



FASTTRAK
TX4650, TX2650
USER MANUAL

Version 1.0

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The appearance in this manual of products made by other companies, including, but not limited to, software, servers, and physical (disk) drives, is for the purpose of illustration and explanation only. Promise Technology does not recommend, endorse, prefer, or support any product made by another manufacturer.

Contents

Chapter 1: Introduction	1
About This Manual	1
Overview	2
FastTrak TX Series	2
FastTrak TX4650	2
FastTrak TX2650	2
WebPAM Software	3
Key Features and Benefits	4
Specifications	6
Chapter 2: Installation	7
Unpacking Your FastTrak Card	7
Installing the FastTrak Card	8
Connecting the FastTrak Card	10
Using a SuperSwap Enclosure	10
Without a SuperSwap Enclosure	11
Creating Your Logical Drive	12
Installing WebPAM	15
Utility Server	15
Java Runtime Environment	16
Operating System Support	16
Browser Support	16
Installation	16
Chapter 3: Installing Drivers	23
FastTrak Driver Diskette for Windows	24
USB Memory Stick for Windows	24
FastTrak Driver Diskette for Linux	25
Windows Vista	26
New OS Installation	26
Existing System	27
Confirming Driver Installation	27
Windows Server 2003	28
New OS Installation	28
Existing System	29
Confirming Driver Installation	29
Windows XP	30
New OS Installation	30
Existing System	31
Confirming Driver Installation	31

Chapter 3: Installing Drivers, cont.

Windows 2000	32
New OS Installation	32
Existing System	33
Confirming Driver Installation	33
Red Hat Linux Enterprise 5.0	34
New OS Installation	34
Existing System	34
SuSE Linux Enterprise Server 10.0	35
New OS Installation	35
Existing System	35

Chapter 4: FastBuild™ Utility37

Using the FastTrak BIOS	37
Navigating the Main Menu	38
Viewing Drive Assignments	39
Creating a Logical Drive	40
Creating Two Logical Drives	43
Deleting a Logical Drive	49
Viewing the Controller Configuration	51
Responding to Logical Drive Problems	52
Finding a Failed Drive in FastBuild	52

Chapter 5: WebPAM53

Logging into WebPAM	53
Regular Connection	53
Secure Connection	53
Logging out of WebPAM	55
Managing Users	56
Adding a User	56
Setting Event Notification	57
Setting a Net Send IP Address	60
Deleting a User	61
Changing a User's Password	61
Changing a User's Email Address	63
Changing a User's Access Rights	63
Viewing Host Management	65
Making Utility Configuration Settings	66
Viewing the FastTrak Card	67

Chapter 5: WebPAM, cont.

Managing the Controller	.68
Viewing Controller Information	.68
Making Controller Settings	.68
Viewing Scheduled Actions	.70
Deleting a Scheduled Action	.70
Locking the Controller	.71
Restoring Default Settings	.72
Managing Physical Drives	.73
Viewing Physical Drives	.73
Viewing Physical Drive Information	.74
Making Physical Drive Settings	.75
Running Media Patrol	.75
Checking the Bad Sector Log	.77
Locating a Physical Drive	.78
Managing Logical Drives	.80
Viewing All Logical Drives	.80
Creating a Logical Drive	.80
Creating a JBOD	.84
Deleting a Logical Drive or JBOD	.88
Viewing Logical Drive Information	.88
Making Logical Drive Settings	.89
Migrating a Logical Drive	.90
Rebuilding a Logical Drive	.93
Synchronizing a Logical Drive	.97
Viewing Logical Drive Initialization	.99
Activating a Logical Drive	.100
Responding to a Critical or Offline Logical Drive	.101
Managing Enclosures	.105
Viewing Enclosures	.105
Viewing Enclosure Information	.105
Managing Spare Drives	.107
Viewing Spare Drives	.107
Creating a Spare Drive	.107
Deleting a Spare Drive	.108

Chapter 6: Technology	109
About FastTrak	109
Adapter BIOS	109
Introduction to RAID	109
RAID 0 – Stripe	110
RAID 1 – Mirror	111
RAID 5 – Block Striping with Distributed Parity	112
RAID 10 – Mirror / Stripe	113
JBOD – Single Drive	115
Choosing a RAID Level	116
RAID 0	116
RAID 1	116
RAID 5	117
RAID 10	117
JBOD	117
Other Logical Drive Features	118
Stripe Block Size	118
Initialization	118
Gigabyte Boundary	118
Hot Spare Drive	118
Cache Setting	119
Logical Drive Migration	119
Chapter 7: Support	123
Frequently Asked Questions	123
Contact Technical Support	130
Limited Warranty	133
Return Product For Repair	135
Appendix A: Partition and Format	137
Appendix B: Upgrades	141
BIOS and Firmware Upgrade	141
Software Driver Upgrade	143
WebPAM Upgrade	146

Chapter 1: Introduction

- About This Manual, below
- Overview (page 2)
- FastTrak TX Series (page 2)
- WebPAM Software (page 3)
- Key Features and Benefits (page 4)
- Specifications (page 6)

Thank you for purchasing Promise Technology's FastTrak TX4650 or TX2650 SATA/SAS RAID Controller card.

About This Manual

This *User Manual* describes how to setup, use and maintain your FastTrak TX4650 or TX2650 SATA/SAS RAID Controller cards.

This manual includes a full table of contents, chapter task lists and numerous cross-references to help you find the specific information you are looking for.

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 TX4650 or TX2650 card installed by a third-party or you have acquired a FastTrak TX4650 or TX2650 retail product for your existing PC and plan to install the card yourself.

- For PC owners wishing to install their FastTrak TX4650 or TX2650 card, go to “Chapter 2: Installation” on page 7.
- For PCs with a FastTrak TX4650 or TX2650 card already installed but the FastTrak card does not recognize your physical (disk) drives, go to “Chapter 7: Support” on page 123.
- If your operating system has crashed for some reason or you have downloaded updated drivers from the Promise website <http://www.promise.com/support>, you may wish to reinstall software drivers for the FastTrak TX4650 or TX2650 card. See “Chapter 3: Installing Drivers” on page 23.

FastTrak TX Series

Promise originally designed the FastTrak TX4650 or TX2650 as cost-effective, high performance RAID controller cards that add performance and/or reliability to PC desktops and/or servers using SATA and SAS drives.

FastTrak TX4650

The FastTrak TX4650 has four independent data channels to support up to four SATA or SAS physical drives and the following RAID levels:

- 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.
- Block Striping with Distributed Parity (RAID 5) – Organizes data and distributes parity across the physical drives to increase performance and provide fault tolerance to protect your data.
- Mirror/Stripe (RAID 10) – Combines RAID 0 and RAID 1 to increase performance by reading and writing data in parallel while protecting data with duplication.
- JBOD – Just a bunch of disks. Up to four physical drives working independently.

FastTrak TX2650

The FastTrak TX2650 has two independent data channels to support up to two SATA or SAS physical drives and the following RAID levels:

- 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.
- JBOD – Just a bunch of disks. Up to two physical drives working independently.

A FastTrak TX4650 or TX2650 striped logical drive can double the sustained data transfer rate of Serial ATA drives.

FastTrak TX4650 and TX2650 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 physical drive in a mirrored logical drive fail, FastTrak TX4650 or TX2650 use the mirrored drive (which contains identical data) to assume all data handling. When a replacement physical drive is later installed, FastTrak TX4650 or TX2650 will rebuild the data to the replacement physical drive from the remaining mirrored drive to restore fault tolerance.

FastTrak TX4650 and TX2650 bootable BIOS supports individual drives larger than 137 GB. With FAT32 and NTFS partitioning, the logical drive can be addressed as one large single volume.

WebPAM Software

The Web-based Promise Array Management (WebPAM) RAID management software offers local management and monitoring of FastTrak logical drives. Browser-based GUI provides email notification of all major events or alarms, memory cache management, logging for Windows servers, logical drive maintenance, rebuild, and access to all related components (server, controller, data channels, physical drives, and enclosure).

WebPAM also displays messages about critical events on the Host PC's monitor screen even if your browser is closed.

For information on using WebPAM, refer to "Chapter 5: WebPAM" on page 53.

Key Features and Benefits

The following information offers an overview of the major features of your new Promise FastTrak TX4650 and TX2650.

Advanced Hardware Design	
Features	Benefits
Supports single-lane PCIe bus motherboards	Allows maximum data transfers of up to 2.5 Gb/s in both directions simultaneously to dramatically reduce the time to save and retrieve large files.
TX4650 supports: RAID 0, RAID 1, RAID 5, and RAID 10 TX2650 supports: RAID 0 and RAID 1	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 II	Burst data transfer rates up to 300 MB/s from Serial ATA drives to boost overall system performance.
Supports Serial Attached SCSI Specification	Burst data transfer rates up to 300 MB/s from SAS drives to boost overall system performance.
Independent data channels for SATA and SAS drives	Drives can multiply their data transfer performance when striped together and each drive uses a separate data channel.
Supports multiple LUNs, two per physical drive	TX4650 supports up to 8 logical drives. TX2650 supports up to 4 logical drives.
Supports online logical drive expansion	Add physical drives to the logical drive without affecting data availability.
Supports online logical drive migration	Change RAID level without affecting data availability.
Utilizes FastBuild™ automenu from the FastTrak onboard BIOS	Has “Auto Setup” option for quick and easy logical drive builds.
Displays status and error checking messages during bootup	Notifies user of possible errors and allows for recovery of mirrored drive logical drives directly from FastBuild™.
Supports S.M.A.R.T. monitoring and reporting	Polls status every 15 minutes, reports through WebPAM.
Employs the latest Promise PCI Express SATA/SAS ASIC technology	Fully supports Serial ATA specifications with 150 and 300 MB/sec timing and CRC error-checking at high speeds.

Advanced Hardware Design	
Features	Benefits
Mirror supports automatic background rebuilds	Fault tolerance can be restored automatically without rebooting.
DOS based flash upgrade of BIOS	Verifies proper file, option to backup existing file. Download files from Promise website.
Gigabyte Boundary	Allows easier interchangeability among physical drive vendors.
System reboot not required after create, delete, migrate or expand logical drive	System boot process continues without restarting.

Compatibility	
Features	Benefits
Complies with PCIe® Base Specification 1.1	Provides highest level of hardware compatibility.
Complies with SATA Specification 1.0a	Provides full compatibility with first generation SATA hard drives.
Complies with Serial ATA 2.6 Specification	Provides enclosure and drive monitoring compatibility.
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 and phase 2 physical 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 drives 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 Express x1 Slot
- Controller card dimensions (H x W): 2.70 x 4.43 inches (68.5 x 112.5 mm)
- Operating temperatures: 32° to 122°F (0°C to 50°C)
- Operating humidity: 5% to 95% non-condensing

Chapter 2: Installation

- Unpack Your FastTrak Card (below)
- Installing the FastTrak Card (page 8)
- Connecting the FastTrak Card (page 10)
- Creating Your Logical Drive (page 12)
- Installing WebPAM (page 15)

This Chapter is designed to quickly get your FastTrak TX Series SATA/SAS RAID Controller card up and running.

If you plan to run the WebPAM software, you must also install the driver appropriate to your operating system. See “Chapter 3: Installing Drivers” on page 23.

Unpacking Your FastTrak Card

When you receive the FastTrak TX Series SATA/SAS RAID Controller card, the package should contain the items listed below:

- FastTrak TX4650 or TX2650 card
- Low profile bracket
- *Quick Start Guide*
- 0.65 m (26 inch) SATA data to SFF-8482 data/power cables
Four for TX4650, two for TX2650
- CD with Promise RAID Management (WebPAM) software, Windows and Linux drivers, and *FastTrak TX4650, TX2650 User Manual*

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



Warning

The electronic components on the FastTrak TX4650 or TX2650 card are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the FastTrak card or its subassemblies.



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.

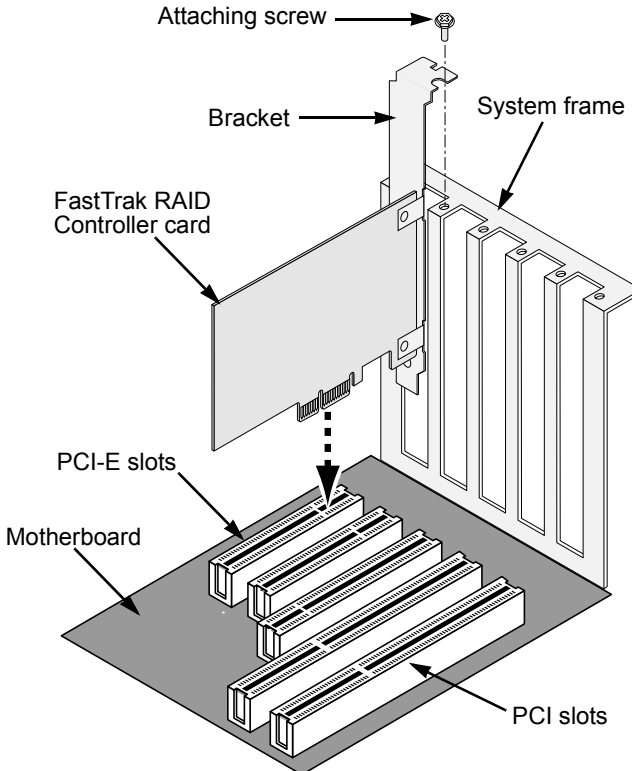


Note

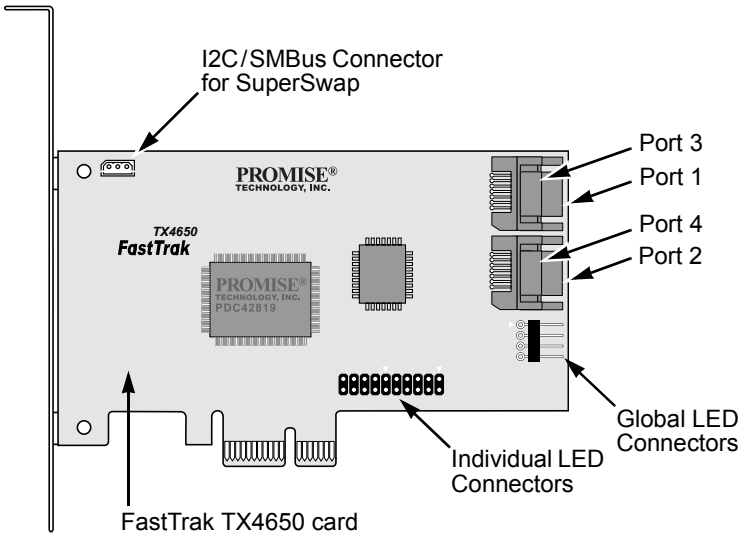
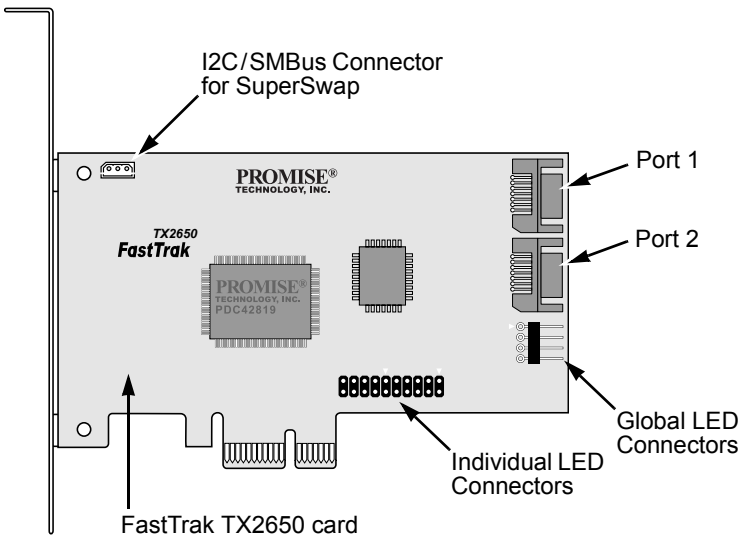
The FastTrak TX4650 or TX2650 card is a PCI Plug-n-Play (PnP) device. No changes are necessary in the motherboard CMOS/BIOS Setup for resources or drive types in most applications.

Installing the FastTrak Card

The FastTrak TX4650 or TX2650 card fits into any available PCI-E x1, x4, x8, or x16 slot in your PC's motherboard.



1. Remove the cover of your system.
2. Install the FastTrak TX4650 or TX2650 card into the open PCI-E slot.
3. Fasten the controller card bracket to the system's frame.
4. Attach your system case's 2- or 4-pin LED cable to the LED connector on the FastTrak TX4650 or TX2650 card.

Figure 1. Connectors on the FastTrak TX4650 card**Figure 2. Connectors on the FastTrak TX2650 card**

Connecting the FastTrak Card

The FastTrak TX4650 and TX2650 cards support SATA 1.5Gb/s, SATA 3.0 Gb/s, and SAS physical (disk) drives. For optimal performance, install drives of the same model and capacity. The drives' matched performance allows the logical drive to function better as a single drive.

