

RAID installation guide for VIA VT6420

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1 Introduction

1.1 About this Guide

This document provides a brief step-by-step guide for beginners in how to set up RAID drive(s) using the onboard **VT6420** RAID Controller, operating under the **Windows XP** environment. This guide was designed to only cover the basic operations in setting up RAID.

1.2 The Basics

1.2.1 What is RAID?

A RAID (Redundant Array of Independent Disks) controller lets you combine multiple hard disks to simulate a single drive. The drive created will properties different to that of the individual drives.

1.2.2 Advantages of RAID

The obvious advantage of using a RAID configuration is the ability to create drives with larger capacity. However, since multiple drives are used, data can be stored in such a way that it spans over many disks, thus the information can be accessed by the disks simultaneously, significantly improving data access times.

1.2.3 Disadvantages of RAID

Using many drives has a disadvantage. The probability of a single drive failing out of many drives is much higher than that of one failing out of only one. This results in a greater chance of losing the information on your disks. There are ways however, to minimize this effect, even making it more reliable than using single disks.

1.3 Different Types of RAID Configurations

There are many different ways in which RAID can be configured, each with its set of advantages and disadvantages. The **VT6420** controller supports RAID 0, RAID 1 and JBOD configurations, each one is described below.

1.3.1 RAID 0 (Striping)

RAID 0 works by breaking down data and spreading it over multiple disk drives. RAID 0 does not protect data from failure, and due to the way it stores data, a fault on one drive would result in failure of the entire array. It does however, have vast improvements in both reading and writing speeds, with the theoretical speed proportional to the number of disks used in the array. It is also fairly efficient in using disk space, with its size is equal to the size of the smallest disk multiplied by the number of disks.

1.3.2 RAID 1 (Mirroring)

RAID 1 works by maintaining an identical copy of the data of one drive on another. If either of these drives should fail, no information is lost as the second drive will always contain an identical copy of the other. A RAID 1 system can be recovered by simply replacing the damaged disk and mirroring the data on the new drive. This method should cause a

decrease in writing speeds, and results in a disk capacity equivalent to that of the smaller disk.

1.3.3 JBOD (Spanning)

Standing for Just a Bunch Of Disks, JBOD simply stores data on a drive in an array and moves on onto another in the array when it is full. It creates a drive size equal to the sum of the sizes of all the drives in the array with no performance enhancement. JBOD does not protect data from failure and a fault on one drive will cause the entire array to fail.

2 Drivers

A driver is required for your operating system (OS) to recognize your RAID drives. If you are planning to install **Windows 2000** or **XP** on a RAID drive, you will need a copy of the drivers on a floppy disk during installation (refer to *2.1 Creating a Driver Disk*). If the RAID drive is to be installed onto a system with an existing OS, please ensure the drivers are correctly installed for your OS to recognize the newly constructed RAID system (refer to *2.2 Installing Drivers*).

2.1 Creating a Driver Disk

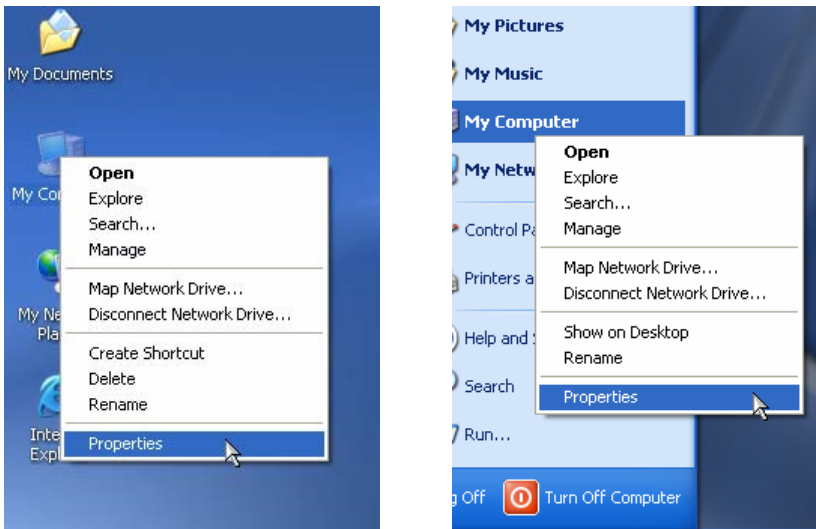
****This most likely will need to be done on a second computer unless you are reinstalling your OS onto a RAID drive.****

