1. Appropriate when using new drives.

> **Caution:** *Do not* interrupt the creation of a RAID 0 using the Migrate option. If you do, there is no way to restart, and no way to recover the data that was on the source drive.

Notes:

■ Before adding a new drive to an array, back up any data contained on the new drive. Otherwise, all data will be lost.

■ If you stop the Build or Clear process on a RAID 1 from ACU, you can restart it by pressing **Ctrl+R**.

■ A RAID 1 created using the Quick Init option may return some data miscompares if you later run a consistency check. This is normal and is not a cause for concern.

■ The ACU allows you to use drives of different sizes in a RAID 1. However, during a build operation, only the smaller drive can be selected as the source drive.

■ When migrating from single volume to RAID 0, migrating from a larger drive to a smaller drive is allowed. However, the destination drive must be at least half the capacity of the source drive.

■ Adaptec does not recommend that you migrate or build an array on Windows dynamic disks (volumes), as it will result in data loss.

5 When you are finished, press **Done**.

Managing Arrays

Select the **Manage Arrays** option to perform these tasks:

■ *Viewing Array Properties*

■ *Adding/Removing a Bootable Array*

■ *Deleting Arrays*

Viewing Array Properties

To view the properties of an existing array:

1 From the ACU Main menu, select **Manage Arrays**.

2 From the List of Arrays dialog box, select the array you want to view, then press **Enter**.

The Array Properties dialog box appears, showing detailed information on the array. The physical disks associated with the array are displayed here.

3 Press **Esc** to return to the previous menu.

Adding/Removing a Bootable Array

To make an array bootable:

1 From the ACU Main menu, select **Manage Arrays**.

2 From the List of Arrays, select the array you want to make bootable, then press **Ctrl+B**. An asterisk will appear next to the bootable array.

3 To make the array nonbootable, select it, then press **Ctrl+B**. The asterisk will disappear next to the array indicating that it is nonbootable.

Deleting Arrays

> ⚠ **Caution:** Back up the data on an array before you delete it. Otherwise, all data on the array is lost. Deleted arrays cannot be restored.

To delete an existing array:

1 From the ACU Main menu, select **Manage Arrays**.

2 Select the array you wish to delete, then press **Delete**.

3 In the Array Properties dialog box, select **Delete**, then press **Enter**. A warning message appears. Press **Yes** or **No**.

> ✔ **Note:** If you are deleting a RAID 0, you will not get a warning message first. When you press **Enter**, you will immediatly delete your RAID 0.

4 If you press **Yes**, select the member when the following prompt is displayed:

To delete the partition table, choose which member: member #0, member #1, both, none

5 Press **Esc** to return to the previous menu.

Adding/Deleting Hotspares

To add, delete, or view hot spares:

1 From the ACU Main menu, select **Add/Delete Hotspares**.

2 Use the up and down arrow keys to highlight the disk you want to designate as a Hotspare, then select **Insert**>**Enter**.

3 Press **Yes** when the following prompt is displayed:

Do you want to create spare? (Yes/No)

The Spare you have selected appears in the Selected Drive menu.

Configuring Disk Drives

> ⚠ **Caution:**
> - If the drive is already used in an array, configuring it may make the array unusable.
> - *Do not* configure a drive that is part of a boot array. To determine which drives are associated with a particular array, see *Viewing Array Properties* on page 6-6.
> - You will not be able to configure drives already used in an array (even if it is a broken array with missing members). You must delete the array before you can configure the drives.

To configure drives:

1 From the ACU Main menu, select **Configure Drives**.

2 Use the up and down arrow keys to highlight the disk you wish to configure, then press **Insert**.

3 Repeat Step 2 if you want to add another drive to be configured.

4 Press **Enter**.

5 Read the warning message and ensure that you have selected the correct disk drives to configure. Type Y to continue.

Rebuilding Arrays

✓ **Note:** Rebuilding applies to Fault Tolerant arrays (RAID 1) only.

By replacing a failed drive of a RAID 1 array with a new drive, you can Rebuild to get the array to Optimal status and assume fault tolerance. You can perform a Rebuild in the following ways:

✓ **Note:** If no spare exists and a hard disk drive fails, you need to create a spare before you can rebuild an array. See *Adding/ Deleting Hotspares* on page 6-7 before continuing your Rebuild.

System Shutdown Rebuild

You can shut down the system and replace the failed drive with a new one (of equal or greater capacity). When the system is booted, you can assign the new drive as a spare, and this will start the Rebuild task. All the data from the good drive is copied to the new one, and the original RAID 1 array is recreated.

