

RocketRAID 404

User's Manual

HighPoint

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HighPoint Technologies, Inc.

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Chapter 1

Introduction

This chapter will give a brief introduction on the RAID-related background knowledge, as well as a brief introduction on RocketRAID 404 ATA RAID solution.

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1.1 RAID Basics

RAID (Redundant Array of Independent Disks) is a method of combining several hard disks (physical disks) into one logical unit (logical disk). Such combining can offer either or both fault tolerance and higher data throughput than a single hard disk system.

There are usually a few methods through which hard disks can be combined together. The different methods are referred as different RAID Levels, and different RAID levels represent different performance level, security level and implementation cost.

The most frequently used RAID levels include RAID 0, 1 and 5. Also there are some combined RAID levels, for example, RAID 0/1 is the combination of RAID 0 and RAID 1. Here is a briefing table of these popular RAID levels:

	Description	Minimum # of Drives	Benefits
RAID0	Data striping	2	Highest Performance without data protection
RAID1	Disk mirroring	2	Data protection through 100% data duplication
RAID 0/1	Data striping and mirroring	4	Highest performance with data protection
RAID5	Data striping with distributed parity	3	Best balance of cost/performance/data protection
JBOD	Disk Spanning	2	No data protection and performance improving, but full usage of disk capacity

1.2 IDE RAID

For quite some time before, RAID technology has been based on SCSI hard disk's bus interface, and mainly focuses on high-end application system. PC users and low-end business application has been excluded from the RAID benefits due to the high cost of SCSI RAID.

It is very lucky that, as the IDE RAID (also known as ATA RAID) technology emerges recently, people now can enjoy the RAID technology's benefits at a pretty low cost.

IDE is another computer hard disk bus interface widely used by PCs. Due to the great development of the PC market in the recent a few years, the IDE hard disk's price has dramatically dropped, while at the same time, its performance has greatly improved. Below is a performance & implementation cost brief comparison between IDE RAID and SCSI RAID:

		IDE RAID	SCSI RAID
Interface		PCI to ATA133	PCI to Ultra 160 SCSI
Controller Card	Number of Channel	4	1
	Maximum number of Drives	8	15
	Maximum Data Throughput	133x4MB/s	160MB/s
	Supported RAID Levels	0,1,0/1,JBOD	0,1,0/1,3,5,JBOD
	Price	100\$	499\$
Hard Drive	Spin(rpm)	7200	10000
	Capacity	40G	33G
	Price	120\$	500\$

Note: The price may vary depending on different period and different market.

Due to the high rate of performance/cost and character/cost, IDE RAID has been widely accepted by the market as cost-effective RAID solution, and RocketRAID 404 is one of the best ATA RAID solutions featured with four ATA channels.

1.3 RocketRAID 404

RocketRAID xxx is a series of ATA RAID solution contributed by HighPoint Technologies, Inc., and it mainly consists two parts: the RAID adapter and the RAID management software.

RocketRAID 404 adapter, using HPT374 chip as RAID controller, is a 4-channel ATA133 RAID solution. ATA RAID Management software is a Windows-based software utility with graphical user interface, and provides users an easy-operation software tool to configure and manage disks or disk arrays connected to RocketRAID 404 adapter.

Below are the main features and benefits of RocketRAID 404:

- (1) Support ATA133 high performance hard disk
- (2) 4 independent ATA channels and maximum 8 hard disks allowed connection
- (3) Support RAID 0, 1, 0/1 and JBOD
- (4) Support hot-swapping failed disk in RAID 1 and 0/1 array
- (5) Support hot spare disk
- (6) Bootable disk or disk array support
- (7) Support OSs like: Windows 95/98/Me, NT4.0, 2000, XP and Linux
- (8) Windows-based RAID configuration & management software tool (compatible with BIOS)
- (9) Real-time monitoring of device status and error alarm with pop-up message box and beeping
- (10) Event log for easy trouble shooting

Chapter 2

Adapter Installation

This chapter will tell you how to install RocketRAID 404 adapter onto your computer and connect hard disks to the adapter correctly. Please make sure to read this chapter carefully before starting your installation procedures.

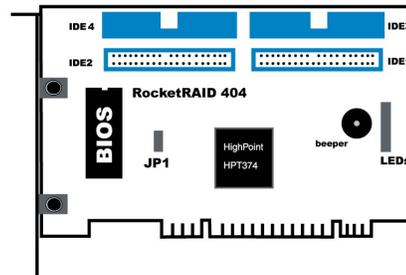
Contents of this Chapter:

- 2.1 Adapter Layout
- 2.2 Hard Disk Connection
- 2.3 Adapter Installation
- 2.4 Verify Adapter's Installation
- 2.5 Driver Installation

If you have any question during installation, please contact our technical support.

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2.1 Adapter Layout



Adapter

Setting of JP1:

1-2 short connected : Disable loading configuration from adapter's BIOS, and use the default on-chip configuration instead.

2-3 short connected: Enable loading configuration from adapter's BIOS.

The default setting of JP1 is 1-2 short connected. No need to change JP1 setting after you got the adapter.

Note:

1. JP1's setting has nothing to do with updating BIOS. Either the JP1 is 1-2 short-connected or 2-3 short-connected, user can update the BIOS by running the program: LOAD.EXE contained in the driver diskette.

LEDsconnection:

The 8-pins LED connector are for LED connecting. From the top to the bottom there are 8 pins, 1-2 for IDE 1, 3-4 for IDE 2, 5-6 for IDE 3, 7-8 for IDE 4.

2.2 Hard Disk Connection

We suggest the following connection way depending on disk numbers (see the table in page 2-2):

Note:

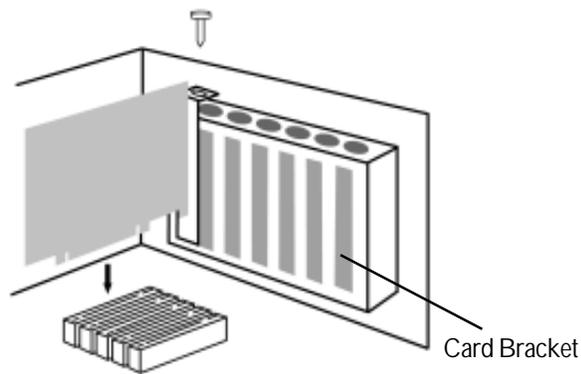
1. " ✓ " means it is better to connect hard disk at this position.
2. When connecting hard disk, pay much attention to its Master -Slave jumper setting: if two hard disks are connected onto one IDE cable, then one disk must be set as master while the other as slave.

Number of Disks	IDE 1		IDE 2		IDE 3		IDE 4	
	Primary	Slave	Primary	Slave	Primary	Slave	Primary	Slave
1	✓							
2	✓		✓					
3	✓		✓		✓			
4	✓		✓		✓		✓	
5	✓	✓	✓		✓		✓	
6	✓	✓	✓	✓	✓		✓	
7	✓	✓	✓	✓	✓	✓	✓	
8	✓	✓	✓	✓	✓	✓	✓	✓

2.3 Adapter Installation

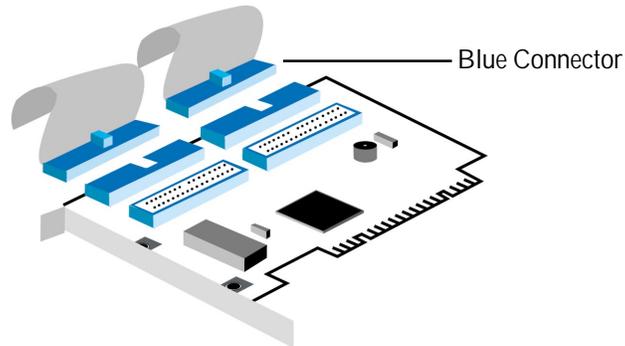
Follow these steps to install the RAID adapter and connect hard disks onto the adapter:

1. Shut down the computer and unplug the power supply;
2. Please discharge static electricity from your body by touching a conductor;
3. Remove the corresponding card bracket from the back of the computer chassis;
4. Insert the RocketRAID 404 adapter steadily into a PCI slot on motherboard and then settle it with screw;



Adapter Installation

5. Set jumper of hard disks and settle them inside the computer chassis;
6. Connect hard disks to RAID adapter with IDE cables;



Cable Connection

7. Connect power supply connector to hard disk;
8. Replace the cover of computer chassis.

Note:

1. If multiple hard disks to be used, user will need a powerful power supply in order to provide enough electricity to the system.

2.4 Verify Adapter's Installation

After installed RocketRAID 404 adapter and connected hard disks as required above, now user can turn on the computer. Please pay attention to the screen display while starting computer. If the following information appear, it indicates that the RocketRAID 404 adapter has been successfully installed and recognized by the computer.

```
HighPoint Technologies, Inc. HPT374 UDMA/ATA133 RAID Controller BIOS v1.0
(c) 1999-2001. HighPoint Technologies, Inc. All rights reserved

Press <Ctrl><H> to run BIOS Setting Utility
Scan Devices. Please wait .._
```

Next, RocketRAID 404 adapter's BIOS will scan the connected hard disks. Please pay attention to the screen display (See next page screen shot). If all connected hard disks are correctly detected out, it indicates that all the hard disks have been connected correctly and recognized by the computer.

Note:

1. If adapter or hard disk is not recognized, please refer the Trouble Shooting chapter for how to solve the problem.

```

HighPoint Technologies, Inc. HPT374 UDMA/ATA133 RAID Controller BIOS v1.0
(c) 1999-2001. HighPoint Technologies, Inc. All rights reserved

Press <Ctrl><H> to run BIOS Setting Utility
Scan Devices. Please wait .....
Channel1 Master : Mirror (RAID 1) for Array #0
Channel1 Slave  : WDC WD200BB-00CFC0
Channel2 Master : Mirror (RAID 1) for Array #0
Channel2 Slave  : ST310211A
Channel3 Master : Maxtor 5T020H2
Channel3 Slave  : WDC WD200BB-00AUA1
Channel4 Master : Maxtor 5T020H2
Channel4 Slave  : FUJITSU MPG3102AT E

```

2.5 Driver Installation

After the RocketRAID 404 adapter is installed and recognized by computer, user can start the installation of driver.