TX4650		TX2650	
Level	Number of Drives	Level	Number of Drives
RAID 0	any number	RAID 0	any number
RAID 1	2 only	RAID 1	2 only
RAID 5	3 or 4	JBOD	1 only
RAID 10	4 only		
JBOD	1 only		

The table above shows the number of drives required for each RAID level and the RAID levels supported by the two FastTrak cards.

Using a SuperSwap Enclosure



Caution

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

For instructions on installing the SuperSwap enclosure and the physical (disk) drives, refer to the SuperSwap *Quick Start Guide* or *User Manual*.

To connect the FastTrak card using a SuperSwap enclosure:

1. Install the SuperSwap enclosure into your system.
2. Install the physical drives into your SuperSwap enclosure.
3. Do one of the following actions:
 - SuperSwap 4600: Connect a SATA-to-SATA data cable (not included) from Port 1 connector on the FastTrak card to the Port 1 connector on the SuperSwap. See Figures 1 and 2.
Connect the rest of the data cables matching the Port numbers.

- SuperSwap 1600: Connect a SATA-to-SATA data cable (not included) from one of the Port connectors on the FastTrak card to the Interface connector on the SuperSwap. See Figures 1 and 2.

Repeat this action for each SuperSwap enclosure in your system.

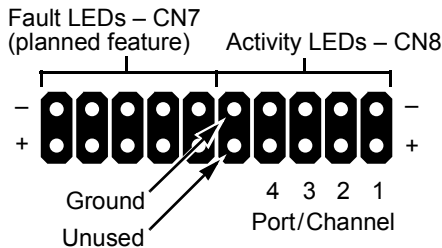
4. Attach one end of the three-wire management cable (included with SuperSwap) from the I2C/SMBus connector on the FastTrak card to the Management connector on the back of the SuperSwap.

The SuperSwap enclosure does not use the LED pins on the FastTrak card.

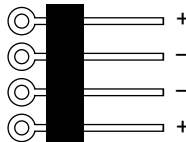
Without a SuperSwap Enclosure

To connect the FastTrak card without a SuperSwap enclosure:

1. Install the physical drives into the open drive bays of your system.
2. Attach the SATA end of a SATA data to SFF-8482 data/power cable to one of the Ports on the FastTrak card. See Figures 1 and 2.
3. Attach the SFF-8482 end of the SATA data to SFF-8482 data/power cable to your SATA or SAS physical drive.
4. Attach the power end of the SATA data to SFF-8482 data/power cable to one of the connectors on your power supply.
5. Repeat steps 2 though 4 for all or your physical drives.
6. Optional. To connect your LEDs, follow one of the following diagrams:
 - Individual LEDs.



- Aggregated or Global Activity LEDs.



Creating Your Logical Drive

You will now use the onboard FastBuild BIOS utility to create a logical drive with the attached drives.

For an explanation of the logical drive concepts, see Chapter 6



Note

You can omit this step, proceed with the WebPAM installation on page 16, then create your logical drive using WebPAM. See “Creating a Logical Drive” on page 80.

1. Boot your system. If this is the first time you have booted with the FastTrak card and drives installed, the Promise onboard BIOS will display the following screen (below).

```
FastTrak TX4650 (tm) BIOS Version 2.8.0.xx
(c) 2004-2007 Promise Technology, Inc. All rights reserved.

No Array is defined...

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

2. Press the Ctrl-F keys to display the FastBuild Utility Main Menu (below).

```
FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
[ Main Menu ]

View Drive Assignments .....[ 1 ]

Define LD.....[ 2 ]

Delete LD.....[ 3 ]

Controller Configuration.....[ 4 ]

[ Keys Available ]

Press 1..4 to Select Option [ESC]..Exit
```

3. Press 2 on the Main Menu screen to display the Define LD Menu (below).

```
FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
[ Define LD Menu ]
```

LD No	RAID Mode	Total Drv	Capacity(MB)	Status
LD 1	----	----	-----	----
LD 2	----	----	-----	----
LD 3	----	----	-----	----
LD 4	----	----	-----	----
LD 5	----	----	-----	----
LD 6	----	----	-----	----
LD 7	----	----	-----	----
LD 8	----	----	-----	----

```
[ Keys Available ]
[↑] Up [↓] Down [ESC] Exit [Enter] Select
```

- Press the arrow keys to highlight an logical drive number you want to define and press Enter to select it.

The Define LD Menu for the logical drive number you selected will next appear (below).

```
FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
[ Define LD Menu ]
```

LD No	RAID Mode	Total Drv
LD 1	RAID 5	3

Stripe Block: 16 KB Fast Init: ON
Gigabyte Boundary: ON

```
[ Drive Assignments ]
```

Channel:ID	Drive Model	Capabilities	Capacity (MB)	Assignment
1:Mas	MHT2060BS	SAS 3.0G	60012	N
2:Mas	MHT2060BS	SAS 3.0G	60012	Y
3:Mas	MHT2060BS	SAS 3.0G	60012	Y
4:Mas	MHT2060BS	SAS 3.0G	60012	Y

```
[ Keys Available ]
[↑] Up [↓] Down [ESC] Exit [Space] Change Option [Ctrl-Y] Save
```

- Choose the RAID Level you want. In the Define LD Menu section, press the Spacebar to toggle through logical drive types:
 - RAID 0 (Stripe)
 - RAID 1 (Mirror)
 - RAID 5 (Distributed Parity)
 - RAID 10 (Stripe/Mirror)
 - JBOD (Single Drive)

See "Introduction to RAID" on page 109 for more information.

6. Press the arrow keys to move to the next option. Option choices depend on the RAID Level you selected.
 - Fast Init erases the Master Boot Record (MBR) of the physical drives when this feature is set to ON. ON is recommended.
 - Gigabyte Boundary enables replacement of a failed physical drive with a slightly smaller physical drive when this feature is set to ON. ON is recommended.
 - Stripe Block Size. Set to 16 KB with no options. Applies to RAID but not to JBOD.
7. Press the arrow keys to move to Disk Assignments. Press the spacebar to toggle between N and Y for each available drive. Y means this physical drive will be assigned to the logical drive.
Assign the appropriate number of physical drives to your logical drive.
8. Press Ctrl-Y to save your logical drive configuration.

If you set Fast Init to ON, the following message displays:

```
Fast Initialization Option has been selected.  
It will erase the MBR data of the disks.  
<Press Ctrl-Y Key if you are sure to erase it>  
<Press any other key to ignore this option>
```

- Press Ctrl-Y to continue logical drive creation and perform the Fast Initialization.
- Press any other key to cancel logical drive creation.

The Modify Array Capacity message displays:

