User Manual

VT8237A PATA/SATA Integrated Storage Controllers
Feature and Driver Support

Revision 0.85, March 27, 2007

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1 INTRODUCTION

This document is intended for use with the VIA PATA/SATA host controllers integrated in the VT8237A South Bridge. This document focuses on the features and driver support of the storage controllers. The scope of this document covers the storage controllers mentioned below:

- VIA Bus Master IDE Controller (Device ID 0x0571)
- VIA SATA Controller (Device ID 0x0591)

1.1 Overview

PCI-SIG defines various types of PCI mass storage controllers. Each type is classified into one class and sub-class. Chip venders (such as VIA Technologies Inc.) who design PCI storage controllers can specify one type for each controller in the controller's PCI header registers. Upon reading the device's PCI header registers, the operating system will determine the type of controllers and then search for corresponding drivers. Table 1-1 lists the base class and sub-class code of all PCI mass storage controllers.

Table 1-1: Base class and Sub-Class code of all PCI mass storage controllers

Base Class Code	Sub-Class Code	Meaning
01h	00h	SCSI bus controller
	01h	IDE controller
	02h	Floppy disk controller
	03h	IPI bus controller
	04h	RAID controller
	05h	ATA controller with single/chained DMA
	06h	Serial ATA Direct Port Access
	80h	Other mass storage controller

There are two host storage controllers integrated in the VT8237A South Bridge:

Table 1-2: Two integrated storage controllers in VT8237A

Item	Name	Device ID	Configurable Class
1	VIA Bus Master IDE Controller	0x0571	Base class = 01, sub-class= 01, IDE Controller
2	VIA SATA Controller – **xxxx**	Depend on Sub-Class Code	Base class = 01, sub-class= 01, IDE controller Base class = 01, sub-class= 04, RAID controller

The term "Configurable Class" refers to the possible base class and sub-class that may be configured for the controller. The controller can be configured in the BIOS settings. In Table 1-2, the "VIA Bus Master IDE Controller" (VT8237A PATA Controller[1]) is not configurable because it only supports IDE controller.

The "VIA SATA controller- **xxxx**" (VT8237A SATA controller) can be dynamically configured to be either an IDE or RAID controller. Within the SATA context, "IDE controller" refers to the SATA controller configured as the "IDE mode". "RAID controller" refers to the SATA controller configured as the "RAID mode". Regarding the "xxxx" code, please refer to VIA VT8237A Data Sheet and VIA BIOS Porting Guide.

[1] Throughout this document, the term "VT8237A PATA Controller" refers to "VIA Bus Master IDE controller" (Device ID 0x0571).

1.2 Features of the VT8237A PATA Controller

The VT8237A PATA controller is a standard dual-channel IDE controller that can only be configured as an "IDE controller". Microsoft Windows and Linux have provided default drivers for standard IDE devices. To enable enhanced support for the ATA/ATAPI Ultra-DMA mode, VIA also provides mini-IDE drivers for VT8237A PATA controller (see section 2.2.1). The VT8237A PATA controller supports the following:

- Standard Dual Channel Bus master IDE controller.
- Transfer mode supports up to ATA 133 (Ultra DMA mode 6).
- AT Attachment with Packet Interface-6 (ATA/ATAPI-6).

Table 1-3: Channel types supported by the VT8237A PATA controller

Class	Interface Type
IDE controller	Two master/slave-mode Parallel ATA channels Support up to four ATA/ATAPI devices.

1.3 Features of the VT8237A SATA Controller

The VT8237A SATA controller is an advanced host controller that provides the functionalities of Serial ATA (SATA). Figure 1-1 shows the function block of the SATA module in the VT8237A SATA controller. The default mode of the SATA module is active.

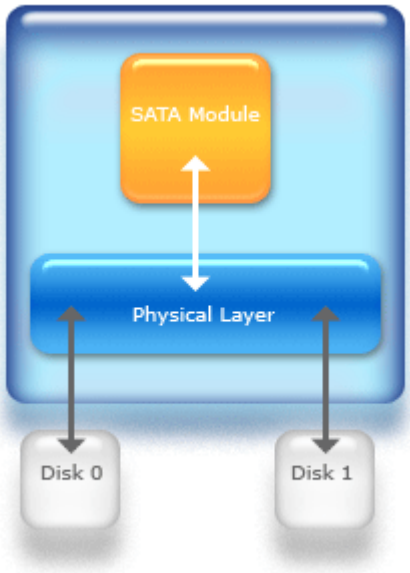


Figure 1-1: Module block of VT8237A SATA controller

As the SATA module of VT8237A SATA controller is in active mode, it can emulate a parallel ATA controller that is compatible to standard dual channel IDE controller. Therefore, the default IDE driver can be loaded.

Table 1-4: Channel type of VT8237A SATA controller

Class	Interface Type
IDE controller	Master/Master-mode SATA channels (ports) Note that Slave ports are not provided by this chip.
RAID controller	Master-only SATA ports. For detailed driver support, see section 2.

2 DRIVER SUPPORT

2.1 Drivers Supported for Microsoft Windows

Table 2-1 and Table 2-2 list the status of current driver support for VT8237A storage controllers[2].

Table 2-1: Storage drivers for Windows NT4, and 9x / ME

Class	Device ID	Module	Windows NT4	Windows 9X / ME
IDE	0x0571	PATA	1. Microsoft - Default.	1. Microsoft - Default.
	0x5337	SATA[3]	1. Microsoft - N/A 2. VIA – N/A	1. Microsoft - N/A 2. VIA – N/A
RAID	0x0591	SATA	VIA: V-RAID after v5.20C (included)	VIA: V-RAID after v5.20C (included)

Table 2-2: Storage drivers for Windows 2000 / XP / Server 2003 and Vista

Class	Device ID	Module	Windows 2000 / XP / Ser2003	Windows Vista
IDE	0x0571	PATA	1. Microsoft - Default. 2. VIA - VIAMiniIDE after v1.60 (included).	Microsoft built-in VIA mini-IDE driver
	0x5337	SATA	1. Microsoft – Default 2. VIA - VIAMiniIDE after v1.60 (included).	1. Microsoft – Default or In-Box VIA Bus/Master driver 2. VIA – VIA MiniIDE after v1.60 (included) Note 3)
RAID	0x0591	SATA[4]	VIA: V-RAID after V5.40a (included)	1. Microsoft – In-Box VIA Stor-Miniport RAID driver 2. VIA: VIA V-RAID v5.40a (included)

[2] Last updated in February 2006.

[3] SATA IDE mode is not supported in Win9X/WinMe/NT4.0. Only RAID mode can be used by configuring the controller into RAID mode through BIOS setup menu in order to enable VIA V-RAID driver.

[4] VIA has checked new RAID driver and new IDE Bus/Master driver into Microsoft Vista to become in-box default driver.

2.1.1 Windows VT8237A PATA Controller Driver

For the VT8237A PATA controller, Microsoft Windows has provided a default driver for the standard IDE controller. The VIA mini-IDE driver included in the driver package may also be installed. See section 2.1.3.1 for detailed information about the mini-IDE driver.

2.1.2 Windows VT8237A SATA Controller Driver

The driver support for the VT8237A SATA controller is based on the configuration mode. When the controller is set to IDE mode, the IDE driver will be available.

When the VT8237A SATA controller is set to the IDE class, the controller will be fully compatible with standard dual-channel IDE controllers. Microsoft Windows loads the default IDE driver to enable support for the VT8237A SATA controller.

The VIA mini-IDE driver may also be installed to improve the performance of the VT8237A SATA controller. When the VIA mini-IDE driver is installed, the SATA hard disks become hot-swappable. The driver enables automatic hot-plug detection of SATA drives. It also enables the safe-remove feature for SATA hard disks (see Figure 2-1).

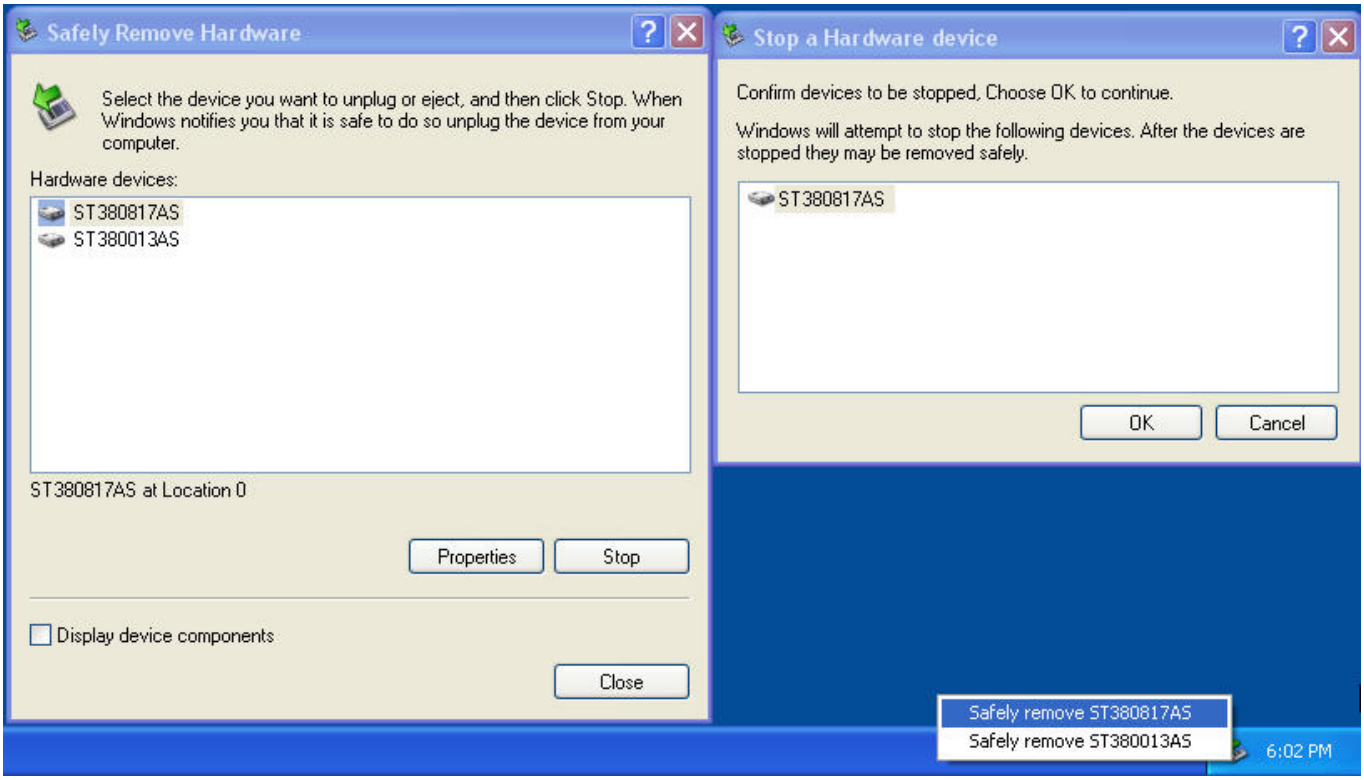


Figure 2-1: Safe-remove icon and safe remove hardware dialog of the SATA hard disk

When the VT8237A SATA controller is set to RAID, Microsoft Windows does not load any default driver (see Figure 2-2). The VIA V-RAID driver must first be installed for the RAID to be recognized. For detailed information about installation, please refer to section 3.

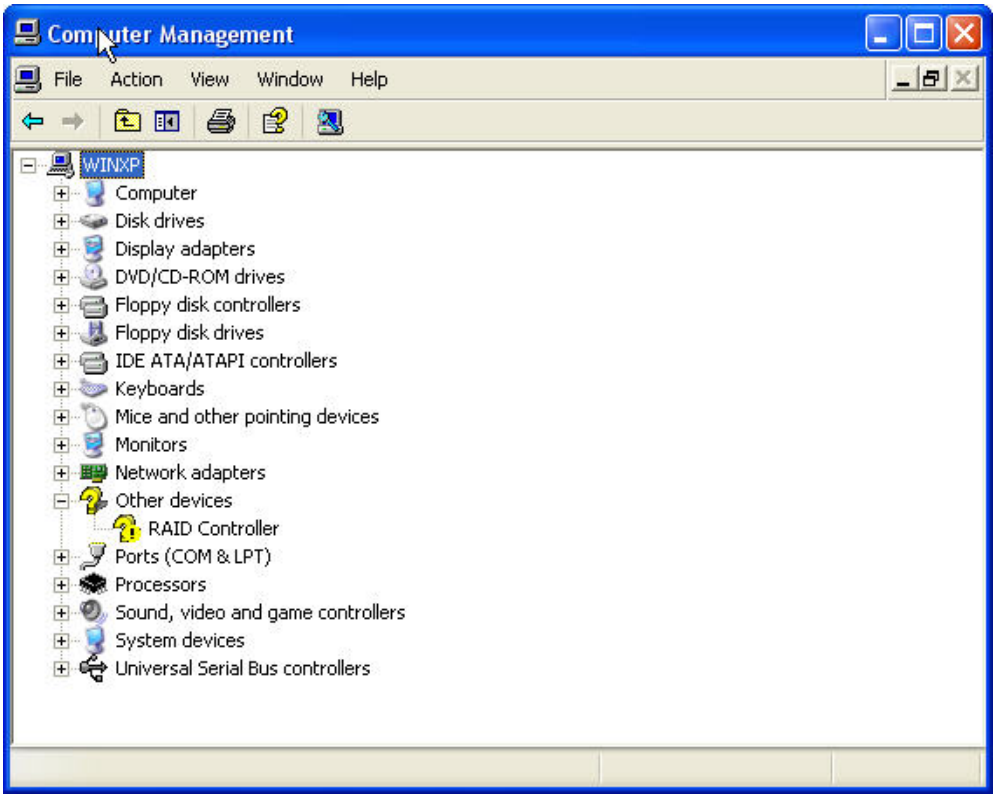


Figure 2-2 : Device Manager View - Unknown RAID controller before installing VIA V-RAID driver

The driver will enable software RAID function according to current mode settings in the BIOS. When it is set to RAID mode, the driver enables the software RAID function.

Table 2-3: Software RAID enable / disable condition

SATA Controller Mode	RAID Mode
Driver RAID function	Enable

2.1.3 Driver Packages

2.1.3.1 VIA Mini-IDE Driver Package

The mini-IDE driver is the vendor-provided driver that reports the capabilities of the IDE controller to Microsoft Windows. The mini-IDE driver exports interface functions for Windows to query and set the transfer mode of the host controller. Windows can perform the following actions shown below using the mini-IDE driver:

- Determine whether the channels are disabled or enabled.
- Determine the transfer modes the IDE controller supports.
- Set the current transfer mode to a specific mode.

Microsoft Windows XP Service Pack 2 has built-in support for VIA's old IDE controller. However, Windows XP Service Pack 2 does not have built-in support for the new VT8237A integrated PATA and SATA IDE controllers. Windows XP will treat it as an unknown VIA IDE controller and assume that the controller can support transfer modes up to Ultra-DMA 6. Microsoft Windows works fine because both integrated controllers are backwards compatible and support transfer modes up to Ultra-DMA 6. For improving the performance of the new VIA VT8237A PATA/SATA IDE controller, it is recommended to install the VIA mini-IDE driver.

The VIA Mini-IDE driver Package (Version 1.30 or above) supports the mini-IDE driver for both PATA IDE and SATA IDE.

2.1.3.2 VIA RAID Driver Package

The VIA RAID driver is a SCSI-miniport driver that performs software RAID functions on VIA storage controller families. The driver supports the features mentioned below on the VT8237A SATA controllers:

- Supports four SATA ports at 3.0 Gb/s (300 MB/s).
- Supports hard disk drives larger than 137 GB (48-bits LBA).
- Supports SATA I, SATA II, Ultra DMA mode 6/5/4/3/2/1/0, DMA mode 2/1/0, and PIO mode 4/3/2/1/0.
- Supports RAID 0, 1 and JBOD.
- Bootable disk or disk array support[5].
- Windows-based RAID configuration and management software tool. (Compatible with BIOS)
- Real-time monitoring of device status and error alarm with popup message box and beeping.
- Supports hot-swapping of a failed disk drive in a RAID 1 array.
- Mirroring and automatic background rebuild support.
- SATA and ATA S.M.A.R.T support.
- Microsoft Windows 98, Me, NT4.0, 2000, XP and Server 2003 operating system support.
- Event logging for easy troubleshooting.
- On-line help for RAID software.

For detailed information about VIA RAID Driver Package installation, please refer to section 4.

[5] The VIA V-RAID OPROM should exist.

2.2 Drivers Supported for Linux

2.2.1 Linux VT8237A PATA Controller Driver

The default Linux driver supports all South Bridge integrated parallel IDE controllers.

2.2.2 VIA VT8237A Linux Kernel SATA Driver Source Patches

VIA has provided a package that includes the kernel driver source patches, examples, and documents for the VT8237A SATA controller to the Linux organization and customers. As Table 2-4 shows, the package is named as "VIA Linux Driver Patch package". The driver patch package can be obtained directly from VIA by contacting josephchan@via.com.tw or through the VIA Arena Web-site. Currently, the Linux organization supports this package in the latest Linux Kernel. For more information about Linux Kernel, please refer to the release note published by the Linux organization. For Linux distributors' OS information, please refer the release history or document published by each distributor.

Table 2-4: Linux storage driver support for VT8237A SATA controller

Class	Device ID	Module	Linux Kernel 2.4.X	Linux Kernel 2.6.X
IDE	0x5337	SATA	See footnote[6]	VIA Linux Driver Patch Package v1.30 or above

[6] VIA recommends Linux users to upgrade their kernel to Version 2.6.X. VIA will not provide VT8237A patches for kernel 2.4.X to end-user. If there is any special request from thirty party hardware vendors, please contact josephchan@via.com.tw.

3 DRIVER INSTALLATION

3.1 VIA mini-IDE Driver Installation

STEP 1: BEFORE INSTALLING THE VIA MINI-IDE DRIVER

Prior to installing the VIA mini-IDE driver, first uninstall all existing non-default driver for the VT8237A PATA and SATA controllers. The VT8237A SATA controller should be set to IDE mode through the BIOS setup menu.

In Figure 3-1, "VIA Bus Master IDE Controller" is the default name of the VT8237A PATA controller and "Standard Dual Channel PCI IDE Controller" is the default name of the VT8237A SATA controller.

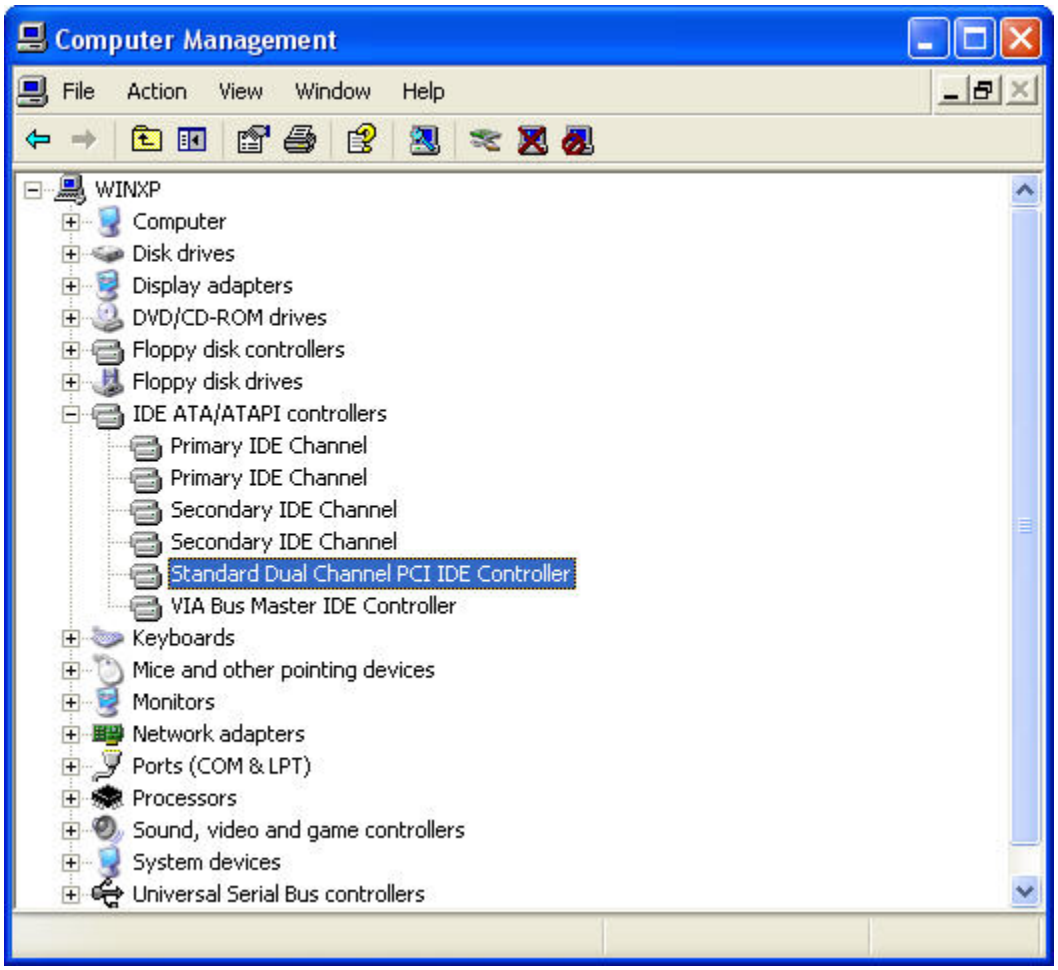


Figure 3-1: Before installing the VIA mini-IDE driver

STEP 2: LOCATE AND EXECUTE THE SETUP.EXE FILE

To start the installation, run the setup.exe file included in the driver package.

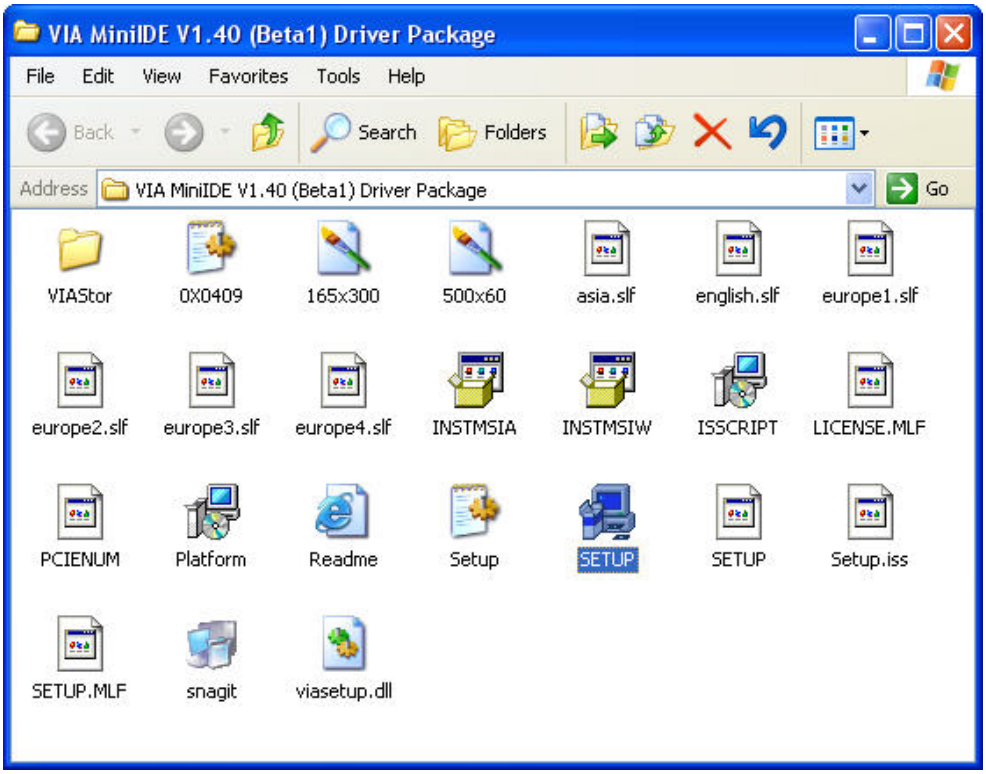


Figure 3-2: Launching the VIA mini-IDE installer file

STEP 3: START THE INSTALLATION WIZARD

Click on the “Next >” button to continue.

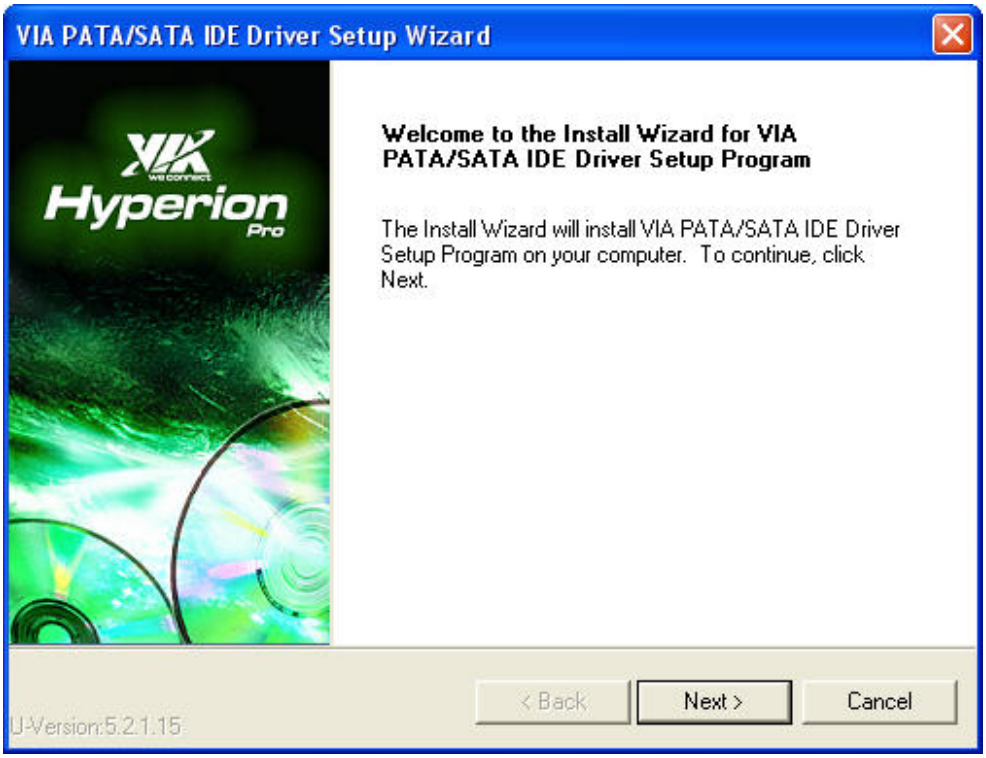


Figure 3-3: The startup screen of the VIA mini-IDE installer

STEP 4: READ THE LICENSE AGREEMENT

After reading the license agreement, select “I Agree” and click on the “Next >” button to continue.

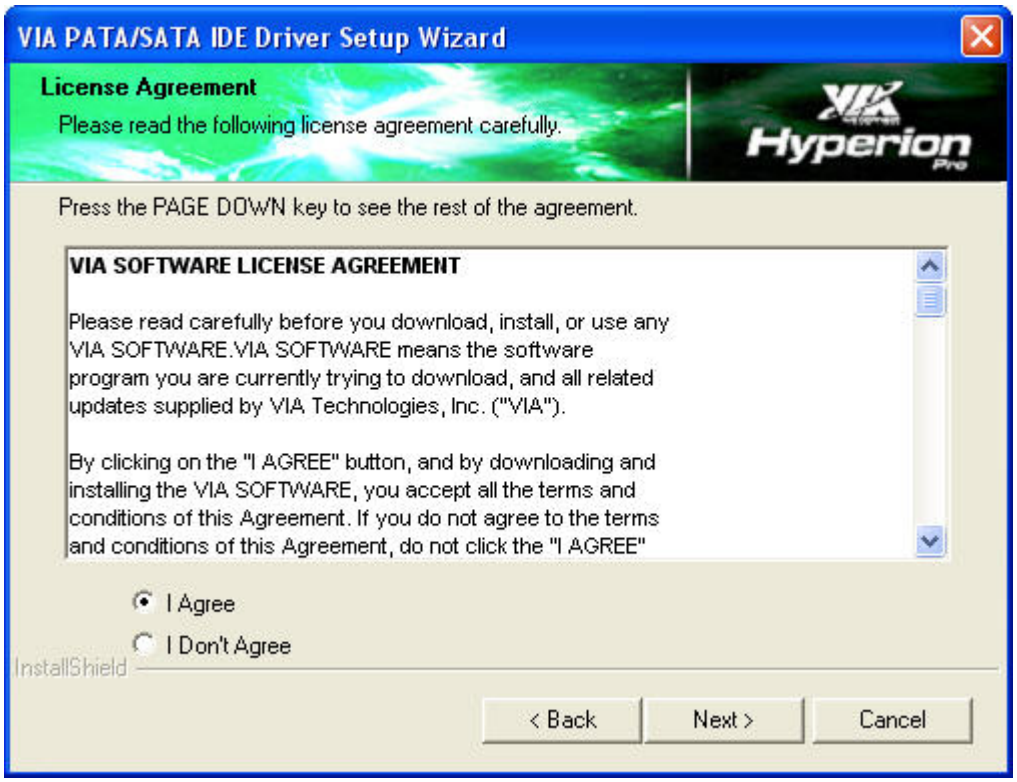


Figure 3-4: VIA mini-IDE license agreement

STEP 5: SELECT THE COMPONENTS TO INSTALL

Confirm that the driver package component is checked and click on the "Next >" button to continue.

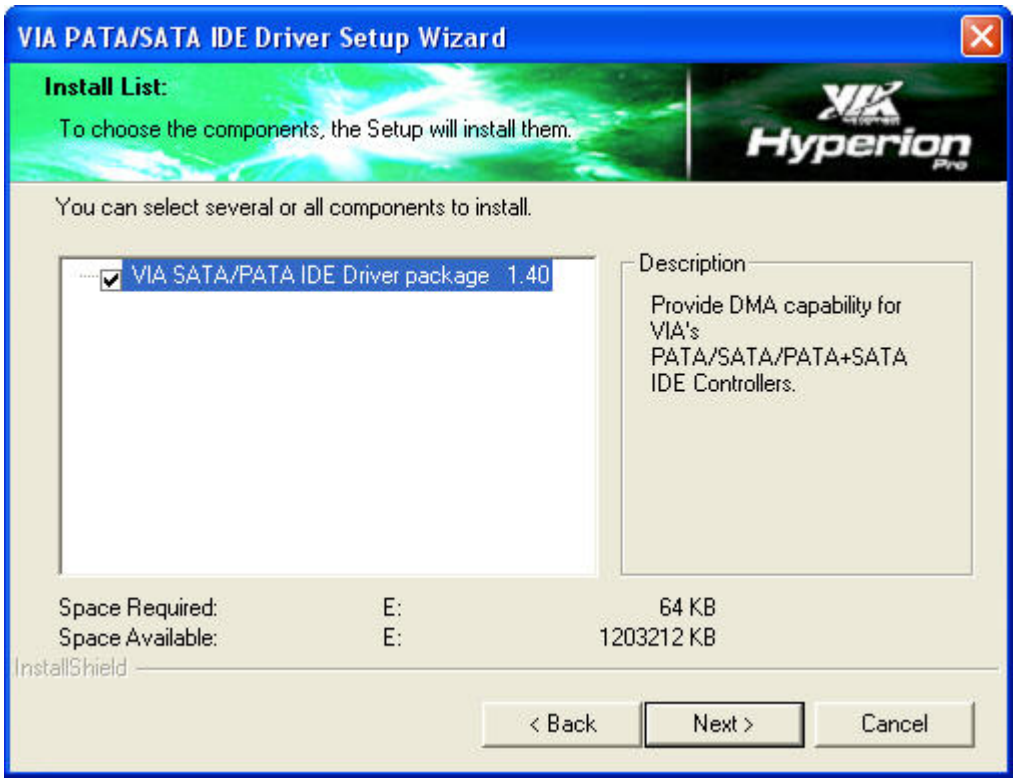


Figure 3-5: Selecting the VIA mini-IDE driver package components for installation

STEP 6: CONFIRM THE ITEMS TO BE INSTALLED

The installation wizard will show a list of components to be installed. Click on the "Next >" button to continue. The installation process will start immediately after clicking on the "Next >" button.

