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HPT370/372 RAID Controller User's Manual

HighPoint

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Chapter 1

Introduction

This chapter will give you a brief introduction on the background knowledge of RAID as well as the hard drive connection on your motherboard which is embedded with HPT370/372 RAID Controller. The driver installation of HPT370/372 RAID Controller is also included in this chapter.

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1.1 RAID Basics

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

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

The most frequently used RAID levels include RAID 0, 1, 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
RAID 0	Data striping	2	Highest Performance without data protection
RAID 1	Disk mirroring	2	Data protection through redundancy
RAID 0+1	RAID 0 and RAID 1 combined	4	Highest performance with data protection
JBOD	Disk Spanning	2	No data protection and performance improving, but full usage of disk space

1.2 IDE RAID

For a long time, RAID technology has been based on SCSI interface, and mainly focused on high-end application. PC users and low-end business application has been excluded from the RAID application due to the high cost of SCSI RAID.

It is very lucky that, as the IDE RAID technology emerges recently, people now can enjoy the RAID benefits at a pretty low cost.

IDE is another computer interface widely used by PCs. Due to the great development of the PC market, the IDE interface devices' price has dramatically dropped, while at the same time, their performance has greatly improved. Below is a performance&cost brief comparison between IDE RAID and SCSI RAID:

		IDE RAID	SCSI RAID
Interface		PCI to ATA133	PCI to Ultra160 SCSI
Controller Card	Number of Channels	2	1
	Maximum number of Drives	4	15
	Maximum Data Throughput	133 x 2 MB/s	160 MB/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 performance and low cost, IDE RAID has been widely accepted by the market as a cost-effective RAID solution.

1.3 Hard Drive Connection

Number of Disks	IDE 1		IDE 2	
	Primary	Slave	Primary	Slave
1	✓			
2	✓		✓	
3	✓	✓	✓	
4	✓	✓	✓	✓

Note:

1. “ ” means it is better to connect hard drive 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, one disk should be set as master while the other as slave.

1.4 Driver Installation

As for the HPT370/372 driver installation, you may have the following information as reference .

● Windows 98/ME

Automatic Installation

After the computer start-up, Windows system will find the RAID function and prompt user to install its driver. Please follow the prompts to finish driver installation.

Manual Installation

If Windows does not find new hardware, the driver can be manually installed through the following steps :

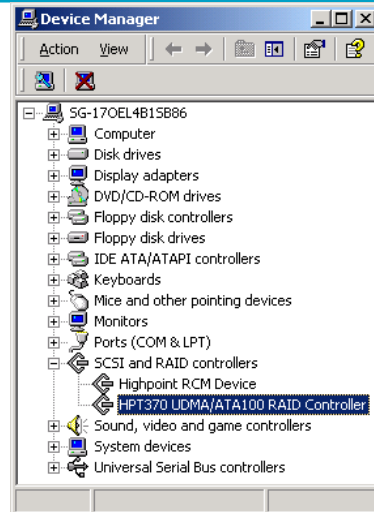
1. Close all programs;
2. Click **Start-->Settings-->Control Panel**, then double-click on **Add New Hardware** icon;
3. Click **Next** in the follow-up window to continue;
4. A dialog box will appear and ask whether to let windows search new hardware. Select **No, I want to select the hardware form a list**, and then click **Next** to continue;
5. Different hardware types will be listed in the follow-up window, Select **SCSI Controllers** from the list and then click **Next** to continue;
6. Insert the driver diskette, then click **Have Disk...**;
7. A dialog box will pop out, please input the path of driver location **A:\Win98_ME**,, then click **OK** to continue;(if users install driver from **CD make sure input the correct path, for example D:\HPT370\Driver\Win98_ME**)
8. In the follow-up window, select **HPT370 UDMA/ATA100 RAID Controller or HPT372 UDMA/ATA 133 RAID Controller**, then click **Next** to continue;
9. Follow the system prompts to finish driver installation. When finished, restart the computer.

Verify Installation

After the driver installation finished and the computer restarted:

1. Right-click **My Computer** icon on desktop, and then select **Properties** item from the popup menu;
2. Activate **Device Manager** item from the popup window.

If there are the two device items under **SCSI Controllers** tree as shown below, it indicates that the driver has been installed correctly.



If you cannot find these two device items, or there is ? or ! on device icon, it indicates that the driver has not been correctly installed and needs reinstallation.

● **WINDOWS NT4.0**

Install driver under existing Windows NT4.0

1. Click **Start-->Settings-->Control Panel**, then double-click **SCSI Adapter** icon;
2. In the follow-up window, select **Driver** item, then click **Add** button;
3. In the follow-up window, select **Have Disk...**;
4. Insert the driver diskette, and input the path of driver location **A:\WinNT**, then click **OK**;(if users install driver from CD make sure input the correct path, for example **D:\HPT370\Driver\WinNT**)
5. In the follow-up window, select **HPT370 UDMA/ATA100 RAID Controller** or **HPT372 UDMA/ATA 133 RAID Controller** item, then click **OK**;
6. Follow the system prompts to finish driver installation. When finished, restart the computer.

Install driver during the process of Windows NT4.0 installation

(For install HPT driver during Windows NT4.0/Windows2000/WindowsXP installation, recommend users copy the driver to a floppy diskette's root directory)

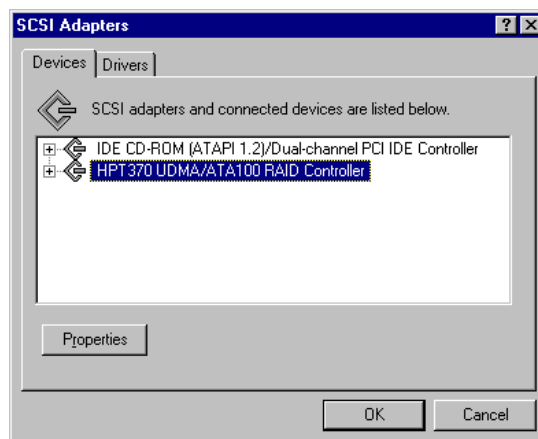
1. Press **F6** key when the system prompts **Setup is inspecting your computer's hardware configuration**;
2. The installation will continue. Later, installation program will prompt user to press **S** key to specify other devices, please press **S** key;
3. In the follow-up Device Type window, select **Other** item, then press ENTER to confirm;
4. The installation program will prompt user to insert the driver diskette. Please insert it and then press ENTER to confirm;

5. In the follow-up window, select **HPT370/372/372A ATA RAID Controller**, then press ENTER to confirm;
6. The follow-up window will list out the devices to be installed, in which **HPT370/372/372A ATA RAID Controller** item should be included(If users want to install other devices, please operate at this time. If all devices have been successfully installed, please go to next step);
7. Press ENTER to continue the installation of Windows NT4.0.

Verify Installation

When the driver has been successfully installed and the computer restarted:

1. Click **Start-->Setup-->Control Panel**, and then double-click **SCSI Adapter** item;
2. If there is **HPT370 UDMA/ATA100 RAID Controller or HPT372 UDMA/ATA 133 RAID Controller** item in the popup window, it indicates that the driver has been successfully installed. Otherwise, users need to reinstall the driver.



