

RocketRAID 174x

SATAII Host Adapter

User's Guide

HighPoint

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HighPoint Technologies, Inc.

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Chapter 1

Introduction

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- About this guide
- Introducing the RocketRAID 174x Host Adapter
- Product Features
- Understanding RAID Concepts and Terminology

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About this Guide

The RocketRAID 174x SATAII Host Adapter's User's Guide provides information about the functions and capabilities of the RR174x series of host adapter cards, and instructions for installing, configuring and maintaining RAID arrays hosted by these adapter.

Introducing the RocketRAID 174x Host Adapter

The HighPoint RocketRAID 174x series are 4-channel PCI to Serial ATA II RAID controllers. The RocketRAID 174x solutions are ideal for small business home and office servers, NAS storage, workgroup and web servers. .

Product Features

- PCI 32bit@33/66 Mhz
- 2/4 internal SATA II 3Gb/s ports (variable, depends on model)
- 2/4 external e.SATA 3Gb/s ports (variable, depends on model)
- Up to 4 SATA II or SATA I Hard Drives
- Support RAID 0, 1, 5, 10, and JBOD
- Backward compatible with RocketRAID 1640 RAID arrays
- Native Command Queuing (NCQ)
- Online Capacity Expansion (OCE) and Online RAID Level Migration (ORLM)
- Staggered drive spin up
- Hard Disk (Activity / Failed) LED chassis function
- SAF-TE Enclosure Management Functions
- BIOS Booting (INT13) to RAID array
- Quick and Background initialization for instant RAID access
- Write through and write back cache for RAID arrays
- Hot swap and hot spare
- Online array roaming
- S.M.A.R.T array monitoring for hard drive status and reliability
- 64-bit LBA for RAID arrays greater than 2TB
- Low profile form factor for 1U chassis

- Web browser-base software (Web GUI)
- Command Line Interface (CLI)
- SMTP email notification for events and error reporting
- Remote array management through (Web GUI, RAID GUI and CLI)
- Support Windows (XP, 2000, Server 2003, Vista), Linux and FreeBSD
- RoHS Compliant

Understanding RAID Concepts and Terminology

The following concepts and terminology is commonly used when describing the functions of the RocketRAID 174x Host Adapter.

Disk initialization

Initializing a disk writes necessary RAID configuration information to that disk. Disks must be initialized before configuring them into RAID arrays. The initialization process will destroy all data on the disk.

Disk Status

New The disk contains no data and has not been initialized.

Initialized The disk has been initialized and can be used for array creation.

Configured The disk has been assigned to one or more arrays, or configured as a spare disk.

Legacy The disk was used on other controllers before use with the RocketRAID 174x (see *legacy disk* below).

Array initialization

A redundant array (RAID5, RAID1, RAID10) needs to be initialized to ensure full performance and reliability. Non-redundant arrays (RAID0, JBOD) do not need to be initialized.

When you create a redundant array using the RocketRAID 174x controller's BIOS Configuration Utility, it will create the array in un-initialized state. The initialization process can be completed after installing the driver and management software.

When creating an array using the HighPoint RAID Management Console software, you can specify an initialization option (Skip initialization, foreground and background).

Note: The RocketRAID 174x's BIOS utility cannot complete the array initialization process – the RAID management utilities (OS specific software) is used to complete this task.

Foreground initialization

Foreground initialization will zero-out all data on the array. The array is not accessible by the operating system until initialization is complete.

Background initialization

Background initialization allows the array to be used immediately. For RAID1 and RAID10 arrays, initialization will result in data being duplicated identically to the mirror pair. For RAID5 arrays, initialization will result in parity being generated from all array members.

Note: An un-initialized RAID1 or RAID10 array can still provide redundancy in case of a disk failure. A RAID5 array, however, is not fault-tolerant until initialization is finished.

Online Capacity Expansion (OCE)

This feature allows disks to be added to existing RAID arrays, in order to increase the array's capacity, without fear of data loss. Any number of disks can be added to an array, at any time. Data can be accessed and utilized even while being redistributed.

Online RAID Level Migration

This term describes the ability to change one type of array (RAID level), into a different type of array (changing a RAID 1 array into a RAID 10 array for example). Data is still accessible during the migration process, and a base level of security is still active.

OCE, ORLM and the RocketRAID 174x

The RocketRAID 174x supports both Online Capacity Expansion (OCE), and Online RAID Level Migration (ORLM). Both features are supported by a single function - an array can be transformed from one RAID level to another RAID level while simultaneously being resized, even under I/O load.

Spare disk

A spare disk is a single disk that can be used to automatically rebuild a redundant array in case of drive failure. Spare disks may also be members of a RAID array. Any available space on these disks may be used to rebuild other broken arrays.

Legacy disk

Disks attached to the RocketRAID 174x that contain valid partition tables will be identified as legacy disks. A legacy disk attached to the RocketRAID 174x can be accessed by the operating system, but cannot be used to create RAID arrays. A legacy disk must be initialized before assigning it to an array.

Chapter 2

RocketRAID 174x

Hardware Description/Installation

Contents of this Chapter:

RocketRAID 174x Hardware

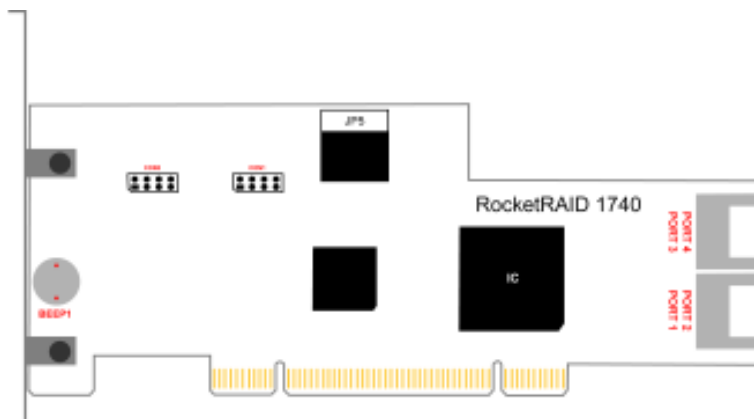
- 1 - RocketRAID 174x Adapter Layout
- 2 - LED Connections
- 3 - Installing the RocketRAID 174x Host Adapter
- 4 - Verifying Installation

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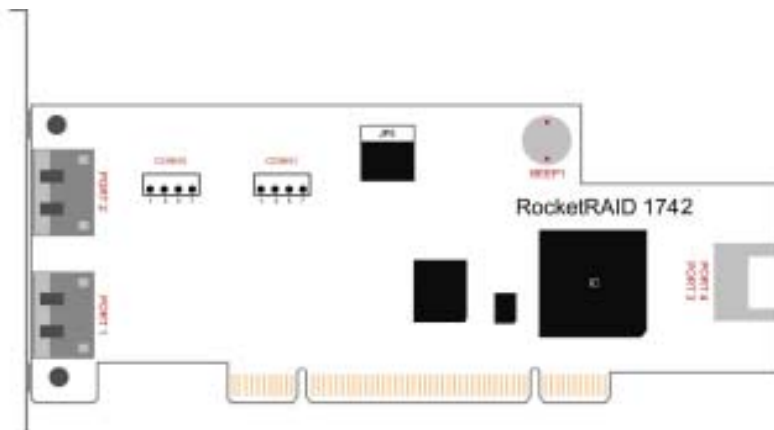
RocketRAID 174x Hardware

1 – RocketRAID 174x Adapter Layout

RocketRAID 1740 Adapter Layout



RocketRAID 1742 Adapter Layout



Port1- Port4

These represent the RocketRAID 174x's 4 SATAII ports. Depending upon the model, these ports utilize standard SATA or eSATA (external SATA) connectors.

CONN1, CONN3

These LED connectors can be used to configure Disk Failure (CONN3) and Disk Activity (CONN1) indicators for each individual disk attached to the RocketRAID 174x.

BEEP1 - Speaker

Alarm (speaker): The speaker emits an audible alarm in the case of disk/array failure.

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SAF-TE support: this support is dependent upon the system chassis. Not all chassis models support SAF-TE features. Consult the chassis's manual for more information.

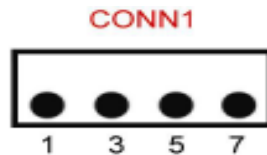
2 - LED Connections

The RocketRAID 174x has two LED jumpers that are used to indicate the activity and failure status of hard disks attached to the card's four SATAII channels. These jumpers are labeled as CONN# (connector).

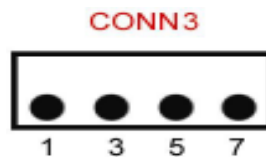
The odd numbered pins of each CONN (1, 3, 5, and 7) represent the RR174x's SATA channels 1, 2, 3, and 4 respectively. The even numbered pins (top row) are not utilized.

Note: These connectors were designed for use with SATA/SATAII back-planes and enclosures (they were not designed for standard 2-pin LED cables). Consult the system chassis' manual for more information about LED support, and configuration options.

CONN1 – Hard disk Activity LED's.



CONN3 – Hard Disk Failure LED's.