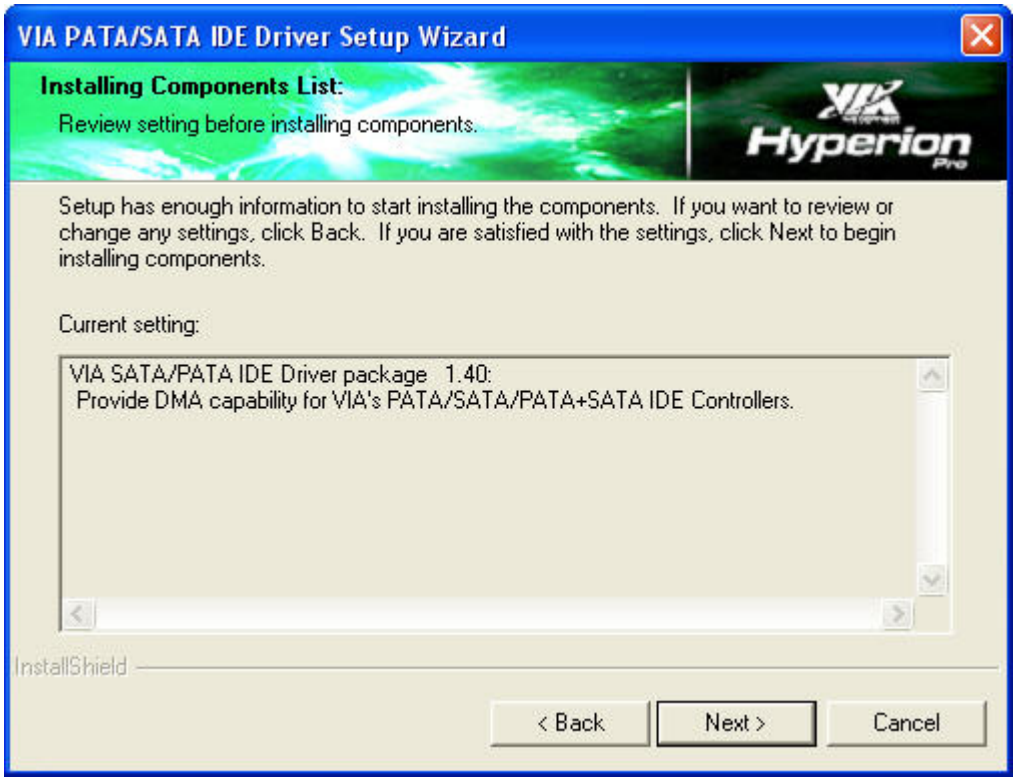


Figure 3-6: Confirmation screen before installing the VIA mini-IDE driver package

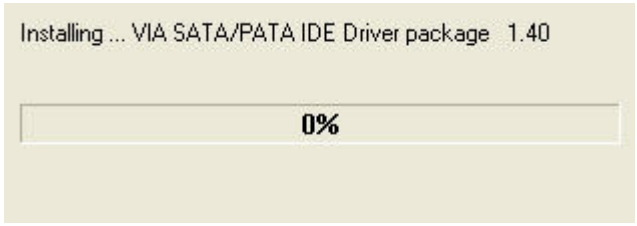


Figure 3-7: Installation progress window of the VIA mini-IDE driver package

STEP 7: INSTALLATION RESULTS

After the installation is complete, the installation wizard will display the results.

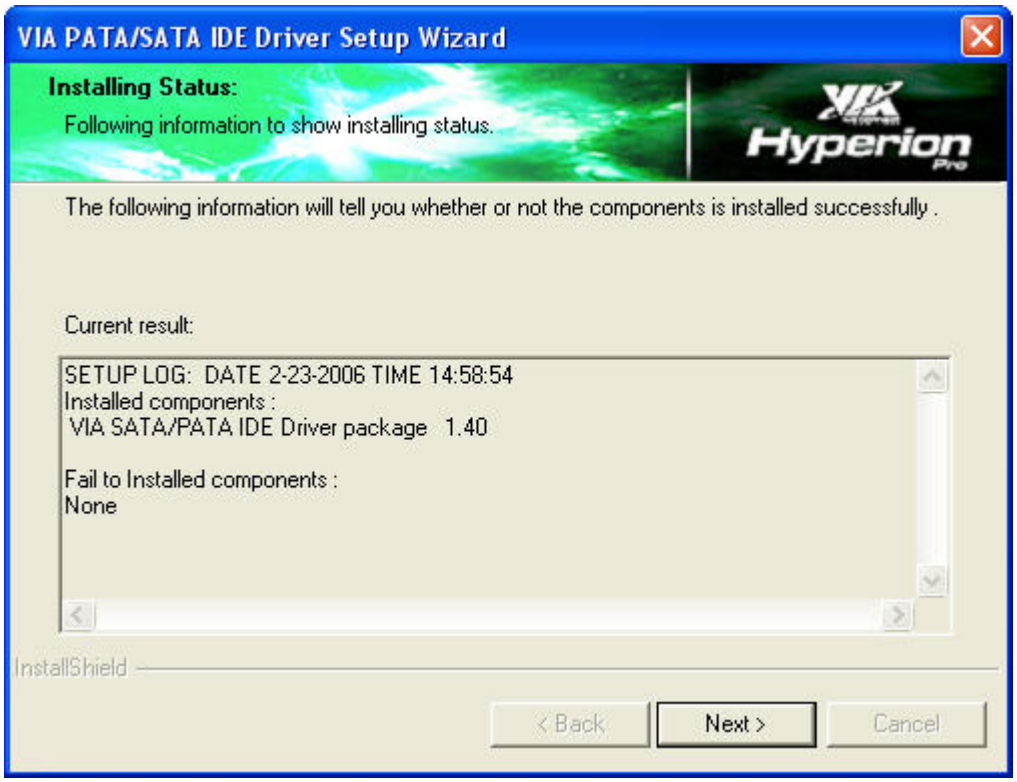


Figure 3-8: Results of the VIA mini-IDE driver installation

STEP 8: EXITING THE INSTALLATION WIZARD

To complete the installation process, select the option to reboot the computer and then click on the "Next >" button to continue.

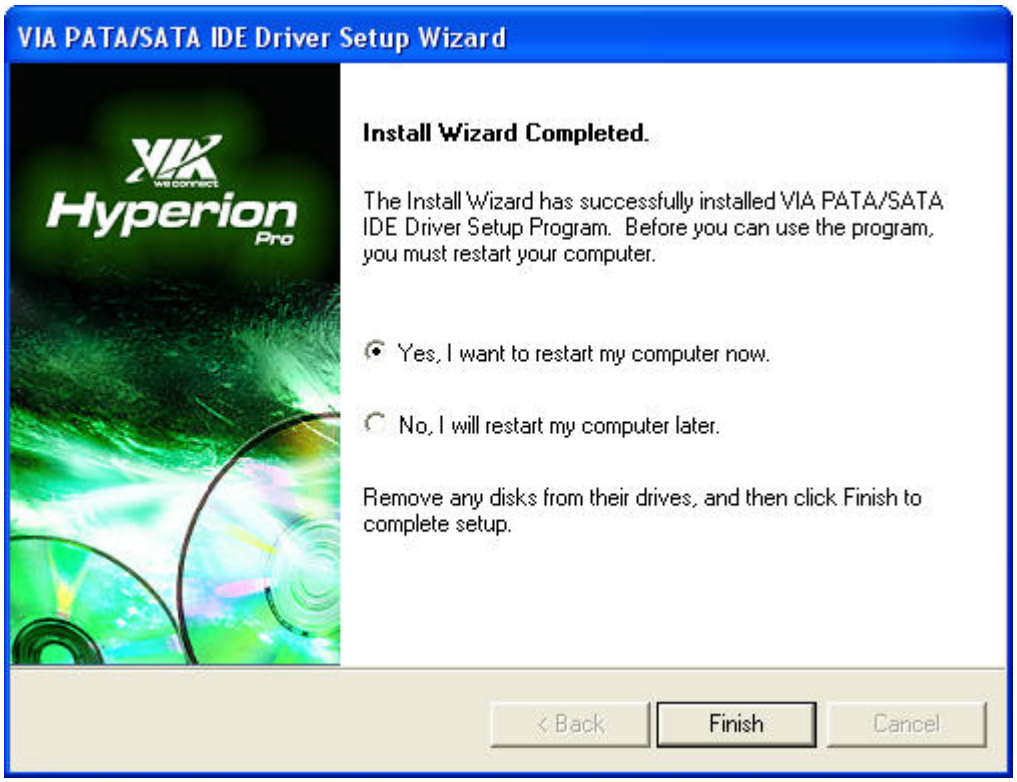


Figure 3-9: Finalizing the VIA mini-IDE installation

If the driver was successfully installed, then the device manager will display the proper names of the devices. The name of VT8237A PATA controller should be changed to “VIA Bus Master IDE Controller - 0571”. The name of VT8237A SATA controller should be changed to “VIA Serial ATA Controller - 5337”.

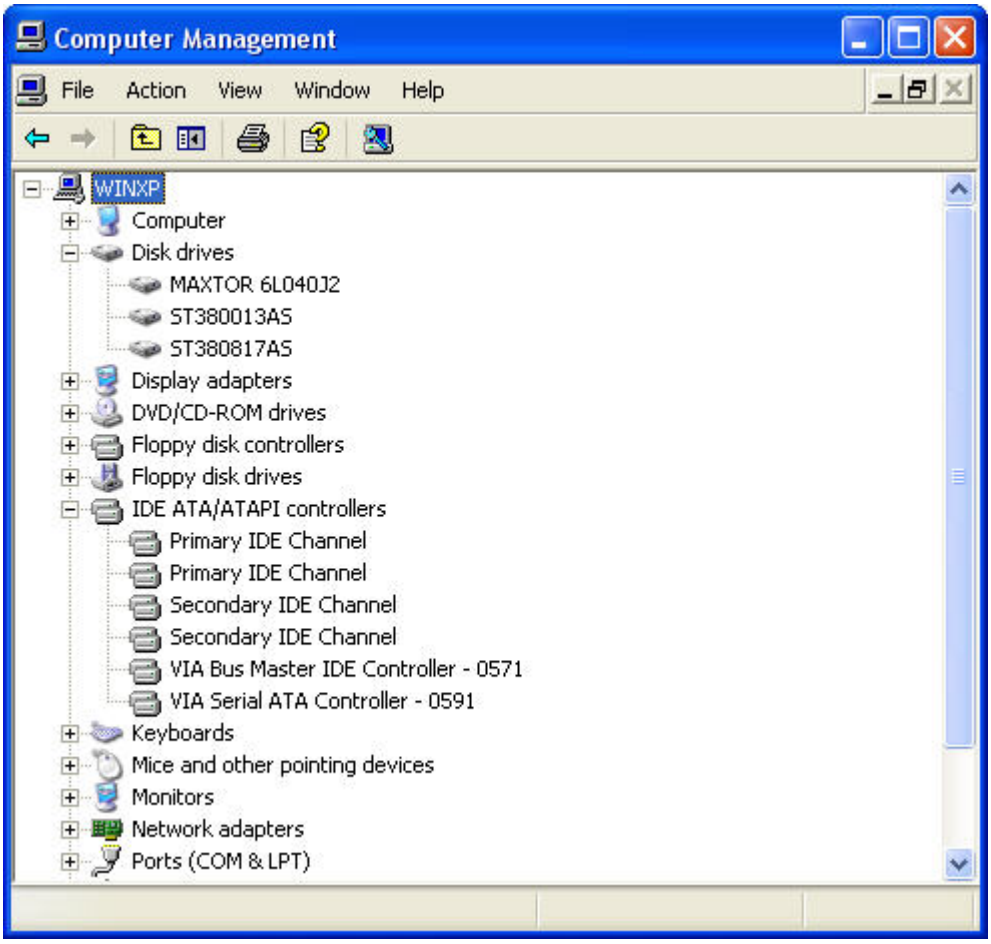


Figure 3-10: Device manager after installing the VIA mini-IDE driver

3.2 VIA V-RAID Driver Installation

STEP 1: BEFORE INSTALLING THE VIA V-RAID DRIVER

Unless the VIA V-RAID driver has been installed, the operating system will not recognize the RAID controller. Additionally, the VT8237A SATA controller must be set to RAID mode in the BIOS setup menu in order for the operating system to recognize the RAID controller.

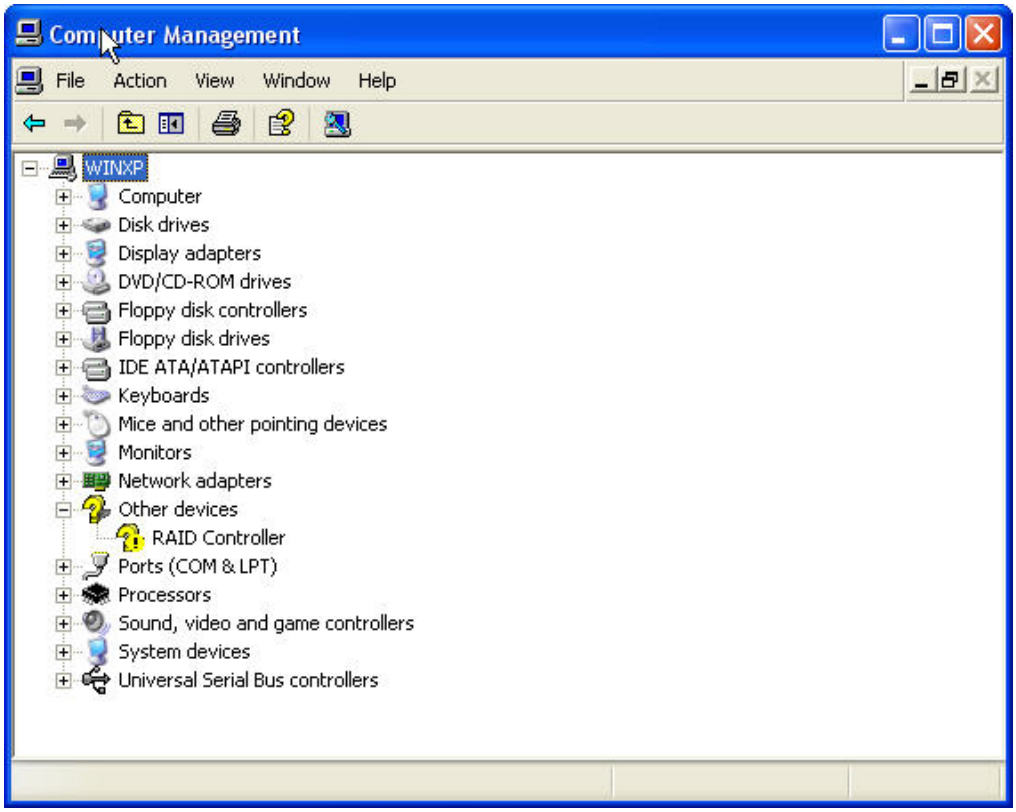


Figure 3-11: Example of an unrecognized RAID controller

STEP 2: EXECUTE SETUP.EXE IN THE DRIVER PACKAGE

To start the installation, run the setup.exe file included in the driver package.

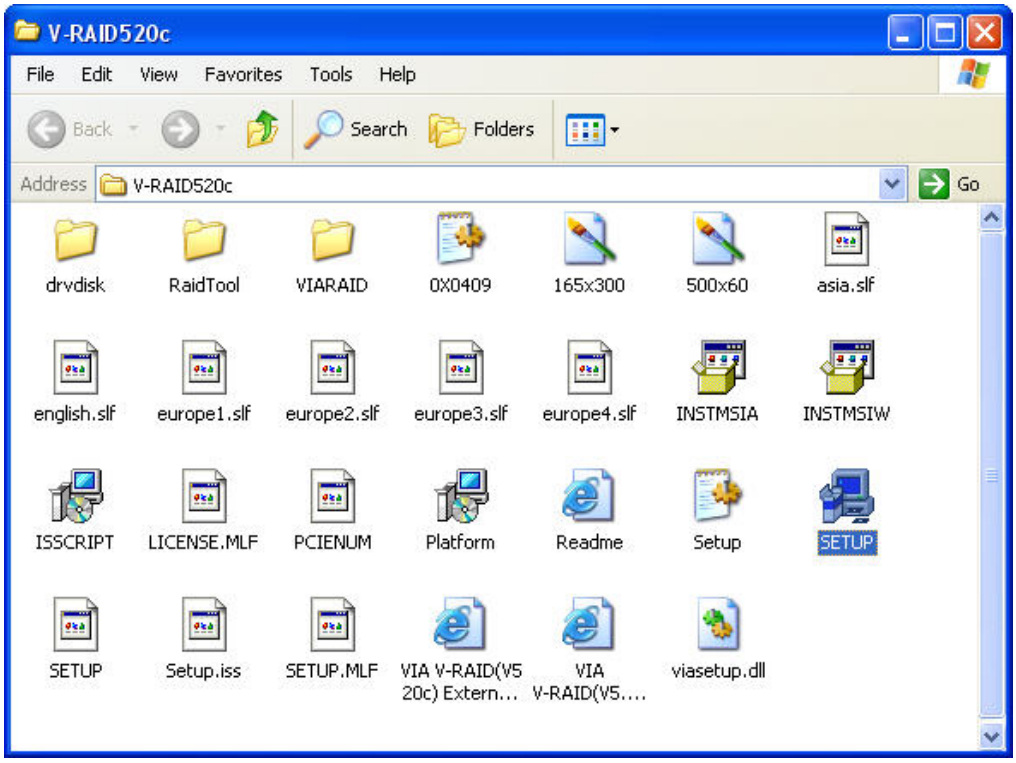


Figure 3-12: Executing the setup file

STEP 3: SELECT INSTALL / UPDATE OR REMOVE

To install the driver, select "Install/Update".

To remove a previously installed VIA V-RAID driver, select "Remove"[7].

Click "Next" to continue.

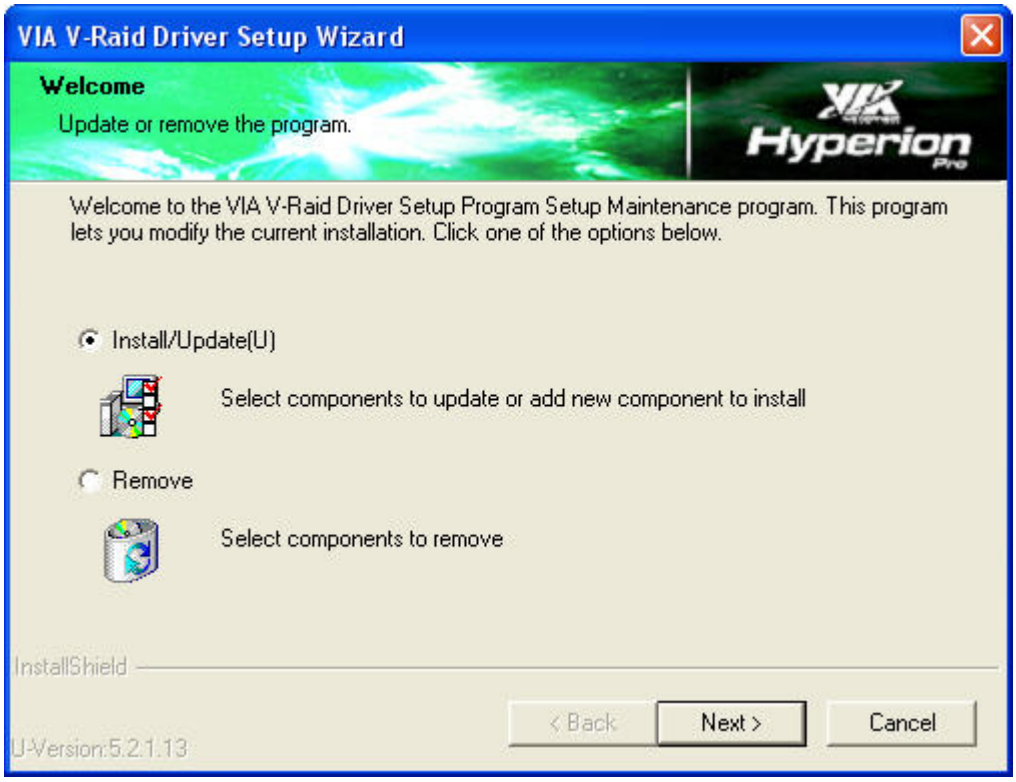


Figure 3-13: VIA V-RAID setup options

[7] If the driver has been installed before, it is recommended to remove previous installation first before installing the driver again.

STEP 4: CHOOSE COMPONENT TO INSTALL

Select the components to be installed. By default both components will be checked. Click "Next" to continue.

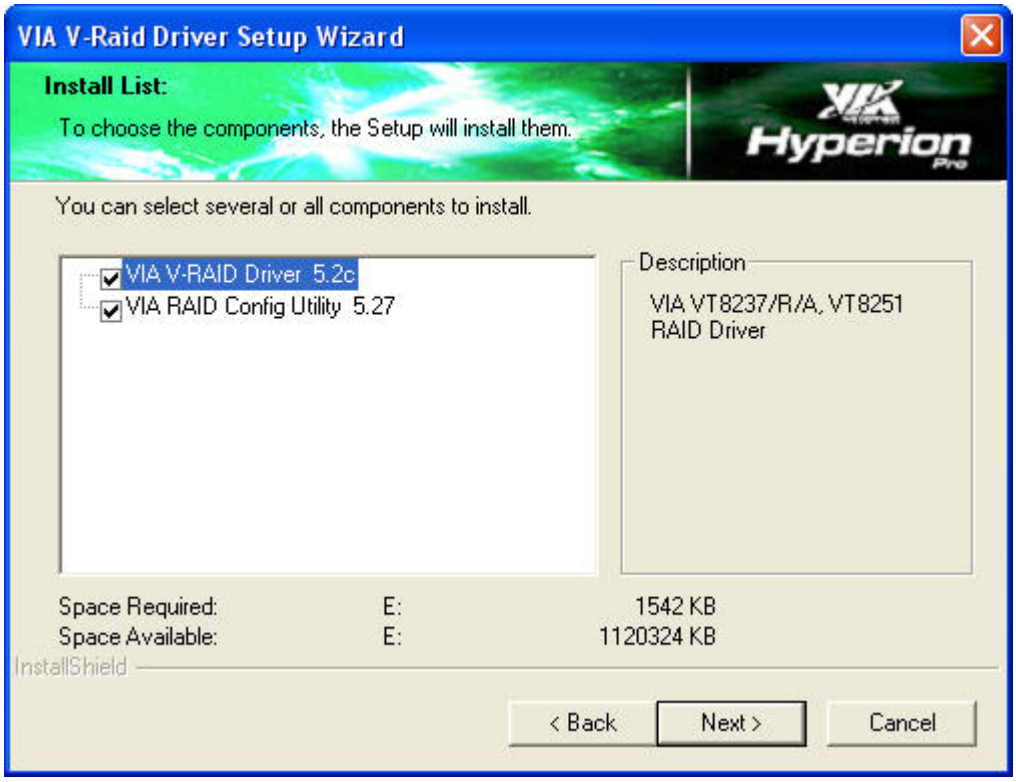


Figure 3-14: VIA V-RAID component selection options

STEP 5: CONFIRM INSTALLATION

The components to be installed will be shown before the actual installation begins.

Click “Back” to make corrections to the installation options.

Click “Next” to continue.

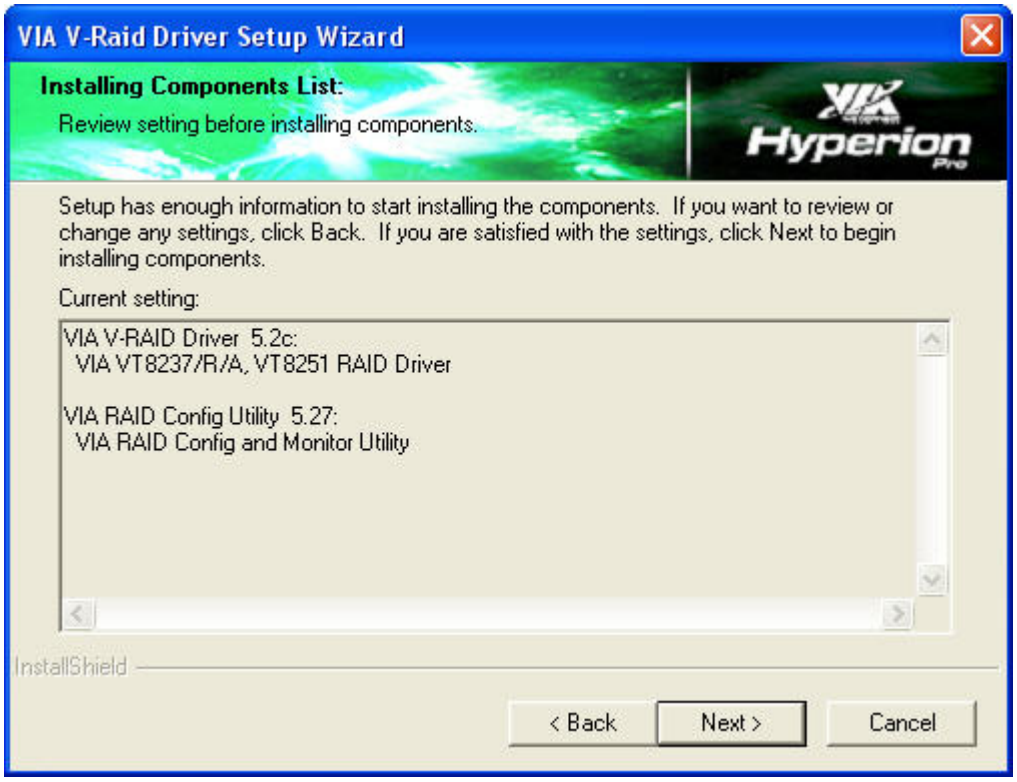


Figure 3-15: VIA V-RAID driver installation confirmation

STEP 6: INSTALLATION RESULTS

When the installation has been completed, the driver setup wizard will show a summary of the installed components. Additionally, the summary will show if any components failed to install properly.

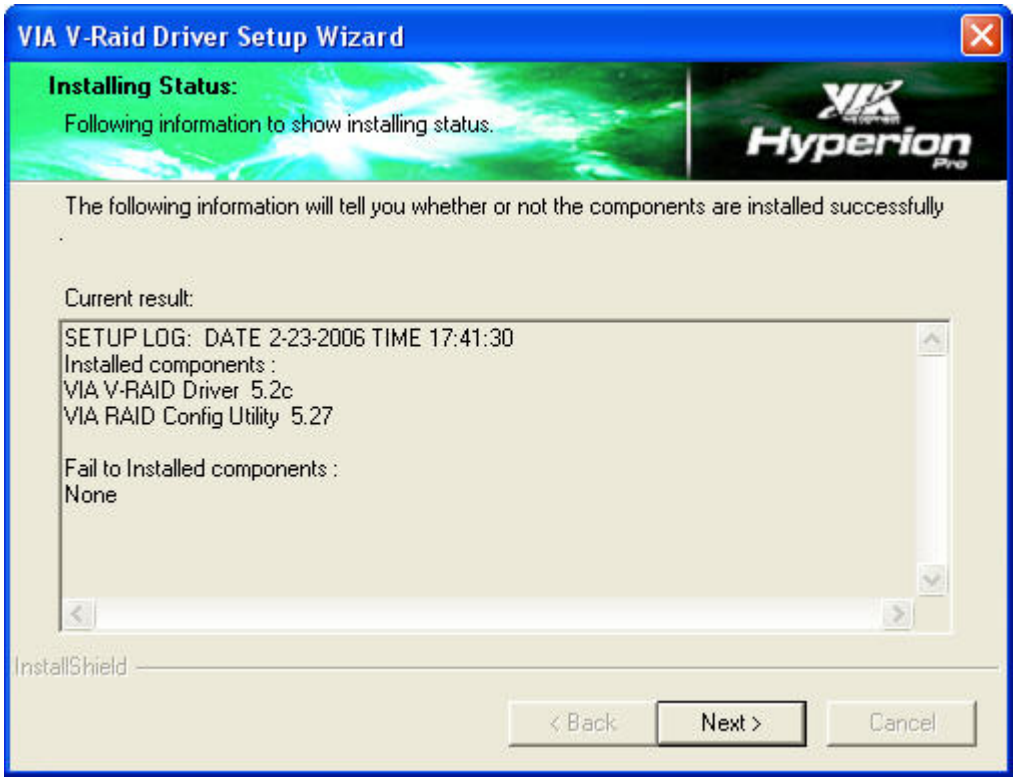


Figure 3-16: VIA V-RAID driver installation results

STEP 7: REBOOT THE COMPUTER

After the installation is completed, the setup wizard gives the option to reboot the computer. It is recommended to reboot immediately to complete the installation process. Otherwise, the RAID functions will be available the next time the computer is restarted.

Figure 3-17: Option to reboot the computer

STEP 8: VERIFYING THE DRIVER INSTALLATION

To verify that the VIA V-RAID driver has been successfully installed, open the device manager. There should now be an entry under “SCSI and RAID Controller” listed as “VIA VT8237A SATA RAID controller”.

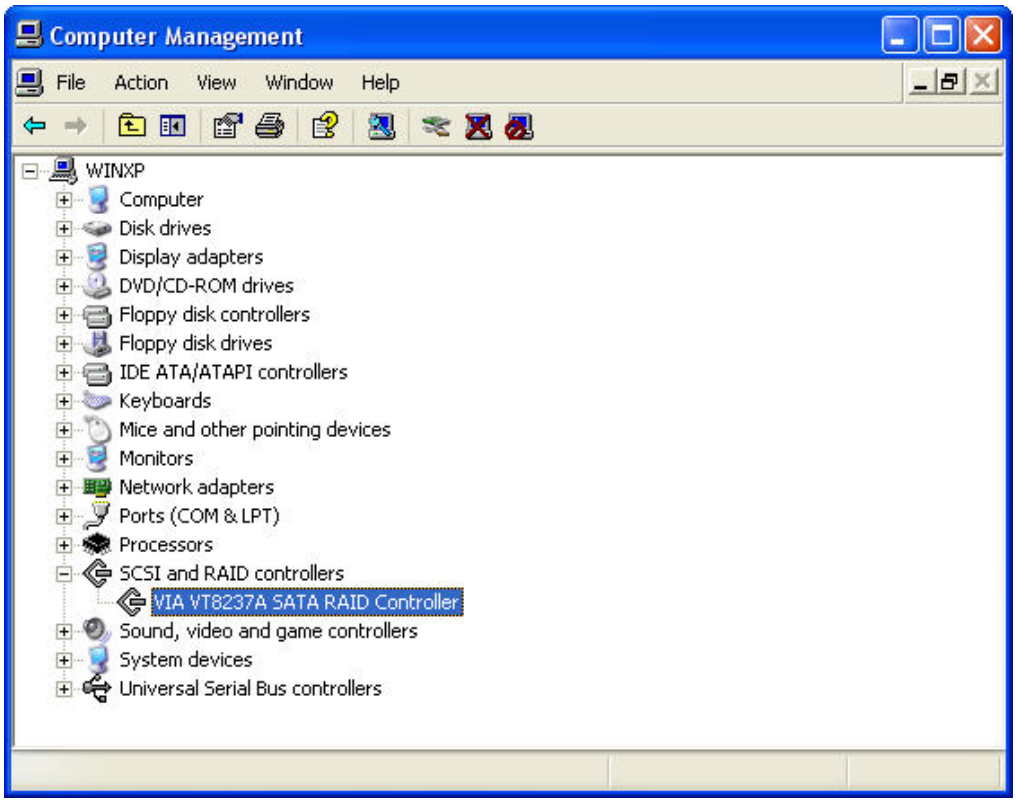


Figure 3-18: VIA V-RAID successfully installed

4 RAID BASICS

RAID (Redundant Array of Independent Disks) is a method of combining two or more hard disk drives into one logical unit. The advantage of an array is to provide better performance or data fault tolerance. Fault tolerance is achieved through data redundant operation, where if one disk drive fails, a mirrored copy of the data can be found on another drive. This can prevent data loss if one hard disk fails. The individual disk drives in an array are called "members". The configuration information of each member is recorded in the "reserved sector" that identifies the drive as a member. All disk members in a formed disk array are recognized as a single physical drive to the operating system.

