PROMISE®
TECHNOLOGY, INC.

FASTTRAK
TX2200 / TX4200
USER MANUAL

Version 1.4

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Contents

Chapter 1: Introduction

Thank you for purchasing Promise Technology's FastTrak TX2200 or TX4200 RAID Controller card.

About This Manual

This *User Manual* describes how to setup, use and maintain the FastTrak TX2200 or TX4200 RAID Controller cards.

In this manual, the terms *array*, *logical drive* and *logical disk* refer to the same thing, one or more disk drives combined logically such that a PC's operating system sees them as one single disk drive.

Also included are four levels of notices:

Note

A *Note* provides helpful information such as hints or alternative ways of doing a task.

Important

An *Important* calls attention to an essential step or point required to complete a task. Important items include things often missed.

Caution

A *Caution* informs you of possible equipment damage or loss of data and how to avoid them.

Warning

A *Warning* notifies you of probable equipment damage or loss of data, or the possibility of physical injury, and how to avoid them.

Overview

The PC which you are using either already contains FastTrak TX2200 or TX4200 RAID Controller card installed by a third-party or you have acquired a FastTrak TX2200 or TX4200 retail product for your existing PC and plan to install the card yourself.

- For PC owners wishing to install their TX2200 or TX4200 RAID Controller card, go to *Chapter 2: Installation* on page 5.
- For PCs with a FastTrak TX2200 or TX4200 RAID Controller card already installed, and you are experiencing any difficulties with the disk drives being recognized by the card, go to *Chapter 6: Troubleshooting* on page 51.
- If your operating system has crashed for some reason or you have downloaded updated drivers from the Promise website (www.promise.com), you may wish to reinstall software drivers for the FastTrak TX2200 or TX4200 RAID controller card. See *Chapter 4: Installing Drivers* on page 33.

FastTrak TX Series

Promise originally designed the FastTrak TX2200 and TX4200 as a cost-effective, high performance RAID controller cards that add performance and/or reliability to PC desktops and/or servers using Serial ATA drives.

FastTrak TX2200 has two independent data channels to support a maximum of two Serial ATA drives and supports:

- Stripe (RAID 0) – Identical drives can read and write data in parallel to increase performance.
- Mirror (RAID 1) – Mirror increases read performance through load balancing and elevator sorting while creating a complete backup of your files.

FastTrak TX4200 has two independent data channels to support a maximum of two Serial ATA drives and supports:

- Stripe (RAID 0) – Identical drives can read and write data in parallel to increase performance.
- Mirror (RAID 1) – Mirror increases read performance through load balancing and elevator sorting while creating a complete backup of your files.
- Mirror / Stripe (RAID 10) – Combining mirror with stripe offers both high read/write performance and fault tolerance

A FastTrak TX2200 or TX4200 striped logical disk can double the sustained data transfer rate of Serial ATA drives.

FastTrak TX2200 and TX4200 offer fault tolerant, data redundancy for entry-level network file servers or simply for desktop PC users wanting to continually protect valuable data on their PC.

Should a drive that is part of a mirrored logical disk fail, FastTrak TX2200 and TX4200 use the mirrored drive (which contains identical data) to assume all data handling. When a new replacement drive is later installed, FastTrak TX2200 and TX4200 rebuild data to the new drive from the mirrored drive to restore fault tolerance.

FastTrak TX2200 and TX4200 bootable BIOS supports individual drives larger than 137 GB. With FAT32 and NTFS partitioning, the logical disk can be addressed as one large single volume.

Promise Array Management (PAM) Software

The Promise Array Management (PAM) software offers local management and monitoring of FastTrak logical disks. Windows-based GUI provides email notification of all major events/alarms, memory cache management, logging for Windows servers, logical disk maintenance, rebuild, and access to all components in logical disk (server, controller, data channels, individual drives, and enclosure). For information on using PAM, refer to the *PAM User Manual*, which is included on the CD that came with your FastTrak TX2200 and TX4200. Or download it from the Promise website.

Key Features and Benefits

The following information offers an overview of the major features of your new Promise FastTrak TX2200 and TX4200.

Advanced Hardware Design	
Features	**Benefits**
Supports 66MHz PCI bus motherboards (automatically backward compatible with 33MHz PCI slots)	Allows maximum data transfers of up to 266MB per second (133 MB/s in 33 MHz slot) over the bus to dramatically reduce the time to save and retrieve large files.
Supports: data stripe (RAID 0), mirror (RAID 1), and mirror/stripe (RAID 10) RAID 10 on 4200 only	Provides dramatic increase in drive performance and/or fault tolerant options. Offers performance customization and data rebuilds from the BIOS menu.
Supports Serial ATA Specification 1.0	Burst data transfer rates up to 150MB/sec from Serial ATA drives to boost overall system performance.
Independent data channels for Serial ATA drives	Drives can multiply their data transfer performance when striped together and each drive uses a separate data channel.

Advanced Hardware Design	
Features	**Benefits**
PCI Plug-n-Play, PCI Interrupt sharing and coexists with motherboard IDE and SCSI controllers	Easy to install; supports up to 4 Serial ATA drives on the FastTrak RAID Controller card while still supporting 4 devices on motherboard ATA controller.
Supports multiple logical disks	TX2200 supports up to 2 logical disks, TX4200 supports up to 4 logical disks.
Supports online logical disk expansion	Add disk drives to the logical disk without affecting data availability.
Supports online logical disk conversion	Change RAID level without affecting data availability.
Supports Hot Spare drive	Uses any free disk to replace a failing disk in a logical disk automatically.
Utilizes FastBuild™ automenu from the FastTrak onboard BIOS	Has “Auto Setup” option for quick and easy logical disk builds
Displays status and error checking messages during bootup	Notifies user of possible errors and allows for recovery of mirrored drive logical disks directly from FastBuild™.
Supports S.M.A.R.T. monitoring and reporting	Polls status every 15 minutes, reports through PAM and Linux CLI.
Employs the latest Promise PCI Serial ATA ASIC technology	Fully supports Serial ATA specifications with 150 MB/sec timing and CRC error-checking at high speeds.
Mirror supports automatic background rebuilds	Fault tolerance can be restored automatically without rebooting.
DOS based flash upgrade of BIOS and Firmware	Verifies proper file, option to backup existing file. Download files from Promise website
Gigabyte Rounding	Allows easier interchangeability among disk drive vendors
System reboot not required after create, delete, migrate or expand logical disk	System boot process continues without restarting.

Compatibility	
Features	**Benefits**
Complies with PCI v2.3 Local Bus standard	Provides highest level of hardware compatibility.
Complies with SATA Specification 1.0	Provides full compatibility with first generation Serial ATA hard drives.
Complies with SATA II Specification 1.0 – Extensions to Serial ATA 1.0	Provides enclosure and drive monitoring compatibility.
Compliant with PCI Bus Master standard. PCI Bus Master support	Provides 32-bit I/O and, Bus Master, and Ultra ATA performance for optimal system performance.
Tested compatibility to coexist with motherboards that have integrated IDE controllers	Improves system performance and minimizes system conflicts for new and existing installations.
Compatible with all major SATA generation 1 and SATA generation 2, phase 1 disk drives	Promise performs verification testing with major drive manufacturers and development partners.
Features LBA support	Supports drives greater than 137 GB capacity.
Supports BIOS Boot Specification	All logical disks attached to the FastTrak card appear in the BBS-compliant motherboards BIOS boot list.
Compatible with Promise SuperSwap enclosures	Provides enclosure management including fan, temperature and voltages.

Specifications

- Low-profile printed circuit board
- PCI Slot 33MHz or 66MHz
- Controller card dimensions
  TX2200 (HWD): 2.25 x 4.69 x 0.33 inches (57 x 119 x 8 mm)
  TX4200 (HWD): 2.25 x 6.28 x 0.33 inches (57 x 160 x 8 mm)
- Operating temperatures: 32° to 110°F (0°C to 45°C)
- Operating himidity: 5% to 85% non-condensing

Chapter 2: Installation

This Chapter is designed to quickly get your FastTrak TX2200 or 4200 Serial ATA RAID Controller card up and running using the default settings, which will be optimal for most users.

If you wish to modify any of the default settings, please refer to Chapter 3: FastBuild™ Configuration Utility on page 19.

Unpack Your FastTrak Card

When you receive the FastTrak Serial ATA RAID card, the package should contain the items listed below:

- FastTrak TX2200 or TX4200 Serial ATA RAID Controller card
- Quick Start Guide
- FastTrak TX series driver diskette with Windows drivers
- 0.65 m (26 inch) Serial ATA data cables, two for TX2200, four for TX4200
- Y power splitter cable, one for TX2200, two for TX4200
- CD with Promise Array Management (PAM) software, *PAM User Manual* and *FastTrak TX2200 / TX4200 User Manual*

If ANY of the contents are missing or appear to be damaged, please contact your dealer or distributor immediately.

Warning

Before installing the adapter into an existing system, backup any important or useful data. Failure to follow this accepted PC practice could result in data loss.

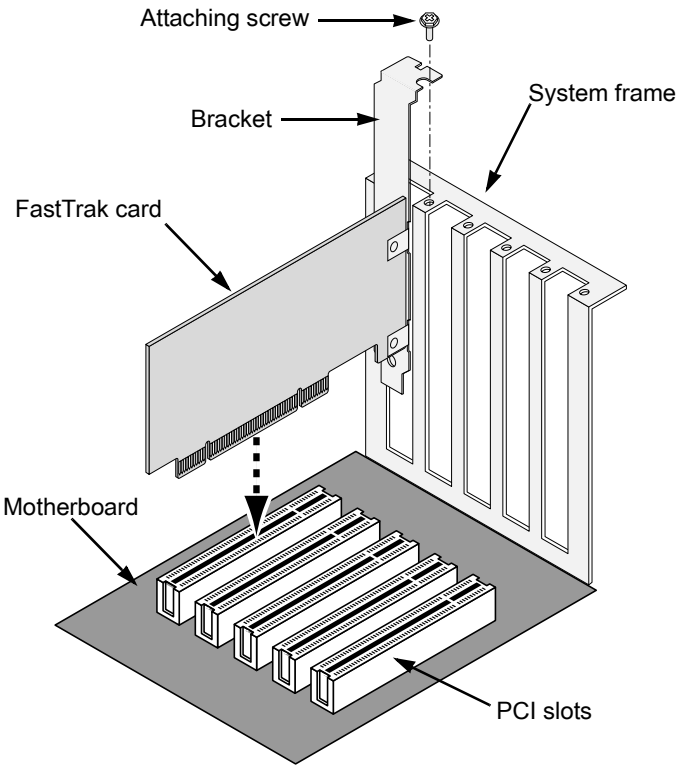
Warning

The FastTrak TX2200 and TX4200 Serial ATA RAID Controller cards, like other parts of your system, are subject to damage by static electricity. Be sure that you're properly grounded (Promise recommends that you wear an anti-static strap or touch a grounded object) and that you unplug your system before installing FastTrak.

Install the FastTrak Card

The FastTrak TX2200 or TX4200 Serial ATA RAID card fits into any available PCI slot on your PC's motherboard (below):

- 32-bit PCI slot (must be PCI 2.2 or 2.3 compliant)
- The 32-bit portion of a 64-bit PCI slot



1. Remove the cover of your system.

2. Remove the inside slot cover of an available 32-bit PCI slot on the motherboard.Install the FastTrak Serial ATA RAID card into the open PCI slot. Secure the bracket to the system's frame.
3. Attach your system case's 2- or 4-pin LED cable to the LED connector on the FastTrak card (see *Install the Disk Drives*, below).
4. Fasten the controller card bracket to the system case.

Install the Disk Drives

Important

If you wish to include your current bootable Serial ATA drive using the Windows 2000, XP or Server 2003 operating system as part of a bootable Mirrored (RAID 1) logical disk on your FastTrak card, do NOT connect the disk drive to the FastTrak yet.

You MUST install the Windows 2000, XP or Server 2003 driver software first onto this drive while it is still attached to your existing disk drive controller.

The FastTrak TX2200 card supports up to two Serial ATA drives while the TX4200 card supports up to four. For optimal performance, install Serial ATA drives of the same model and capacity. The drives' matched performance allows the logical disk to function better as a single drive.

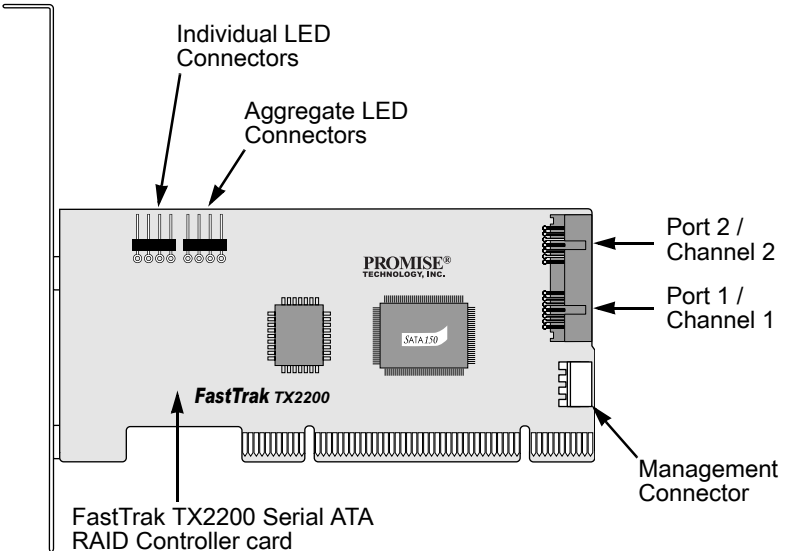
If you are using stripe (RAID 0) for performance, use up to four new drives. If using mirror (RAID 1) for protection, you can use two new drives OR use an existing drive and a new drive (the new drive must be the same size or larger than the existing drive).