● Windows 98/Me

Installation

After Windows 98/Me is start-up, Windows system will automatically find the newly installed adapter and prompt user to install its driver. Follow these steps to install the driver:

1. After the [Add New Hardware Wizard](#) window appears, press [Next](#) button until the following window appears:



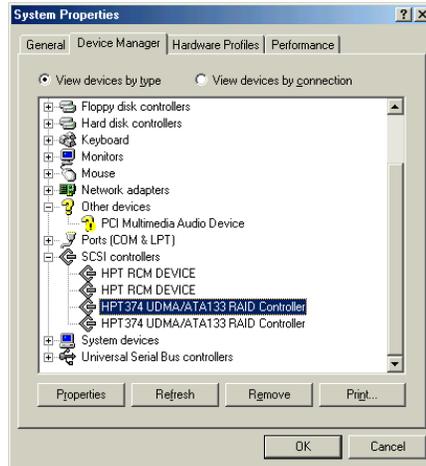
2. Insert the driver diskette, then select the [Specify a location](#) item and type in the driver location: [A:\Win98_ME](#), then click on [Next](#) button to continue (if users install driver from CD-ROM make sure input the correct path, for example, [D:\RR404\Windows\Driver\Win98_ME](#))
3. Confirm the following dialogue windows to finish the first part of driver installation, then system will prompt user whether to restart the computer;
4. Press [NO](#) to skip restarting computer, then Windows will find another hardware. Please repeat from step 1 to step 3 to finish the second part of driver installation. When finished, restart the computer;

5. After rebooting, Windows will automatically find RCM devices and install its drivers.

Verify Installation

After the driver installation finished and the computer restarted:

1. Right-click on [My Computer](#) icon on desktop, and then select [Properties](#) item from the popup menu;
2. From the popup window, activate [Device Manager](#) item, see below:



If there are the four device items under [SCSI Controllers](#) tree as shown above, it indicates that the driver has been installed correctly.

If user cannot find these four device items, or there is [?](#) or [!](#) marks on device icon, it indicates that the driver has not been correctly installed and user need to delete the devices and reinstall the drivers.

Note:

1. If user do not restart the computer after installation, then there may have [!](#) on the device items. User only need to reboot to make the devices normal.

● Windows NT4.0

Install driver under existing Windows NT4.0

1. Click [Start](#)-->[Settings](#)-->[Control Panel](#), then double-click on the [SCSI Adapters](#) icon;

2. Within the follow-up window, select [Driver](#) item, then click on [Add](#) button;
3. Within the follow-up window, click on [Have Disk...](#) button, the following window will appear, see below;



4. Insert the driver diskette, and type in the path of driver location: [A:\Win_NT](#) in the above window, then click [OK](#)(if users install driver from CD-ROM make sure input the correct path, for example, [D:\RR404\Windows\Driver\Win_NT](#));
5. Within the follow-up window, select [HPT374 UDMA/ATA133 RAID Controller](#) item, then click [OK](#);
6. Confirm the follow-up system prompts to finish driver installation. When installation finished, restart the computer.

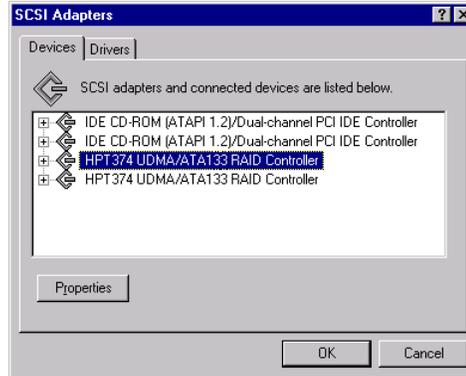
Install driver during WindowsNT4.0 installation

1. Press F6 key when the installation program prompts [Setup is inspecting your computer's hardware configuration](#);
2. The installation will continue. Later, installation program will prompt user to press S key to specify other devices, then please press S key;
3. Within the follow-up device type window, select [Other](#), then press ENTER to confirm;
4. Installation program will prompt user to insert the driver diskette. Please insert the driver diskette and then press ENTER to confirm(if you have not the driver dirkette please copy the diver files to diskette from installation CD);
5. Within the follow-up window, select [HPT374 UDMA/ATA133 RAID Controller for WinNT4.0](#), then press ENTER to confirm;
6. The follow-up window will list out the devices to be installed, in which [HPT374 UDMA/ATA133 RAID Controller](#) item should be included(If user want to install other devices, please operate at this time. If all devices have been installed, please go to next step);
7. Press ENTER to confirm the devices to be installed and continue the installation of Windows NT4.0.

Verify Installation

After the driver has been installed and the computer is restarted:

1. Click [Start](#)-->[Settings](#)-->[Control Panel](#), and then double-click on [SCSI Adapters](#) icon;
2. Within the [SCSI Adapters](#) window, see below:



If there are two **HPT374 UDMA/ATA133 RAID Controller** items, it indicates that the driver has been successfully installed.

Otherwise, if user cannot find these two device items, or there is ? or ! marks on device icon, it indicates that the driver has not been correctly installed and user need to delete the devices and reinstall the drivers.

● Windows 2000

Install driver under existing Windows 2000

After Windows 2000 is start-up, Windows system will automatically find the newly installed adapter and prompt user to install its driver. Please follow these steps to install the driver:

1. When the **Found New Hardware Wizard** window appears, click **Next** button to continue, in the follow-up window, please select **Display a list ...** and then click **Next** to continue;
2. In the follow-up window, select **SCSI and RAID Controllers** and then click **Next** to continue;
3. In the follow up window, click **Have Disk...**, then Insert the driver diskette and type in the driver location: **A:\Win_2000**, then click **OK** to continue(if users install driver from CD-ROM make sure input the correct path, for example, **D:\RR404\Windows\Driver\Win_2000**);



4. In the follow-up window, select [HPT374 UDMA/ATA133 RAID Controller](#), then click [Next](#) to continue;
5. Confirm the follow-up windows and click the [Finish](#) button to continue;
6. Next, Windows will find another hardware, please repeat step 1, step 4 and step 5 to operate;
7. Next, Windows will find [HighPoint RCM device](#) twice, please confirm the two [Digital Signature Not Found](#) windows when they appear, when finished, please restart the computer;

Install driver during Windows 2000 installation

1. Booting from CD-ROM, when the [Windows 2000 Setup](#) blue screen appear and prompt user to [Press F6 if you need to install third party SCSI or RAID driver](#), please press F6 key;
2. The setup program will continue, later when the setup program prompt user if to specify additional adapters, please press S key;
3. Then the setup program will prompt user to insert the driver diskette. Please insert the driver diskette, then press ENTER to continue(if you have not the driver diskette please copy the driver files to diskette from installation CD);
4. The follow-up window will list out the installation choices, please select [HPT374 UDMA/ATA133 RAID Controller for Windows 2000](#) and press ENTER to continue;
5. The follow-up window will list out the devices to be installed, in which [HPT374 UDMA/ATA133 RAID Controller](#) item should be included; (If user want to install other devices, please operate at this time. If all devices have been successfully installed, please go to next step.)
6. Press ENTER to continue Windows 2000 setup.

Verify Installation

After the driver has been installed and the computer restarted:

1. Right-click [My Computer](#) icon, then select [Properties](#) item from the popup menu;
2. In the pop-up window, select [Hardware](#) item and then click [Device Manager](#) button.



If [HPT374 UDMA/ATA133 RAID Controller](#) and [HighPoint RCM Device](#) items exists in the popup [Device Manager](#) window (see above), it indicates that the driver has been successfully installed.

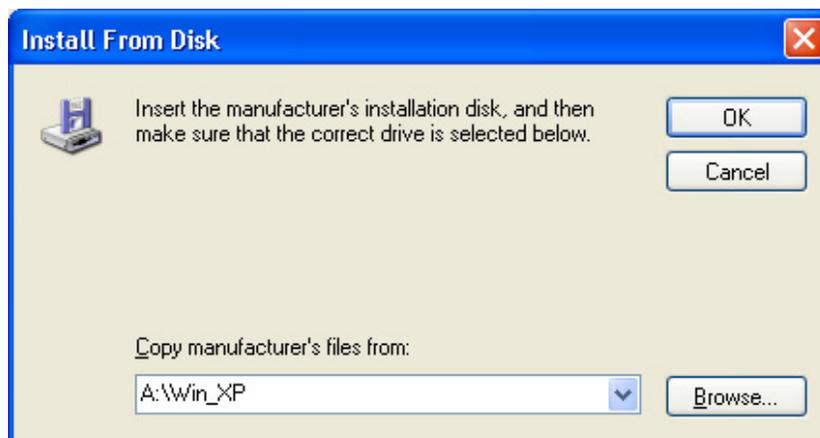
Otherwise, if user cannot find these four device items, or there is ? or ! marks on device icon, it indicates that the driver has not been correctly installed and user need to delete the devices and reinstall the drivers.

- **Windows XP**

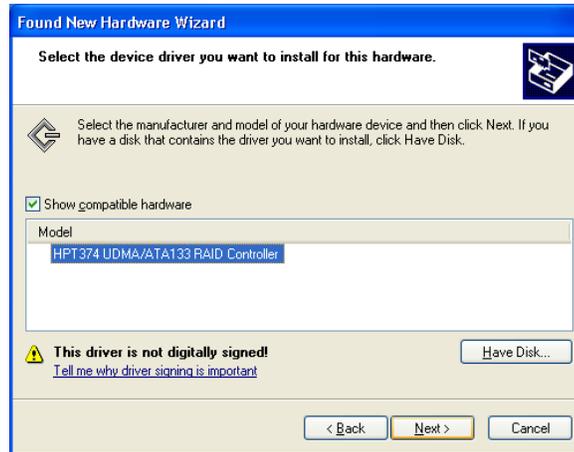
Install driver under existing Windows XP

After Windows XP is start-up, Windows system will automatically find the newly installed adapter and prompt user to install its driver. Please follow these steps to install the driver:

1. When the [Found New Hardware Wizard](#) window appears, select [Install from a list or specify location\(Advanced\)](#), and click [Next](#) to continue;
2. In the follow-up window, please select [Don't search, I will choose the driver to install](#), then click [Next](#) to continue;
3. In the follow-up window of device list, please select [SCSI and RAID controllers](#), and then click [Next](#) to continue;
4. In the next window, click on [Have Disk...](#), then type in the driver location: [A:\Win_XP](#) into the follow-up window, then click [OK](#) to continue(if users install driver from CD-ROM make sure input the correct path, for example, [D:\RR404\Windows\Driver\Win_XP](#));



5. In the follow-up window, select [HPT374 UDMA/ATA133 RAID Controller](#), then click [Next](#) to continue;
6. In the follow-up window, click on [Continue Anyway](#), then click [Finish](#) to finish the first part of driver installation;
7. Next, Windows will find another hardware, please repeat steps 1 and 6, then the below window will appear:



Just repeat step 5 and step 6 to finish the driver installation. When finished, please restart the computer.