Hard disk drives can be combined together through a few different methods. The different methods are referred to as different RAID levels. Different RAID levels represent different performance levels, security levels and implementation costs. The RAID levels supported by the VT8237A SATA RAID controller are RAID 0, 1 and JBOD. The table below briefly introduces these RAID levels.

Table 4-1: RAID levels supported by the VT8237A SATA RAID controller

RAID Level	No. of Drives	Capacity	Benefits
RAID 0 (Striping)	2 to 4	Number drives * Smallest size	Highest performance without data protection
RAID 1 (Mirroring)	2	Smallest size	Data protection
JBOD (Spanning)	2 to 4	Sum of all drives	No data protection and performance improving, but disk capacity fully used.

4.1 RAID 0 (Striping)

In RAID 0, sectors of data are interleaved between multiple drives. If any disk member fails, the entire array will be affected. The disk array data capacity is equal to the number of drive members times the capacity of the smallest member. The striping block size can be set from 4KB to 64KB. RAID 0 does not support fault tolerance.

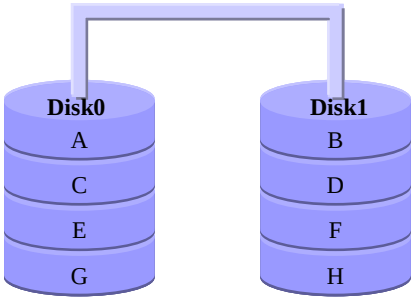


Figure 4-1: RAID 0 Disk Array Configuration

4.2 RAID 1 (Mirroring)

In RAID 1, the system writes duplicate data onto a pair of drives and reads both sets of data in parallel. If one of the mirrored drives suffers a mechanical failure or does not respond, the remaining drive will continue to function. Due to the data redundancy, the drive capacity of the array is the capacity of the smallest drive. Under a RAID 1 setup, an extra drive called the "spare drive" can be attached. Such a drive will be activated to replace a failed drive that is part of a mirrored array. Due to the fault tolerance, if any RAID 1 drive fails, data access will not be affected as long as there are other working drives in the array.

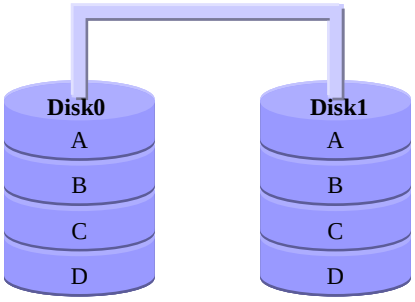


Figure 4-2: RAID 1 Disk Array Configuration

4.3 JBOD (Spanning)

A spanning disk array is equal to the sum of all drives in the array. Spanning stores data on to a drive until it is full and then proceeds to store files onto the next drive in the array. When any disk member fails, the failure affects the entire array. JBOD is not really a RAID and does not support fault tolerance.

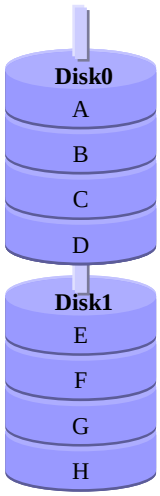


Figure 4-3: RAID JBOD Disk Array Configuration

5 BIOS CONFIGURATION

5.1 Entering the BIOS Configuration Utility

When the system powers on, the following information will appear on the screen. Press the "Tab" key to enter the BIOS configuration utility.

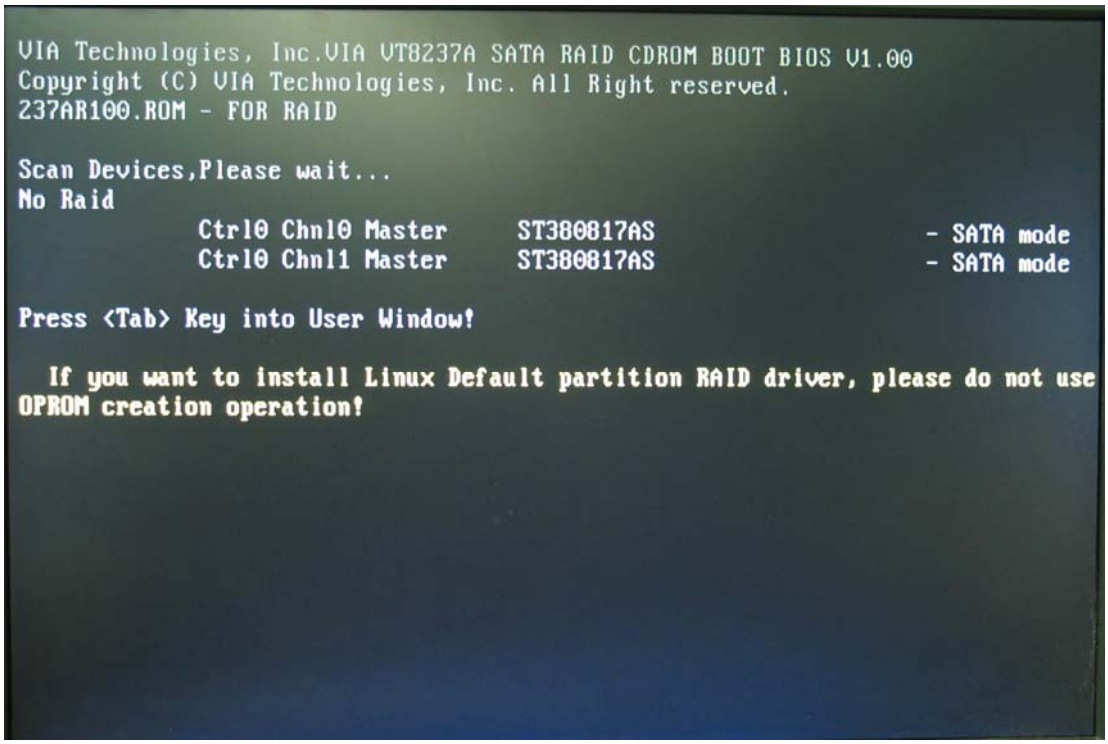


Figure 5-1: Option to enter the RAID BIOS configuration utility

The main menu of the BIOS configuration utility is shown in Figure 5-2. Some of the options may not be selectable depending upon the system's current configuration. To navigate the menu, use the arrow keys.

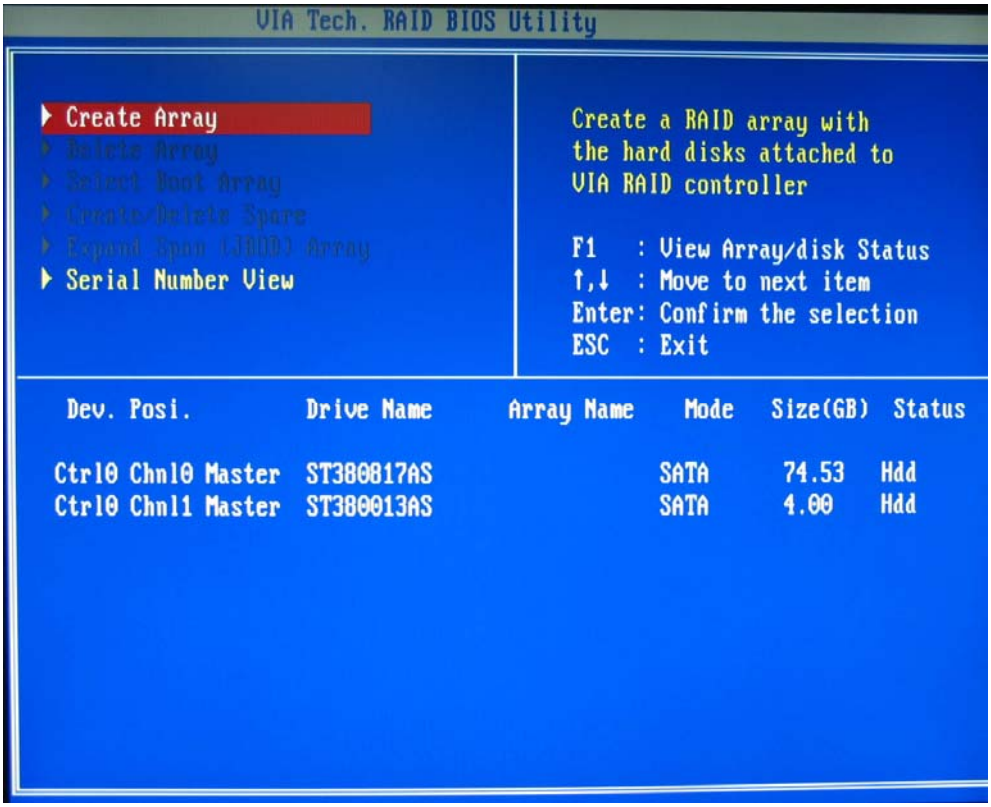


Figure 5-2: Main menu of the RAID BIOS configuration utility

5.2 Creating a New Disk Array

STEP 1: SELECT ARRAY FUNCTION FROM THE MAIN MENU

Select **Create Array** and press <Enter> to continue.

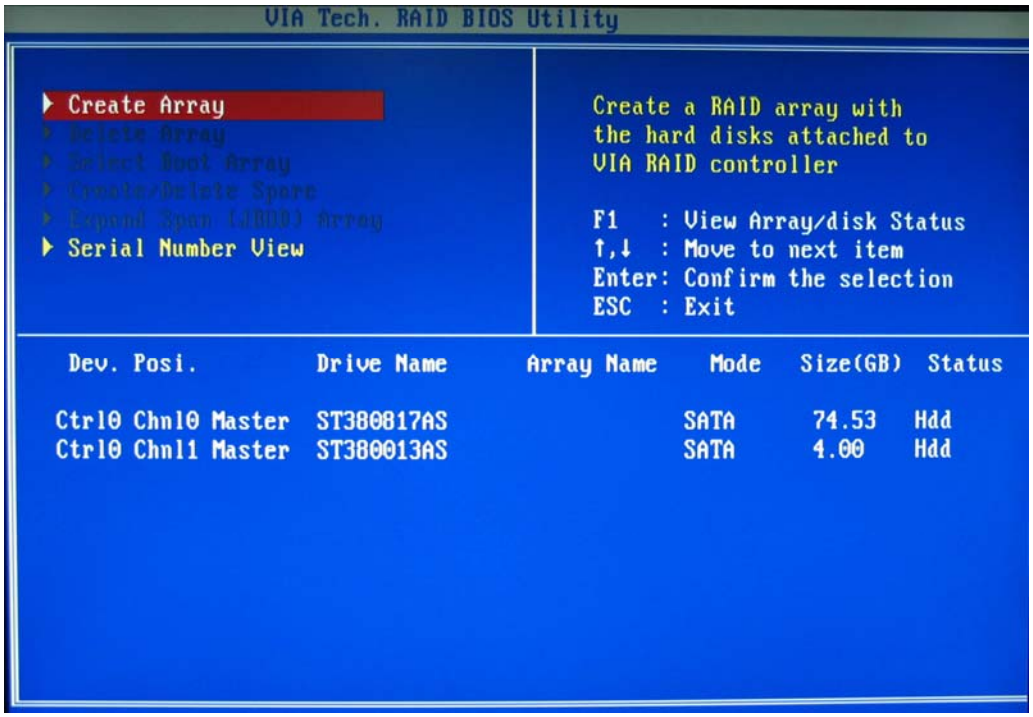


Figure 5-3: Creating an array using the RAID BIOS utility

STEP 2: SELECT THE ARRAY TYPE

A list of array modes will appear. Highlight the target array mode that you want to create, and press <Enter> to confirm the selection. If RAID 1 or RAID 0/1 is selected, an option list will pop up and enable the users to select **Create only** or **Create and duplicate**. **Create only** will allow the BIOS only to create an array. The data on the mirroring drive may be different from the source drive. **Create and duplicate** allows the BIOS to copy the data from the source to the mirroring drive.

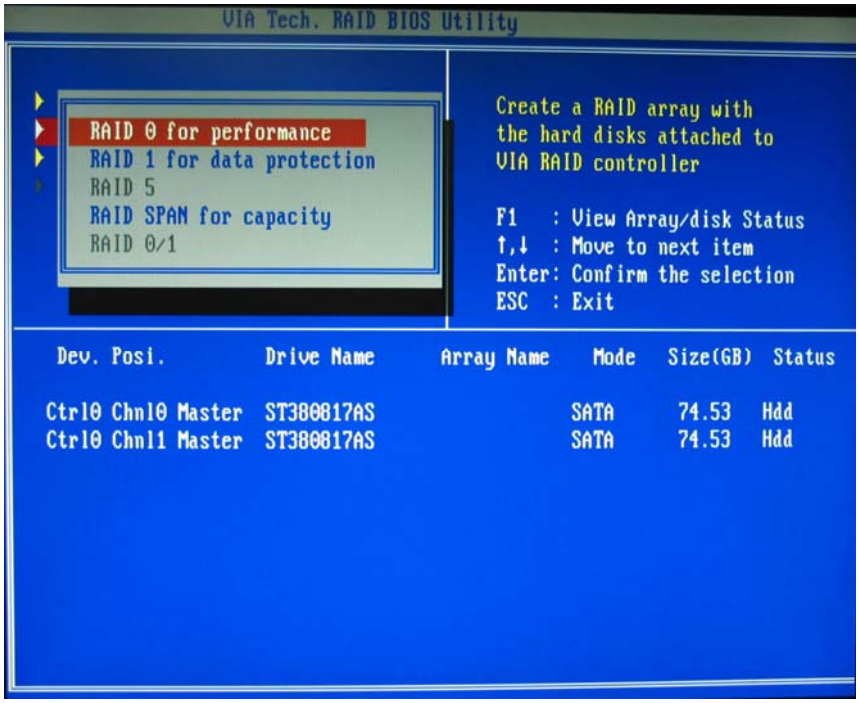


Figure 5-4: Selecting an array type in the RAID BIOS utility

STEP 3: SELECTING THE HARD DRIVES FOR THE ARRAY

After the array mode is selected, there are two methods to create a disk array. One method is "**Auto Setup**" and the other one is "**Select Disk Drives**".

Auto Setup allows the BIOS to select the disk drives and create arrays automatically but it does not duplicate the mirroring drives even if the user selected **Create and duplicate** for RAID 1. When using this option, using new disk drives is recommended.

Select Disk Drives enables the user to select the array hard drives according to their requirements. When using **Select Disk Drives**, the channel column will be activated. Highlight the drives that will be used and press <Enter> to select them. After all drives have been selected, press <Esc> to return to the main menu.

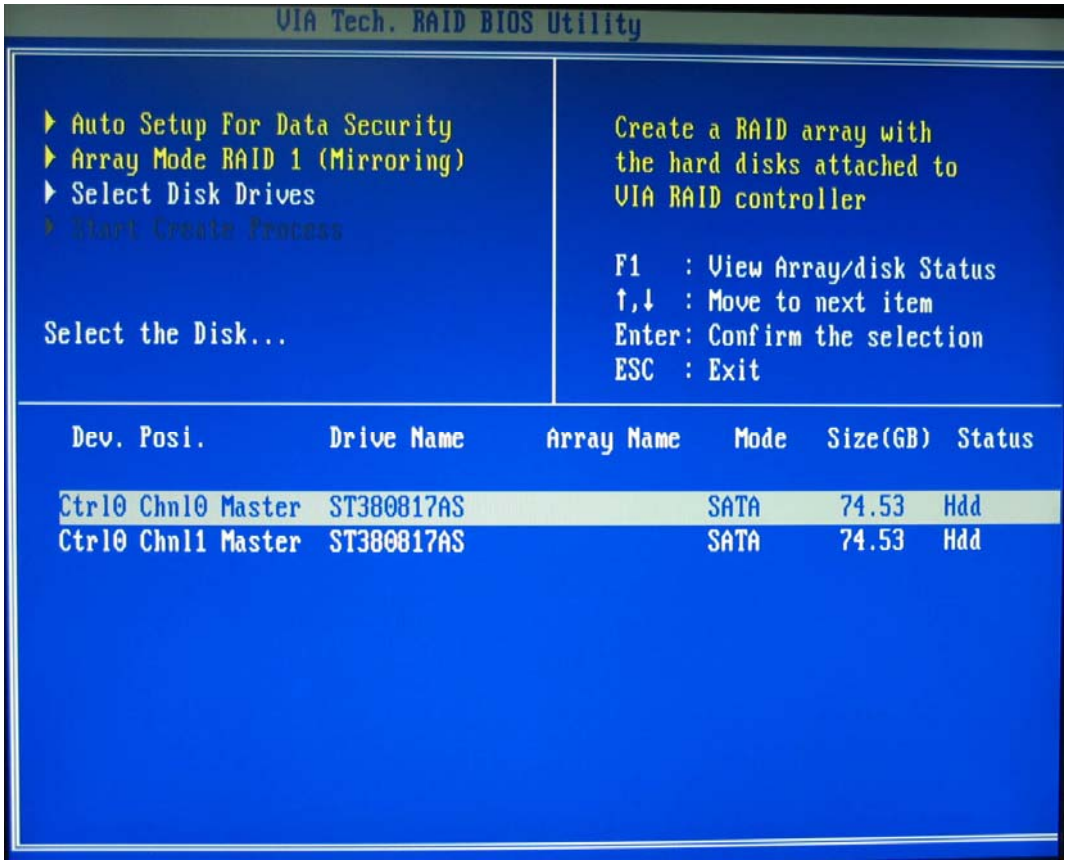


Figure 5-5: Methods for creating disk arrays

If RAID 0 was selected in step 2, the block size of the array can also be selected. Use the arrow key to highlight **Block Size** and press <Enter>. Then select a block size from the popup menu. The block size can be 4 kB to 64 kB.

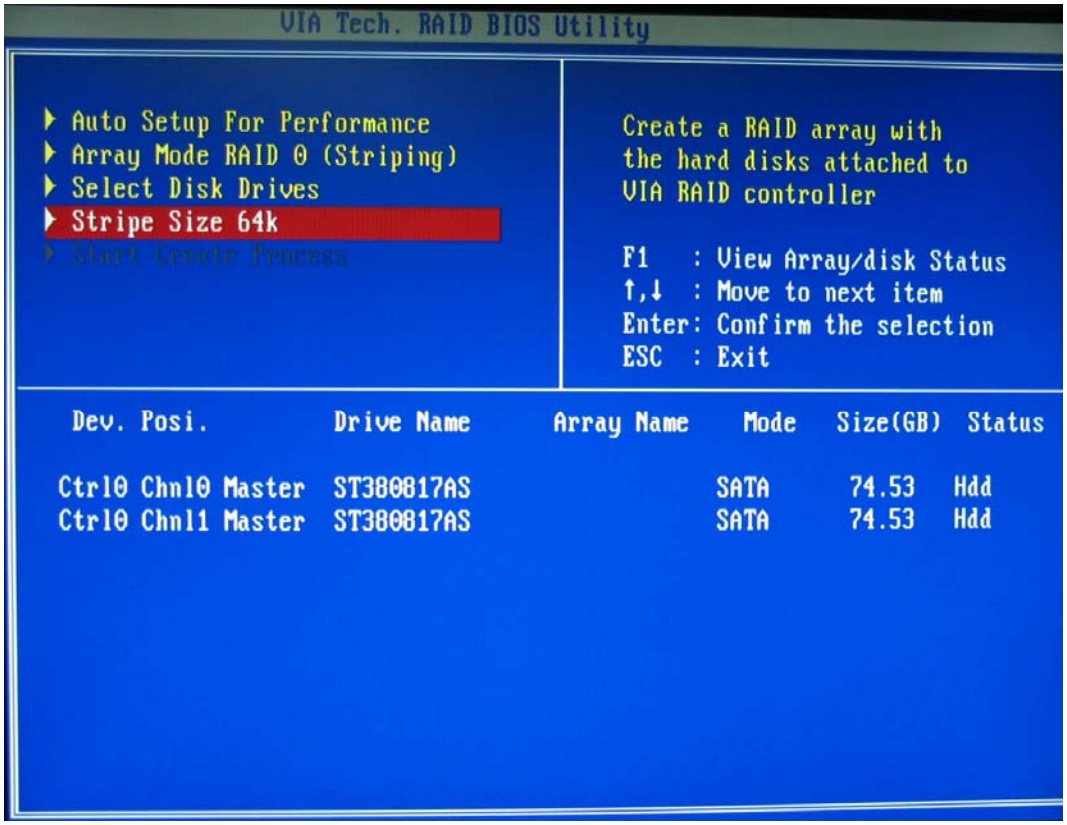


Figure 5-6: Setting the stripe size in a RAID 0 array

STEP 4: START THE ARRAY CREATION PROCESS

Use the arrow key to highlight **Start Create Process** and press <Enter> to continue. A confirmation message will appear. Press **Y** to finish the creation, or press **N** to cancel the creation.

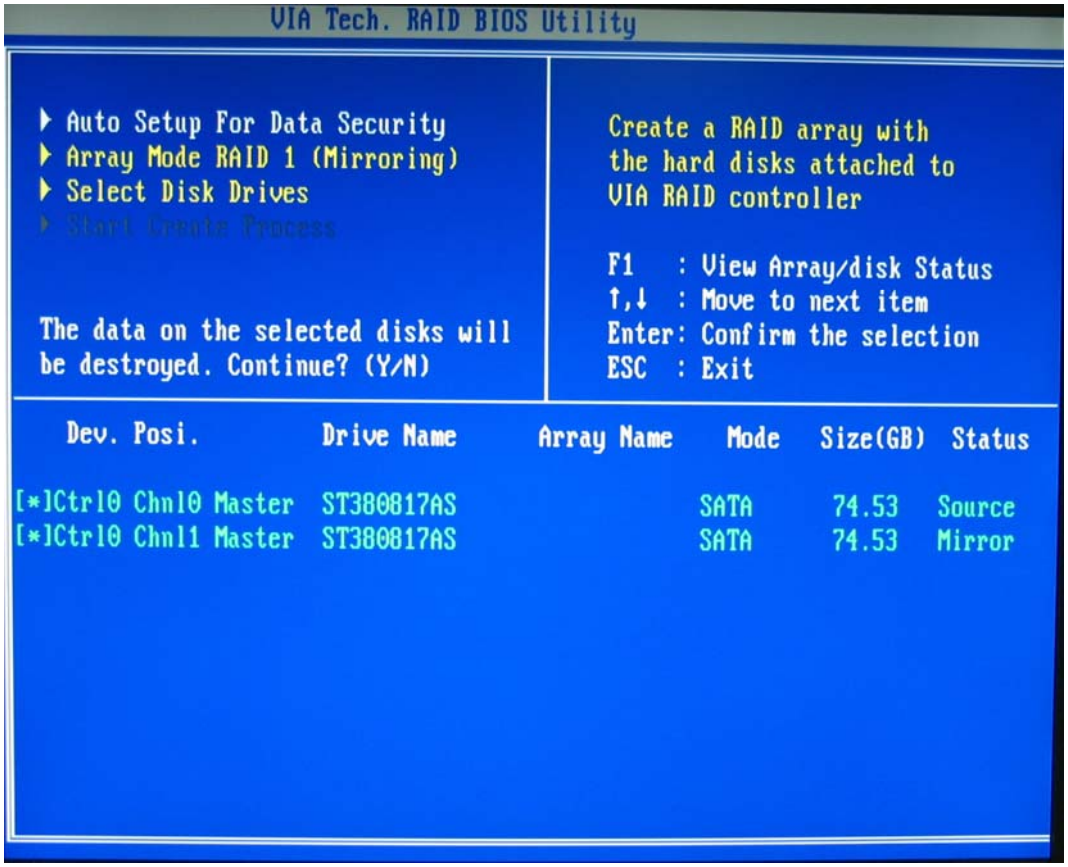


Figure 5-7: Starting the array creation process

Important:
All existing content in the hard drive will be erased during array creation.

5.3 Deleting a Disk Array

A RAID array can be deleted after it has been created.

STEP 1: SELECT THE DELETE FUNCTION FROM THE MAIN MENU

To delete a RAID, first select **Delete Array** from the main menu and press <Enter> to continue. The channel column will be activated.

STEP 2: SELECT THE ARRAY TO BE DELETED

Select the member of the array to be deleted and press <Enter> to continue. A warning message will display. Press **Y** to delete or press **N** to cancel.

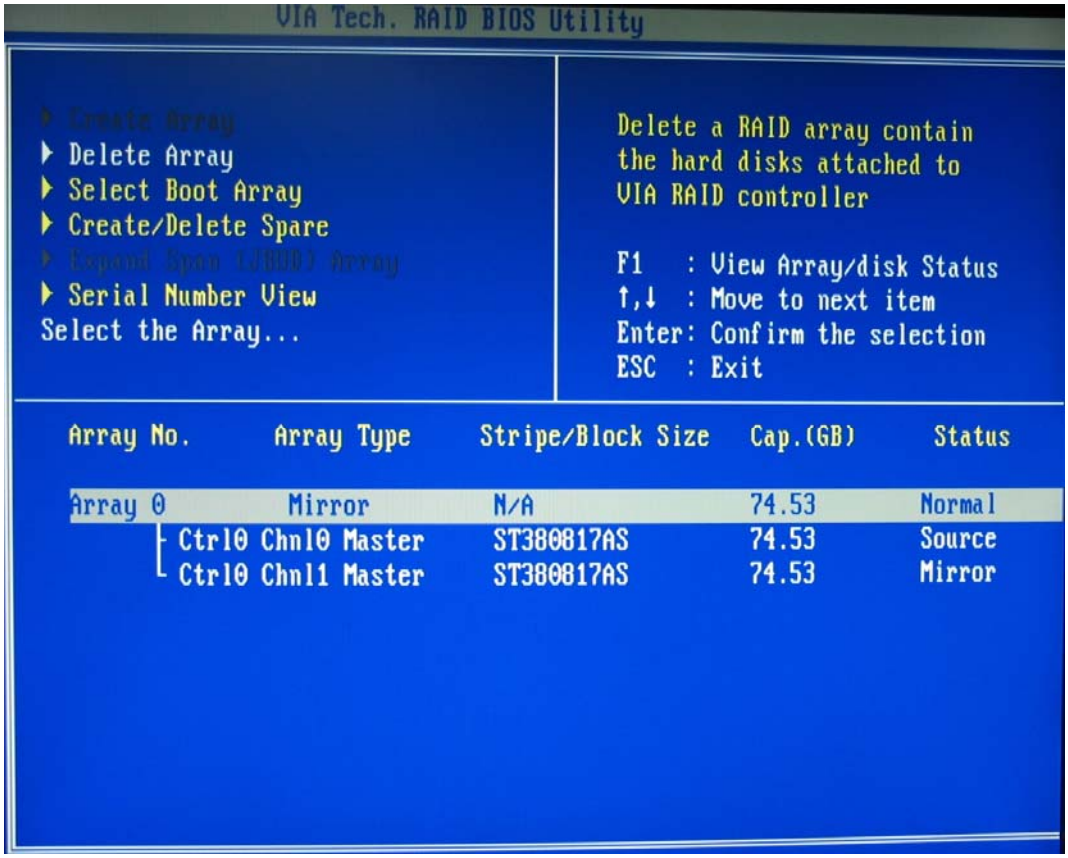


Figure 5-8: Deleting an array in the RAID BIOS utility

Deleting a disk array will destroy all the data on the disk array except in RAID 1 arrays. When a RAID 1 array is deleted, the data on the member disk drives will be reserved. The member disk drives will be converted to normal disk drives.

5.4 Setting Up a Bootable Array

Disk arrays may be used as boot devices if an operating system will be installed on the array.[8]

STEP 1: SETTING UP THE BOOT ARRAY

Highlight the **Select Boot Array** item, then press <Enter> to continue. The channel column will be activated.

STEP 2: SELECT THE DISK ARRAY

Highlight the target disk array and press <Enter> to continue.[9]

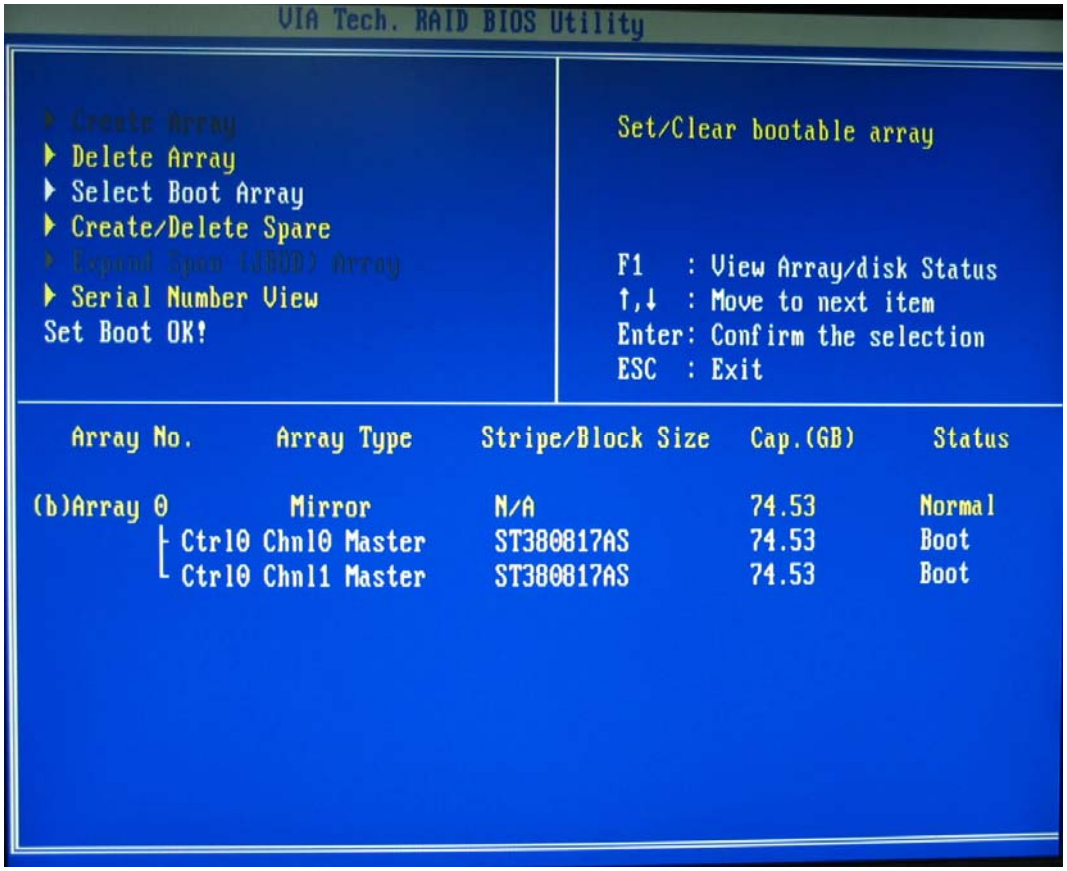


Figure 5-9: Setting up a boot array in the RAID BIOS utility

[8] Bootable disk arrays cannot be selected if the operating system does not boot from the disk array.

[9] If disk array that has a boot mark is selected, its boot setting will be canceled.

5.5 Viewing the Serial Number of a Hard Drive

Highlight **Serial Number View** and press <Enter> to continue. Use the arrow keys to select a disk drive. The selected drive's serial number[10] can be viewed in the last column.

5.6 Viewing the Array Status

Press the **F1** key to show the array status on the screen. If there are no disk arrays, then nothing will be displayed on the screen.