- 1) Insert your motherboard's **Support CD** into your CD-ROM drive. A menu should automatically pop up if Autorun is enabled.
- 2) Click on **Browse CD** if the option is available and locate the folder `\Drivers\VIARAID`. If not, go to **My Computer** and then your CD-ROM drive to find the folder. **Please note that the directory structure may vary between different Support CDs.**
- 3) Copy the contents of the folder `DriverDisk` onto a floppy.

2.2 Installing Drivers

The drivers for the **VIA®** IDE RAID controller should be already installed if you have followed your motherboard's manual after installing your OS. However, it is still best to check.

- 1) Under **Windows XP**, right click on **My Computer** and go to properties.



- 2) Click on the **Hardware** tab and then click on **Device Manager**.
- 3) Open **SCSI and RAID controllers** and check if VIA Serial ATA RAID Controller (Windows XP) is there.
- 4) If it is, then you should be ready to install your RAID drive. If not, follow the remaining steps to install the driver.
- 5) Insert your motherboard's **Support CD** into your CD-ROM drive. A menu should automatically pop up if Autorun is enabled.
- 6) Click on the **Drivers** tab and then on **VIA RAID Controller Driver**. Likewise, if Autorun isn't enabled, run the installer from \Drivers\VIARAID\setup.exe.

3 Installing Hard Disks

The **VIA**[®] controller supports up to 2 serial ATA connectors, both of these are needed to create a RAID array.

When installing hard disks for a RAID array, it is preferable to use disks that are similar. For best results, use identical disks.

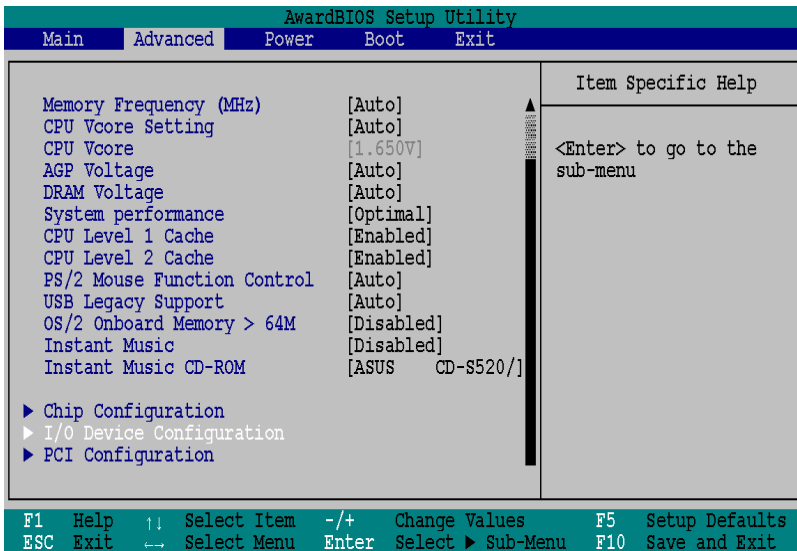
Connect 2 SATA hard drives to the SATA connectors, referring to your motherboard's manual for help if necessary.