Manual Rebuild

1 From the ACU Main menu, select **Manage Arrays**. From the List of Arrays, select the array you want to Rebuild.

2 Press **Ctrl+R** to Rebuild.

Verifying Drives

If you are notified of a mismatch of data during a build of RAID 1, you have an option of verifying your drives. To Verify the drives:

> **Note:** The Verify option is only available if the array is Optimal. If the array has failed, you cannot rebuild the array.

1   Select the drives you want to verify.

2   Press **Ctrl+S**.

3   Verify will fix the errors found during the Verify operation and when it is complete, you will be notified of the number of fixed errors.

Using SATA*Select*

The SATA*Select* utility enables you to change device and controller settings without opening the system chassis or handling the card.

To start SATA*Select*:

1   Turn on your computer and press **Ctrl+A** when prompted to access the ARC utility.

2   If multiple controllers are installed, select the controller you want to configure, then press **Enter**.

3   From the ARC menu, select **SATASelect**.

    The **Controller Configuration** and **SATA Configuration** menu options are displayed.

To exit SATA*Select*, press **Esc** until a message prompts you to exit. (If you changed any settings, you are prompted to save the changes before you exit.) Choose **Yes** to exit and reboot the system. Any changes you made take effect after the system boots.

Controller Configuration

To access Controller Configuration:

From the SATA*Select* menu, select **Controller Configuration**.

You can modify the following Controller Interface options:

■ **Runtime BIOS**—Enables or disables the controller's runtime BIOS. The BIOS must be enabled if you want to boot from the controller.

   If Runtime BIOS is enabled and the Array-based BBS Support option is disabled, the controller BIOS is enabled and will post the first array (or drive) attached to the controller as a bootable hard disk drive.

   The default is *Enabled*.

■ **Array-Based BBS Support**—If Runtime BIOS, and this option are enabled, all devices (array or drives) on each controller in the system are posted as BBS devices.

   In a BBS-enabled system, if array-based BBS support is enabled, the Hard Drive Boot order menu includes entries for all arrays (or drives) connected to the installed RAID controllers.

   The default is *Enabled*.

■ **Physical Drives Display during POST**— The default is *Disabled*.

SATA Configuration

To access SATA Configuration:

From the SATA*Select* menu, select **SATA Configuration**.

The **SATA Device Configuration** menu is displayed. Select the appropriate channel from this menu.

You can modify the following SATA Device Configuration options:

■ **Write Cache**—Enables or disables write cache on the drive. Write cache enabled provides maximum performance. Default is *Yes* to enable.

> ⚠️ **Caution:** When caching is Enabled, there is a risk of data loss or corruption during a power failure. Therefore you should enable caching unless your data is highly sensitive, or your application performs completely reads.

■ **DMA**—Enables or disables the use of Direct Memory Access (DMA) mode for the drive. Enabled provides maximum performance. Default is *Yes* to enable.

■ **SMART**—Enables or disables the predictive failure feature of the disk drive. When enabled the SMART status of the drive (Healthy or Failed) will be displayed along with the physical drive display during POST. If the drive does not support SMART, the SMART status is not displayed. Default is *Yes to enable*.

■ **Allow Read Ahead**—Enables or disables the read ahead cache algorithm on the drive. Enabled provides maximum performance under most circumstances. Default is *Yes*.

Using the Disk Utilities

The Disk Utilities enable you to format or verify the media of your Serial ATA hard disks.

To use the disk utilities:

1 Turn on your computer, then press **Ctrl+A** when prompted to access the ARC utility.

2 From the ARC menu, select **Disk Utilities**.

3 Select the desired disk, then press **Enter**.

You are offered the following options:

– **Format Disk**—Simulates a low-level format of the disk drive by writing zeros to the entire disk. Serial ATA drives are low-level formatted at the factory and do not need to be low-level formatted again.

> ⚠️ **Caution:** Formatting destroys all data on the disk. Be sure to back up your data before performing this operation.

– **Verify Disk Media**—Scans the media of a disk drive for defects.

A

About RAID

A RAID (Redundant Array of Independent Disks) provides better performance and reliability from combinations of drives than is possible with the same total storage space without RAID.

This *Appendix* describes the various RAID levels supported by the Adaptec Serial ATA RAID 1420SA controller.