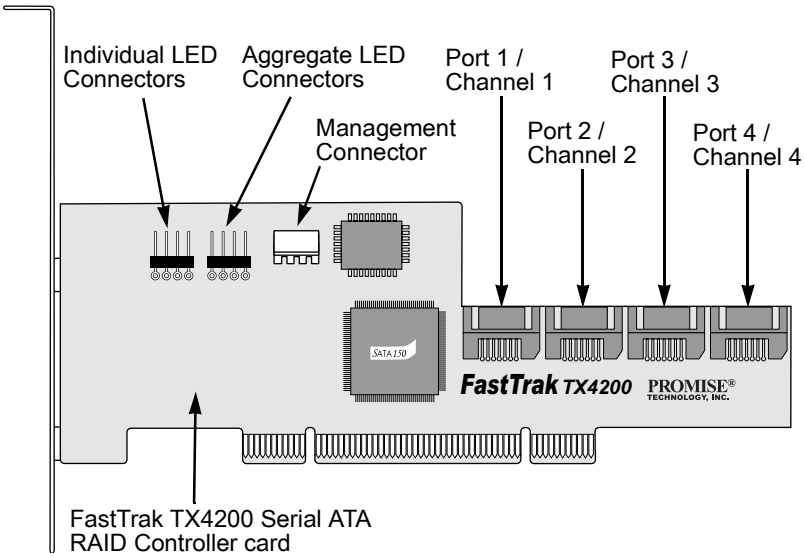
1. Install the disk drives into the drive bays of your system.
2. Attach the power cables to the disk drives..

Caution

Use of removable disk drive enclosures other than Promise Technology's SuperSwap is not supported and may result in performance loss or other undesired results.

3. Attach one Serial ATA data cable to each Serial ATA disk drive. Then attach the other ends of the cables to the connectors on the FastTrak card (below).





4. Attach the Y-cable power splitters to your Serial ATA disk drives.

If you are using a Promise SuperSwap 1100 or 4100 enclosure in your PC:

- Connect the power cables to the SuperSwap enclosure.
- Attach a SMBus cable from the Management Connector on the FastTrak card to the Management Connector on the first enclosure

These actions are described in Chapter 2 of the SuperSwap *User Manual*.

Note

The FastTrak TX2200 and TX4200 RAID Controllers are PCI Plug-n-Play (PnP) devices. No changes are necessary in the Motherboard CMOS Setup for resources or drive types in most applications.

Create Your Logical Disk

You will now use the onboard FastBuild™ BIOS utility to create your logical disk using the attached drives. There are four different ways to create this logical disk. You can create a logical disk for:

- Performance (page 12)
- Security, using new disk drives (recommended) (page 13)
- Security, using an existing disk drive and a new one (page 14)
- Security, using Quick Initialization (page 16)

The first three steps are the same for all four choices. After that, follow the steps for the logical disk you want to create.

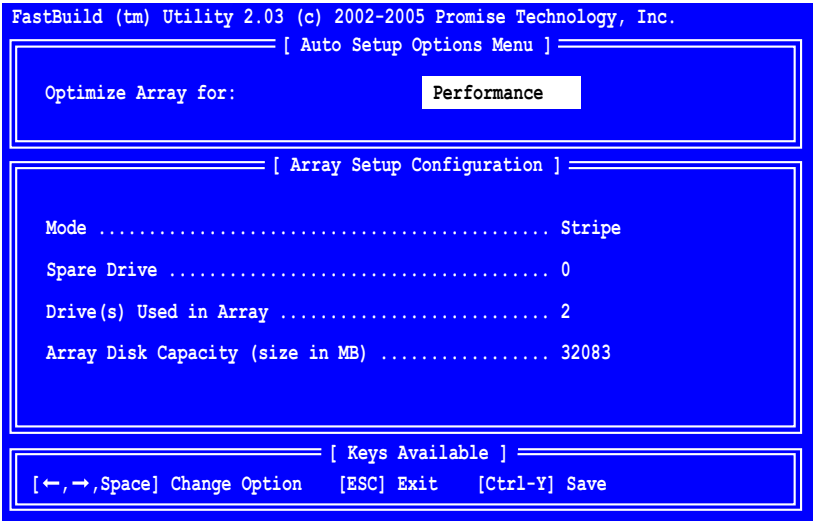
1. Boot your system. If this is the first time you have booted with the FastTrak TX2200 or TX4200 RAID Controller card and drives installed, the Promise onboard BIOS will display the following screen.

```
FastTrak TX4200 (tm) BIOS Version 2.00.0.xx
Copyright (c) 2003 Promise Technology, Inc.
Updated in 2004

No Array is defined...

Press <Ctrl-F> to enter FastBuild (tm) Utility...
Press <ESC> to continue booting...
```

2. Press the Ctrl-F keys to display the FastBuild Utility Main Menu.
3. Press "1" to display the Auto Setup Menu below. This is the fastest and easiest method to creating your first logical disk.



This is the fastest and easiest method to creating your first logical disk.

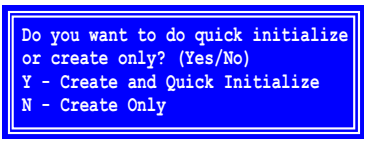
Performance Logical Disk (Array)

Use this setting to create a Striped (RAID 0) logical disk. These logical disks have no fault tolerance but they do have better read/write performance.

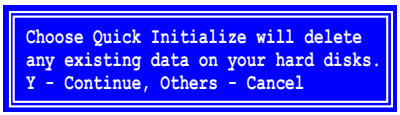
To create a logical disk for best performance, follow these steps:

1. Press the Spacebar to choose Performance under the Optimize Array for section.
2. Press Ctrl-Y to save the logical disk information.

   The window below will appear.



3. If the drives in your logical disk have been used before, press Y for the Create and Quick Initialize option. Othewise press N to Create only..



4. If you chose to initialize, press Y to verify that you want your disks initialized.
5. Press Esc twice to exit FastBuild and continue booting your computer.

Proceed to Chapter 4 on page 39 and install the FastTrak driver.

Note

Before you can use your new logical disk, you must partition and format the logical disk using your PC's operating system. See page 71.

Security Logical Disk (Array) with New Drives

Use this setting to create a Mirrored (RAID 1) logical disk with two new disk drives. If one of the drives has data on it, follow the Creating a Security logical disk with an Existing Data Drive procedure on the next page.

Under the Security setting in Auto Setup, FastTrak assigns two drives for a single Mirrored logical disk or four drives (TX4200) for a Striped/Mirrored logical disk (RAID 10).

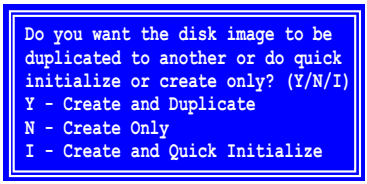
Note

When creating a Security logical disk with new drives, a feature called Gigabyte Boundary will automatically be set to ON. For a description of this feature, see page 23.

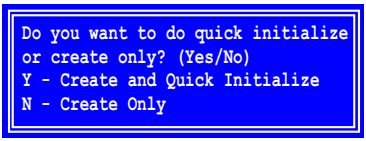
To create a logical disk for data protection using new disk drives, follow these steps:

1. Press the Spacebar to choose *Security* under the Optimize Array section.
2. Press Ctrl-Y to Save your selection.

   The window below will appear.



2-drive RAID 1 logical disk



4-drive RAID 10 logical disk

3. Press N for the Create Only option.
4. Press Esc twice to exit FastBuild and continue booting your computer.

Proceed to Chapter 4 on page 39 and install the FastTrak driver.

Note

Before you can use your new logical disk, you must partition and format the logical disk using your PC's operating system. See page 71.

Security Logical Disk (Array) with an Existing Data Drive

Use this setting to create a Mirrored (RAID 1) logical disk with a new disk drive and an existing drive with data and/or the bootable drive in your system. Use a new drive of identical or larger storage capacity as the existing drive

Under the Security setting in Auto Setup, FastTrak assigns two drives for a single Mirrored logical disk. The Create and Duplicate function does not work with a four-drive Striped/Mirrored logical disk (RAID 10).

Choose this method if you wish to use a drive that already contains data and/or is the bootable drive from your system. Obtain a second disk drive of equal or larger storage capacity.

Warning

If you plan to create a Security logical disk using an existing disk drive, backup any important data. Failure to do so could result in data loss.

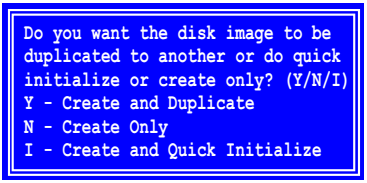
Important

!f you wish to include your current bootable drive using the Windows 2000, XP or Server 2003 operating system as part of a bootable Mirrored (RAID 1) logical disk, do NOT connect the disk drive to the FastTrak yet.

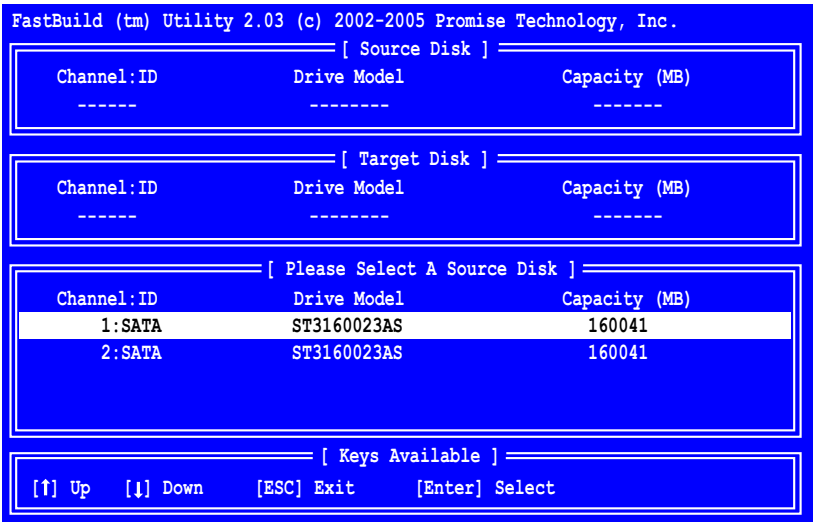
You MUST install the FastTrak driver to this disk drive while it is still attached to your existing disk drive controller. See Chapter 4 on page 39.

Follow these steps:

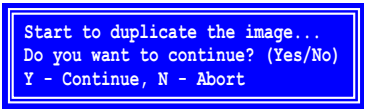
1. Press the Spacebar to choose *Security* under the Optimize Array section.
2. Press Ctrl-Y to Save your selection. The window below will appear.



3. Press Y for the Create and Duplicate option.
   The window below will appear asking you to select the Source drive to use.

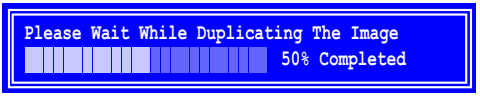


4. Use the arrow keys to choose which drive contains the existing data to be copied.
5. Press Enter to Save selection the source disk.
   Fast Build asks for verification.



6. Press Y to continue.

FastBuild will copy all data from the Source drive to the Target drive and report its progress in percent completed.



7. Press Esc twice to exit FastBuild and continue booting your computer.

Proceed to Chapter 4 on page 39 and install the FastTrak driver.

Note

Before you can use your new logical disk, you must partition and format the logical disk using your PC's operating system. See page 71.

Security Logical Disk (Array) with Quick Initialization

Use this setting to create a Mirrored (RAID 1) logical disk with one or two existing disk drives containing data that you do *not* want to keep. This method creates a mirrored logical disk and erases the first data block from your existing drives.

Under the Security setting in Auto Setup, FastTrak assigns two drives for a single Mirrored logical disk or four drives (TX4200) for a Striped/Mirrored logical disk (RAID 10).

Choose this method if you wish to create a mirrored logical disk with existing disk drives but you do not want to keep the data currently on those drives.

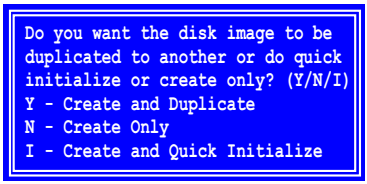
Warning

Using the Quick Initialization option on existing drives will result in the loss of all data on those drives.

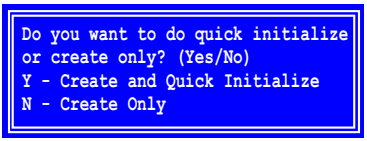
Follow these steps:

1. Press the Spacebar to choose *Security* under the Optimize Array section.
2. Press Ctrl-Y to Save your selection.

The window below will appear.

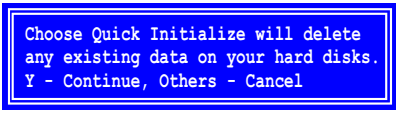


2-drive RAID 1 logical disk



4-drive RAID 10 logical disk

3. For the Create and Quick Initialize option:
   - Press I if you have a two-drive RAID 1 logical disk (above, left).
   - Press Y if you have a four-drive RAID 10 logical disk (above, right).



4. Press Y to verify that you want your disks initialized.
5. Press Esc twice to exit FastBuild and continue booting your computer.

Proceed to Chapter 4 on page 39 and install the FastTrak driver.

Note

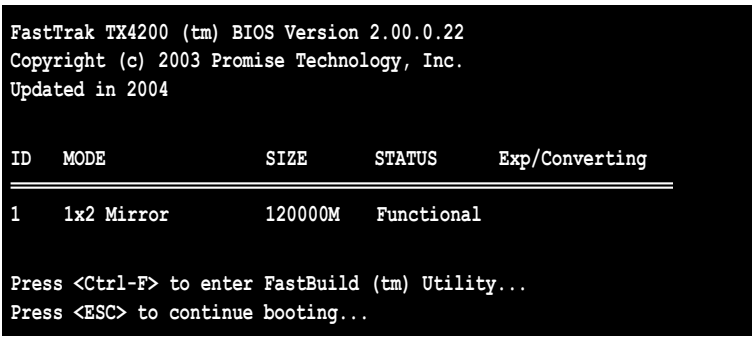
Before you can use your new logical disk, you must partition and format the logical disk using your PC's operating system. See page 71.

Chapter 3: FastBuild™ Configuration Utility

The FastBuild Configuration Utility offers several menu choices to create and manage a logical disk on the FastTrak TX2200 andTX4200 RAID Controller cards. For purposes of this manual, it is assumed you have already created a logical disk in the previous chapter and now wish to make a change to the logical disk or view other options.