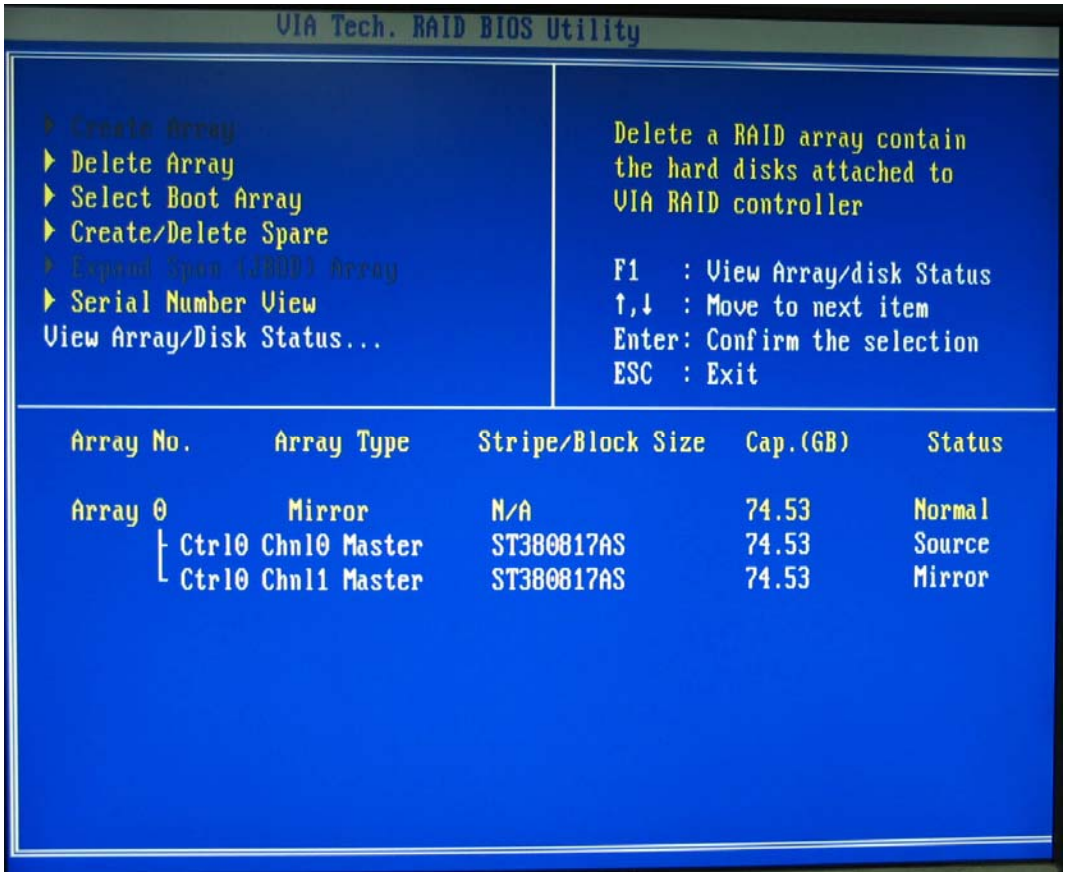


Figure 5-10: Displaying the disk array status in the RAID BIOS utility

[10] The serial number is assigned by the manufacturer of the disk drive.

5.7 Duplicating a RAID 1 Array

When booting up the system, the BIOS will detect if the RAID 1 array has any inconsistency between the source and mirror disk drives. If the BIOS detects any inconsistency, it will prompt the user to press **Ctrl+C** to enter the critical process window. The status of the disk array will be marked as critical and the BIOS will prompt the user to duplicate the RAID 1 array to make the mirrored data consistent with the source data.

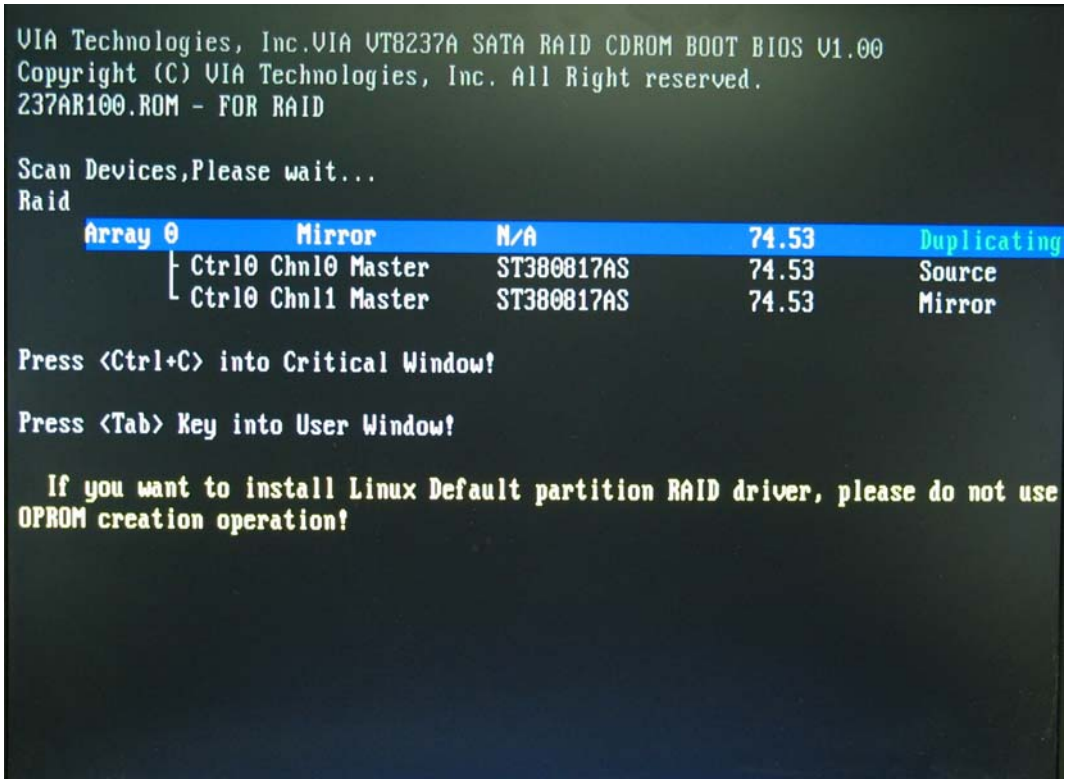


Figure 5-11: Inconsistency in a RAID 1 array detected

After entering the critical process window, there are two ways to duplicate the source data. The disk array can be duplicated immediately by using the **Duplicating Now** option. Alternatively, the disk array can be duplicated after the OS boots by choosing the **Continue to boot** option.

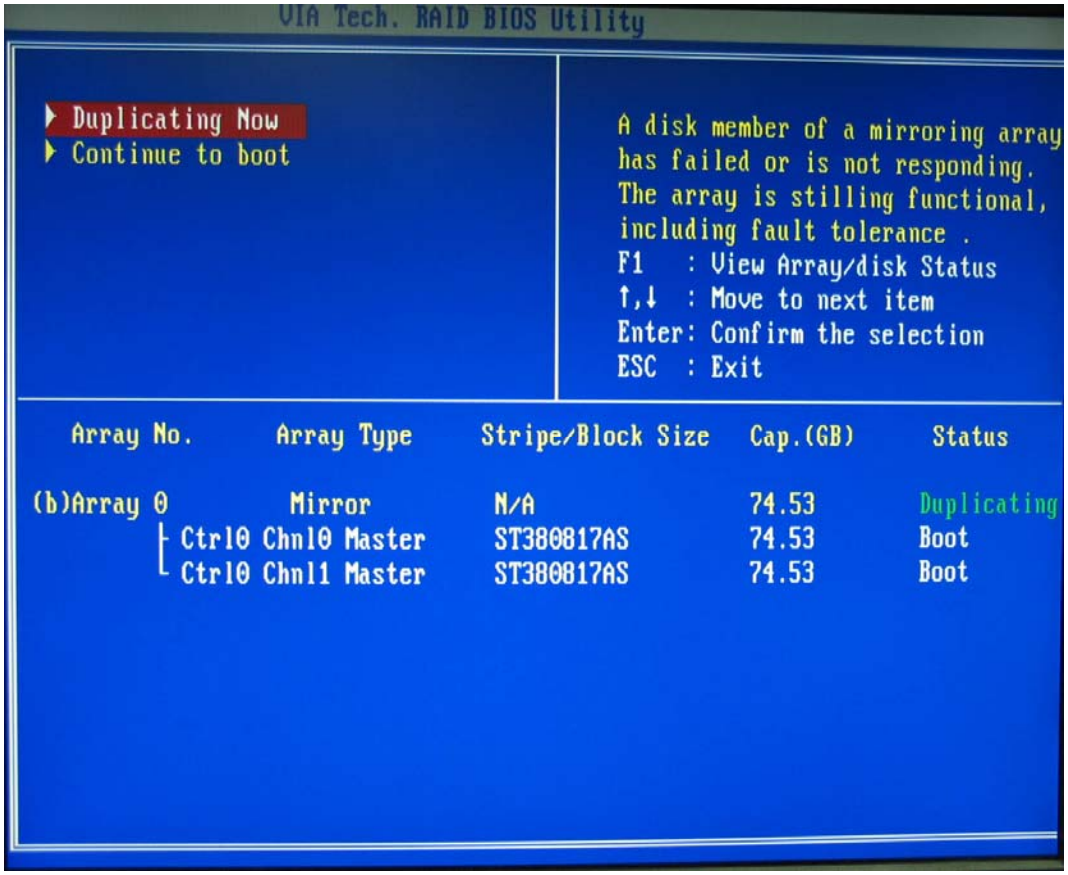


Figure 5-12: Options for duplicating a RAID 1 array

6 USING THE VIA V-RAID SOFTWARE

6.1 Getting Started

After installing the GUI software, it will be launched automatically every time Windows is started. An icon will appear in the system tray of the tool bar to indicate that GUI software is currently running.

Figure 6-1: VIA V-RAID system tray icon

Double click on the system tray icon to launch the main interface of the utility.

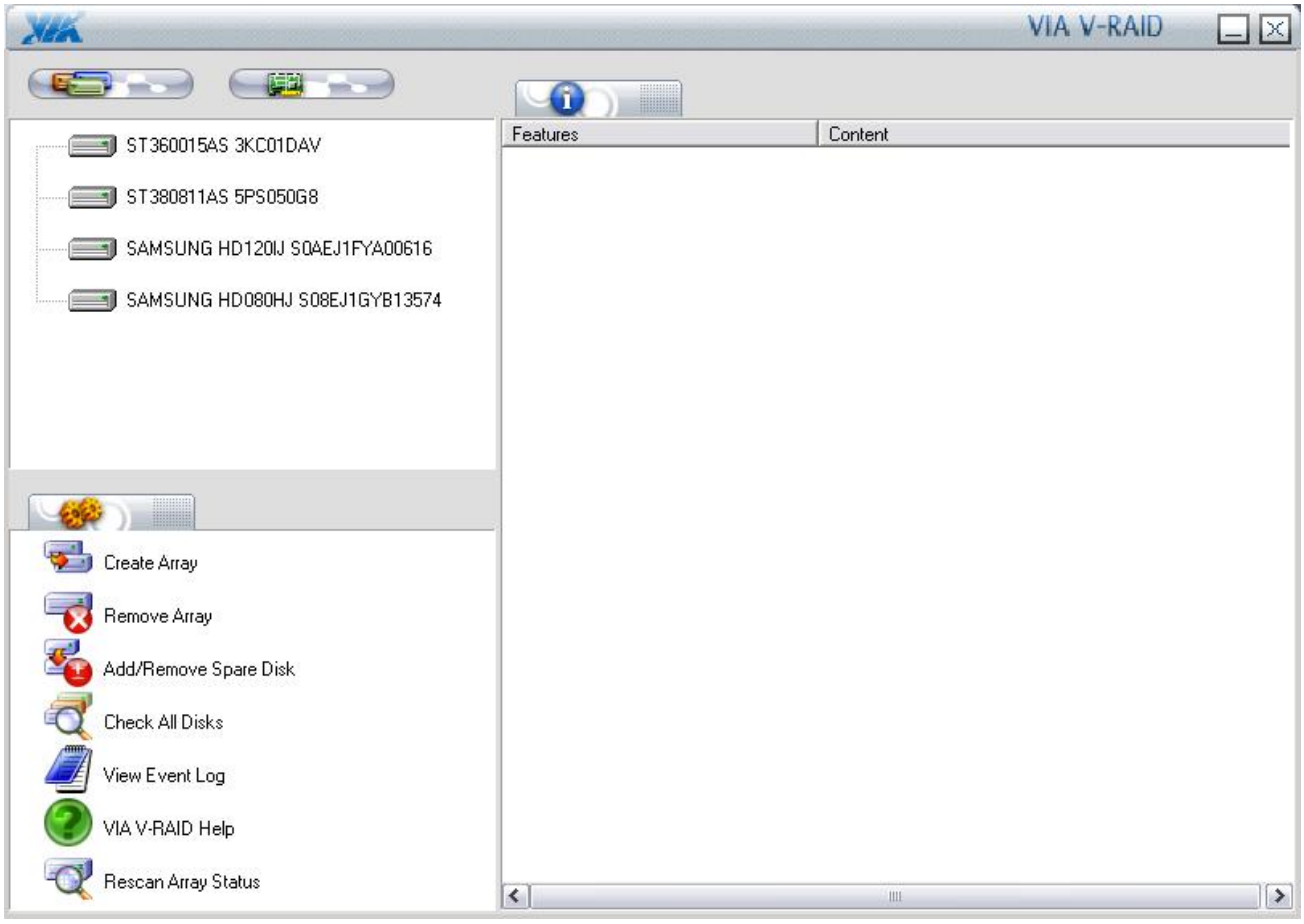
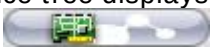


Figure 6-2: Main interface of the VIA V-RAID utility

There are three windowpanes in the main window: the Tree windowpane, the Information windowpane, and the Operation windowpane.

The top-left windowpane contains the Tree windowpane. There are two types of trees: the device tree and the controller tree. To view the device tree, click on the  button. The device tree displays all arrays and non-array disks in the system. To view the controller tree, click on the  button. The controller tree displays the RAID controllers, IDE channels, and physical locations of all disks.

The right windowpane contains the Information windowpane. The Information windowpane displays the details of the controller or disk drives selected in the Tree windowpane.

The bottom-left windowpane contains the Operation windowpane. The Operation windowpane displays the main functions of the VIA V-RAID tool. Click on these Operation item to execute specific functions.

 Create Array

 Add/Remove Spare

 View Event Log

 Rescan Array Status

 Remove Array

 Check All Disks

 VIA V-RAID Help

Figure 6-3: Available options in the VIA V-RAID utility

6.2 View Online Help

Click on to launch the Help Topics. It is recommended to read through the help articles before using the RAID utility.

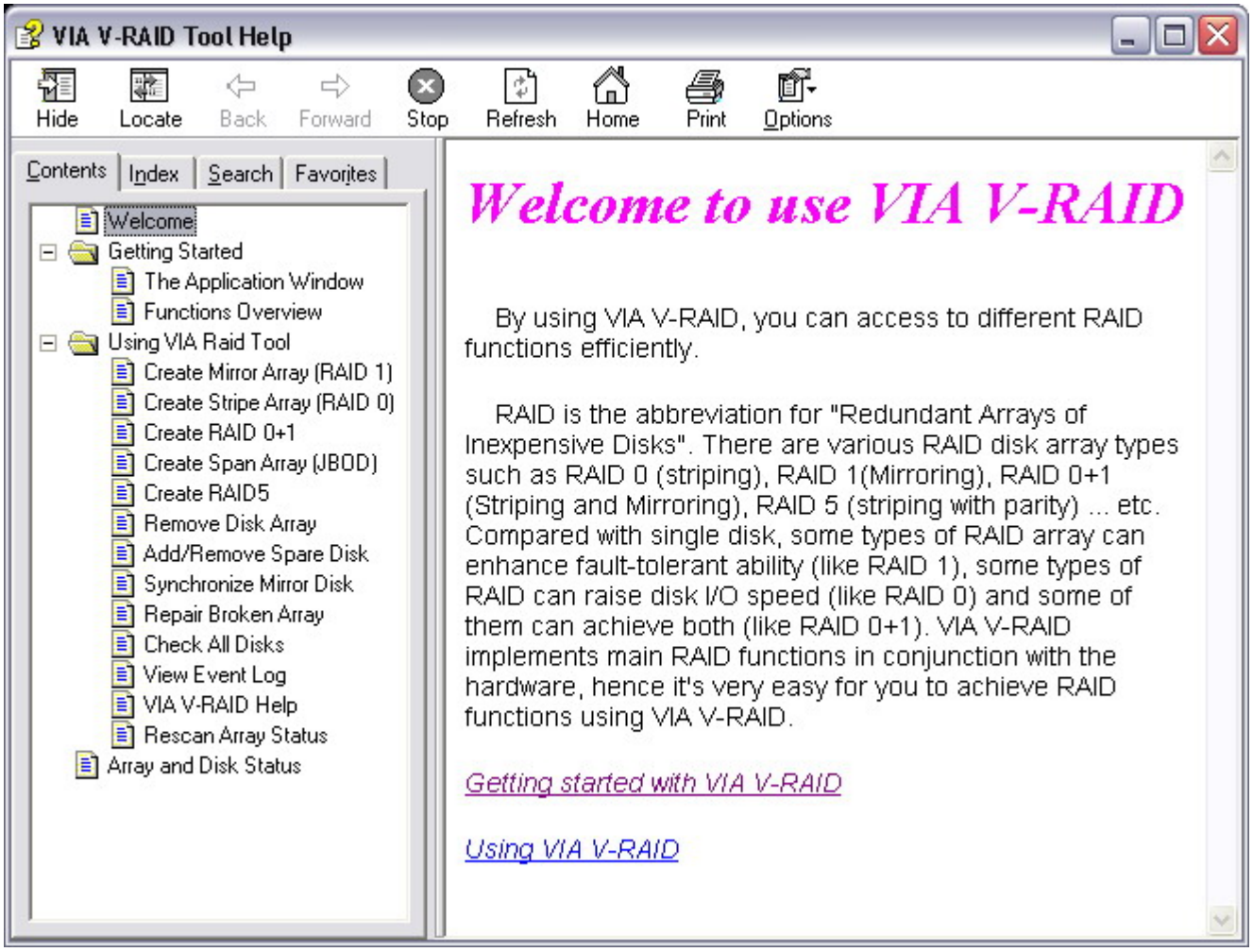


Figure 6-4: VIA V-RAID help information

6.3 View Controller and Device Status

Click on  or  buttons to display in the Tree windowpane.

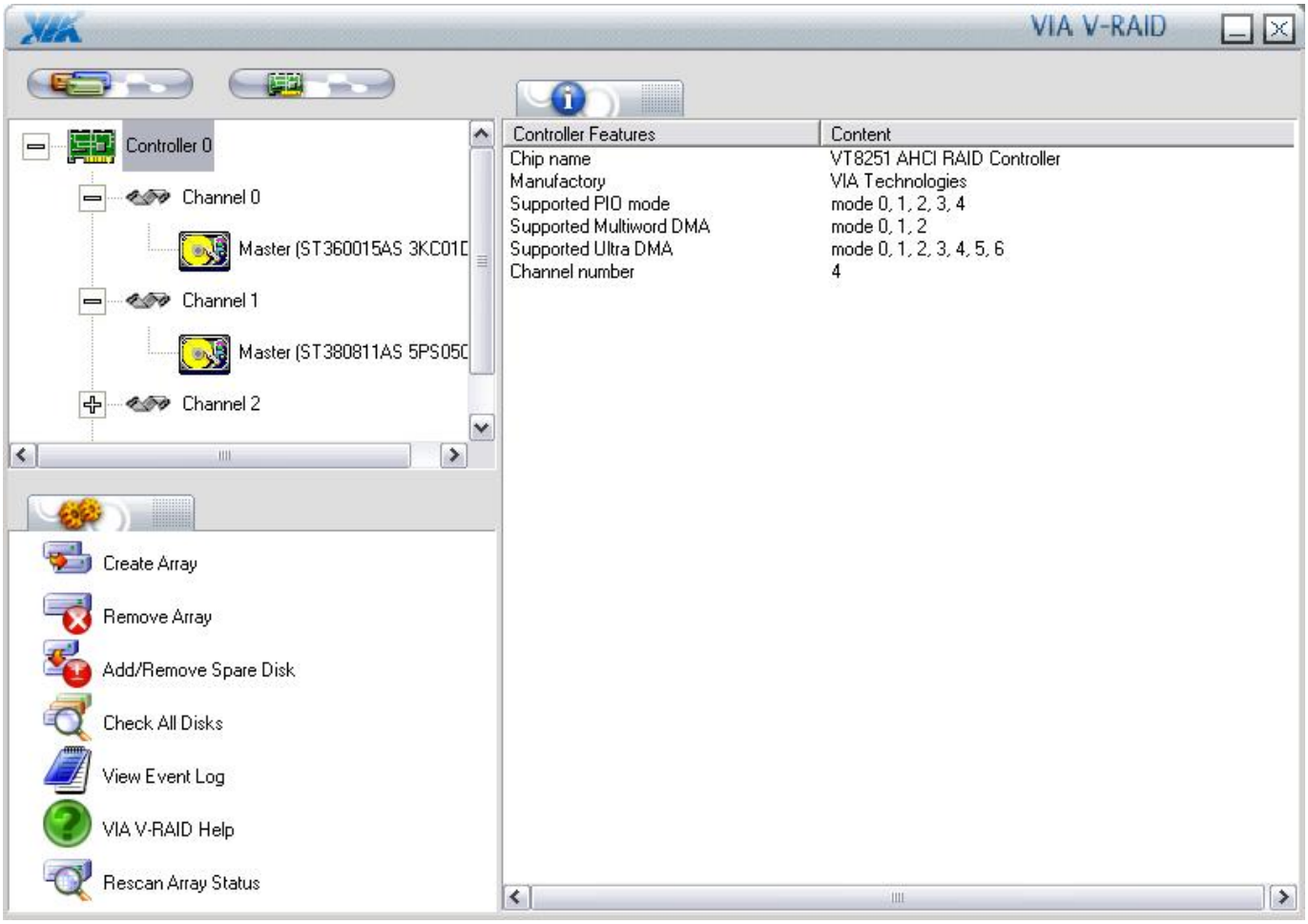


Figure 6-5: Displaying the controller tree in the VIA V-RAID utility

6.4 Create Disk Array

To create an array, click the **Create Array** button in the Operation windowpane.

Figure 6-6: Creating an array using the VIA V-RAID utility

6.4.1 Create RAID 1 Disk Array

STEP 1: SELECTING THE RAID 1 TYPE

RAID Mode lists all available RAID types according to the number of available free-disks. Select the **RAID 1(Mirror)** and click on "Next >>" to continue.

Figure 6-7: Selecting a RAID 1 type with the VIA V-RAID utility

STEP 2: SELECT CONTROLLER AND CREATING METHOD

A list of available controllers will be listed in **Select Controller**. Select a controller to create the array.[11]

Below **Select Controller** are two options: **Auto** and **Custom**. Selecting **Auto** will cause the VIA V-RAID utility to automatically select the disks to be used for the array. Selecting **Custom** will cause the VIA V-RAID utility to list all available disks. When the list is displayed, select the disks for the array manually.

The selected disks may be modified manually in both cases.

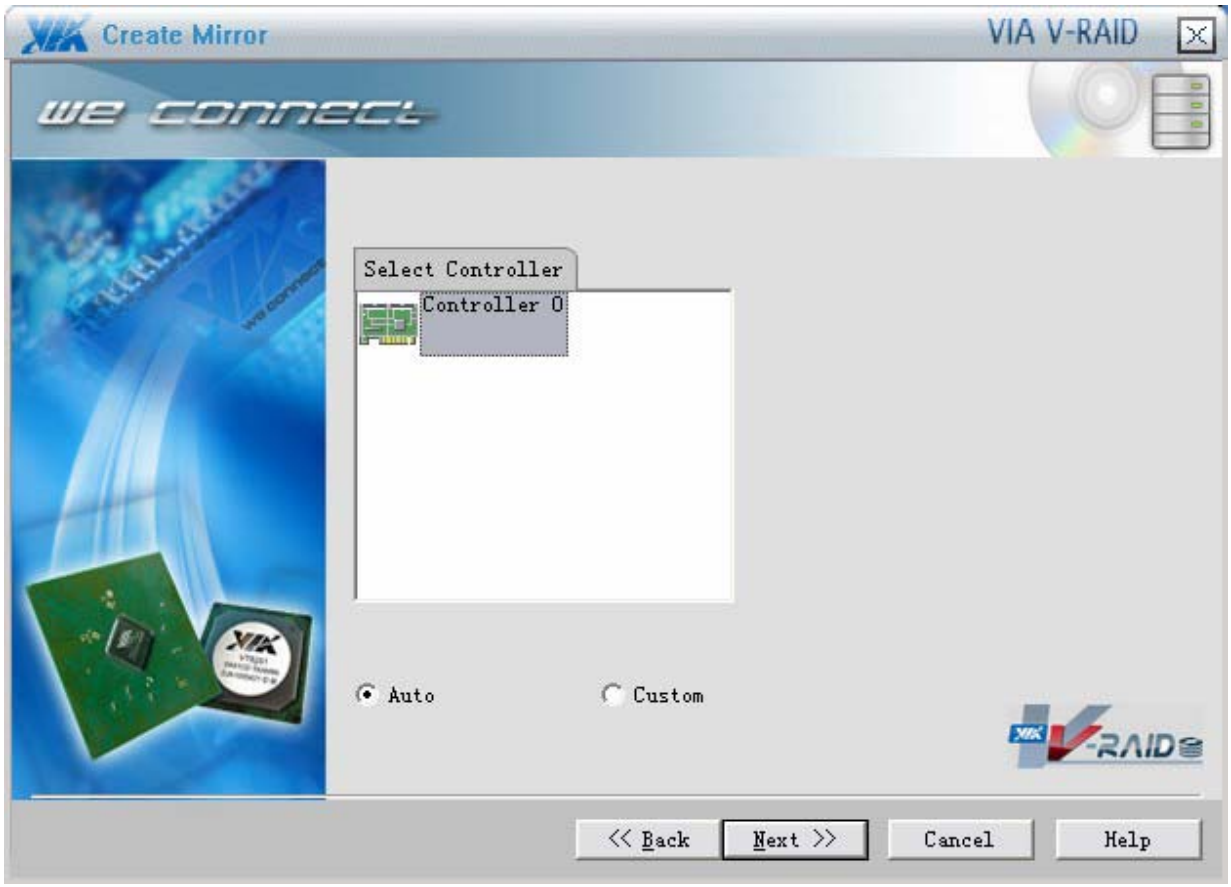


Figure 6-8: Selecting a controller and creation method for a RAID 1 array with the VIA V-RAID utility

[11] The disks that will be selected for the array will be limited to the selected controller.

STEP 3: SELECTING THE ARRAY DISKS

Select the disks for the array you are creating.

To add a disk into the array, select an available disk from **Available List**, then click >> button (or press the right arrow key). The array disks will be added in the following order: Source, Mirror, and Spare disk. A spare disk can also be added or removed after a mirror array is created. Refer to the Add and Remove Spare Disk Drive section for details.

To remove a disk from the array, select the array disk, then click << button (or press the left arrow key).

Whenever a disk (array disk or available disk) is selected, its capacity and physical location will be shown below **Available List**.

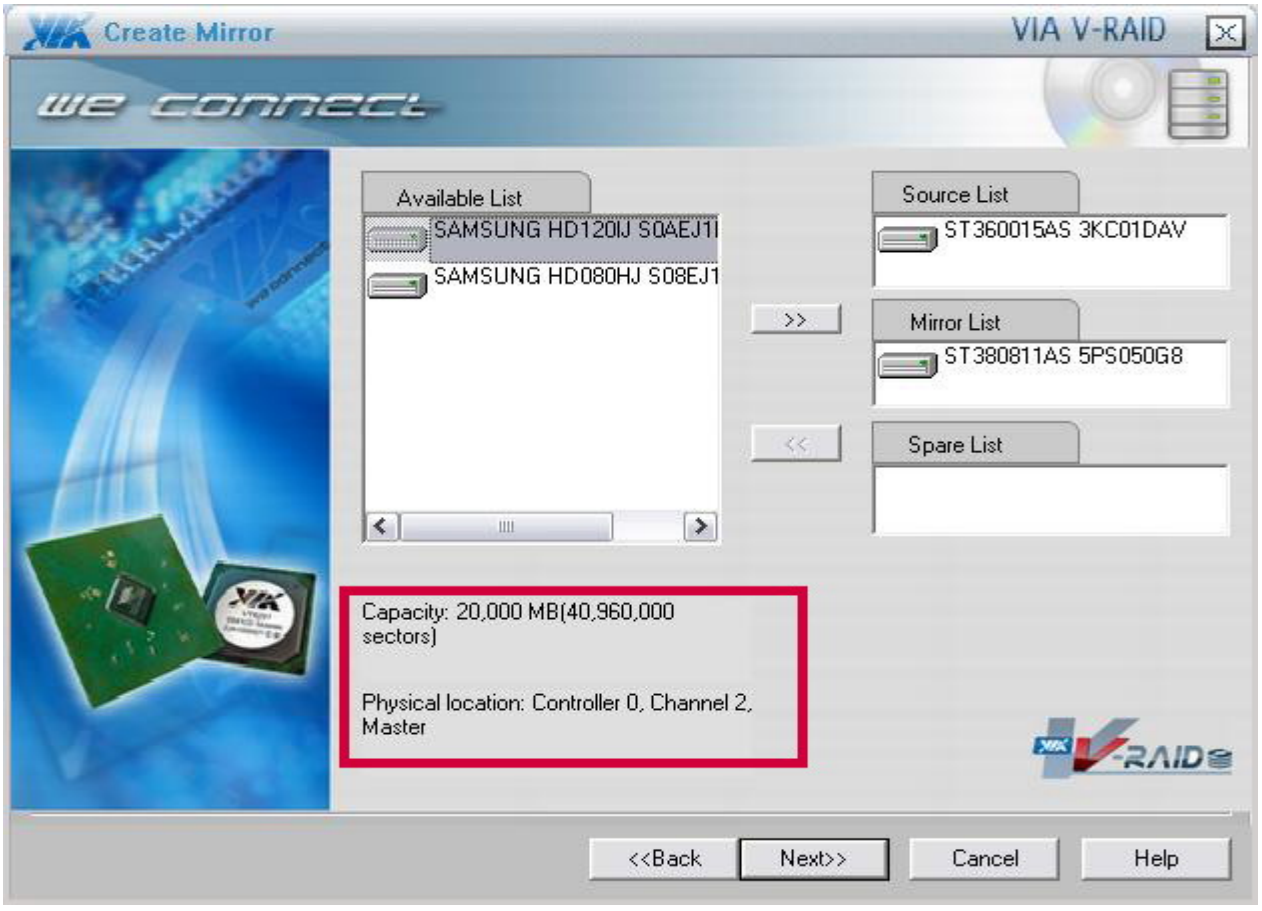


Figure 6-9: Selecting disks to be used in the RAID 1 array with the VIA V-RAID utility

If any of the disks selected for the array contains an operating system, the following information will be displayed.

Figure 6-10: Notice regarding disks containing an operating system during a RAID 1 array creation

If the mirror disk is smaller than the source disk the following warning notice will be displayed.

Figure 6-11: Notice of a failed RAID 1 array creation

If any data is found on the source disk, a confirmation dialog box will appear. Checking the **Keep the data on Source Disk** option will prevent the data from being erased.

Figure 6-12: Existing data found on the source disk during array creation

STEP 4: FINAL CONFIRMATION

To finalize the steps and begin the array creation, click on the "Next >>" button. As soon as the "Next >>" button is clicked, the data on the hardware disk will be permanently erased. There is no undo option after clicking "Next >>".

Figure 6-13: Final confirmation before creating the RAID 1 array with the VIA V-RAID utility

STEP 5: EXIT THE WIZARD

If the array creation was successful, the following dialog box will be displayed. Other possibilities include: a message box popping up to ask for confirmation and prompting a system reboot or a message box popping up to ask for synchronization. Click on the "OK" button to close and exit the wizard.