4 Creating a RAID Array

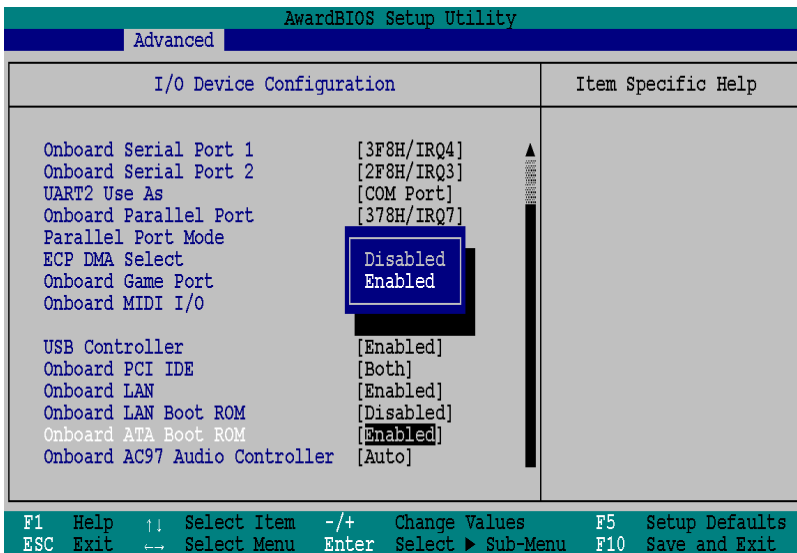
4.1 Configuring BIOS

Please note that procedures may vary between different motherboards. Check with your motherboard's manual if you have any problems.

- 1) Power on your computer and go into the BIOS settings by pressing the **<Delete>** key during the boot sequence.
- 2) Enter the **Advanced** menu by pressing the right arrow key.
- 3) Browse until you reach the **I/O Device Configuration** and then press **<Enter>**.



4) Set Onboard ATA Boot ROM to **Enabled**.



5) Press **<F10>** to save your settings and reboot.

4.2 Using the BIOS Configuration Utility

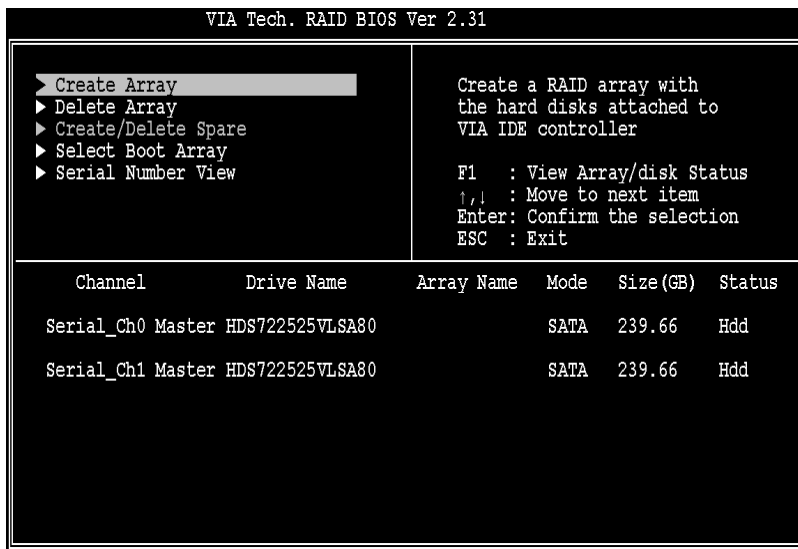
The **VIA® Tech RAID BIOS Utility** is used to manage your RAID arrays with this chipset. Enter the utility by pressing **<TAB>** when it prompts you to during boot.

```
VIA Technologies, Inc. VIA VT6410 RAID BIOS Setting Utility Ver 2.31
Copyright (C) VIA Technologies, Inc. ALL Right reserved.
```

```
Press < Tab > Key into User Window!
Scan Devices, Please wait...
Serial_Ch0 Master: HDS722525VLSA80
Serial_Ch0 Master: HDS722525VLSA80
```

On that screen it also lists the drives connected to your **VIA®** RAID controller.