Viewing the FastTrak BIOS Screen

When you boot your system with the FastTrak card and drives installed, the Promise onboard BIOS will detect the drives attached and show the following screen.



If a logical disk exists already, the BIOS will display the following above screen showing the card's BIOS version and status of the logical disk.

The logical disk status consists of five possible conditions: *Functional*, *Synchronizing*, *Rebuilding*, *Critical*, and *Offline*.

Functional – The logical disk is operational.

Synchronizing – The process of verifying data integrity by recalculating redundant data and matching the data on the disk drives

Rebuilding – The process of reconstructing a logical disk in Critical mode by placing redundant data on a replacement disk drive.

Critical – Degraded logical disk condition due to a failed or removed disk drive. Applies to mirrored logical disks (RAID 1 and 10) only. Fault tolerance is lost but the data is still accessible. Triggers automatic rebuilding.

Offline – Striped logical disks (RAID 0): Degraded logical disk condition due to one failed or removed disk drive. The data is not accessible.

Mirrored logical disks (RAID 1 and 10): Degraded logical disk condition due to two failed or removed disk drives. Fault tolerance is lost. The data is not accessible.

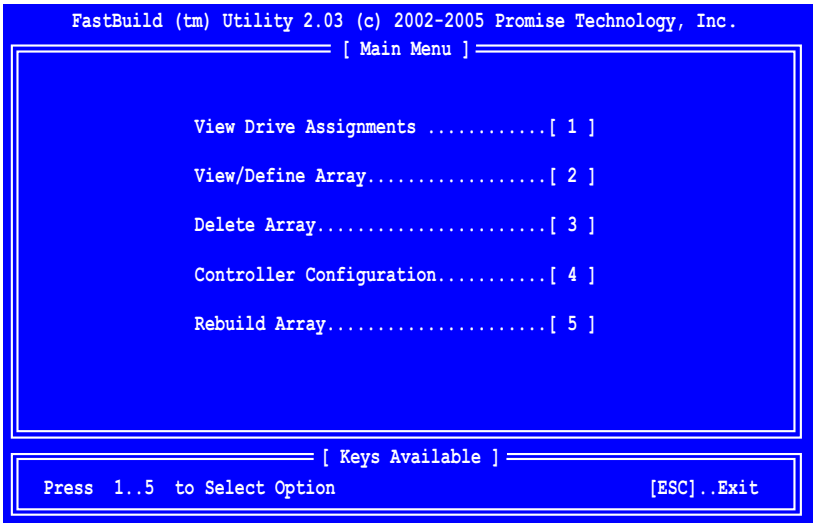
If your logical disk goes Offline, contact Promise Technical Support for assistance. See Appendix B.

Navigate the FastBuild Setup Menu

When using the menus, these are some of the basic navigation tips: Arrow keys highlights through choices; the Space bar allows to cycle through options; Enter selects an option; Esc aborts or exits the current menu.

Using the Main Menu

This is the first option screen when entering the FastBuild Setup.



To create a new logical disk automatically, press 1 and see *Create Logical Disks Automatically* on page 21. Promise recommends this option for most users.

To manually create a logical disk, press 3 and see *Create Logical Disks Manually* on page 25. If you wish to modify block size, you must create the logical disk manually.

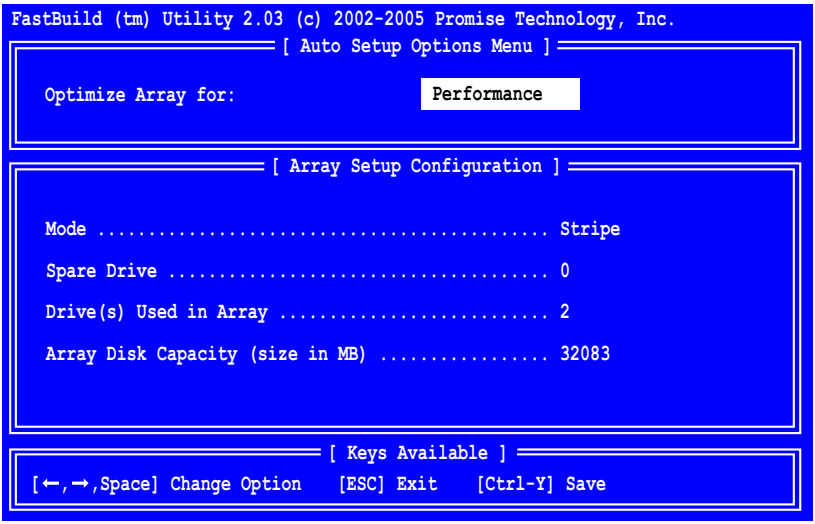
To view drives assigned to logical disks, press 2 and see *View Drive Assignments* on page 22.

To delete a logical disk (but not delete the data contained on the logical disk), press 4 and see *Delete a Logical Disk* on page 34.

To rebuild a mirrored (RAID 1 or 10) logical disk, press 5 and see *Rebuild a Mirrored Logical Disk* on page 36.

Create Logical Disks Automatically

The Auto Setup (1) selection from the Main Menu can intuitively help create your logical disk. It will assign all available drives appropriate for the logical disk you are creating. After making all selections, press Ctrl-Y to Save the selections. FastBuild will automatically build the logical disk.



Optimize Array (Logical Disk) for

Select whether you want Performance (RAID 0), Security (RAID 1 or RAID 10) under the Optimize Array for setting.

Performance

RAID 0 (Stripe) supports the high performance. The storage capacity equals the number of drives times the capacity of the smallest drive in the logical disk.

Under the Performance setting, FastTrak assigns all available drives to a single Striped logical disk.

Security

(RAID 1 Mirror, or RAID 10 Mirror/Stripe) creates a mirrored (or fault tolerant) logical disk for data security. The storage capacity equals one-half the number of drives times the capacity of the smallest drive in the logical disk.

Under the Security setting, FastTrak assigns two drives to a single Mirrored logical disk or four drives (TX4200) to be used for a Mirror/Stripe logical disk in Auto Setup.

Security and Performance (TX4200 only)

RAID 10 (Mirror/Stripe) creates a logical disk with stripe for high performance plus mirror for fault tolerance and data security. The storage capacity equals the number of drives times the capacity of the smallest drive in the logical disk. This option requires four drives and a FastTrak TX4200.

Create Multiple Logical Disks

If you plan to create multiple logical disks, you must manually create logical disks with the Define Array (3) option from the Main Menu (see page 25).

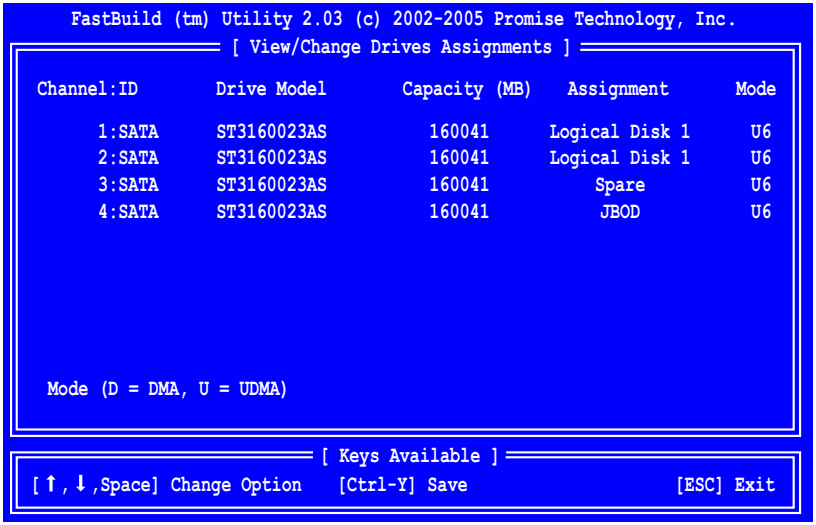
View/Change Drive Assignments

The View/Change Drive Assignments (2) option in the Main Menu displays whether each drive is:

- Assigned to a Logical Disk
- A spare (unassigned) drive
- A JBOD (an independent drive)

Spare drives can be used as hot spares for a mirrored logical disk the Spare drive's capacity is equal to or larger than the smallest drive in the logical disk.

The menu also displays the data transfer mode that relates to speed used by each drive (U refers to Serial ATA).



Change Between Spare and JBOD

By default, unassigned disk drives are designated as Spares. You can designate them as JBOD in order for your PC's operating system to recognize them.

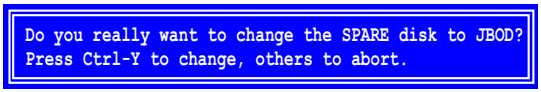
	Spare	JBOD
Use as a Hot Spare (if capacity is sufficient)?	Yes	No
Assignable to a Logical Disk (Array)?	Yes	No
Recognized as a drive by the PC's operating system?	No	Yes

JBOD disks function the same any other disk drive that is part of your PC.

To change a Spare disk to JBOD:

1. From the FastBuild Main Menu, select View/Change Drive Assignments (2).
2. In the View Drive Assignments menu, use the arrow keys to highlight a Spare drive you want to redisignate.
3. Press the spacebar to change the disk to JBOD.

   FastBuild asks for verification.



4. Press Ctrl-Y to confirm.

   The disk is re-designated as JBOD.

Note

Before you can use your JBOD disk, you must partition and format it using your PC's operating system.

Caution

When you re-designate a JBOD disk as a Spare, you lose all data on the disk.

Spare disks are not recognized by your PC until they become part of a logical disk.

To change a JBOD disk to a Spare:

1. From the FastBuild Main Menu, select View Drive Assignments (2).
2. In the View Drive Assignments menu, use the arrow keys to highlight a JBOD drive you want to redisignate.
3. Press the spacebar to change the disk to Spare.

   FastBuild asks for verification.

```
Do you really want to change the JBOD disk
 to SPARE?  Data in JBOD might be lost
 after you change the assigment!
Press Ctrl-Y to change, others to abort.
```

4. Press Ctrl-Y to confirm.

   Fast Build again asks for verification.

```
Transfer JBOD disk to SPARE can and will result
 in a loss of data. Proceed with changing
 of the JBOD disk?
Any Key - Back / Ctrl-Y - Yes
```

5. Press Ctrl-Y to confirm.

   The disk is re-designated as a Spare.

Create Logical Disks Manually

The FastBuild utility lets you create logical disks manually on your FastTrak TX2200 or TX4200 Serial ATA RAID Controller card.

Logical Disk Specifications

There are several decisions you must make before you create a logical disk, including:

- Logical Disk type
- Stripe Block Size
- Gigabyte Rounding
- Number of disk drives
- Use of new drives or drives with data

Logical Disk Type

The FastTrak offers three RAID level options:

- RAID 0 Stripe
- RAID 1 Mirror
- RAID 10 Mirror/Stripe

An alternative to creating a logical disk is to designate an unassigned drive as JBOD. See page 23. JBOD drives act as single, independent disk drives. You can have some of your disk drives in a logical disk and the rest in JBOD.

See page 45 for more information about RAID levels

Selecting Stripe Block

The available sizes are 32, 64 and128 KB. A larger block size is better when handling large data transfers (such as in A/V editing or graphics) while a smaller block size is better when handling e-mail and other common server data. The default is 64 KB. When in doubt, use the default.

Gigabyte Rounding

When a logical disk goes Critical becamse a disk drive has failed, you must replace the failed drive with one that is the same size or larger. However, the

Gigabyte Rounding feature permits the installation of a replacement drive that is slightly smaller (within 1 gigabyte) than the remaining working drive.

This can be helpful in the event that a drive fails and an exact replacement model is no longer available. For example, with the Gigabyte Rounding feature enabled, the remaining working drive can be 80.5 GB and the replacement drive can be 80.3, since both are rounded down to 80 GB.

Number of Disk Drives

The number of disk drives you add to your logical disk depends on the number of available channels on your FastTrak card and the type of logical disk you want to create.

This chart shows your FastTrak Controller, the number of drives and the RAID Levels it supports

FastTrak Card	No. Drives	RAID Levels
TX2200	2	0, 1
TX4200	4	0, 1, 10

This chart below shows the correlation between RAID Levels and the other features and options:

RAID Level	No. Drives	Stripe Block Size	Gigabyte Rounding
0 Stripe	1 to 4	32, 64 (default), 128	Not available
1 Mirror	2	Not available	ON (default) or OFF
10 Mirror/Stripe	4	32, 64 (default), 128	ON (default) of OFF

New Drives versus Drives with Data

When you build a logical disk using new disk drives, you do not need to copy data or perform quick initiation.

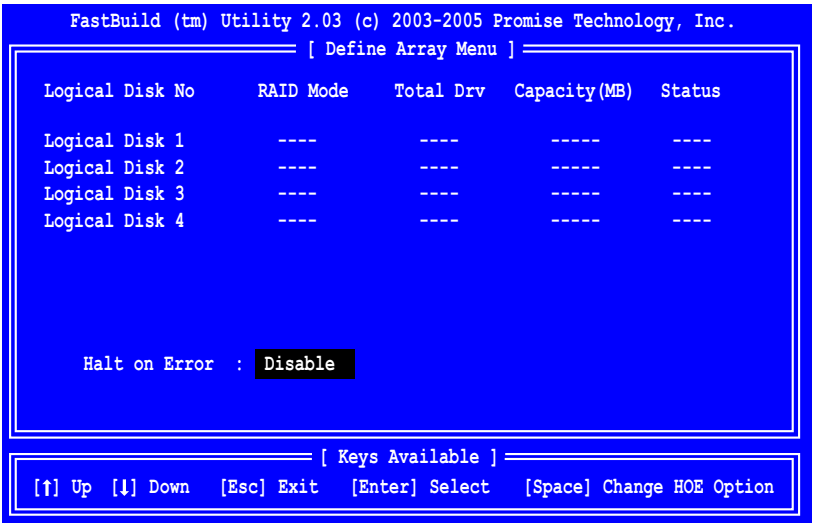
When you build a logical disk with disk drives that have been used before, but you do not want to keep the data they contain, choose the quick initialization option.

In some cases, you will have a disk drive full of data and want to make a mirror (RAID 1) logical disk in order to have a full copy. See *Add Fault Tolerance to Existing Drive* on page 30.

