RAID installation guide for Promise PDC20378

Contents

1 Introduction

1.1 About this Guide

This document provides a brief step-by-step guide for beginners in how to set up a RAID drive using the onboard **Promise® PDC20378** controller, operating under the **Windows XP** environment. This guide was designed to only cover the basic operations in setting up RAID. Should this document not cover what you need, please refer to the **FastTrak 378 Quick Start Guide** provided on the motherboard's **Support CD**.

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 **Promise® FastTrak 378™** controller supports RAID 0, RAID 1 and RAID 0+1 configurations, each one is described below.

1.3.1 RAID 0 (Data 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 (Data 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 RAID 0+1 (Data Striping and Data Mirroring)

RAID 0+1 combines RAID 0 and RAID 1, creating two arrays of RAID 0, one mirroring the other. This method has both the faster data access speeds of RAID 0 and the data security level of RAID 1. Its disk capacity (in a 4 drive array) is double that of the smallest drive.

2 Drivers

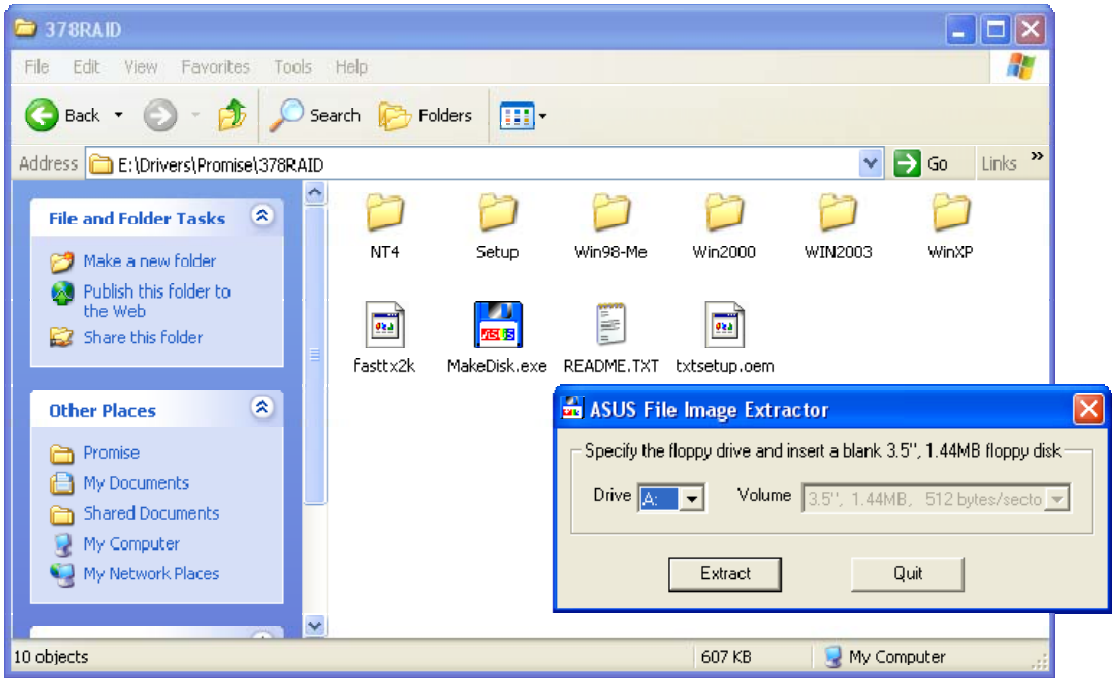
A driver is required for your operating system (OS) to recognize your RAID drives. If you are planning to install **Windows 2000** or **XP** on a RAID drive, you will need a copy of the drivers on a floppy disk during installation (refer to *2.1 Creating a Driver Disk*). If the RAID drive is to be installed 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 done on a second computer unless you are reinstalling your OS onto a RIAD 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\Promise\378RAID. 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) Run MakeDisk.exe.

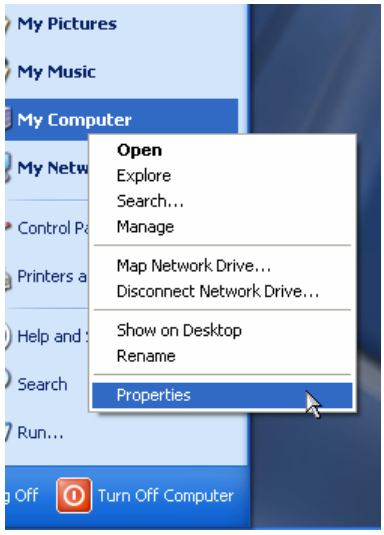
4) Insert a floppy into your floppy drive and click on **Extract**. This will copy the driver files onto the floppy.

5) When the program finishes copying the files, click on **Quit** to close the program.

2.2 Installing Drivers

The drivers for the **Promise® FastTrak™ 387** 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 WinXP Promise FastTrak 378 (tm) Controller 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 **Promise Fastrak 378 Driver**. This will open a text file. Likewise, if Autorun isn't enabled, open the file corresponding to you OS from \Drivers\Promise\Setup\. The file will contain instructions on how to install the driver.

3 Installing Hard Disks

The **Promise®** controller supports up to a maximum of 4 hard disks; 2 parallel ATA and 2 serial ATA disks.

For a RAID 0 array, any number of disks can be used, though using one disk will make the array act like a normal non-RAID drive. A RAID 1 array needs two disks while a RAID 0+1 needs four.

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

Depending on which setup mode you choose, there will be restrictions on the exact number of hard disks you can install in order to set up a particular RAID array. Refer to *4.3 Creating with Auto Setup* and *4.4 Creating with Define Array* for more information.

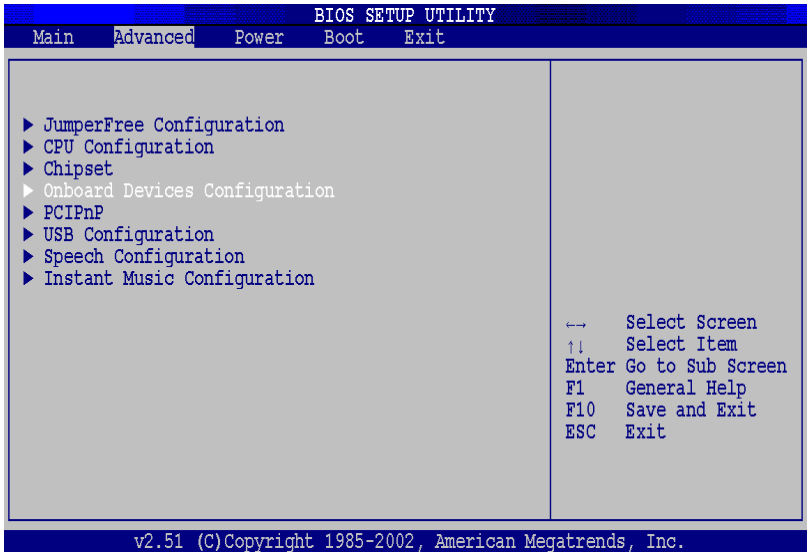
Connect your hard drives to their respective connectors, referring to your motherboard's manual for help if necessary.