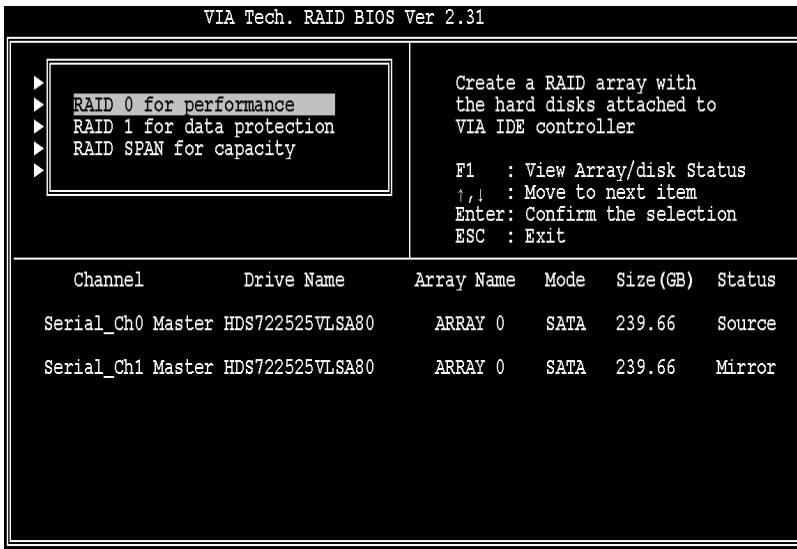
The main menu of the utility allows you to access the functions used to create and manage your RAID arrays.



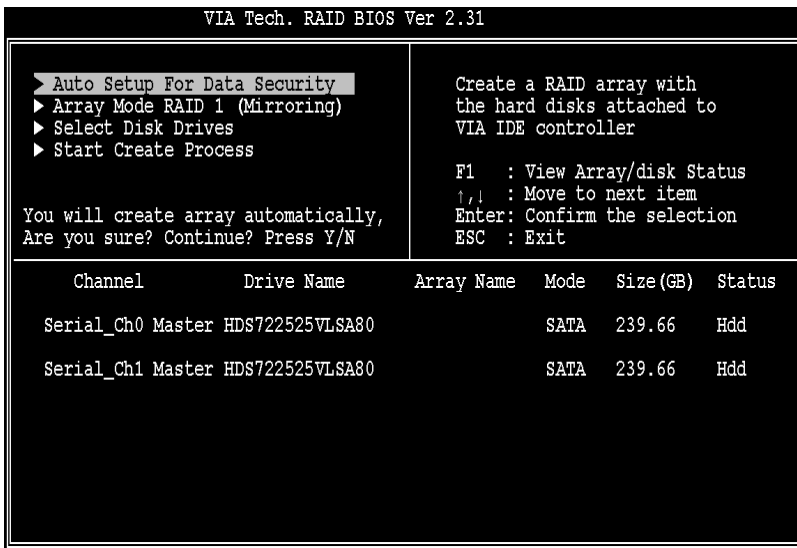
4.3 Creating Arrays Automatically

This function allows you to quickly create a RAID drive using default settings (Please make you have already back up your data in hard drive before you create arrays). When creating a RAID 0 or JBOD array, all available hard disks will be used. If you do not wish this to happen, you must create the arrays manually (refer to *4.4 Creating Arrays Manually*).

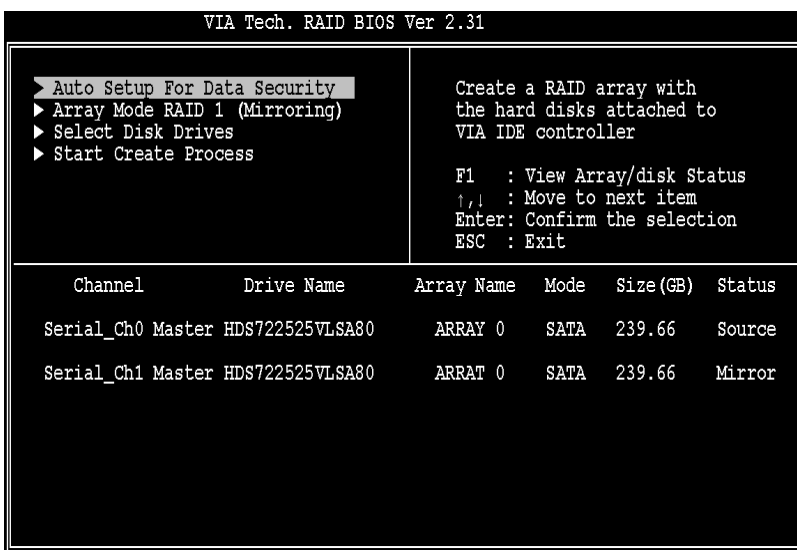
- 1) Enter the BIOS utility and select **Create Array**.
- 2) Move down to **Array Mode** and select your desired array type, then press **<Enter>**.