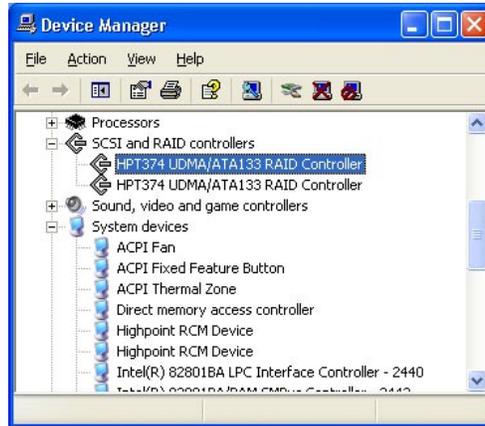
Install driver during Windows XP installation

1. Booting from CD-ROM, when the [Windows XP Setup](#) blue screen appears and prompt user to [press F6 key to install a third party SCSI or RAID driver](#), please press **F6** Key.
2. The setup program will continue, later when the setup program prompt user if to specify additional adapters, please press **S** key;
3. Then the setup program will prompt user to insert the driver diskette. Please insert the driver diskette, then press ENTER to continue (If you have not the driver disk please copy the driver files to diskette from installation CD);
4. The follow-up window will list out the installation choices, please select [HPT374 UDMA/ATA133 RAID Controller for Windows XP](#) and press ENTER to continue;
5. The follow-up window will list out the devices to be installed, in which [HPT374 UDMA/ATA133 RAID Controller](#) item should be included; (If user want to install other devices, please operate at this time. If all devices have been successfully installed, please go to next step.)
6. Press ENTER to continue Windows XP setup.

Verify Installation

After the driver has been installed and the computer restarted:

1. Right-click [My Computer](#) icon, then select [Properties](#) item from the popup menu;
2. In the popup window, select [Hardware](#) tab and then click [Device Manager](#) button.



If **HPT374 UDMA/ATA133 RAID Controller** and **HighPoint RCM Device** items exist in the pop-up **Device Manager** window (see above), it indicates that the driver has been successfully installed.

Otherwise, if user cannot find these four device items, or there is **?** or **!** marks on device icon, it indicates that the driver has not been correctly installed and user need to delete the devices and reinstall the drivers.

Chapter 3

BIOS Configuration Utility

RocketRAID 404 provided on-card BIOS configuration utility, through which, user can configure and manage disks or disk arrays connected to RocketRAID 404 adapter. BIOS configuration utility is specially useful when user wanted to create a disk array before an OS is installed.

Contents of this Chapter:

- 3.1 Enter BIOS Configuration Utility
- 3.2 Create Disk Array
- 3.3 Delete Disk Array
- 3.4 Add/Delete Disks into/from Spare Pool
- 3.5 Set Boot Device
- 3.6 Duplicate Critical RAID 1 or 0/1 array
- 3.7 Rebuild Broken RAID 1 or 0/1 array

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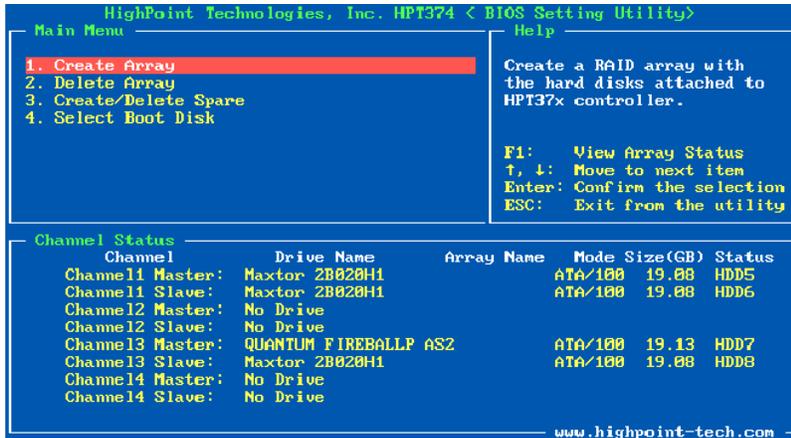
3.1 Enter BIOS Configuration Utility

When the following information appears on screen during the computer is starting, press Ctrl+H key to enter BIOS configuration utility.

```
HighPoint Technologies, Inc. HPT374 UDMA/ATA133 RAID Controller BIOS v1.0
(c) 1999-2001. HighPoint Technologies, Inc. All rights reserved

Press <Ctrl><H> to run BIOS Setting Utility
Scan Devices. Please wait .-._
```

The main interface of BIOS configuration utility is as below:

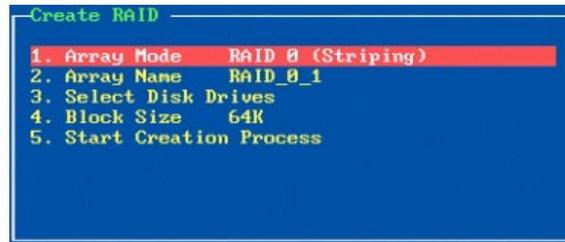


- MainMenu:** This column lists all currently available operation commands.
- Help:** This column gives help information about the current selected item and the prompts on available operations.
- Status:** This column lists all the hard disks and disk arrays connected to the adapter. When this column is activated, user can select the target device to perform a specific operation.

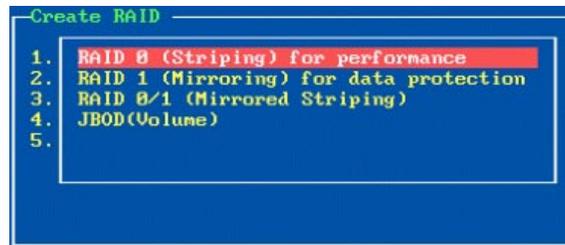
3.2 Create Disk Array

Follow these steps to create a disk array:

1. Within the **Menu** column of main interface, use the arrow key to highlight the **Create Array** command and press ENTER to call out the list of creation steps:



2. Highlight the [Array Mode](#) and press ENTER, then a list of array modes will appear, see below:

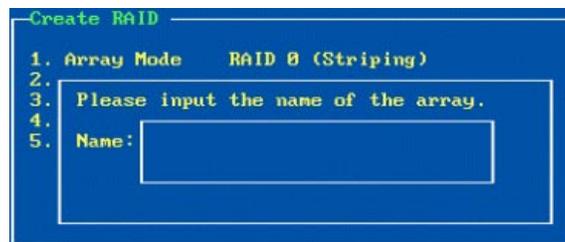


Just highlight the target array model that you want to create, and then press ENTER to confirm the selection;

If user selected RAID 1 (mirror) array, then an option list will popup to enable user selecting [Duplication](#) or [Create Only](#). [Duplication](#) will let BIOS reserve the data on source disk (the first selected disk) and copy them onto the mirror disk (the second selected disk) when creating mirror array; But [Create Only](#) will let BIOS destroy all data on all the selected disks and create a clean mirror array without any data on it.

(Creation steps may be different depending on what array mode has been selected)

3. Within the [Menu](#) column of main interface, use the arrow key to highlight the [Array Name](#), and then press ENTER. Then the array name dialogue box will appear, see below:



Just type in the name that you want to name the array, then press ENTER to continue;

4. Within the **Menu** column of main interface, use the arrow key to highlight the **Select Disk Drives** and press ENTER, the **Status** column will be activated, see below:

Channel	Master	Drive Name	Array Name	Mode	Size(GB)	Status
Channel1	Master:	No Drive				
Channel1	Slave:	No Drive				
Channel2	Master:	No Drive				
Channel2	Slave:	No Drive				
Channel3	Master:	Maxtor 2B020H1	RAID_1_0	ATA/100	19.08	Hidden
Channel3	Slave:	Maxtor 2B020H1	RAID_1_0	ATA/100	19.08	HDD1
Channel4	Master:	QUANTUM FIREBALLP AS2	ATA/100	ATA/100	19.13	HDD2
Channel4	Slave:	Maxtor 2B020H1	ATA/100	ATA/100	19.08	HDD3

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Just highlight the target disks that you want to use and press ENTER to select them respectively; After all disks have been selected, press **Esc** to go back to the creation steps menu;

5. If user selected a RAID 0 or 0/1 array in step 2, then now, user need to select a block size for the array. Within the **Menu** column of main interface, use the arrow key to highlight the **Block Size** and press ENTER, then select a block size from the popup list, see below;

Create RAID		
1. Array Mode	RAID	64K
2. Array Name	RAID	32K
3. Select Disk Drives		16K
4. Block Size	64K	
5. Start Creation Pro		

6. Within the **Menu** column of main interface, use the arrow key to highlight the **Start Creation Process** and press ENTER, then some warning messages will appear, see below:

Create RAID		
1. Array Mode	RAID 0 (Striping)	
2. Array Name	RAID_0_1	
3. Select Disk Drives		
4. Block Size	64K	
5. Start Creation Process		
WARNING: All data on the selected disks will be deleted. Continue? Press Y/N		

Please pay attention to the warning message, and then press **Y** to finish the creation, or press **N** to cancel the creation.

(the warning message may be different depending on what array mode that user is creating)

Warning:

1. Please pay attention to the warning message at Step 6:
Creating RAID 0 array, JBOD array or RAID 0/1 array will destroy all data on all the selected disks.
When creating mirror array, [Duplication](#) operation will reserve the data on source disk (the first selected disk) and copy them onto the mirror disk (the second selected disk) when creating mirror array; But [Create Only](#) operation will destroy all data on all the selected disks and create a clean mirror array without any data on it.