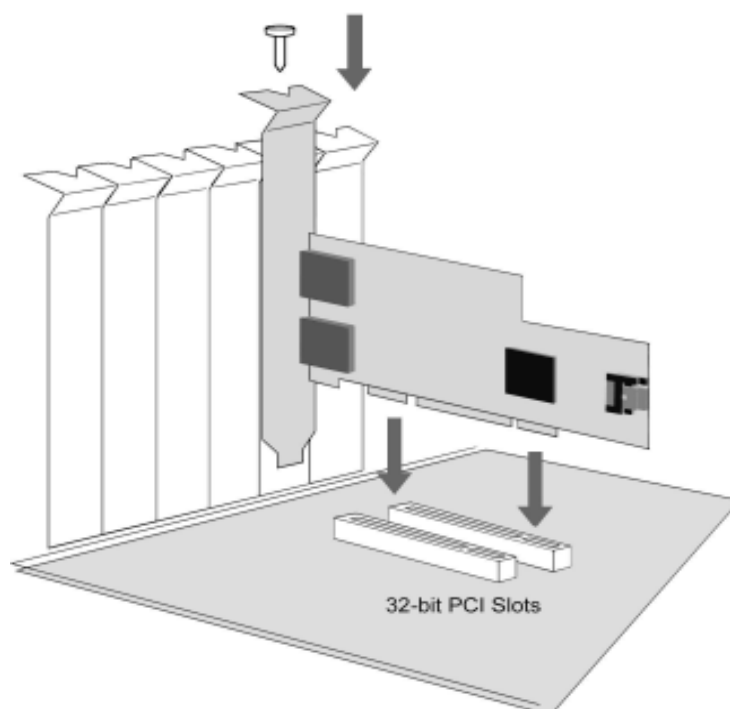
Note: The RR1740 LED's utilize right-angle connectors, but functions in the same manner as the other 174x host adapters.

3 - Installing the RocketRAID 174x Host Adapter

Note: Make sure the system is powered-off before installing the RocketRAID 174x host adapter.

The RocketRAID 174x includes both standard and low-profile brackets. It may be necessary to attach the low-profile bracket in place of the standard bracket, depending upon the chassis design.

1. Open the system chassis and locate an unused PCI slot.
2. Remove the PCI slot cover.
3. Gently insert the RocketRAID 174x into the PCI slot, and secure the bracket to the system chassis.



4. After installing the adapter, attach hard disks to the RocketRAID 174x using the appropriate data cable. SATA cables have universal connections – either end can be attached to the adapter or hard disk. Each RocketRAID 174x included two standard SATA cables, for the internal ports (Port 3 and Port 4). The eSATA ports are designed for use with external disk enclosures that utilize eSATA connectors.
5. Many server-level chassis include hard-disk hot-swap bays. For these system chassis, cables are attached to the chassis backplane, rather than directly to each individual hard disk. Consult the chassis's manual for proper installation procedures.
6. Close and secure the system chassis.

4 - Verifying Installation

Once the RocketRAID 174x host adapter and hard disks have been installed into the chassis, boot-up the system to verify that the hardware is properly recognized.

1. Power on the system. If the system detects the presence of the adapter, the RocketRAID 174x BIOS Utility will be displayed during bootup.
2. Press **Ctrl+H** to access the RocketRAID 174x BIOS Utility.

The BIOS Utility will display information about hard disks attached to the adapter. Make sure all attached disks are detected by this utility. If any of the hard disks are not detected, power down the system and check the power and SATA cable connections.

Chapter 3

RocketRAID 174x BIOS Utility

Contents of this Chapter:

- RocketRAID 174x BIOS Utility
- 1 - BIOS Command Overview
- 2 - Creating RAID Arrays
- 3 - Adding/Removing Spare Disks
- 4 - Updating the BIOS

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RocketRAID 174x BIOS Utility

The RocketRAID 174x's BIOS Utility can be accessed using the "Ctrl+H" command.

This command should be displayed automatically when the RocketRAID 174x's BIOS screen appears during the system's boot up procedure.

1 - BIOS Command Overview

The RocketRAID 174x BIOS Utility provides a wide selection of RAID related commands. These commands are displayed towards the top of the utility's interface.



Use the ← → arrow keys to scroll through the various commands, and the ↑ ↓ arrows to browse through the corresponding command menus. Use the ENTER key to execute the selected command.

The ESC button can be used to cancel the selected command, or return to the previous command menu.

Create - this command is used to create RAID arrays. Section 2 discusses this command in detail.

Delete - this command will delete the selected RAID array.

Warning: *This command may result in permanent data loss - it should only be used if data stored on the target array is no longer relevant, or has been backed up to an alternate storage device.*

Add/Remove Spare - this command is used to assign hard disks to function as spare disks. The controller is capable of using spare disks to automatically rebuild broken or faulted RAID arrays.

Section 3 discusses this command in detail.

Settings

Set Boot Mark - this function is used to designate a particular disk or RAID array to function as the RocketRAID 174x's boot device.

Note: This setting is only relevant if the motherboard's BIOS has set the RocketRAID 174x to function as the system's primary boot device.

Staggered drive spin up – This function is used to enable (or disable) staggered drive spin up support. This setting, by default, is disabled. Enabling staggered drive spin up will power up the hard disks one at a time, approximately every two seconds

View – this command is used to select between two views. Press the ENTER key to change the view.

Devices – displays information about hard disks attached to the RocketRAID 174x. Use the ↑ ↓ arrow keys to highlight the target hard disk, and press ENTER to view the information.

RAID Arrays – displays information about RAID arrays attached to the RocketRAID 174x. Use the ↑ ↓ arrow keys to highlight the target array, and press ENTER to view the information.

Initialize - this function is used to prepare disks for use with RAID arrays.

Note: Arrays cannot be created between disks that have not been initialized.

The following section discusses this command in detail.

2 - Creating RAID Arrays

Initializing Disks:

Before creating a RAID array, the disks must be initialized.

Initialization writes necessary RAID configuration information to the hard disk.

Use the ← → arrow keys to select the **Initialize** command, and press ENTER.

Warning: Initialization will destroy all pre- existing data on the selected hard disks.

Use the ↑ ↓ arrow keys to highlight the target hard disk(s) and press ENTER. Next, press the **Y** (yes) key to initialize the selected disk(s), or **N** (no) key to cancel the initialization process.

Once initialized, these disks can be utilized to create RAID arrays.

To create an array:

1. Use the ← → arrow keys to highlight the **Create** command, and press ENTER to open the Create Menu.
2. Use the ↑ ↓ arrow keys to select the appropriate RAID level, then press ENTER.
3. Next, use the ↓ arrow key to highlight the **Array Name** option and press ENTER. The array name dialogue box will appear. Use the keyboard to input a new Array Name, and press the Enter key.

Note: the Array Name command is optional – it is not necessary to name the array. The array can be named at a later time, and the name of the array can be changed at any time.

4. On the Create menu, use the ↓ arrow key to highlight the **Select Devices** item and press ENTER. A device list will appear, and display all available hard disk drives.
5. Highlight the target disks that you want to use, and press ENTER to select them. After all of the disks have been selected, press the ESC key to return to the Create Menu.

6. Next, Use the ↓ arrow key to highlight the **Capacity (GB)** option and press ENTER. The total available capacity will be displayed. Press ENTER if you wish to use all available space.
7. If you wish to reserve disk space for additional arrays/single disks, use the keyboard to input the amount of space (in GB) you wish to set aside for this particular array, and press ENTER.

***Note:** Multiple arrays can be created using the same set of hard disk drives. The Capacity option allows you to set aside disk space that be used to create another array, set as a spare disk, or partitioned to act as a single disk (by the operating system).*

8. To complete the creation procedure, use the ↓ arrow key to highlight the **Start Creation** item and press ENTER. Press the **Y** (yes) key to create the array, or **N** (no) key to cancel the creation process.

Additional Notes: Redundant arrays cannot be initialized at the BIOS level – the RAID management software is used to complete this task. An un-initialized array can still be utilized (it will be recognized as an available volume during an OS installation, for example), but we highly recommend completing the initialization process before transferring critical data to the redundant array, to avoid the risk of data loss, should a disk fail.

3 - Adding/Remove Spare Disks

This command is used to assign a hard disk to act as a Spare Disk.

Spare Disks are used to automatically rebuild Redundant RAID arrays (RAID 1, 5, 10) in the case of disk failure. To set a hard disk to act as a Spare Disk, use the ↑ ↓ arrow keys to select a disk, and press ENTER.

To remove the Spare Disk setting from a hard disk, highlight the spare disk, and press ENTER.

Generally, single disks are designated to act as spares (disks that are not configured into RAID arrays).

However, in some instances, disks that are members of RAID arrays may also be designated to act as a spare. If the disks in question are part of a RAID array that did

not utilize the full available capacity at the time of creation, these disks may be used as spares.