```
Press Ctrl-Y to Modify Array Capacity or press any  
other key to use maximum capacity...
```

9. Press any key to continue.
See "Creating a Logical Drive" on page 40 for information about this option.
10. Press Esc to exit to the Main Menu. Press Esc again to exit the Utility.
11. Press Y to restart your computer.

You have successfully created a new RAID logical drive.



Important

You must be partition and format your new logical drive before you can use it. Use the same method of partitioning and formatting a logical drive as you would any other fixed disk added to your computer system.

Installing WebPAM



Important

Install the FastTrak software driver for your operating system before installing WebPAM. See “Chapter 3: Installing Drivers” on page 23 for instructions.

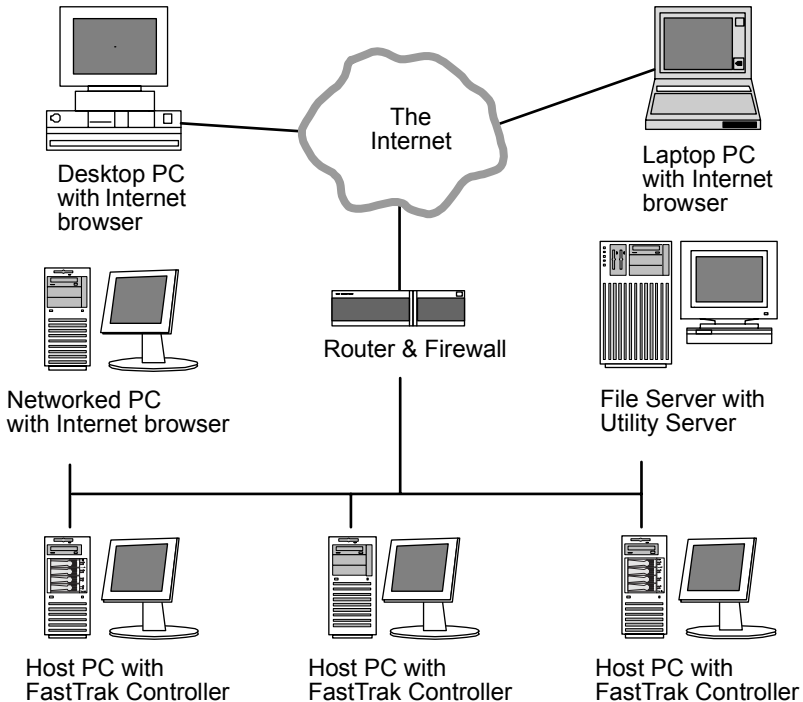
WebPAM installation software will install two major components:

- Utility Server – WebPAM RAID monitoring and Networking software
- Java Runtime Environment (if not previously installed)

Utility Server

The Utility Server installs on the PC with the FastTrak RAID Controller card (the “Host PC”).

Figure 3. WebPAM on a network



Java Runtime Environment

WebPAM uses a private installation of the Java Runtime Environment (JRE). The JRE is installed in the WebPAM folder and is only used with WebPAM. Any existing installation of a JRE or JDK on your PC will not be affected.

Operating System Support

On the Host PC where you install the FastTrak controller and WebPAM, Promise Technology recommends:

- Windows Vista Business, Enterprise, or Ultimate
- Windows Server 2003
- Windows XP Professional
- Windows 2000
- Red Hat Enterprise 5
- SuSE Linux Enterprise Server 10

WebPAM supports these operating systems. Choose one of them to take full advantage of all the features of WebPAM.

Browser Support

On the Host PC where you install the FastTrak card and WebPAM, you must have one of the following browsers:

- Internet Explorer
- Mozilla
- Firefox
- Netscape Navigator

If you do not have one of the above browsers, install the browser first and make it the default browser. Then install WebPAM.

Installation

Windows

Follow these steps to install WebPAM on your Windows-based PC or Server.

1. Boot up the PC/server and launch Windows.
If the computer is already running, exit all programs.
2. Insert the software CD into your CD-ROM drive.
3. Double-click the Install CD's icon to open it.
4. Double-click the Installer icon to launch it (right).

The first WebPAM installation dialog box appears. Go to “WebPAM Installation for Windows and Linux” on page 17



PromiseWebPAM

Linux

Follow these steps to install WebPAM on your Linux-based PC or Server.

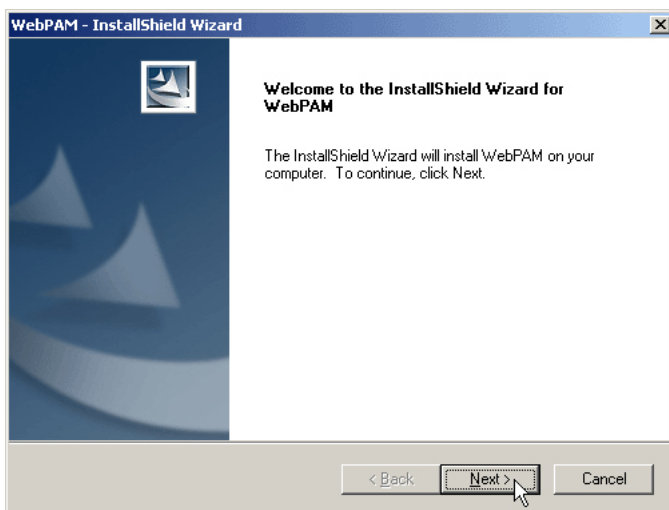
1. Boot up the PC/server and launch the Linux GUI.
If the computer is already running, exit all programs.
2. Insert the software CD into your CD-ROM drive.
3. In the CD window, double-click the **webpam...bin** icon to begin installation (right).
4. When the Run or Display? dialog box appears, click *Run in Terminal*.



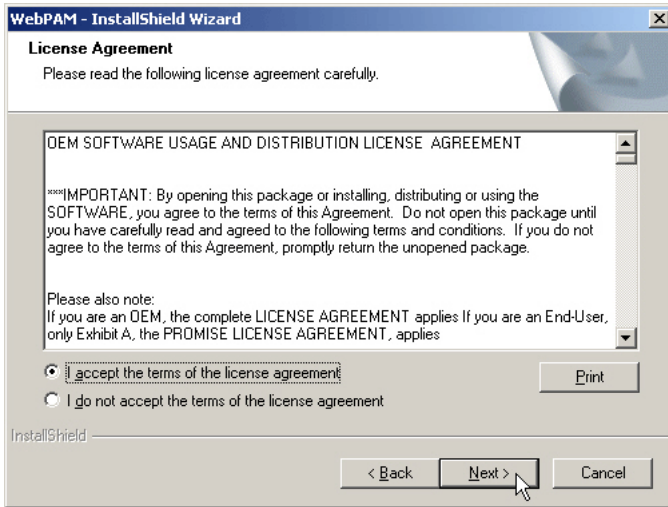
After several moments, the Terminal window closes and the first WebPAM installation dialog box appears.

WebPAM Installation for Windows and Linux

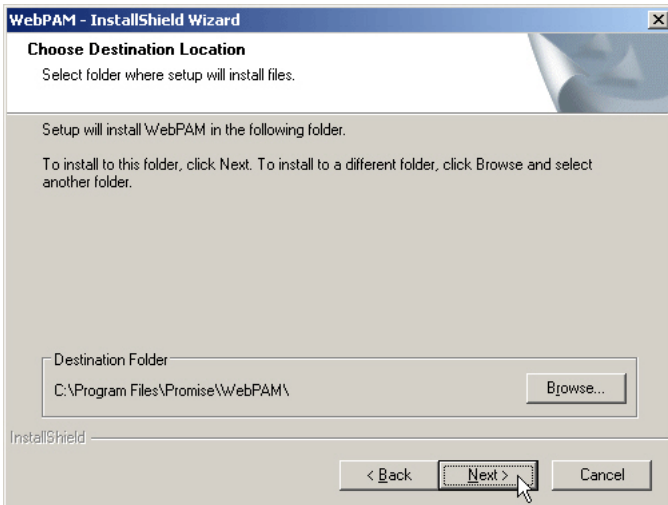
The first WebPAM installation dialog box appears, as shown below.



5. When the Introduction screen appears (above), click the **Next** button.



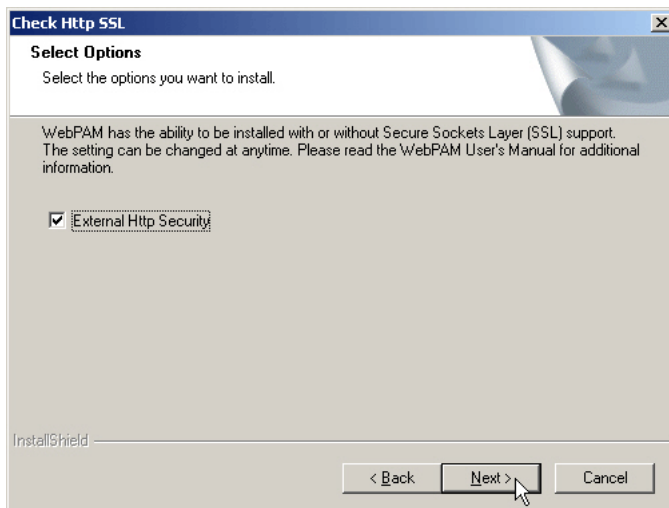
6. When the License Agreement appears (above), click the “I accept the terms of the license agreement” option. Then click the **Next** button.



7. When the Choose Install Folder screen appears (above), make your selection of a folder for the WebPAM applications you are installing. The default folder is **C:\Program Files\Promise\WebPAM**. If you want a different folder, type its location or click the **Browse** button and select a new location.

If you change your mind and want the default location, click the **Back** button, then the **Next** button.

Click the **Next** button when you are finished.



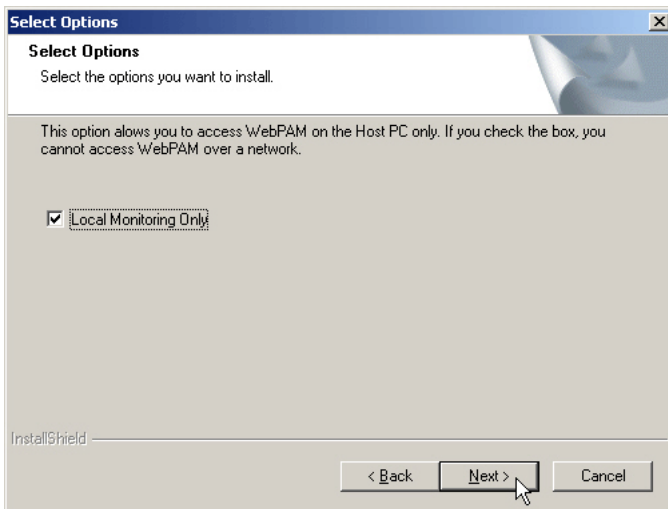
8. When the SSL Security Options screen appears (above), you can check External Security. An explanation follows.

External SSL Security – Applies security to all connections involving the Internet or outside your company firewall.

Security options are invisible to authorized users.

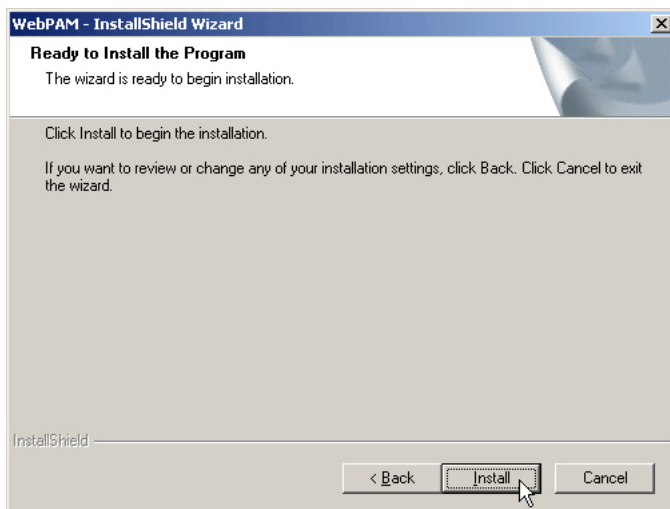
Promise Technology provides a default certificate for the server as well as for internal data communication. However, in some cases, it is better to install and verify your own certificate for the webserver. And, if possible, have your certificate verified by a certificate authority such as Verisign or Thwate. See your MIS Administrator for guidance.

Click the **Next** button when you have made your choice.

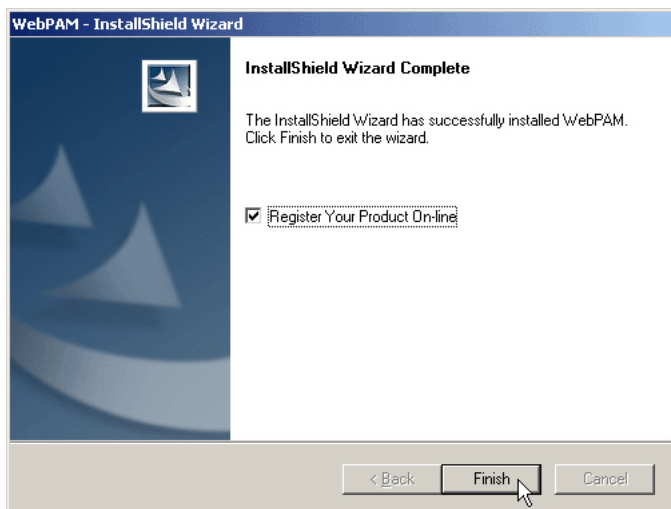


9. When the Select Options screen appears (above), you have the option of choosing *Local Monitoring Only*.
- If you check this option, you can only log into WebPAM from the Host PC. You cannot log into WebPAM over a network.
 - If you do not check this option, you can log into WebPAM from the Host PC or over a network.

To continue, click the **Next** button.



10. When the Ready to Install screen appears (above), click the **Install** button.



11. When the Install Complete screen appears (above), the installation process is finished. Click the **Finish** button to go to the Promise Registration website.



Important

Registration of your FastTrak and WebPAM provides useful information that helps Promise Technologies to offer better products and support. Please take a few minutes to register. Thanks!

This completes the WebPAM installation. Go to “Chapter 5: WebPAM” on page 53 for information about using WebPAM.

Chapter 3: Installing Drivers

- FastTrak Driver Diskette for Windows (page 24)
- USB Memory Stick for Windows (page 24)
- FastTrak Driver Diskette for Linux (page 25)
- Windows Vista
 - New OS Installation (page 26)
 - Existing System (page 27)
 - Confirming Driver Installation (page 27)
- Windows Server 2003
 - New OS Installation (page 28)
 - Existing System (page 29)
 - Confirming Driver Installation (page 29)
- Windows XP
 - New OS Installation (page 30)
 - Existing System (page 31)
 - Confirming Driver Installation (page 31)
- Windows 2000
 - New OS Installation (page 32)
 - Existing System (page 33)
 - Confirming Driver Installation (page 33)
- Red Hat Linux Enterprise 5.0
 - New OS Installation (page 34)
 - Existing System (page 34)
- SuSE Linux Enterprise Server 10.0
 - New OS Installation (page 35)
 - Existing System (page 35)

Following are driver installation procedures for the Windows operating systems that support the FastTrak TX Series SATA/SAS RAID Controller card. The FastTrak drivers for Windows and Linux are included on the CD.

Please download the latest drivers from the Promise website at <http://www.promise.com/support>.

FastTrak Driver Diskette for Windows

If you have a Windows PC and plan to install your FastTrak driver from a diskette, follow this procedure. This procedure requires one write-enabled blank 3.5-inch diskette.

1. Place your blank diskette in the appropriate drive.
2. Insert the Promise CD into your CD-ROM drive.
The display screen should open automatically.
If the display screen does not open, click **MyComputer > CD Drive D:** and double-click the **Launch.exe** icon.
3. Click the **Windows Driver** button.
The Disk Copy Utility opens.
4. Click the **Create** button in the Utility.
A confirmation box appears.
5. Click the **Yes** button in the confirmation box.
The utility prepares your driver diskette.
When the utility is finished, it displays a message.
6. In the message, click the **OK** button, then click the **Exit** button to close the Promise CD.

USB Memory Stick for Windows

If you have a Windows PC and plan to install your FastTrak driver from a USB memory stick, follow this procedure. This procedure requires one write-enabled USB memory stick.

1. Attach your USB memory stick to the USB port.
2. Insert the Promise CD into your CD-ROM drive.
3. Click **MyComputer > CD Drive D:** go to the Windows Driver folder.
4. Manually copy the driver files to you USB memory stick.

FastTrak Driver Diskette for Linux

If you have a Linux PC and plan to install your FastTrak driver from a diskette, follow this procedure. This procedure requires one write-enabled blank 3.5-inch diskette.

1. Place your blank diskette in the appropriate drive.
2. Insert the Promise CD into your CD-ROM drive.

The display screen should open automatically.

If the display screen does not open, open the CD manually in your graphic user interface.

3. Click the **Linux Driver** button.
4. Manually copy the driver image file to your PC's hard drive or a USB memory stick.
5. Do one of the following actions:
 - On a Windows PC – Type **rawrite.exe** to extract the driver image file to the blank diskette.
 - On a Linux PC – Type **dd if=<imageFileName> of=<floppyDeviceName> bs=10k** to extract the driver image file to the blank diskette.

Where <imageFileName> is the driver image file name and <floppyDeviceName> is the device name, such as /dev/ fd0.

Windows Vista

New OS Installation

The following details the installation of the FastTrak TX Series RAID Controller drivers while installing Windows Vista.

1. Start the installation: Boot from the DVD-ROM.
2. When the “Where do you want to install Windows?” dialog box appears, click **Load Driver**.
3. Insert the FastTrak driver diskette into drive A: or attach a USB memory stick with the FastTrak driver to the USB port.
4. In the Load Driver dialog box, click the **Browse** button.
5. In the Browse for Folder dialog box, click the diskette or USB stick, then click the **OK** button.
6. In the “Select the driver to be installed” dialog box, highlight *Promise FastTrak TX [4650, 2650] (tm) Controller*, then click the **Next** button.
7. When the “Where do you want to install Windows?” dialog box appears again, in the list of Disks, highlight the Disk representing your logical drive (the Disk with unallocated space), then click the **Next** button.
8. Continue the Windows installation.

Existing System

After installing the FastTrak TX Series RAID Controller card and rebooting your system, Windows Vista setup will show a “Found New Hardware” dialog box. Under Windows Vista, “RAID Controller” will be displayed.

1. Insert the FastTrak driver diskette into drive A: or attach a USB memory stick with the FastTrak driver to the USB port.
2. Choose *Install the software automatically* and press the Enter key.
3. Choose *Promise FastTrak TX [4650, 2650] (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**.

Confirming Driver Installation

1. Right-click the My Computer icon and choose *Manage* from the popup menu.
2. From the left panel, choose *Device Manager*.
3. Click the + in front of Storage controllers. “Promise FastTrak TX [4650, 2650] (tm) Controller” and “Promise Raid Console” should appear.

Windows Server 2003

New OS Installation

The following details the installation of the FastTrak TX Series 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 *Promise FastTrak TX [4650, 2650] (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 "Promise FastTrak TX [4650, 2650] (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 System

After installing the FastTrak TX Series RAID Controller card and rebooting your system, Windows Server 2003 setup will show a “Found New Hardware” dialog box. Under Windows 2003, “RAID 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 *Promise FastTrak TX [4650, 2650] (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**.

Confirming Driver Installation

1. Right-click the My Computer icon and choose *Manage* from the popup menu.
2. From the left panel, choose *Device Manager*.
3. Click the + in front of SCSI and RAID controllers. “Promise FastTrak TX [4650, 2650] (tm) Controller” and “Promise Raid Console” should appear.

Windows XP

New OS Installation

The following details the installation of the FastTrak TX Series 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 *Promise FastTrak TX [4650, 2650] (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 “Promise FastTrak TX [4650, 2650] (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 System

After installing the FastTrak TX Series 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 *Promise FastTrak TX [4650, 2650] (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**.

Confirming Driver Installation

1. Right-click the My Computer icon and choose *Manage* from the popup menu.
2. From the left panel, choose *Device Manager*.
3. Click the + in front of SCSI and RAID controllers. “Promise FastTrak TX [4650, 2650] (tm) Controller” and “Promise Raid Console” should appear.

Windows 2000

New OS Installation

The following details the installation of the FastTrak TX Series 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 *Promise FastTrak TX [4650, 2650] (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 "Promise FastTrak TX [4650, 2650] (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 System

After installing the FastTrak TX Series 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 *Promise FastTrak TX [4650, 2650] (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.

Confirming Driver Installation

1. Right-click the My Computer icon and choose *Manage* from the popup menu.
2. From the left panel, choose *Device Manager*.
3. Click the + in front of SCSI controllers. “Promise FastTrak TX [4650, 2650] (tm) Controller” and “Promise Raid Console” should appear.

Red Hat Linux Enterprise 5.0

New OS Installation

1. Start the RedHat Linux Installation by booting from the install CD.
At the “Welcome to Red Hat Linux...” installation screen, a prompt labeled **boot:** will appear at the bottom of the screen.
2. Type **linux dd acpi=off** and press Enter.
3. When the Installer asks, “Do you have a driver disk?” click **Yes**.
4. At the “Insert your driver disk and press OK to continue,” insert the driver diskette into the floppy drive and click **OK**.
5. Continue with the installation normally.



Note

On first installation mode, do not choose the *Virtualization* option. FastTrak does not support it.

Existing System

1. Insert FastTrak driver diskette into the floppy drive.
2. Log in as *root*.
3. Type **mount -r /dev/fd0 /media/floppy**.
4. Type **cd /media/floppy**
5. Type **sh ./install**.
6. When the installer asks, “You are installing a driver on an existing OS. Is it true (y/n)?” type **Y** and press Enter.
7. Type **cd; umount /media/floppy**.
8. Remove the FastTrak driver diskette.
9. Type **reboot** to restart the system.

SuSE Linux Enterprise Server 10.0

New OS Installation

1. Start the SuSE Linux Installation by booting from the install CD.
2. As the system boots, press F5 for the Driver Disk.
3. Move the cursor to the *Installation – ACPI Disabled* option, and press Enter.
4. When the installer displays, “Please insert the Driver Update floppy/CDROM,” insert the FastTrak driver disk, then press Enter.
5. When the Driver Update Menu pops up, click **OK**, then click **Back** to return to the installer.
6. Follow the on-screen prompts to complete the installation.

Existing System

1. Insert the FastTrak driver diskette into the floppy drive.
2. Log in as *root*.
3. Type **mount /dev/fd0 /media/floppy**.
4. Type **cd /media/floppy**
5. Type **./install**.
6. Type **cd; umount /media/floppy**.
7. Remove the FastTrak driver diskette.
8. Type **reboot** to restart the system.

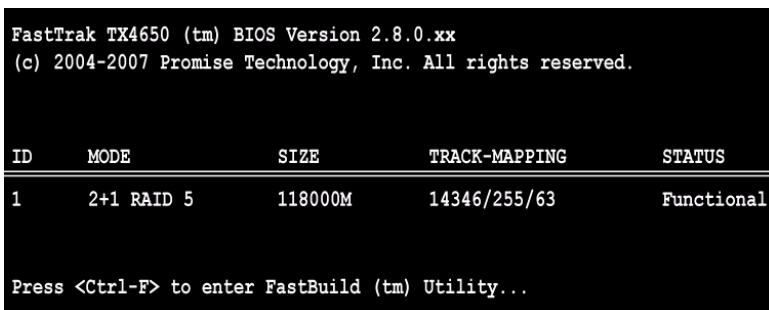
Chapter 4: FastBuild™ Utility

- Using the FastTrak BIOS (below)
- Navigating the Main Menu (page 38)
- Viewing Drive Assignments (page 39)
- Creating a Logical Drive (page 40)
- Creating Two Logical Drives (page 43)
- Deleting a Logical Drive (page 49)
- Viewing the Controller Configuration (page 51)
- Responding to Logical Drive Problems (page 52)

Using the FastTrak BIOS

The FastTrak BIOS is a built-in component of the FastTrak TX Series SAS/SATA RAID Controller card.

When the FastTrak BIOS loads during bootup, it displays pertinent information about the RAID logical drives that it finds. At this point, you can press Ctrl-F to enter the FastBuild Utility.



FastTrak TX4650 (tm) BIOS Version 2.8.0.xx
(c) 2004-2007 Promise Technology, Inc. All rights reserved.

ID	MODE	SIZE	TRACK-MAPPING	STATUS
1	2+1 RAID 5	118000M	14346/255/63	Functional

Press <Ctrl-F> to enter FastBuild (tm) Utility...

When the FastTrak BIOS screen appears, press Ctrl-F to enter the FastBuild Utility.

The FastTrak BIOS screen displays the following information:

ID – An identification number assigned to each logical drive by the BIOS.

Mode – The RAID mode (level) configuration of the logical drive

Size – The data capacity of the logical drive in MB (Megabytes).

Track-Mapping – This is the CHS (Cylinder/Head/Sector) equivalent of the logical drive geometry as hosted by the FastTrak BIOS int 13h disk services.

Status – Shows one of three logical drive conditions:

Functional – The logical drive is fully operational, and no problems are present.

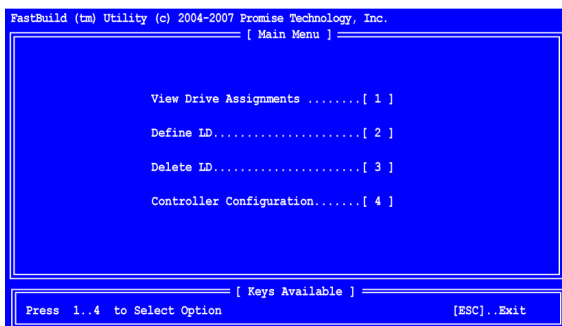
Critical – The logical drive is operational, but has lost its fault tolerance. For RAID 1, 5, or 10, the logical drive contains a failed drive. You must identify and replace the failed physical (disk) drive.

Offline – The logical drive is no longer operational and the FastBuild utility cannot rebuild it. You must identify and replace the failed drive(s). Then you can create a new logical drive and copy your data to it from the last tape backup or other device.

- For RAID 1, 5, or 10, two or more physical drives in the logical drive have failed.
- For a RAID 0 or JBOD, one physical drive has failed.

Navigating the Main Menu

When the FastTrak BIOS displays on your computer screen, press Ctrl-F to launch the FastBuild utility and display the Main Menu.



The Main Menu (above) has five options:

- Press 1 to view physical drive assignments
- Press 2 to create a logical drive or view information about an existing logical drive.
- Press 3 to delete a logical drive.
- Press 4 to view and change controller configuration.
- Press Esc (Escape) to exit the menu.

Viewing Drive Assignments

From the Main Menu screen, press 1 to see the View Drive Assignments screen.

FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.

[View Drives Assignments]

Channel:ID	Drive Model	Capabilities	Capacity (MB)	Assignment
1:Mas	ST380023AS	SATA 1.5G	60012	
	Extent 1		59945	Free
2:Mas	MHT2060BS	SATA 1.5G	60012	
	Extent 1		59945	LD 1-1
3:Mas	MHT2060BS	SATA 1.5G	60012	
	Extent 1		59945	LD 1-2
4:Mas	MHT2060BS	SATA 1.5G	60012	
	Extent 1		59945	LD 1-3

[Keys Available]

[↑] Up [↓] Down [ESC] Exit

The View Drive Assignments screen reports physical (disk) drive assignments and provides the following information:

Channel: ID – Shows the FastTrak Controller channel (port) ID number to which each physical drive is attached.

Drive Model – Identifies the manufacturer, model, and model number (if applicable) of each physical drive.

Capabilities – Refers to the type of physical drive, SAS or SATA, and the drive's data rate in Gb/s.

Capacity (MB) – Reflects the capacity in MB (megabytes) of the physical drive. The effective capacity of the physical drive is slightly smaller than its maximum rated capacity.

Assignment – This field identifies the logical drive to which the physical drive belongs. LD 1-2 means logical drive 1, physical drive 2. JBOD also appears as LD on this screen.

Unassigned physical drives are labeled *Free*. Unassigned drives may also be used to create a new logical drive at any time.

Extent – Refers to the all or part of the physical drive's capacity allocated to a logical drive. If you create two logical drives using the same set of physical drives, each physical drive will display two Extents.

Creating a Logical Drive

The following action will create one logical drive on a set of physical drives. You can also create two logical drives on the same set of physical drives. See “Creating Two Logical Drives” on page 43.

To create a logical drive:

1. From the Main Menu screen, press 2 to display the Define LD Menu.

FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.

[Define LD Menu]

LD No	RAID Mode	Total Drv	Capacity (MB)	Status
LD 1	----	----	-----	----
LD 2	----	----	-----	----
LD 3	----	----	-----	----
LD 4	----	----	-----	----
LD 5	----	----	-----	----
LD 6	----	----	-----	----
LD 7	----	----	-----	----
LD 8	----	----	-----	----

[Keys Available]

[↑] Up [↓] Down [ESC] Exit [Enter] Select

2. Press the arrow keys to highlight an logical drive number you want to define and press Enter to select it.
The Define LD Menu appears for the logical drive number you selected.