4 Creating a RAID Array

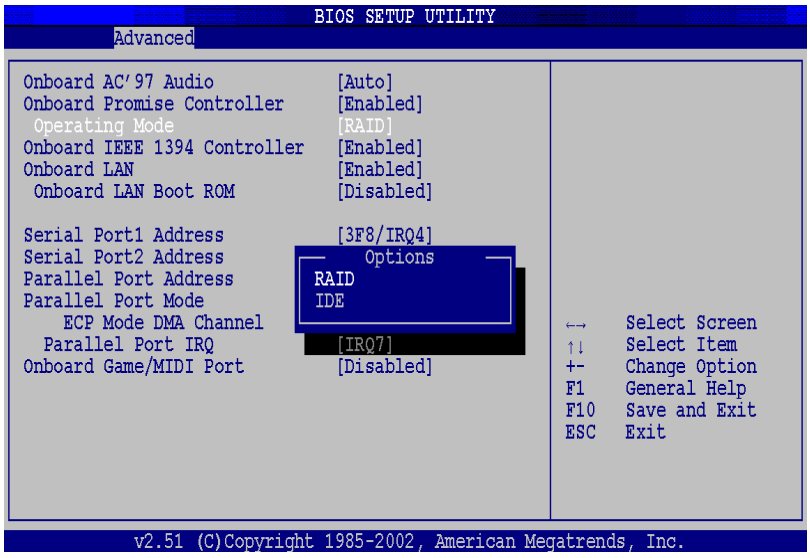
4.1 Configuring BIOS

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 Onboard Devices Configuration and then press **<Enter>**.



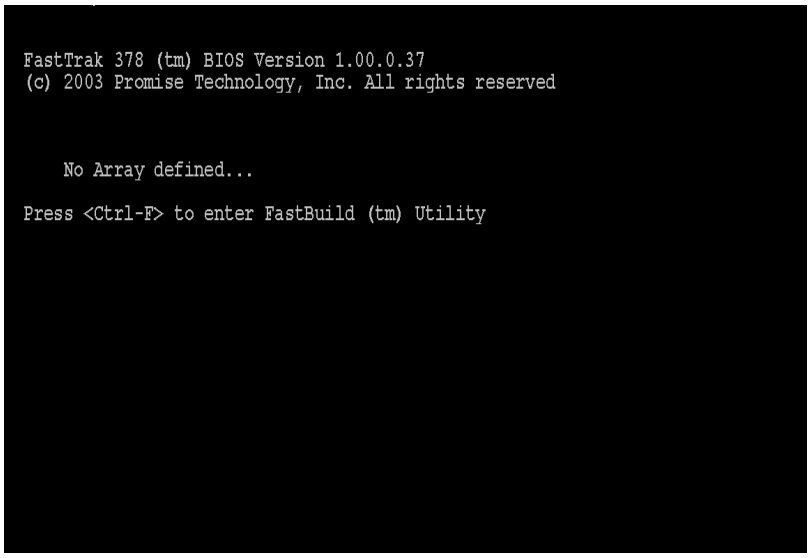
4) Set Onboard Promise Controller to **Enabled** and Operation Mode to **RAID**.



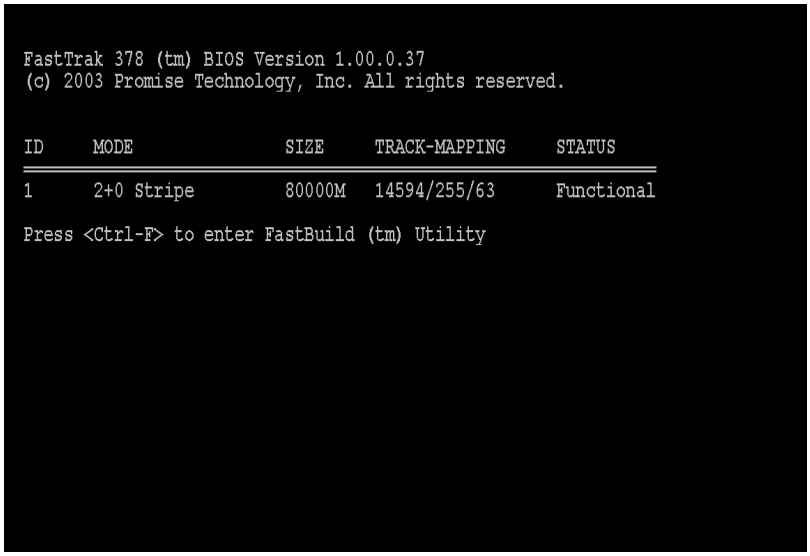
5) Press **<F10>** to save your settings and reboot.

4.2 Using FastBuild™

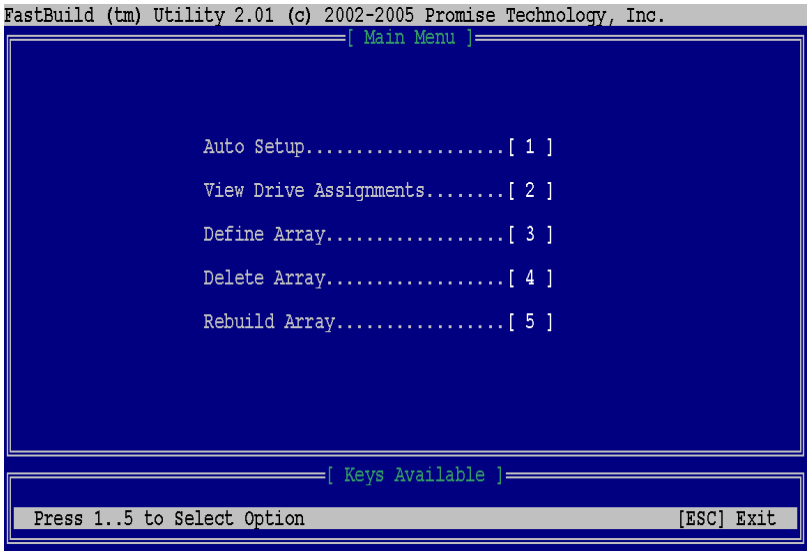
FastBuild™ is the utility used to set up RAID arrays using this RAID controller. To use it, press **<Ctrl+F>** when it prompts you to during boot.