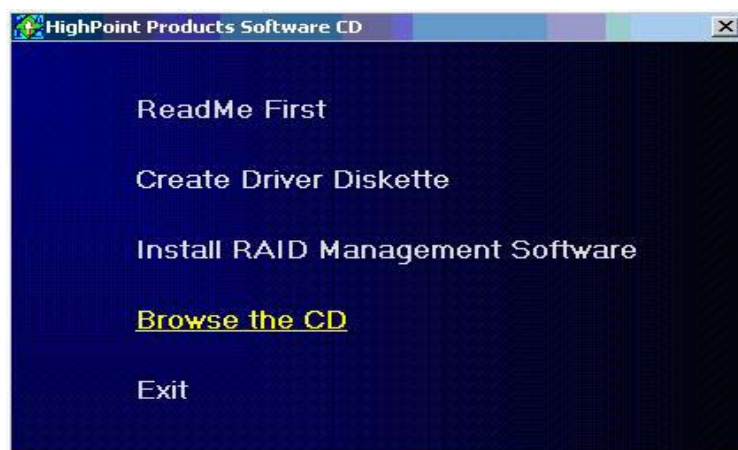
For example: a RAID 0 array was created between two 200GB hard disks, but only 200GB of space (out of a grand total of 400GB), was assigned to that array. In this example, 200GB of disk space remains unallocated. This unallocated space would allow these disks to be set as spares for a separate redundant array that falls into the same capacity range (200GB).

4 - Updating the BIOS

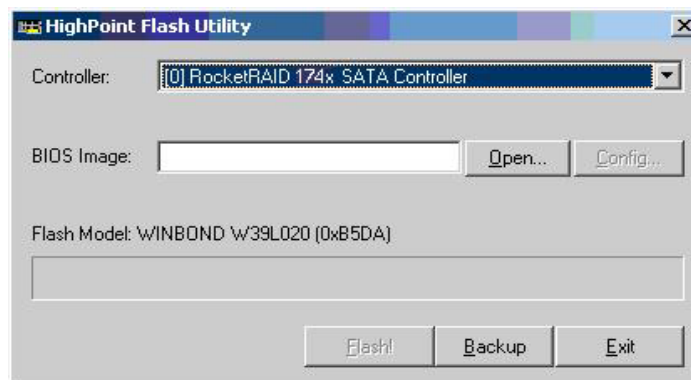
BIOS updates are released periodically, and posted on our website for download. There are several ways to flash the RR174x BIOS.

For Windows based operating systems:

- 1) Download the desired BIOS update from the Support section provided for the RR174x host adapter. Extract the download to the directory of your choice.
- 2) Insert the Driver and Software CD included with the RR174x retail box into the system's CD-ROM or DVD drive.
- 3) The CD should autorun, and display the following screen:



- 4) Select the “Browse the CD” option, and access the directory provided for the RR174x host adapter.
- 5) Open the “BIOS” directory, and double click the “hptflash.exe” icon. This will start the BIOS flash utility:



- 6) Select the RR174x from the drop down menu labeled “Controller”, and press the “Open” button – this will allow you to browse to the extracted BIOS download (step 1).
- 7) Highlight the image file, and click the “Flash!” button. The utility will update the card, then verify the update.
- 8) Once complete, click on the “Exit” button to close the utility. Shutdown and reboot the system.

Note: the “Backup” button will save a copy of the card’s current BIOS to the directory of your choice.

For other operating systems:

In order to update the BIOS, the system must be booted into DOS mode, using a DOS-boot diskette or CD image.

- 1) Copy the load.exe and the bios image file to the bootable floppy diskette (you may need to use a different floppy depending upon how much space is available on the boot diskette - this can vary).

- 2) If you are booting from a CD image, you will need to add these files to the CD.
Insert the boot image media into the appropriate drive, and boot the system.
- 3) Once the A:\> prompt has appeared, insert the media that contains the required BIOS files, and type the following command:
loadxxx.xxx
Then, press enter.
Note: xxx.xxx = the name of the BIOS image file (type it exactly as it appears).
- 4) The utility will scan for the controller, and ask if you want to backup the BIOS (save a copy of the current BIOS to a floppy diskette). This is optional - you can answer No, and continue.
Note: This option will not function if the system was booted from CD.
- 5) The utility will then ask if you want to flash the controller (upgrade the BIOS). Select Y for yes.
- 6) The utility will display a progress bar during the flash procedure, then will attempt verify the update.
- 7) Once complete, the system can be rebooted.

Chapter 4

RocketRAID 174x Driver and Software Installation Microsoft Windows (2000, XP, 2003 Server, x64 versions, Vista)

Contents of this Chapter:

- Driver and Software CD

- Windows Driver Installation

The logo for HighPoint, featuring the word "HighPoint" in a stylized, italicized, blue script font.

Driver and Software CD

The RocketRAID 174x retail box includes a Driver and Software CD.

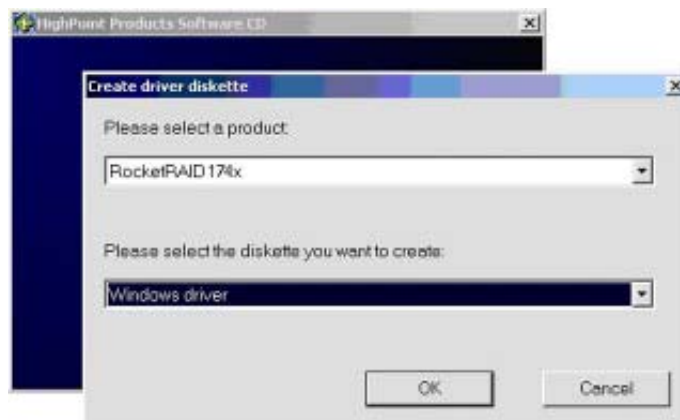
This CD can be used to generate driver diskettes, and install the RAID Management software for a variety of operating systems.

To create a driver diskette:

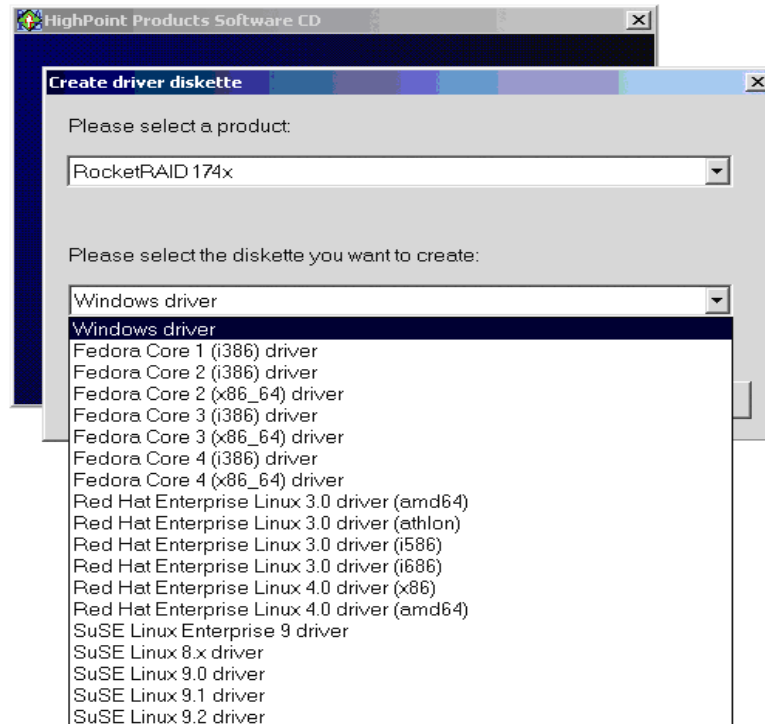
1. Insert the CD into the system's CD/DVD drive. The program should start automatically.
2. Insert a blank floppy diskette into the system's floppy drive.
3. Click on "Create Driver Diskette".



4. Click on the "Please Select a Product" drop-down button, and select "RocketRAID 174x" from the list.



5. Click on the "Please Select the Diskette you want to create" drop-down button, and select the appropriate OS from the list.



6. Click on the “OK” button to create the driver diskette.

To install the RAID software:

1. Click on “Install RAID Management Software”.



2. Select the desired software from the drop down menu, and click on the “OK” button.

Windows Driver Installation

Before installing the RocketRAID 174x device driver, make sure the RocketRAID 174x host adapter and all required hard disks have been installed into the system's chassis (refer to the Hardware Installation section, page 2-3).

Installing the RocketRAID 174x driver for an existing Windows XP/2003/x64/Vista system

After the operating system has booted, Windows will automatically detect the RocketRAID 174x, and request that a device driver be installed. To install the device driver, follow the steps outlined below:

1. When the "Found New Hardware Wizard" window appears, select "Install from a list or specific location (Advanced)", and click Next to continue.
2. Click on the "Include this location in the search" option, and select the system's floppy drive (generally Disk A). Next, insert the Driver Installation diskette into the system's floppy drive.
3. At the Hardware Wizard screen, select the floppy drive as the source, then click the Next button. Select the appropriate operating system folder, then click the Next button.
4. Windows will display a warning message that states the driver has "not been signed". Select "Continue Anyway" and click Finish when prompted. When Windows asks to reboot the system, choose No.
5. Windows will then display a second "Found New Hardware Wizard" window – repeat steps 1 through 4.
6. Remove the Driver Installation diskette from the floppy drive, then Shut down and restart the computer.

Installation Verification

After the driver has been installed, and the system has been restarted:

1. Click the Start button, then right-click My Computer icon. Select the Properties item from the popup menu.
2. In the popup window, select Hardware tab and then click Device Manager button.