3.3 Delete Disk Array

Follow these steps to delete a disk array:

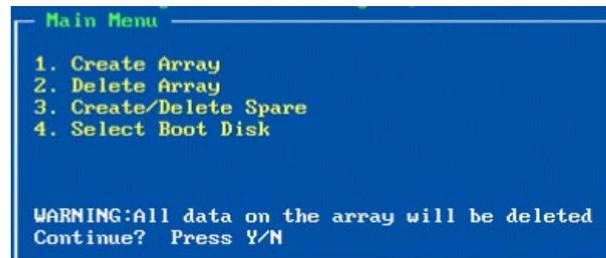
1. Within the [Menu](#) column of main interface, use the arrow key to highlight [Delete Array](#) item, and then press ENTER, then the [Status](#) column will be activated, see below:

Channel	Drive Name	Array Name	Mode	Size(GB)	Status
Channel11 Master:	No Drive				
Channel11 Slave:	No Drive				
Channel12 Master:	No Drive				
Channel12 Slave:	No Drive				
() Channel13 Master:	Maxtor 2B020H1	RAID_1_0	ATA/100	19.08	Hidden
Channel13 Slave:	Maxtor 2B020H1	RAID_1_0	ATA/100	19.08	HDD1
() Channel14 Master:	QUANTUM FIREBALLP AS2	RAID_0_1	ATA/100	19.13	HDD2
Channel14 Slave:	Maxtor 2B020H1	RAID_0_1	ATA/100	19.08	Hidden

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highlight the target disk array and then press ENTER to delete it;
(User can select a disk array by selecting its first member disk)

2. Then a warning message will appear as below:



Pay attention to the warning message, and then press **Y** to delete the selected disk array, or press **N** to cancel.

Warning:

1. Deleting a disk array will destroy all the data on the disk array.

3.4 Add/Delete disks into/from spare pool

Follow these steps to add disks into spare pool or delete disks from spare pool:

1. Within the **Menu** column of main interface, use the arrow key to highlight **Create/Delete Spare** item and press ENTER, then the **Status** column will be activated, see below:

Channel	Drive Name	Array Name	Mode	Size(GB)	Status
Channel1 Master:	No Drive				
Channel1 Slave:	No Drive				
Channel2 Master:	No Drive				
Channel2 Slave:	No Drive				
Channel3 Master:	Maxtor 2B020H1	RAID_1_0	ATA/100	19.08	Hidden
Channel3 Slave:	Maxtor 2B020H1	RAID_1_0	ATA/100	19.08	HDD1
() Channel4 Master:	QUANTUM FIREBALLP AS2		ATA/100	19.13	HDD2
() Channel4 Slave:	Maxtor 2B020H1		ATA/100	19.08	HDD3

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Just use the arrow key to highlight the target disk and press ENTER to add it into spare pool, or highlight a spare disk and press ENTER to delete it from spare pool.

2. After a disk is added into the spare pool, its status will be marked as **Spare**, see below:

Channel	Drive Name	Array Name	Mode	Size(GB)	Status
Channel1 Master:	No Drive				
Channel1 Slave:	No Drive				
Channel2 Master:	No Drive				
Channel2 Slave:	No Drive				
Channel3 Master:	Maxtor 2B020H1	RAID_1_0	ATA/100	19.08	Hidden
Channel3 Slave:	Maxtor 2B020H1	RAID_1_0	ATA/100	19.08	HDD1
Channel4 Master:	QUANTUM FIREBALLP AS2		ATA/100	19.13	Spare
Channel4 Slave:	Maxtor 2B020H1		ATA/100	19.08	HDD2

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3. If user want to add another disk into spare pool or delete another spare disk from the spare pool, please repeat step 1 to operate.

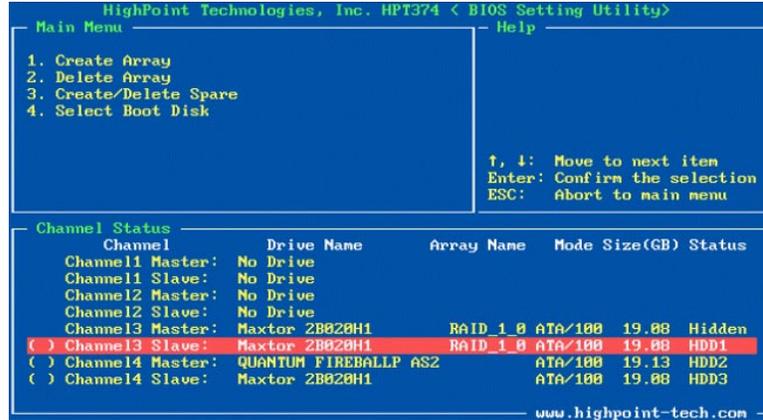
Warning:

1. Adding a disk into spare pool will destroy all the data on that disk.

3.5 Set Boot Device

Follow these steps to select a disk or disk array as boot device:

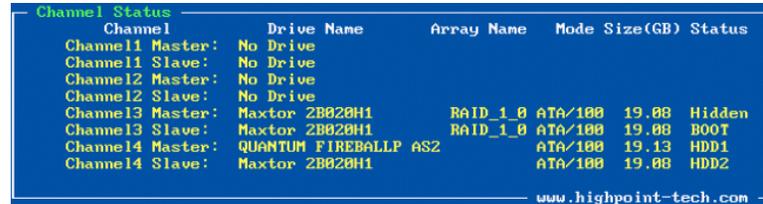
1. Within the **Menu** column of main interface, use the arrow key to highlight **Select Boot Disk** item, and then press ENTER; then the **Status** column will be activated, see below:



Just use the arrow key to highlight the target disk or disk array, then press ENTER to select it as boot device.

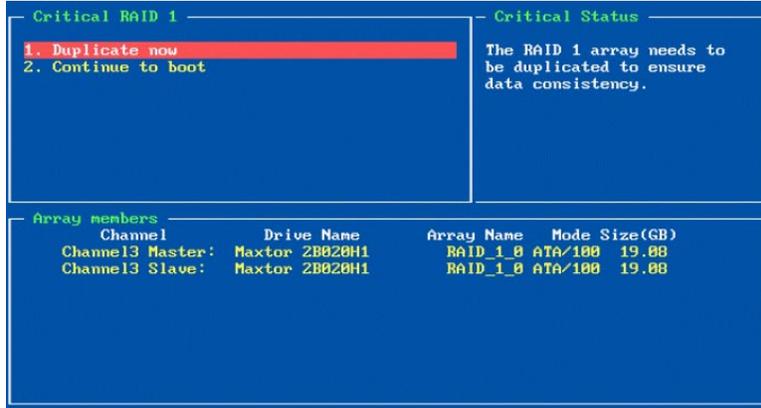
If user select a disk or disk array which has a boot mark and press ENTER, then its boot setting will be canceled.

2. After the disk or disk array is selected, its status will be marked as **BOOT**, see below:



3.6 Duplicate Critical RAID 1 or 0/1 array

When booting computer, if BIOS detect a RAID 1 or 0/1 array duplication has been canceled or any reasons that may cause the inconsistency between user data and backup data on the disk array, then the disk array will be marked as critical status, and BIOS will automatically prompt user to duplicate the RAID 1 or 0/1 array to make the backup data consist with the user data again, see below:

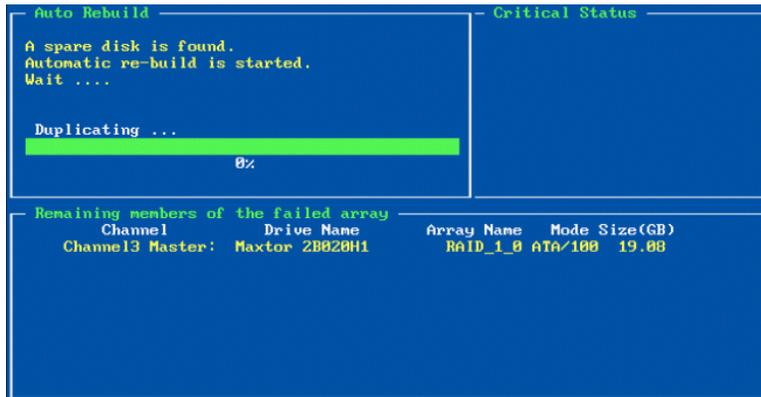


Just select [Duplicate Now](#) to duplicate, or select [Continue to Boot](#) to skip. If user select [Continue to Boot](#), user still can duplicate the array after booting into the OS.

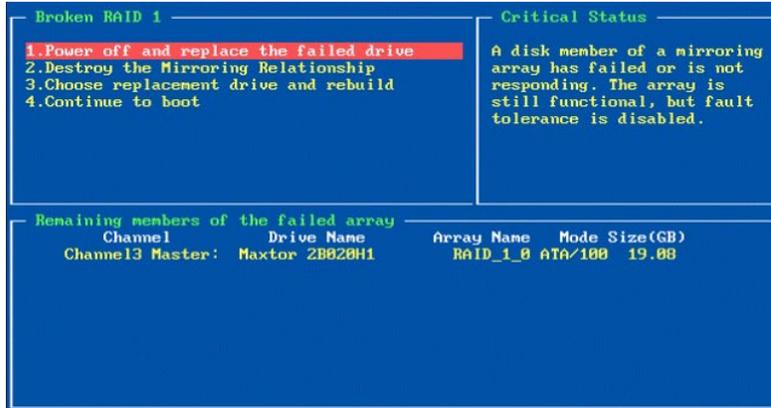
3.7 Rebuild Broken RAID 1 or 0/1 array

When booting computer, if BIOS detects one member disk of RAID 1 or 0/1 array is failed, the array will be marked as broken status.