On that screen, it also displays your RAID configurations and the status of them.



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



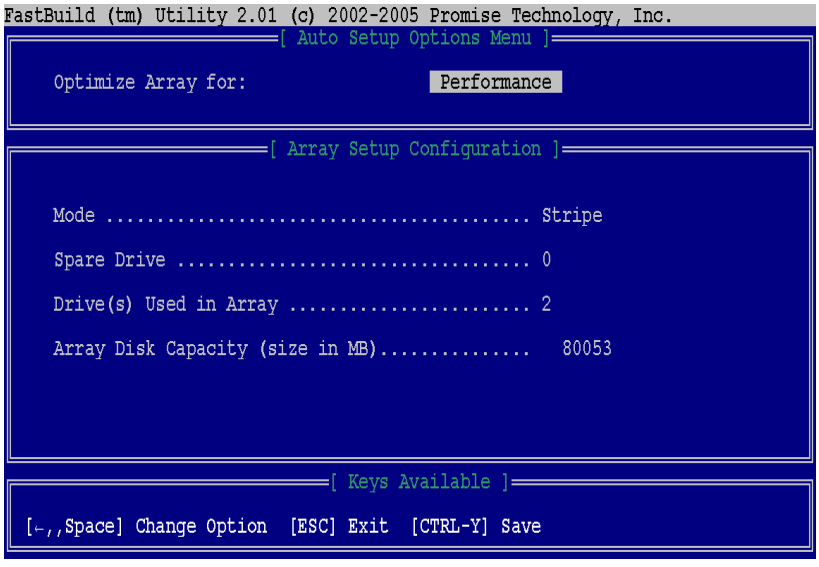
4.3 Creating with Auto Setup

This function allows you to quickly create a RAID drive using default settings. Enter the Auto Setup menu by pressing **<1>** in the main menu. (Please make you have already back up your data in hard drive before you create arrays)

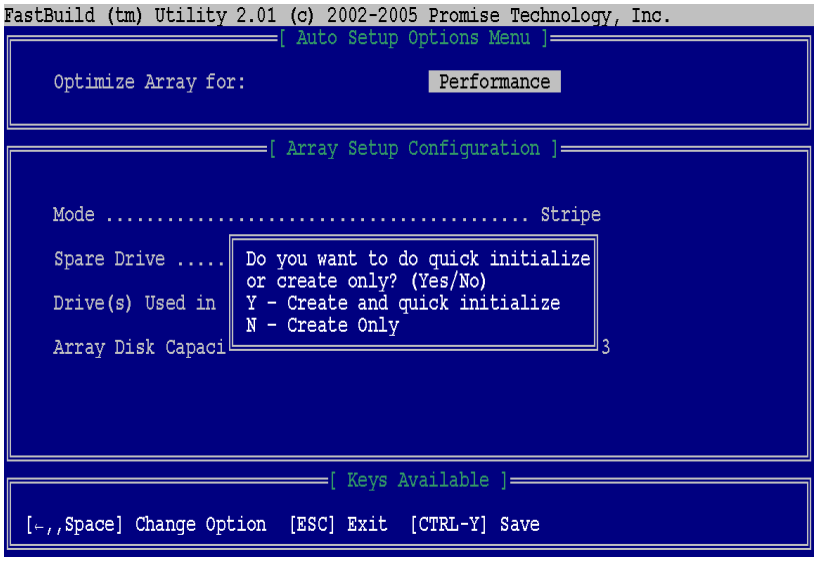
4.3.1 Quick Create a RAID 0 Array

This will allow users to construct a RAID 0 array using all the hard disks connected to the RAID Ultra ATA 133 and the SATA RAID connector. If you do not wish to use all of these hard drives to construct a single RAID 0 array, go to *4.4 Creating with Define Array*.

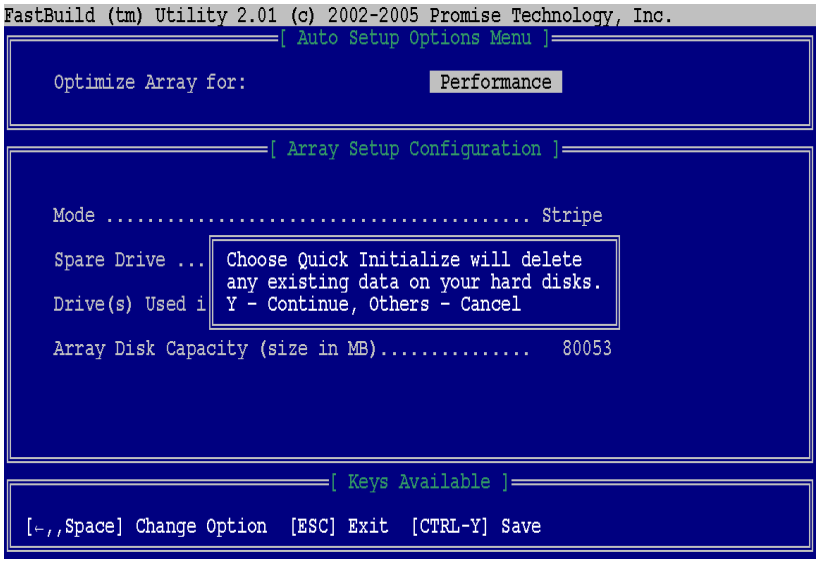
1) Start **FastBuild™** and go into Auto Setup.
2) Press the left/right arrow keys until you select **Performance**. Press **<Ctrl+Y>** to save settings.