```

FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
[ Define LD Menu ]
LD No      RAID Mode    Total Drv
LD 1       RAID 5       3

Stripe Block: 16 KB                      Fast Init: ON
Gigabyte Boundary: ON

[ Drive Assignments ]
Channel:ID  Drive Model  Capabilities  Capacity (MB)  Assignment
1:Mas MHT2060BS        SAS 3.0G      60012          N
2:Mas MHT2060BS        SAS 3.0G      60012          Y
3:Mas MHT2060BS        SAS 3.0G      60012          Y
4:Mas MHT2060BS        SAS 3.0G      60012          Y

[ Keys Available ]
[↑] Up    [↓] Down  [ESC] Exit  [Space] Change Option  [Ctrl-Y] Save

```

3. Choose the RAID Level you want. In the Define LD Menu section, press the Spacebar to toggle through logical drive types:

- RAID 0 (Stripe)
- RAID 1 (Mirror)
- RAID 5 (Distributed Parity)
- RAID 10 (Stripe/Mirror)
- JBOD (Single Drive)

Only the FastTrak TX4650 supports RAID 5 and RAID 10. See “Introduction to RAID” on page 109 for more information.

4. Press the down arrow key to move to the next option. Option choices depend on the RAID Level you selected.
 - Fast Init erases the Master Boot Record (MBR) of the physical drives when this feature is set to ON. ON is recommended.
 - Gigabyte Boundary enables replacement of a failed physical drive with a slightly smaller physical drive when this feature is set to ON. ON is recommended.
 - Stripe Block Size. Set to 16 KB with no options. Applies to RAID but not to JBOD.
5. Press the down arrow key to move to Disk Assignments. Press the spacebar to toggle between N and Y for each available drive. Y means this physical drive will be assigned to the logical drive.

Assign the appropriate number of physical drives to your logical drive.

6. Press Ctrl-Y to save your logical drive configuration.

If you set Fast Init to ON, the following message displays:

```
Fast Initialization Option has been selected.
It will erase the MBR data of the disks.
<Press Ctrl-Y Key if you are sure to erase it>
<Press any other key to ignore this option>
```

Press Ctrl-Y again to create the logical drive and perform the Fast Initialization.

The Modify Array Capacity message displays:

```
Press Ctrl-Y to Modify Array Capacity or press any
other key to use maximum capacity...
```

7. Press any key to continue.

The Define LD menu displays your new logical drive.

FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.

[Define LD Menu]				
LD No	RAID Mode	Total Drv	Capacity (MB)	Status
LD 1	RAID 5	3	118000	Functional
LD 2	----	----	-----	----
LD 3	----	----	-----	----
LD 4	----	----	-----	----
LD 5	----	----	-----	----
LD 6	----	----	-----	----
LD 7	----	----	-----	----
LD 8	----	----	-----	----

[Keys Available]				
[↑] Up	[↓] Down	[ESC] Exit	[Enter] Select	

8. Press Esc to exit to the Main Menu. Press Esc again to exit the Utility.
9. Press Y to restart your computer.

You have successfully created a new RAID logical drive.

You must be partition and format your new logical drive before you can use it. See "Appendix A: Partition and Format" on page 137.

Creating Two Logical Drives

The following action will create two logical drive on the same set of physical drives. You can also create one logical drive on a set of physical drives. See “Creating a Logical Drive” on page 40

To create a logical drive:

1. From the Main Menu screen, press 2 to display the Define LD Menu.

```
FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
```

LD No	RAID Mode	Total Drv	Capacity (MB)	Status
LD 1	----	----	-----	----
LD 2	----	----	-----	----
LD 3	----	----	-----	----
LD 4	----	----	-----	----
LD 5	----	----	-----	----
LD 6	----	----	-----	----
LD 7	----	----	-----	----
LD 8	----	----	-----	----

```
[ Keys Available ]
```

```
[↑] Up [↓] Down [ESC] Exit [Enter] Select
```

2. Press the arrow keys to highlight LD 1 and press Enter to select it.
The Define LD Menu for LD 1 appears.

```
FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.

[ Define LD Menu ]

LD No      RAID Mode    Total Drv
LD 1       RAID 5       3

Stripe Block: 16 KB                      Fast Init: ON
Gigabyte Boundary: ON

[ Drive Assignments ]

Channel:ID  Drive Model    Capabilities    Capacity (MB)    Assignment
1:Mas MHT2060BS          SAS 3.0G        60012            N
2:Mas MHT2060BS          SAS 3.0G        60012            Y
3:Mas MHT2060BS          SAS 3.0G        60012            Y
4:Mas MHT2060BS          SAS 3.0G        60012            Y

[ Keys Available ]

[↑] Up    [↓] Down    [ESC] Exit    [Space] Change Option    [Ctrl-Y] Save
```

3. Choose the RAID Level you want. In the Define LD Menu section, press the Spacebar to toggle through logical drive types:

- RAID 0 (Stripe)
- RAID 1 (Mirror)
- RAID 5 (Distributed Parity)
- RAID 10 (Stripe/Mirror)

You can create your two logical drives with different RAID levels. But you cannot combine a logical drive and JBOD.

Only the FastTrak TX4650 supports RAID 5 and RAID 10. See “Introduction to RAID” on page 109 for more information.

4. Press the down arrow key to move to the next option. Option choices depend on the RAID Level you selected.
- Fast Init erases the Master Boot Record (MBR) of the physical drives when this feature is set to ON. ON is recommended.
 - Gigabyte Boundary enables replacement of a failed physical drive with a slightly smaller physical drive when this feature is set to ON. ON is recommended.
 - Stripe Block Size. Set to 16 KB with no options.
5. Press the down arrow key to move to Disk Assignments. Press the spacebar to toggle between N and Y for each available drive. Y means this physical drive will be assigned to the logical drive.

Assign the appropriate number of physical drives to your logical drive.

6. Press Ctrl-Y to save your logical drive configuration.

If you set Fast Init to ON, the following message displays:

```
Fast Initialization Option has been selected.
It will erase the MBR data of the disks.
<Press Ctrl-Y Key if you are sure to erase it>
<Press any other key to ignore this option>
```

Press Ctrl-Y again to create the logical drive and perform the Fast Initialization.

The Modify Array Capacity message displays:

```
Press Ctrl-Y to Modify Array Capacity or press any
other key to use maximum capacity...
```

7. Press Ctrl-Y to continue.

The Define LD Menu displays the maximum available capacity of the physical drives and prompts you to enter the capacity for the first logical drive.

```
FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
[ Define LD Menu ]
LD No      RAID Mode   Total Drv   Capacity(MB)
LD 1       RAID 5      3           1198905
Stripe Block: 16 KB                      Fast Init: ON
Gigabyte Boundary: ON

[ Drive Assignments ]
Channel:ID  Drive Model   Capabilities  Capacity (MB)  Assignment
1:Mas      MHT2060BS      SAS 3.0G      60012          Y
2:Ma
3:Ma      Enter array capacity (in MB) here: 55000  Y
4:Ma      Y

[ Keys Available ]
[0-9] Input Capacity  [Enter] Save  [BackSpace] Delete  [ESC] Exit
```

8. Type the capacity for the first logical drive, then press Enter.

The Define LD Menu displays the first logical drive.

```
FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
```

LD No	RAID Mode	Total Drv	Capacity (MB)	Status
LD 1	RAID 5	3	55000	Functional
LD 2	----	----	-----	----
LD 3	----	----	-----	----
LD 4	----	----	-----	----
LD 5	----	----	-----	----
LD 6	----	----	-----	----
LD 7	----	----	-----	----
LD 8	----	----	-----	----

[Keys Available]

[↑] Up [↓] Down [ESC] Exit [Enter] Select

9. Press the arrow keys to highlight a logical drive number you want to define and press Enter to select it.

The Define LD Menu appears for the logical drive number you selected. Note the reduced capacity of the physical drives used for the first logical drive.

```
FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
```

LD No	RAID Mode	Total Drv
LD 2	RAID 5	3

Stripe Block: 16 KB Fast Init: ON
Gigabyte Boundary: ON

Channel:ID	Drive Model	Capabilities	Capacity (MB)	Assignment
1:Mas	MHT2060BS	SAS 3.0G	60012	N
2:Mas	MHT2060BS	SAS 3.0G	32445	Y
3:Mas	MHT2060BS	SAS 3.0G	32445	Y
4:Mas	MHT2060BS	SAS 3.0G	32445	Y

[Keys Available]

[↑] Up [↓] Down [ESC] Exit [Space] Change Option [Ctrl-Y] Save

10. Choose the RAID Level you want. In the Define LD Menu section, press the Spacebar to toggle through logical drive types:

- RAID 0 (Stripe)
- RAID 1 (Mirror)
- RAID 5 (Distributed Parity)
- RAID 10 (Stripe/Mirror)

You can create your two logical drives with different RAID levels. But you cannot combine a logical drive and JBOD.

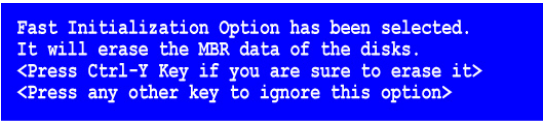
Only the FastTrak TX4650 supports RAID 5 and RAID 10. See “Introduction to RAID” on page 109 for more information.

11. Press the down arrow key to move to the next option. Option choices depend on the RAID Level you selected.
 - Fast Init erases the Master Boot Record (MBR) of the physical drives when this feature is set to ON. ON is recommended.
 - Gigabyte Boundary enables replacement of a failed physical drive with a slightly smaller physical drive when this feature is set to ON. ON is recommended.
 - Stripe Block Size. Set to 16 KB with no options.
12. Press the down arrow key to move to Disk Assignments. Press the spacebar to toggle between N and Y for each available drive. Y means this physical drive will be assigned to the logical drive.

Assign the appropriate number of physical drives to your logical drive.

13. Press Ctrl-Y to save your logical drive configuration.

If you set Fast Init to ON, the following message displays:



```
Fast Initialization Option has been selected.  
It will erase the MBR data of the disks.  
<Press Ctrl-Y Key if you are sure to erase it>  
<Press any other key to ignore this option>
```

Press Ctrl-Y again to create the logical drive and perform the Fast Initialization.

The Define LD menu displays your new logical drive

FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.

[Define LD Menu]

LD No	RAID Mode	Total Drv	Capacity (MB)	Status
LD 1	RAID 5	3	55000	Functional
LD 2	RAID 5	3	64000	Functional
LD 3	----	----	-----	----
LD 4	----	----	-----	----
LD 5	----	----	-----	----
LD 6	----	----	-----	----
LD 7	----	----	-----	----
LD 8	----	----	-----	----

[Keys Available]

[↑] Up [↓] Down [ESC] Exit [Enter] Select

14. Press Esc to exit to the Main Menu. Press Esc again to exit the Utility.
15. Press Y to restart your computer.

You have successfully created a new RAID logical drives.

You must be partition and format your new logical drive before you can use it. See "Appendix A: Partition and Format" on page 137.

Deleting a Logical Drive



Caution

Deletion of an existing logical drive will result in the loss of all data saved on the logical drive.

Record all logical drive information, including RAID level, disk members, stripe block size and gigabyte boundary, in case you wish to undo a deletion.

Logical drives may possibly be recovered after deletion by immediately re-defining the logical drive with information identical to the original configuration.

To delete a logical drive:

1. From the Main Menu screen, press 3 to display the Delete LD Menu.

```
FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
[ Delete LD Menu ]

LD No      RAID Mode   Total Drv   Capacity (MB)   Status
LD 1       RAID 5       3           55000           Functional
LD 2       RAID 5       3           64000           Functional
LD 3       ----          ----          -----          ----
LD 4       ----          ----          -----          ----
LD 5       ----          ----          -----          ----
LD 6       ----          ----          -----          ----
LD 7       ----          ----          -----          ----
LD 8       ----          ----          -----          ----

[ Keys Available ]
[↑] Up  [↓] Down  [ESC] Exit  [Del or Alt+D] Delete
```

2. Highlight the logical drive you want to delete and press the Del key or Alt-D. The View LD Definition Menu for the selected logical drive appears.

```

FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
[ View LD Definition Menu ]
  LD No      RAID Mode    Total Drv    Capacity(MB)    Status
  LD 2       RAID 5       3            64000          Functional

  Stripe Block: 16 KB                      Cache Mode:

[ Drives Assignments ]
  Channel:ID  Drive Model    Capabilities    Capacity (MB)
  2:Mas MHT2060BS          SAS 3.0G        60012
  3:Mas MHT2060BS          SAS 3.0G        60012
  4:Mas MHT2060BS          SAS 3.0G        60012

Press Ctrl-Y to delete the data in the disk!
or press any other key to abort...

```

- Press Ctrl-Y to confirm deletion of the logical drive.

The screen returns to the Delete LD Menu. The deleted logical drive no longer appears in the Menu.

```

FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
[ Delete LD Menu ]

  LD No      RAID Mode    Total Drv    Capacity (MB)    Status
  LD 1       RAID 5       3            55000          Functional
  LD 2       ----         ----         -----         ----
  LD 3       ----         ----         -----         ----
  LD 4       ----         ----         -----         ----
  LD 5       ----         ----         -----         ----
  LD 6       ----         ----         -----         ----
  LD 7       ----         ----         -----         ----
  LD 8       ----         ----         -----         ----

[ Keys Available ]
[↑] Up  [↓] Down  [ESC] Exit  [Del or Alt+D] Delete

```

Press Esc to return to the Main Menu.

Viewing the Controller Configuration

From the Main Menu screen, press 4 to display the Controller Configuration Options screen (below).

```
FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
===== [ Adapter Configuration - Options ] =====
No Parameters Defined for Current Disk(s)

===== [ System Resources Configuration ] =====

Controller IRQ: 11

ATA IO Base Address: CC80
Host IO Base Address: C800
Function MMIO Base Address: DF7FF000
Flash ROM Base Address: DF7C000
AHCI HBA MMIO Base Address: DF7FC000

===== [ Keys Available ] =====
[ESC] Exit
```

The information in the System Resources section might be helpful for troubleshooting purposes:

- The system IRQ used by the FastTrak card
- ATA IO Base Address
- Host IO Base Address
- Function MMIO Base Address
- Flash ROM Base Address
- AHCI HBA MMIO Base Address

Press Esc to return to the Main Menu.

Responding to Logical Drive Problems

When you boot your system, the FastTrak BIOS screen informs you if there is a critical or offline logical drive. RAID 1, 5, or 10 logical drives go *Critical* when one physical drive fails. RAID 0 and JBOD go *Offline* when a physical drive fails.

```
FastTrak TX4650 (tm) BIOS Version 2.8.0.xx
(c) 2004-2007 Promise Technology, Inc. All rights reserved.

ID      MODE      SIZE      TRACK-MAPPING      STATUS
-----
1       2+1 RAID 5    55000M    6686/255/63        Critical

Problem is detected with Array : 1
Critical Status:
A disk member of an array has failed or is not responding.
Please refer to your Promise User Manual for further details.

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

Choose one of the following applications to identify the failed drive:

- FastBuild Utility – See “Finding a Failed Drive in FastBuild” below.
- WebPAM – Allow your PC to finish booting, then launch WebPAM.

See “Responding to a Critical or Offline Logical Drive” on page 101 for more information.

Finding a Failed Drive in FastBuild

1. Press Ctrl-F to enter the FastBuild Utility.
2. In the Main Menu, press 1 to display View Drive Assignments, then look for a physical drive that was present before but no longer appears.