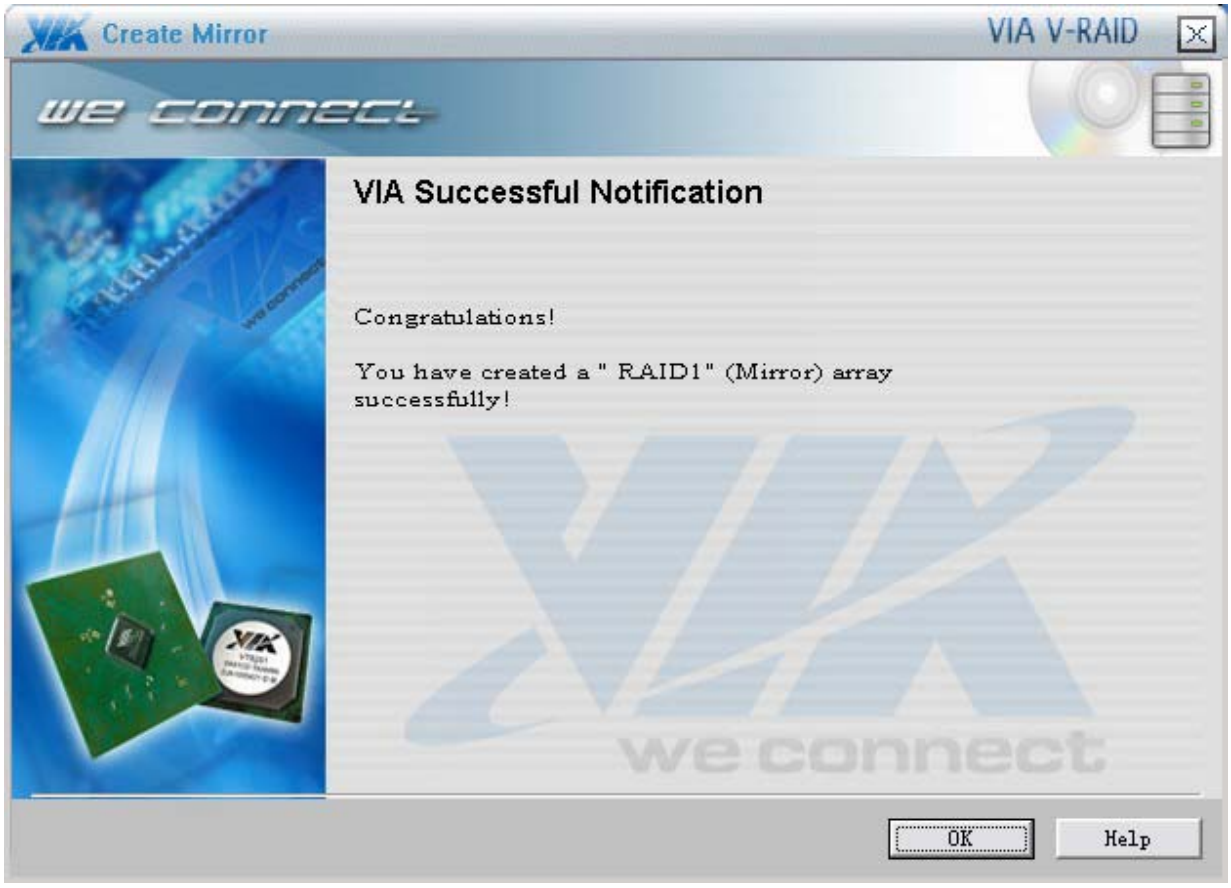


Figure 6-14: Successful mirror array created

6.4.2 Create RAID 0 Disk Array

STEP 1: SELECTING THE RAID 0 TYPE

RAID Mode lists all available RAID types according to the number of available free-disks. Select the **RAID 0(Stripe)** and click on "Next >>" to continue.

Figure 6-15: Selecting a RAID 0 type with the VIA V-RAID utility

STEP 2: SELECT CONTROLLER AND CREATING METHOD

A list of available controllers will be listed in **Select Controller**. Select a controller to create the array.[12]

Below **Select Controller** are two options: **Auto** and **Custom**. Selecting **Auto** will cause the VIA V-RAID utility to automatically select the disks to be used for the array. Selecting **Custom** will cause the VIA V-RAID utility to list all available disks. When the list is displayed, select the disks for the array manually.

The selected disks may be modified manually in both cases.

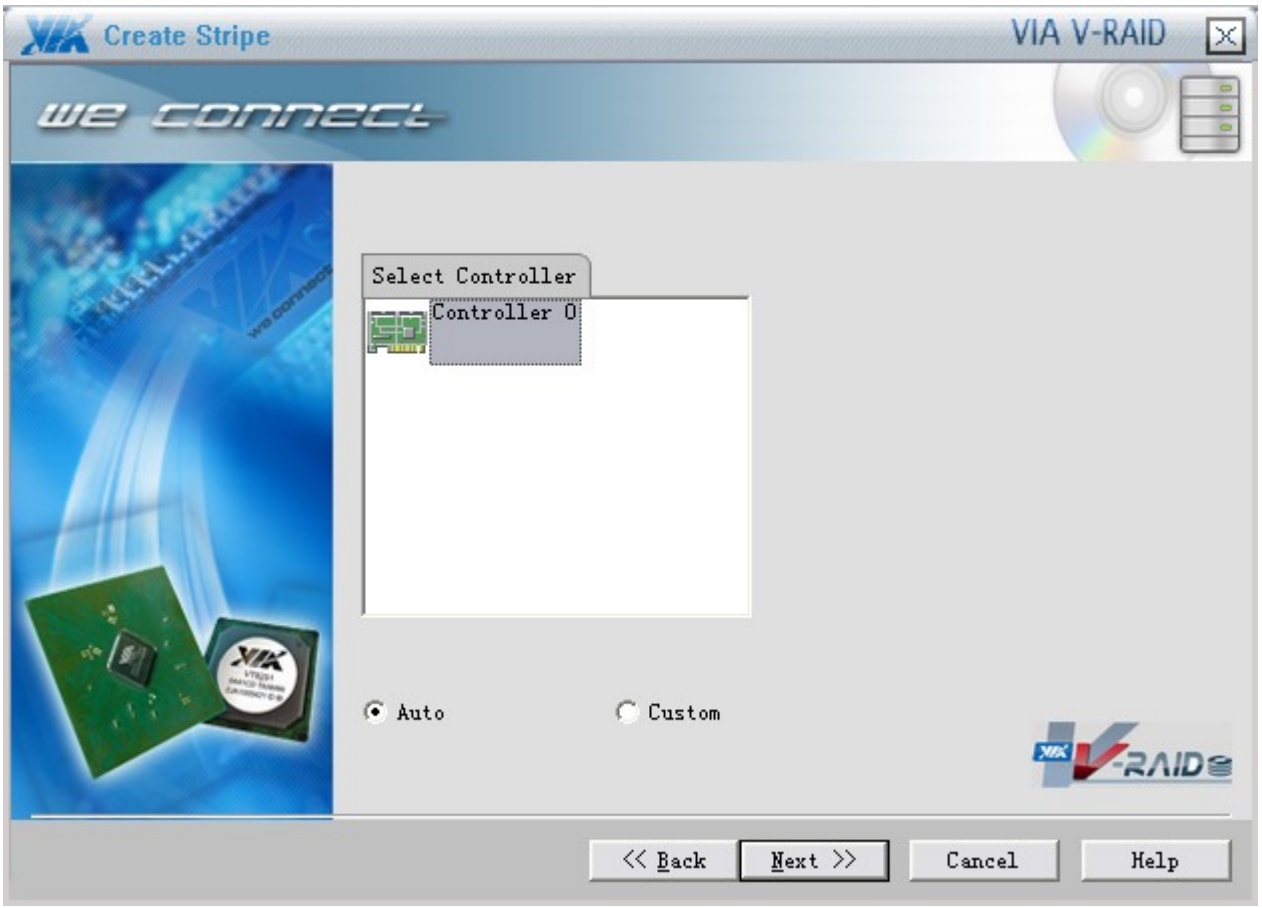


Figure 6-16: Selecting a controller and creation method for a RAID 0 array with the VIA V-RAID utility

[12] The disks that will be selected for the array will be limited to the selected controller.

STEP 3: SELECTING THE ARRAY DISKS

Select the disks for the array you are creating.

To add a disk into the array, select an available disk from **Available List**, then click >> button (or press the right arrow key). The array's disk order will be the same as the order it was added.

To remove a disk from the array, select the array disk, then click << button (or press the left arrow key).

Whenever a disk (array disk or available disk) is selected, its capacity and physical location will be shown below **Available List**.

To set the stripe size for the array, select the desired stripe size from the **Stripe Size** drop-down list.

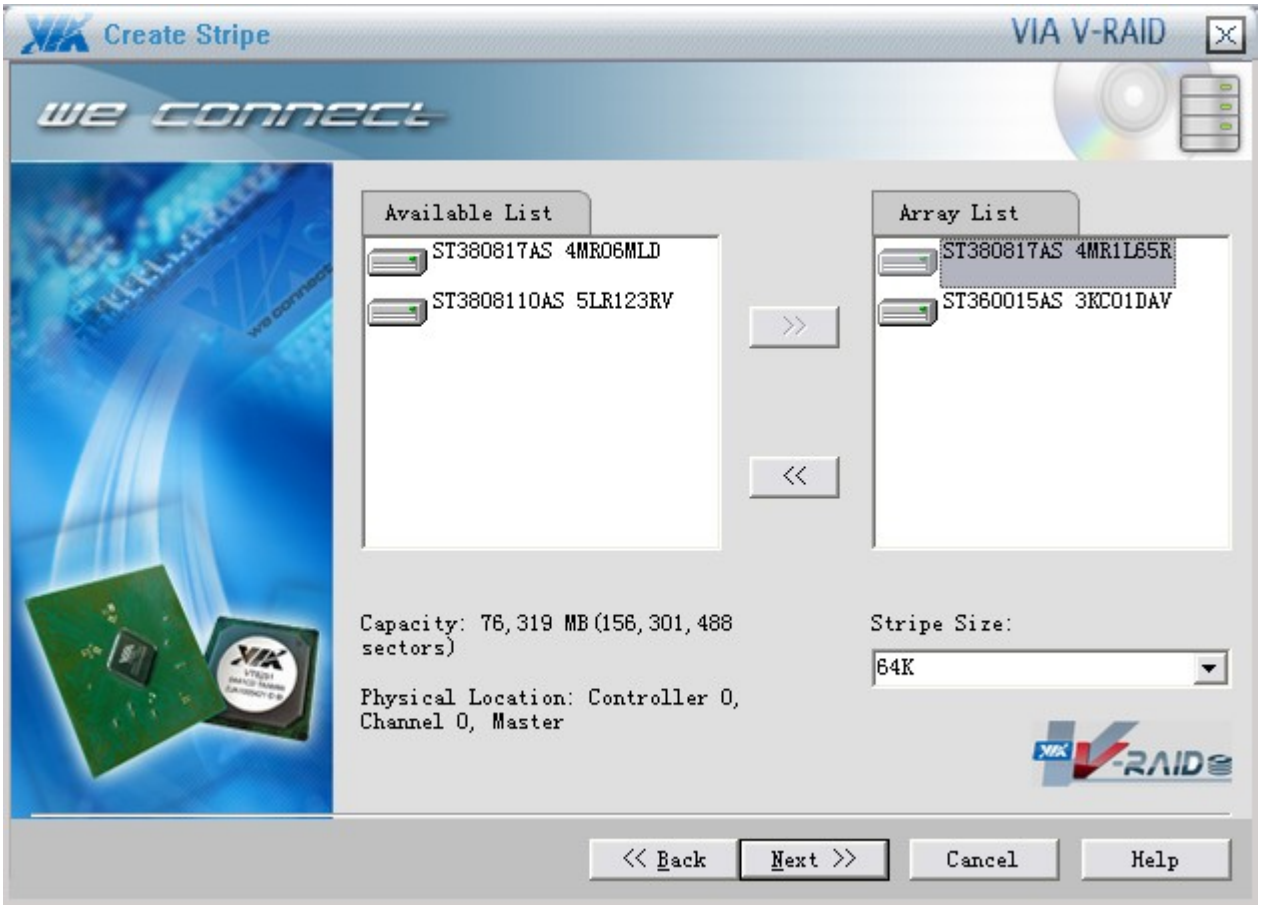


Figure 6-17: Selecting disks to be used in the RAID 0 array with the VIA V-RAID utility

If any of the disks selected for the array contains an operating system, the following information will be displayed.

Figure 6-18: Notice regarding disks containing an operating system during a RAID 0 array creation

If the total capacity required for data migration is not enough, the following warning notice will be displayed.

Figure 6-19: Notice of a failed RAID 0 array creation

If there are no disks containing an operating system but there is data found on the Stripe0[13] disk, a confirmation dialog box will appear. Checking the **Keep the data on Stripe0** option will prevent the data from being erased.

Figure 6-20: Existing data found on one of the disks being setup for RAID 0 array creation

[13] Stripe0 is the first disk in the array.

STEP 4: FINAL CONFIRMATION

To finalize the steps and begin the array creation, click on the "Next >>" button. As soon as the "Next >>" button is clicked, the data on the hardware disk will be permanently erased. There is no undo option after clicking "Next >>".

Figure 6-21: Final confirmation before creating the RAID 0 array with the VIA V-RAID utility

STEP 5: EXIT THE WIZARD

If the array creation was successful, the following dialog box will be displayed. Other possibilities include: a message box popping up to ask for confirmation and prompting a system reboot or a message box popping up to ask for data migration. Click on the "OK" button to close and exit the wizard.

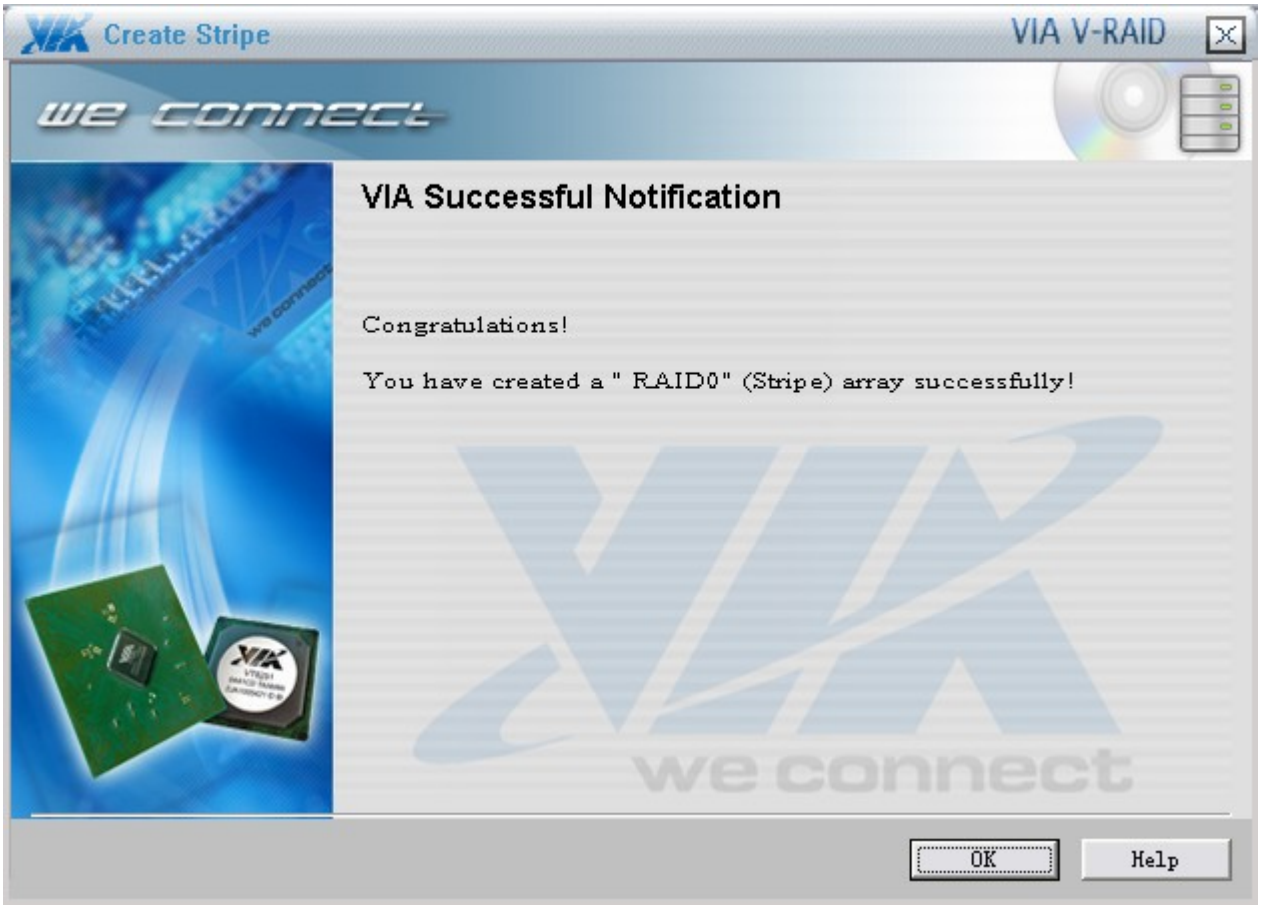


Figure 6-22: Successful stripe array created

6.4.3 Create JBOD Disk Array

STEP 1: SELECTING THE JBOD RAID TYPE

RAID Mode lists all available RAID types according to the number of available free-disks. Select the **SPAN(JBOD)** and click on "Next >>" to continue.

Figure 6-23: Selecting a JBOD RAID type with the VIA V-RAID utility

STEP 2: SELECT CONTROLLER AND CREATING METHOD

A list of available controllers will be listed in **Select Controller**. Select a controller to create the array.[14]

Below **Select Controller** are two options: **Auto** and **Custom**. Selecting **Auto** will cause the VIA V-RAID utility to automatically select the disks to be used for the array. Selecting **Custom** will cause the VIA V-RAID utility to list all available disks. When the list is displayed, select the disks for the array manually.

The selected disks may be modified manually in both cases.

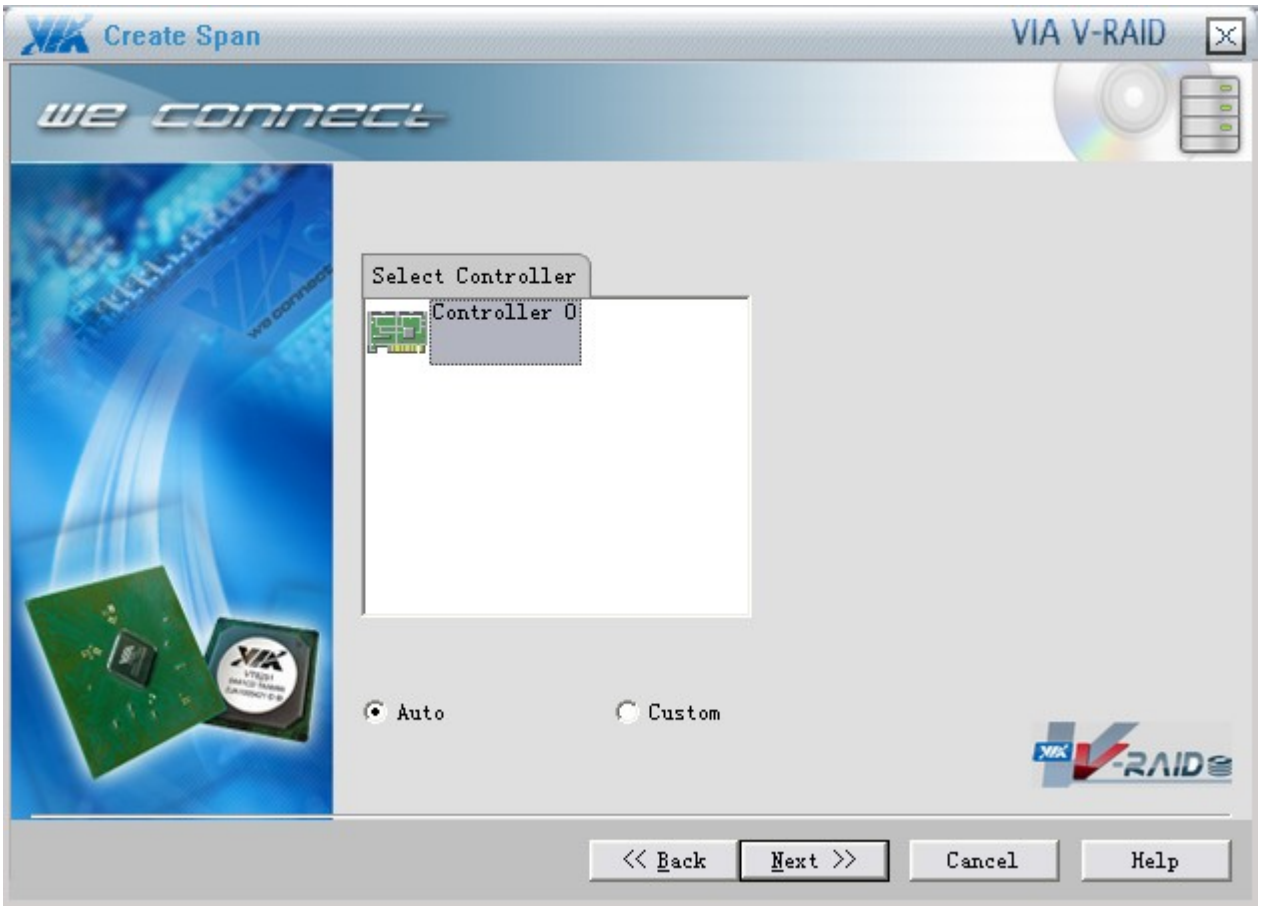


Figure 6-24: Selecting a controller and creation method for a JBOD RAID array with the VIA V-RAID utility

[14] The disks that will be selected for the array will be limited to the selected controller.

STEP 3: SELECTING THE ARRAY DISKS

Select the disks for the array you are creating.

To add a disk into the array, select an available disk from **Available List**, then click >> button (or press the right arrow key). The array's disk order will be the same as the order it was added.

To remove a disk from the array, select the array disk, then click << button (or press the left arrow key).

Whenever a disk (array disk or available disk) is selected, its capacity and physical location will be shown below **Available List**.

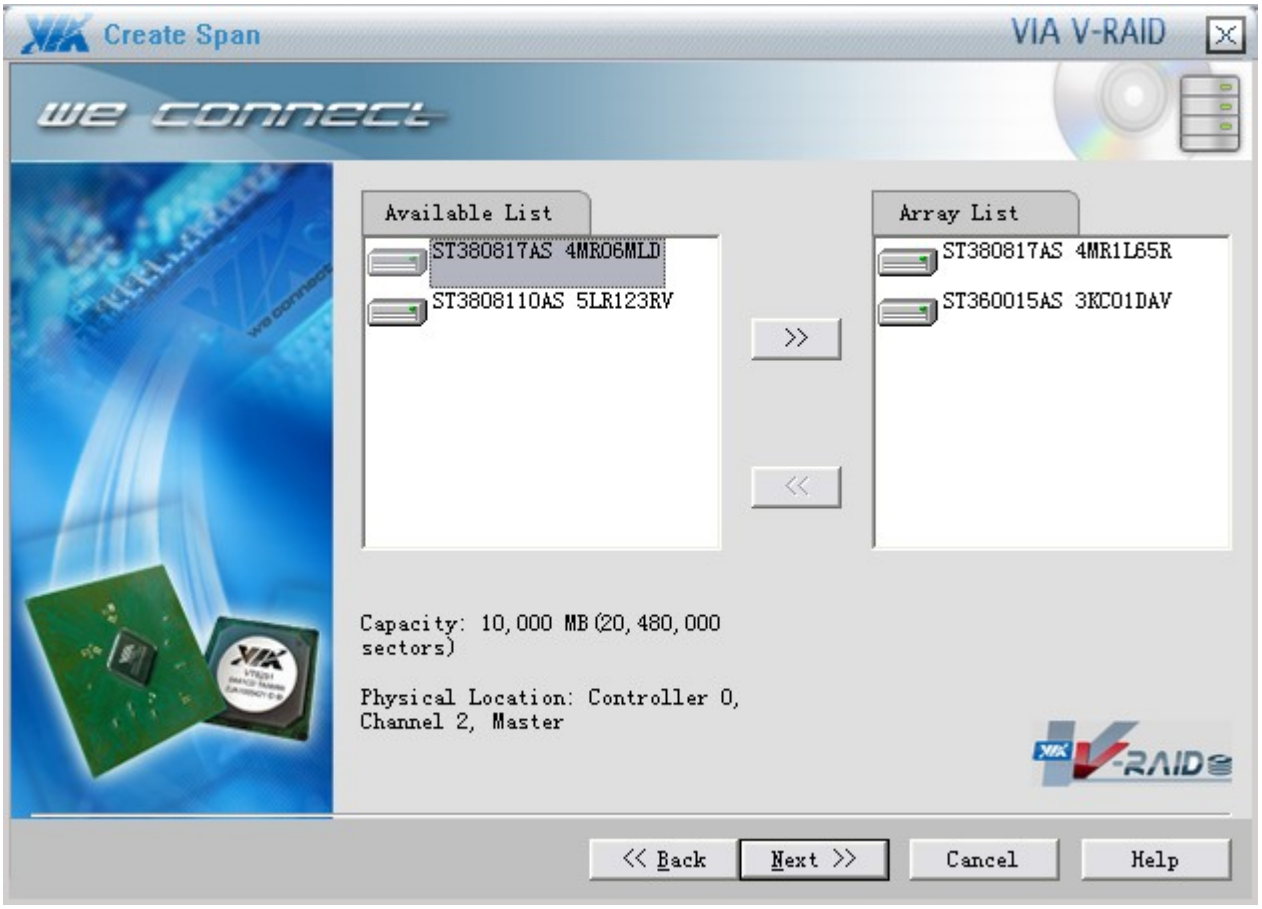


Figure 6-25: Selecting disks to be used in the JBOD RAID array with the VIA V-RAID utility

If any of the disks selected for the array contains an operating system, the following information will be displayed.

Figure 6-26: Notice regarding disks containing an operating system during a JBOD RAID array creation

If any data is found on the Span0[15] disk, a confirmation dialog box will appear. Checking the **Keep the data on Span0** option will prevent the data from being erased.

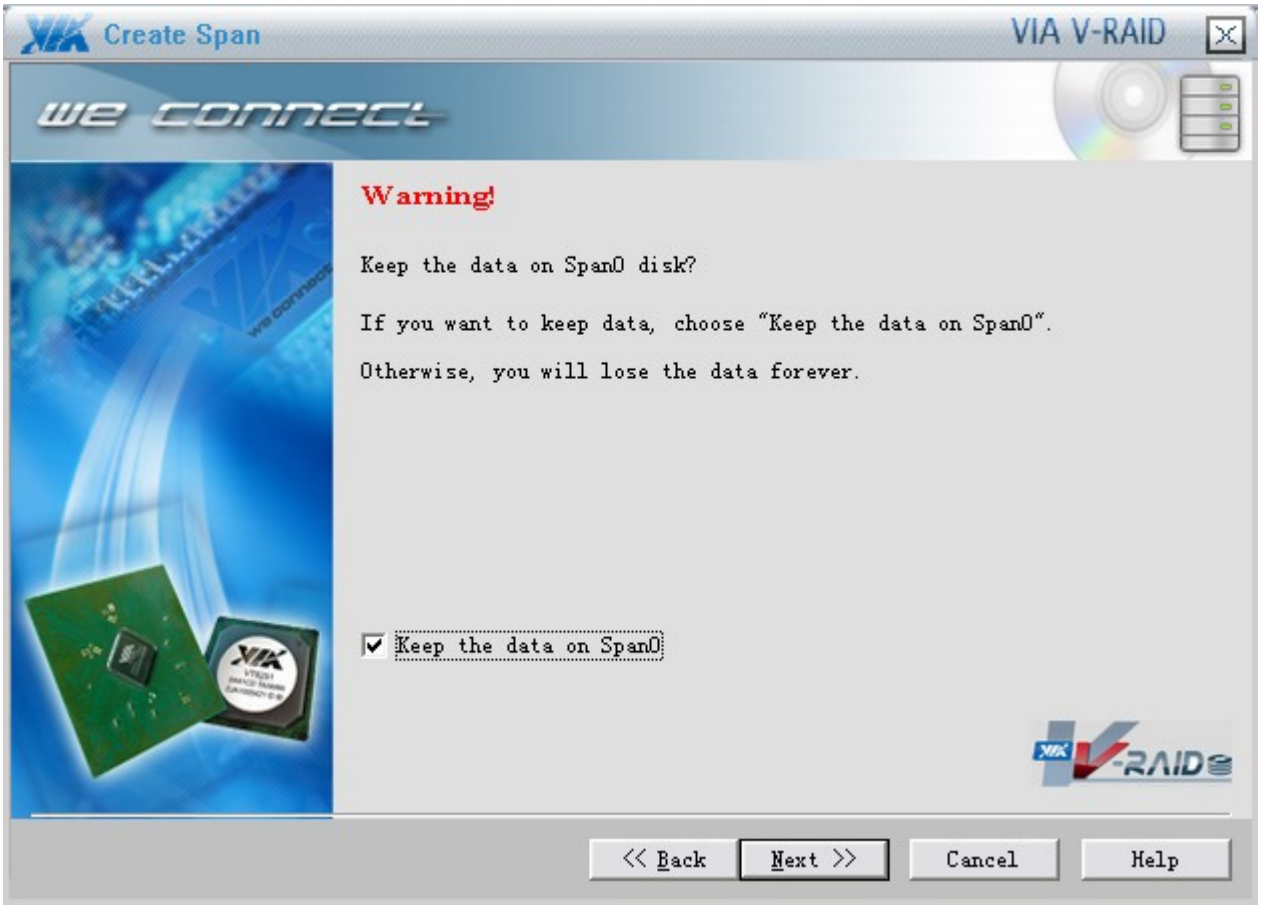


Figure 6-27: Existing data found on one of the disks being setup for JBOD array creation

[15] Span0 is the first disk in the array.

STEP 4: FINAL CONFIRMATION

To finalize the steps and begin the array creation, click on the “Next >>” button. As soon as the “Next >>” button is clicked, the data on the hardware disk will be permanently erased. There is no undo option after clicking “Next >>”.

Figure 6-28: Final confirmation before creating the JBOD array with the VIA V-RAID utility

STEP 5: EXIT THE WIZARD

If the array creation was successful, the following dialog box will be displayed. A message box may also pop up to ask for confirmation and prompt for a system reboot. Click on the "OK" button to close and exit the wizard.

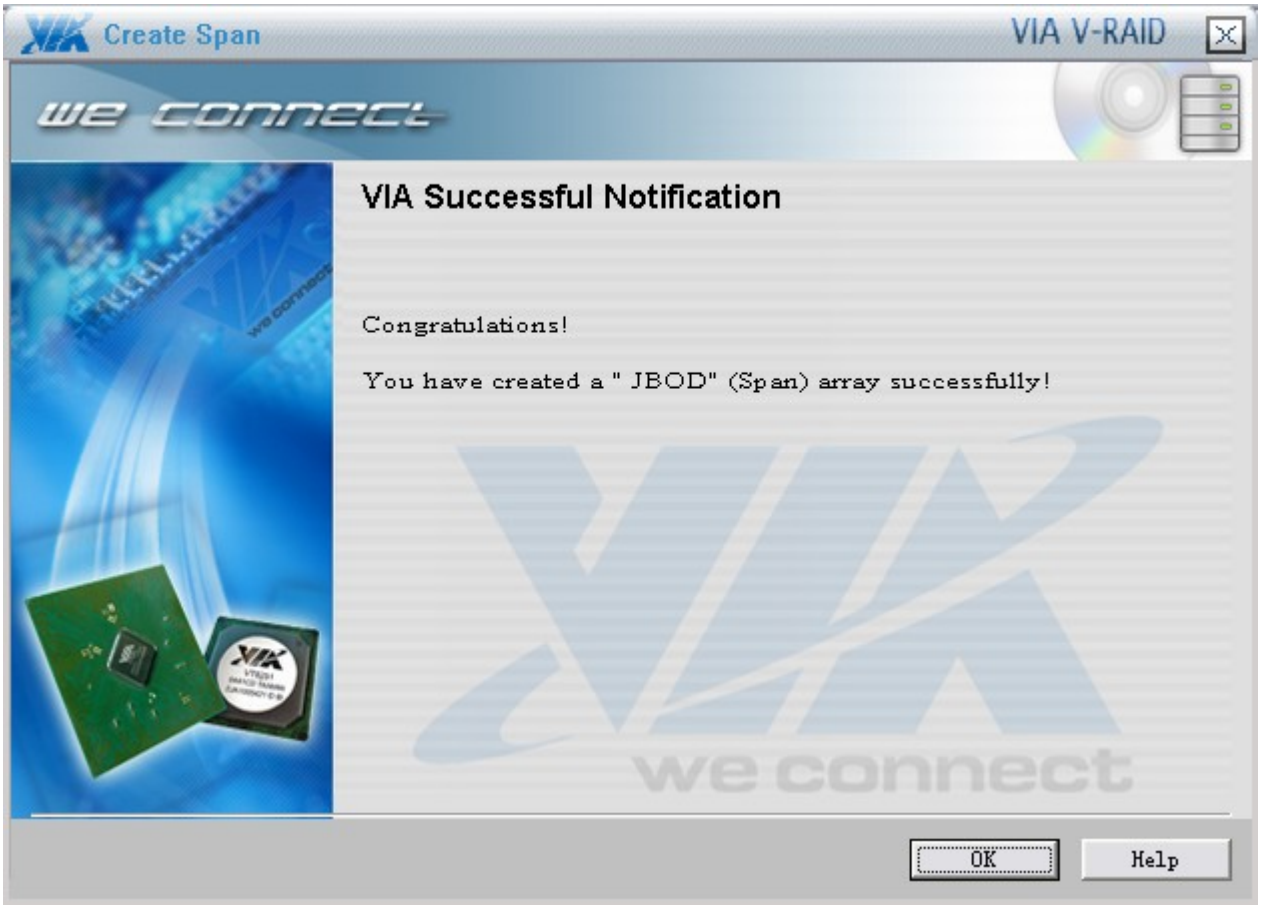


Figure 6-29: Successful JBOD array created

6.4.4 Create RAID 0+1 Disk Array

STEP 1: SELECTING THE RAID 0+1 TYPE

RAID Mode lists all available RAID types according to the number of available free-disks. Select the **RAID 0+1** and click on "Next >>" to continue.