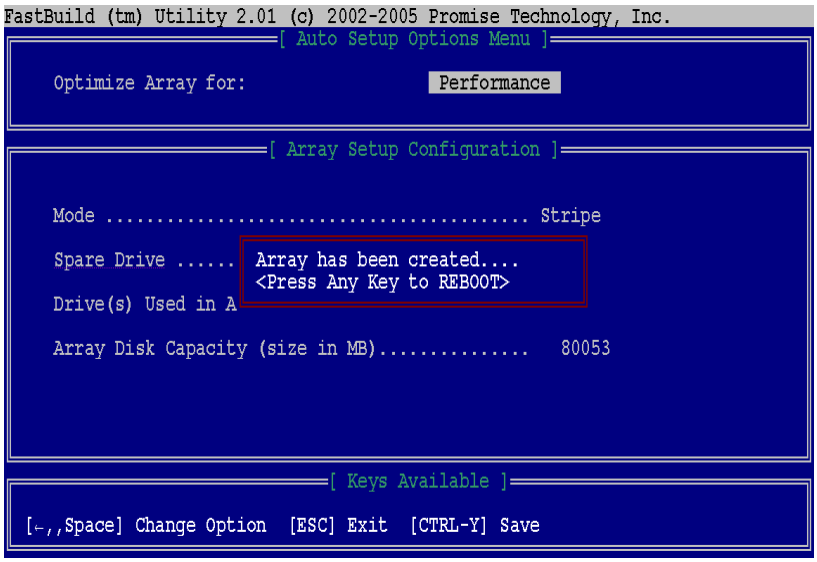
3) Press **<Y>** to quick initialize.



4) Press **<Y>** again to continue.



5) Press any key and the system will reboot. Your RAID 0 drive is now ready for use.

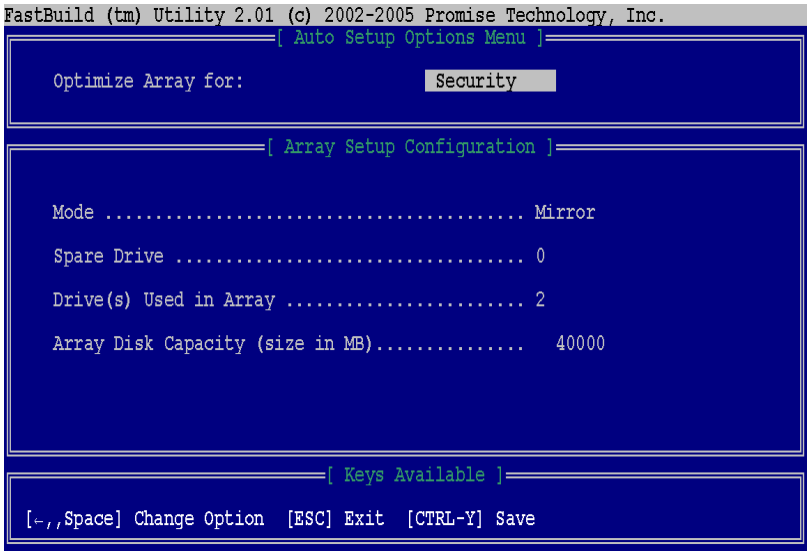


4.3.2 Quick Create a RAID 1 Array

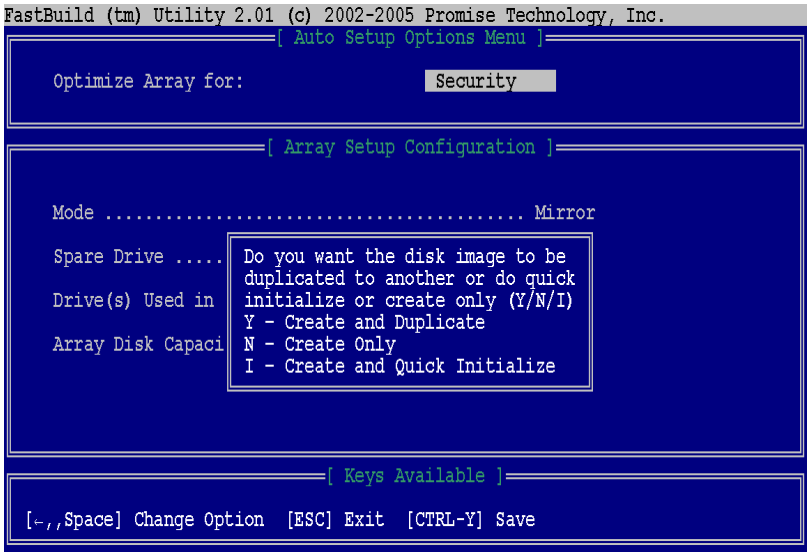
You cannot create a RAID 1 array using this method if you have a total of 4 hard disks attached to the RAID Ultra ATA 133 connector and the SATA RAID connector. Read *4.4 Creating with Define Array* to create a RAID 1 array using Define Array.

1) Start **FastBuild™** and go into Auto Setup.

2) Press the left/right arrow keys until you select **Security**. Press **<Ctrl+Y>**.



3) Press **<I>** to quick initialize and then press **<Y>** again to continue.



4) Press any key and the system will reboot. Your RAID 1 drive is now ready.

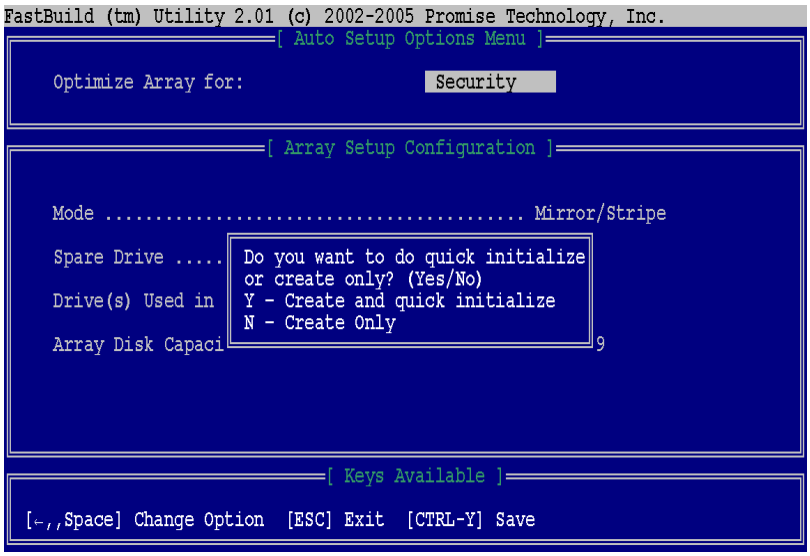
4.3.3 Quick Create a RAID 0+1 Array

The Auto Setup procedure for creating a RAID 0+1 array is almost identical to that of RAID 1. Auto setup will automatically create a RAID 0+1 array instead of a RAID 1 should it detect 4 hard disks connected to the RAID connectors.

1) Press the left/right arrow keys until you select **Security**. Press **<Ctrl+Y>**.