3) Select the top option, **Auto Setup**, to automatically create the array.



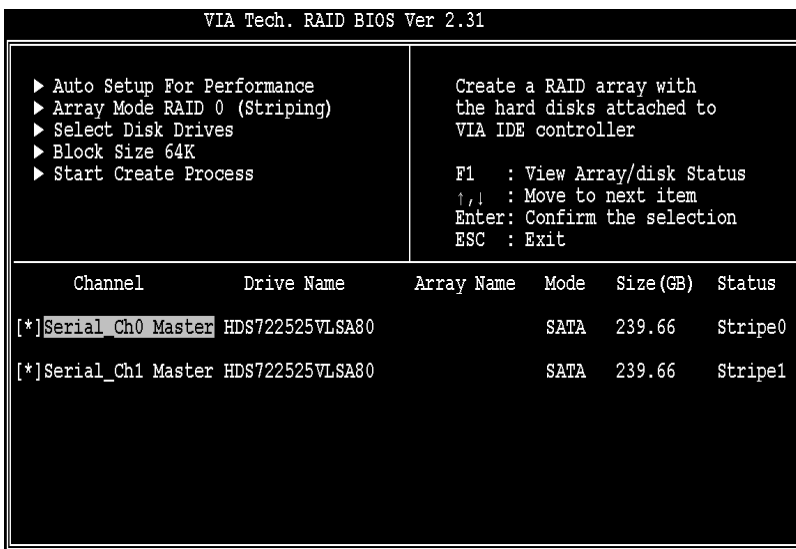
4) Press **<Y>** and your array will be created.



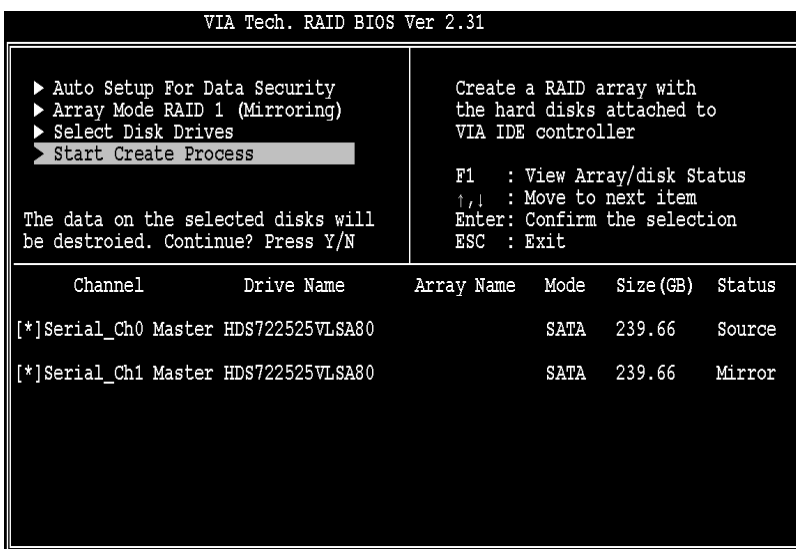
4.4 Creating Arrays Manually

This function allows you to manually create RAID arrays (Please make you have already back up your data in hard drive before you create arrays), allowing better flexibility over what was offered when setting up automatically (4.3 *Creating Arrays Automatically*).

- 1) Enter the BIOS utility and select **Create Array**.
- 2) Move down to **Array Mode** and select your desired array type, then press **<Enter>**.
- 3) Next, select the disk drives you want in the array by selecting **Select Disk Drive** and then marking the disks you wish to use.



- 4) If you have chosen to create a RAID 0 you will be given the option of selecting the **Block Size**. Leave this option in its default setting.
- 5) Select **Start Create Process**.
- 6) If you have chosen to create a RAID 1 array, you will be asked if you wish to copy the data on the source drive to the mirror drive. Press **<N>**.