Figure 6-30: Selecting a RAID 0+1 type with the VIA V-RAID utility

STEP 2: SELECT CONTROLLER AND CREATING METHOD

A list of available controllers will be listed in **Select Controller**. Select a controller to create the array.[16]

Below **Select Controller** are two options: **Auto** and **Custom**. Selecting **Auto** will cause the VIA V-RAID utility to automatically select the disks to be used for the array. Selecting **Custom** will cause the VIA V-RAID utility to list all available disks. When the list is displayed, select the disks for the array manually.

The selected disks may be modified manually in both cases.

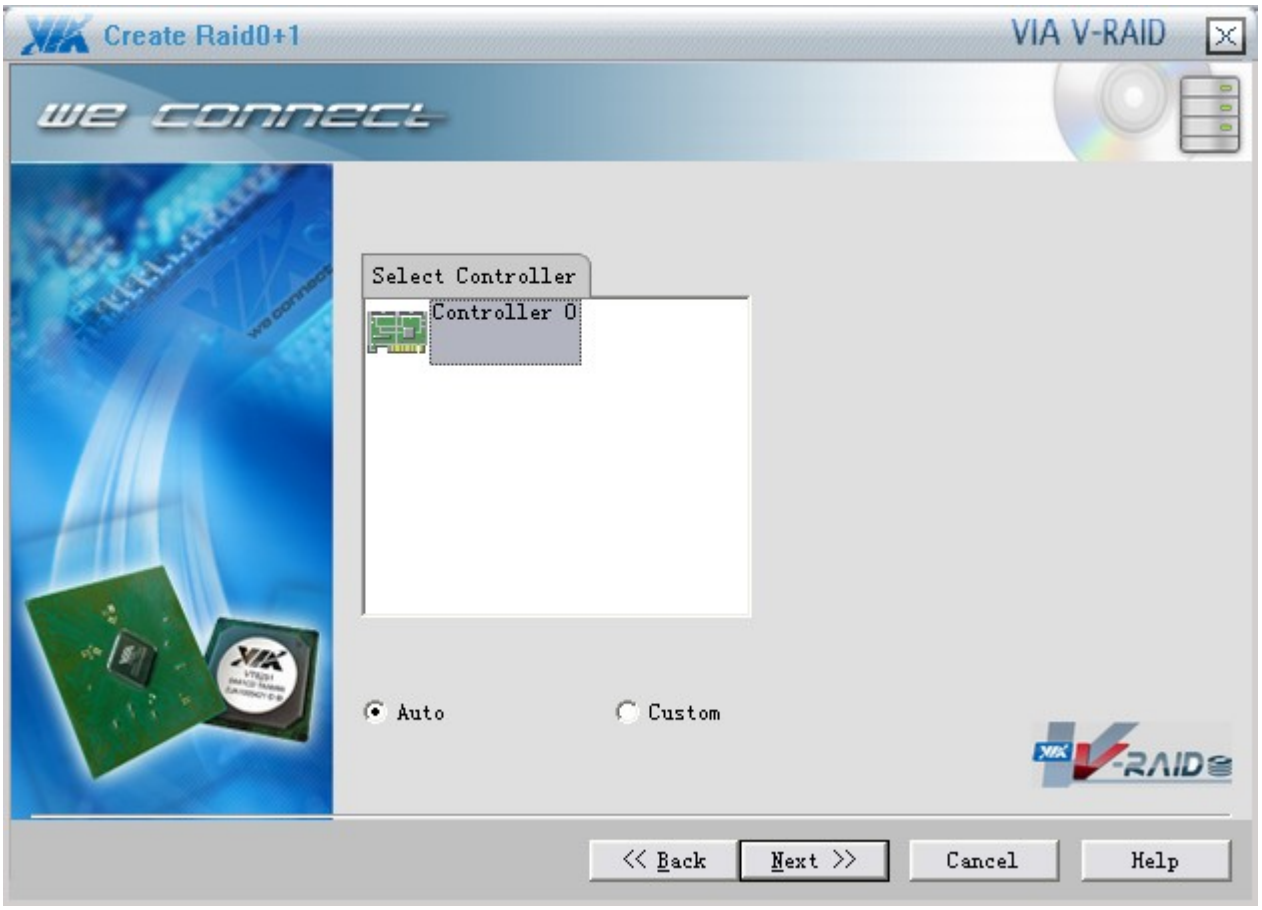


Figure 6-31: Selecting a controller and creation method for a RAID 0+1 array with the VIA V-RAID utility

[16] The disks that will be selected for the array will be limited to the selected controller.

STEP 3: SELECTING THE ARRAY DISKS

Select the disks for the array you are creating.

To add a disk into the array, select an available disk from **Available List**, then click >> button (or press the right arrow key).

To remove a disk from the array, select the array disk, then click << button (or press the left arrow key).

Whenever a disk (array disk or available disk) is selected, its capacity and physical location will be shown below **Available List**.

To set the stripe size for the array, select the desired stripe size from the **Stripe Size** drop-down list.

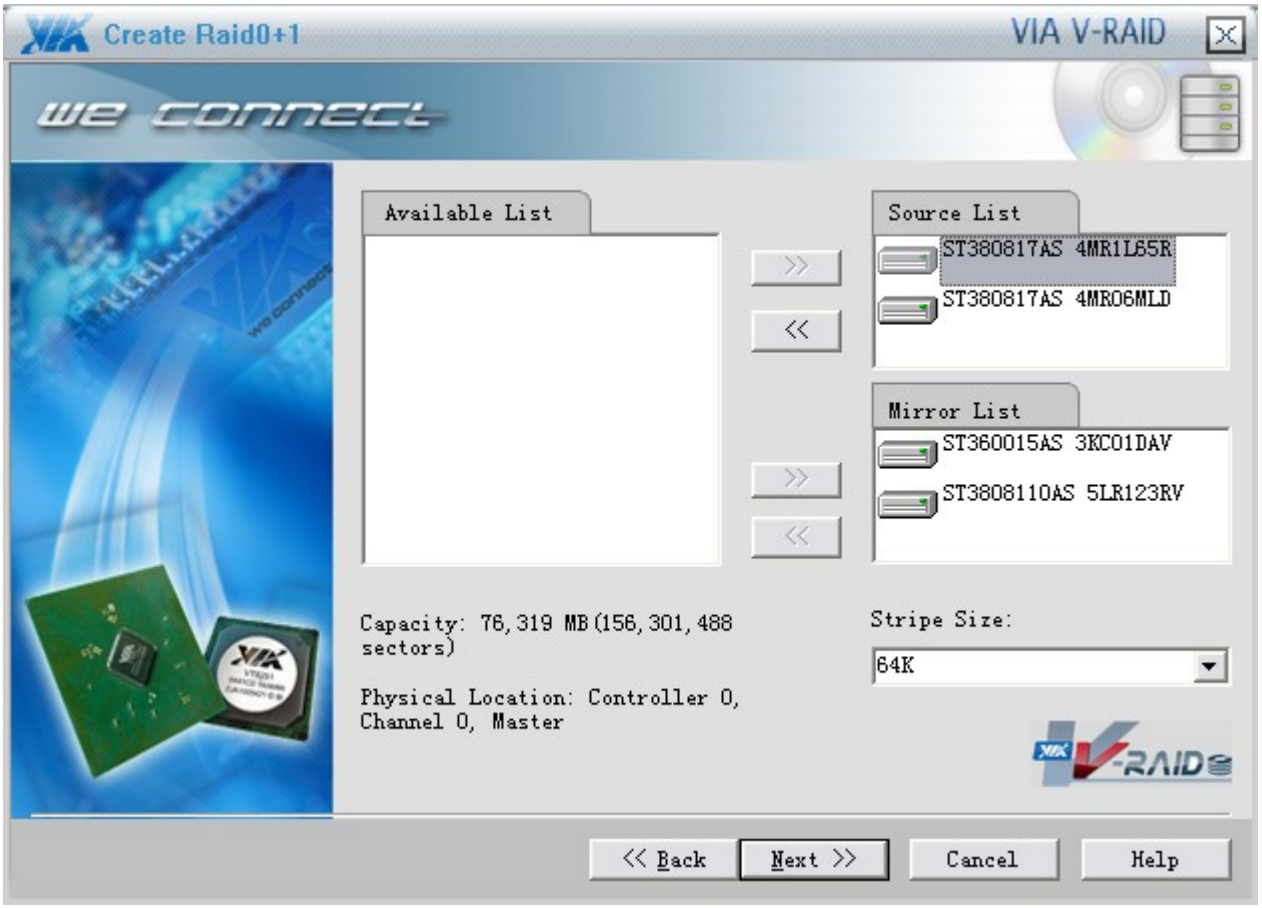


Figure 6-32: Selecting disks to be used in the RAID 0+1 array with the VIA V-RAID utility

STEP 4: FINAL CONFIRMATION

To finalize the steps and begin the array creation, click on the "Next >>" button. As soon as the "Next >>" button is clicked, the data on the hardware disk will be permanently erased. There is no undo option after clicking "Next >>".

Figure 6-33: Final confirmation before creating the RAID 0+1 array with the VIA V-RAID utility

STEP 5: EXIT THE WIZARD

If the array creation was successful, the following dialog box will be displayed. Other possibilities include: a message box popping up to ask for confirmation and prompting a system reboot or a message box popping up to ask for synchronization. Click on the "OK" button to close and exit the wizard.

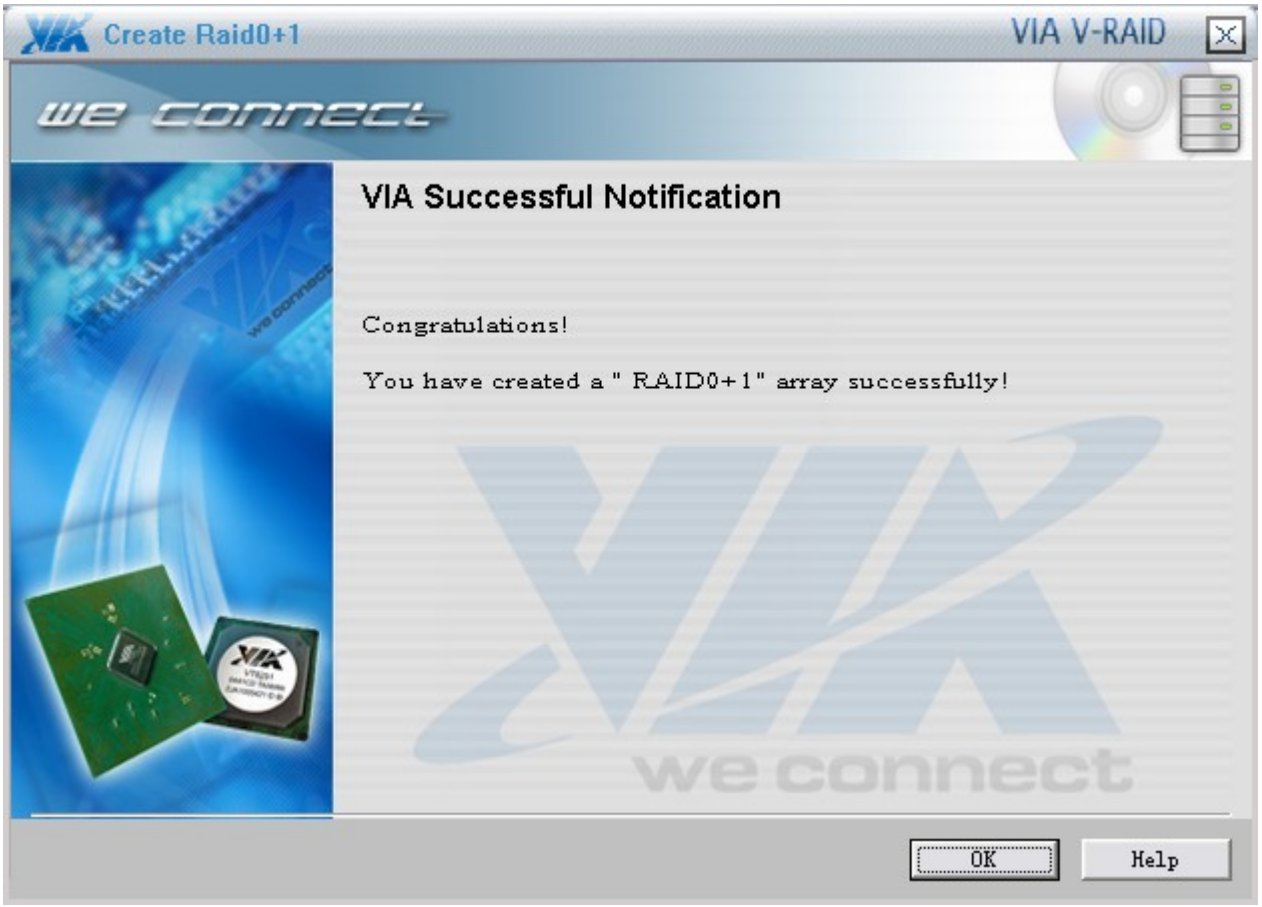


Figure 6-34: Successful RAID 0+1 array created

6.4.5 Create RAID 5 Disk Array

STEP 1: SELECTING THE RAID 5 TYPE

RAID Mode lists all available RAID types according to the number of available free-disks. Select the **RAID 5** and click on "Next >>" to continue.

Figure 6-35: Selecting a RAID 5 type with the VIA V-RAID utility

STEP 2: SELECT CONTROLLER AND CREATING METHOD

A list of available controllers will be listed in **Select Controller**. Select a controller to create the array.[17]

Below **Select Controller** are two options: **Auto** and **Custom**. Selecting **Auto** will cause the VIA V-RAID utility to automatically select the disks to be used for the array. Selecting **Custom** will cause the VIA V-RAID utility to list all available disks. When the list is displayed, select the disks for the array manually.

The selected disks may be modified manually in both cases.

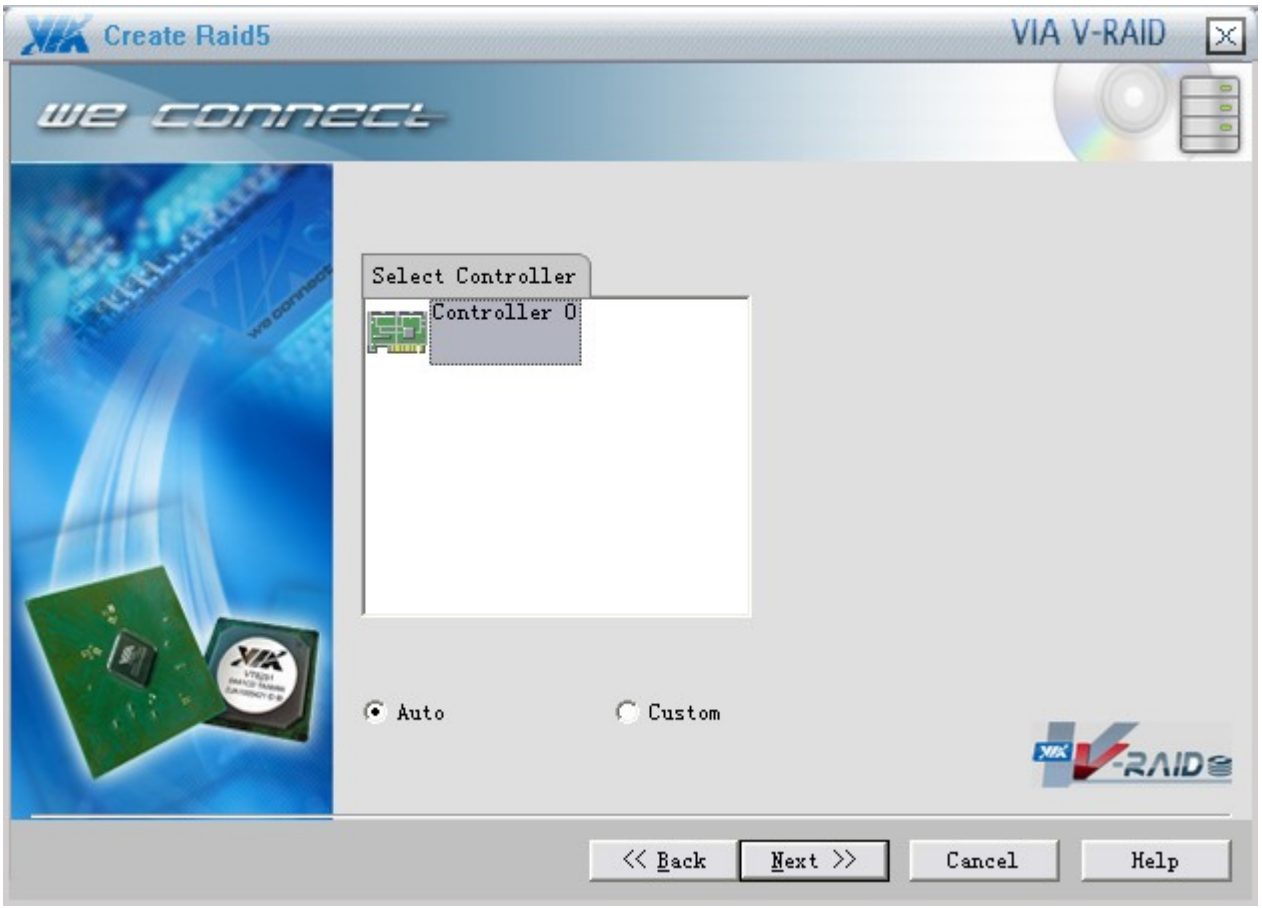


Figure 6-36: Selecting a controller and creation method for a RAID 5 array with the VIA V-RAID utility

[17] The disks that will be selected for the array will be limited to the selected controller.

STEP 3: SELECTING THE ARRAY DISKS

Select the disks for the array you are creating.

To add a disk into the array, select an available disk from **Available List**, then click >> button (or press the right arrow key). The array's disk order will be the same as the order it was added.

To remove a disk from the array, select the array disk, then click << button (or press the left arrow key).

Whenever a disk (array disk or available disk) is selected, its capacity and physical location will be shown below **Available List**.

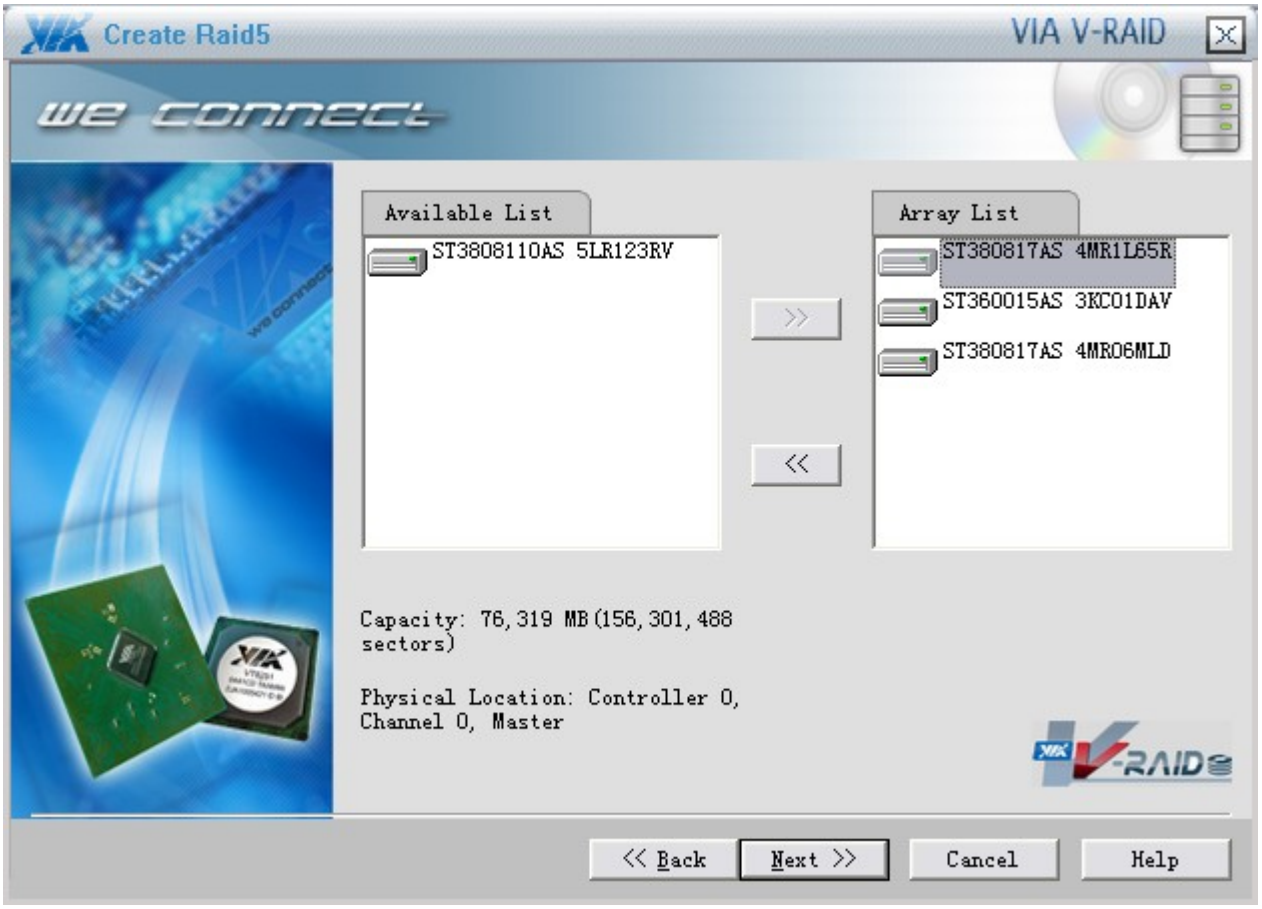


Figure 6-37: Selecting disks to be used in the RAID 5 array with the VIA V-RAID utility

If any of the disks selected for the array contains an operating system, the following information will be displayed.

Figure 6-38: Notice regarding disks containing an operating system during a RAID 5 array creation

If the total capacity required for data migration is not enough, the following warning notice will be displayed.

Figure 6-39: Notice of a failed RAID 5 array creation

If any data is found on the Stripe0[18] disk, a confirmation dialog box will appear. Checking the **Keep the data on Stripe0** option will prevent the data from being erased.

Figure 6-40: Existing data found on one of the disks being setup for RAID 5 array creation

[18] Stripe0 is the first disk in the array.

STEP 4: FINAL CONFIRMATION

To finalize the steps and begin the array creation, click on the "Next >>" button. As soon as the "Next >>" button is clicked, the data on the hardware disk will be permanently erased. There is no undo option after clicking "Next >>".

Figure 6-41: Final confirmation before creating the RAID 5 array with the VIA V-RAID utility

STEP 5: EXIT THE WIZARD

If the array creation was successful, the following dialog box will be displayed. Other possibilities include: a message box popping up to ask for confirmation and prompting a system reboot or a message box popping up to ask for data migration. Click on the "OK" button to close and exit the wizard.

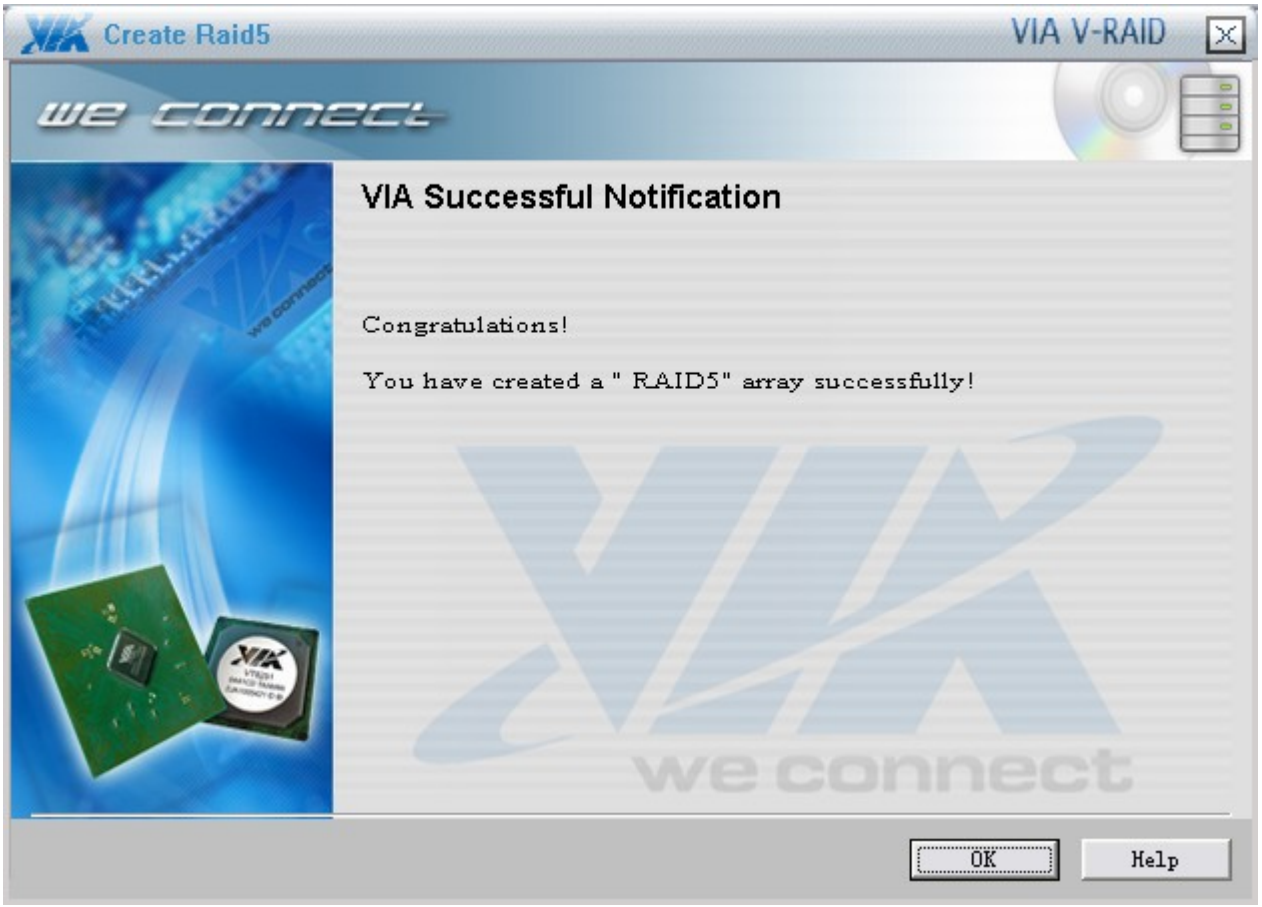


Figure 6-42: Successful RAID 5 array created

A message box will pop up to ask for prompting a system reboot. Click on the "Yes" to reboot the system or click "No" to skip reboot. The new disk array setting will take effect only after system reboot[19].

Figure 6-43: A message box popping up to ask for prompting a system reboot

[19] There is no need to reboot for operation systems such as Windows 2000 or above.

6.5 Delete Disk Array

There are two ways to delete a disk array. One way is by using the Remove Array wizard. The other way is by using the device tree in the Tree windowpane.

6.5.1 Using the Remove Array Wizard

To remove a disk array, click on **Remove Array** in the Operation windowpane. Follow the **Remove Array** wizard to complete the operation.

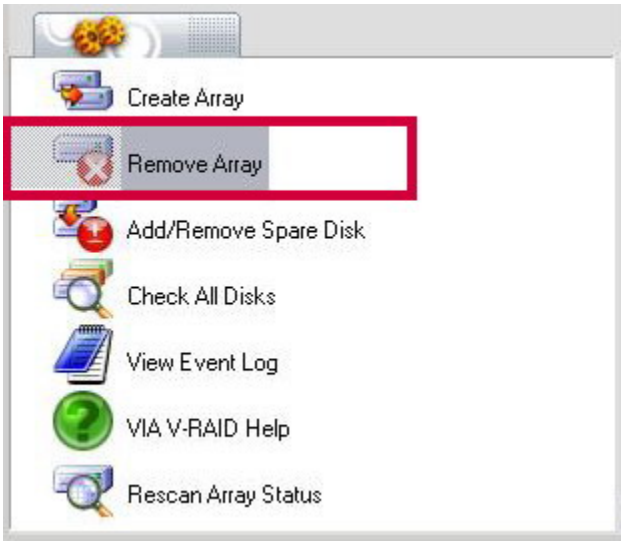


Figure 6-44: Deleting an array using the Remove Array wizard

STEP 1: SELECT THE ARRAY TO BE DELETED

The **Remove Array** wizard will display a list of available arrays to choose from. Select the array to be deleted and click on "Next >>" to continue.

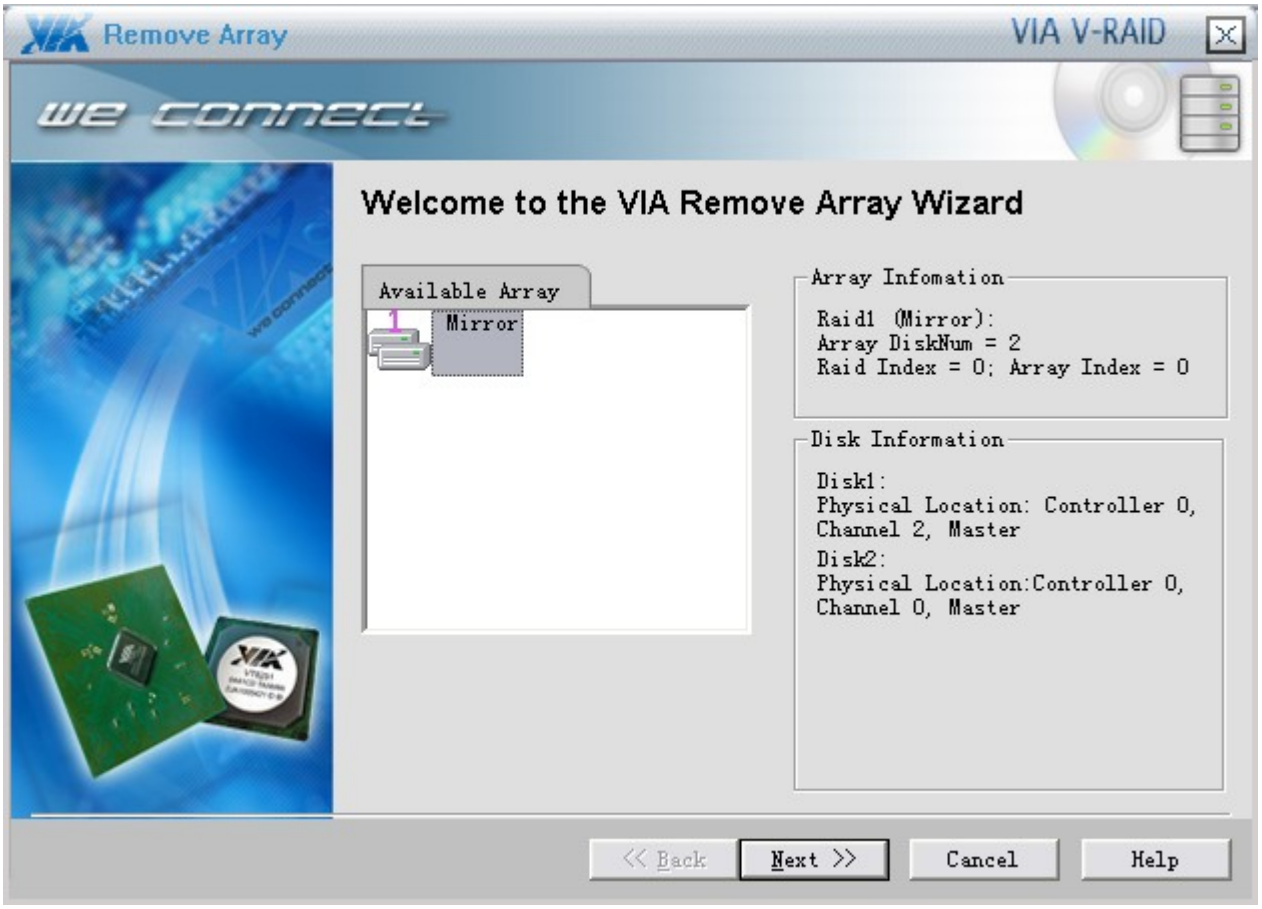


Figure 6-45: Selecting the array to be deleted

STEP 2: FINAL CONFIRMATION

To finalize the deletion of the array, click on the “Next >>” button. As soon as the “Next >>” button is clicked, the data on the hardware disk will be permanently erased. There is no undo option after clicking “Next >>”.