2) Press **<I>** to quick initialize and then press **<Y>** again to continue.

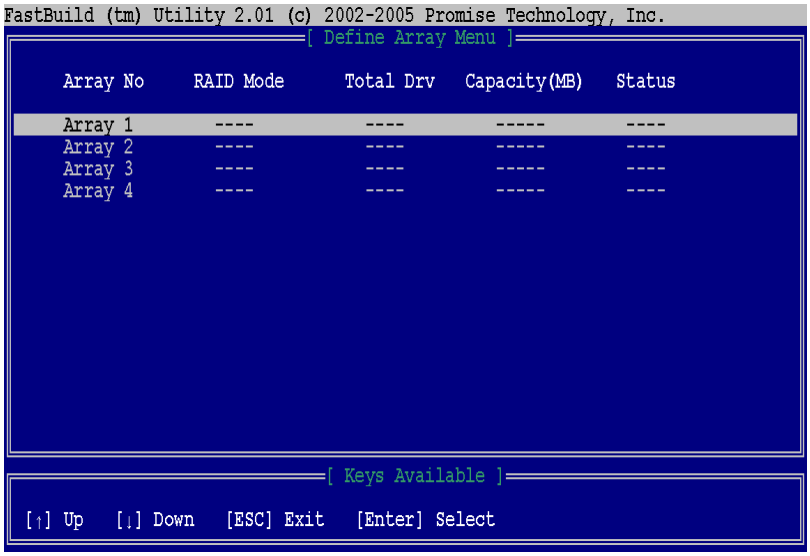
3) Press any key and the system will reboot. Your RAID 0+1 drive is now ready.



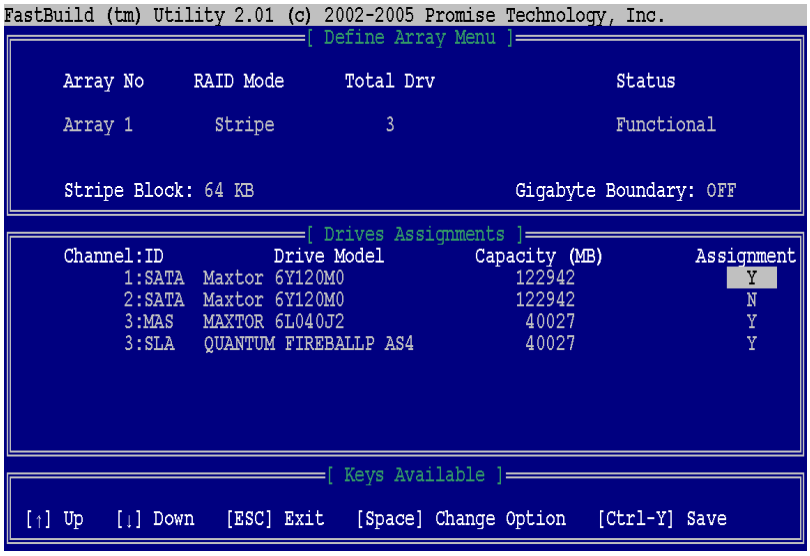
4.4 Creating with Define Array

This function allows you to manually create RAID arrays, allowing better flexibility over what was offered using Auto Setup (*4.3 Creating with Auto Setup*). It also allows you to easily create multiple arrays. Enter the Define Array menu by pressing **<3>** in the **FastBuild™** main menu.

In this menu, you will be able to see any created RAID arrays. Select one of them to view the details regarding these arrays. Select an empty array to manually create an array.



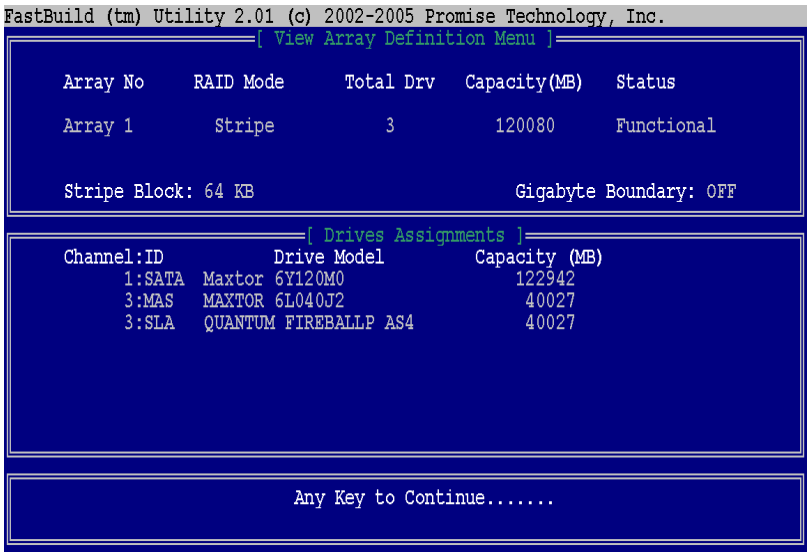
Choose the RAID mode you want to configure your array as. RAID 0 is **Stripe**, RAID 1 is **Mirror**, and RAID 0+1 is **Mirror/Stripe**. It is recommended you leave Stripe Block and Gigabyte Boundary as default unless you know what you are doing.



Move down and select the drives you want assigned to the array. Remember, a RAID 1 array requires 2 hard drives, while RAID 0+1 requires 4. A RAID 0 array can be constructed using any number of drives.

Press **<Ctrl+Y>** to save, **<Y>** to quick initialize, and **<Y>** again to accept.

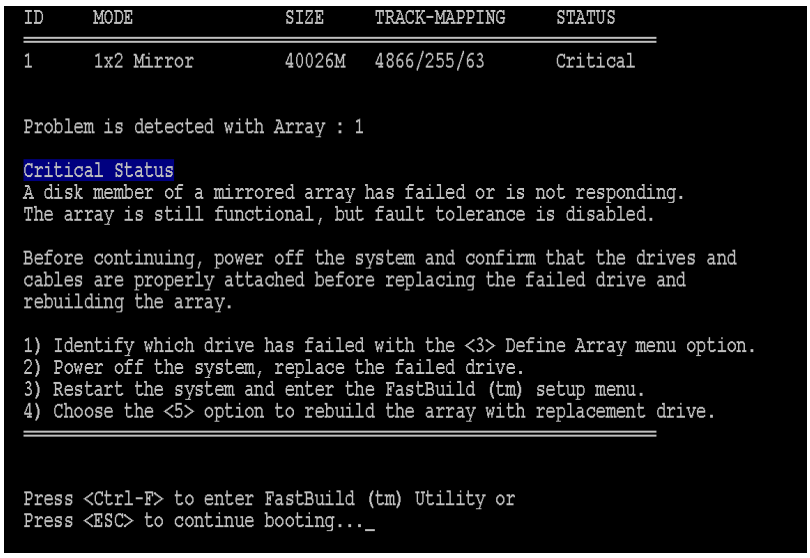
Your array is created. You can also now view it in the Define Array menu.