● Windows 2000

Install driver under existing Windows 2000

Automatic Installation

Start the computer and boot into Windows 2000, the system will automatically detect new hardware and prompt users to install the driver. Please insert the driver diskette and follow the system prompts to finish the driver installation and then restart the computer.

Manual Installation

If Windows can not find new hardware, the driver should be manually installed through the following steps :

1. Click **Start-->Settings-->Control Panel**, double click **Add/Remove New Hardware**. In the follow-up window, Click **Next** to continue;
2. In the follow-up window, select the first item **Add/Troubleshoot a device**, then click **Next** to continue;
3. In the follow-up window of device list, select the first item **Add New Device**, then click **Next** to continue;
4. Then the system will ask whether to let Windows to search new hardware. Please select **No, I want to select the hardware from a list**. then click **Next** to continue;
5. In the follow-up window of device types, select **SCSI and RAID controllers**, then click **Next** to continue;
6. In the follow-up window, select **Have Disk...**;
7. Please insert the driver diskette and input the path of driver location: **A:\Win2000** into **Copy manufacturer's files from:** column, then click **OK**; (if users install driver from CD make sure input the correct path, for example **D:\HPT370\Driver\Win2K**)
8. In the follow-up window, select **HPT370 UDMA/ATA100 RAID Controller or HPT372 UDMA/ATA 133 RAID Controller**;
9. Follow the system prompts to finish driver installation, and restart the computer.

Install driver during the process of Windows 2000 installation

1. If Windows 2000 is installed from diskette booting , please let the install program run automatically. If Windows 2000 is installed from the CD-ROM, please **F6** key when the message **Press F6 if you need to install a third party SCSI or RAID driver** appears. If start installation by typing **Winnt**, after files have been copied and the computer restarted, press **F6** key when the message **Setup is inspecting your computer's hardware configuration** appears;
2. Press **S** key to specify additional devices when the **Windows 2000 Setup** window appears;
3. In the follow-up window for selecting device type, please select **Other** and press ENTER to continue;
4. Insert the driver diskette, then press ENTER to continue;
5. The system will ask whether to install driver for **WinNT** or for **Windows 2000**, please select to install driver for **Windows 2000**;
6. The follow-up window will list out the devices to be installed, in which **HPT370/372/372A ATA RAID Controller** item should be included;(If

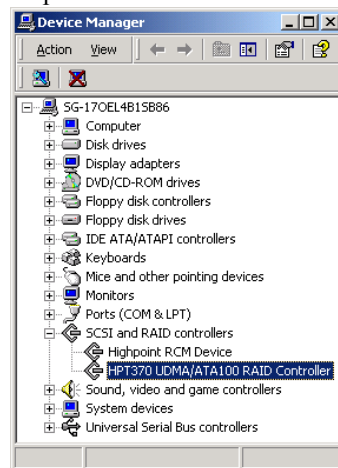
user want to install other devices, please operate at this time. If all devices have been successfully installed, please go to next step.)

7. 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 popup window, select **Hardware** item and then click **Device Manager** button.



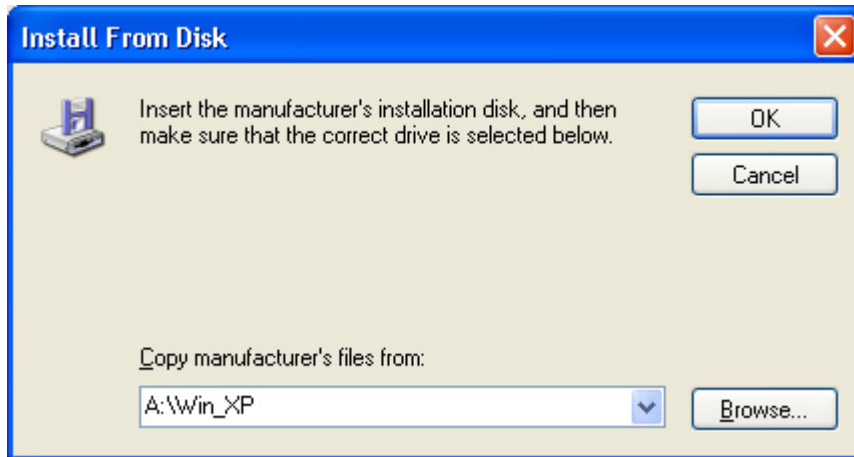
If **HPT370 UDMA/ATA100 RAID Controller** or **HPT372 UDMA/ATA 133 RAID Controller** item exists in the popup **Device Manager** window, it indicates that the driver has been successfully installed. Otherwise, please reinstall the driver.

● Windows XP

Install driver under existing Windows XP

After Windows XP is start-up, Windows system will automatically find new hardware 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 make sure input the correct path, for example **D:\HPT370\Driver\Win_XP**)



5. In the follow-up window, select **HPT370 UDMA/ATA100 RAID Controller** or **HPT372 UDMA/ATA 133 RAID Controller**, then click Next to continue;
6. In the follow-up window, click on Continue Anyway, then click Finish in the follow-up window;
7. Next, Windows will find HighPoint RCM device, please confirm the Digital Signature Not Found window when it appears, when finished, please restart the computer.

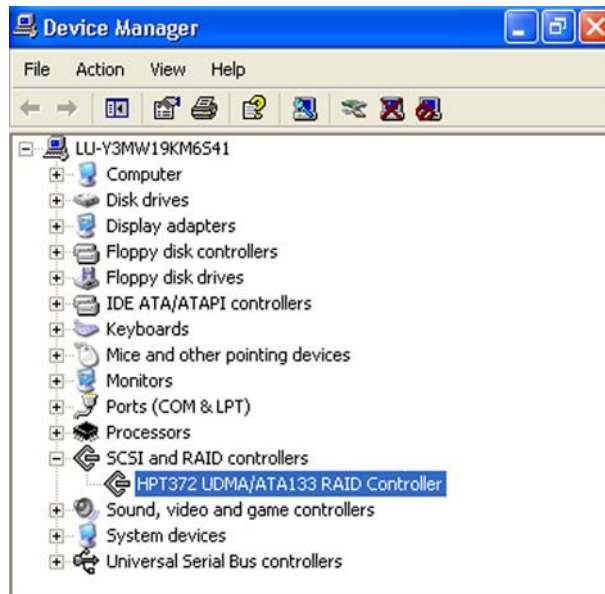
Install driver during Windows XP installation

1. Booting from CD-ROM, when the Windows XP Setup blue screen appears and prompt user to press F6 key to install 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;
4. The follow-up window will list out the installation choices, please select **HPT370/372/372A ATA 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 **HPT370/372/372A ATA 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 **HPT370 UDMA/ATA100 RAID Controller** or **HPT372 UDMA/ATA 133 RAID Controller** item exists in the popup **Device Manager** window (see above), it indicates that the driver has been successfully installed.

Otherwise, if user cannot find these two device items, or there is **?** or **!** markings 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 2

BIOS Configuration Utility

RAID Administrator's configuration is compatible with BIOS configuration. RAID Administrator provides all functions that BIOS can provide except setting boot device. Also RAID Administrator provides much convenience with the graphical user interface based on OS.

So we strongly recommend users to use RAID Administrator for RAID configuration and management. Only the particular functions provided by BIOS will be introduced in this chapter. If users want to configure and manage in BIOS, please refer to the help information given by BIOS interface.