Create a RAID 0 Logical Disk

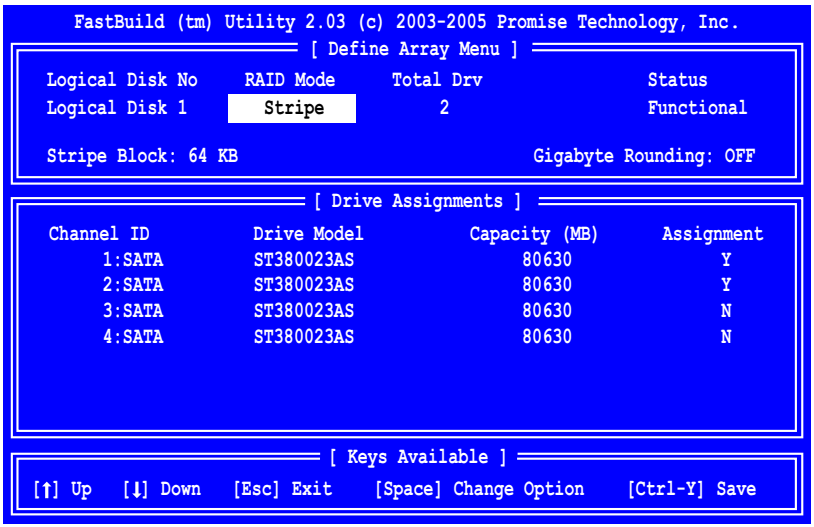
1. From the FastBuild Main Menu, press 3 to choose Define Array.

   The Define Array Menu displays.



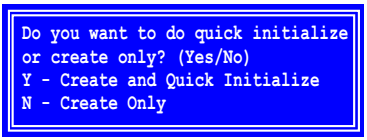
2. Press the arrow keys to highlight the logical disk number you wish to define, and press Enter to select.

   The Define Array Definition Menu displays. .

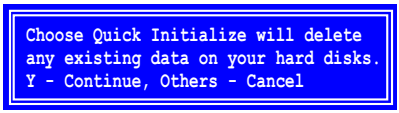


3. Under the Define Array Menu section, press the arrow keys to highlight the RAID Mode.
4. Press the Spacebar to select the Stripe RAID Mode.
5. Press the arrow keys again to highlight Stripe Block.
6. Press the Spacebar to select the Stripe Block Size you want: 32, 64 or 128 KB.
7. Under the Drive Assignments section, press the arrow keys to highlight a disk drive.
8. Press the Spacebar to change the Assignment option to Y to add the drive to the logical disk.
9. Press Ctrl-Y to save the logical disk information.

   The window below will appear.



10. If the drives in your logical disk have been used before, press Y for the Create and Quick Initialize option. Othewise press N to Create only..



If you chose to initialize, press Y to verify that you want your disks initialized.

11. Press Esc twice to exit FastBuild and continue booting your computer..

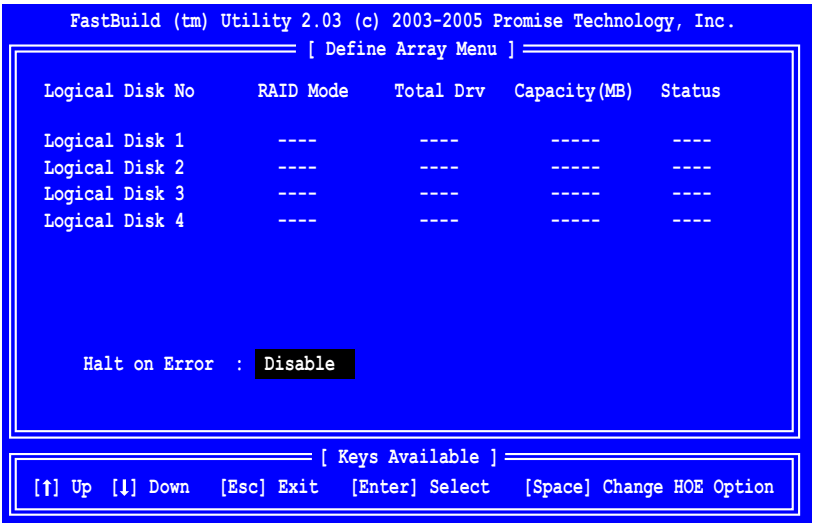
Note

Before you can use your new logical disk, you must partition and format the logical disk using your PC's operating system.

Create a RAID 1 Logical Disk

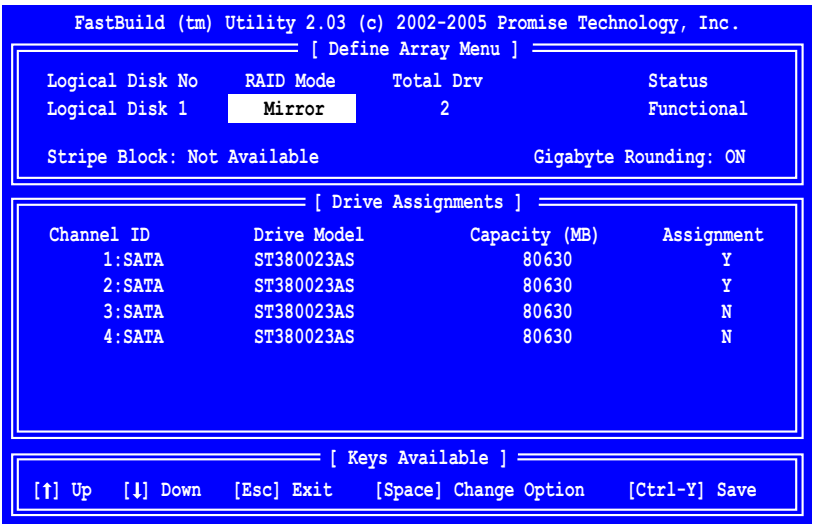
1. From the FastBuild Main Menu, press 3 to choose Define Array.

   The Define Array Menu displays.



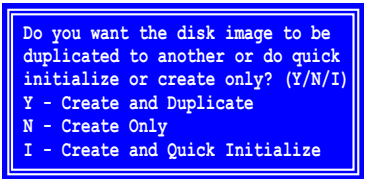
2. Press the arrow keys to highlight the logical disk number you wish to define, and press Enter to select.

   The Define Array Definition Menu displays. .

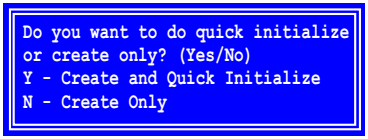


3. Under the Define Array Menu section, press the arrow keys to highlight the RAID Mode.
4. Press the Spacebar to select the Mirror RAID Mode.
5. If you want to disable Gigabyte Rounding, press the arrow keys again to highlight it.
6. Press the Spacebar to toggle Gigabyte Rounding on or off.
7. Under the Drive Assignments section, press the arrow keys to highlight a disk drive.
8. Press the Spacebar to change the Assignment option to Y to add the drive to the logical disk.
9. Press Ctrl-Y to save the logical disk information.

   The window below will appear.



2-drive RAID 1 logical disk



4-drive RAID 10 logical disk

10. Press N for the Create Only option.
11. Press Esc twice to exit FastBuild and continue booting your computer..

Note

Before you can use your new logical disk, you must partition and format the logical disk using your PC's operating system.

Add Fault Tolerance to Existing Drive

FastTrak Serial ATA RAID Controller card will create a mirrored logical disk using an existing system drive with data. You must assign the existing drive and another drive of same or larger capacity to the Mirrored (RAID 1) logical disk. The BIOS will copy the existing data to the new blank drive.

The Create and Duplicate function that builds the RAID 1 logical disk does not work with a four-drive Striped/Mirrored logical disk (RAID 10).

Warning

Backup any necessary data before proceeding. Failure to follow this accepted PC practice could result in data loss.

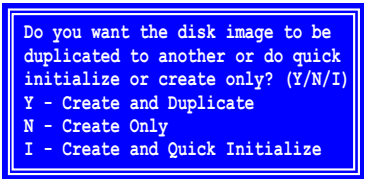
Important

If you wish to include your current bootable drive using the Windows 2000, XP or Server 2003 operating system as part of a bootable Mirrored (RAID 1) logical disk on your FastTrak, you MUST install the FastTrak driver onto the bootable drive while it is still attached to your existing hard drive controller. See Chapter 4.

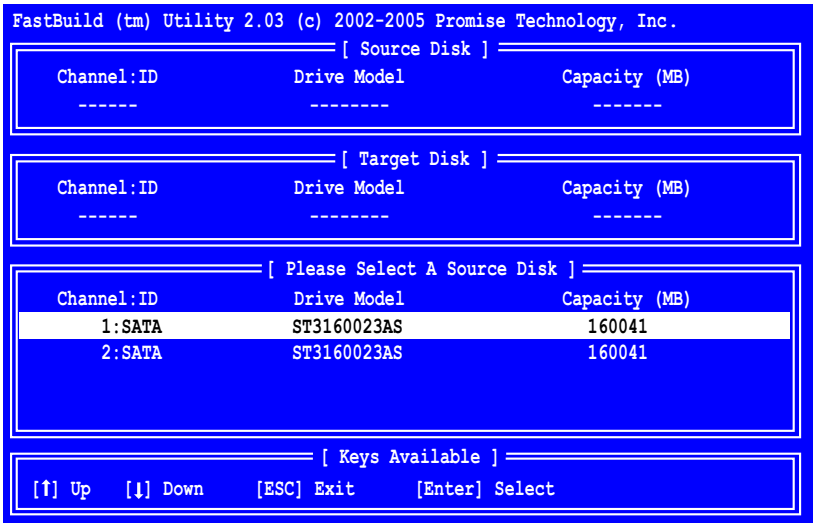
1. From the FastBuild Main Menu, press 3 to choose Define Array.
2. Press the arrow keys to highlight the logical disk number you wish to define, and press Enter to select.
3. Under the Define Array Menu section, press the arrow keys to highlight the RAID Mode.
4. Press the Spacebar to select the Mirror RAID Mode.

   Note: Gigabyte Rounding is automatically disabled when creating a Mirrored (RAID 1) logical disk from an existing drive. This protects the existing drive's partition table in order to maintain data integrity.
5. Under the Drive Assignments section, press the arrow keys to highlight a disk drive.
6. Press the Spacebar to change the Assignment option to Y to add the drive to the logical disk.
7. Press Ctrl-Y to save the logical disk information.

   The window below will appear.



8. Press Y for the Create and Duplicate option.
9. The window below will appear asking you to select the Source drive to use.



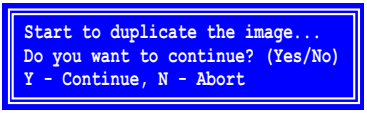
10. Press the arrow keys to choose which drive contains the existing data to be copied.

Warning

All target drive data will be erased. Make sure you choose the correct drive.

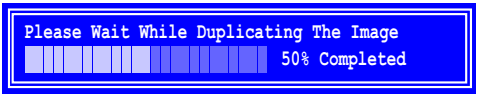
11. Press Ctrl-Y to Save selection and start duplication.

    The following confirmation screen will appear. .



12. Press Y to continue.

    FastBuild will copy all data from the Source drive to the Target drive and report its progress in percent completed.



13. Press Esc twice to exit FastBuild and continue booting your computer.

Note

Before you can use your new logical disk, you must partition and format the logical disk using your PC's operating system.

Hot Spare Drive

This arrangement applies to the FastTrak TX4200. For automatic rebuilds of a Mirrored (RAID 1) logical disk, attach a spare drive to the TX4200 card. FastTrak will use the unassigned drive as a hot spare, providing it:

- Is not assigned to a logical disk
- Is designated Spare (not JBOD)
- Is the same size or larger than the drives in the logical disk

If the logical disk suffers a disk drive failure, it goes Critical. FastTrak will replace the failed drive with the hot spare rebuild the logical disk automatically. This action is performed in the background under all supported operating systems. At a later time, you can power down the system and replace failed drive. If the new drive meets the requirements, it then becomes the hot spare.

FastTrak TX2200 does not support a hot spare drive because has only two channels. TX4200 supports a hot spare drive only with a Mirrored (RAID 1) logical disk. It cannot support a hot spare if you have a Mirror/Stripe (RAID 10) logical disk.

For more information on rebuilding logical disks, see Rebuild a Mirrored Logical Disk on page 36.

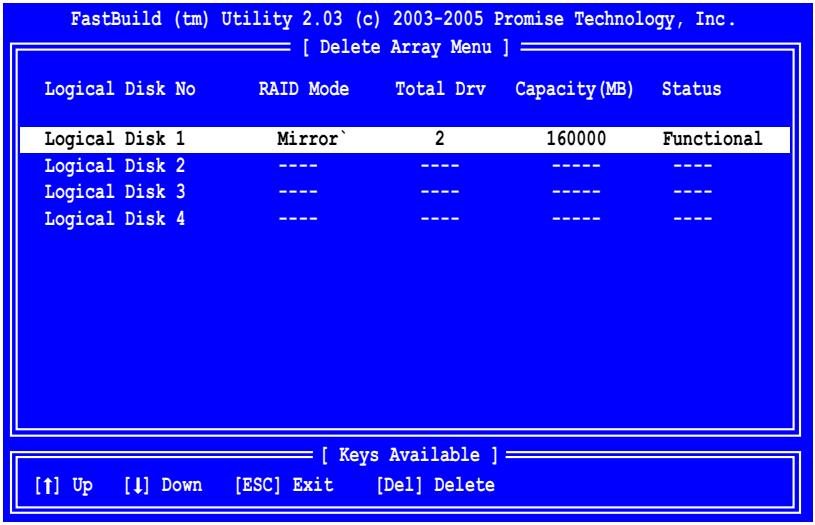
Delete a Logical Disk

Warning

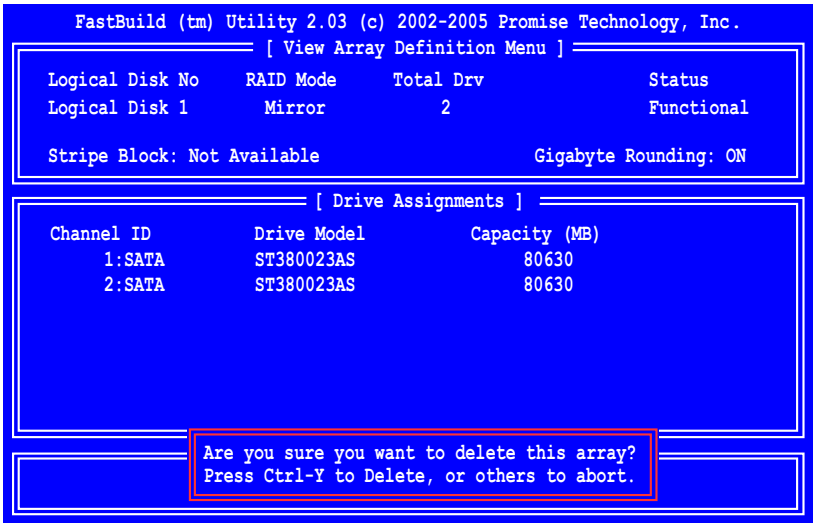
Deleting an existing logical disk could result in loss of data. Record all logical disk information including the logical disk type, the disk drives, and stripe block size in case you wish to undo a deletion.