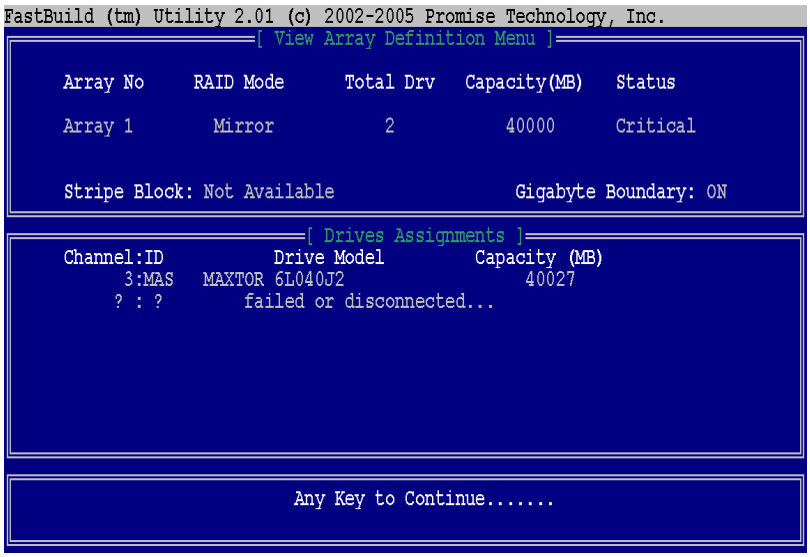
4.5 Rebuilding a RAID 1/RAID 0+1 Array

Should one of your drives in a RAID 1 or RAID 0+1 array fail, you can repair the array using the Rebuild Array function by pressing **<5>** on the **FastBuild™** main menu.

You will be notified of any faults in the RAID system at boot. Follow the onscreen instructions to repair the array.



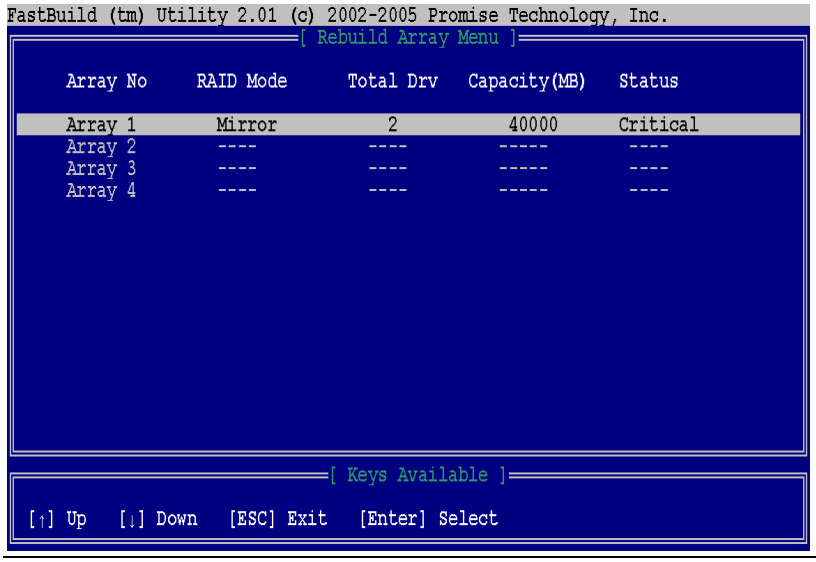
1) Enter **FastBuild™** and identify the failed drive with Define Array.



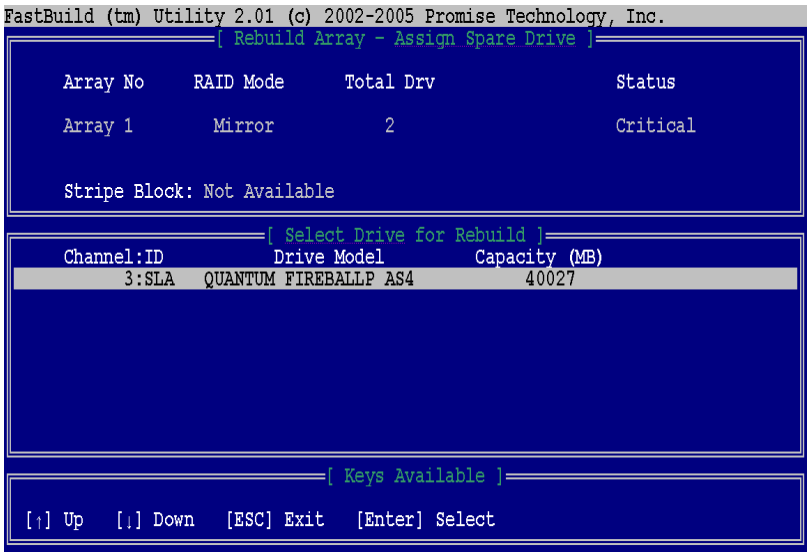
2) Turn off the computer and replace the failed drive.

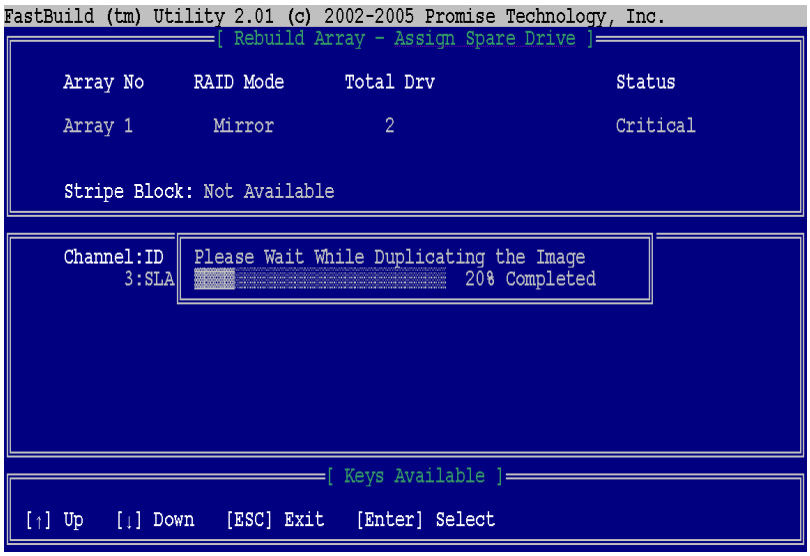
3) Restart the computer and enter **FastBuild™**. Go into Rebuild Array.