3. Double click the “SCSI and RAID controllers” entry. If the RocketRAID 174x device entry is not displayed, or there are “?” or “!” marks displayed near the RocketRAID 174x entry, the driver has not been installed properly. Delete the entries and reinstall the driver.

Installing the RocketRAID 174x driver during a fresh Windows 2000/XP/2003/x64/Vista installation

Note: Windows operating systems require driver input from a floppy disk drive – they will not accept drivers from other media during the installation phase.

1. After booting from the Windows 2000/XP/2003 CD-ROM, when the Windows Setup blue screen appears, look towards the bottom of the screen. Windows will prompt you to press the F6 key if you want to install a third party SCSI or RAID driver. Press the F6 key at this time.
2. The setup procedure will continue, and will later instruct you to press the “S” key to specify additional adapters. Press the “S” key as instructed.
3. Next, the setup program will prompt for the insertion of the driver diskette. Please insert the driver diskette, and then press ENTER to continue.
4. The next window will display several driver options. Please select the RocketRAID 174x Controller for the corresponding operating system, and press ENTER to continue.

1 Web RAID Management Interface

Note: To use the web-based RAID management interface, a web browser with XML support is required, e.g. Internet Explorer 6.0, Mozilla or FireFox

To run the management interface, start your browser and enter the following URL address:

<https://localhost:7402>

If you are managing a remote system please change “localhost” to the server’s host name or IP address.

The default user name is “RAID” and the initial password is “hpt”. You can change the password after you have logged in.

Note: the login information is saved in /etc/hptuser.dat. If you forget the password you can remove this file to reset the password.

If you can't connect to the local system, please check and make sure a process named hptsvr is running. If hptsvr is not running, you can start it manually by using the following command (from a terminal window)

“/Library/Startup Items/Hptsvr/hptsvr”.

If you can't connect to a remote system, make sure hptsvr is running on that system. and you can access the remote system via TCP/IP connection. If you have a firewall configured, make sure TCP port 7402 is not blocked.

2 Preparing Hard disks

Disks must be initialized before they can be configured into RAID arrays.

Initializing hard disks:

- 1) Select the “Manage - Device” function to access the device management page.
- 2) Click on the “Initialize Devices” button towards the upper portion of the interface screen.



- 3) Checkmark each disk you wish to initialize, and click the “Submit” button.

Warning: initializing disks may delete data stored on the selected disks.

3 Array Management

Creating an Array

To create an array:

- 1) Select “**Manage - Array**” from the menu.
- 2) Click the **Create Array** button. The create array page will appear.



- 3) Choose the array type you want to create from the drop-down list.
- 4) Enter a name for the array (this is optional)
- 5) If you are creating a redundant RAID array (RAID1, 5, 10), select an initialization option for the array.

Note: An un-initialized RAID1 or RAID10 array can still provide redundancy in case of a disk failure. A RAID5 array, however, is not fault-tolerant until initialization is finished.

- 6) If you are creating RAID5, specify a cache policy for the array:

Write-back

When the write-back setting is selected, writes to the array are cached. This will result in higher performance, but data loss may occur in case of a power failure.

Write-through

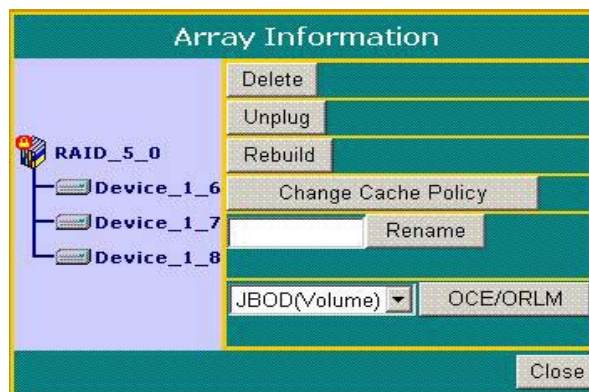
When the write-through setting is selected, writes to the array are always passed directly to the disks. Subsequent reads may still be completed from the cache, if appropriate.

- 7) Select disks from the **Available Disks** list.
- 8) Enter a capacity for the array, or use the default value (the maximum capacity for the array).
- 9) Click **Create**. If you have specified an initialization option, the initialization process will start automatically.

Deleting an Array

To delete an array:

- 1) Select “**Manage - Array**” from the menu.
- 2) Click on the **Maintenance** button. An Array Information window will appear.



- 3) Click the **Delete** button.

Note: An array in use by the operating system cannot be deleted. Any data stored on a deleted array will be inaccessible

Adding Disks to an Array

When an array member in a redundant array fails, the array will be listed as *broken*. A broken array will be automatically rebuilt using available-spare disks. However, if you have no spare disks configured, you can still rebuild by manually adding an Available Disk to the array. To add a disk to a broken array:

- 1) Select menu “**Manage - Array**”.
- 2) Click the **Maintenance** button.
- 3) Click the **Add Disk** button.
- 4) If the disk is successfully added to the array, rebuild process will start automatically.

Note: If the system utilizes hot-swap capable enclosures, you can add new physical disks to the RocketRAID card in order to rebuild or modify an existing array, using the “*Rescan*” feature.

Verifying an Array

For a RAID 1 or RAID1/0 array, verify process compares the data of one mirror pair with the other. For RAID 5, verify process calculates RAID5 parity and compares it to the parity data on the array. Verification checks each sector on a drive. Periodic verification of an array allows the disk drive firmware to take corrective actions on problem areas on the disk, minimizing the occurrence of uncorrectable read and write errors.

To verify an array:

- 1) Select menu “**Manage | Array**”.
- 2) Click the **Maintenance** button.
- 3) Click the **Verify** button to start the verify process.

Rebuilding an Array

When a redundant array enters a critical/broken state, a rebuild is necessary to restore the array’s redundancy (security). The rebuild process for an array generally starts automatically. If you have aborted a rebuild process, you can start it manually. To rebuild an array:

- 1) Select menu “**Manage - Array**”.
- 2) Click the “**Maintenance**” button.
- 3) Click the “**Rebuild**” button. The rebuild process should begin.

Expanding/Migrating an Array

With the OCE/ORLM function, you can migrate an array from one RAID level to another RAID level and/or expand the array dynamically, even under I/O load. This function implements both Online Capacity Expansion (OCE) and Online RAID Level Migration (ORLM).

To expand/migrate an array:

- 1) Select “**Manage | Array**” from the menu.
- 2) Click the **Maintenance** button.
- 3) Select the target array type.
- 4) Click the **OCE/ORLM** button.
- 5) The OCE/ORLM page will appear. The interface is similar to the array creation wizard.

Note:

When expanding a JBOD array, all the original disks must be included in the target array, and these disks must be selected in the same order (as the original array). If you want to migrate a JBOD array to another RAID level, only the first member disk can be included in the target array. For example, a JBOD comprised of 3 disks (1, 2, 3), can only be “migrated” using disk 1. Disks 2 and 3 cannot be used – disk 1 would have to be combined with other disks attached to the RocketRAID card (4).

You cannot change an array to another type of array with a smaller capacity. In some cases, a disk may need to be added to the RocketRAID card.

During the OCE/ORLM procedure, the redundancy level of the array will be the lowest of the source and target arrays; e.g. if you ORLM a RAID0 array to a RAID1 array, the array will be non-redundant until the procedure is complete.

The OCE/ORLM process can be aborted and continued at later time. However, you should always stop the transform progress from the RAID Management software.

An unexpected system crash may result in data loss while performing OCE/ORLM on an array. We strongly recommend backing up data before starting the OCE/ORLM process.

Renaming an Array

To rename an array:

- 1) Select “**Manage - Array**” from the menu.
- 2) Click on the **Maintenance** button.
- 3) Enter a new name for the array.
- 4) Click the **Rename** button.

Note: An array running background tasks cannot be renamed.

4 Device Management

Select the “**Manage | Device**” function to access the device management page.

Manage Event Task Setting Logout Help

Rescan Devices Initialize Devices

Controller 1 (RocketRAID 232x SATA Controller)				
Device_1_5	Model	WDC WD5000YS-01MPB0	Read Ahead	Enabled Change
	Revision	07.02E07	Write Cache	Enabled Change
	Location	1/5	TCQ	Not Supported
SMART	Capacity	500.02 GB	NCQ	Enabled Change
	Max Free	0.00 GB	Status	Normal
Device_1_6	Model	WDC WD5000YS-01MPB0	Read Ahead	Enabled Change
	Revision	07.02E07	Write Cache	Enabled Change
	Location	1/6	TCQ	Not Supported
SMART	Capacity	500.02 GB	NCQ	Enabled Change
	Max Free	0.00 GB	Status	Normal
Device_1_7	Model	WDC WD5000YS-01MPB0	Read Ahead	Enabled Change
	Revision	07.02E07	Write Cache	Enabled Change
	Location	1/7	TCQ	Not Supported
SMART	Capacity	500.02 GB	NCQ	Enabled Change
	Max Free	0.00 GB	Status	Normal
Device_1_8	Model	WDC WD5000YS-01MPB0	Read Ahead	Enabled Change
	Revision	06.02E06	Write Cache	Enabled Change
	Location	1/8	TCQ	Not Supported
SMART	Capacity	500.02 GB	NCQ	Enabled Change
	Max Free	0.00 GB	Status	Normal

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Change Device Settings

Depending upon the capabilities RAID controller and hard disks drives in use, several configurable device settings may be available: Read Ahead, Write Cache, TCQ, and NCQ. Each feature can be enabled or disabled individually, for each hard disk.