The failed drive is attached to the missing channel.

In some cases, the FastTrak Controller will begin to rebuild your logical drive automatically. From the Main Menu, press 2 to display the Define LD Menu and look under Status.

- If the Status shows Rebuilding, wait for rebuilding to finish, then shut down your PC and replace the failed drive. The replacement drive will be Free (unassigned).
- If the Status shows Critical, shut down your PC and replace the failed drive as soon as possible. The FastTrak Controller will begin rebuilding your logical drive automatically.

Chapter 5: WebPAM

- Logging into WebPAM (page 53)
- Logging out of WebPAM (page 55)
- Managing Users (page 56)
- Viewing Host Management (page 65)
- Making Utility Configuration Settings (page 66)
- Viewing the FastTrak Card (page 67)
- Managing the Controller (page 68)
- Managing Physical Drives (page 73)
- Managing Logical Drives (page 80)
- Managing Enclosures (page 105)
- Managing Spare Drives (page 107)

WebPAM is a RAID management software application. If you have not installed WebPAM on your PC, see “Installing WebPAM” on page 15.

Logging into WebPAM

Double-click the WebPAM icon on your desktop (right). Or,

1. Launch your Browser.
2. In the Browser address field, type in the IP address of the Host PC, as explained below.

If you did *not* choose the External Security option during WebPAM installation, use the *Regular* connection. See page 15.

If you chose the External Security option during WebPAM installation, use the *Secure* connection.



Regular Connection

- WebPAM uses an HTTP connectionhttp://
- Enter the Host PC's IP address127.0.0.1 or localhost
- Enter the Port number:8080
- Add to launch WebPAM. /promise

Together, your entry looks like this:

http://127.0.0.1:8080/promise or **https://localhost:8443/promise**

Secure Connection

- WebPAM uses a secure HTTP connectionhttps://
- Enter the Host PC's IP address127.0.0.1 or localhost
- Enter the Port number:8443

- Add to launch WebPAM. /promise

Together, your entry looks like this:

https://127.0.0.1:8443/promise or **https://localhost:8443/promise**

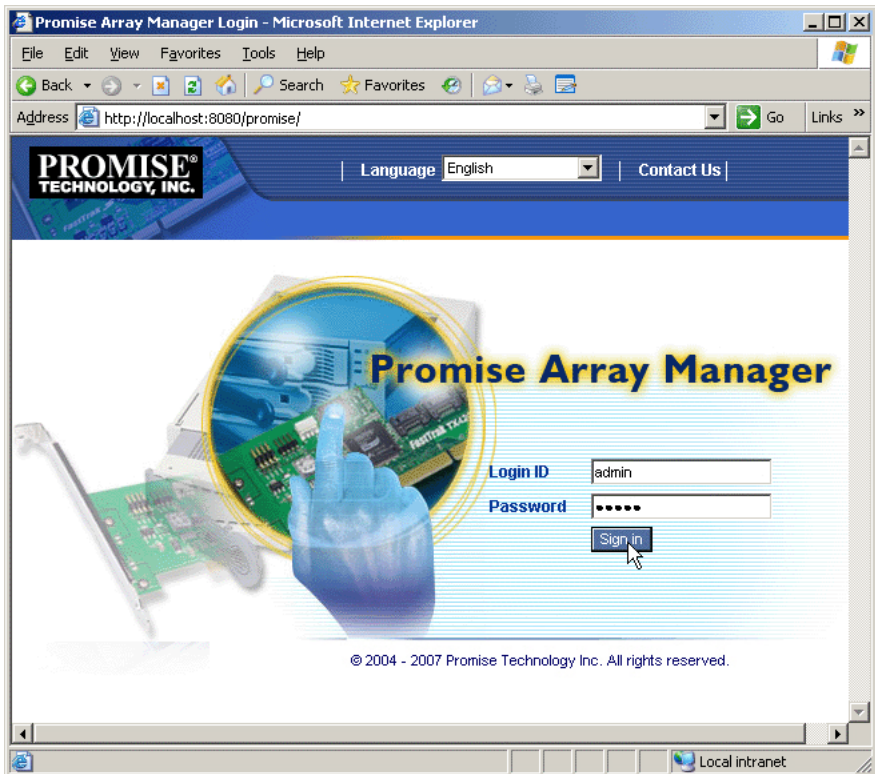
Note that the IP address shown above applies to a log-in at the Host PC. When you log in over a network, you will enter the Host PC's actual IP address.



Note

If you chose the *Local Monitoring Only* option during WebPAM installation, you can only log into WebPAM from the Host PC. You cannot log into WebPAM over a network.

Figure 3. The WebPAM login screen



When the login screen appears (above):

1. Type **admin** in the Login ID field.

2. Type **admin** in the Password field.
3. Click the **Sign in** button.

The Login ID and Password are case sensitive.

Logging out of WebPAM

There are two ways to log out of WebPAM:

- Close your browser window
- Click **Logout** on the WebPAM banner (below)



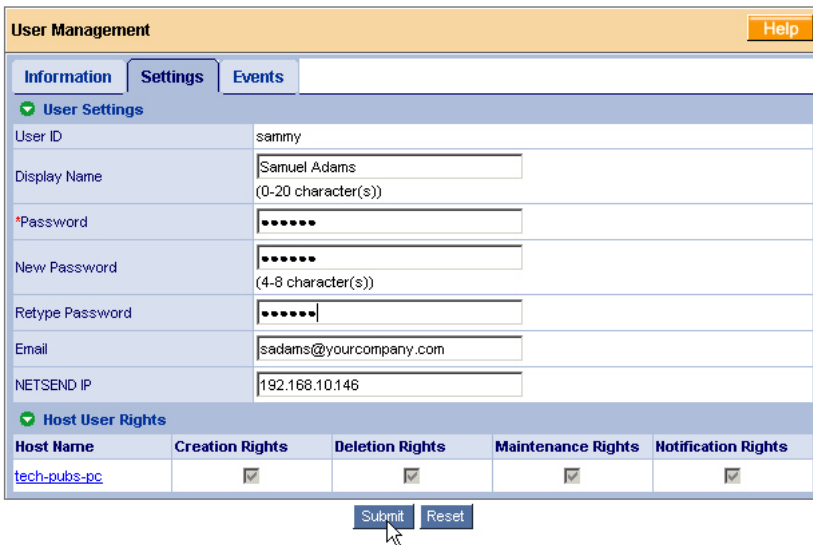
After logging out, you must enter your user name and password to log in again. Clicking **Logout** brings you back to the Login Screen.

Managing Users

- Adding a User (below)
- Setting Event Notification (page 57)
- Setting a Net Send IP Address (page 60)
- Deleting a User (page 61)
- Changing a User's Password (page 61)
- Changing a User's Email Address (page 63)
- Changing a User's Access Rights (page 63)

Adding a User

1. Under Administrative Tools in Tree View, click the User Management  icon.
2. Click the **Create** tab.



User Management Help

Information **Settings** **Events**

✓ **User Settings**

User ID: sammy

Display Name: Samuel Adams
(0-20 character(s))

*Password:
(4-8 character(s))

New Password:
(4-8 character(s))

Retype Password:
(4-8 character(s))

Email: sadams@yourcompany.com

NETSEND IP: 192.168.10.146

✓ **Host User Rights**

Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
tech-pubs-pc	☒	☒	☒	☒

3. Type a User ID into the User ID field.
The User ID is the User's login name.
4. Type the user's display name into the Display Name field.
The display name could be the User's actual name.
5. Type a password into the Password field.
Use up to 8 letters and numbers but no spaces or other characters.
6. Type the same password into the Retype Password field.

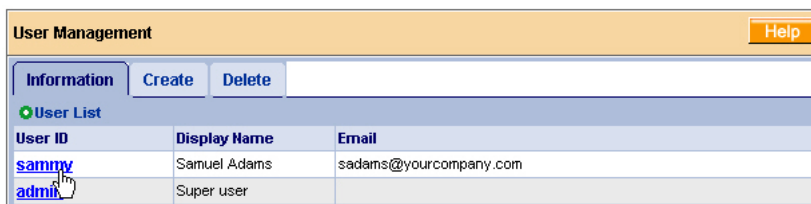
7. If you plan to set up Event Notification, type the user's email address in the Email field.
8. Under Host User Rights, check the boxes to select rights for this user.

Right	Meaning
Creation	Permission to create a logical drive and a spare drive
Deletion	Permission to delete a logical drive and a spare drive
Maintenance	Permission to migrate, rebuild and synchronize a logical drive; to run Media Patrol on a physical drive; make controller and physical drive settings
Notification	Permission to receive notification of events affecting the logical drive

9. Click the **Submit** button.

Setting Event Notification

1. Under Administrative Tools in Tree View, click the User Management  icon.



2. Click the **User ID** link.
The user's information displays.
3. Click the **Events** tab.

Select Events

Help

InformationSettingsEvents

tech-pubs-pc(192.168.1.204)

Email Notification

Select All Events

Select All Information Events

Select All Warning Events

Select All Error Events

Disk Events

☒ Disk Plugged In

☒ Disk BSL Update

☒ Disk BSL Cleared

☒ Disk BSL Accessed

☒ Disk Error Fixed

☒ Disk Patrol Progress

☒ Disk Media Patrol Started

☒ Disk Media Patrol Completed

☒ Disk Media Patrol Paused

☒ PCI Parity Error

☒ Memory Single Bit Error

☒ PCI System Error

☒ Memory Multi Bit Error

Other Events

☒ Unknown

SubmitReset

The image above was shortened to fit into the available space.

4. Check the boxes of the notification events that you want to have reported to you via email and popup messages.
To select events by their severity, check one of the four Select Events boxes at the top of the window. See the table on the next page.

5. Click the **Submit** button.

Event Notification Severity Levels

Error Events

Disk Setdown
Disk NON ECC Error
Disk S.M.A.R.T. Error
Array Offline
Synchronization Aborted with Error
Redundancy Check Aborted with Error
Redundancy Check Inconsistency Found

Error Events, continued

Rebuild Aborted with Error
Rebuild Error Aborted Onstream
Background Initialization Aborted with Error
Migration Aborted with Error
PCI System Error
Memory Multi Bit Error
Unknown (error)

58

Warning Events

Disk Unplugged
Disk Timeout
Task Error
Disk Media Patrol Aborted with Error
Bad Block Remapped
Disk Pre Fail
Array Critical
Array Degrade
Synchronization Requested
Redundancy Check Rejected
Enclosure Fan Error
Enclosure Voltage 3.3 Out Of Range

Warning Events, continued

Enclosure Voltage 5 Out Of Range
Enclosure Voltage 12 Out Of Range
Enclosure Temperature Above Threshold
Battery Temperature Out Of Range
Battery Temperature Unstable
Battery Voltage Out Of Range
Battery Voltage Unstable
Battery Communication Error
Battery Not Functioning
PCI Parity Error
Single Bit Memory Error

Information Events

Disk Plugged In
Disk BSL Update
Disk BSL Cleared
Disk BSL Accessed
Disk Error Fixed
Disk Patrol Progress
Disk Media Patrol Started
Disk Media Patrol Completed
Disk Media Patrol Paused
Disk Media Patrol Resumed
Disk Media Patrol Aborted
Array Online
Array Created
Array Deleted
Array Cache Mode Changed
Array Auto Cache Mode Changed
Synchronization Started
Synchronization Completed
Synchronization Paused
Synchronization Resumed
Synchronization Aborted
Synchronization Progress
Synchronization Inconsistency Fixed
Redundancy Check Started
Redundancy Check Completed

Information Events, continued

Redundancy Check Paused
Redundancy Check Resumed
Redundancy Check Aborted
Redundancy Check Progress
Rebuild Started
Rebuild Completed
Rebuild Paused
Rebuild Resumed
Rebuild Aborted
Rebuild Restarted
Rebuild Progress
Background Initialization Progress
Background Initialization Started
Background Initialization Completed
Background Initialization Paused
Background Initialization Resumed
Background Initialization Aborted
Migration Started
Migration Completed
Migration Paused
Migration Resumed
Migration Aborted
Migration Progress
Battery Becomes Normal
Battery Not Detected

Setting a Net Send IP Address

In WebPAM, each user can set his/her own Net Send IP address or the Administrator can do it.



Important

Windows Vista and Server 2008 do not support Messenger Service. To receive messages on those platforms, you must install a third-party tool.

To set a user's Net Send IP address:

1. Under Administrative Tools in Tree View, click the User Management  icon.
2. Click the **User ID** link for the user whose Net Send IP address you want to set.

The screenshot shows the 'User Management' window with the 'Information' tab selected. Below the tabs are 'Create' and 'Delete' buttons. A 'User List' section contains a table with three columns: 'User ID', 'Display Name', and 'Email'.

User ID	Display Name	Email
sammy	Samuel Adams	sadams@yourcompany.com
admin	Super user	

3. Click the **Settings** tab.

The screenshot shows the 'User Management' window with the 'Settings' tab selected. The 'User Settings' section contains a form with the following fields:

- User ID: sammy
- Display Name: Samuel Adams (0-20 character(s))
- *Password: [masked]
- New Password: [masked] (4-8 character(s))
- Retype Password: [masked]
- Email: sadams@yourcompany.com
- NETSEND IP: 192.168.10.146

Below the settings is the 'Host User Rights' section with a table:

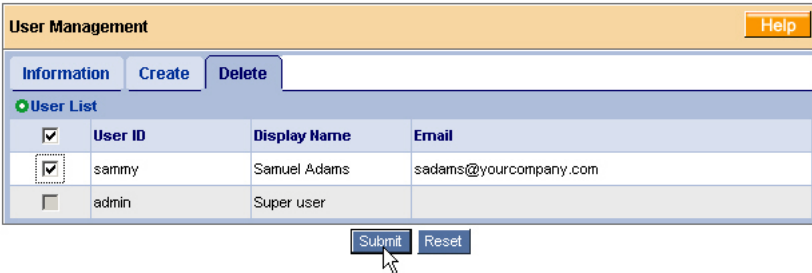
Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
tech-pubs-pc	☒	☒	☒	☒

At the bottom are 'Submit' and 'Reset' buttons.

4. Type a Net Send IP address in the NETSEND IP field.
5. Click the **Submit** button.

Deleting a User

1. Under Administrative Tools in Tree View, click the User Management  icon.
2. Click the **Delete** tab.



User Management Help

Information **Create** **Delete**

User List

☒	User ID	Display Name	Email
☒	sammy	Samuel Adams	sadams@yourcompany.com
☐	admin	Super user	

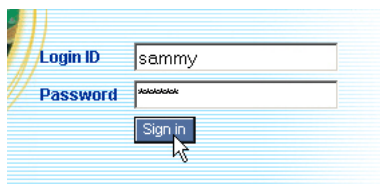
Submit Reset

3. Check the box to the left of the user you want to delete.
4. Click the **Delete** button.
5. In the Confirmation box, click the **OK** button.

Changing a User's Password

In WebPAM, each user can change his/her own password.

To change a user's password:

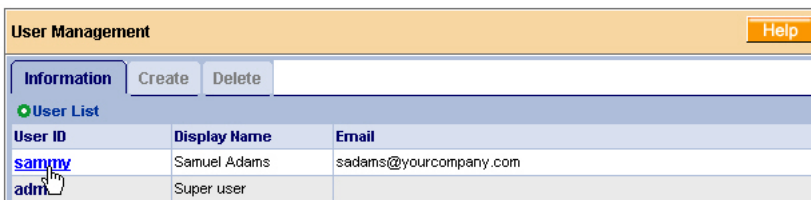


Login ID

Password

Sign In

1. Log into WebPAM under the User name.



User Management Help

Information **Create** **Delete**

User List

User ID	Display Name	Email
sammy	Samuel Adams	sadams@yourcompany.com
admin	Super user	

2. Under Administrative Tools in Tree View, click the User Management  icon.
3. Click your **User ID** link.
4. Click the **Settings** tab.

User Management
Help

Information
Settings
Events

User Settings

User ID

sammy

Display Name

*Password

New Password

Retype Password

Email

NETSEND IP

Host User Rights

Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
tech-pubs-pc	☒	☒	☒	☒

Submit
Reset

5. Type a new password in the New Password field.
6. Retype the new password in the Retype Password field.
7. Click the **Submit** button.

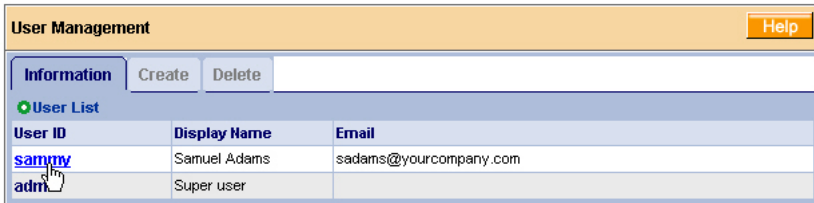


Important

If a user forgets his/her password, the Administrator must delete that User and create a new User, as described above.