Contents of this Chapter:

- 2.1 Enter BIOS Configuration Utility
- 2.2 Create Disk Array
- 2.3 Delete Disk Array
- 2.4 Add/Delete Spare Disk
- 2.5 Set Boot Device
- 2.6 Duplicate Critical RAID 1/0+1 array
- 2.7 Rebuild Broken RAID 1/0+1 array

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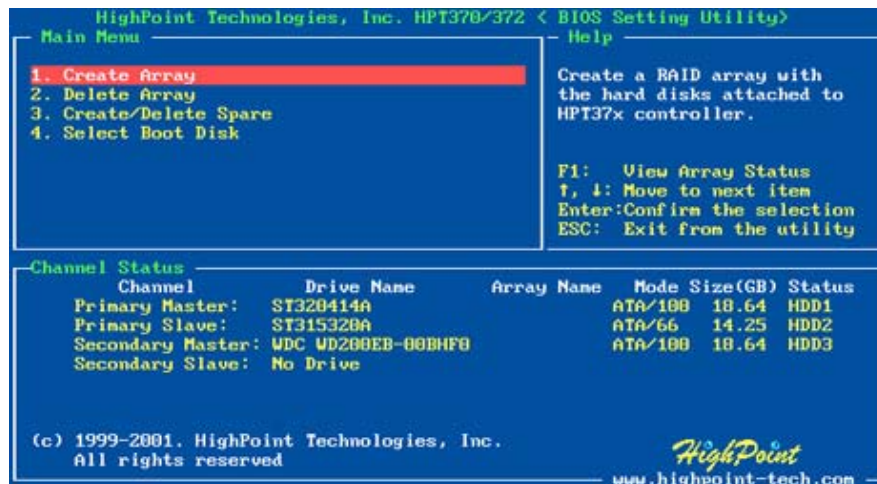
2.1 Enter BIOS Configuration Utility

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

```
HighPoint Technologies, Inc. HPT370/372 BIOS Setting Utility v2.31
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Press <Ctrl><H> to run BIOS Setting Utility
Scan Devices. Please wait ..._
```

The main interface of BIOS configuration utility is as below:



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.

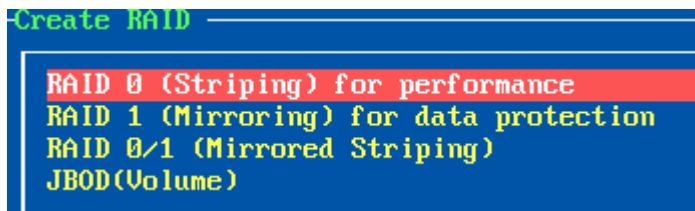
2.2 Create Disk Array

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:

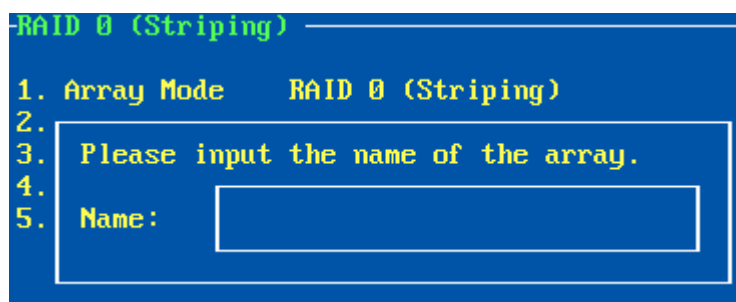


Just highlight the target array mode that you want to create, and then press ENTER to confirm the selection;

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 Status						
Channel	Drive Name	Array Name	Mode	Size(GB)	Status	
() Primary Master:	MAXTOR 6L020J1		ATA/100	20.54	HDD5	
() Primary Slave:	ST340016A		ATA/100	40.01	HDD6	
() Secondary Master:	WDC WD600BB-32BSA0		ATA/100	60.02	HDD7	
() Secondary Slave:	ST315320A		ATA/66	15.30	HDD8	

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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 needs 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;

RAID 0 (Striping)		
1. Array Mode	RAID	2M
2. Array Name	RAID	1M
3. Select Disk Drives		512K
4. Block Size	64K	256K
5. Start Creation Pro		128K
		64K
		32K
		16K

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:

RAID 0 (Striping)	
1. Array Mode	RAID 0 (Striping)
2. Array Name	RAID0
3. Select Disk Drives	
4. Block Size	2M
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)

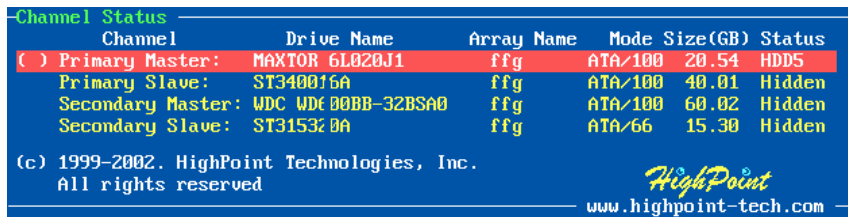
Warning:

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.

2.3 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:

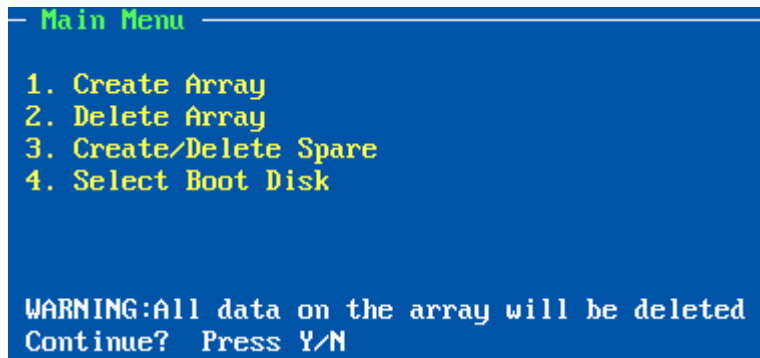


Channel	Drive Name	Array Name	Mode	Size(GB)	Status
() Primary Master:	MAXTOR 6L020J1	ffg	ATA/100	20.54	HDD5
Primary Slave:	ST340016A	ffg	ATA/100	40.01	Hidden
Secondary Master:	WDC WD6000BB-32BSA0	ffg	ATA/100	60.02	Hidden
Secondary Slave:	ST3153Z0A	ffg	ATA/66	15.30	Hidden

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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.