S.M.A.R.T Status

You can view S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) data about a particular hard disk to help troubleshoot problems that occur. You can also setup periodically S.M.A.R.T. status checking to send notification messages when S.M.A.R.T. thresholds are exceeded.

To view the S.M.A.R.T status of a hard disk:

- 1) Select “**Manage | Device**” from the menu.
- 2) Click the “**SMART**” link to display the S.M.A.R.T information page.

Model Number WDC WD2500JD-00GB80

S.M.A.R.T. ☒ Enabled ☐ Disable

Status **OK**

S.M.A.R.T Attributes					
ID	Name	Threshold	Worst	Value	Status
1	Read Error Rate	51	200	200	OK
3	Spin-up Time	21	105	108	OK
4	Start/Stop Count	40	100	100	OK
5	Re-allocated Sector Count	140	200	200	OK
7	Seek Error Rate	51	200	200	OK
9	Power-on Hours Count	0	99	99	OK
a	Spin-up Retry Count	51	100	100	OK
b	Drive Calibration Retry Count	51	100	100	OK
c	Drive Power Cycle Count	0	100	100	OK
c2	HDA Temperature	0	253	103	OK
c4	Relocation Event Count	0	200	200	OK
c5	Current Pending Sector Count	0	200	200	OK
c6	Off-line Scan Uncorrectable Sector Count	0	200	200	OK
c7	Ultra ATA CRC Error Rate	0	253	200	OK
c8	Multi-zone Error Rate	51	155	200	OK

Preferences

☐ Poll this disk every 1 Minutes

Submit

Note: S.M.A.R.T attribute data is drive-specific. The software includes a list of definitions for popular drive models/manufacturers. Unknown S.M.A.R.T. attributes will be shown as “unknown”. You can add the attribute definitions for your drive in the file smart.def (which resides in the software installation directory).

Rescan Devices

When you physically add drives to the controller while the system is running, you can rescan the controller to reflect the change.

To rescan the devices:

- 1) Select menu “**Manage | Device**”.
- 2) Click “**Rescan Devices**” button.

Note: When you are hot-plugging an entire array, run rescan *only* after all array members (hard disks) have been physically plugged or unplugged from the system. You can rescan all the devices at once using the Rescan function on the **Array Management** page.

5 Configuring Spare Disks

To configure spare disks attached to the RocketRAID card, select the “**Manage | Spare**” function. The Spare Pool Management page will be displayed.

Spare Pool				
<input type="checkbox"/>		Device_1_5	WDC WD2500JD-00GBB0	249.98 GB
Remove Spare				
Available Disks				
<input type="checkbox"/>		Device_1_6	FUJITSU MPG3204AH	20.40 GB
<input type="checkbox"/>		Device_1_7	WDC WD2500JD-00GBB0	249.98 GB
<input type="checkbox"/>		Device_1_8	ST315320A	15.23 GB
Add Spare				

Adding a Spare Disk

To add a spare disk, select a disk from the *Available Disks* list and click **Add Spare** button. This will add the disk to the *Spare Pool* list.

Removing a Spare Disk

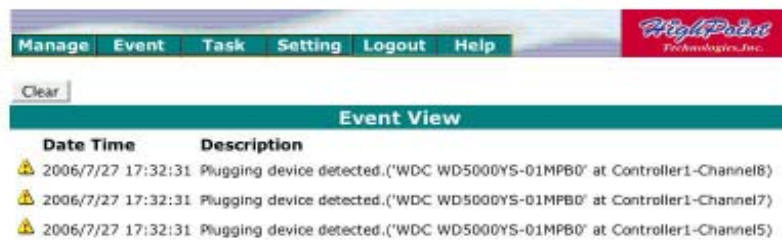
To remove a spare disk, select it from the *Spare Pool* list and click the **Remove Spare** button. This will remove the disk from the *Spare Pool* list.

6 Managing Events and Tasks

The HighPoint Web RAID Management Software automatically logs all controller related events that have occurred (for all controllers/cards managed by the software). In addition you can configure E-mail Notification to receive information about these events (see Section 7 Settings)

View Events

To view logged events, Please select “**Event**” from the menu. The *Event Management* page will be displayed.



Click the **Clear** button to clear the event log.

Managing Tasks

With HighPoint RAID Management Software, you can setup background rebuild and verify tasks to help maintain the integrity of your drives and data. The tasks can be scheduled periodically.

You can select menu “**Task**” to enter Task Management page.

The screenshot shows the HighPoint Web RAID Management interface. At the top, there is a navigation bar with links: Manage, Event, Task, Setting, Logout, and Help. The HighPoint logo is on the right. Below the navigation bar, there is a 'Tasks List' section. The main form is titled 'New Verify Task'. It has a 'Task Name' field with the value 'RAID_5_0'. There are two radio buttons for scheduling: 'Occurs one time on' and 'Occurs every'. The 'Occurs every' option is selected. The frequency is set to '1 Day(s) on Sunday at 17:53:28'. The 'Start date' is '2006-9-20' and the 'End date' is '2006-9-20'. There is a 'Submit' button at the bottom. At the very bottom, it says 'HighPoint Web RAID Management 1.4' and 'Copyright (c) 1996-2006 HighPoint Technologies, Inc. All Rights Reserved'.

Scheduling a Task

To add a task schedule:

- 1) Select the array that you want to verify or rebuild.
- 2) Enter a name for the task.
- 3) Configure the frequency for the task.
- 4) Check the **Submit** button.

Delete a Scheduled Task

To delete a task schedule:

- 1) Select a task from the Tasks List.
- 2) Click the Delete button.

7 Settings

Select the “**Settings**” option to access *Settings* page.

Manage Event Task **Setting** Logout Help

Audible Alarm

☒ Enable audible alarm. [Change](#)

SAF-TE

Set SAF-TE Config File: [Change](#)

Listening Port

☐ Restrict to localhost access.

Port Number: [Change](#)

Password

Password:

Confirm:

[Change Password](#)

SMTP Setting

☐ Enable Event Notification

Server Address (name or IP):

Mail From (E-mail address):

Login Name:

Password:

SMTP Port:

[Change Setting](#)

Recipients

E-mail	Name	Event Level
Add Recipient		
E-mail: <input type="text"/>	Name: <input type="text"/>	Event Level: <input type="checkbox"/> Information <input type="checkbox"/> Warning <input type="checkbox"/> Error
Add Test		

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Enable Audible Alarm

This setting enables and disables the RR174x’s alarm.

Listening Port

Change Listening Port

This is the TCP port number utilized by the HighPoint RAID Management Service in order to communicate with the management console and web browser software.

When you connect to the service, the port value you enter must be in accordance with the system port value on the service. The default value is 7402.

Enter a new port number and click the “**Change Port**” button to change the listening port.

Restrict to localhost access

If this option is selected, the HPT Web RAID Management Service will refuse any Remote Access request. Please connect to the local machine by entering “localhost” in the URL bar.”

Change Password

This setting allows you to alter the default password (when logging on).

Enter a new password and click the “**Change Password**” button to change the current user’s password. Configure E-mail notification

Enabling E-mail notification:

To configure E-mail notification:

- 1) Select the “**Enable Event Notification**” option.
- 2) Enter the appropriate information for the SMTP server.
- 3) Click the “**Change Setting**” button.

Note: Your SMTP server may require user authentication – enter the appropriate password and username as required.

To add a Recipient:

1. Enter the necessary information for the desired recipient.
2. Click the **Add** button.

To test E-mail notification:

- 1) Enter the necessary information for the recipient.
- 2) Click the **Test** button.

Chapter 5

Linux Driver Support

Contents of this Chapter:

- Fedora Core 6 Linux installation Overview

- Red Hat Enterprise 4 Overview

- SuSE Linux Enterprise Server (SLES) installation Overview

HighPoint

1 – Fedora Core 6 Linux installation Overview

This section provides instructions describing how to install and utilize the RocketRAID 174x Adapter on a Fedora Core 6 Linux system.

2 - Installing Fedora Core 6 on the RocketRAID 174x Host Adapter

Note: If the OS is running kernel that differs from the one supported by the precompiled driver, the precompiled drivers cannot be used. A driver can be built for this kernel using the OpenSource package for the RocketRAID 174x controller. This package is available from our website, and is posted on the BIOS/Driver page for the RocketRAID 174x.

To install Fedora Linux onto hard disks or RAID arrays attached to RocketRAID 174x controller, follow the steps outlined below:

Step 1 Prepare the Driver Diskette

The driver is contained in a floppy diskette image file.

On a DOS or Windows system, a Fedora driver diskette can be generated using rawrite.exe. This utility is included on the Fedora Linux CD (under /dosutils). Run rawrite using a command prompt window, and follow the directions it provides.

On a Linux system, use the “dd” command to generate a boot diskette. Insert a floppy disk into the floppy drive and type the following command:

```
# dd if=fcX-i386.img of=/dev/fd0
```

Note: The driver disk image file depends on your core version and hardware.