Important

If you delete a logical disk by accident, immediately define a new logical disk identical to one you deleted. This action normally recovers the deleted logical disk.

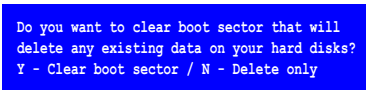


1. From the FastBuild Main Menu, press 4 to select Delete Array.
2. In the Delete Array Menu, press the arrow keys to highlight the logical disk you wish to delete.
3. Press the Delete key.
4. The View Array Definition menu will appear (see below) showing which drives are assigned to this logical disk.



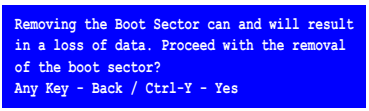
5. Press Ctrl-Y to confirm that you want to delete the logical disk.

   The option appears to remove the Boot Sectors from the disk drives.



   The Boot Sector contains information about where data is stored on the disk drive. Clearing (deleting) the Boot Sector effective deletes all data from the drive. If you choose this option, FastTrak will clear the Boot Sector from each drive that belonged to the logical disk you just deleted.

6. To clear the Boot Sector, press Y. Otherwise, press N.



   Press Ctrl-Y to confirm Boot Sector clearing.

After deleting the logical disk, FastBuild returns to the Delete Array Menu. From here, press Esc to reach the Main Menu.

Rebuild a Mirrored Logical Disk

When a mirrored (RAID 1 or 10) logical disk suffers a disk drive failure, it goes Critical. This means you can still access the logical disk but it has lost fault tolerance. To restore the logical disk to Functional status, you must:

- Replace the failed drive
- Rebuild the logical disk to the replacement drive.

If you have a FastTrak TX4200 with a Mirrored (RAID 1) logical disk, you can have a hot spare disk drive. With the hot spare, rebuilding of the logical disk to the spare drive will happen automatically. See page 33.

For all other Mirrored (RAID 1 or 10) logical disk configurations, you must rebuild the Critical logical disk manually, as described below.

```
ID    MODE                  SIZE       STATUS       Exp/Converting
═══════════════════════════════════════════════════════════════════
1     1x2 Mirror            120000M    Critical


Problem is detected with Array : 1

Critical Status:
A disk member of a mirrored array has failed or is not responding.
The array is still functional, but fault tolerance is disabled.

Before continuing, power off the system and confirm that the drives and
cables are properly attached before replacing the failed drive and
rebuilding the array.

1) Identify which drive has failed with the "<3> Define array" menu option.
2) Power off the system, replace the failed drive.
3) Restart the system and enter the FastBuild (tm) setup menu.
4) Choose the "<5> Rebuild Array" menu optionto rebuild the array.
═══════════════════════════════════════════════════════════════════

Press <Ctrl-F> to enter FastBuild (tm) Utility...
Press <ESC> to continue booting...
```

When you boot your system, the FastTrak BIOS displays the Critical status and describes what to do (above).

If your FastTrak's Halt on Error feature is enabled (shown in the screen page 25), your system will stop booting at the FastTrak BIOS screen and wait for your input. If Halt on Error is disabled, your system will pause for a few moments, then continue booting.

When you observe this condition when booting your system from the FastTrak BIOS, your logical disk needs attention.

.

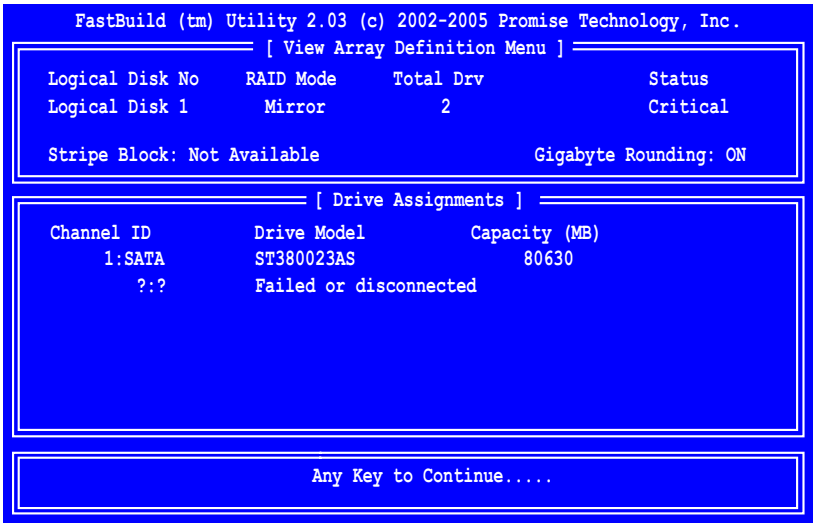
Important

Drives MUST be replaced if they contain any physical errors, before rebuilding the logical disk.

Follow these steps to use the Rebuild Array feature:

1. Press Ctrl-F to enter FastBuild Main Menu.
2. Select Define Array (3).
3. Press the arrow keys to select the Critical logical disk then press Enter to select it.

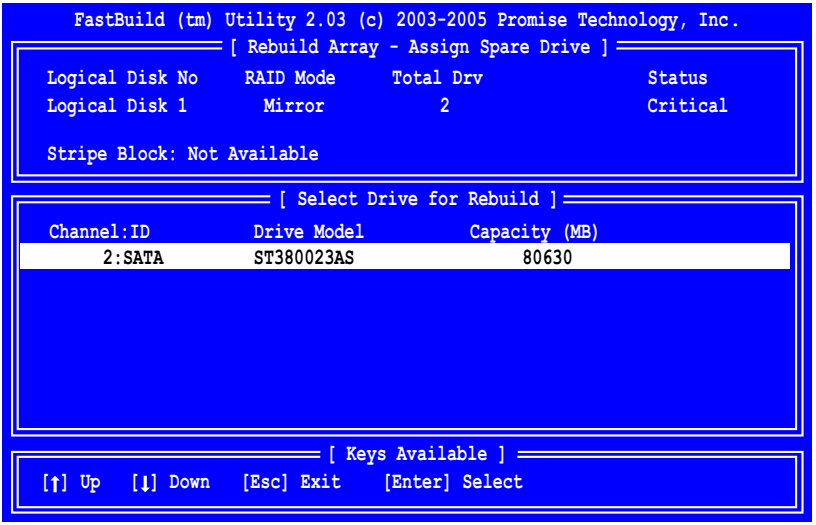
   The View Array Definition Menu appears (below).



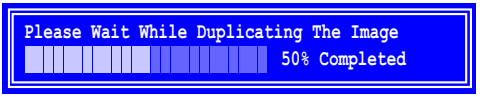
   In the example above, there is a two-drive Mirrored (RAID 1) logical disk. Under Drive Assignments, the drive in Channel 1 appears but no drive appears in Channel 2. This means the disk drive connected to Channel 2 is the failed drive.

4. Power down your system.
5. Replace the failed drive with an identical or larger disk drive.
6. Reboot the system and enter the FastBuild Main Menu.
7. Select the Rebuild Array (5) option.
8. Press the arrow keys to select the Critical logical disk then press Enter to select it.

The Rebuild Array - Assign Spare Drive menu appears (below).



9. Press the arrow keys to highlight the replacement disk drive.
10. Press Enter to select the drive.
11. FastBuild will to copy the data from the remaining original drive to the replacement drive and reports its progress in percent completed.



12. When rebuilding is done, press Esc twice to exit FastBuild and continue booting your system.

Chapter 4: Install Drivers

Following are driver installation procedures for the Windows operating systems that support the FastTrak TX2200 and TX4200 Serial ATA RAID Controller card. The FastTrak drivers for Windows are included on the driver diskette.

Drivers and installation instructions for Linux and Novell operating systems are on the Software CD and also downloadable from the Promise website at www.promise.com.

Important

!f you wish to include your current bootable drive using the Windows 2000, XP or Server 2003 operating system as part of a bootable Mirrored (RAID 1) logical disk, you MUST install the FastTrak driver to this drive while it is still attached to your existing disk drive controller.

Procedure **Page Number**

Windows Server 2003

New Installation

The following details the installation of the FastTrak Serial ATA RAID Controller drivers while installing Windows Server 2003.

1. Start the installation:
   - Floppy Install: Boot the computer with the Windows Server 2003 installation diskettes.
   - CD-ROM Install: Boot from the CD-ROM. Press F6 after the message "Press F6 if you need to install third party SCSI or RAID driver" appears.
2. When the Windows Server 2003 Setup window is generated, press S to specify an Additional Device(s).
3. Insert the FastTrak driver diskette into drive A: and press Enter.
4. Choose *Windows Promise FastTrak TX2200/TX4200 (tm) Controller* from the list that appears on screen, and then press the Enter.
5. Press S to use the driver on the floppy disk and then press Enter to continue with installation.
6. The Windows Server 2003 Setup screen will appear again saying “Setup will load support for the following mass storage devices:” The list will include “Windows Promise FastTrak TX2200/TX4200 (tm) Controller”.

   NOTE: If there are any additional devices to be installed, specify them now. When all devices are specified, continue to the next step.
7. From the Windows Server 2003 Setup screen, press the Enter. Setup will now load all device files and then continue the Windows Server 2003 installation.

Existing Installation

After installing the FastTrak Serial ATA RAID Controller card and rebooting your system, Windows Server 2003 setup will show a “Found New Hardware” dialog box. Under Windows 2003, “Mass Storage Controller” will be displayed.

1. Insert the FastTrak driver diskette into the A:\ drive.
2. Choose *Install the software automatically* and press the Enter key.
3. Choose *Windows Promise FastTrak TX2200/TX4200 (tm) Controller* from the list that appears on screen, and then press the Enter key.
4. If using a driver that has not been digitally signed by Microsoft, you will be asked if you want to continue the installation. Click Continue anyway.
5. When the New Hardware Wizard has finished installing the FastTrak driver, click Finish.

Confirm Installation

1. Right-click on the My Computer icon and select Manage from the popup menu.
2. From the left panel, select Device Manager.
3. Click the “+” in front of SCSI and RAID controllers. “Windows Promise FastTrak TX2200/TX4200 (tm) Controller” should appear.

Windows XP

New Installation

The following details the installation of the FastTrak Serial ATA RAID Controller drivers while installing Windows XP.

1. Start the installation:
   - Floppy Install: Boot the computer with the Windows XP installation diskettes.
   - CD-ROM Install: Boot from the CD-ROM. Press F6 after the message "Press F6 if you need to install third party SCSI or RAID driver" appears.
2. When the Windows XP Setup window is generated, press S to specify an Additional Device(s).
3. Insert the FastTrak driver diskette into drive A: and press Enter.
4. Choose *Windows Promise FastTrak TX2200/TX4200 (tm) Controller* from the list that appears on screen, and then press the Enter.
5. Press S to use the driver on the floppy disk and then press Enter to continue with installation.
6. The Windows XP Setup screen will appear again saying “Setup will load support for the following mass storage devices:” The list will include “Windows Promise FastTrak TX2200/TX4200 (tm) Controller”.

   NOTE: If there are any additional devices to be installed, specify them now. When all devices are specified, continue to the next step.
7. From the Windows XP Setup screen, press the Enter. Setup will now load all device files and then continue the Windows XP installation.

Existing Installation

After installing the FastTrak Serial ATA RAID Controller card and rebooting your system, Windows XP setup will show a “Found New Hardware” dialog box.

1. Insert the FastTrak driver diskette into the A:\ drive.
2. Choose Install the software automatically and press the Enter key.
3. Choose *Windows Promise FastTrak TX2200/TX4200 (tm) Controller* from the list that appears on screen, and then press the Enter key.
4. If using a driver that has not been digitally signed by Microsoft, you will be asked if you want to continue the installation. Click Continue anyway.
5. When the New Hardware Wizard has finished installing the FastTrak driver, click Finish.

Confirm Installation

1. Right-click on the My Computer icon and select Manage from the popup menu.
2. From the left panel, select Device Manager.
3. Click the “+” in front of SCSI and RAID controllers. “Windows Promise FastTrak TX2200/TX4200 (tm) Controller” should appear.

Windows 2000

New Installation

The following details the installation of the FastTrak Serial ATA RAID Controller drivers while installing Windows 2000.

1. Start the installation:
   - Floppy Install: Boot the computer with the Windows 2000 installation diskettes.
   - CD-ROM Install: Boot from the CD-ROM. Press F6 after the message “Press F6 if you need to install third party SCSI or RAID driver” appears.
2. When the Windows 2000 Setup window is generated, press S to specify an Additional Device(s).
3. Insert the FastTrak driver diskette into drive A: and press Enter.
4. Choose *Windows Promise FastTrak TX2200/TX4200 (tm) Controller* from the list that appears on screen then press Enter.
5. The Windows 2000 Setup screen will appear again saying “Setup will load support for the following mass storage devices:” The list will include “Windows Promise FastTrak TX2200/TX4200 (tm) Controller”.

   NOTE: If there are any additional devices to be installed, specify them now. When all devices are specified, continue to the next step.
6. From the Windows 2000 Setup screen, press Enter. Setup will now load all device files and then continue the Windows 2000 installation.