2.4 Add/Delete Spare Disk

Follow these steps to add or delete a spare disk from the mirror array:

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
Primary Master:	MAXTOR 6L020J1	ffg	ATA/100	20.54	HDD5
Primary Slave:	ST340016A	ffg	ATA/100	40.01	Hidden
() Secondary Master:	WDC WD600BB-3ZBSA0		ATA/100	60.02	HDD6
() Secondary Slave:	ST315320A		ATA/66	15.30	HDD7

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

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

Channel	Drive Name	Array Name	Mode	Size(GB)	Status
Primary Master:	MAXTOR 6L020J1	ffg	ATA/100	20.54	HDD5
Primary Slave:	ST340016A	ffg	ATA/100	40.01	Hidden
Secondary Master:	WDC WD600BB-3ZBSA0	ffg	ATA/100	60.02	Hidden
Secondary Slave:	ST315320A		ATA/66	15.30	HDD6

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Warning:

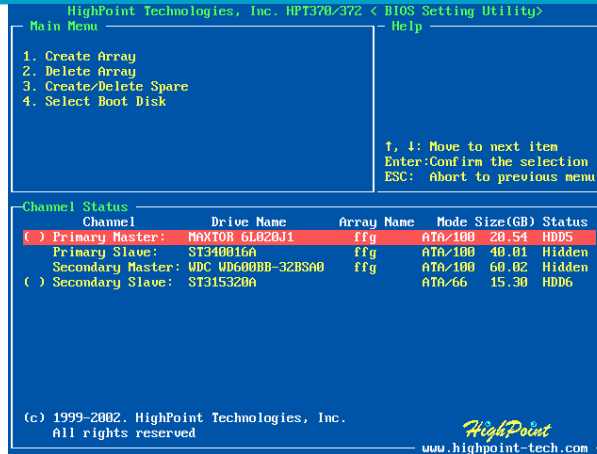
1. Adding a spare disk into the mirror array will destroy all the data on that disk.

2.5 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:

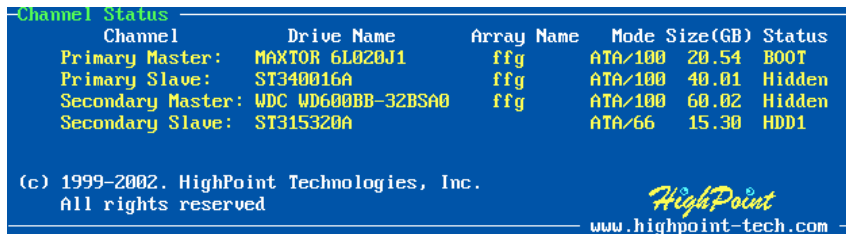
BIOS Configuration Utility



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

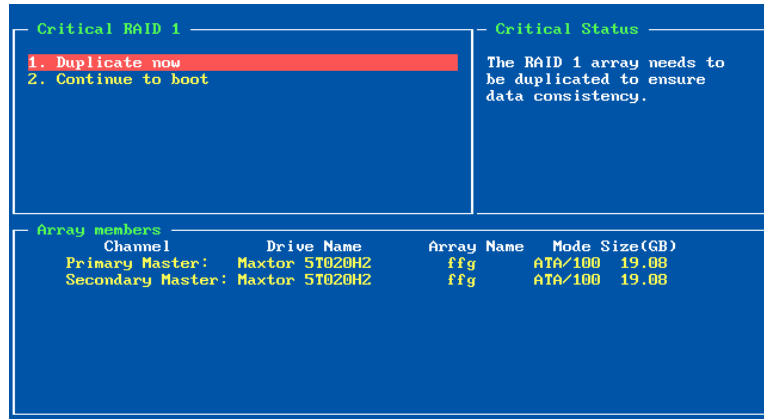
If user select a disk or disk array which has a boot mark and press ENTER, then its boot setting will be canceled.

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



2.6 Duplicate Critical RAID 1/0+1 array

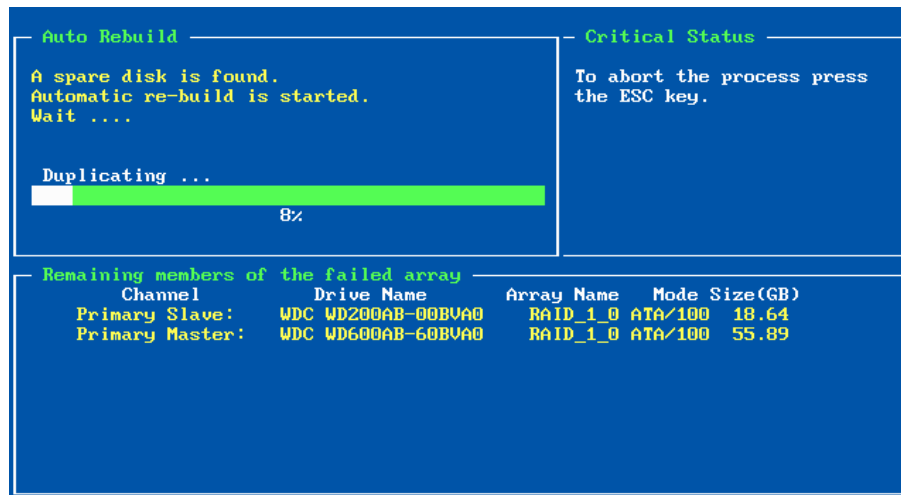
When booting computer, if BIOS detect a RAID 1 or 0+1 array duplication has been canceled or any reasons that may cause the inconsistency between user data and backup data on the disk array, then the disk array will be marked as critical status, and BIOS will automatically prompt user to duplicate the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



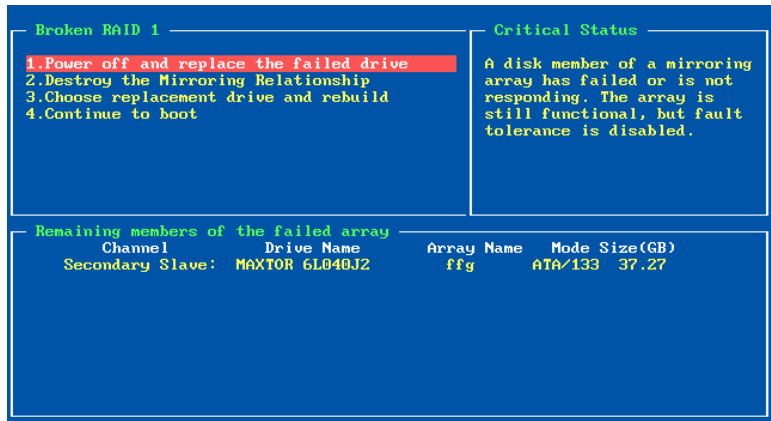
Just select **Duplicate Now** to duplicate, or select **Continue to Boot** to skip. If user selects **Continue to Boot**, user still can duplicate the array after booting into the OS.

2.7 Rebuild Broken RAID 1/0+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 a RAID 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 RAID 1 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.

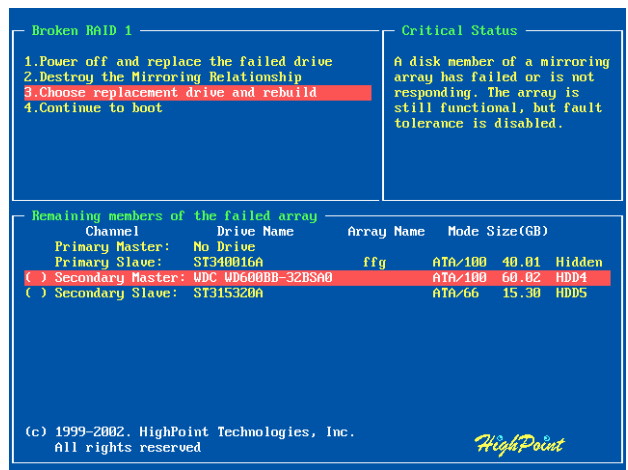
2. Destroy the mirroring relationship

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 the 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

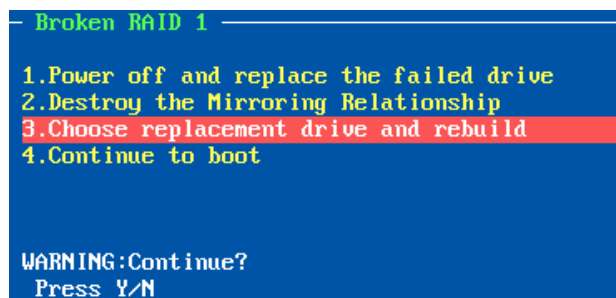
This command enables user to select an already-connected disk to rebuild the broken array and replace the data to that disk.