- 7) Press **<Y>** and your array will be created.

4.5 Repairing Arrays

Should there be a problem with your arrays, during boot, you will be prompted to take certain actions to try and resolve the problem.

4.5.1 Repairing a RAID 1 Array

If the data a RAID 1 array has been detected to be inconsistent between the source/mirror drive(s), you will be given the option to rebuild the mirroring disk from the source disk. Select **Duplicate now** to begin the mirroring process.

```
----- Critical RAID 1 ----- Critical Status -----
Duplicate now
Continue to boot

The RAID 1 array needs to
be duplicated to ensure
data consistency,

----- Remaining members of the failed array -----
Channel      Drive Name      Array Name  Mode  Size(GB)  Status
Serial_Ch0 Master HDS722525VLSA80 Array0     SATA  239.66   Mirror
Serial_Ch1 Master HDS722525VLSA80 Array0     SATA  239.66   Source

Note:
1) Press <ESC> to Exit.
2) After Execute, Press <TAB> immediately can into Utility Window!
```

```
----- Critical RAID 1 ----- Critical Status -----
Duplicate now
Continue to boot

Duplicating...
Press Yes(Y) to Escape

The RAID 1 array needs to
be duplicated to ensure
data consistency,

----- Remaining members of the failed array -----
Channel      Drive Name      Array Name  Mode  Size(GB)  Status
Serial_Ch0 Master HDS722525VLSA80 Array0     SATA  239.66   Mirror
Serial_Ch1 Master HDS722525VLSA80 Array0     SATA  239.66   Source

Note:
1) Press <ESC> to Exit.
2) After Execute, Press <TAB> immediately can into Utility Window!
```

4.5.2 Rebuilding RAID 1

If a disk has failed in a RAID 1 array, you will be presented with the following screen during boot.

```

Broken Raid 1----- Critical Status -----
Power off and check the failed drive
Destroy the Mirroring Relationship
Choose replacement drive and rebuild
Continue to boot
A disk member of a mirroring
array has failed or is not
responding.The array is
stiling functional,but fault
tolerance is disabled.

----- Remaining members of the failed array -----
Channel      Drive Name      Array Name  Mode  Size(GB)  Status
Serial_Ch0 Master HDS722525VLSA80  Array0    SATA  239.66   Broken

Note:
1)Press <ESC> to Exit.
2)After Execute,Press <TAB> immediately can into Utility Window!

```

- 1) Select **Power off and check the failed drive** and shut down your computer. Check that the cables are properly connected and replace the failed drive if necessary. Turn on your computer.
- 2) Select **Choose replacement drive and rebuild**.
- 3) Select the disk you wish to use as the mirroring drive.
- 4) Press **<Y>** to start duplicating.

```

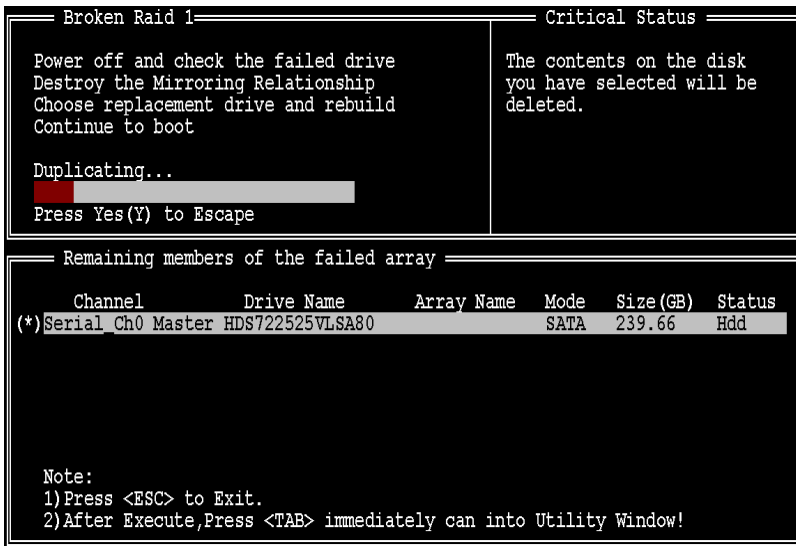
Broken Raid 1----- Critical Status -----
Power off and check the failed drive
Destroy the Mirroring Relationship
Choose replacement drive and rebuild
Continue to boot
The contents on the disk
you have selected will be
deleted.

WARNING: Would you like to Continue ?
Press Y/N ?

----- Remaining members of the failed array -----
Channel      Drive Name      Array Name  Mode  Size(GB)  Status
Serial_Ch0 Master HDS722525VLSA80  Array0    SATA  239.66   Broken

Note:
1)Press <ESC> to Exit.
2)After Execute,Press <TAB> immediately can into Utility Window!