Existing Installation

After installing the FastTrak Serial ATA RAID Controller card and rebooting your system, Windows 2000 setup will show a “New Hardware Found” dialog box. Under Windows 2000, “PCI Mass Storage Controller” will be displayed.

1. Choose Add New Hardware Wizard from the list, and then press Enter.
2. Choose Add/Troubleshoot a device and click Next. The new hardware wizard will show device list
3. Choose Mass Storage controller and click Next. At the following screen click Finish.
4. Choose Display a list the known drivers for this device so that I can choose a specific driver then click Next.
5. When the Windows 2000 supported SCSI adapter drivers list appears, click Have disk.
6. Insert the FastTrak driver diskette in drive A:\.
7. Type A:\Win2000 in the text box. Click OK.
8. Choose *Windows Promise FastTrak TX2200/TX4200 (tm) Controller* from the list that appears on screen, then click Next.
9. Click Yes to confirm continue the installation and copy the driver to system.
10. Remove the diskette and click Finish to restart the system. Windows 2000 will then restart for the driver installation to take effect.

Confirm Installation

1. Right-click on the My Computer icon and select Manage from the popup menu.
2. From the left panel, select Device Manager.
3. Click the “+” in front of SCSI controllers. “Windows Promise FastTrak TX2200/TX4200 (tm) Controller” should appear.

Chapter 5: RAID Concepts

FastTrak Serial ATA RAID Controller Card

FastTrak TX2200 and TX4200 Serial ATA RAID controller cards feature concurrent data channel operation and onboard BIOS. The channels on the FastTrak Controller support concurrent operation that allows for overlapped I/O under multi-tasking operating systems and sharing the workload between multiple drives.

Adapter BIOS

The FastTrak TX2200 and TX4200 cards contain a BIOS code that extends the standard disk service routine provided through Int13. The BIOS is bootable for DOS and other operating systems that rely on the system BIOS for drive operation. When the FastTrak BIOS appears during bootup, press Ctrl-F to enter the FastBuild setup to select from menu settings.

FastBuild Auto Menu Setup

This setup utility is used to build and manage FastTrak logical disks. The utility is menu driven and features the Auto Setup (1) option that uses a simple, interactive setup process. Once the logical disk is built, all the logical disk members store the configuration information in the drive's reserved area. See Chapter 3, which provides descriptions of individual functions.

Reserve Sector

Logical disk configuration data about the drive member and other members in the logical disk are saved on a special location on the disk drives called the reserve sector. If any member of the logical disk becomes corrupt or lost, the redundant configuration data on the other members can be used for rebuilds.

Logical disk members do not have a memory of their drive positions. This allows drives to be placed on different FastTrak connectors or FastTrak Controller cards within the system without reconfiguring or rebuilding.

Logical Disk Terms

Logical disk

A *logical disk* (array) is formed from a group of two or more disk drives that appear to the PC's operating system as a single drive. The FastTrak Serial ATA RAID Controller provides the organization and management for your disk drives so they can work together in this way. FastTrak allows you to create a single-drive RAID 0 logical disk but such a logical disk has no advantage over any other single disk drive.

Member

The individual disk drives in a logical disk are called *members*. Each member of a specific logical disk has coded in its *reserve sector* the configuration information that identifies the drive as a member of a specific logical disk. All disk members in a logical disk are recognized as a single physical drive to the PC's operating system.

Types

FastTrak logical disks conform to the Redundant Array of Independent Disks technology, or *RAID*. RAIDs are used to:

- Increase throughput performance
- Provide fault tolerance protection

RAID 0 Stripe increases performance by working multiple disk drives in parallel or simultaneously. RAID 1 Mirror provides fault tolerance by providing a full copy of the data on two separate disk drives. RAID 10 Mirror/Stripe (TX4200 only) combines RAID 0 and RAID 1 techniques to provide both increased performance and fault tolerance.

The chart below summarizes the features and advantages of each RAID level that you can achieve with the FastTrak Controller card.

RAID Level	Performance	Fault Tolerance	Capacity	No. of Drives
RAID 0 Stripe	Highest	No	No. Drives x Smallest Size	1 to 4
RAID 1 Mirror	Normal	Yes	Smallest Size Drive	2 only
RAID 10 Mirror/Stripe	High	Yes	2X Smallest Size Drive	4 only

Stripe Block Size

The size selected (32, 64, 128 KB) affects how FastTrak sends data blocks to and receives them from the drives. You must perform your own testing to determine how the data block size affects your particular use of the logical disk. In general, a larger block size is better when handling large data transfers (such as in A/V editing or graphics) while a smaller block size is better when handling e-mail and other common server data. The default is 64 KB.

Gigabyte Rounding

The Gigabyte Rounding feature is designed for mirrored logical disks (RAID 1 or RAID 10) that makes replacing a disk drive easier. When a logical disk goes Critical becamse a disk drive has failed, you must replace the failed drive with one that is the same size or larger. However, the Gigabyte Rounding feature permits the installation of a replacement drive that is slightly smaller (within 1 gigabyte) than the remaining working drive.

This can be helpful in the event that a drive fails and an exact replacement model is no longer available. Without this feature enabled, FastTrak TX2200 or TX4200 will NOT permit the use of a replacement drive that is slightly smaller than the remaining working drive.

For the Gigabyte Rounding feature to work, the Gigabyte Rounding feature must be set to ON when the original mirrored logical disk is created. When enabled, the Gigabyte Rounding feature rounds the drive capacity of both drives to the common whole GB drive size. For example, with the Gigabyte Rounding feature enabled, the remaining working drive can be 80.5 GB and the replacement drive can be 80.3, since both are rounded down to 80GB.

This permits the smaller drive to be used. Please note that users will lose a small amount of available storage capacity from both drives in order to arrive at a common drive size.

Note

Gigabyte Rounding is automatically disabled when you create a mirrored logical disk (RAID 1) from an existing drive (versus using two brand new drives). This protects the existing drive's partition table in order to maintain data integrity.

How FastTrak Orders Logical Disks

During startup, the logical disks on the FastTrak Serial ATA Controller card are recognized in this order:

1. The logical disk set to bootable in the FastBuild Setup.
2. The logical disk number (i.e. logical disk 0, logical disk 1…). This would be involved in determining which drive letters will be assigned to each logical disk.

How FastTrak Saves Logical Disk Information

All logical disk data is saved into the *reserve sector* on each disk drive in the logical disk. The FastTrak controller can recognize disk drive members even if they are moved between different FastTrak card connectors or they belong to a logical disk created with a different Promise RAID controller.

RAID Levels

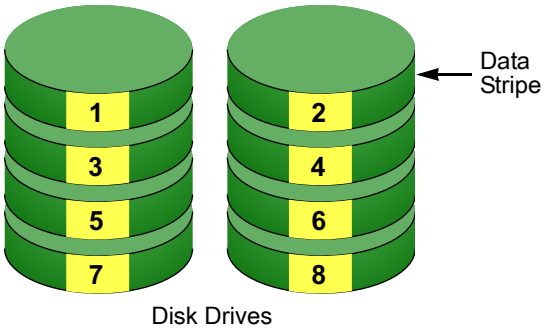
Stripe (RAID 0)

Reads and writes sectors of data interleaved between multiple drives. When any disk member fails, it affects the entire logical disk. Performance is better than a single drive since the workload is balanced between the logical disk members.

This logical disk type is for high performance systems. Identical drives are recommended for performance as well as data storage efficiency. The logical disk data capacity is equal to the number of drive members times the smallest member capacity. For example, one 100 GB and three 120 GB drives will form a 400 GB (4 x 100 GB) logical disk.

Stripe Size – For RAID 0 logical disks you can manually select the stripe block size of 32, 64, 128 MB. The default is 64 KB.

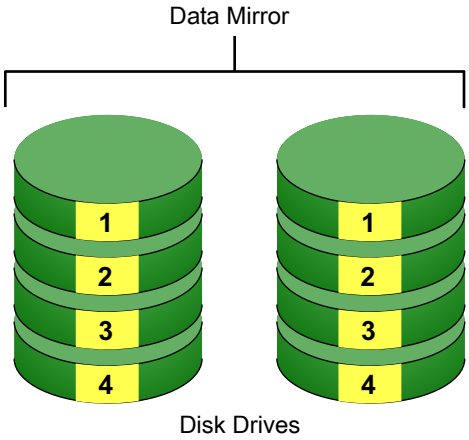
The size selected affects how FastTrak sends data blocks to and receives them from the drives. You must perform your own testing to determine how the data block size affects your particular use of the logical disk. In general, a larger block size is better when handling large data transfers (such as in A/V editing or graphics) while a smaller block size is better when handling e-mail and other common server data.



RAID 0 logical disks on FastTrak can have from one to four disk drives.

Mirror (RAID 1)

Writes duplicate data on to a pair of drives while reads are performed in parallel. RAID 1 is fault tolerant because each drive of a mirrored pair is installed on separate channels. If one of the mirrored drives suffers a mechanical failure or does not respond to the controller, the remaining drive will continue to function. Or, if one drive has a physical sector error, the mirrored drive will continue to function.



On the next reboot, the FastBuild™ Utility will display an error in the logical disk and recommend replacing the failed drive. You can continue using your PC, however Promise recommends replacing the failed drive as soon as possible.

Due to redundancy, the drive capacity of the logical disk is half the total drive capacity. For example, two 100 GB drives that have a combined capacity of 200 GB would have 100 GB of usable storage. With drives of different capacities, there may be unused capacity on the larger drive.

RAID 1 logical disks on FastTrak consist of two disk drives only.

Hot Spare Drive – For a RAID 1 logical disk, you can attach a third disk drive to the FastTrak card without assigning it to the logical disk. FastTrak will activate the drive and use it to replace a failed drive that was part of the mirrored logical disk. A rebuild operation copies the good drive data to the spare automatically and in the background.

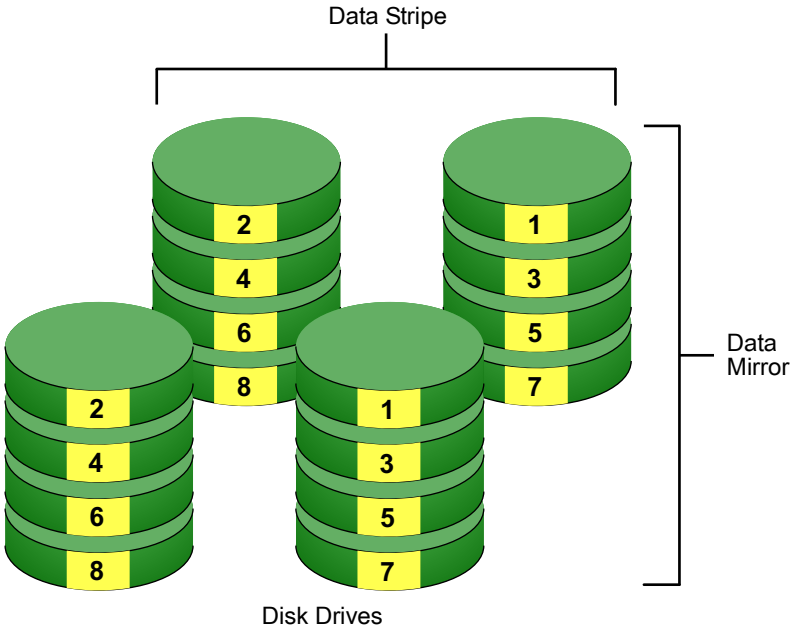
At a later time, power off the system and replace the failed drive. Spare drives must be the same or larger capacity than the smallest logical disk member.

For more information on how to set up a hot spare drive, see page 33.

Mirror / Stripe (RAID 10)

A combination of RAID 0 and RAID 1 logical disks. It can increase performance by reading and writing data in parallel while protecting data with duplication. Four drives are required for this logical disk.

A RAID 10 logical disk starts with a mirrored pair of disk drives, like a RAID 1 logical disk. Then it stripes the data, like a RAID 0 logical disk, from the mirrored pair over two more disk drives. The data capacity is similar to a standard RAID 1 logical disk with half of the capacity used for redundancy.



Stripe Size – For RAID 10 logical disks you can manually select the stripe block size of 32, 64 or 128 MB. The default is 64 KB.

The size selected affects how FastTrak sends data blocks to and receives them from the drives. You must perform your own testing to determine how the data block size affects your particular use of the logical disk. In general, a larger block size is better when handling large data transfers (such as in A/V editing or graphics) while a smaller block size is better when handling e-mail and other common server data.

RAID 10 logical disks on FastTrak consist of four disk drives only.

Dual Data Redundancy

One unique (though rarely used) feature of RAID 10 is *dual* fault tolerance. In some cases, two drives can fail simultaneously yet the logical disk still maintains the integrity of data. There are six combinations in which two of the four drives can fail. The FastTrak Serial ATA RAID Controller protects the data on a logical disk in four of those cases depending on each drive's assignment in the logical disk.

Assume the drives are configured as follows:

- CH indicates channels (ports) on the FastTrak card.
- A/B indicates which mirrored pair the drive belongs to.
- 1/2 indicates which part of stripe data.

CH1	CH2	CH3	CH4
Drive A1	Drive A2	Drive B1	Drive B2

Under RAID 10, the logical disk maintains data integrity if any 1, 2 combination survives.

Event	Failed Drives	Logical Disk Status	Why?
1	A1/A2	Functional	B1/B2 retain logical disk integrity
2	B1/B2	Functional	A1/A2 retain logical disk integrity
3	A1/B2	Functional	B1/A2 retain logical disk integrity
4	B1/A2	Functional	A1/B2 retain logical disk integrity
5	A1/B1	Offline	B2/A2 contain only half of the data
6	B2/A2	Offline	A1/B1 contain only half of the data

Chapter 6: Troubleshooting & Tips

This section is used to assist with troubleshooting conflicts and FastTrak TX2200 and TX4200 installation problems. Also refer to the README.TXT file on the FastTrak driver diskette for more recent information as well as the PromiseOnline services listed on page 65.

The section is divided into the following categories: Motherboard Issues, System CMOS Issues, Drive Errors, Operating System Errors, and Audio/Video Editing Tips.