Figure 6-46: Final confirmation before deleting an array with the VIA V-RAID utility

STEP 3: EXIT THE WIZARD

If the array deletion was successful, the following dialog box will be displayed. Click on the "OK" button to close and exit the wizard.

Figure 6-47: Successful deletion of an array

6.5.2 Using the Device Tree to Remove an Array

Another way to remove an array is by deleting it from the device tree. First, select the array's root node in the device tree. Then, right click the array node and select **Remove Array** on the shortcut menu. A message box will then pop up to ask for confirmation and prompt a system reboot. The system must be rebooted to actually delete the disk array.

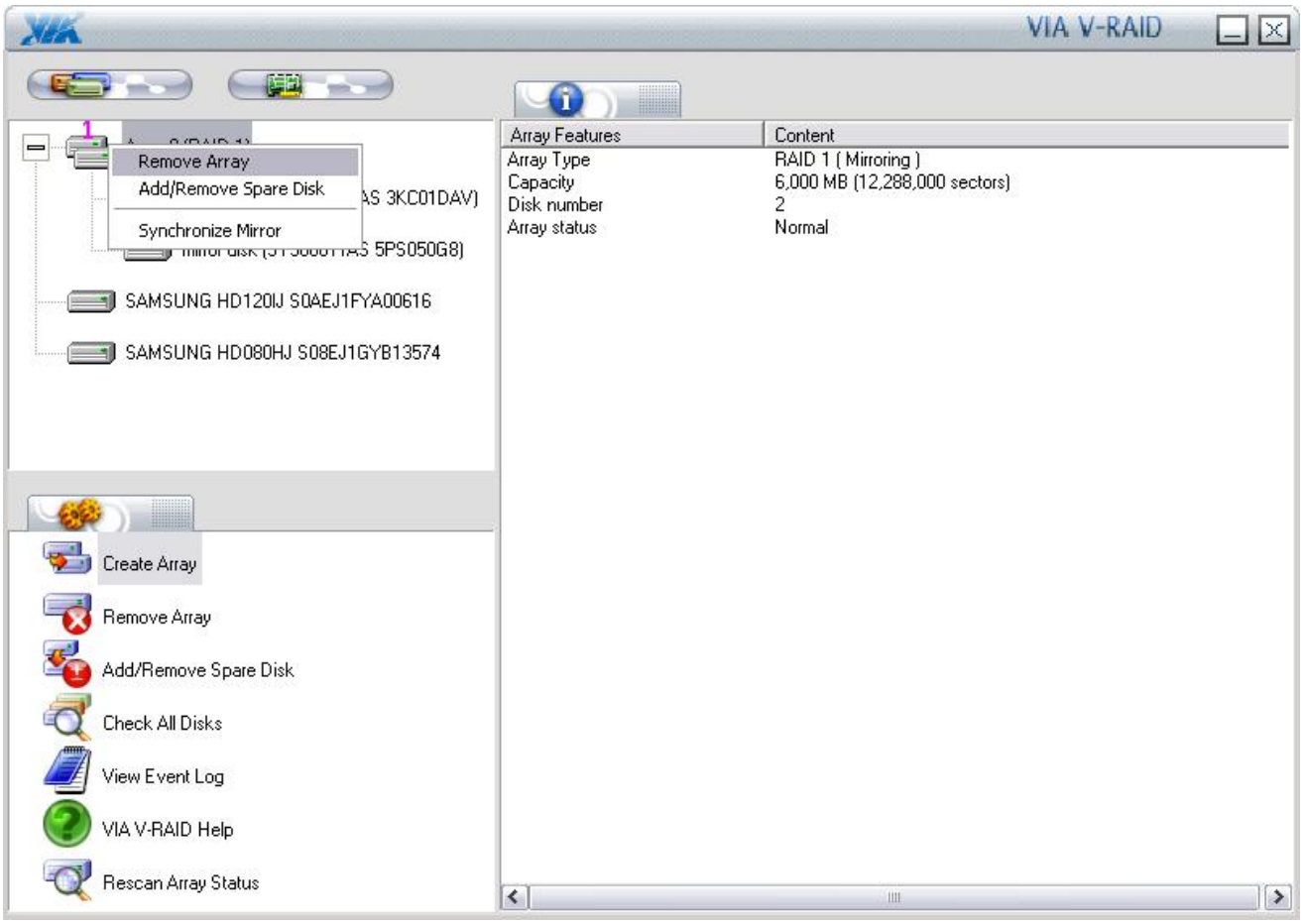


Figure 6-48: Deleting an array using the device tree

6.6 Add and Remove Spare Disk Drive

There are two ways to add/remove a spare disk to an existing mirror array. One way is by using the **Add/Remove Spare Disk** wizard. The other way is by using the device tree in the Tree windowpane.

6.6.1 Using the Add/Remove Spare Disk Wizard

To add/remove a spare disk to/from an existing mirror array, click on **Add/Remove Spare Disk** in the Operation windowpane. Follow the **Add/Remove Spare Disk** wizard to complete the operation.

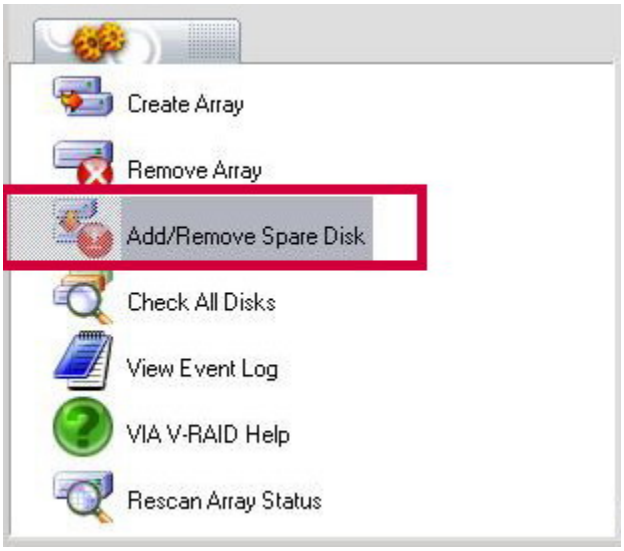


Figure 6-49: Adding or removing a spare disk using the Add/Remove Spare Disk wizard

6.6.1.1 Adding a Spare Disk

STEP 1: SELECT THE MIRROR ARRAY TO ADD A SPARE DISK

The **Add/Remove Spare Disk** wizard will display a list of existing mirror arrays[20]. Select the array to be modified and click on "Next >>" to continue.

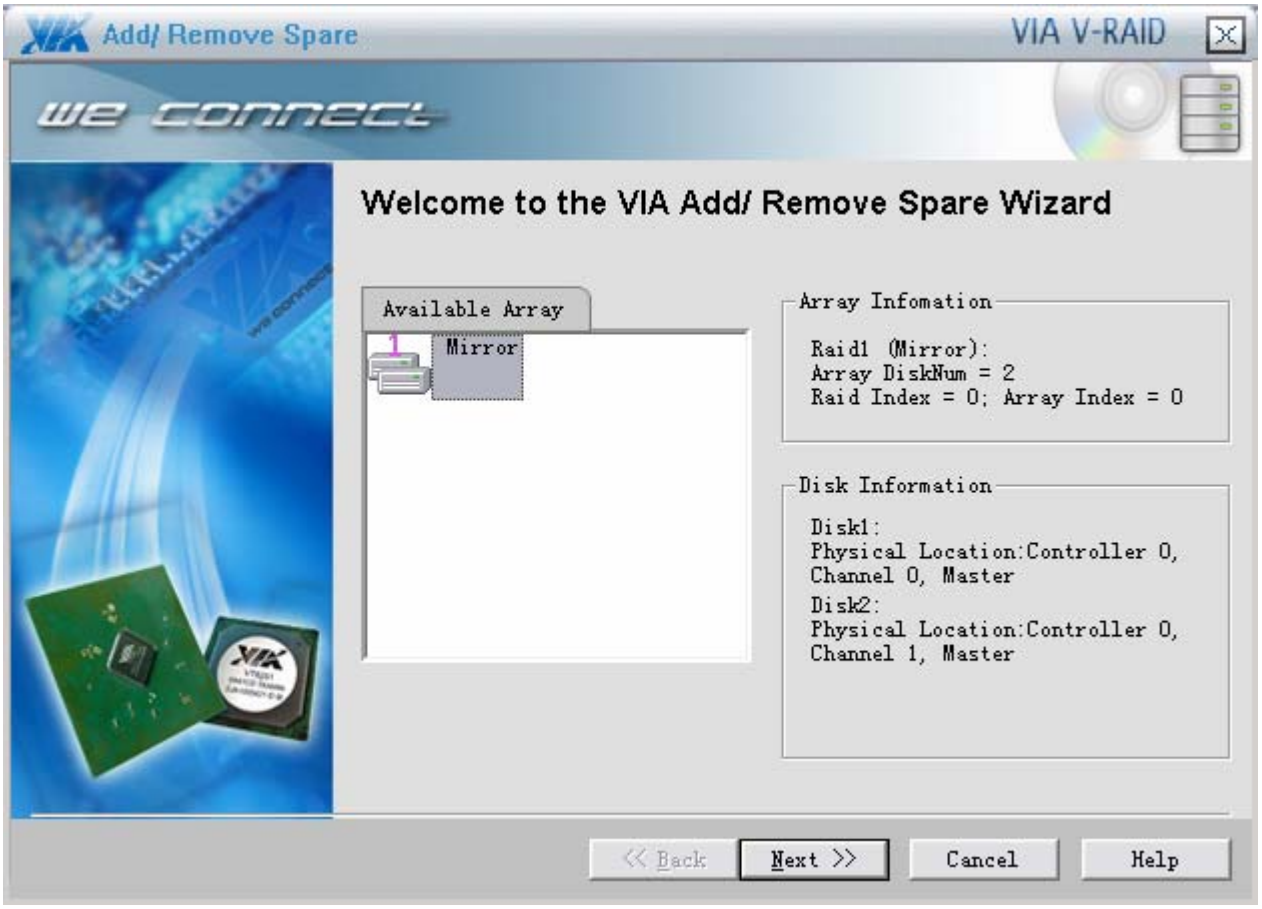


Figure 6-50: Selecting a mirror array to add a spare disk

[20] In the Array Information area, the "Array DiskNum" will have a value assigned to it. If the value is "2", then clicking on "Next >>" will activate the add spare disk wizard.

STEP 2: SELECTING A SPARE DISK

The **Add/Remove Spare Disk** wizard will display a list of all qualified[21] free disks attached on the RAID controller. Select a free disk to be added as the spare disk. All existing data on the free disk will be erased in order to make it a spare disk.

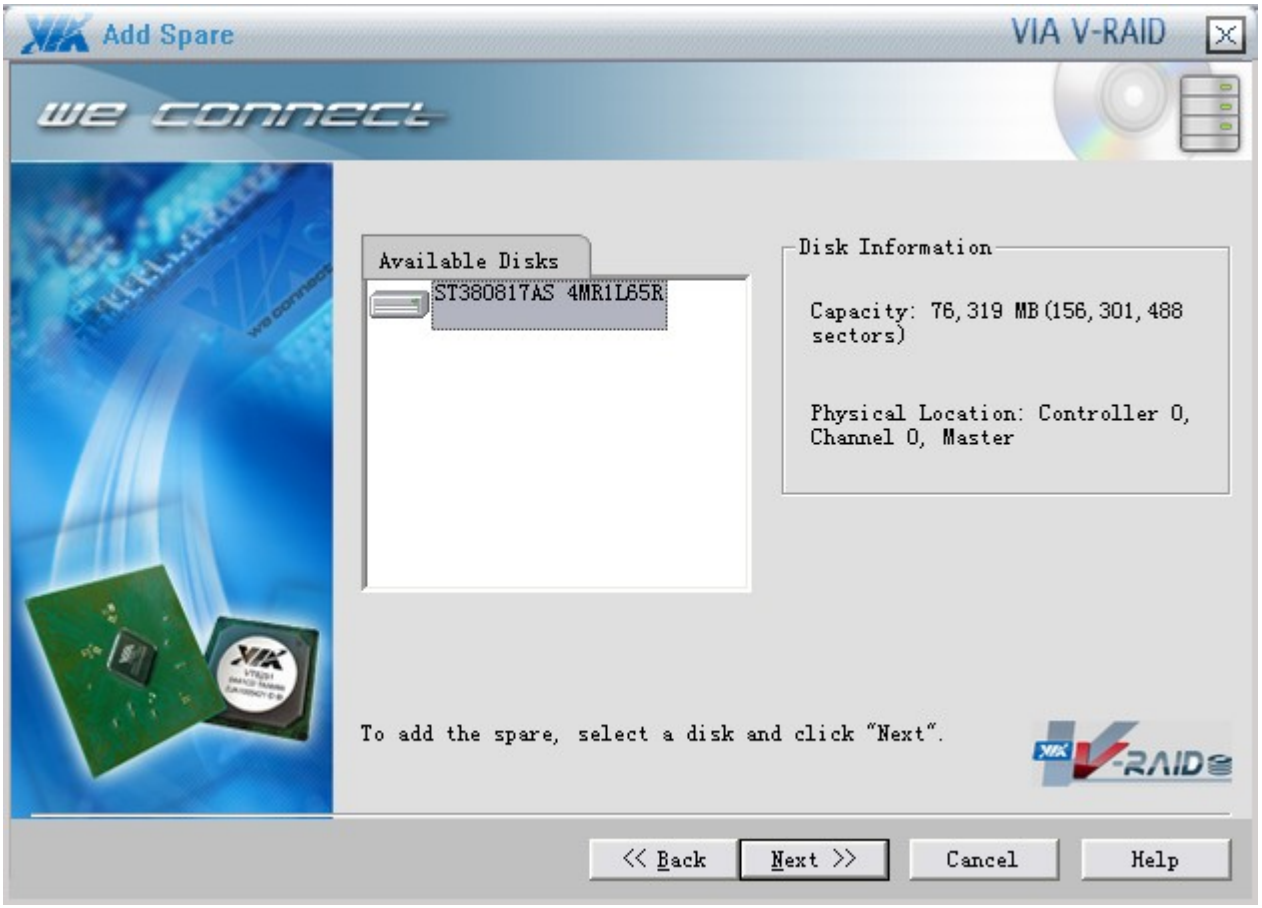


Figure 6-51: Selecting a qualified spare disk for a mirror array

[21] In order to be a qualified spare disk, a free disk's data capacity must be larger than or equal to the smallest disk in the mirror array. The Add/Remove Spare Disk wizard will pick out all qualified free disks automatically.

STEP 3: FINAL CONFIRMATION

To finalize the addition to the mirror array, click on the "Next >>" button.[22]

Figure 6-52: Final confirmation before adding a spare disk to a mirror array

[22] If Mirror array selected has no spare disk, the data on the free-disk selected will be destroyed as soon as clicking on "Next >>" button in this step

STEP 4: EXIT THE WIZARD

If the spare disk was successfully added, the following dialog box will be displayed. Click on the "OK" button to close and exit the wizard.

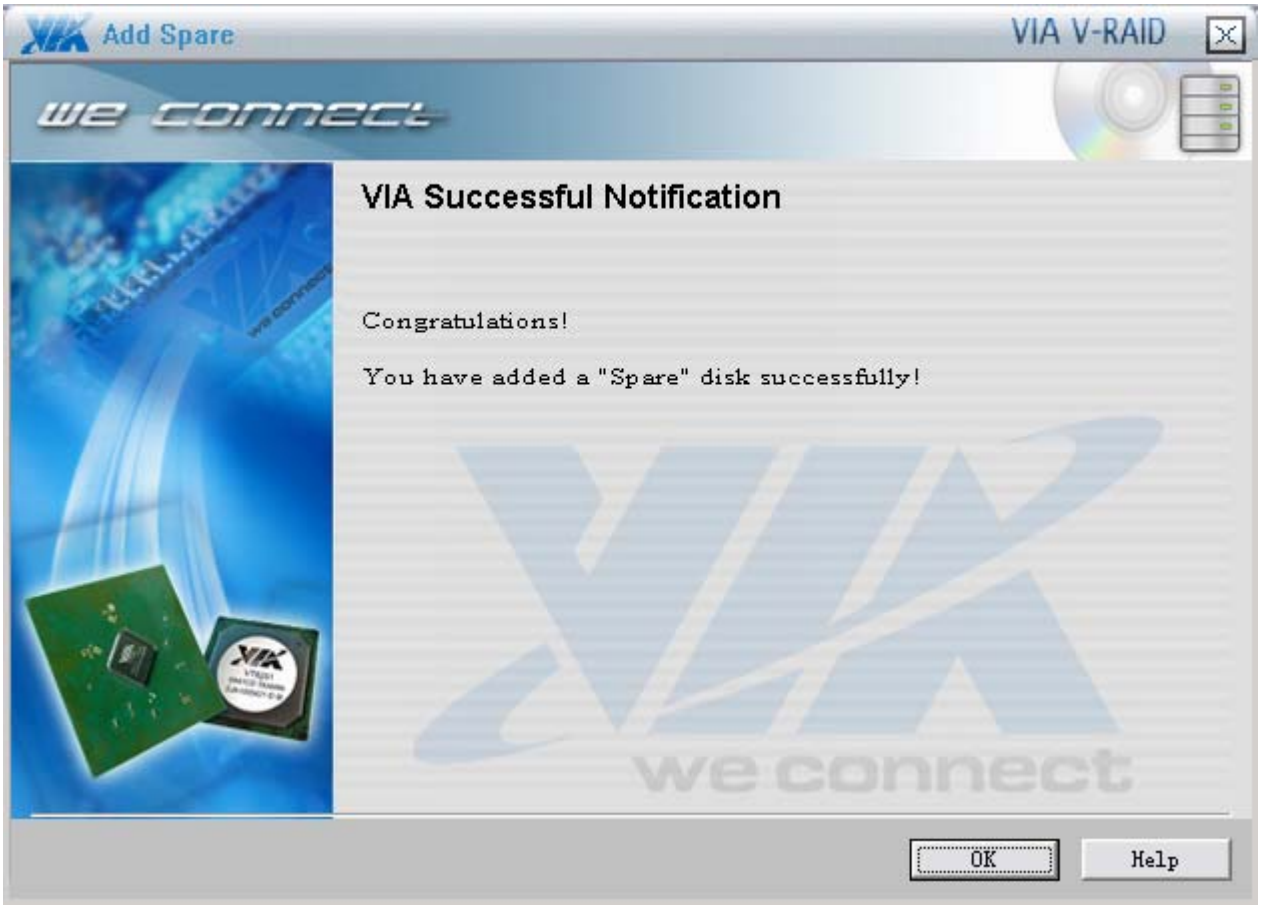


Figure 6-53: Successful addition of a spare disk to a mirror array

6.6.1.2 Removing a Spare Disk

STEP 1: SELECT THE MIRROR ARRAY TO REMOVE A SPARE DISK

The **Add/Remove Spare Disk** wizard will display a list of existing mirror arrays[23]. Select the array to be modified and click on "Next >>" to continue.

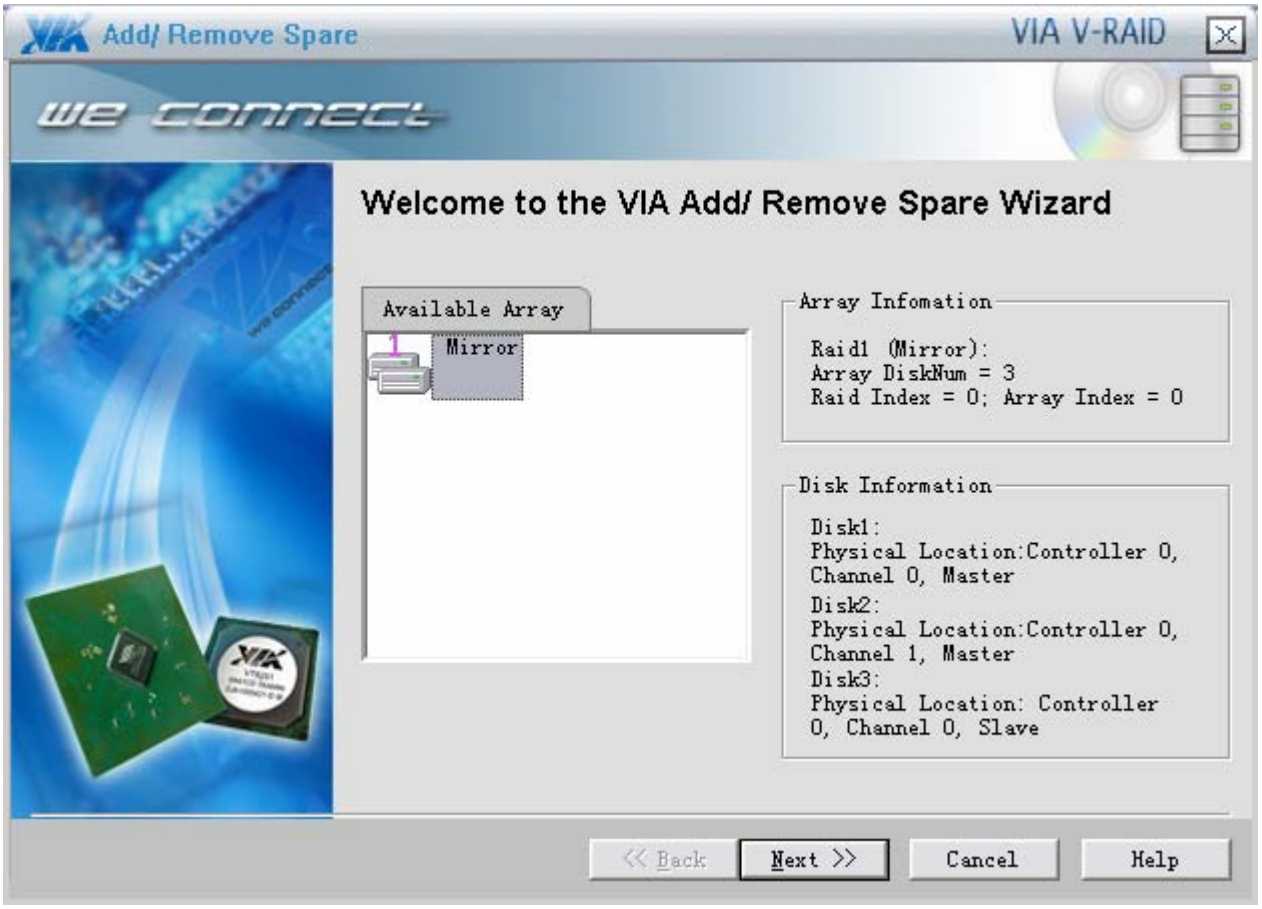


Figure 6-54: Selecting a mirror array to remove a spare disk

[23] In the Array Information area, the "Array DiskNum" will have a value assigned to it. If the value is "3", then clicking on "Next >>" will activate the remove spare disk wizard.

STEP 2: FINAL CONFIRMATION

To finalize the removal of the spare disk from the mirror array, click on the “Next >>” button.

Figure 6-55: Final confirmation before removing a spare disk from a mirror array

STEP 3: EXIT THE WIZARD

If the spare disk was successfully removed, the following dialog box will be displayed. Click on the "OK" button to close and exit the wizard.

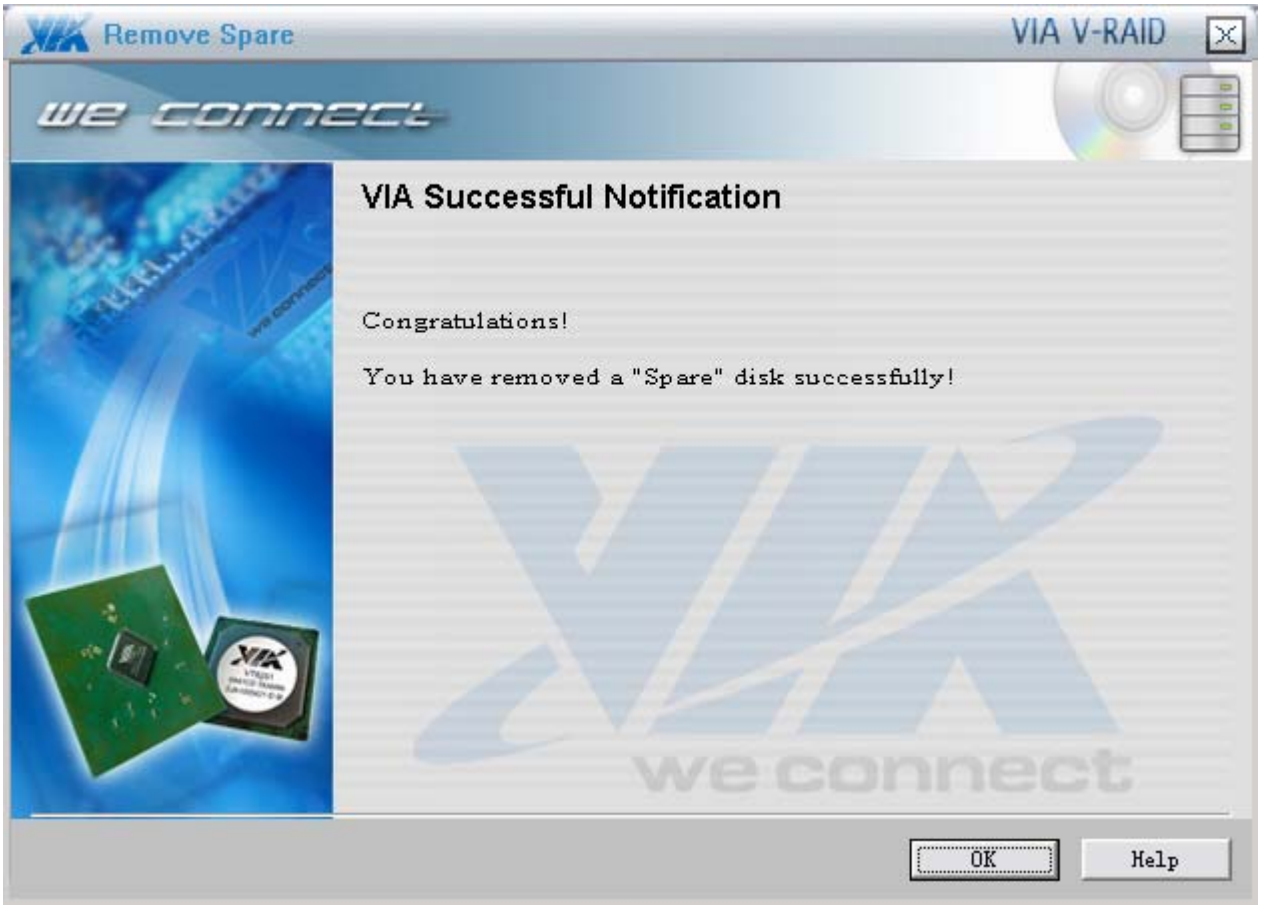


Figure 6-56: Successful removal of a spare disk from a mirror array

6.6.2 Using the Device Tree to Add/Remove a Spare Disk

Another way to add/remove a spare disk is using the device tree. First, select the array's root node in the device tree. Then, right click the array node and select **Add/Remove Spare Disk** on the shortcut menu.

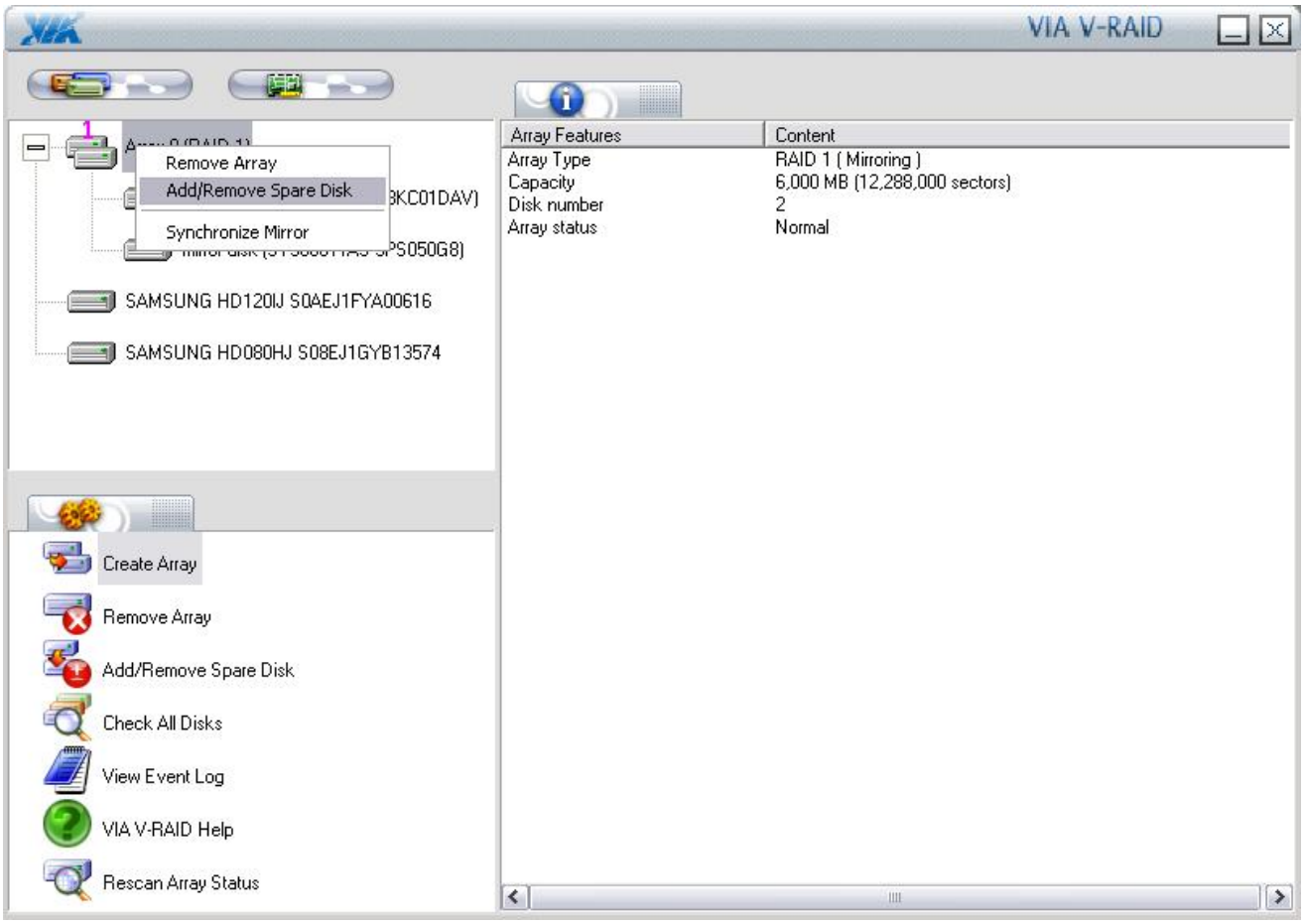


Figure 6-57: Adding / removing a spare disk using the device tree

Spare disks can also be removed by right clicking on the spare disk in device tree. When the shortcut menu appears, select Add/Remove Spare Disk.