4) Select the damaged array.

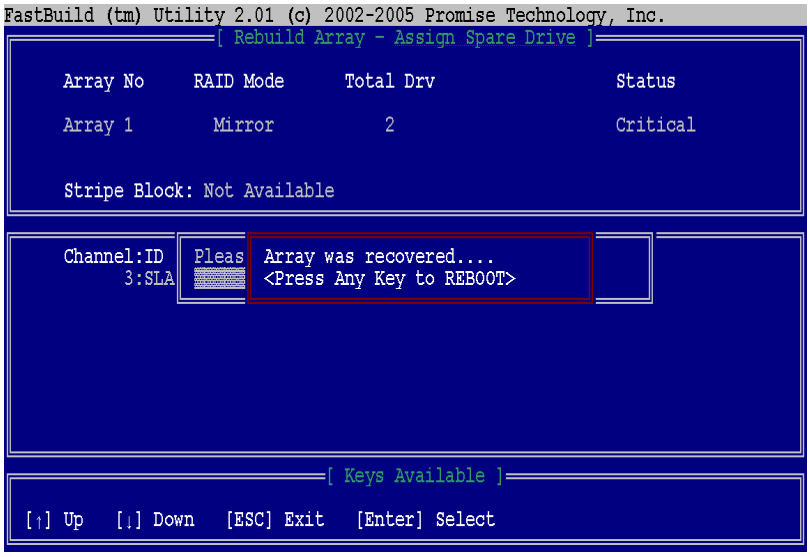


5) Select the replacement drive.





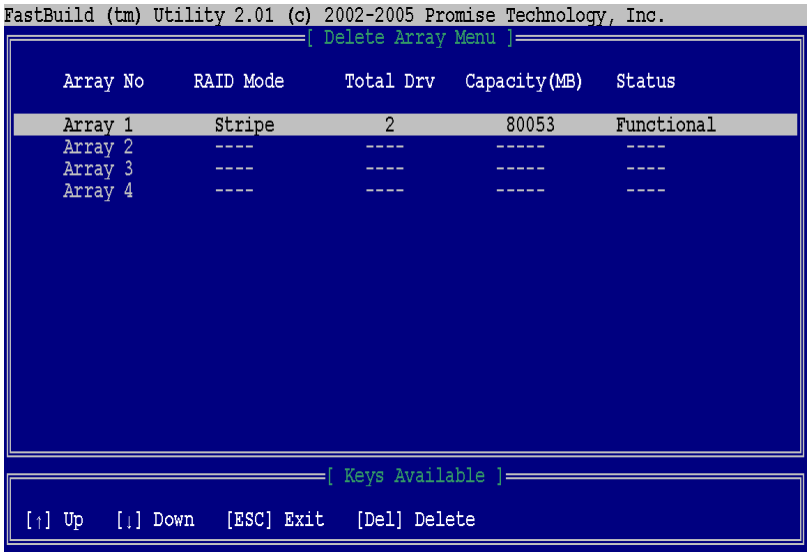
6) **FastBuild™** will then mirror your information onto your new drive, rebuilding your array.



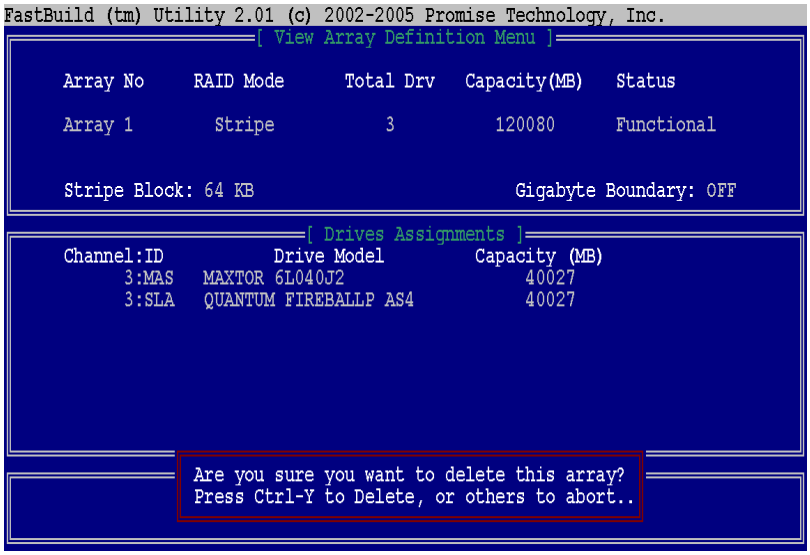
4.6 Deleting Arrays

Should you no longer wish to use your raid drive(s), you can delete it by going into the Delete Array menu by pressing **<4>** in the **FastBuild™** main menu.

1) Select the array you wish to delete and then press **<Del>**.



2) Press **<Ctrl+Y>** to delete and then **<Y>** to clear the boot sector. The array is now deleted.



It is possible to remove an array without deleting any actual information on the disks and then recreating the array with all information intact. This however, will not be covered in this document.

4.7 Viewing Drive Assignments

This function can be accessed by pressing **<2>** in the **FastBuild™** main menu. It allows the user to view the list of hard drives connected to the RAID Ultra ATA 133 and SATA RAID connectors. In addition to this, it will also indicate which array each drive is assigned to and the operating mode of each drive.

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.

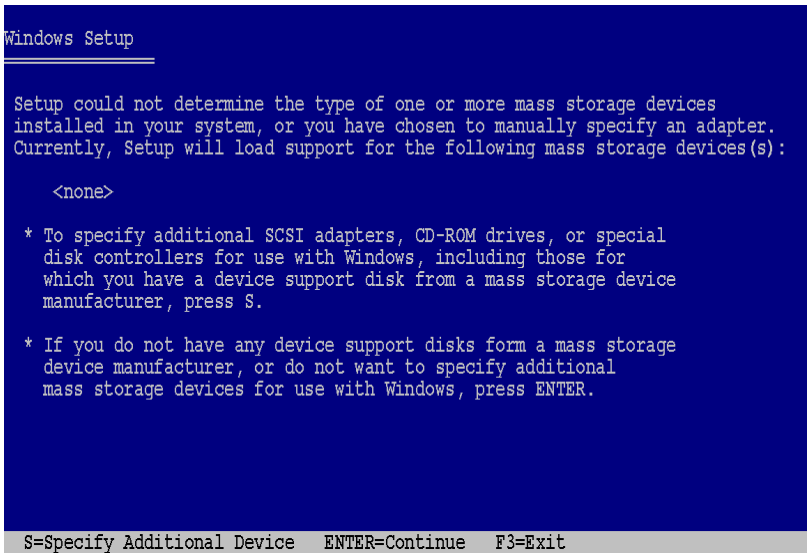
5.2.1 Installing Windows 98/ME

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.