Changing a User's Email Address

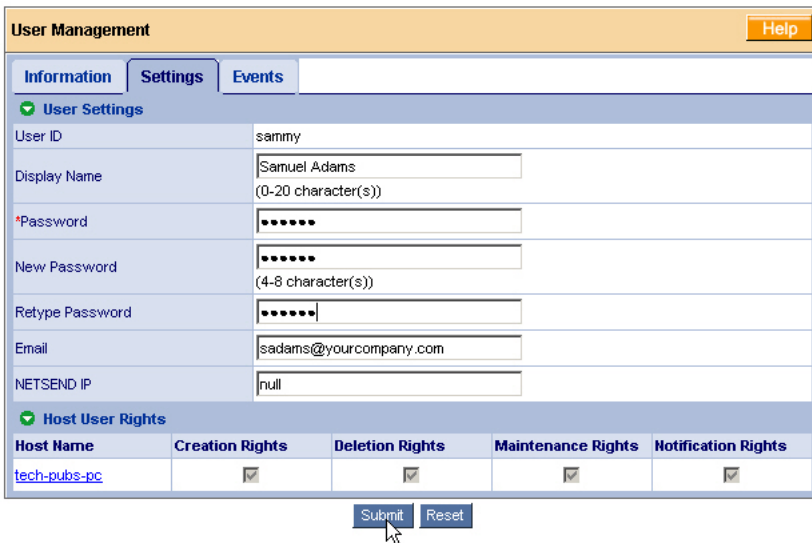
In WebPAM, each user can change his/her own email address or the Administrator can do it. To change a user's email address:



The screenshot shows the 'User Management' window with a 'Help' button. Below the title bar are tabs for 'Information', 'Create', and 'Delete'. A 'User List' section contains a table with three columns: 'User ID', 'Display Name', and 'Email'. The table has two rows: one for 'sammy' (Samuel Adams, sadams@yourcompany.com) and one for 'admin' (Super user). A mouse cursor is pointing at the 'sammy' link in the 'User ID' column.

User ID	Display Name	Email
sammy	Samuel Adams	sadams@yourcompany.com
admin	Super user	

1. Under Administrative Tools in Tree View, click the User Management .
2. Click the **User ID** link for the user whose email address will change.
3. Click the **Settings** tab.



The screenshot shows the 'User Management' window with the 'Settings' tab selected. The 'User Settings' section contains a form with fields for 'User ID' (sammy), 'Display Name' (Samuel Adams), 'Password', 'New Password', 'Retype Password', 'Email' (sadams@yourcompany.com), and 'NETSEND IP' (null). Below this is the 'Host User Rights' section with a table showing rights for 'tech-pubs-pc'. At the bottom are 'Submit' and 'Reset' buttons. A mouse cursor is pointing at the 'Submit' button.

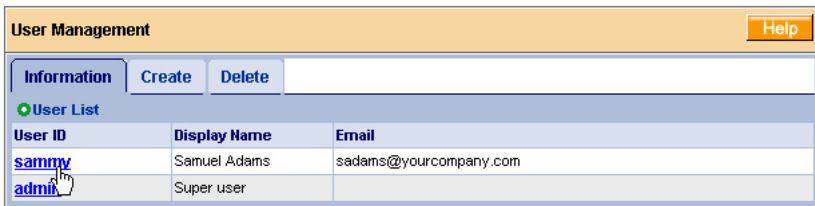
Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
tech-pubs-pc	☒	☒	☒	☒

4. Type a new email address in the Email field.
5. Click the **Submit** button.

Changing a User's Access Rights

In WebPAM, the Administrator can change a user's access rights. To change a user's access rights:

1. Log in as the Administrator.



The screenshot shows the 'User Management' window with a 'Help' button in the top right. Below the title bar are three tabs: 'Information', 'Create', and 'Delete'. Under the 'Information' tab, there is a 'User List' section with a green plus icon. Below this is a table with three columns: 'User ID', 'Display Name', and 'Email'. The table contains two rows: one for 'sammy' (Samuel Adams, sadams@yourcompany.com) and one for 'admin' (Super user). A mouse cursor is pointing at the 'admin' link.

User ID	Display Name	Email
sammy	Samuel Adams	sadams@yourcompany.com
admin	Super user	

2. Under Administrative Tools in Tree View, click the User Management  icon.
3. Click the **User ID** link for the user whose access rights will change.
4. Click the **Settings** tab.



The screenshot shows the 'User Management' window with the 'Settings' tab selected. The 'User Settings' section displays fields for 'User ID' (sammy), 'Display Name' (Samuel Adams), 'Email' (sadams@yourcompany.com), and 'NETSEND IP' (null). Below this is the 'Host User Rights' section, which contains a table with columns: 'Host Name', 'Creation Rights', 'Deletion Rights', 'Maintenance Rights', and 'Notification Rights'. The 'Host Name' column lists 'tech-pubs-pc'. All four right-hand columns have checkboxes that are checked. Below the table are 'Submit' and 'Reset' buttons. A mouse cursor is pointing at the 'Submit' button.

Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
tech-pubs-pc	☒	☒	☒	☒

5. Under Host User Rights, check the boxes to assign rights for this user.

Right	Meaning
Creation	Permission to create a logical drive and a spare drive
Deletion	Permission to delete a logical drive and a spare drive
Maintenance	Permission to migrate, rebuild and synchronize a logical drive; to run Media Patrol on a physical drive; make controller and physical drive settings
Notification	Permission to receive notification of events affecting the logical drive

Uncheck the boxes to remove rights for this user.

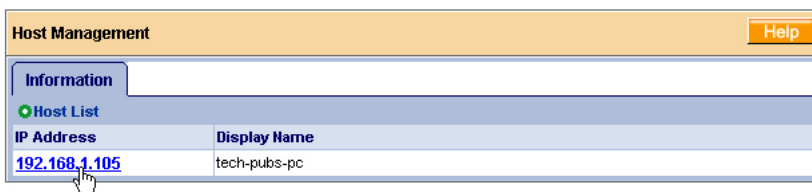
6. Click the **Submit** button.

Viewing Host Management

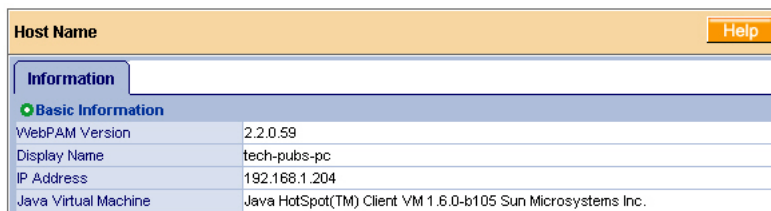
This function provides information only. There are no user settings.

To access Host Management:

1. Under Administrative Tools in Tree View, click the Host Management  icon.



2. Under Host List, click the **IP Address** link to the host you want to see.
The Host IP address is always 127.0.0.1. If you log in over a network, the actual IP address of the PC or server with the FastTrak card is shown.



The Information tab displays with information about the Host PC.

- **WebPAM Version** – The version number of the WebPAM software.
- **Display Name** – The display name of the Host PC. “localhost” is the default.
- **IP Address** – 127.0.0.1 is the IP address of the Host PC, accessed at the Host PC. Other addresses, such as 192.168.1.204, refer to a Host PC accessed over the network.
- **Java Virtual Machine** – The version number of the private JVM used by WebPAM on the Host PC.

Making Utility Configuration Settings

To make utility configuration settings:

1. Under Administrative Tools in Tree View, click the Utility Configuration icon.



Utility Configuration		Help
Settings		
Configuration		
Email Sender	RAIDmaster@yourcompany.com	Display email of the person from whom every email notification is sending out.
Email Server	mail.yourcompany.com	Display name of the Email Server.
Email Subject	Controller Error	Display subject of the every Email Notification sending out.
Event Frame Refresh Time	30 secs	Display Refreshing time of the event frame.
Submit		Reset

2. Enter the Sender's address in the Email Sender field.
Be sure the sender has an account in your email system. See your IT administrator.
3. Enter your email server in the Email Server field.
4. Keep or change the Email Subject line.
5. Type a new interval (in seconds) in the Event Frame Refresh Time field.
30 seconds is the default interval.
6. Click the **Submit** button when you are done.

Viewing the FastTrak Card

The FastTrak–Information tab displays a photograph of the FastTrak TX4650 or TX2650 card installed in your system.



To display this screen in Management View, click the FastTrak  icon in Tree View.

If you have multiple FastTrak controller cards in the same system, they will appear under the FastTrak icon as Controller 1, Controller 2, and so on.

Managing the Controller

- Viewing Controller Information (below)
- Making Controller Settings (page 68)
- Viewing Scheduled Actions (page 70)
- Deleting a Scheduled Action (page 70)
- Locking the Controller (page 71)

Viewing Controller Information

The term Controller refers to the device that controls your RAID.

To access the controller, click the Controller  icon in Tree View.

Controller Help				
Information	Settings	Schedule	Lock	Restore
Basic Information				
Product Name	FastTrak TX4650			
BIOS Version	2.8.0.3			
Driver Version	0.0.0.37			
Hardware Information				
Maximum Number of Port(s)	4			
Maximum Physical Drive(s)	4			
Maximum Logical Drive(s)	8			

The Information tab displays with information about the controller.

- **Product Name** – The Promise product name for this controller.
- **BIOS Version** – Version number of the controller's BIOS.
- **Driver Version** – Version number of the controller's software driver.
- **Maximum Number of Ports** – The number of ports on the controller.
- **Maximum Physical Drives** – The maximum number of physical (disk) drives the controller can support.
- **Maximum Logical Drives** – The maximum number of logical drives (arrays) the controller can support.

Making Controller Settings

To make controller settings:

1. Click the Controller  icon in Tree View.
2. Click the **Settings** tab in Management View.

The controller settings display.

Controller Help

Information **Settings** **Schedule** **Lock** **Restore**

View/Change Controller Parameter

Rebuild Rate	☐ Low ☒ Medium ☐ High
Migration/Expansion Rate	☐ Low ☒ Medium ☐ High
Initialization Rate	☐ Low ☒ Medium ☐ High
Synchronization Rate	☐ Low ☒ Medium ☐ High
Automatic Rebuild Status	☒ Enable ☐ Disable
Automatic Rebuild Policy	☒ Free & Spare ☐ Spare
Buzzer Status	☒ Enable ☐ Disable
S.M.A.R.T. Status	☒ Enable ☐ Disable
S.M.A.R.T. Check Polling Interval	120 Second(s)

Click the Settings tab to access controller settings.

- **Rates** – Allocates system resources between the background process (such as Rebuild, Expansion/Migration, Initialization, and Synchronization) and the data read/write activity.

A *High* setting assigns most of the system resources to background processes. The process will finished sooner but read/write requests are handled slower.

A *Medium* setting tries to balance system resources between the background processes and data input/output activity.

A *Low* setting assigns most of the system resources to handling read/write requests. Read/write requests are handled at nearly normal speed while the background processes take longer.

- **Automatic Rebuild Status** – When enabled, a critical or degraded logical drive will rebuild itself automatically after you replace the failed physical drive. Automatic Rebuilding applies to RAID 1, 5, and 10 logical drives only. See “Rebuilding a Logical Drive” on page 93 for more information.
- **Automatic Rebuild Policy** – Directs WebPAM to use either a Free drive or a Spare drive, or only a Spare drive to rebuild a logical drive. See “Rebuilding a Logical Drive” on page 93 for more information.
- **Buzzer** – When enabled, the FastTrak controller’s buzzer will sound to report a problem.

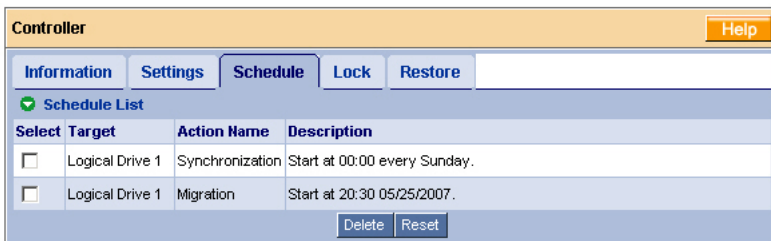
- **S.M.A.R.T. Status** – SMART, an acronym for Self-Monitoring Analysis and Reporting Technology, is a feature of the physical drive software. When enabled, the FastTrak controller polls the physical drives for SMART information and reports it to you.
- **S.M.A.R.T. Check Polling Interval** – The FastTrak controller periodically polls the physical drives for SMART information and displays it in WebPAM. Choose an interval from the dropdown menu. The range is 0 to 120 seconds. A setting of 0 seconds disables the polling function.

Viewing Scheduled Actions

To view scheduled actions:

1. Click the Controller  icon in Tree View.
2. Click the **Schedule** tab.

The Schedule tab lists all scheduled background processes, such as Rebuild, Media Patrol, Expansion/Migration, Initialization and Synchronization.



To begin or schedule a Migration, Rebuild, or Synchronization, click the Logical Drive  icon in Tree View then select the appropriate tab in Management View.

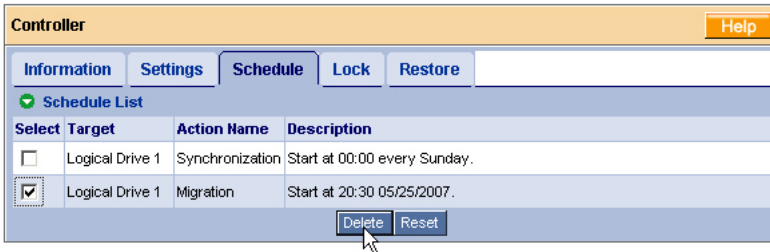
To begin or schedule a Media Patrol, click the Physical Drive  icon in Tree View then select the Media Patrol tab in Management View.

Deleting a Scheduled Action

To delete a scheduled action:

1. Click the Controller  icon in Tree View.
2. Select the **Schedule** tab in Management View.
3. Check the box to the left of the process you want to delete.

- Click the **Delete** button.

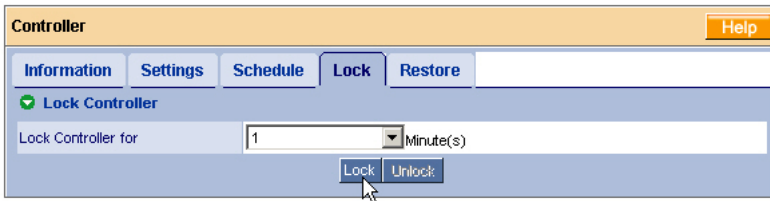


- In the Confirmation box, click the **OK** button.

Alternative method to delete a scheduled process:

- Go to its function tab under the Physical Drive  or Logical Drive .
- Under Schedule, click the **Disable** option.

Locking the Controller



The Lock tab displays lock status and enables you to lock or unlock a subsystem controller. The locking mechanism isolates the controller during maintenance operations and other periods when you want to avoid interruption from other users trying to access the logical drives under this controller.

To lock the Controller on the Host PC:

- Click the Controller  icon in Tree View.
- Select the **Lock** tab in Management View.
- From the dropdown menu, select a period of time to hold the lock.
The lock time range is 1 to 30 minutes.
- Click the **Lock** button to set the lock.
The lock will release itself automatically at the end of the period you specified.

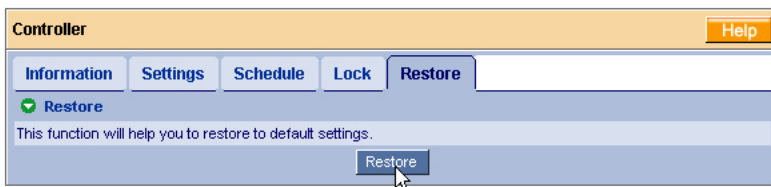
To release the lock before the scheduled time, click the **Unlock** button.

Restoring Default Settings

The Restore tab enables you to restore all of the controller's settings to their default values. Use this function for diagnosis and to clear any erroneous user settings.

To restore the default controller settings:

1. Click the Controller  icon in Tree View.
2. Click the **Restore** tab in Management View.
3. Click the **Restore** button.



All controller settings are restored to their default values.

Managing Physical Drives

- Viewing Physical Drives (below)
- Viewing Physical Drive Information (page 74)
- Making Physical Drive Settings (page 75)
- Running Media Patrol (page 75)
- Checking the Bad Sector Log (page 77)
- Locating a Physical Drive (page 78)

Viewing Physical Drives

From this window, you can view information about all of the physical drives attached to the FastTrak card, including their port numbers, capacity, status, and assignments.

To access Physical Drive View, click the Physical Drive View  icon in Tree View.