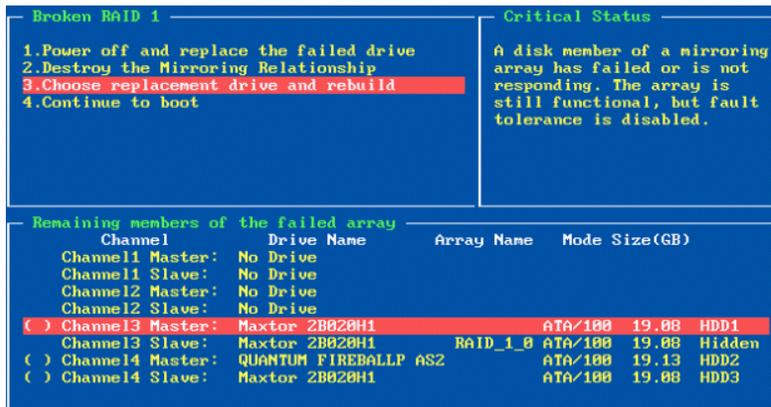
If BIOS detect either a RAID 1 or 0/1 array is broken, and there is a spare disk can be used to rebuild the broken array, then BIOS will automatically use the spare disk to rebuild the broken array and then replace data to the target disk, see below:



If BIOS detects either a RAID 1 or 0/1 array is broken, but no spare disk can be used to rebuild, then BIOS will prompt users with a few operations to solve the problem, see below:

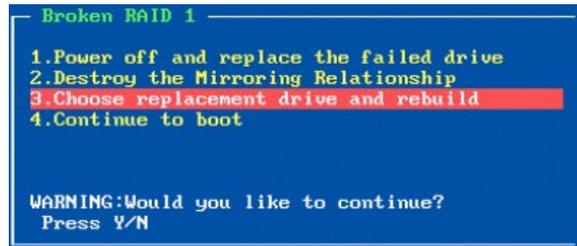


1. Power off and replace the failed drive
This command enables user to power off the computer and replace the failed disk with a good one. If your computer does not support APM, you must turn off your computer manually. After replacement, user can boot into BIOS and select the **3. Choose replacement drive and rebuild** to rebuild the broken array.
2. Destroy the mirroring relationship
This command enables user to cancel the broken array's data mirroring relationship. For broken RAID 1 array, the data on the remained normal disk will be reserved after destroy operation. For broken RAID 0/1 array, all data on the array will be lost after destroy operation!
3. Choose replacement drive and rebuild
This command enables user to select an already-connected disk to rebuild the broken array and replace the data to that disk.
 1. After chosen this command line, the **Status** column will be activated, see below:



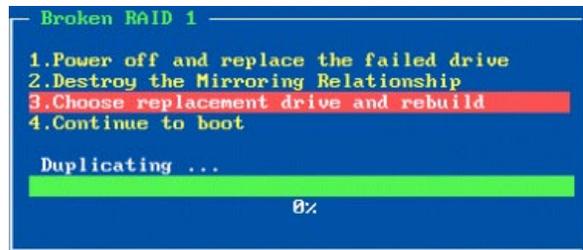
Just highlight the target disk and press ENTER to select it;

2. Then the warning message will appear, see below:



Please pay much attention to the warning message, and then press **Y** to use that disk to rebuild, or press **N** to cancel. If user press **Y**, then all the data on all the selected disk will be destroyed;

3. Next, BIOS will replace data onto the newly added disk, see below:



User can press **Esc** to cancel the duplicating process at anytime.

4. Continue to Boot
This command will let BIOS to skip the problem and boot into OS.

Chapter 4

ATA RAID Software

This chapter introduces for using HighPoint ATA RAID Management software in detail.

Contents of this chapter:

- 4.1 Installation
- 4.2 Getting Start
- 4.3 Configuration Functions
- 4.4 Management Functions
- 4.5 View Information
- 4.6 Rebuild Broken RAID 1 or 0/1 Array

HighPoint

4.1 Installation

Follow these steps to install the ATA RAID software:

1. Browse the software installation diskettes, and double click on the setup.exe file to begin the software installation(if user installs the software from CD-ROM please select the correct path, for example, [D:\RR 404\Windows\GUI\setup.exe;](#))
2. Confirm the follow-up dialogue windows to finish the installation;
3. When installation completed, restart the computer;

With the default option, the setup program will create program group: [Start-->Program-->HighPoint](#). This program group contains the following items:

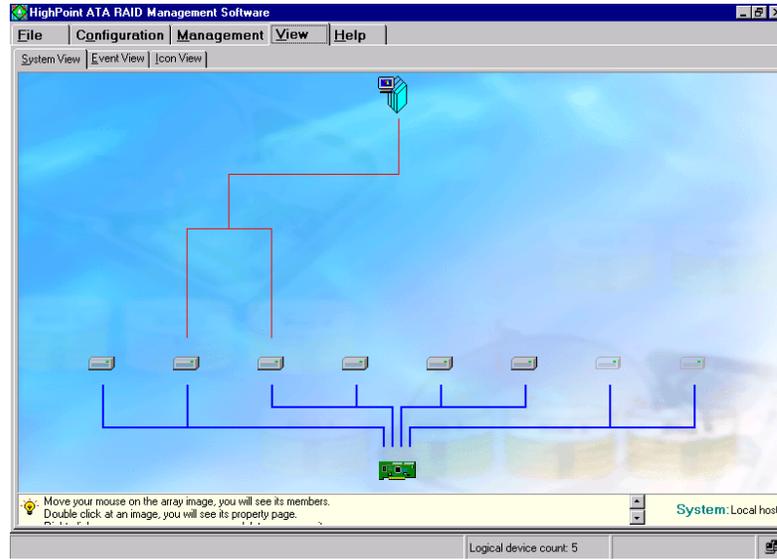
HighPoint ATA RAID Management software	Main Program
ReadMe	Software Information
Uninstall...	Uninstall the Program

4.2 Getting Start

After installed ATA RAID software, it will be automatically started every time when your Windows OS is started, and the small icon "  " will appear in the system tray of the tool bar to indicate that ATA RAID software is currently running:



Just double click on the small icon to call out the main interface of the software:



The main interface has five tabs: [File](#), [Configuration](#), [Management](#), [View](#) and [Help](#). You can switch to different tabs by clicking on it.

File: This tab displays welcome information. Click the [Exit](#) button to exit ATA RAID software.

Configuration: This tab includes four sub-tabs, they are: [Create RAID](#), [Delete RAID](#), [Spare Pool Management](#) and [Duplicate](#). These sub-tabs will be introduced later.

Management: This tab includes two sub-tabs: [Event Notification](#) and [Refresh](#). The [Event Notification](#) enables users to set automatic email notification when specified events occur. When user click the [Refresh](#) sub-tab, the software will rescan the devices that connected to the adapter, and the screen will jump directly to the [View](#) tab.

View: This screen includes three sub-tabs: [System View](#), [Event View](#) and [Icon View](#). The [System View](#) screen will display all disks and arrays connection status. The [Event View](#) window will list all the recorded events during the software is running. The [Icon View](#) window will show the meaning of different icons in the software.

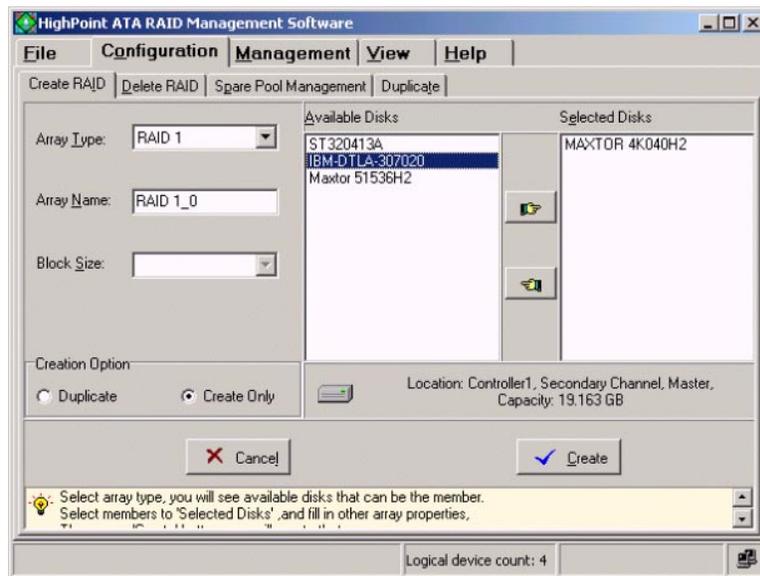
Help: This tab contains the help information for this software.

4.3 Configuration Functions

Create Disk Array

Follow these steps to create a disk array:

1. Click the tab **Configuration** --> **Create Raid**, the following window will appear:

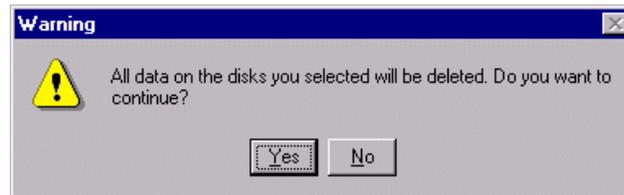


Within this interface:

- Array Type:** This drop-down box enable user to select disk array type. There are four array types user can select: RAID 0, RAID 1, RAID 0/1 and JBOD.
- Array Name:** User can type in a name for identifying the array to be created. A good name will make it easy to distinguish different arrays.
- Block Size:** If user selected RAID 0 or RAID 0/1 array in the **Array Type** box, then the **Block Size** selection drop-down box will be available and user must select a block size here. If user selected RAID 1 or JBOD, then the **Block Size** selection drop-down box will become disable .

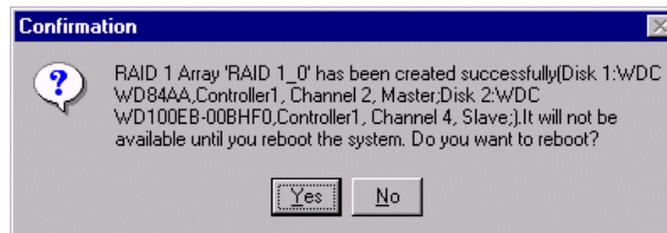
- Available Disks:** This pane will list out all the disks that currently can be used to create disk array.
- Selected Disks:** This pane will list out the disks that have been selected to create the disk array. User can highlight the specific disk in **Available Disks** pane and click the corresponding hand icon to select that disk into the **Selected Disks** pane.
- Creation Option:** This option is only available after user select RAID 1 array in the **Array Type** box . **Duplicate** means reserve the data on the source (first selected disk) when creating RAID 1 array. **Create Only** means destroy all data on the selected disks and create a clean RAID 1 array with no data on it.