Motherboard Issues

Freeing additional IRQ resources

Since the Promise card supports PCI Interrupt sharing, it is possible to use IRQs already assigned to another PCI card. Interrupt Sharing is not supported with onboard IDE controllers. If the onboard IDE controller(s) are not used, you may disable the controllers to free IRQ 14 and/or 15.

Configuring PCI IRQ resources

Setting the IRQ for a particular PCI slot will be different depending on the motherboard BIOS. This setting is usually made in the PCI Configuration and/or Plug and Play (PnP) section of the motherboard BIOS setup. There are three common methods that motherboard BIOS's handle assignment of IRQs to PCI slots:

- Specifically assigning an IRQ to a particular slot - You can tell the motherboard to use IRQ 10 for PCI slot 1, IRQ 11 for PCI slot 2, etc.
- Listing which IRQs are available to be assigned to the PCI slots – This BIOS has an option where you specify 1st Available IRQ, 2nd Available IRQ, etc. The BIOS then scans the PCI slots for PCI cards and assigns these IRQs in the order that it finds the PCI cards.

Consult your motherboard manual for information that is specific to your motherboard.

Intermittent data problems

Overclocking the PCI bus may cause the system to hang or data corruption. If you experience either of these problems and you are overclocking the PCI bus, set the PCI bus back to its normal setting to see if this is causing the errors.

System CMOS Issues

Set motherboard CMOS Boot sequence to boot to FastTrak Controller

On some Motherboard BIOS, it is necessary to set the Boot sequence to SCSI, A:, C: since the Promise card is identified as a SCSI card.

Motherboard CMOS displays C: or D: drive failure during startup

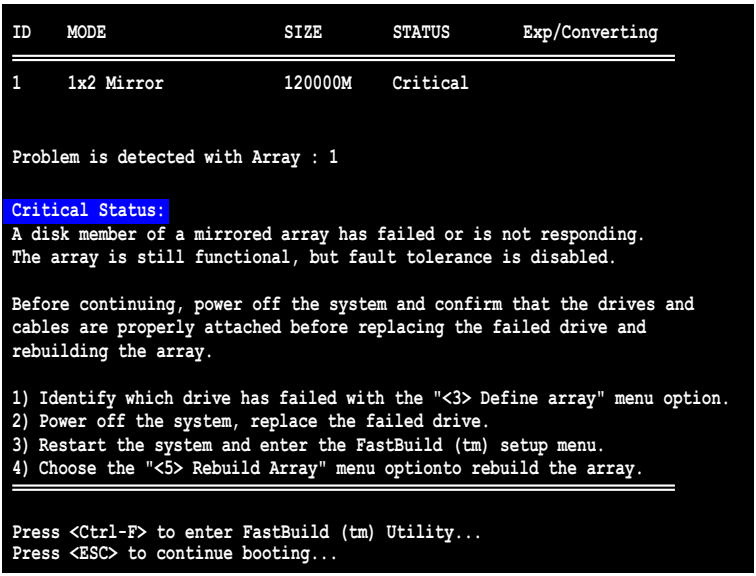
See the Drive-Related Errors section.

Using an onboard IDE card with FastTrak Controller

If an onboard IDE controller is installed with hard disks, enable support in the Motherboard Standard CMOS Setup for the drives. Note that the onboard IDE hard drives will then be the bootable hard disk unless the system BIOS has a boot sequence setting with the option to specify booting to a different device.

Drive-Related Issues

Critical logical disk (array) status error reported during boot



If a critical status error message appears on the FastTrak BIOS startup screen for a mirrored logical disk (array), there is a drive in the logical disk that has failed or is not responding. The mirrored logical disk has lost its fault tolerance, but will still perform normal drive reads and writes.

See page 36 for information on how to identify a failed disk drive and rebuild your logical disk.

Disk drives cannot be formed into a logical disk

Disk drives must support Serial ATA and be free of media defects in order to be added to a logical disk. Promise recommends using new identical drives for each logical disk. Also, re-check the data and power cabling and connections.

System CMOS displays C: or D: drive failure during Startup

Do not reference C: or D: in the Motherboard Standard CMOS for drives attached to the FastTrak Serial ATA RAID Controller. Only enter drive information in the Motherboard CMOS for drives attached to the onboard IDE controller.

Unable to partition or format logical disk

This condition may occur when the *Reserve Sector* of one of the drives has become corrupt or bad. Removing (erasing) the reserve sector will remedy any issue related directly to a bad reserve sector.

Warning

Before removing the reserve sector of the drive(s), backup any existing data. Removal of the reserve sector of any disk drive permanently deletes all existing data on the drive.

To remove the reserve sector, follow these steps:

1. Backup any important data from the logical disk.
2. Note the logical disk information, including which drives are used, the number of drives, RAID Level, etc.
3. Delete the logical disk.
4. Create a new logical disk using the specifications from the previous logical disk.
5. During the creation process, select the Create and Quick Initialize option.
6. Partition and format the logical disk using your PC's operating system. See page 71.

Logical disk constantly goes critical or offline during reboot

See Unable to Partition or Format logical disk, above.

Cannot rebuild mirrored (RAID 1) logical disk

See Unable to Partition or Format logical disk, above.

Fatal errors or data corruption are constantly reported when reading or writing to the logical disk

See Unable to Partition or Format logical disk, above.

Operating System-Related Issues

The Operating System no longer boots after creating a Mirrored Logical Disk using your existing boot drive using Windows

This is due to Drive Geometry issues. You can verify this if you move the original drive back to the onboard controller and it boots successfully. Each controller can view a drive differently. This can be an issue for a new controller that loads the original Master Boot Record (MBR) and then has a problem translating it or the Operating System boot record.

Promise recommends a clean install of the Operating System. This action restores the MBR and OS boot record. This requires repartitioning and formatting the drive.

Promise Windows driver does not appear in Device Manager

Windows may already be listing the controller under Other Devices instead of the Hard disk controllers section. In Device Manager under Other Devices to see if it lists a PCI Card or RAID Controller. If so, highlight this listing and click on the Properties button then click on the Driver tab. Depending on your version of Windows, choose either Change Driver or Update Driver. Follow the on-screen prompts to complete installation of the driver. If Windows asks if you want to test if the device can be removed safely, click on CANCEL. Reboot the system to complete installation of the driver.

“Inaccessible Boot Device” message appears during floppyless installation of Windows

The F6 key was not pressed at the appropriate time. Reboot the system, and press the F6 key when the message "Press F6 if you need to install third party SCSI or RAID driver" appears in Windows.

“No Hard Drives Found” message appears during CD-ROM installation of Windows

The F6 key was not pressed at the appropriate time. Reboot the system, and press the F6 key when the message “Press F6 if you need to install third party SCSI or RAID driver” appears in Windows.

Performance Tips

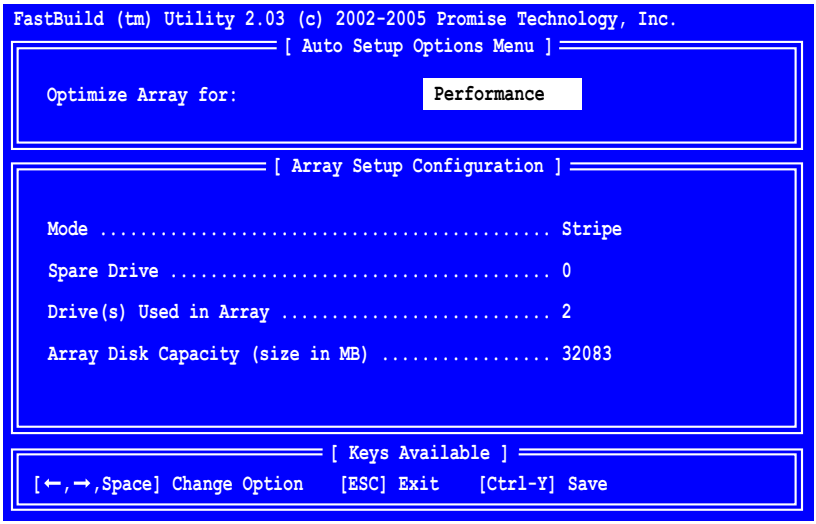
Here are some tips that may optimize performance in a RAID 0 striped logical disk. If you are using an audio/video-editing card, we also recommend reviewing your card's documentation for additional information.

Use FastTrak TX2200 or TX4200 as D: or other non-bootable drive in a striped logical disk

For Audio/Video editing, keep the original system boot drive on the standard IDE controller as C: drive. Partitioning software will see the logical disk as one physical drive, D: or later. This will prevent file fragmentation and provide better accessibility to the logical disk.

Optimize logical disk for "performance"

The Promise FastBuild BIOS Utility Auto Setup Menu allows optimizing the logical disk for Performance applications such as A/V Editing. The default Performance setting (Stripe) selects a Stripe Block size of 64. This larger block size is recommended for the data streaming requirements of A/V editing. You may select an even larger block size in manual mode (see page 25).



Chapter 7: Support

Frequently Asked Questions

This section lists frequently asked questions involving pre-installation, drive issues, installation, and post-installation.

Pre-Installation

(Speed, Device Types, Capacity, Cabling)

What kind of hard drives can I use for a FastTrak Serial ATA RAID logical disk?

You can use any Serial ATA disk drive(s) to create logical disks on the FastTrak Serial ATA RAID Controller card. Use matching drives for multiple-logical disks to maximize capacity usage as well as performance.

Will ACPI work with disk drives on the FastTrak Controller card?

Yes.

Can I use ATAPI devices on the FastTrak Controller card?

No. The FastTrak Serial ATA RAID Controller card does not support ATAPI devices.

Will the FastTrak Controller card work with 66MHz PCI bus speed?

Yes, the FastTrak Serial ATA RAID Controller card is designed to accommodate the newer PCI bus speed and is backward compatible with 33MHz speeds.

How can I change the resources that the FastTrak uses?

The FastTrak Serial ATA RAID Controller card is fully PnP. This means all the resources that it uses are given to it by the PnP BIOS on the motherboard. The FastTrak Serial ATA RAID Controller does support IRQ sharing, but this will not work unless ALL the concerned devices support the feature. If your motherboard allows you to control the assignment of these resources, you may be able to remedy the problem by:

- Changing the IRQ assignments to the PCI slots in the motherboard BIOS during boot up.

- Reset the configuration data in your CMOS. This is usually an option in the PnP section of your CMOS.
- Otherwise, switch the FastTrak card to a different PCI slot.

How does the FastTrak Controller provide storage and/or data protection with their logical disks?

The FastTrak Serial ATA RAID Controller card implements three different RAID levels as follows:

RAID 0 (Stripe)

For capacity – The FastTrak logical disk will be as big as the smallest drive in the logical disk times however many drives are in the logical disk. Any larger HDDs will simply be truncated. The truncated space on the bigger drives is unusable.

For sustained data transfers – Using FastTrak, a RAID 0 logical disk consisting of two drives will transfer at about twice the speed of the slowest drive in the logical disk. A RAID 0 logical disk consisting of four drives (TX4200) will transfer at about three times the speed of the slowest drive in the logical disk.

RAID 1 (Mirror)

For capacity – The FastTrak logical disk will be as big as the smallest drive in the logical disk. The larger drive will simply be truncated. The truncated space on the bigger drive is unusable.

For sustained data transfers – The FastTrak logical disk will write data at the rate of the slowest drive in the logical disk. The FastTrak logical disk will read data at twice the rate of the slowest drive in the logical disk.

RAID 10 (Mirror/Stripe) (TX4200 only)

For capacity – The FastTrak logical disk will be twice the size as the smallest drive in the logical disk. Larger drive will simply be truncated. The truncated space on the bigger drives is unusable.

For sustained data transfers – The FastTrak logical disk will read and write data at the rate of the slowest drive in the logical disk.

Drive Issues

Can I add a drive to a FastTrak logical disk via hot-swap and dynamically adjust the logical disk size?

Yes. The FastTrak Serial ATA RAID Controller card supports dynamically adjustable RAID size and RAID level. RAID level changes depend on the original RAID level and the number of drives available.

Do the disk drives on the FastTrak Controller have to be the same size?

The disk drives connected to the FastTrak Serial ATA RAID Controller card do not have to be the same size. If the sizes differ, the FastTrak Controller will truncate the bigger drive so the drives match. The resulting difference in drive space is unusable, so avoid using disk drives of significantly different capacities.

I already have a logical disk on an older FastTrak controller. Can I move that logical disk to my new FastTrak Serial ATA RAID controller?

Yes, provided your logical disk was build using Serial ATA disk drives. All FastTrak controllers read the logical disks the same way so you can move them from one controller to another.

Can I take a drive used in a FastTrak logical disk and access it directly with a different controller, such as the one integrated on the motherboard?

Only Single-drive striped (RAID 0) and mirrored (RAID 1) logical disk configurations allow the drive(s) to be accessed individually on another controller. Multiple-drive striped (RAID 0) or mirrored/striped (RAID 10) drives will not work.

If I have a problem with one of the drives on the FastTrak Controller, how can I low-level format it to correct the problem?

Do NOT do this. Low-level formatting is unnecessary and generally does not correct problems commonly experienced. If you think the disk drive is faulty, run the drive manufacturer's diagnostic utility on it.

Errors such as bad sectors or ECC/CRC failure are best remedied by completely replacing the drive. For this reason, do NOT low-level format the drives attached to the FastTrak controller.

Do I have to install disk management software on my logical disk in order to access the full storage capacity of drives?

No! Disk management software will only complicate things. The logical disk should be fully addressable by your OS as it is. Remember that some operating systems have varying limits on the sizes of partitions and logical drives that can be defined. Consult your OS documentation about partitioning larger drives.

What system BIOS setup settings do I use for the drives on the FastTrak Serial ATA RAID Controller card?

None. The drives on the FastTrak Controller are supported by the FastTrak BIOS and/or OS drivers, not by your system BIOS.

How do I partition/format my FastTrak logical disk?

The FastTrak Serial ATA RAID Controller represents the logical disk as a single disk drive to your system. Therefore, anything that you can do to a single disk drive you can do to a FastTrak logical disk. You can partition the logical disk as you see fit using any file system you want.