1. After chosen this command line, the **Status** column will be activated, see below:



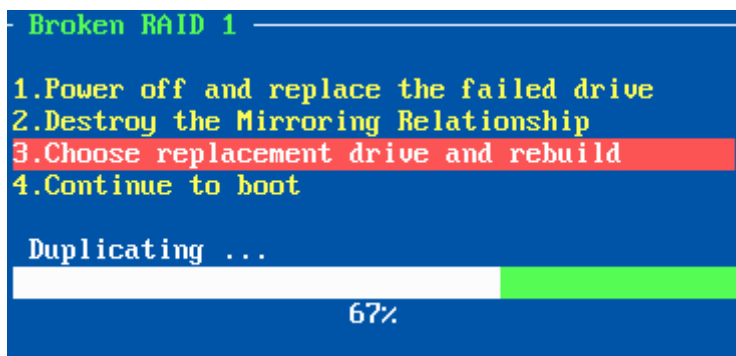
Just highlight the target disk and press ENTER to select it;

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 3

RAID Administrator

Detailed introduction on using RAID Administrator is given in this chapter. It helps users to configure and manage RAID through this software tool.

Contents of this chapter:

- 3.1 Installation
- 3.2 Getting Start
- 3.3 Configuration Functions
- 3.4 Management Functions
- 3.5 View Information
- 3.6 Rebuild Broken RAID 1/0+1 Array

HighPoint

3.1 Installation


Follow these steps to install the ATA RAID software:

1. Browse the software installation CD or diskettes, and double click on the **setup.exe** file to begin the software installation;
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:

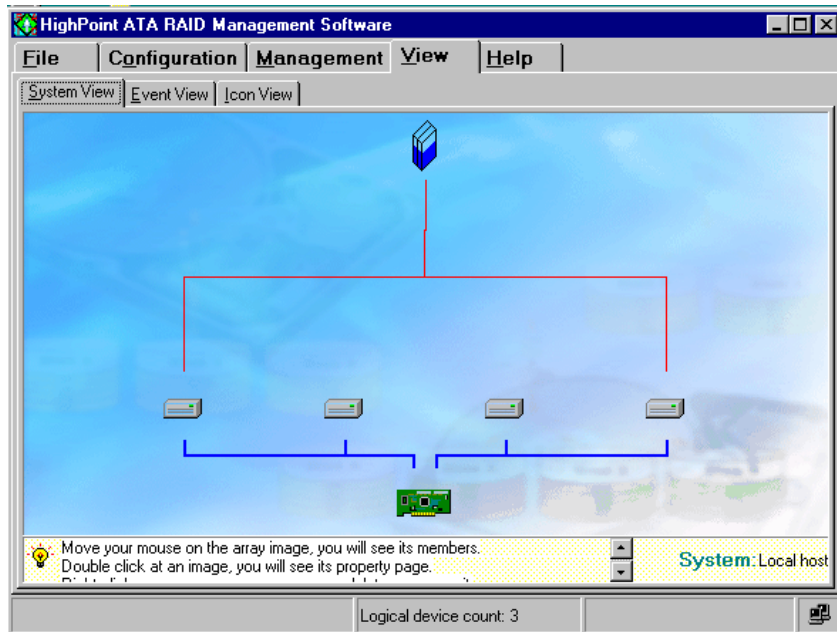
HighPoint ATA RAID Management software	Main Program
Read Me	Software Information
Uninstall...	Uninstall the Program

3.2 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

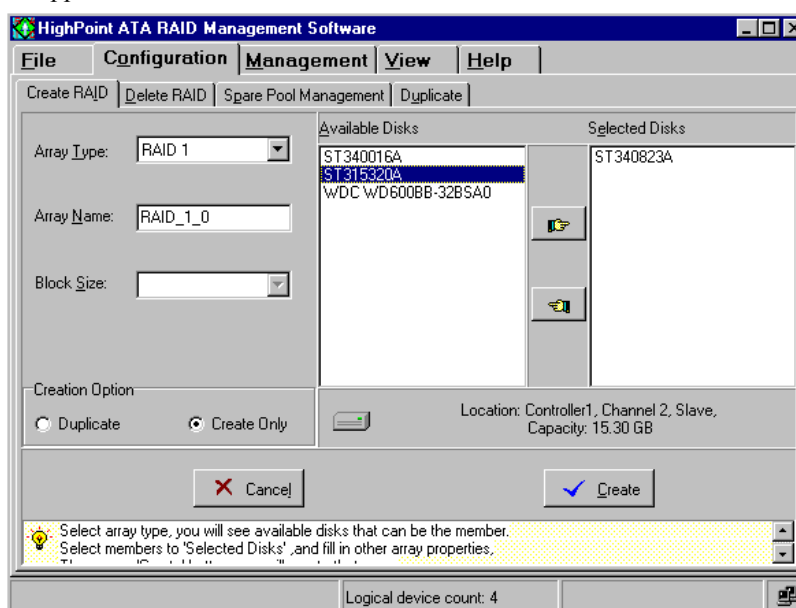
Help: This tab contains the help information for this software.

3.3 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:

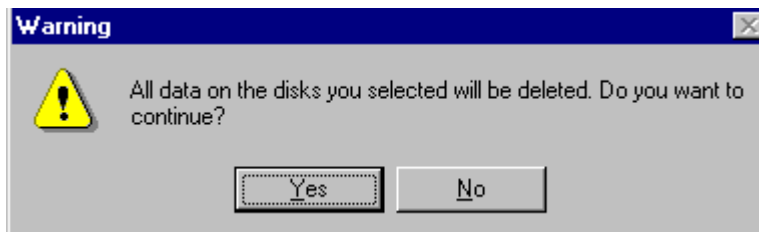


Within this interface:

- 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 .