2. When the disk array's configuration is finished, click the **Create** button, then a warning message will popup, see below:



Pay attention to the warning message, and then click **Yes** to finish the creation of disk array, or click **No** to cancel;

3. Next, a message box will popup to prompt user that disk array has been created successfully and whether to restart the computer, see below:



Please click **Yes** to restart the computer or click **No** to skip restarting;
(New setting will take effect only after restarting)

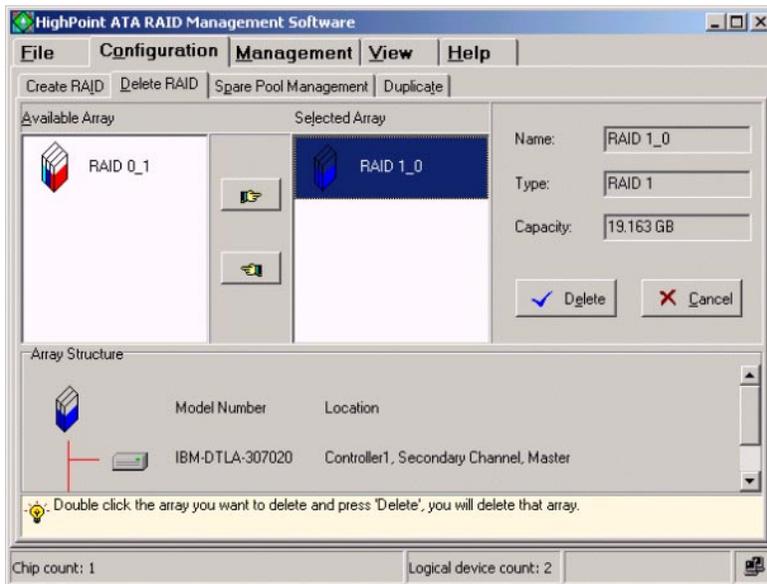
Warning:

1. Please pay attention to the warning message at Step 2:
Creating stripe array, JBOD array or 0/1 array will destroy all the data that already on the selected disks.
When creating mirror array, **Duplicate** operation will reserve the data on source disk (the first selected disk) and copy them onto the mirror disk(the second selected disk); But **Create Only** operation will destroy all data on all the selected disks and create a clean mirror array without any data on it.

Delete Disk Array

Follow these steps to delete a disk array:

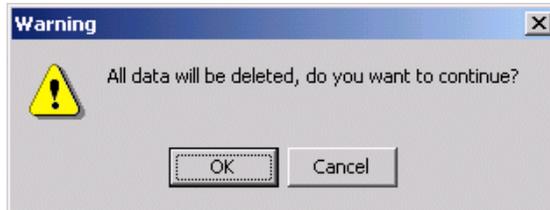
1. Click the tab **Configuration** --> **Delete RAID**, the following window will appear:



Within this interface:

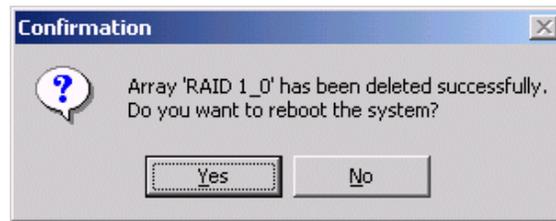
- Available Array:** All arrays that can be deleted will be listed in this pane. The bootable array will not appear here and can not be deleted, user must delete it in BIOS.
- Selected Array:** Disk array in the **Selected Array** pane will be deleted after clicking the **Delete** button.
- Array Structure:** This area will display the member disks' information of the highlighted array.

2. Highlight the disk array in the [Available Array](#) pane, and then click on the corresponding hand icon to add it into the [Selected Array](#) pane, then click on the [Delete](#) button;
3. Next, the warning message will popup, see below:



Please pay much attention to the warning message, and just click [OK](#) to delete the selected disk array, or click [Cancel](#) to give up deletion;

4. Next, a message box will prompt user that array has been deleted and whether to restart the computer, see below:



Just click [Yes](#) to restart the computer, or click [No](#) to skip restarting;
(New setting will take effect only after rebooting)

Warning:

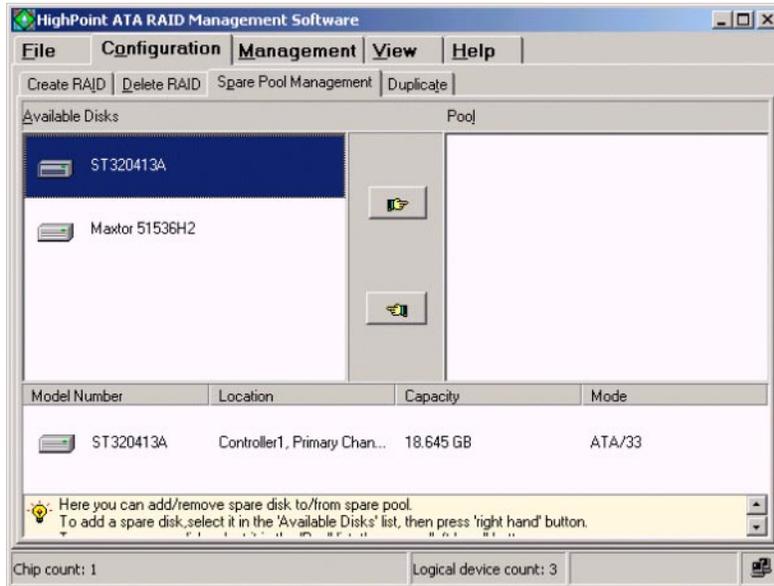
1. Deleting a disk array will destroy all the data on the disk array.

Spare Pool Management

When a disk fails in RAID 1 or 0/1 array, the spare disk (disks in the spare pool) will be automatically used as a replacement for the failed disk, and then rebuild the broken RAID 1 or 0/1 array and replace data to the target disk. With setting a spare disk, you can enhance security of RAID 1 or 0/1 array.

Follow these steps to add/remove a disk into/from the spare pool:

1. Click the tab [Configuration](#) --> [Spare Pool Management](#), the following window will appear:

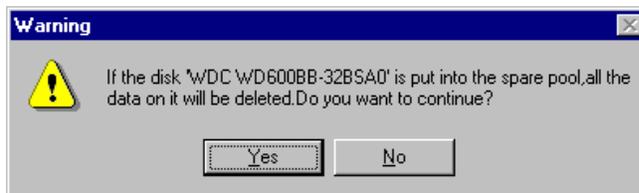


Within this interface:

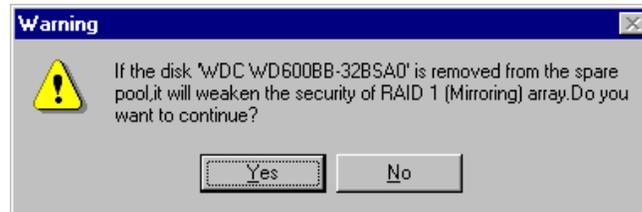
Available Disks: All available disks that can be added into the spare pool will be listed in this pane.

Pool: Spare disks will be listed in this pane.

2. Within the **Available Disks** pane, highlight a disk and then click the corresponding hand icon to add it into the spare pool, or within the **Pool** pane highlight a spare disk and then click the corresponding hand icon to remove it from spare pool;
3. Then a confirmation dialogue box will appear, the confirmation window for adding disk into spare pool will be as below:



The dialogue window for removing spare disk will be as below:



Please pay attention to the warning message, and then click [Yes](#) to add/remove the disk into/from the spare pool, or click [No](#) to cancel;

4. Restart the computer when completed.

Warning:

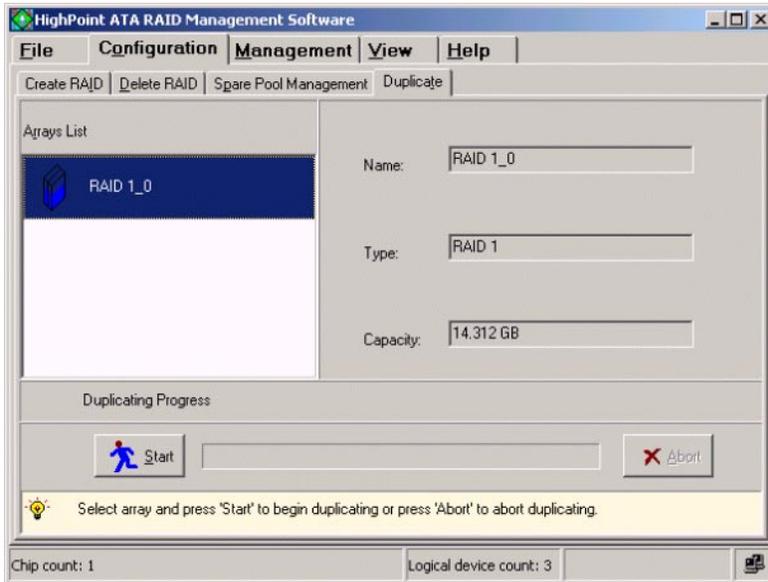
1. Adding a disk into spare pool will destroy all the data on that disk.

Duplicate RAID 1 or 0/1 array

When a RAID 1 or 0/1 array is in critical status, software will prompt user to duplicate that RAID 1 or 0/1 array.

Also, software provides a way for manually duplicate a RAID 1 or 0/1 array, this duplication way enables users to duplicate a RAID 1 or 0/1 array whether in critical status or not. Follow these steps to manually duplicate a RAID 1 or 0/1 array:

1. Click the tab [Configuration](#) --> [Duplicate](#), the following window will appear:



Within this interface:

Arrays List: All RAID 1 and 0/1 arrays that can be duplicated will be listed in this pane.

2. Highlight a disk array within the **Arrays List** pane, then the array's information will be shown on the right side (see above picture), then click on the **Start** button to start duplication, the progress bar will show the duplication progress. User can cancel the duplication by clicking the **Abort** button while it is going.