> **Note:** Select RAID drives of equal capacity and performance. Otherwise, the RAID tends to be limited in capacity and performance to that of the smallest and slowest drive.
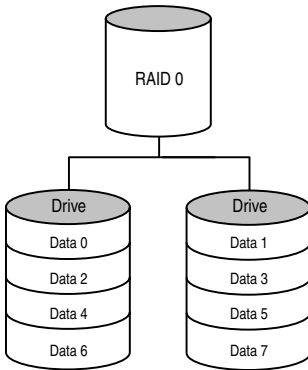
Simple Volume

A simple volume consists of a single drive.

RAID 0

A RAID 0 is created by striping data across two or more drives. This striping scheme creates no redundancy to protect the data. However, because the drives share load equally, RAID 0 provides the best read and write performance of any RAID type.

Following is an example of a RAID 0 array.

RAID 1

A RAID 1 array is created by copying, or mirroring, all data from one drive onto a second drive. This mirroring provides redundancy, ensuring that if one drive fails no data is lost. Redundancy also means that only half of the total capacity is available.

RAID 1 offers no write performance advantage over a simple volume configuration. However, because the drives share read load equally, RAID 1 provides improved read performance. Following is an example of a RAID 1 array.
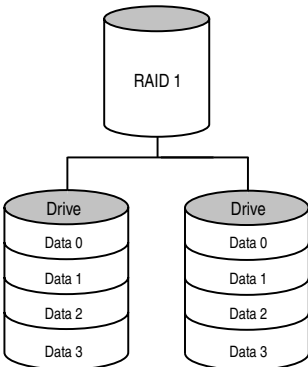
B

Specifications

Environmental Specifications

Ambient temperature without battery backup module	0 °C to 50 °C
Relative humidity	10% to 90%, noncondensing
Altitude	up to 3,000 meters

Note: Forced airflow is recommended, but not required.

DC Power Requirements

Ripple and noise	50 mV peak-to-peak (max)
DC Voltage	3.3 V ± 10%

Current Requirements

Adaptec Model	Maximum Current (A)
AAR 1420SA	1.5 A

Glossary

A

activity

See *task*.

ACU

Array Configuration Utility. An application used to create, configure, and manage arrays from the controller's BIOS or MS-DOS.

array

A logical disk created from available space and made up of one or more segments on one or more physical disks. Arrays are typically used to provide data redundancy or enhanced I/O performance. See also *volume*, *spanned volume*, *RAID 0*, *RAID 1*. Also known as a *container*.

array initialization

See *configure*.

ATA

AT Bus Attachment. Standard parallel interface to IDE hard disks typically used in desktop computers and some entry-level servers. *Serial ATA (SATA)*, is a successor to parallel ATA, which is sometimes referred to as PATA.

available space/segment

Unused space on a configured disk from which logical devices (arrays) are created. When an array is deleted, the space that it used is returned to the available space pool.

B

background consistency check

Option that forces the controller to constantly check all portions of disks used by all arrays to see if the disks can return data from the blocks. See also *consistency check command*.

bad segment

Segment that is in an unknown state.

bootable array

Array configured as the boot device.

build

Background initialization of a redundant array. The array is accessible throughout. RAID 1 copies the contents of the primary drive to a secondary drive. See also *clear*.

bus

See *channel*.

C

cache

Fast-access memory on the controller that serves as intermediate storage for data that is read from, or written to, drives.

capacity

Total usable space available in megabytes or gigabytes.

channel

Any path, or *bus*, used for the transfer of data and the control of information between storage devices and a RAID controller. For SATA channels, each channel has a single drive capacity.

check point

A feature that enables you to exit the ACU when an operation is in progress and be able to continue without interruption. The driver then resumes the operation from where the BIOS left off and the BIOS resumes the operation where the driver left off.

chunk

See *stripe*.

clear

Foreground initialization of a fault-tolerant array. A *clear* operation zeros all blocks of the array. The array is not accessible until the clear task is complete.

concatenation

Joining of physical or logical drives in sequential order.

configure

Process of preparing a disk for use by the controller. When a disk is configured, the controller records the RAID signature on the disk.

configured array

An array that is ready for data reads and writes. Arrays can be configured by *build* or *clear*.

consistency check command

Command that reads all the blocks of a RAID 1 to determine if the blocks are consistent. Any inconsistent blocks are fixed.

D

dead partition

See *failed*.

degraded

A redundant (for example, a RAID 1) array in which one or more members have failed. The data is intact but redundancy has been compromised. Any further failure would cause the array to fail and result in data loss.

disk

Physical disk drive. Randomly accessible, rewritable data storage device. Also called *hard disk*.

disk ID

Unique disk identifier that consists of the channel number, SATA ID. For example, (channel:ID:LUN) 1:04:0. See also *channel*.

drive LED

Disk indicator LED that illuminates during read or write operations.