Step 2 Install Fedora Linux

Installation steps for Fedora Core 6

- 1) Boot from the Fedora Installation CD, and start the install procedure.
- 2) At the “Welcome to Fedora Linux” installation screen, a prompt labeled “boot:” will appear at the bottom of the screen. Type in **linux dd**, then press Enter.

```
boot: linux dd
```

3) When prompted “Do you have a driver disk?”, select “Yes”. At the “Insert your driver disk and press OK to continue” prompt, insert the driver diskette in the floppy drive and then select “OK”.

4) The system will now load the RocketRAID 174x driver automatically.

3 - Installing the RocketRAID 174x driver for an Existing System

Note: If a SCSI adapter is used to boot the system, make sure the RocketRAID 174x controller BIOS loads/posts after the SCSI adapter’s BIOS. It may be necessary to move the adapter(s) to another PCI slot.

Step 1 Obtain the Driver Module

Extract the module file from the file modules.cgz (from the driver disk) using the following commands:

```
# mount /dev/fd0
# cd /tmp
# gzip -dc /media/floppy/modules.cgz | cpio -idumv
```

Driver modules for all supported kernel versions will be extracted. The driver module for the active kernel is located under the directory that matches the kernel version (/tmp/`uname -r`/i686/rr174x.ko).

After extracting the driver module, load it using the following commands:

```
# modprobe sd_mod
# insmod rr174x.ko
```

Arrays attached to the adapter can be accessed as SCSI devices (e.g. /dev/sda).

Step 2 Mounting and Partitioning the Device

Example: A RAID array has been configured between several hard disks.

This array will be registered to the system as device “/dev/sda”.

To create a partition on this array (which will listed as /dev/sda1), use the “fdisk /dev/sda” command.

Next, use the “mkfs /dev/sda1” command to setup a file system on this partition.

Use the command “mkdir xxxx” to create a mount point for the RAID array.

Then mount /dev/sda1 /xxxx in order to access it.

Note: xxxx represents the desired name of the mount point.

Step 3 Configure System to Automatically Load the Driver

To avoid typing in “insmod rr174x.ko” each time the operating system is booted, the system must be instructed to automatically load the module during bootup. To install the module, type in the following commands (first change to the directory where the proper rr174x.ko file is located):

```
#cp rr174x.ko /lib/modules/$(uname -r)/kernel/drivers/scsi
#depmod
```

Then, instruct the system to load the module when booting. Use the following commands:

```
#echo “modprobe rr174x” > /etc/init.d/hptdriver
#chmod 755 /etc/init.d/hptdriver
#ln -sf /etc/init.d/hptdriver /etc/rc.d/rc3.d/S01hptdriver
#ln -sf /etc/init.d/hptdriver /etc/rc.d/rc4.d/S01hptdriver
#ln -sf /etc/init.d/hptdriver /etc/rc.d/rc5.d/S01hptdriver
```

Step 4 Configure System to Mount Volumes during Startup

The system can be instructed to automatically mount the array(s) during startup by modifying the file “/etc/fstab”.

For example, add the following line to tell the system to mount /dev/sda1 to location /mnt/raid after startup:

```
/dev/sda1    /mnt/raid    ext3    defaults    0 0
```

4 - Updating the Driver

1. If the original driver is installed in the system’s initrd (Initial RAM Disk) file (when using a system installed to the RocketRAID 174x controller, for example), the driver module in the initrd file should be updated using the **mkinitrd** command (or extract the initrd file and replace the driver module manually).

2. If the original driver is installed in the `/lib/modules/$(uname -r)/kernel/drivers/scsi/` directory, and loaded by the script file (Example `/etc/init.d/hptdriver`) during the init process, or the configure file (Example `/etc/modules.conf`), please replace it with the new driver (`rr174x.o` or `rr174x.ko`).

5 Installing the RAID Management Software

The HighPoint RAID Management Software is used to configure and keep track of your hard disks and RAID arrays attached to RR174x controller. Installation of the management software is optional but recommended. To configure HighPoint RAID Management Software to work with RR174x driver, you should setup `/etc/hptcfg` to be the driver name: `# echo RR174x > /etc/hptcfg` Please refer to HighPoint RAID Management Software documents for more information.

6 - Uninstalling the Driver

To uninstall the RocketRAID 174x driver

Note: The driver cannot be uninstalled while the system is booted from a disk or array attached to the RocketRAID 174x.

To uninstall the driver, remove the lines added to `/etc/fstab`, and remove the files created in the `/etc/init.d` directory.

1 - Red Hat Enterprise 4 Overview

This section provides instructions describing how to install and utilize the RocketRAID 174x Adapter on a Red Hat Enterprise 4 Linux system.

2 - Installing Red Hat Enterprise 4 (AS, ES, WS) Linux on the RocketRAID 174x controller

To install Red Hat Enterprise Linux onto disks or RAID arrays attached to RocketRAID 174x:

Step 1 Prepare the Driver Diskette

The driver is provided in a floppy diskette image file format.

On a DOS or Windows system, a driver diskette can be generated using rawrite.exe. This utility is included on the Red Hat Enterprise Linux CD (under /dosutils). Run rawrite using a command prompt window, and follow the directions it provides.

On a Linux system, use the “dd” command to generate a boot diskette. Insert a floppy disk into the floppy drive and type the following command (amd64 driver for example):

```
# dd if=rh3dd-amd64.img of=/dev/fd0
```

Step 2 Install Red Hat Enterprise Linux

Start installing Red Hat Enterprise Linux by booting from the installation CD.

At the “Welcome to Red Hat Linux” installation screen, a prompt labeled “boot:” will appear at the bottom of the screen. Type in **linux dd**, then press Enter.

```
boot: linux dd
```

When prompted “Do you have a driver disk?”. Select “Yes”.

When prompted “Insert your driver disk and press OK to continue”, insert the driver diskette into the system’s floppy drive, and select “OK”.

1. The system will now load the RocketRAID 174x driver automatically.
2. When prompted “Where do you want to install the boot loader?” in the “Boot Loader Configuration” dialog, select “Master Boot Record (MBR)” to instruct the system be to boot from the RocketRAID 174x.

Continue the installation as normal. You can refer to Red Hat Enterprise Linux installation guide.

Note:

The system device mapping order is the same as the order shown in RocketRAID 174x BIOS Setting Utility. If no other SCSI adapters are installed, the device marked as “BOOT” or “HDD0” will be identified as `/dev/sda`, “HDD1” as `/dev/sdb`, “HDD2” as `/dev/sdc`, etc. When creating mount points, `/boot` must be mounted on `/dev/sda`.

3 - Installing the RocketRAID 174x driver for an Existing System

Note: If a SCSI adapter is used to boot the system, make sure the RocketRAID 174x controller BIOS loads/posts after the SCSI adapter’s BIOS. It may be necessary to move the adapter(s) to another PCI slot.

Step 1 Obtain the Driver Module

Extract the module file from the file `modules.cgz` (from the driver disk) using the following commands:

```
# mount /dev/fd0
# cd /tmp
# gzip -dc /mnt/floppy/modules.cgz | cpio -idumv
```

Driver modules for all supported kernel versions will be extracted. The driver module for the active kernel is located under the directory that matches the kernel version (`/tmp/$(uname -r)/rr174x.ko`).

After you have extracted the driver module, you can load it by following commands:

```
# modprobe sd_mod
# insmod rr174x.ko
```

Arrays attached to the adapter can be accessed as SCSI devices (e.g. `/dev/sda`).

Step 2 Mounting and Partitioning the Device

Example: A RAID array has been configured between several hard disks.

This array will be registered to the system as device `“/dev/sda”`.

To create a partition on this array (which will listed as /dev/sda1), use the “fdisk /dev/sda” command.

Next, use the “mkfs /dev/sda1” command to setup a file system on this partition.

Use the command “mkdir xxxx” to create a mount point for the RAID array.

Then, mount /dev/sda1 /xxxx in order to access it.

Note: xxxx represents the desired name of the mount point.

Step 3 Configure System to Automatically Load the Driver

To avoid typing in “insmod rr174x.ko” each time the operating system is booted, the system must be instructed to automatically load the module during bootup. To install the module, type in the following commands (first change to the directory where the proper rr174x.ko file is located):

```
# install -d /lib/modules/$(uname -r)/kernel/drivers/scsi
# install -c rr174x.ko /lib/modules/$(uname -r)/kernel/drivers/scsi
```

Then, instruct the system to load the module when booting. Use the following commands:

```
#echo “modprobe rr174x” > /etc/init.d/hptdriver
#chmod 755 /etc/init.d/hptdriver
#ln -sf /etc/init.d/hptdriver /etc/rc.d/rc3.d/S01hptdriver
#ln -sf /etc/init.d/hptdriver /etc/rc.d/rc4.d/S01hptdriver
#ln -sf /etc/init.d/hptdriver /etc/rc.d/rc5.d/S01hptdriver
```

Step 4 Configure System to Mount Volumes during Startup

The system can be instructed to automatically mount the array(s) during startup by modifying the file “/etc/fstab”.