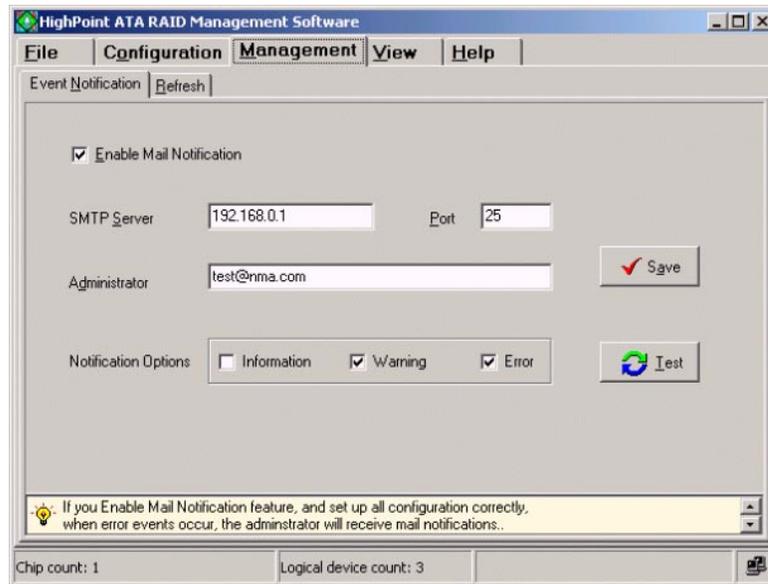
4.4 Management Functions

Event Notification

Event notification will enable users to set the software to notify relative administrator by email when specified events or errors occur. In order to use this function, the computer must can access a SMTP server.

Follow these steps to set event notification:

1. Click the tab **Management** --> **Event Notification**, the following window will appear:



Within this interface:

- SMTP Server:** Type in the domain name or IP address for the SMTP server that you will use to send email.
- Port:** Type in the port of the SMTP service on the email server.
- Administrator:** Type in the email address where the notification information will be sent to.
- Notification Option:** Select what kind of events that you want the software to notify.

2. Make sure the **Enable mail Notification** item is checked, then type in the required information and set the notification option, then press the **Save** button to finish.
User can test if the setting is correct by clicking the **Test** button before saving the setting.

Refresh

When user click on this tab, the software will scan the computer system for any updated system information, like if there is any new hard disk plugged, or if there is any connected disk is failed.

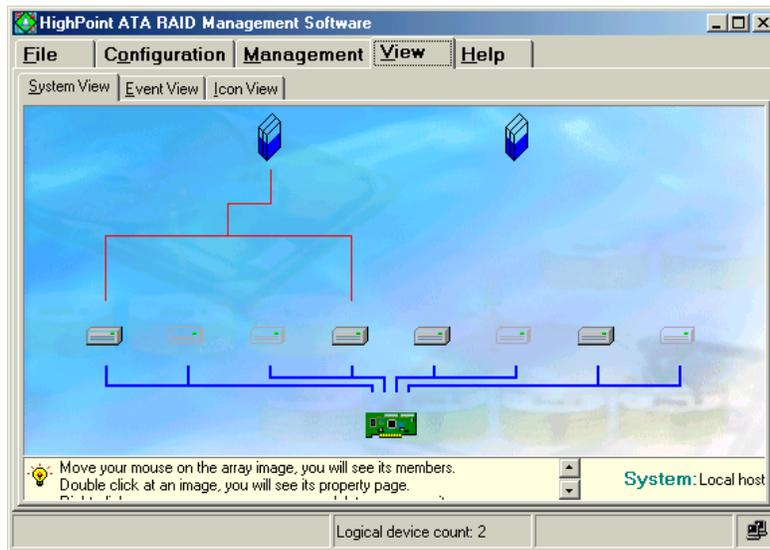
After clicking on this tab, the software will automatically switch to the **System View** screen, here user can find the updated system information after scanning.

4.5 View Information

System View

All devices will be shown in this window, including the disk arrays (Logical Devices), the hard disks (physical devices) and the controller.

Click the tab [View](#) --> [System View](#), the following window will appear:



Within this interface, user can perform the following operations:

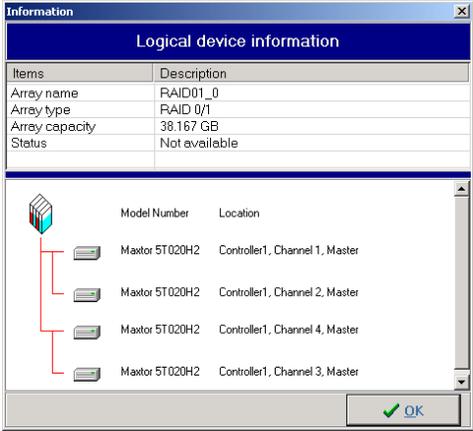
(1) Viewing Device Relationship

When you move your mouse on a disk array, a red line between the array and some hard disks will appear. This means these hard disks constructed that disk array.

The blue lines between controller icon and hard disk icons represent the different ATA channels and the hard disks connected to these channels.

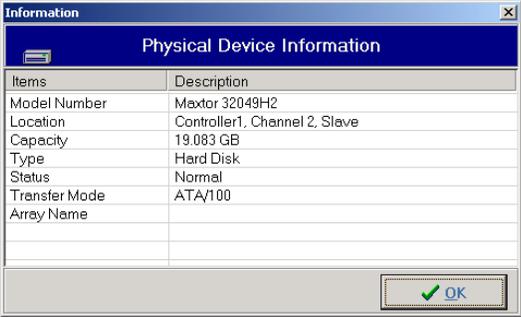
(2) Viewing disk array information

Double-click on the disk array icon which you want to view, then the information table about that array will pop up as below:



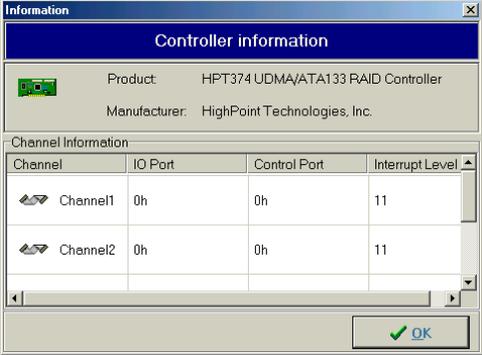
(3) Viewing Physical Device Information

Double-click on the hard disk icon that you want to view, then information table about that hard disk will popup as below:



(4) Viewing Controller Information

Double-click on the controller icon, then the information table about the controller will popup as below:



Just click the scrolling bar to view all information about the controller.

(5) Disk Array Operation

Right-click on the disk array icon, from the pop-up menu, you can select to delete or rename the disk array.

Note: If the array is being duplicated, broken or disabled, the right-click menu will not be available.

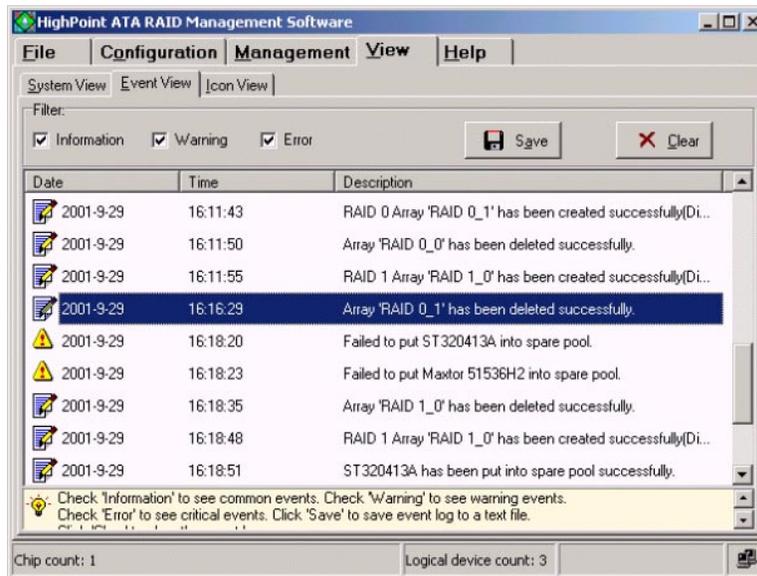
(6) Refresh

Right-click on the blank area within the [System View](#) window, and select [Refresh](#) from the popup menu to refresh the devices connected. This refresh operation is as same as the one under [Management Functions](#) tab.

Event View

All logged events will appear in this window. The filter divides them into three types: Information, Warning and Error.

Click the tab [View](#) --> [Event View](#), the following window will appear:



Within this interface, user can:

- (1) Selecting what type of events to be listed

There are three types of events: [Information](#), [Warning](#) and [Error](#). Just check the information types under the [Filter](#) option to select what types of information to be listed.

- (2) Save all the listed events into a file

Click the [Save](#) button, and type in the file name and path in the followup window to save the currently listed events into a TXT file.

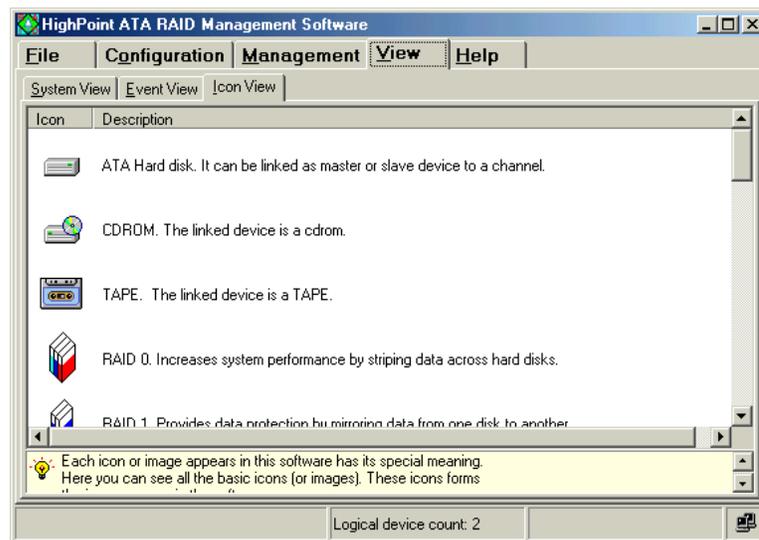
- (3) Clear all the currently logged events

Click the [Clear](#) button, then all the currently logged events will be deleted from the system and no more appear in the [Event View](#) list.

Icon View

All icon types and their meanings will be listed in the [Icon View](#) window, from here user will check what meaning a specific icon represents.