```

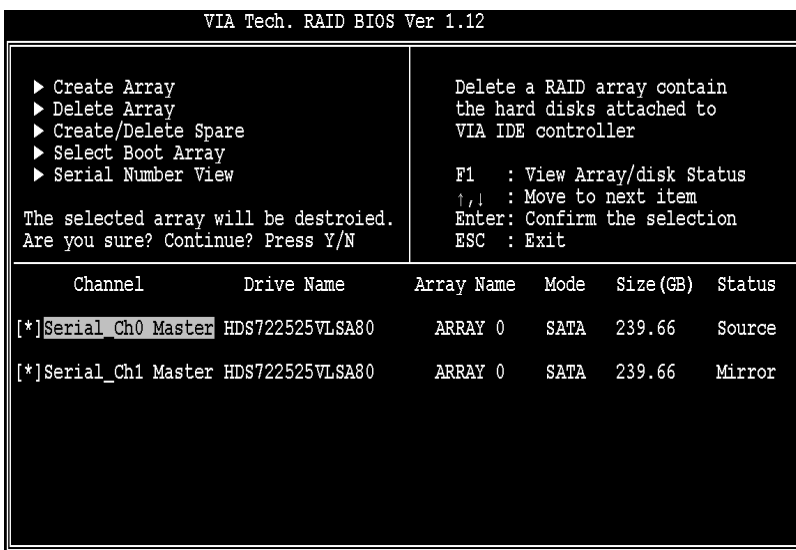


You can select **Destroy the Mirroring Relationship** if you no longer wish to use the drive in a RAID 1 array. This will make the hard drive like a normal non-RAID drive without it losing any data on that drive.

4.6 Deleting Arrays

Should you no longer wish to use your raid drive(s), you can delete it.

- 1) Enter the RAID utility and select **Delete Array**.
- 2) Select a hard drive that is part of the array you wish to delete and press **<Enter>**.



- 3) Press **<Y>** to confirm your selection. Your array is now deleted.

5 Using your RAID Drive

Once you created your RAID drive, it will act like any other newly installed disk drive; it will be unpartitioned and unformatted. You will have to partition and format the drive in order to properly use it. If you are installing Windows, the setup program will allow you to partition and format the drive during installation.

5.1 Partitioning and Formatting Under Windows XP

The **Disk Management** utility is used to partition and format disks under Windows XP.

- 1) Right click on **My Computer** and select manage.
- 2) Select **Disk Management** under **Storage**.

For further information on how to use this utility, consult your Windows manual or click on **Help**.