Installation Issues

(Capacity, Booting)

How can I change the system boot sequence in order to boot from the FastTrak logical disk?

The boot sequence is controlled by the system BIOS. As far as the system BIOS is concerned, the FastTrak Serial ATA RAID Controller and its defined logical disks are categorized as a SCSI device. This allows you to set the boot sequence in your BIOS setup utility to boot from SCSI first, rather than IDE.

If there are multiple SCSI add-in controllers in the system, then the boot sequence among is determined by their PCI slot priority. PCI slot #1 will be first, slot #2 second, etc. If you want to boot from the logical disk, put the FastTrak Controller in the PCI slot where it will be accessed before the other SCSI controllers.

How can I change the boot sequence between a PCI SCSI card and the FastTrak logical disk?

Since all PCI devices are PnP, it is difficult to determine which device is addressed first. Some newer motherboard BIOSes have advanced options that identify devices and allow you to select which device will be assigned resources first. Otherwise you may have to physically switch the device cards on the PCI slots so that the boot device is in the highest priority slot number, as described in the previous answer.

Post-Installation

Why can't I see the drives on the FastTrak Controller card under FDISK?

You have not created a logical disk yet. If no logical disk has been created, the system will not recognize drive(s) attached to the FastTrak card.

Contact Technical Support

Promise Technical Support provides several support options for Promise users to access information and updates. We encourage you to use one of our electronic services, which provide product information updates for the most efficient service and support.

If you decide to contact us, please have the following information available:

- Product model and serial number
- BIOS and driver version numbers
- A description of the problem / situation
- System configuration information, including: motherboard and CPU type, hard drive model(s), ATA/ATAPI drives & devices, and other controllers.

Technical Support Services

Promise Online™ Web Site	http://www.promise.com (technical documents, drivers, utilities, etc.)

North and South America

E-mail Support	support@promise.com
Fax Technical Support	(408) 228-0730 Attention: Technical Support
Phone Technical Support	(408) 228-6073 7:30-5:30pm M-F Pacific Standard Time
If you wish to write us for support:	Promise Technology, Inc. Attn: Technical Support 580 Cottonwood Drive Milpitas, CA 95035, USA

Europe, Africa and Middle East

E-mail Support	support@promise.nl
Fax Technical Support	+31 (0) 40 256 9463 Attention: Technical Support
Phone Technical Support	+31 (0) 40 235 2600 8:30-5:00pm The Netherlands Time
If you wish to write us for support:	Promise Technology Europe B.V. Attn: Technical Support Luchthavenweg 81-125 5657 EA Eindhoven, The Netherlands

Pacific Rim

E-mail Support	support@promise.com.tw
Fax Technical Support	+886 3 564 53 13 Attention: Technical Support
Phone Technical Support	+886 3 578 23 95 (ext. 8873) 9:00-5:30pm Taiwan Time
If you wish to write us for support:	Promise Technology, Inc. Attn: Technical Support 2F, No. 30, Industry E. Rd. IX Science-based Industrial Park Hsinchu, Taiwan, R.O.C.

China

E-mail Support	support-china@promise.com
Fax Technical Support	+86 10 8857 8015 Attention: Technical Support
Phone Technical Support	+86 10 8857 8085 or 8095 9:00-6:00pm China Time
If you wish to write us for support:	Promise Technology China Attn: Technical Support Room 1205,Tower 3,Webok Time-center No.17 South Zhong Guan Cun Road Hai Dian District, Beijing 100081 P.R. China

Limited Warranty

Promise Technology, Inc. (“Promise”) warrants that for three (3) years from the time of the delivery of the product to the original end user:

a) the product will conform to Promise’s specifications;

b) the product will be free from defects in material and workmanship under normal use and service.

This warranty:

a) applies only to products which are new and in cartons on the date of purchase;

b) is not transferable;

c) is valid only when accompanied by a copy of the original purchase invoice.

d) Is not valid on spare parts, fans, and power supplies

This warranty shall not apply to defects resulting from:

a) improper or inadequate maintenance, or unauthorized modification(s), performed by the end user;

b) operation outside the environmental specifications for the product;

c) accident, misuse, negligence, misapplication, abuse, natural or personal disaster, or maintenance by anyone other than a Promise or a Promise-authorized service center.

Disclaimer of other warranties

This warranty covers only parts and labor, and excludes coverage on software items as expressly set above.

Except as expressly set forth above, Promise DISCLAIMS any warranties, expressed or implied, by statute or otherwise, regarding the product, including, without limitation, any warranties for fitness for any purpose, quality, merchantability, non-infringement, or otherwise. Promise makes no warranty or representation concerning the suitability of any product for use with any other item. You assume full responsibility for selecting products and for ensuring that the products selected are compatible and appropriate for use with other goods with which they will be used.

Promise DOES NOT WARRANT that any product is free from errors or that it will interface without problems with your computer system. It is your responsibility to back up or otherwise save important data before installing any product and continue to back up your important data regularly.

No other document, statement or representation may be relied on to vary the terms of this limited warranty.

Promise's sole responsibility with respect to any product is to do one of the following:

a) replace the product with a conforming unit of the same or superior product;

b) repair the product.

Promise shall not be liable for the cost of procuring substitute goods, services, lost profits, unrealized savings, equipment damage, costs of recovering, reprogramming, or reproducing of programs or data stored in or used with the products, or for any other general, special, consequential, indirect, incidental, or punitive damages, whether in contract, tort, or otherwise, notwithstanding the failure of the essential purpose of the foregoing remedy and regardless of whether Promise has been advised of the possibility of such damages. Promise is not an insurer. If you desire insurance against such damage, you must obtain insurance from another party.

Some states do not allow the exclusion or limitation of incidental or consequential damages for consumer products, so the above limitation may not apply to you.

This warranty gives specific legal rights, and you may also have other rights that vary from state to state. This limited warranty is governed by the State of California.

Your Responsibilities

You are responsible for determining whether the product is appropriate for your use and will interface with your equipment without malfunction or damage. You are also responsible for backing up your data before installing any product and for regularly backing up your data after installing the product. Promise is not liable for any damage to equipment or data loss resulting from the use of any product.

Return Product For Repair

If you suspect a product is not working properly, or if you have any questions about your product, contact our Technical Support Staff through one of our Technical Services, making sure to provide the following information:

- Product model and serial number (required)
- Return shipping address
- Daytime phone number
- Description of the problem
- Copy of the original purchase invoice

The technician will assist you in determining whether the product requires repair. If the product needs repair, the Technical Support Department will issue an RMA (Return Merchandise Authorization) number.

Return ONLY the specific product covered by the warranty (do not ship cables, manuals, diskettes, etc.), with a copy of your proof of purchase to:

USA and Canada:	Promise Technology, Inc. Customer Service Dept. Attn.: RMA # _____ 580 Cottonwood Drive Milpitas, CA 95035
Other Countries:	Return the product to your dealer or retailer. Contact them for instructions before shipping the product.

You must follow the packaging guidelines for returning products:

- Use the original shipping carton and packaging
- Include a summary of the product's problem(s)
- Write an attention line on the box with the RMA number
- Include a copy of proof of purchase

You are responsible for the cost of insurance and shipment of the product to Promise. Note that damage incurred due to improper transport or packaging is not covered under the Limited Warranty.

When repairing returned product(s), Promise may replace defective parts with new or reconditioned parts, or replace the entire unit with a new or reconditioned unit. In the event of a replacement, the replacement unit will be under warranty for the remainder of the original warranty term from purchase date, or 30 days, whichever is longer.

Promise will pay for standard return shipping charges only. You will be required to pay for any additional shipping options (such as express shipping).

Appendix A: Partition and Format

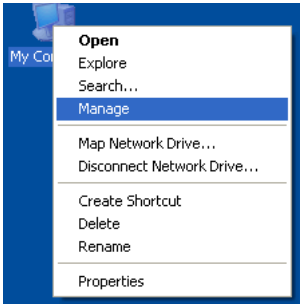
In order for your operating system to recognize and work with the disk drives attached to your FastTrak TX2200 or TX4200 Serial ATA RAID Controller card, the drives must be partitioned and formatted.

- If your drives were previously partitioned and formatted they are ready to use and you can skip this procedure
- If your drives have not been partitioned and formatted, you must do that job before you can use them

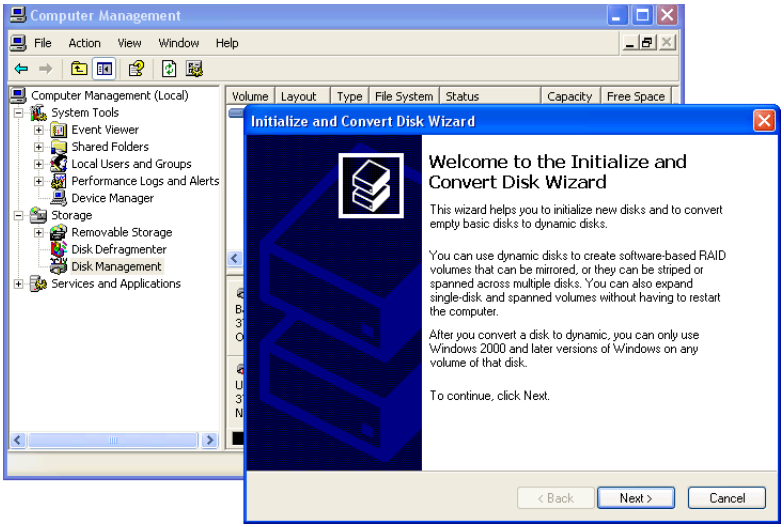
The actions of partitioning and formatting create a file structure on the disk drives with which your operating system can work. In the example below, we show how this is done in Windows. A similar procedure is required for Linux PC's. However, partitioning and formatting in Linux is unautomated, therefore please refer to your system documentation for the exact procedure.

Note

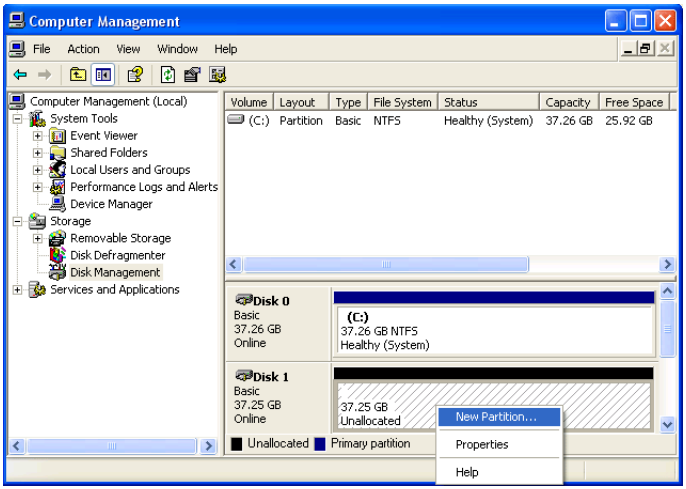
If you plan to boot your computer from this logical disk, go to Windows and Device Driver Installation under the Installation section for instructions. The instructions here are for data logical disks only.



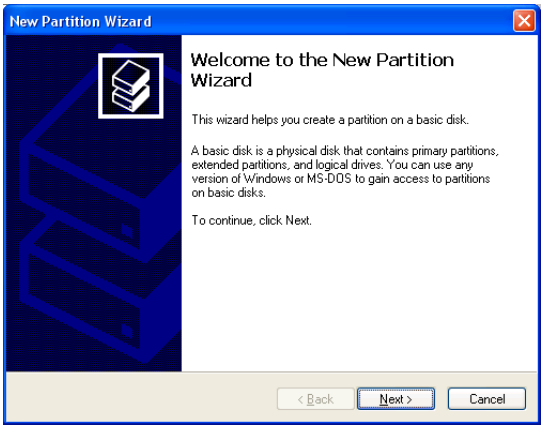
1. From the desktop, right-click on the My Computer icon and select Manage from the popup menu. The Computer Management window opens.
2. From the left menu, click on Disk Management. The Disk Management window opens with your new logical disk identified as Disk 1. The Initialize Wizard appears automatically.



3. Click the Next button to start the Wizard.
4. In the following windows, select Disk 1 to Initialize. Do not select any disks to Convert. Click the Finish button to Initialize the logical disk.

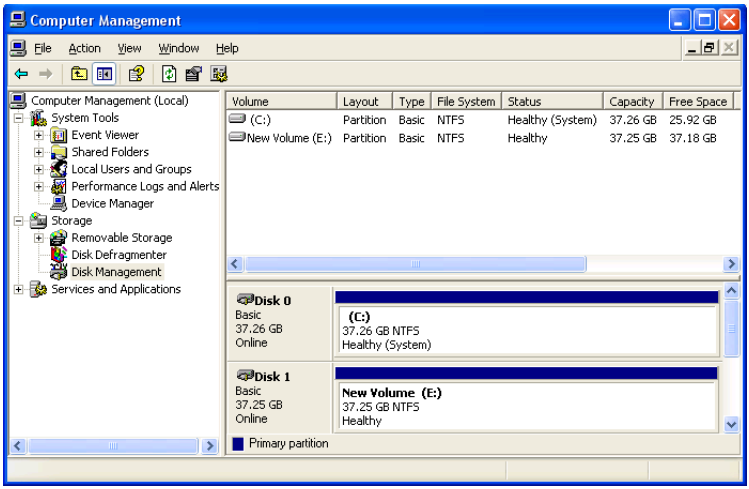


5. Right-click on the Unallocated portion of Disk 1 and select New Partition... from the popup menu. The New Partition Wizard appears.



6. Click the Next button to start the wizard.
7. In the following windows, do the following actions. Click Next to move to the next window.
   - Select Primary Partition
   - Specify the maximum available partition size in MB
   - Assign the available drive letter of your choice
   - Choose Format this partition with the following settings
   - File system: NTFS
   - Allocation unit size: Default
   - Volume label: Enter your choice of name
   - Do not check “Perform a quick format” or “Enable file and folder compression”
8. Review your selections and click Finish. The New Partition Wizard will disappear while partitioning and formatting begin.

   This process will take some time. The Disk Management window displays the progress.



When formatting is complete, your logical disk will appear as a hard drive in the Disk Management window (above) and the My Computer window (below).