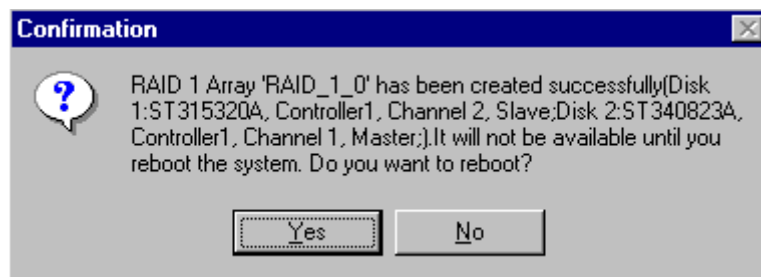
- Available Disks:** This pane will list out all the disks that currently can be used to create disk array.
- Selected Disks:** This pane will list out the disks that have been selected to create the disk array. User can highlight the specific disk in **Available Disks** pane and click the corresponding hand icon to select that disk into the **Selected Disks** pane.
- Creation Option:** This option is only available after user selects RAID 1 array in the **Array Type** box . **Duplicate** means reserve the data on the source disk (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)

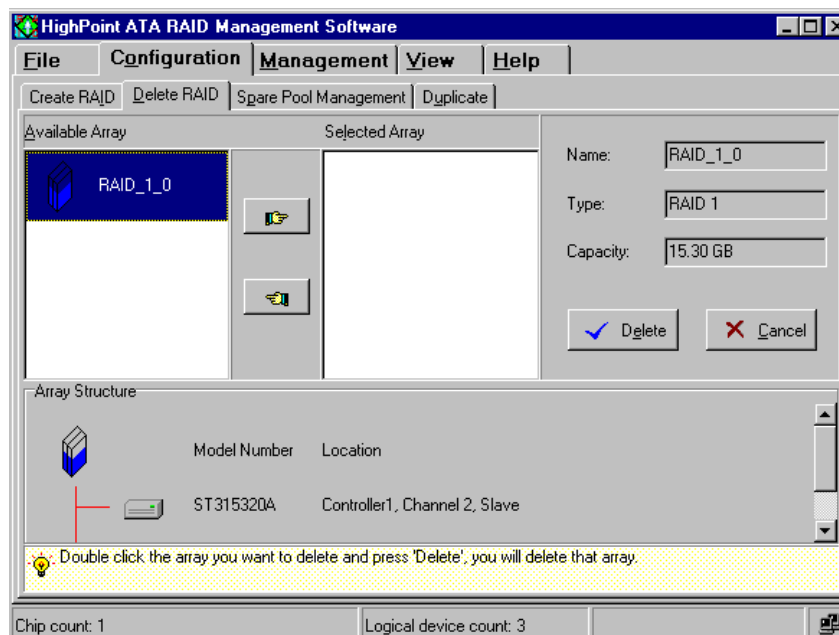
Warning:

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:

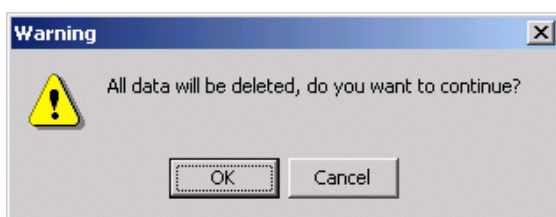
1. Click the tab **Configuration** --> **Delete RAID**, the following window will appear:



Within this interface:

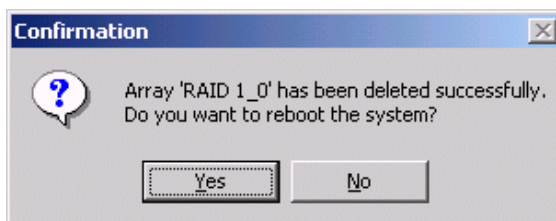
- Available Array:** All arrays that can be deleted will be listed in this pane. The bootable array will not appear here and can not be deleted, user must delete it in BIOS.
- Selected Array:** Disk array in the **Selected Array** pane will be deleted after clicking the **Delete** button.
- Array Structure:**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

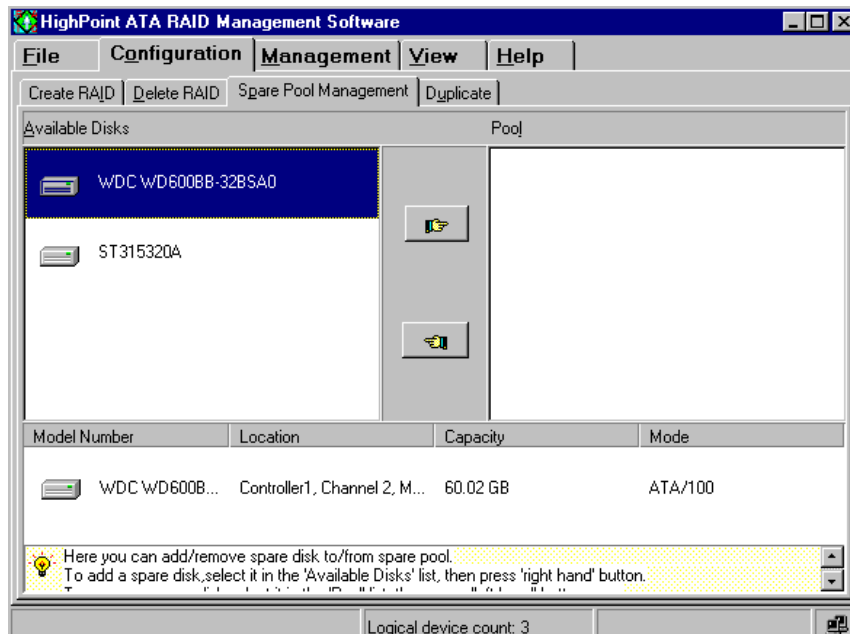
1. **Deleting a disk array will destroy all the data on the disk array.**

Spare Pool Management

When a disk fails in RAID 1 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 array and replace data to the target disk. With setting a spare disk, you can enhance security of RAID 1 array.

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

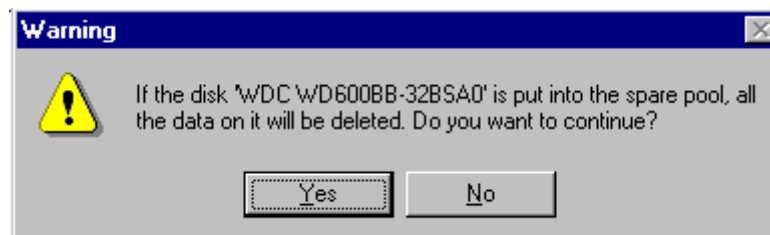
1. Click the tab **Configuration** --> **Spare Pool Management**, the following window will appear:



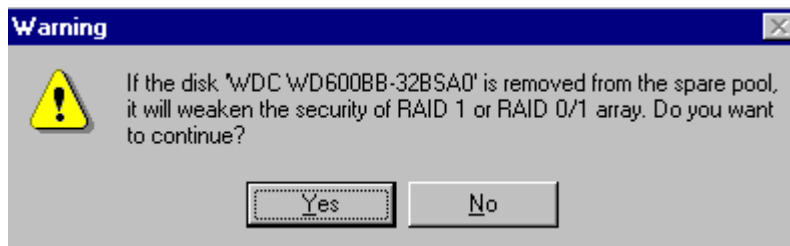
Within this interface:

- 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:

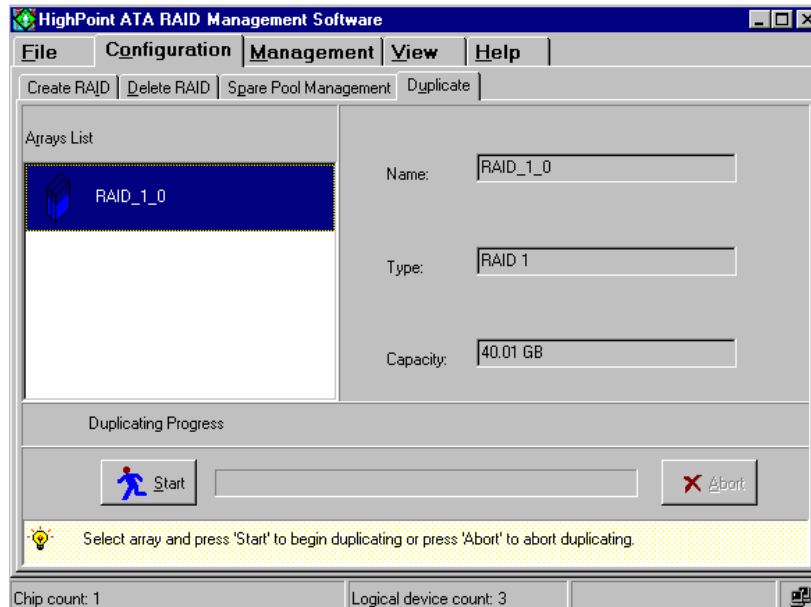
1. Adding a disk into spare pool will destroy all the data on that disk.