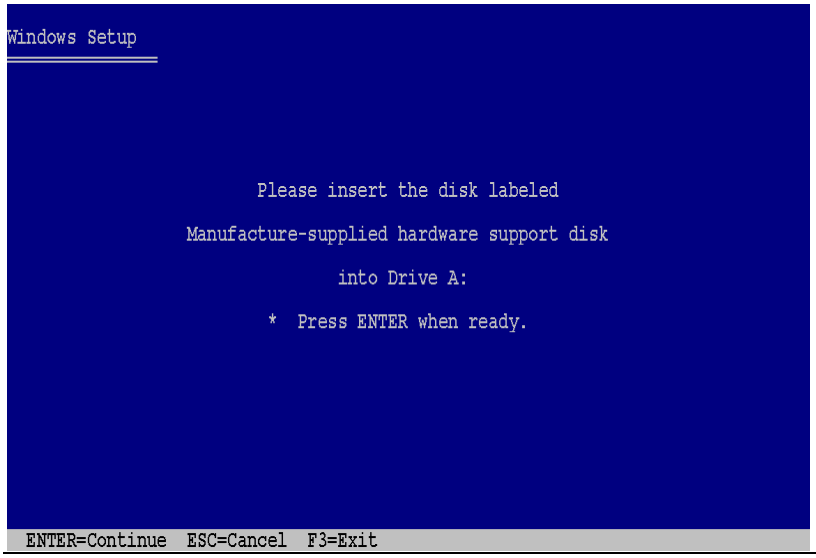
5.2.2 Installing Windows 2000/XP

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.

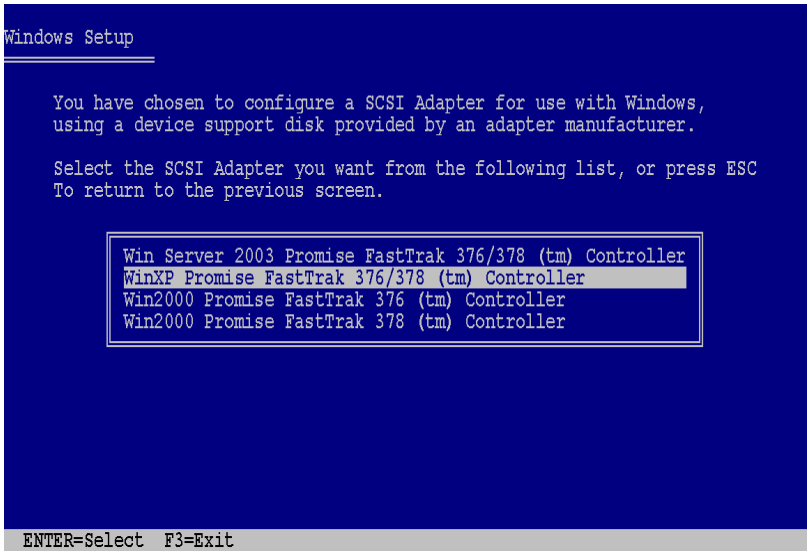
6) When **Windows** finishes an examination of your system, you will be asked to specify additional devises or to ignore it. Press **<S>** to specify your **Promise® PDC20378** RAID controller.

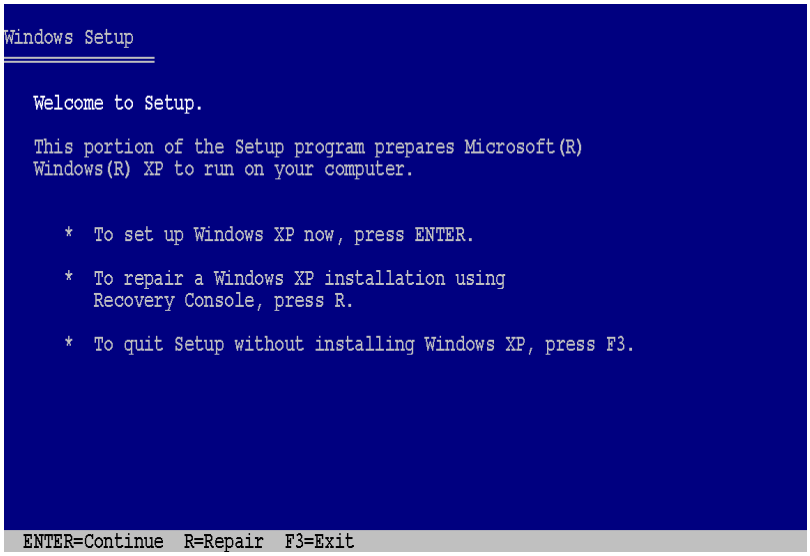


7) Insert the floppy containing the RAID drivers created in *2.1 Creating a Driver Disk* and then press **<Enter>**.



8) Select **WinXP Promise FastTrak 376/378 (tm) Controller** (or **Win2000 Promise FastTrak 378 (tm) Controller** if installing **Windows 2000**). Please select the correct driver for you OS. Choosing the wrong driver may cause problems.





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 RAID Ultra ATA 133 connector or the SATA RAID connectors do not have to be set up in an RAID array. The **FastTrak™** controller can also be set to allow users to use these hard drives as standard non-RAID drives.

To do this, go to the Operation Mode option under BIOS and change it to **IDE** (refer to section *4.1 Configuring BIOS*). Please note that drivers are still needed to use these hard disks correctly under the **Windows 2000/XP** environment. The procedures for setting up the drivers and installing Windows are the same for IDE mode and RAID, except a different set of drivers are needed. The MakeDisk.exe program for using this setting can be found under the \Drivers\Promse\378ATA folder on the motherboard's **Support CD**. Also, the **SATA 378 Quick Start Guide** provided on the **Support CD** can provide you with further information should you need it.