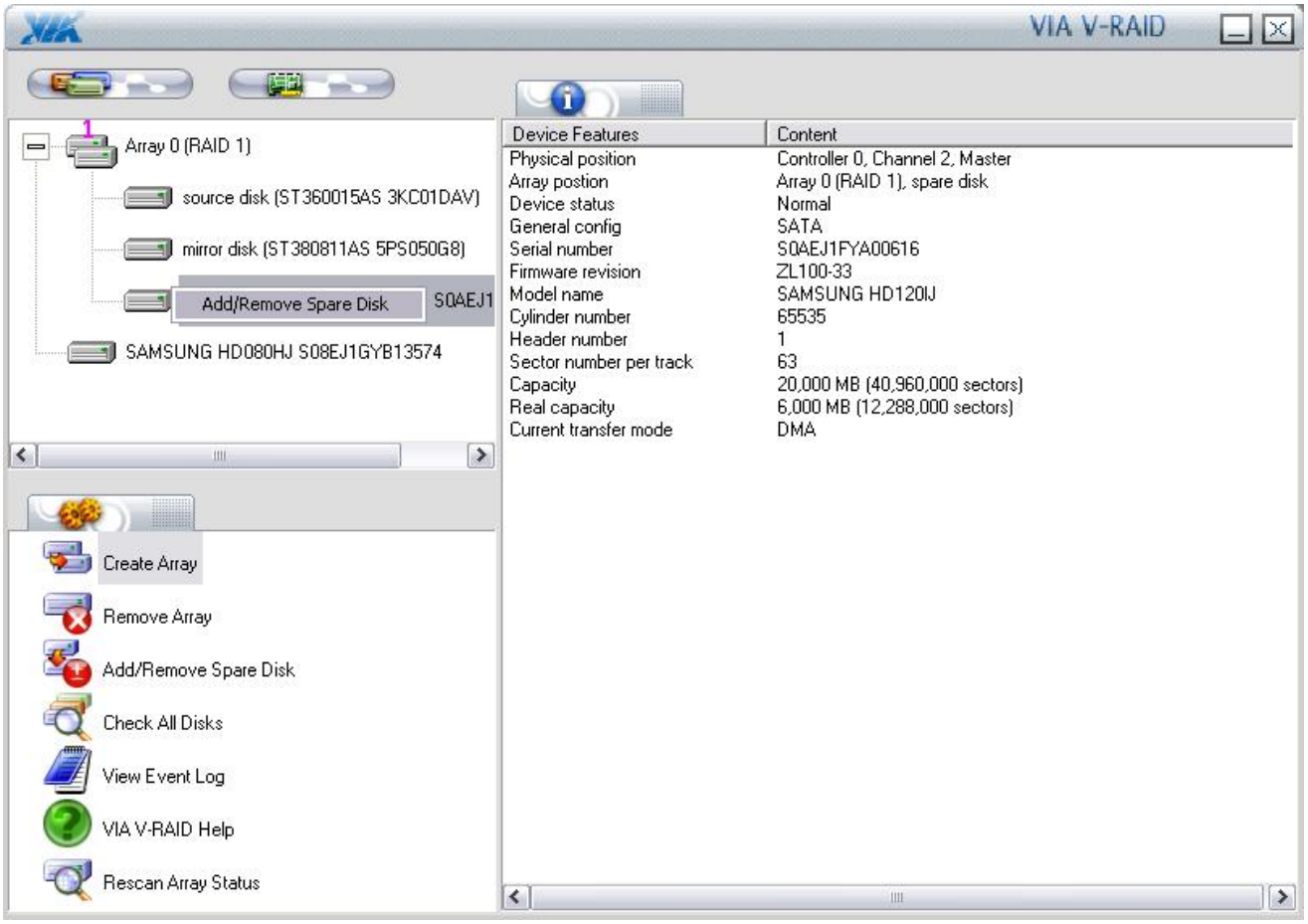


Figure 6-58: Deleting a spare disk using the device tree

6.7 Check All Disks

At any time, a diagnostic can be performed on the hard disks by executing the **Check All Disks** wizard in the Operation windowpane. Follow the **Check All Disks** wizard to complete the operation.

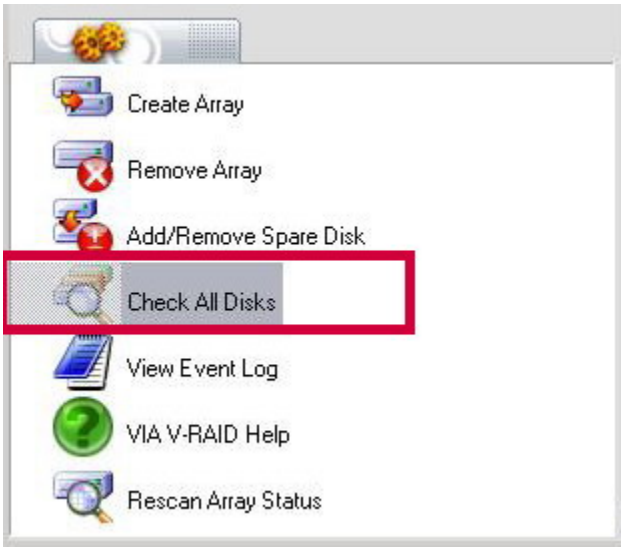


Figure 6-59: Starting the hard disk diagnostic wizard

STEP 1: START THE HARD DISK DIAGNOSTIC

After checking is completed, a dialog box will pop up showing disk current status in **Disk List**. Detailed information from the diagnostic can be viewed if the “Advanced” option is checked. Click on the “Next >” button to continue.[24]

Figure 6-60: Check All Disks wizard screen

[24] The "Advanced" option in the Check All Disks wizard is not supported on Windows 98/ME and Windows NT4.

STEP 2: VIEW THE DIAGNOSTIC RESULTS

The history of past diagnostic results can be viewed by clicking on the “History Logs” button. Detailed diagnostic results can be viewed by clicking on the “Advanced Logs” button.[25]

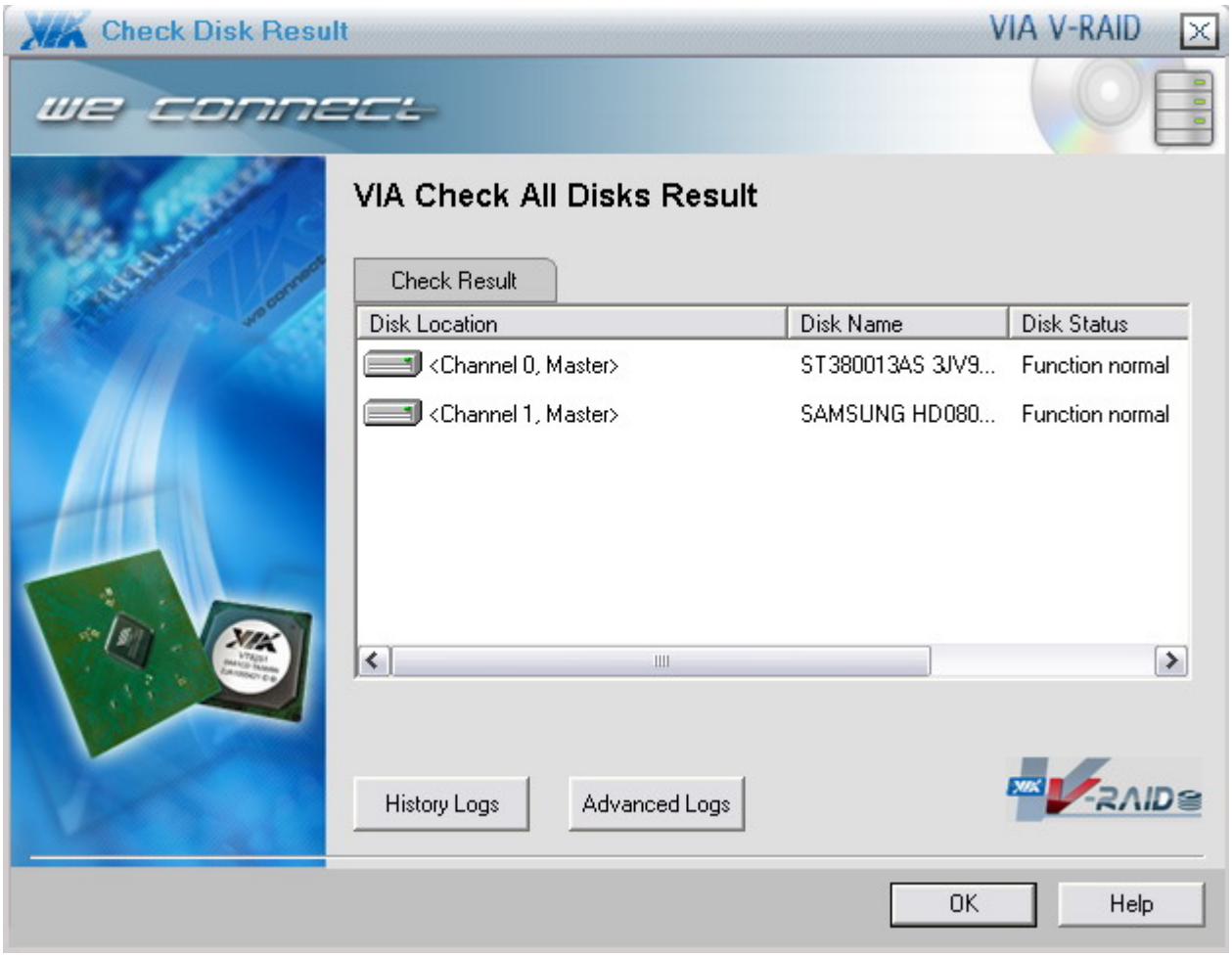


Figure 6-61: Viewing the results of the hard disk diagnostic

[25] The "History Logs" and “Advanced Logs” buttons are not supported on Windows 98/Me and Windows NT4.

6.8 View Event Log

The VIA V-RAID utility records important events (e.g. disk array creation/removal, disk failure, synchronization, etc) into a log file. To view the log, click on **View Event Log** in the Operation windowpane.

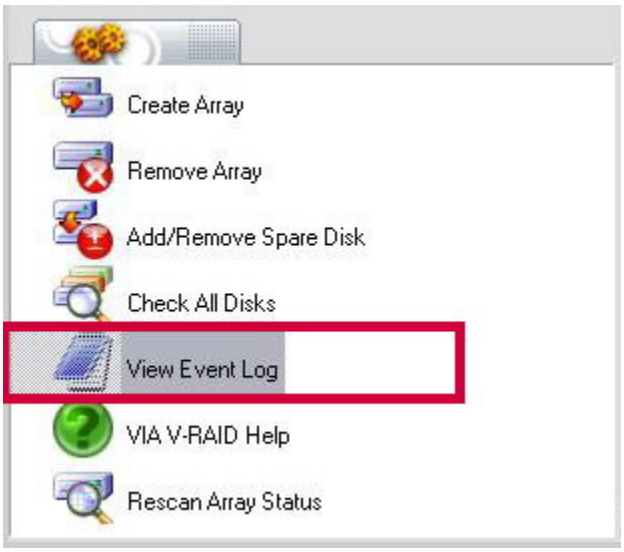


Figure 6-62: Starting the View Event Log wizard

There are three types of log items: information, warning, and error. The icons are as shown in the table below.

Table 6-1: Event log icons

Icon	Description
	Information
	Warning
	Error

To view the details of any log item, select the desired item. The details of the desired item will be displayed below the list of event logs.[26]

To clear all of the event log items, click on the “Clear” button.

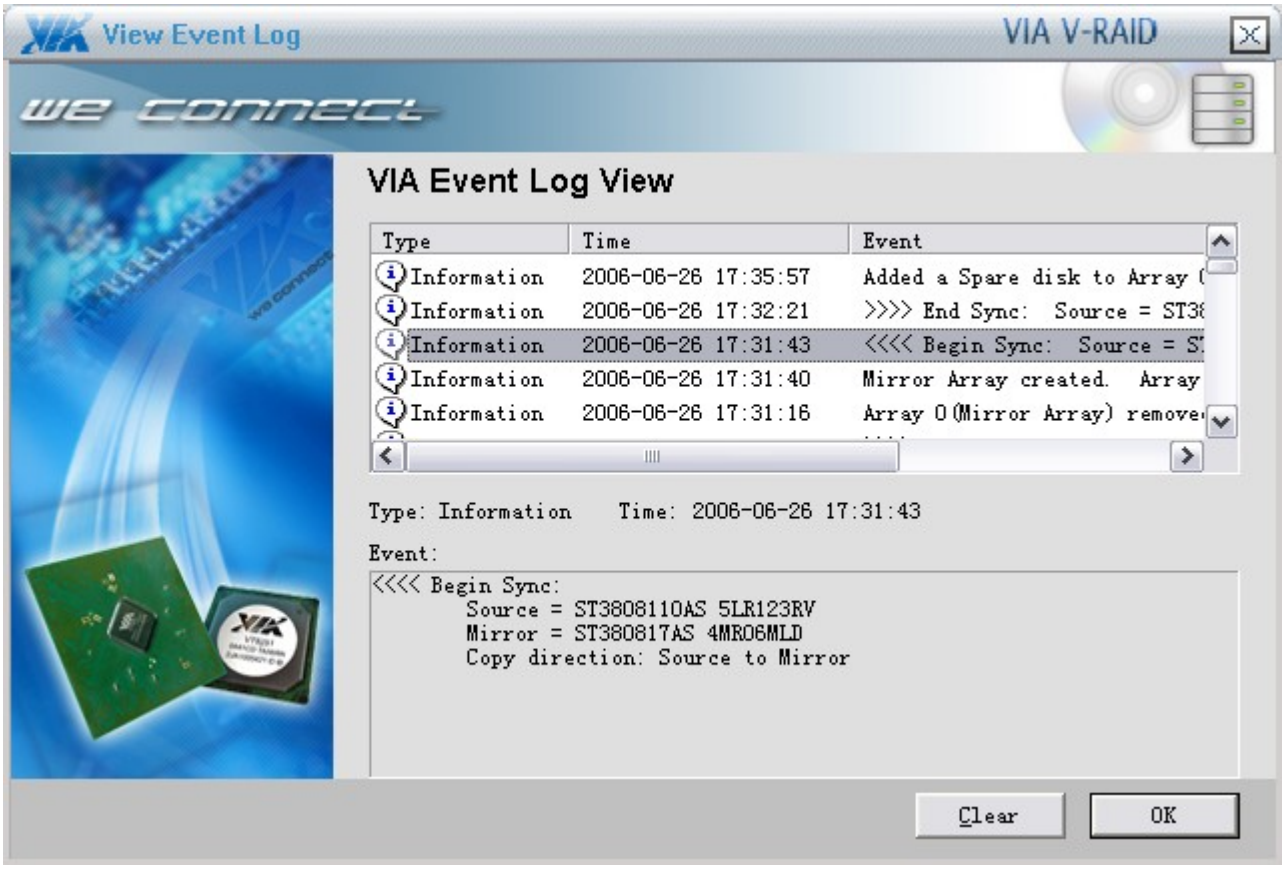


Figure 6-63: Viewing event logs

[26] Only the operations in the RAID software can be recorded into the log file. The operations in BIOS will not be recorded.

6.9 Synchronize Mirror Disk

RAID 1 arrays must be synchronized when the data on the mirror disk is not identical with the corresponding source disk. Sometimes the data on the mirror disk may be newer than the data on the source disk. For example, the source disk is absent and the mirror disk runs in the tolerance mode. The RAID software always marks the mirror disk with the "Need-Sync" icon even though the mirror disk may already have the correct data.

To synchronize a mirror disk with the corresponding source disk, right click the mirror disk in the device tree. Then click **Synchronize Mirror** on the shortcut menu.

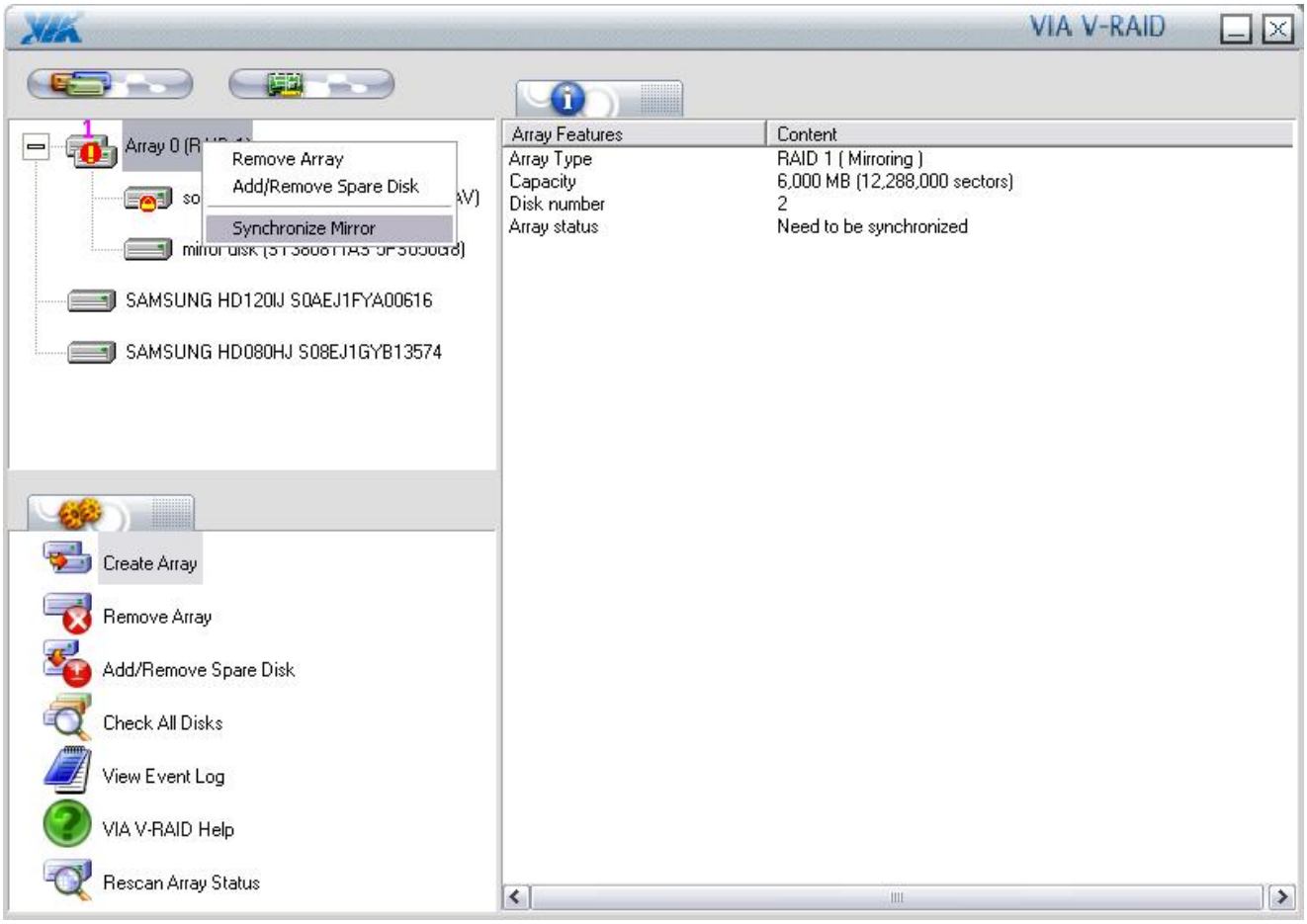


Figure 6-64: Synchronizing a mirror array using the device tree

The Synchronize Mirror feature may also be applied from a root node of a RAID 1 or RAID 0+1 array. To execute the command, right click on the root node of the array and select **Synchronize Mirror** or **Synchronize All Mirror Disks** from the shortcut menu.

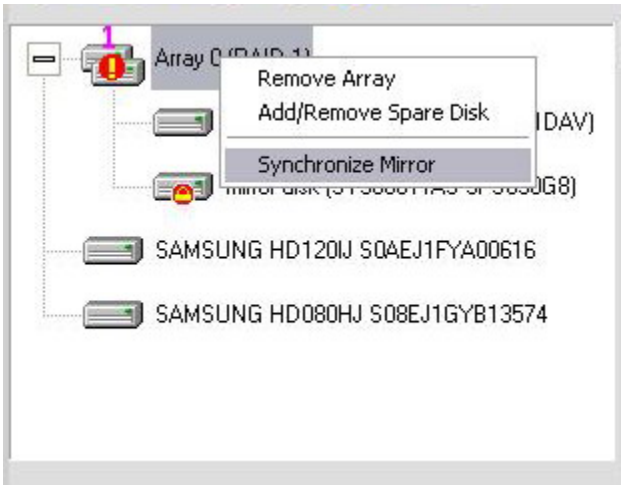


Figure 6-65: Synchronizing a mirror from the root node of a RAID 1 array

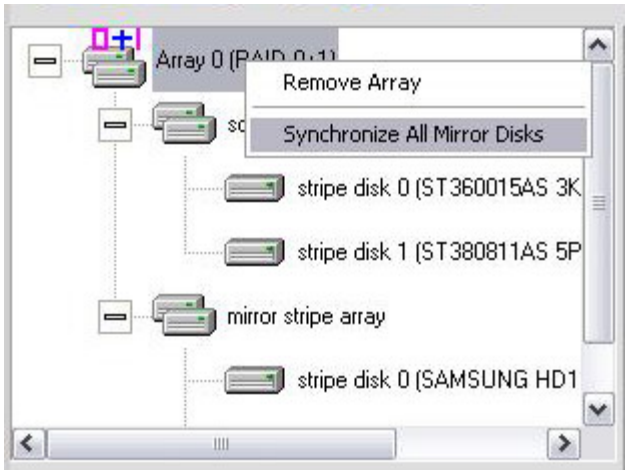


Figure 6-66: Synchronizing all mirrors from the root node of a RAID 0+1 array

When the synchronization has started, a dialog box will appear to show information about the current hard disks being synchronized, and the progress of the synchronization. The process can be paused or canceled at any time. If the synchronization is canceled, the array will be on the "Need-Sync" condition.

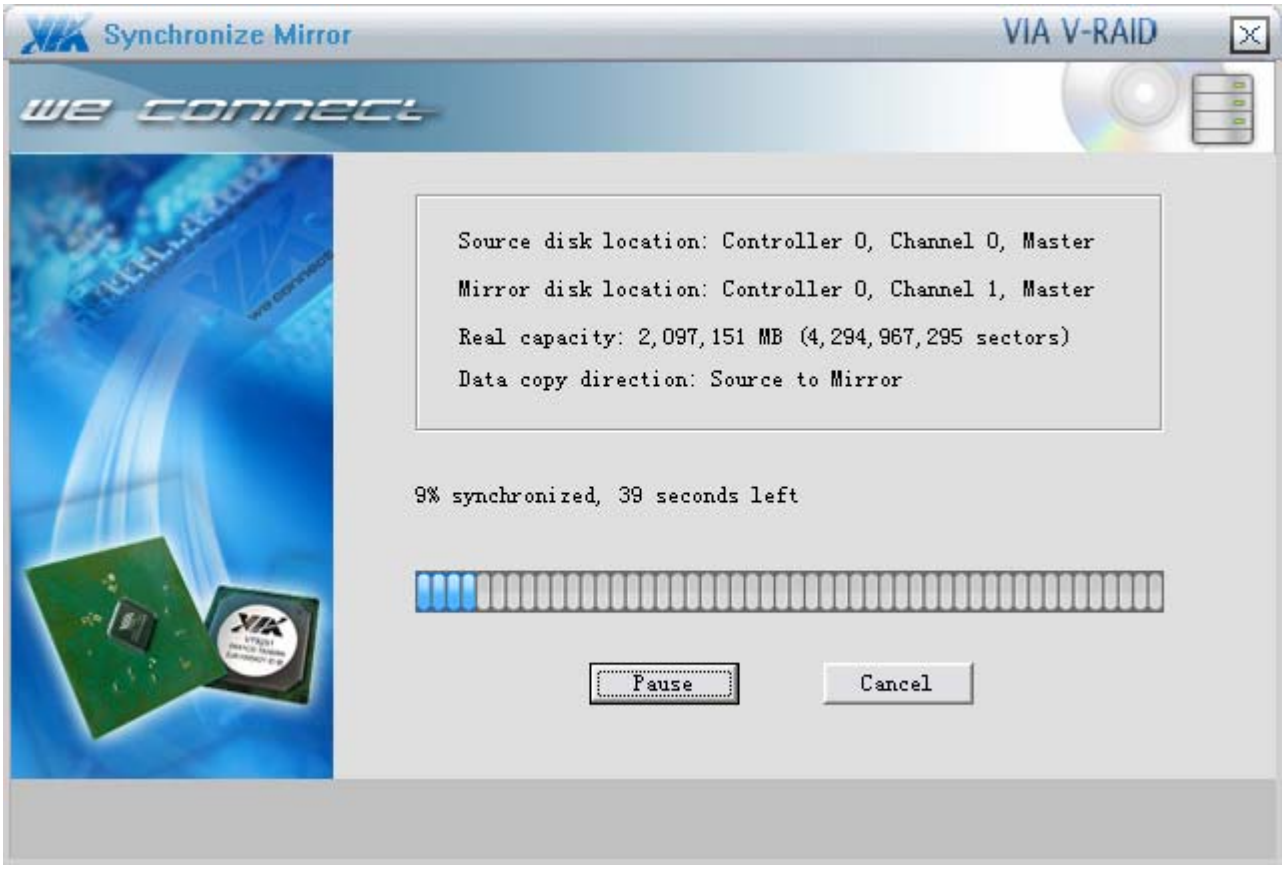


Figure 6-67: Synchronization in process

A message will pop up when the synchronization is finished.

Figure 6-68: Synchronization completed

6.10 Disk Error Detection

An error message will pop up if the VIA V-RAID utility detects a hard disk failure or missing presence.

Figure 6-69: Disk error pop up message box

6.11 Duplicate Critical RAID 1 Array

When booting up the system, the RAID utility will detect if there are any inconsistencies between the source and mirror disk drives of the RAID 1 arrays. If the software detects that a RAID 1 array has inconsistencies, then the status of the disk array will be marked as critical and the software will prompt the user to duplicate the RAID 1 array to make the mirror disk consistent with the corresponding source disk.

Figure 6-70: Message box prompting for array synchronization

Clicking on **Y** will start the synchronization process immediately. Clicking on **N** will close the prompt. To synchronize the array manually, refer to the Synchronize Mirror Disk section.

6.12 Rescan Array Status

The **Rescan Array Status** function can be used to determine the types of arrays existing in the system and whether any actions need to be performed on the arrays. Click on Rescan Array Status to display the results in the Information windowpane.

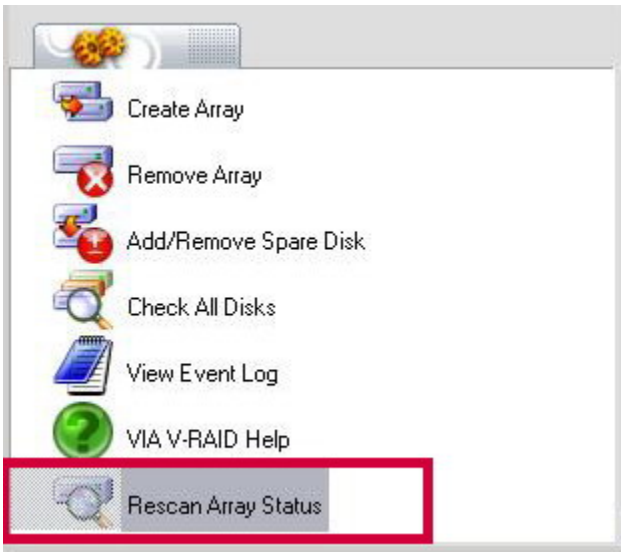


Figure 6-71: Using the Rescan Array Status function

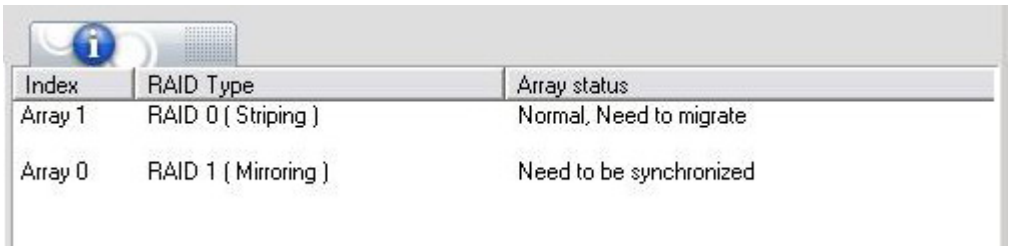


Figure 6-72: Viewing the array status information

7 ICON GLOSSARY

All icon types and their meanings are listed below. The real status of an array or a disk drive is described on “Array status” or “Device status” in the Information windowpane.

Table 7-1: Icon glossary

Icon	Description
	Spare disk is the auto-selected replacement disk when repairing a broken Mirror (RAID 1) array. Only Mirror array can have a Spare disk. A Spare disk can be added when Creating a Mirror array, it can also be added or removed after a Mirror array is created.
	you can check if all hard disks work normally by executing the Check All Disks command
	To create a RAID disk array
	VIA V-RAID record important events into a log file；To view the log, you can click on “View Event Log”
	Stripe Array is also called RAID 0, it implements a striped disk array and the data is broken down into blocks in which each block is written to a separate disk drive
	RAID 0+1 is implemented as a mirrored array whose segments are RAID 0 arrays. It has the advantages both provided by RAID 0 (high I/O performance) and RAID 1 (fault tolerance). At least four disks are needed to create a RAID 0+1 disk array.
	Mirror Array is also called RAID 1; it provides 100% data redundancy
	RAID5 Array uses block-level striping with parity data distributed across all member disks. It requires a minimum of 3 disks to implement. It has highest read data transaction rate and medium write data transaction rate. When one of the disks in RAID5 failed, the data in RAID5 can also be accessed, and the broken RAID5 disk array can be repaired with a new disk.
	To remove a disk array, you can click on “Remove Array”
	This function is used to scan the array status of existing disk arrays.

	Span Array is also called JBOD (Just a Bunch Of Disks), which uses a bunch of disks as a larger disk. Span provides no fault tolerance and no I/O performance enhancement; it's just a measure to enlarge disk capacity.
	You can open this VIA V-RAID help file by clicking “VIA V-RAID Help”
	Used in RAID01: a RAID01 is comprised of 2 RAID0 (here we can call the raid0 is the sub-array of the raid01); Each RAID0 is the image of the another RAID0.
	Used to represent the array that is absent.
	Disk that is in an array
	Represent a hard disk that is absent in array
	Array disk with *error*
	Array disk which need system reboot to enable its function
	Array disk with *warning* status
	ATA device
	ATAPI device
	Span array that has error event occured
	Channel icon
	Controller icon
	Error event that occurs in event log : our UI will mark the event with this error icon

	Disk failed or has error on it
	The pair of Source and Mirror disks should be synchronized
	Move a disk to upstairs. When we repair broken RAID1 (maybe its source disk had lost) with a new asserted disk, the original mirror disk will be done as source disk, thus it position in the array will move from mirror place to source place.
	Newly added disk inserted in an existed array (maybe still not finish migration or synchronize)
	No device
	Normal event that occurs in event log : our UI will mark the event with this icon
	Normal hard disk
	Port multiplier
	RAID0 that is broken
	RAID0 that need to be migrate
	RAID01 that is broken
	RAID01 that need to be synchronized
	RAID1 that is broken
	RAID1 that need to be synchronized
	RAID5 that is broken

	RAID5 that need to be synchronized or migrated
	This icon is for the Set Acoustic for Hard disk function. Set acoustic for hard disk means set noise level of hard disk when HD runs.
	Span array that is broken
	Array disk with warning status
	Disk Drive needs system rebooting to enable its function
	Warnings occurs
	Device
	Controller
	Operation
	Information