Physical Drive View
Help

Information
Merge

✓ **Physical Drive Overview**

Drive Model	Port Number	Capacity	Status
ST380013AS	1	80.02 GB	Functional
FUJITSU MHT2060BS	2	60.01 GB	Functional
ST380013AS	3	80.02 GB	Functional
FUJITSU MHT2060BS	4	60.01 GB	Functional

✓ **Graphic View**

Drive on Port 1 - 80.02 GB

Free

79.95 GB

Drive on Port 2 - 60.01 GB

Assigned LD 1-01

59.94 GB

Drive on Port 3 - 80.02 GB

Free

79.95 GB

Drive on Port 4 - 60.01 GB

Assigned LD 1-02

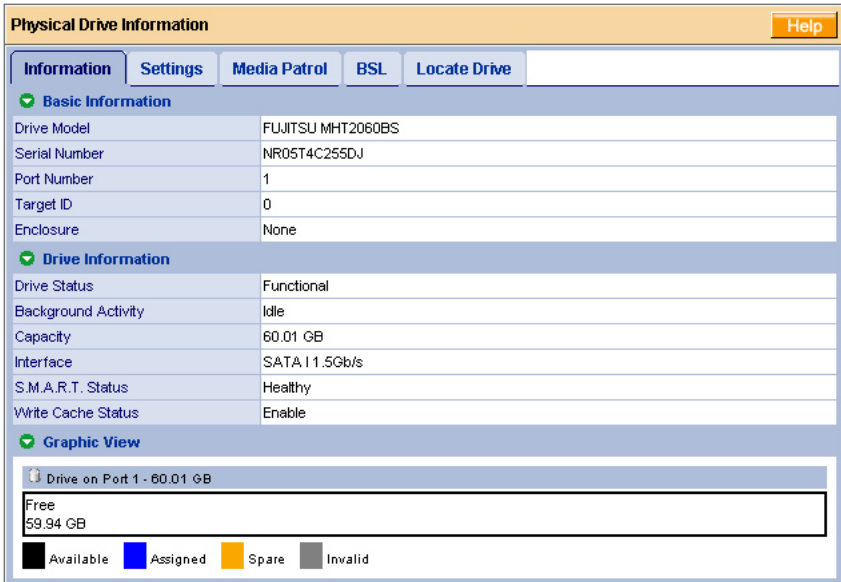
59.94 GB

■ Available
 ■ Assigned
 ■ Spare
 ■ Invalid

Viewing Physical Drive Information

To view information about a physical drive:

1. Click the Physical Drive View  icon in Tree View.
2. Click the Physical Drive  icon.



Physical Drive Information Help

Information Settings Media Patrol BSL Locate Drive

✓ **Basic Information**

Drive Model	FUJITSU MHT2060BS
Serial Number	NR05T4C255DJ
Port Number	1
Target ID	0
Enclosure	None

✓ **Drive Information**

Drive Status	Functional
Background Activity	Idle
Capacity	60.01 GB
Interface	SATA I 1.5Gb/s
S.M.A.R.T. Status	Healthy
Write Cache Status	Enable

✓ **Graphic View**

Drive on Port 1 - 60.01 GB

Free	59.94 GB
------	----------

 Available
  Assigned
  Spare
  Invalid

The information tab displays the following information:

- **Drive Model** – The physical (disk) drive manufacturer's model name or number.
- **Serial Number** – The serial number of this physical drive.
- **Port Number** – The FastTrak port to which this physical drive is attached.
- **Target ID** – The SCSI target number of this physical drive.
- **Enclosure** – The model of SuperSwap enclosure in which the physical drive is installed. If there is no SuperSwap enclosure, the field says None.
- **Drive Status** – The operational of this physical drive. Functional means normal. The alternative status is Offline.
- **Background Activity** – The current background activity affecting this physical drive. Idle means no activity. Others include Initializing and Rebuilding.
- **Capacity** – The data capacity of this physical drive in GB.

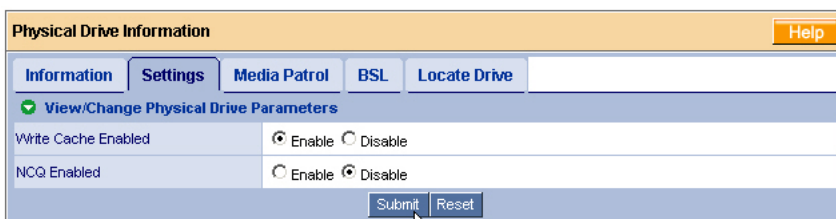
- **Interface** – Identifies whether the physical drive is SATA 1 1.5 Gb/s, SATA II 3.0 Gb/s or SAS.
- **S.M.A.R.T. Status** – SMART, an acronym for Self-Monitoring Analysis and Reporting Technology, is a feature of the physical drive's software. When this feature is supported, the drive will pass SMART information to the FastTrak controller when it polls the physical drives.
- **Write Cache Status** – Indicates whether the physical drive's write cache is Enabled or Disabled. You can change this status under the Settings tab (see below).

Making Physical Drive Settings

Physical Drive Settings allows you to enable or disable the Write Cache and Native Command Queuing (NCQ) on an individual physical drive. The options displayed are those features the physical drive supports.

To make physical drive settings:

1. Click the Physical Drive View  icon in Tree View.
2. Click the Physical Drive  icon.
3. Click the **Settings** tab in Management View.



Physical Drive Information Help

Information **Settings** Media Patrol BSL Locate Drive

View/Change Physical Drive Parameters

Write Cache Enabled ☒ Enable ☐ Disable

NCQ Enabled ☐ Enable ☒ Disable

Submit Reset

4. Click the Write Cache **Enable** or **Disable** option.
5. Click the NCQ **Enable** or **Disable** option.
6. Click the **Submit** button.

Running Media Patrol

The Physical Drive–Media Patrol tab allows you to start Media Patrol on an individual physical (disk) drive. Media Patrol is a routine maintenance procedure that checks the magnetic media on each physical drive, sector by sector.

Media Patrol checks physical drives assigned to logical drives, spare drives and currently unassigned physical drives that were once part of a logical drive or a spare. Media Patrol does not check new physical drives that have never been configured nor physical drives assigned as JBOD.

Unlike Synchronization and Redundancy Check (see page 97), Media Patrol is concerned with the condition of the media itself, not the data recorded on the media.

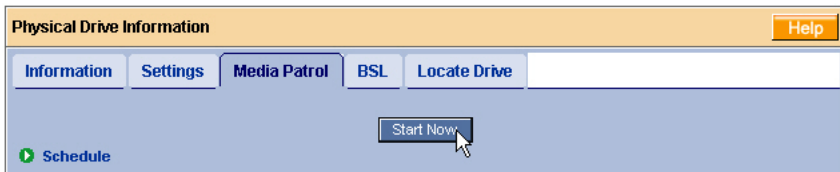
If Media Patrol encounters a suspect sector, it will attempt to regenerate the data and write to the suspect sector. If the write operation is successful, Media Patrol continues checking other sectors.

If the write operation fails, Media Patrol reports the error to your PC's system log and to the physical drive's Bad Sector Log (see page 77). This action triggers a BSL update message and an email message if you enabled that notification option (see page 57).

On Demand

To start Media Patrol:

1. Click the Physical Drive View  icon in Tree View.
2. Click the Physical Drive  icon.
3. Click the **Media Patrol** tab in Management View.



4. Click the **Start Now** button.

Scheduled

Scheduling allows you to perform the Media Patrol at a time when there is less demand on the RAID system.

To schedule Media Patrol:

1. Click the Physical Drive View  icon in Tree View.
2. Click the Physical Drive  icon.
3. Click the **Media Patrol** tab in Management View.

Physical Drive Information Help

Information Settings **Media Patrol** BSL Locate Drive

Start Now

☒ **Schedule**

☐ Disable ☒ **Enable**

☐ By Day Start At 0 : 0

☒ **By Week** Start At 4 : 30 Every Wednesday

☐ By Month Start At 0 : 0 On the 1st

Example 10:30(hh:mm)

Schedule

4. Click the **Enable** option.
5. Click the **by Day**, **by Week** or **by Month** option.
From the dropdown menus, select a start time and a day of the Week or Month, if applicable.
Start time is based on a 24-hour clock.
6. Click the **Schedule** button.

To cancel the scheduled Media Patrol operation:

1. Click the Physical Drive View  icon in Tree View.
2. Click the Physical Drive  icon.
3. Click the Media Patrol tab in Management View.
4. Click the **Disable** option.

Checking the Bad Sector Log

On occasion, an error can arise with the media on a physical drive. WebPAM keeps track of bad sectors in order to inform you of the condition of individual physical drives.

To check a physical drive's bad sector log:

1. Click the Physical Drive View  icon in Tree View.
2. Click the Physical Drive  icon.
3. Click the **BSL** tab in Management View.



If any bad sectors are found, they are listed here. WebPAM informs you by popup and email messages when a bad sector error is logged. See page 57.

After 10 bad sectors have been discovered on a physical drive, WebPAM issues a warning to replace the drive.

After 20 bad sectors have been discovered:

- On fault-tolerant (RAID 1, 5, and 10) logical drives, the FastTrak controller will set down the physical drive (take it offline) and the logical drive will go critical.
Replace the physical drive and rebuild your logical drive. See “Responding to a Critical or Offline Logical Drive” on page 101.
- On non-fault-tolerant (RAID 0 or JBOD) logical drives, the physical drive remains online.
Backup your data, replace the physical drive, create a new logical drive, and copy your data to it.

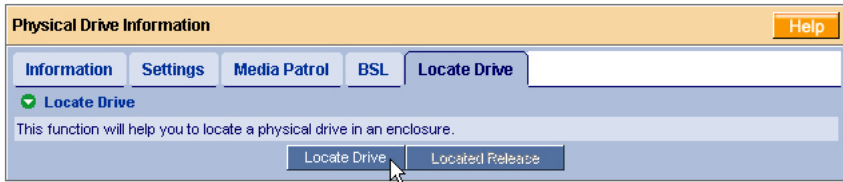
See “Rebuilding a Logical Drive” on page 93 and “Responding to a Critical or Offline Logical Drive” on page 101.

See the *SuperSwap User Manual* for more information about replacing a physical drive.

Locating a Physical Drive

When it becomes necessary to access a physical drive installed in a SuperSwap enclosure, this function will help you identify the physical drive you want. To locate a physical drive:

1. Click the Physical Drive View  icon in Tree View.
2. Click the Physical Drive  icon.
3. Click the **Locate Drive** tab in Management View.



4. Click the **Locate Drive** button.

The Management Window will display the message "Identified started" and the Status LED for this physical drive will flash rapidly on the SuperSwap enclosure.

If you remove the physical drive, the Status LED stops blinking, the Activity LED goes dark and WebPAM will report that the physical drive was unplugged. When you replace the drive, the LEDs will return to normal operation.

If you do not remove the physical drive, click the **Located Release** button to stop the Status LED from blinking. For more information, see the *SuperSwap User Manual*.

Managing Logical Drives

- Viewing All Logical Drives (below)
- Creating a Logical Drive (page 80)
- Creating a JBOD (page 84)
- Deleting a Logical Drive or JBOD (page 88)
- Viewing Logical Drive Information (page 88)
- Making Logical Drive Settings (page 89)
- Migrating a Logical Drive (page 90)
- Rebuilding a Logical Drive (page 93)
- Synchronizing a Logical Drive (page 97)
- Viewing Logical Drive Initialization (page 99)
- Activating a Logical Drive (page 100)
- Responding to a Critical or Offline Logical Drive (page 101)

Viewing All Logical Drives

Logical Drive View provides a list of all logical drives currently on the Host PC. To access Logical Drive View, click the Logical Drive View  icon in Tree View.

Logical Drive View

Help

InformationCreateDelete

✓ Logical Drive Overview

Assigned Name	RAID Level	Status	Background Activity	Capacity
Logical Drive 1	RAID 1	Functional	Idle	58.99 GB

From this screen, you can click the links to access information and functions of individual logical drives and use the Create and Delete features.

Creating a Logical Drive

A logical drive is a collection of physical drives in a RAID.

To create a new logical drive:

1. Click the Logical Drive View  icon.
2. Click the **Create** tab.
The Select RAID Level screen appears.

Select RAID Level

Redundant Array of Independent Disks (RAID) combines multiple physical drives to form one logical drive.

- ☐ **RAID 0** - Data striped across one or more drives for increased performance but no data protection
- ☐ **RAID 1** - Mirrored pairs of drives for data protection with increased read performance
- ☒ **RAID 5** - Striped parity on 3 or more drives, ultimate data protection, capacity and performance balance
- ☐ **RAID 10** - Data mirrored then striped across 4 or more drives, for double drive failure protection
- ☐ **JBOD** - Just a Bunch Of Drives: independent connected drives with no RAID interconnection

<< Prev Next >>

3. Click the option button beside the RAID level you want for your logical drive. WebPAM displays the RAID levels you can use with the available physical drives. See “Choosing a RAID Level” on page 116 for more information. Click the **Next** button to continue. The Select Drive Group screen appears.

Select Drive Group

Please select a free drive(s) or one logical drive that has free space.

Select one of the following groups:

- ☒ Free Drive(s)

<< Prev Next >>

4. In the Select Drive Group screen, click the option button for one of the following:
 - **Free Drives** – Select all Free (unassigned) physical drives.
 - **Logical Drive** – If you previously created a logical drive but did not choose *Use Maximum Capacity* (see step 6) this option appears. Choose *Logical Drive* to use the unassigned portion of physical drives that belong to the existing logical drive.
5. Click the **Next** button.
The Select Drives screen appears.

Select Drives

RAID 5 Striped Parity: Data is striped over 3 or more drives, parity provides redundancy using less space. Best overall balance of performance, capacity and protection.

Logical Drive Size GB

☒ Use Maximum Capacity

Please select at least 3 drives for RAID 5.

Drive on Port 1 - 80.0 GB
Free 79.95 GB
Drive on Port 2 - 80.0 GB
Free 59.94 GB
Drive on Port 3 - 80.0 GB
Free 79.95 GB
Drive on Port 4 - 80.0 GB
Free 59.94 GB

☐ Selected ☐ Available ☐ Assigned ☐ Spare ☐ Invalid

6. If you want to create a logical drive with unused capacity, enter the assigned (used) capacity in the Logical Drive Size field.
To use the maximum capacity, check the *Use Maximum Capacity* box.
7. Click the physical drives to select them.
Available drives have a black frame. Selected drives have a red frame.
8. Click the **Next** button.
The Assign a Name screen appears.

Assign a Name

Assign a name to the logical drive.

Assigned Name
(1-32 character(s))

9. Enter a name for the logical drive in the field provided and click the **Next** button.

The Final Settings screen appears.

Final Settings	
Confirm your choices. Make any changes here.	
Name	Logical Drive 1
RAID Level	RAID 5
Logical Drive Size	Maximum Capacity
Stripe Block Size	16 KB
Write Cache	Write Through
Gigabyte Boundary	GigaByte Boundary
Initialization	Fast Initialization
<< Prev Finish	

These features have only the default setting:

- Stripe Block Size – Set to 16 KB with no options.
 - Write Cache – Set to Write Through with no options.
10. Choose Gigabyte Boundary or None from the Gigabyte Boundary dropdown menu.
 Gigabyte Boundary enables you to replace a failed physical drive with a slightly smaller physical drive. This option is available only when you have checked the *Use Maximum Capacity* box in step 6.
 11. Choose an Initialization method from the Initialization dropdown menu:
 - **Fast Initialization** – Erases the Master Boot Record (MBR) of the physical drives being added to the logical drive.
 - **Full Initialization** – Erases all sectors of the physical drives being added to the logical drive. Available for RAID 1, 5, and 10.
 - **None** – No initialization. This choice is not recommended.
 12. Click the **Finish** button.

If there are physical drives available, the Select RAID Level screen appears again, where you can create an additional logical drive.

Click the Logical Drive  Icon to see all of the information about your new logical drive.

Logical Drive Information Help

Information Settings Migration Rebuild Synchronization Initialization Activation

✓ **Basic Information**

Assigned Name	Logical Drive 1
RAID Level	RAID 5
Sector Size	512 Bytes
Stripe Size	16 KB
Capacity	117.99 GB
Status	Functional
Background Activity	Idle

✓ **Graphic View**

Drive on Port 1 - 80.02 GB

Assigned LD 1-01 59.94 GB	Free 20.01 GB
------------------------------	------------------

Drive on Port 2 - 80.01 GB

Assigned LD 1-02 59.94 GB	
------------------------------	--

Drive on Port 3 - 80.02 GB

Assigned LD 1-03 59.94 GB	Free 20.01 GB
------------------------------	------------------

Available
Assigned
Assigned to Logical Drive 1
Spare
Invalid

Before you can use your new logical drive, you must partition and format the logical drive using your PC's operating system. See "Appendix A: Partition and Format" on page 137 for more information.

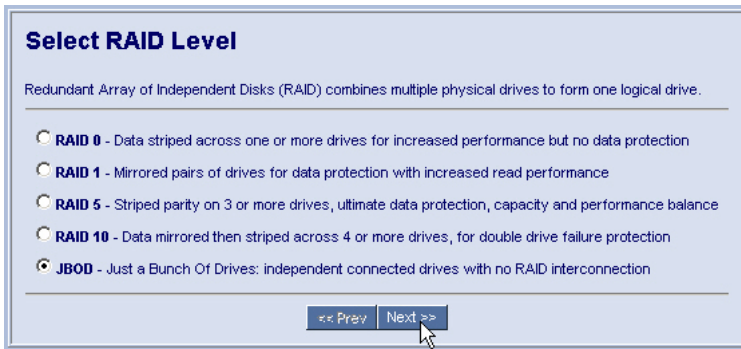
Creating a JBOD

With FastTrak, a JBOD is one or more physical drives that function independently. There is no concatenation among multiple JBOD drives.