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.

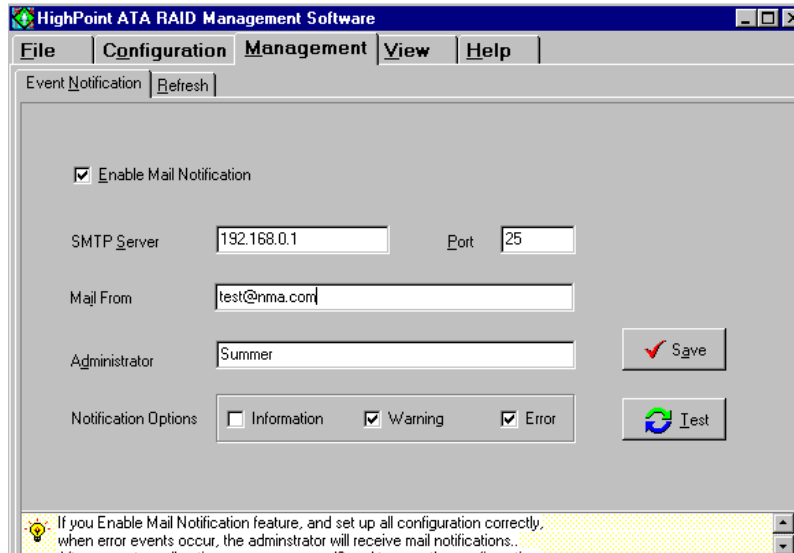
3.4 Management Functions

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.

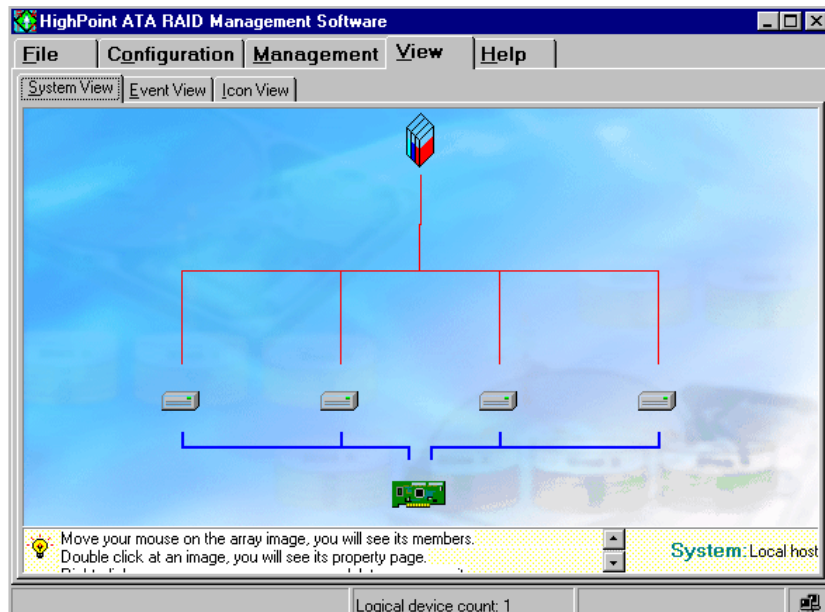
After clicking on this tab, the software will automatically switch to the **System View** screen, here user can find the updated system information after scanning.

3.5 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:

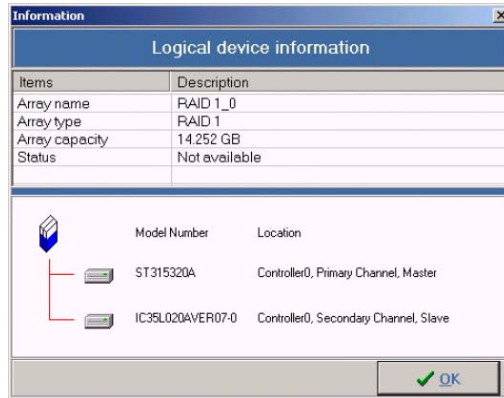
(1) Viewing Device Relationship

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.

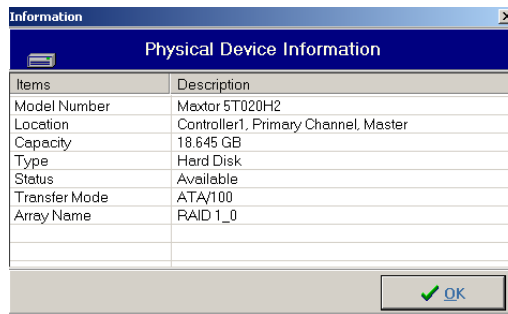
(2) Viewing disk array information

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



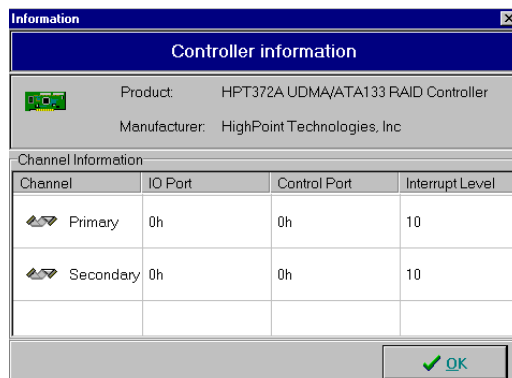
(3) Viewing Physical Device Information

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, and 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 popup 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.

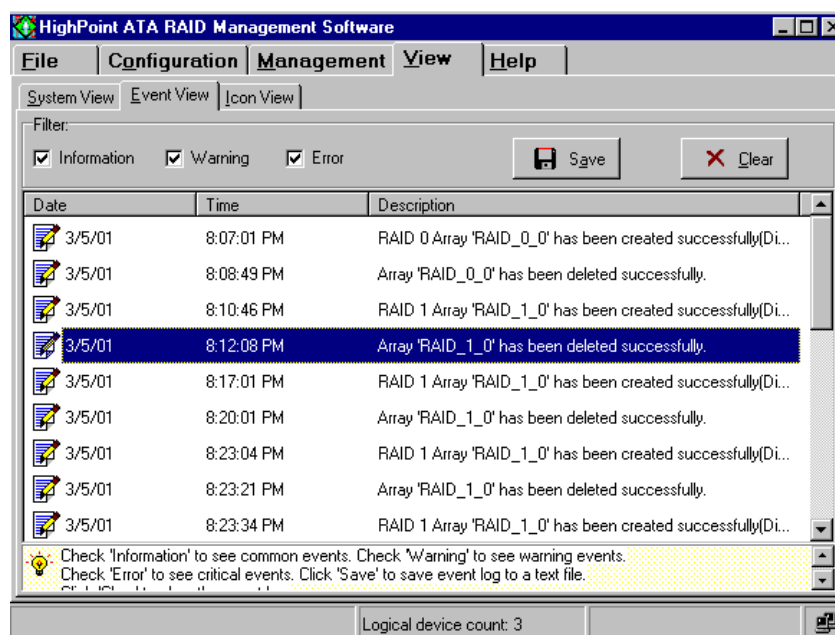
(6) Refresh

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 follow-up window to save the currently listed events into a TXT file.