Click the tab [View](#) --> [Icon View](#), the following window will appear:



4.6 Rebuild Broken RAID 1 or 0/1 Array

During the running of ATA RAID software, if a RAID 1 or RAID 0/1 array is broken due to a disk failure, then the software will report the error and warn user with beeping until user confirm the error by clicking the **OK** button, like below:



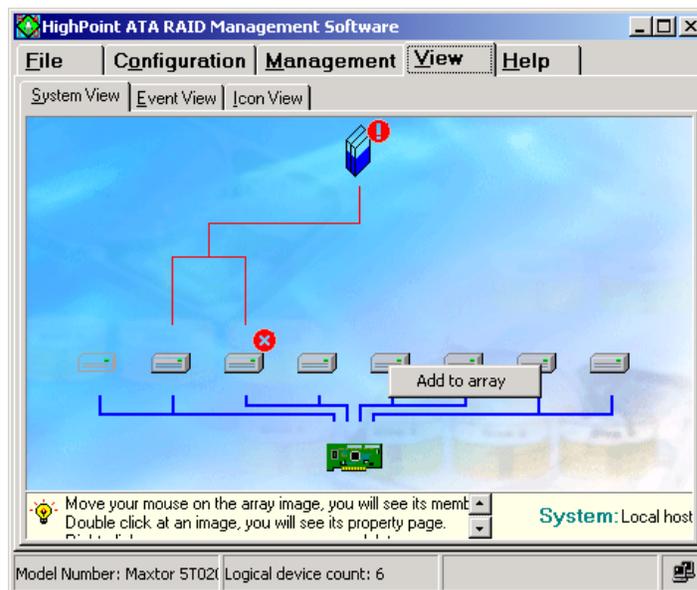
If there is a spare disk in the spare pool which can be used to rebuild the broken array, then the ATA RAID software will automatically use the spare disk to replace the failed disk, and rebuild the broken RAID 1 or RAID 0/1 and replace data to the target disk.

If there is no spare disk has been set or spare disk has not enough capacity to rebuild the broken array, then user still can use the following ways to rebuild the broken RAID 1 or RAID 0/1 array:

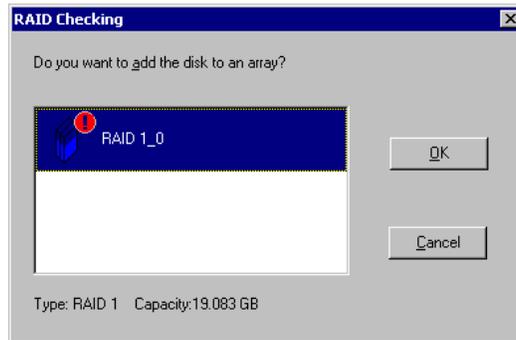
(1) Use an already-connected physical hard disk to rebuild

Follow these steps to rebuild by this way:

Right click on a physical hard disk (not belong to any disk array) in the [System View](#) window, then select [add to array](#) from the popup menu, see below:



Then the followup window will appear as below:



Just select the broken array, then click OK and confirm the follow-up data loss warning message box to finish the rebuilding of the selected broken array. After rebuilding, the new array will be automatically duplicated to rebuild the lost data.

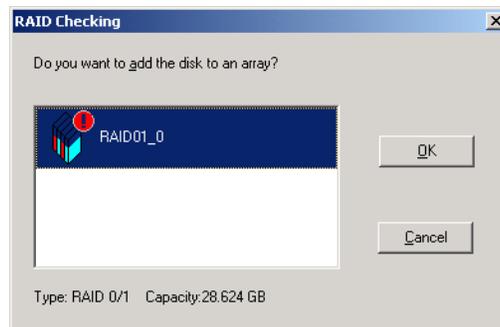
(2) Hot swapping a hard disk to rebuild

Follow these steps to rebuild by this way:

Hot swap on a good hard disk, then within the ATA RAID software click [Management](#) --> [Refresh](#) tab to refresh the devices connected. After refreshing, the ATA RAID software will find new disk plugged, see below:



Just click OK, the following window will popup to prompt user whether to use this newly plugged disk to rebuild the broken array, see below:



Just select the broken array, then click **OK** and confirm the followup data loss warning message box to finish the rebuilding of the selected broken array. After rebuilding, the new array will be automatically duplicated to rebuild the lost data.

- (3) Power off the computer and connect a new hard disk, then power on and boot into BIOS or ATA RAID software to rebuild.

Warning:

1. In order to avoid possible damage to hard disk or the computer when manually unplugging or plugging a hard disk while computer is powered, please use hard disk hot swapping mobile rack for plugging or unplugging.
2. Data on the hard disk used to rebuild the broken array will be all destroyed.

Chapter 5

Trouble Shooting

This chapter will list the most possibly occurred problem and most frequently asked question, and their corresponding solution. Please refer this chapter when you encounter a problem or do not know what to do when using our product.

HighPoint

1. The adapter can not be recognized by the computer after plugged into PCI slot.

If user can find the following information on the screen when starting computer, it indicates that the adapter has been recognized successfully.

```
HighPoint Technologies, Inc. HPT374 UDMA/ATA133 RAID Controller BIOS v1.0
(c) 1999-2001. HighPoint Technologies, Inc. All rights reserved

Press <Ctrl><H> to run BIOS Setting Utility
Scan Devices. Please wait .-_-
```

If the above information does not appear, it indicates that the adapter is not recognized by the system. Then you should open the computer chassis and check the following points:

1. Whether the adapter has been correctly and steadily plugged into the PCI slot on the motherboard.
2. If necessary, try to use another PCI slot.

After checked the above points, replace the computer case and power on the computer.

2. The hard disk connected to adapter can not be detected out.

After the RocketRAID 404 adapter is recognized, the adapter's BIOS will start to scan disks connected to the adapter, the information will display as below:

```
HighPoint Technologies, Inc. HPT374 UDMA/ATA133 RAID Controller BIOS v1.0
(c) 1999-2001. HighPoint Technologies, Inc. All rights reserved

Press <Ctrl><H> to run BIOS Setting Utility
Scan Devices. Please wait .....
Channel1 Master : Mirror (RAID 1) for Array #0
Channel1 Slave  : WDC WD200BB-00CF00
Channel2 Master : Mirror (RAID 1) for Array #0
Channel2 Slave  : ST310211A
Channel3 Master : Maxtor 5T020H2
Channel3 Slave  : WDC WD200BB-00A0A1
Channel4 Master : Maxtor 5T020H2
Channel4 Slave  : FUJITSU MPG3102AT E
```

Please pay attention to the hard disks listed on the screen, if all connected disks are correctly detected out, it indicates that these hard disks are well connected and recognized by the computer.

If some hard disks are not recognized out, you should open the computer chassis and check the following points:

1. Whether the power supply connector has been well plugged. If necessary, try to use another connector.
2. Whether the cable has been well connected. If necessary, try to use another cable.

3. If there are two devices connected to one cable, check the jumper setting to ensure no conflict exists. (The two devices connected to one cable must be configured one as master and the other as slave)

After checked the above points, please replace the cover of computer chassis and power on the computer.

3. Hard disk mode is not correctly recognized.

ATA 66/100/133 hard disks require special IDE cable. If user use a wrong cable, then hard disk mode will be set to a lower level. The solution is change a proper IDE cable for the hard disks.

4. Can not boot from the on-adapter device which is already installed OS.

In order to boot from disk or disk array connected to adapter, usually you should do the following things:

1. Set SCSI device as the first booting device in main board BIOS;
2. Set a booting device in RocketRAID 404 adapter BIOS (refer Chapter 3 on how to set a boot device);

5. Why Windows found two new hardwares and ask me to install driver twice after I installed one RocketRAID 404 adapter?

RocketRAID 404 RAID controller adopts two PCI functions design, so computer system will treat the adapter as two devices. But don't worry, for user, it totally acts as one adapter. User will see one adapter in BIOS or OSs and manage one adapter in BIOS and RAID Administrator.

6. What to do if an array is broken?

If an array is broken, user may first power off the computer and check the power and cable connection between adapter and hard disk (if necessary, please change a new cable and power connector) and then power on the computer again. These measures may bring the broken array back to normal if the broken is caused by the connection problem.

If the above measures do not work, then the reason of broken most likely is hard disk's not function. For RAID 1 or 0/1 array, user can use a new hard disk to rebuild the broken RAID 1 or 0/1 array, data will not lost. For RAID 0 or JBOD array, user has to delete the array, and all data on that array will lost. So please always backup the important data stored on a RAID 0 or JBOD array.

Appendix A

Glossary

Array

Also known as Disk Array, two or more hard disks combined together to appear as a single device to the host computer.

Broken Array

Disk array with a member disk failed. A broken RAID 1 or 0/1 array can still function with the remained normal disks, but a broken RAID 0 or JBOD will no longer function.

Critical

A RAID 1 or 0/1 array can be in critical status, that means the array may have inconsistency between user data and backup data due to some reasons, and need duplicate operation to make the backup data consist with the user data.

Duplicate

The operation of duplicating user data to generate backup data within a RAID 1 or 0/1 array. Also known as Synchronize.

Hot Swap

The ability to remove a failed member of a redundant disk array and replace it with a good disk, then repairing the critical redundant disk array without turning down the computer and interrupting user's work.

Mirroring

Known as RAID 1, which provides data protection by real-time and automatic duplicating all data from a source disk to a mirror disk.

RAID

Redundant Array of Independent Disks, it is a method of combining several hard disks (physical disks) into one logical unit (logical disk), thus providing higher performance and data redundancy.

RAID Levels

RAID levels refer to different array architectures (or methods of organizing a disk array). Different RAID levels represent different performance level, security level and cost.

RAID 0/1

Mirroring of two striped disk arrays. It is the combination of RAID 0 and RAID 1.

Rebuild

The ability to use a new disk to replace the failed disk in a redundant disk array (say mirror array or 0/1 array), then to repair the broken disk array and recover all the data on that failed disk.

Spare Disk

A spare hard disk which can automatically be used to replace the failed member of a redundant disk array and then automatically recover the redundant disk array without user intervention.

Spare Pool

Logically the place where spare disks stay. When a disk is added into the spare pool, it will become a spare disk.

Striping

Known as RAID 0, spread data over multiple disks to improve performance. It does not provide data protection.

Synchronize

Same as Duplicate.

Appendix B

Contact Technical Support

If you have any problems and questions when using our products, you may get help from the following ways:-

- Read this manual carefully;
- Visit our website: www.highpoint-tech.com We will post the most updated materials and FAQs onto our website.

If you still can not solve the problem after tried the above two ways, please contact our technical support: support@highpoint-tech.com
Our technical support will respond your question quickly with the proper answer!

Thank you for choosing our products!