For example, add the following line to tell the system to mount /dev/sda1 to location /mnt/raid after startup:

```
/dev/sda1    /mnt/raid    ext2    defaults    0 0
```


4 - Updating the Driver

If you are not booting from disks attached to RocketRAID 174x controller, you can update the driver just by reinstalling it following the procedure outlined in the previous section, “Installing the RocketRAID 174x driver for an Existing System”.

If you are running the system installed to a disk or array attached to the RocketRAID 174x:

First, obtain the new driver module “rr174x.ko”. Refer to the previous section “Obtain the Driver Module”. In following steps, we assume it has been copied to “/tmp/rr174x.ko”.

Replace rr174x.o in the boot RAM disk image, /boot/initrd-xxx.img (where xxx is the kernel version).

Example: (2.4.21-4.EL for Red Hat Enterprise Linux 3.0):

```
# gzip -dc /boot/initrd-xxx.img > /tmp/initrd.ext2
# mkdir /mnt/initrd
# mount -o loop /tmp/initrd.ext2 /mnt/initrd
# cp /tmp/rr174x.o /mnt/initrd/lib/rr174x.o
# umount /mnt/initrd
# gzip -c /tmp/initrd.ext2 > /boot/initrd-xxx.img
```

If you are using lilo to boot the system, use “lilo” to reinstall the RAM disk:

```
# lilo
```

Update rr174x.o in /lib/modules:

```
# cp /tmp/rr174x.ko /lib/modules/`uname -r`/kernel/drivers/scsi/rr174x.ko
```

Reboot your system to allow the new driver take effect.

5 - Uninstalling the Driver

To uninstall the RocketRAID 174x driver

Note: The driver cannot be uninstalled while the system is booted from a disk or array attached to the RocketRAID 174x.

To uninstall the driver, remove the lines added to /etc/fstab, and remove the files created in the /etc/init.d directory.

1 – SuSE Linux Enterprise Server (SLES) installation Overview

This section provides instructions describing how to install and utilize the RocketRAID 174x Adapter on a SuSE (SLES) Linux system.

2 - Installing SLES Linux on the RocketRAID 174x Host Adapter

Note: If the OS is running kernel that differs from the one supported by the precompiled driver, the precompiled drivers cannot be used. A driver can be built for this kernel using the OpenSource package for the RocketRAID 174x controller. This package is available from our website, and is posted on the BIOS/Driver page for the RocketRAID 174x.

To install SLES onto hard disks or RAID arrays attached to RocketRAID 174x controller, follow the steps outlined below:

Step 1 Prepare the Driver Diskette

The driver is contained in a floppy diskette image file (slesdd.img).

On a DOS or Windows system, a driver diskette can be generated using rawrite.exe. This utility is included on the SLES Linux CD (under /dosutils). Run rawrite using a command prompt window, and follow the directions it provides.

On a Linux system, use the “dd” command to generate a boot diskette. Insert a floppy disk into the floppy drive and type the following command:

```
# dd if=SLESdd.img of=/dev/fd0
```

Step 2 Install SLES Linux

1. Start the install procedure by booting from SLES installation CD.
2. After the CD boots, select the “Installation” option and press F6 to load the driver.
3. Insert the Driver Diskette when it displays “Please insert the Driver Update floppy”.

4. When the “Diver Update Menu” is displayed, press “OK” and “back” for back to installer.
5. Next. Select “back” to return to the installer.
6. Installation will now proceed normally. Refer to SLES Linux documents for additional OS installation procedures.

Additional Installation Notes:

The system device mapping order is the same as the order shown in RocketRAID 174x BIOS Setting Utility. If no other SCSI adapters are installed, the device marked as “BOOT” or “HDD0” will be identified as `/dev/sda`, “HDD1” as `/dev/sdb`, “HDD2” as `/dev/sdc`, etc. When creating mount points, `/boot` must be mounted on `/dev/sda`.

3 - Installing the RocketRAID 174x Driver on an Existing System

If you are currently running SLES and would like to access drives or arrays attached to the Rocket RAID 174x controller, follow the steps outlined below:

Note:

1. If a SCSI adapter is used to boot the system, make sure the RocketRAID 174x controller BIOS loads/posts after the SCSI adapter’s BIOS. It may be necessary to move the adapter(s) to another PCI slot.
2. The driver may work incorrectly on certain motherboards (such as DFI77B KT400). For these motherboards, add the “acpi=off” kernel parameter in the `boot/grub/menu.lst`:

```
kernel (hd0,1)/vmlinuz root=/dev/hda1 acpi=off
initrd (hd0,1)/initrd
```

Step 1 Update Grub

If you are running an SLES SMP System, you must first update the `/boot/grub/menu.lst`.

Example:

```
default=0
timeout=8
```

```
title Linux
kernel (hd0,1)/vmlinuz root=/dev/hda1 acpi=off
initrd (hd0,1)/initrd
```

Reboot the system to allow the new kernel parameters to take effect.

Step 2 Install the Driver Module

Extract the module file from the file /linux/suse /*[arch]*-*[version]*/install/update.tar.gz (from the driver disk), using the following commands:

```
# mount /dev/fd0 /mnt/floppy
# cd /
# tar xfz /mnt/floppy/linux/suse/i386-sles9/install/update.tar.gz
```

The driver modules will be extracted to the directory /lib/modules/*[kernel-ver]*/kernel/drivers/scsi/ .

After you have extracted the driver module, you can load it by following commands:

```
# modprobe sd_mod
# insmod rr174x.ko
```

Then you can access the arrays attached to the controller as SCSI devices (e.g. /dev/sda).

Step 3 Mounting and Partitioning the Device

Note: Many versions of SuSE include YAST. YAST is a graphical configuration utility that is capable of executing the commands described below. We recommend using YAST, if available, as it may help simplify the installation process.

Example: A RAID array has been configured between several hard disks.

This array will be registered to the system as device “/dev/sda”.

1. To create a partition on this array (which will listed as /dev/sda1), use the “fdisk /dev/sda” command.
2. Next, use the “mkfs /dev/sda1” command to setup a file system on this partition.
3. Use the command “mkdir *xxxx*” to create a mount point for the RAID array. Then, mount /dev/sda1 /*xxxx* in order to access it.

Note: *xxxx* represents the desired name of the mount point.

Step 4 Configure System to Automatically Load the Driver

To avoid typing in “insmod rr174x.o” each time the operating system is booted, the system must be instructed to automatically load the module during bootup. To install the module, type in the following commands (first change to the directory where the proper rr174x.ko file is located):

1. Edit the file “/etc/sysconfig/kernel”, and add the rr174x module to the line “INITRD_MODULES=...”

Example:

```
INITRD_MODULES="reiserfsrr174x"
```

2. Run the “depmod” command to update the module configuration:
depmod
3. Next, run the “mkinitrd” command to update the initrd file:
mkinitrd
4. If you are using the lilo boot loader, run lilo again:
lilo

Step 5 Configure System to Mount Volumes during Startup

The system can be instructed to automatically mount the array(s) during startup by modifying the file “/etc/fstab”.

For example, add the following line to tell the system to mount /dev/sda1 to location /mnt/raid after startup:

```
/dev/sda1    /mnt/raid    ext2  defaults  0 0
```

4 – Updating the Driver

To update the driver, simply reinstall the driver following the steps in previous section, “Install RocketRAID 174x Driver on an Existing System”.

Note: If the driver is loaded in initrd (when system is installed onto a disk or array attached to the RocketRAID 174x), you need to run the mkinitrd command to update the initrd file. If you are using the lilo boot loader, run lilo again (# lilo).

5 - Uninstalling the Driver

To uninstall the RocketRAID 174x driver

Note: The driver cannot be uninstalled while the system is booted from a disk or array attached to the RocketRAID 174x.

To uninstall the driver, remove the lines added to `/etc/modules.conf` and `/etc/fstab`.

Chapter 6

FreeBSD Driver Support

Contents of this Chapter:

- 1 - Installing FreeBSD on the RocketRAID 174x Controller
- 2 - Installing the RocketRAID 174x Driver on an Existing System
- 3 - Updating the Driver
- 4 - Uninstalling the Driver

HighPoint

1 - Installing FreeBSD on the RocketRAID 174x Controller

If you would like to install FreeBSD onto arrays attached to the RocketRAID 174x host adapter, please follow the steps below.

Step 1 Prepare the Driver Diskette

When installing FreeBSD to a disk or array attached to the RocketRAID 174x, you must prepare a RocketRAID 174x driver diskette before starting the installation procedure.

First, obtain the driver diskette image file from the driver package.

In a DOS or Windows system, create the boot diskette using the rawrite.exe utility. This utility can be found on the FreeBSD CD (under \tools). Run it under a DOS-Prompt window and follow it's prompt.

On a FreeBSD system, use the "dd" command to make the driver diskette. For example, Insert a floppy disk into the floppy drive and type the following command (if you are installing FreeBSD 5.x versions):

```
# dd if=freebsd_5.x.img of=/dev/fd0
```

Step 2 Install FreeBSD

1. Start the FreeBSD installation procedure by booting from installation CD.
2. If you are installing FreeBSD 5.0 or earlier versions, skip this step. When the "Welcome to FreeBSD" screen appears, select "6".
3. When the "Hit [enter] to boot immediately or any other key for command prompt" screen appears, press the SPACE key to stop the loader from autobooting.

```
BTX loader 1.00  BTX version is 1.01
Console: internal video/keyboard
BIOS driver A: is disk0
BIOS driver B: is disk1
BIOS driver C: is disk2
BIOS 636kB/74512kB available memory
```



```
FreeBSD/i386 bootstrap loader, Revision 0.8
(mailto:jkh@narf.osd.bsdi.com, Sat Apr 21 08:46:19 GMT 2001)
```

Hit [Enter] to boot immediately, or any other key for
command prompt.