5.2 Installing an OS on a RAID Drive

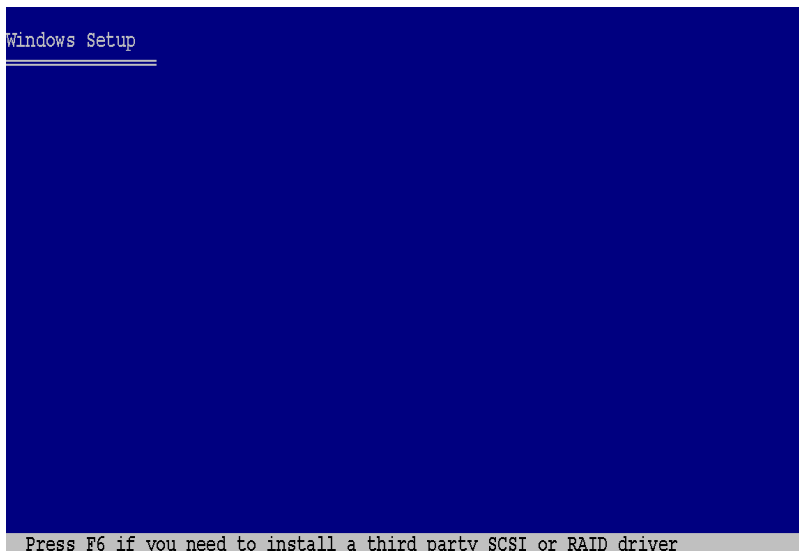
Installing an operating system on a RAID drive is the same as installing it on a standard drive except that a RAID driver needs to be installed during the installation of the OS.

5.2.1 Installing Windows 98/ME

A driver disk is not need to install **Windows 98** and **ME** onto your RAID drive. However, it is recommended that the drivers on your **Support CD** be used instead of the ones already provided.

5.2.2 Installing Windows 2000/XP

- 1) Remove any floppy disks from their drives.
- 2) Insert your **Windows** installation CD into your CD-ROM drive and restart your computer.
- 3) Enter **CMOS** setup screen, and follow instructions in your user's manual to set your desired optical drive (the one with the **Windows** installation CD inside) as the first boot device, then save and exit the **CMOS** setup screen.
- 4) Press any key in boot from the CD when prompted (in some motherboards, booting from a CD is automatic and no keys are needed to be pressed).
- 5) Press **<F6>** when Windows asks if you need to install a third party SCSI or RAID driver.



- 6) When **Windows** finishes an examination of your system, you will be asked to specify additional devices or to ignore it. Press **<S>** to specify your **VIA® VT6420** IDE RAID controller.

```
Windows Setup
-----
Setup could not determine the type of one or more mass storage devices
installed in your system, or you have chosen to manually specify an adapter.
Currently, Setup will load support for the following mass storage device(s):

    <none>

* To specify additional SCSI adapters, CD-ROM drives, or special
  disk controllers for use with Windows, including those for
  which you have a device support disk from a mass storage device
  manufacturer, press S.

* If you do not have any device support disks from a mass storage
  device manufacturer, or do not want to specify additional
  mass storage devices for use with Windows, press ENTER.

S=Specify Additional Device  ENTER=Continue  F3=Exit
```

7) Insert the floppy containing the RAID drivers created in *2.1 Creating a Driver Disk* and then press **<Enter>**.

```
Windows Setup
-----

Please insert the disk labeled
Manufacture-supplied hardware support disk
into Drive A:

* Press ENTER when ready.

ENTER=Continue  ESC=Cancel  F3=Exit
```

8) Select **VIA Serial ATA RAID Controller(Windows XP)**. Please select the correct driver for you OS. Choosing the wrong driver may cause problems.

```
Windows Setup
-----

You have chosen to configure a SCSI Adapter for use with Windows,
using a device support disk provided by an adapter manufacturer.

Select the SCSI Adapter you want from the following list, or press ESC
To return to the previous screen.

VIA Serial ATA RAID Controller(Windows XP)
VIA Serial ATA RAID Controller(Windows 2000)
VIA Serial ATA RAID Controller(Windows NT)
VIA ATA/ATAPI Host Controller(Windows XP)

ENTER=Select  F3=Exit
```

```
Windows Setup
-----
Welcome to Setup.

This portion of the Setup program prepares Microsoft (R)
Windows (R) XP to run on your computer.

* To set up Windows XP now, press ENTER.

* To repair a Windows XP installation using
  Recovery Console, press R.

* To quit Setup without installing Windows XP, press F3.

ENTER=Continue R=Repair F3=Exit
```

9) The RAID driver is now loaded, continue the installation of Windows as you normally would.

6 Using Hard Drives as Non-RAID

Drives connected to the **VIA**[®] RAID connectors do not have to be set up in a RAID array in order for them to work. By simply not assigning them to an array, they can be used like any other drive connected to the board's main IDE connectors.