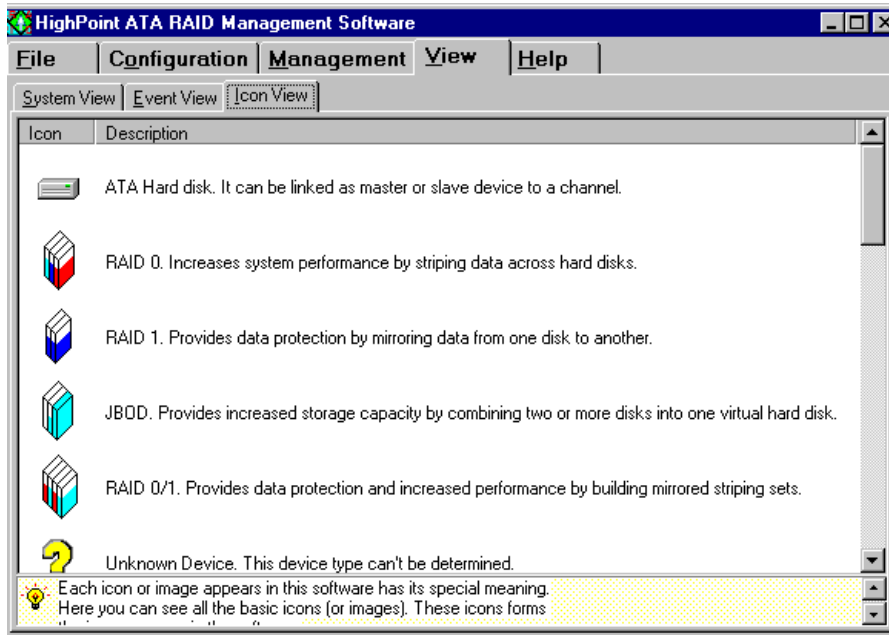
(3) Clear all the currently logged events

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:



3.6 Rebuild Broken RAID 1/0+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:



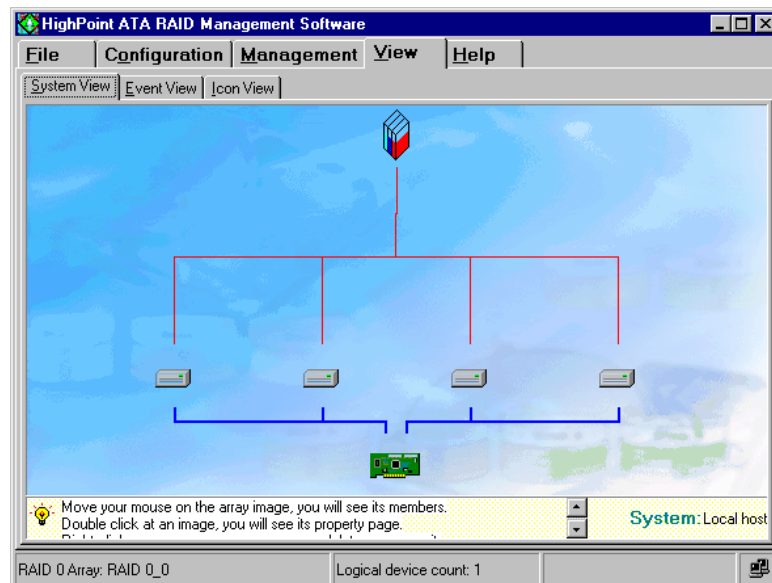
If the broken array is a RAID 1 array and there is a spare disk in the spare pool which can be used, then the ATA RAID software will automatically use the spare disk to replace the failed disk, and rebuild the broken RAID 1 and replace data to the target disk.

If the broken array is RAID 0+1 array, or the broken array is RAID 1 array but no proper spare disk can be used to automatically rebuild, then user still can use the following ways to rebuild the broken RAID 1 or RAID 0+1 array:

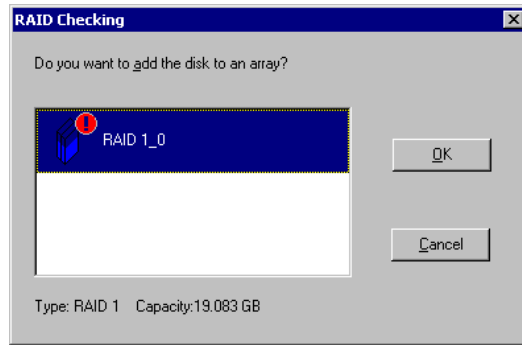
- (1) Use an already-connected physical hard disk to rebuild broken RAID 1 array

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 follow-up window will appear as below:

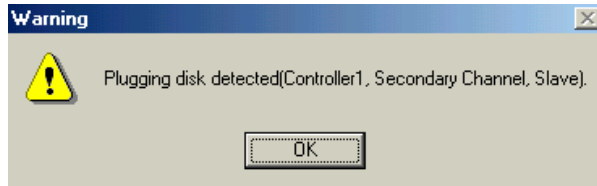


Just select the broken array, then click OK and confirm the follow-up data loss warning message box to finish the rebuilding of the selected broken RAID 1 array. After rebuilding, the new array will be automatically duplicated to rebuild the lost data.

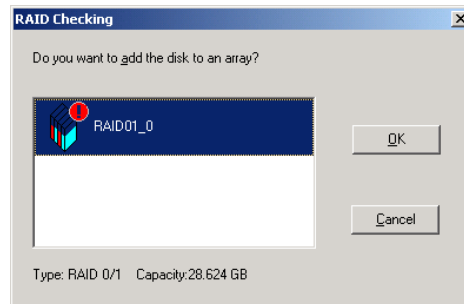
(2) Hot swapping a hard disk to rebuild broken RAID 1 or RAID 0+1 array

Follow these steps to rebuild by this way:

Hot swap on a good hard disk (user may need to hot swap off the failed disk first), 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 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.

- (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.**

Appendix A

Glossary

Array

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

Hot Swap

The ability to remove a failed member of a redundant disk array and replace it with a good drive, then repairing the errored 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 drive to a mirror disk.

RAID

Redundant Array of Independent Disks, it is a method of combining several hard drives(physical drives) into one logical unit(logical drive), 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.

Spare Disk

A spare hard disk drive which can automatically be used to replace the failed member of a redundant disk array.

Striping

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

Synchronize

The operation of duplicating data from source drive to mirror drive of a mirror array, so that the data on mirroring disks can keep identical.

Appendix B

Contact Technical Support

If you have problems or 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 you question quickly with the proper answer!

Thank you for choosing our products!