Booting [kernel] in 9 seconds...

<-press SPACE key

A prompted label “**ok**” will appear at the bottom of the screen.

4. Insert the RocketRAID 174x driver diskette into floppy drive. Type in “**load diskx:rr174x-x.x**” (without quotation marks), and then press **enter**.

```
for FreeBSD 4.3-RELEASE
```

```
ok load kernel
```

```
ok load disk1:rr174x-4.3.ko
```

```
for FreeBSD 4.4-RELEASE
```

```
ok load kernel
```

```
ok load disk1:rr174x-4.4.ko
```

```
for FreeBSD 4.5-RELEASE
```

```
ok load disk1:rr174x-4.5.ko
```

```
for FreeBSD 4.6.2-RELEASE
```

```
ok load disk1:rr174x-4.6.2.ko
```

```
for FreeBSD 4.7-RELEASE
```

```
ok load disk1:rr174x-4.7.ko
```

```
for FreeBSD 4.8-RELEASE
```

```
ok load disk1:rr174x-4.8.ko
```

```
for FreeBSD 4.9-RELEASE
```

```
ok load disk1:rr174x-4.9.ko
```

```
for FreeBSD 4.10-RELEASE
```

```
ok load disk1:rr174x-4.10.ko
```

```
for FreeBSD 4.11-RELEASE
ok load disk1:rr174x-4.11.ko
```

```
for FreeBSD 5.0-RELEASE
ok load disk0:rr174x-5.0.ko
```

```
for FreeBSD 5.1-RELEASE
ok load disk0:rr174x-5.1.ko
```

```
for FreeBSD 5.2.1-RELEASE
ok load disk0:rr174x-5.2.1.ko
```

```
for FreeBSD 5.3-RELEASE
ok load disk0:rr174x-5.3.ko
```

```
for FreeBSD 5.4-RELEASE
ok load disk0:rr174x-5.4.ko
```

```
for FreeBSD 5.3-AMD64-RELEASE
ok load disk0:rr174x-5.3-amd64.ko
```

```
for FreeBSD 5.4-AMD64-RELEASE
ok load disk0:rr174x-5.4-amd64.ko
```

5. After the driver has been loaded, remove the floppy diskette from the floppy drive.
6. Type in “boot” and continue with installation as normal. Refer to FreeBSD installation guide for additional information.

ok **boot**

***Note:** On some systems, when ACPI is enabled, FreeBSD may not function properly. Try disabling ACPI in the motherboard’s BIOS settings, or type the command “set hint.acpi.0.disabled=”I”” under the boot prompt, in order to solve the problem.*

7. Before exiting installation, an additional step must be taken to copy the RocketRAID 174x driver module to the system. On the driver diskette, there is a setup script labeled “**postinstall**”, which will complete this task. Before rebooting the system, press **Alt-F4** to enter the command shell, and type the following commands:

```
# mount -o ro /dev/fd0 /mnt
# sh /mnt/postinstall
# umount /mnt
```

Then, press **Alt-F1** to return to the setup screen, and choose [**X Exit Install**] to finish setup.

2 - Installing the RocketRAID 174x Driver on an Existing System

If you are currently running FreeBSD and would like to access drives or arrays attached to the RocketRAID 174x Controller, follow the steps outlined below:

Step 1 Copy the Driver Module

If you have made FreeBSD drivers into a diskette, you can insert the driver diskette to floppy drive, then using the following commands to copy the driver module:

```
For FreeBSD 4.x:
# mount -o ro /dev/fd0 /mnt
# cp /mnt/rr174x-xxx.ko /modules/rr174x.ko
# umount /mnt

For FreeBSD 5.x:
# mount -o ro /dev/fd0 /mnt
# cp /mnt/rr174x-xxx.ko /boot/kernel/rr174x.ko
# umount /mnt
```

Alternately, it is possible extract the files from the .img files directly, without using a floppy diskette:

For FreeBSD 4.x:

```
# vnconfig vn0c freebsd_xxx.img
# mount /dev/vn0c /mnt
# cp /mnt/rr174x-xxx.ko /modules/rr174x.ko
# vnconfig -du vn0c myfilesystem mount=/mnt
```

For FreeBSD 5.x:

```
# mdconfig -a -t vnode -f freebsd_5.x.img -u 0
# mount /dev/md0 /mnt
# cp /mnt/rr174x-xxx.ko /boot/kernel/rr174x.ko
# umount /mnt
# mdconfig -d -u md0
```

Step 2 Test the Driver Module

Test the driver module to ensure that it works with the system, by loading it during bootup. If the module has been loaded successfully you should see the RocketRAID 174x banner and a display screen of the attached drives. You can now access the drives as a SCSI device.

Note: If you have no other SCSI device, the first device is `/dev/da0`, then `/dev/da1`, etc.).

Example: F1 FreeBSD

Default: F1

```
>> FreeBSD/i386 BOOT
```

```
Default: 0:ad(0,a)/boot/loader
```

```
boot:
```

```
BTX loader 1.00 BTX version is 1.01
```

```
Console: internal video/keyboard
```

```
BIOS driver A: is disk0
```

```
BIOS driver C: is disk2
```

```
BIOS 636kB/74512kB available memory
```

```
FreeBSD/i386 bootstrap loader, Revision 0.8
```

```
(mailto:jkh@narf.osd.bsdi.com, Sat Apr 21 08:46:19 GMT
```

```
2001)
```

```
Loading /boot/defaults/loader.conf
```

```
/kernel text=0x24f1db data=0x3007ec+0x2062c -  
<- For FreeBSD 5.1 and later: select "6" on "Welcome to  
FreeBSD" screen.
```

Hit [Enter] to boot immediately, or any other key for command prompt.

Booting [kernel] in 9 seconds...

```
<-press SPACE key  
Type '?' for a list of commands, 'help' for more de-  
tailed help.  
ok load rr174x  
/modules/rr174x.ko text=0xf571 data=0x2c8+0x254  
ok autoboot
```

Note: If you have configured a RAID 10 using 4 disks, it will be registered to system as device `/dev/da0`. You can use `"/stand/sysinstall"` to create partitions and disklabels (like `da0s1e`) on `da0`. Then, create a new filesystem using `"newfs /dev/da0s1e"`. Now you can mount `/dev/da0s1e` to somewhere to access it

Step 3 Configure System to Automatically Load the Driver

To avoid typing in `"load rr174x"` each time the operating system is booted, the system must be instructed to automatically load the module during bootup. To configure the system to automatically install the module, type in the following commands:

```
# echo 'rr174x_load="YES"' >> /boot/defaults/  
loader.conf
```

This command will instruct the loader to load the RocketRAID 174x module together with the kernel. After using this command, reboot the system. The RocketRAID 174x module should now automatically load each time the operating system starts up.

Note: When using FreeBSD 4.x, type in the following command to configure the system:

```
# mknod /dev/rr174x c 200 0
```

Then, check to make sure the node `"/dev/rr174x"` is present in the `/dev` directory.

Step 4 Configure the System to Mount Volumes at Startup

Instruct the system to automatically mount the array by modifying the file `/etc/fstab`.

Example: Add the following line to instruct the system to mount `/dev/dasle` to location `/mnt/hpt` after startup:

```
/dev/dasle  /mnt/hpt    ufs  rw  0  0
```

3 - Updating the Driver

To update the driver with a newer revision, simply reinstall the driver following the steps discussed in the previous section, “*Install the driver on an existing system*”.

4 – Uninstalling the Driver

The driver can only be uninstalled when the system is not booting from devices attached to the RocketRAID 174x controller. To uninstall, remove the line `rr174x_load="YES"` located in `/boot/defaults/loader.conf`, and then delete the driver module `/modules/rr174x.ko` or `/boot/kernel/rr174x.ko`.

Appendix

Customer Support

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Customer Support

If you encounter any problems while utilizing the RocketRAID 174x, or have any questions about this or any other HighPoint product, feel free to contact our Customer Support Department.

Troubleshooting Checklist

Before contacting our Customer Support department:

Make sure the latest BIOS, driver and RAID Software have been installed for the RocketRAID 174x. Updates are available from our website.

Prepare a list of the computer system's hardware and software (motherboard, CPU, memory, other PCI devices/host adapters, operating system, applications)

Contact Information

E-mail address: support@highpoint-tech.com

Phone: 408-942-5800 (request for support)

9:00AM-6:00PM, Pacific Standard Time

Additional information about HighPoint products is available from our web site:

<http://www.highpoint-tech.com>

FCC Part 15 Class B Radio Frequency Interference statement

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 instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television 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 the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC 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.

European Union Compliance Statement

This Information Technologies Equipment has been tested and found to comply with the following European directives:

- European Standard EN55022 (1998) Class B
- European Standard EN55024 (1998)