E

event

Notification or alert from the system, indicating that a change has occurred.

event log

File used to maintain information about prior controller activities or errors.

event notification

Process for transmitting events.

F

failed

State of a nonredundant array that has suffered a single drive failure, or a redundant array that has suffered multiple drive failures. A failed array is inaccessible and data is lost.

fault-tolerant array

Refers to an array that can continue to function after a disk drive failure without loss of data. Fault tolerant, or redundant arrays, include RAID 1 arrays. See also *Redundant*.

foreign disk

Disk that has previously been configured on another Adaptec RAID controller. The RAID signature on the disk allows the RAID controller to identify whether or not the disk was configured on the controller it is currently connected to.

H

hard disk drive

Basic unit of nonvolatile, nonremovable, magnetic storage media. See also *disk*.

hot swap

To remove a component from a system, and install a new component while the power is on and the system is running.

hotspare

A spare hard disk that automatically replaces a failed hard disk on any array associated with any HBA.

I

impacted

An impacted array is one which has been created but for some reason the initial build operation did not complete. All member drives are present and operational, and all data written to the array is protected. To optimize the array, run a Verify with Fix Task.

initialize

See *configure*.

L

legacy disk

Disk that contained a valid partition table when connected to the controller. The controller manages the disk as a legacy disk array where there is a one-to-one logical-to-physical mapping of array to disk.

logical device

Volume comprised of space from one or more physical drives and presented to the operating system as if it were a single storage unit.

low-level format

Process performed by the drive firmware that completely cleans any data off the hard disk.

M

mirrored array/mirroring

See *RAID 1*.

monitoring

Process of receiving, displaying, and logging system events.

O

offline array

Array that can no longer be accessed.

optimal

The state of an array when it is fully operational. For redundant arrays, the entire array is protected.

P

partition

A section of a disk storage device created by the operating system disk management program, in which data and/or software programs are stored. Computers have a primary operating system partition that contains the special files needed to boot the computer. Each operating system partition is assigned a unique drive letter, such as C or D. A single disk device can have multiple partitions.

phantom object

Object that represents a component that cannot be configured by the controller management software; for example, a missing drive.

Q

quick init

An array configured using the Quick Init option is available immediately, with no on-going background controller activity. All data written to an array that has been quick configured is protected.

R

RAID

Redundant Array of Independent Disks (alternative definition Redundant Array of Inexpensive Disks).

RAID 0

A *single-level array* consisting of two or more equal-sized segments residing on different disks. RAID 0 distributes data evenly across its respective drives in equal-sized sections called *stripe*s. RAID 0 arrays are not redundant.

RAID 1

Single-level array consisting of two equal segments residing on two different drives. Provides redundancy by storing identical copies on two drives.

See also *mirrored array/mirroring*.

RAID signature

The area on each disk reserved for use by the RAID controller.

RAID volume

Concatenates two or more arrays of the same type.

rebuild

Background regeneration of redundant data on a RAID 1.

redundant

The ability of an array to maintain operability when one or more hardware failures occur. RAID 1 is redundant. In the event of a drive failure, redundant arrays can be restored to normal operation by replacing the failed drive and rebuilding the array.

rescan

Process of updating the current screen to show all currently available resources.

S

Serial ATA (SATA)

A successor to ATA that uses a serial, instead of parallel, interface.

simple volume

A volume made up of disk space from a single disk. It can consist of a single region on a disk, or concatenated multiple regions of the same disk.

single-level array

Array created from one or more segments. See also *volume*, *spanned volume*, *RAID 0*, *RAID 1*.

snapshot

Instantaneous read-only copy of an array at a precise point in time.

spanned volume

A simple volume that spans two or more drives.

stripe

Contiguous set of data distributed across all the disks in an array. A striped array distributes data evenly across all members in equal-sized sections called *stripes*.

stripe size

The amount of data in each section of a striped array.

striped array

See *RAID 0*.

T

task

An operation that occurs only on the RAID controller, asynchronous to all other operations; for example, initializing a disk or verifying an array. Some tasks can take an extended period of time, particularly if the RAID controller is also performing intensive data I/O while the task is running.

V

verify

Low-level check that a drive, logical device, or hot spare is good. In a RAID 1, verify is a low-level check that contents of both members' segments are consistent and, optionally, corrects errors while assuming that the master drive is correct. In a simple volume, verify performs a low-level check that the whole drive can be read.

volume

See *simple volume*, *spanned volume*.

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