If you attach a physical drive that was initialized using Windows disk management, that drive will be automatically recognized as a JBOD by the FastTrak controller and WebPAM.

To create a new JBOD:

1. Click the Logical Drive View  icon.
2. Click the **Create** tab.
The Select RAID Level screen appears.



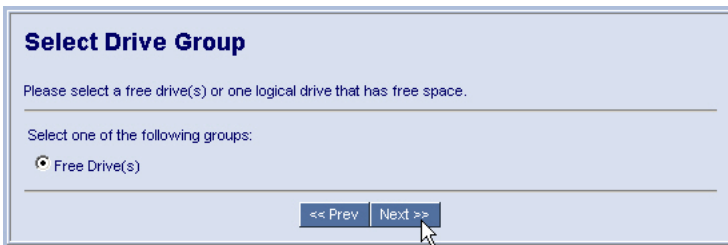
Select RAID Level

Redundant Array of Independent Disks (RAID) combines multiple physical drives to form one logical drive.

- ☐ **RAID 0** - Data striped across one or more drives for increased performance but no data protection
- ☐ **RAID 1** - Mirrored pairs of drives for data protection with increased read performance
- ☐ **RAID 5** - Striped parity on 3 or more drives, ultimate data protection, capacity and performance balance
- ☐ **RAID 10** - Data mirrored then striped across 4 or more drives, for double drive failure protection
- ☒ **JBOD** - Just a Bunch Of Drives: independent connected drives with no RAID interconnection

<< Prev Next >>

3. Click the option button beside JBOD, then click the **Next** button.
The Select Drive Group screen appears.



Select Drive Group

Please select a free drive(s) or one logical drive that has free space.

Select one of the following groups:

- ☒ Free Drive(s)

<< Prev Next >>

4. Click the **Next** button to continue.
The Select Drives screen appears.

Select Drives

Just a Bunch of Drives (JBOD): Drives operate alone with no RAID features.

Logical Drive Size: GB

☒ Use Maximum Capacity

Please select 1 drive for JBOD.

Select All Physical Drives

Drive on Port 1 - 60.0 GB

Free
59.94 GB

Drive on Port 3 - 60.0 GB

Free
59.94 GB

Drive on Port 4 - 60.0 GB

Free
59.94 GB

Selected Available Assigned Spare Invalid

<< Prev Next >>

5. Click the physical drives to select them.
Available drives have a black frame. Selected drives have a red frame.
6. Click the **Next** button.
The Assign a Name screen appears.

Assign a Name

Assign a name to the logical drive.

Assigned Name:
(1-32 character(s))

<< Prev Next >>

7. Click the **Next** button to continue.
The Final Settings screen appears.



Final Settings

Confirm your choices. Make any changes here.

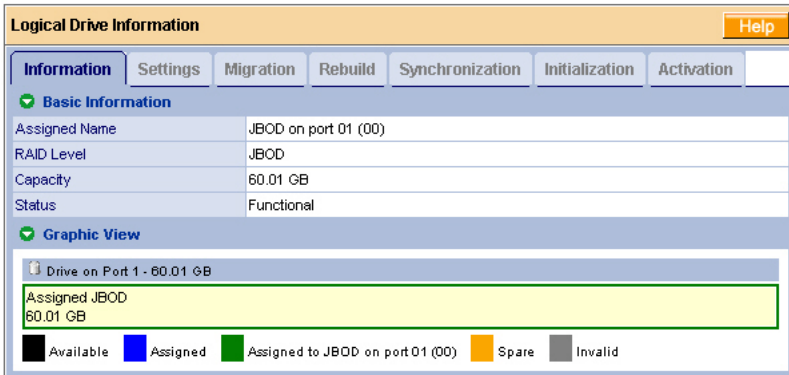
Name	JBOD
RAID Level	Maximum Capacity
Logical Drive Size	
Stripe Block Size	16 KB
Write Cache	Write Through
Gigabyte Boundary	GigaByte Boundary
Initialization	Fast Initialization

<< Prev Finish

8. Choose an Initialization method from the Initialization dropdown menu:
 - **Fast Initialization** – Erases the Master Boot Record (MBR) of the physical drives being added to the logical drive.
 - **None** – No initialization. This choice is not recommended.
9. Click the **Finish** button.

If there are physical drives available, the Select RAID Level screen appears again, where you can create an additional logical drive.

Click the Logical Drive  Icon to see the information about your new JBOD.



Logical Drive Information Help

Information Settings Migration Rebuild Synchronization Initialization Activation

✓ Basic Information

Assigned Name	JBOD on port 01 (00)
RAID Level	JBOD
Capacity	60.01 GB
Status	Functional

✓ Graphic View

Drive on Port 1 - 60.01 GB

Assigned JBOD
60.01 GB

Available Assigned Assigned to JBOD on port 01 (00) Spare Invalid

Before you can use your new JBOD, you must partition and format the logical drive using your PC's operating system. See "Appendix A: Partition and Format" on page 137 for more information.

Deleting a Logical Drive or JBOD

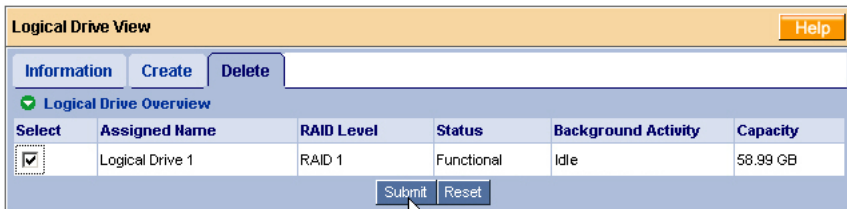


Warning

When you delete a logical drive, you delete all data on the logical drive. Be sure to backup any important data before you delete a logical drive!

To delete a logical drive or JBOD:

1. Click the Logical Drive View  icon.
2. Select the **Delete** tab.



Logical Drive View Help

Information Create **Delete**

✓ Logical Drive Overview

Select	Assigned Name	RAID Level	Status	Background Activity	Capacity
☒	Logical Drive 1	RAID 1	Functional	Idle	58.99 GB

Submit Reset

3. Check the box to the left of the logical drive you want to delete.
 4. Click the **Submit** button.
 5. In the Confirmation box, click the **OK** button.
 6. In the Warning box, click the **OK** button.
- The selected logical drive is deleted.

Viewing Logical Drive Information

Logical Drive View provides a list of all logical drives currently on the Host PC.

To view logical drive information:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon of the logical drive you want to see.

Logical Drive Information Help

Information Settings Migration Rebuild Synchronization Initialization Activation

✓ **Basic Information**

Assigned Name	Logical Drive 1
RAID Level	RAID 1
Stripe Size	64 KB
Capacity	100.00 GB
Status	Functional
Background Activity	Idle

✓ **Graphic View**

Drive on Port 1 - 80.02 GB

Assigned LD 1-1 100.00 GB	Free 59.95 GB
------------------------------	------------------

Drive on Port 2 - 80.02 GB

Assigned LD 1-2 100.00 GB	Free 59.95 GB
------------------------------	------------------

Available
Assigned
Assigned to Logical Drive 1
Spare
Invalid

From this screen, you can click the links to access the Settings, Migration, Rebuild, Synchronization, Initialization and Activation features. The features that apply to this logical drive have blue tabs. Features that do not apply have grayed tabs.

Making Logical Drive Settings

Logical Drive Settings allows you to assign or change the name of a logical drive. To make logical drive settings:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon of the logical drive you want to see.
3. Click the **Settings** tab in Management View.

Logical Drive Information Help

Information Settings Migration Rebuild Synchronization Initialization Activation

✓ **View/Change Logical Drive Parameters**

Assigned Name

Submit Reset

4. Enter a name in the Assigned Name field, as desired.
5. Click the **Submit** button.

Migrating a Logical Drive

To *migrate* a logical drive is to:

- Change its RAID level
- Add one or more physical drives
- Change its RAID level and add physical drives

Migration takes place on an existing Functional logical drive without disturbing the existing data. While the logical drive is migrating, you can access the data as before. When migration is complete, your logical drive will have a different RAID level, a larger capacity, or both. For more information, see “Logical Drive Migration” on page 119.

The FastTrak TX4650 supports the following logical drive migration:

From	To	Result
RAID 0: 1 drive	RAID 0: 2, 3, or 4 drives	Increased performance and capacity
	RAID 1: 2 drives	Adds redundancy
	RAID 5: 3 or 4 drives	Adds capacity and redundancy
	RAID 10: 4 drives	Adds capacity and redundancy
RAID 0: 2 drives	RAID 0: 3 or 4 drives	Increased performance and capacity
	RAID 5: 3 or 4 drives	Adds capacity and redundancy
	RAID 10: 4 drives	Adds capacity and redundancy
RAID 0: 3 drives	RAID 0: 4 drives	Increased performance and capacity
	RAID 5: 4 drives	Adds capacity and redundancy
RAID 1: 2 drives	RAID 5: 3 or 4 drives	Increased performance and capacity
	RAID 10: 4 drives	Increased performance and capacity
RAID 5: 3 drives	RAID 5: 4 drives	Adds capacity
RAID 10: 4 drives	RAID 5: 4 drives	Increased performance and capacity

The FastTrak TX2650 supports the following logical drive migration:

From	To	Result
RAID 0: 1 drive	RAID 1: 2 drives	Add redundancy
	RAID 0: 2 drives	Add capacity

You can set up a Migration to:

- Begin immediately (on demand).
- Begin at the time and date you specify. See page 92.



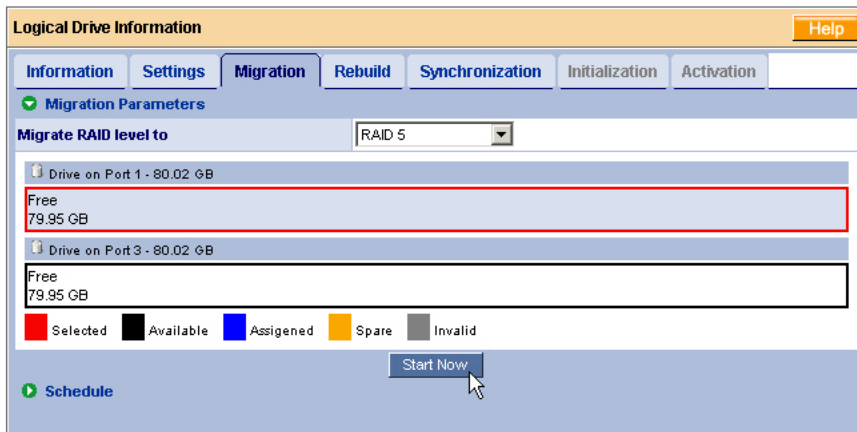
Caution

Before you begin logical drive Migration, back up your important data.

On Demand

To migrate a logical drive:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon of the logical drive you want to migrate.
3. Click the **Migration** tab in Management View.



Logical Drive Information Help

Information Settings **Migration** Rebuild Synchronization Initialization Activation

✓ Migration Parameters

Migrate RAID level to: RAID 5

Drive on Port 1 - 80.02 GB

Free 79.95 GB

Drive on Port 3 - 80.02 GB

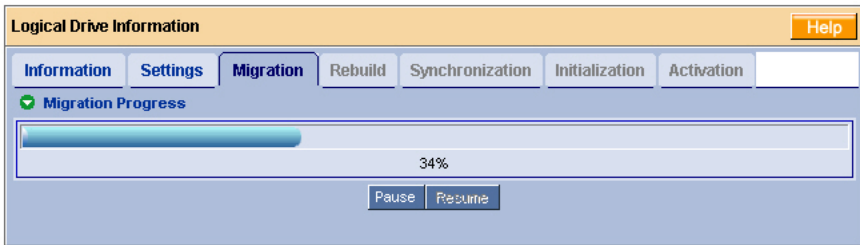
Free 79.95 GB

Selected Available Assigned Spare Invalid

Schedule Start Now

4. Click the free physical drive to select it.
Available drives have a black frame. Selected drives have a red frame.
5. Click the **Start Now** button.
6. Click the **OK** button in the confirmation box.

You can monitor Migration progress on the Logical Drive Migration tab.



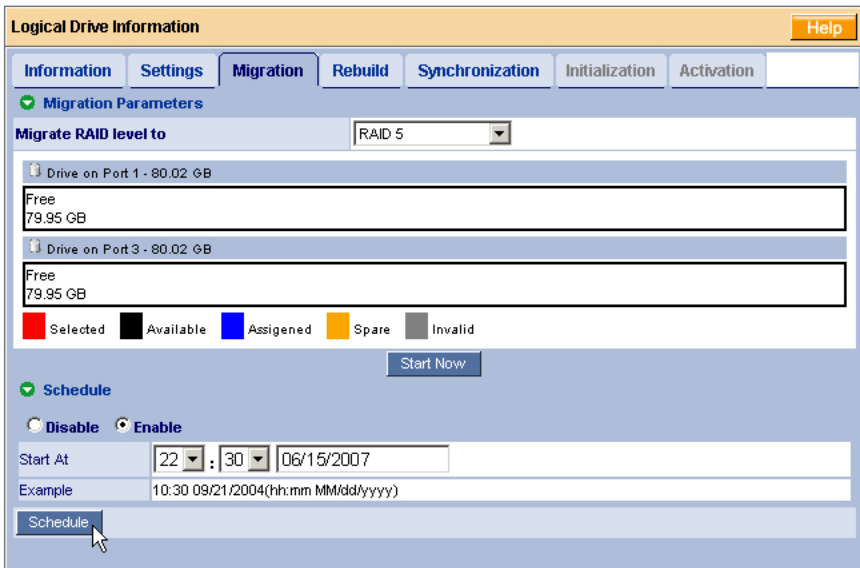
Click the respective buttons to pause and resume the Migration.

Scheduled

Scheduling allows you to perform the Migration at a time when there is less demand on the RAID system.

To schedule a Migration:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon of the logical drive you want to migrate or expand.
3. Click the **Migration** tab in Management View.



4. Click the free physical drive to select it.

Available drives have a black frame. Selected drives have a red frame.

5. Click the **Enable** option.
6. From the dropdown menus, select a start time.
Start time is based on a 24-hour clock.
7. Click the **Start At** field to display a popup calendar.
8. Click the start date in the calendar or enter a date manually.
9. Click the **Schedule** button.

Cancelling a Schedule

To cancel the scheduled Migration:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon.
3. Click the **Migration** tab in Management View.
4. Click the **Disable** option.

Rebuilding a Logical Drive

Rebuilding refers to the process of repairing a logical drive by reconstructing the data on a failed or removed physical drive. This feature applies to RAID 1, 5, and 10 logical drives. It does not apply to RAID 0 or JBOD.

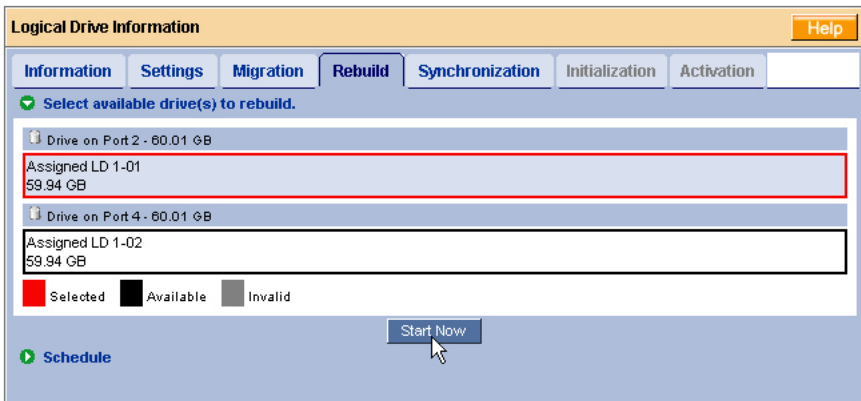
You can set up a Rebuild to:

- Begin immediately (on demand).
- Begin at the time and date you specify. See page 94.
- Begin automatically when you replace the failed physical drive. See page 96.
- Begin automatically using a hot spare drive. See page 96.
- Begin automatically using a free drive. See page 96.

On Demand

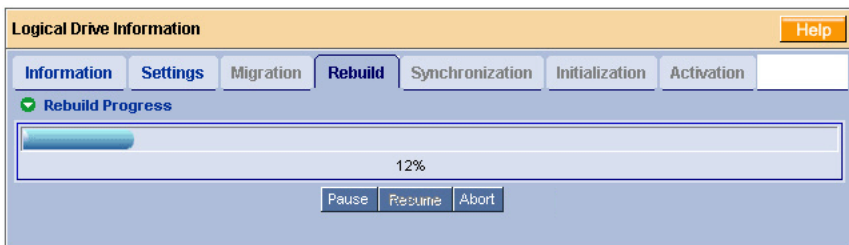
To rebuild a logical drive:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon of the logical drive you want to rebuild.
3. Click the **Rebuild** tab in Management View.



4. Select the physical drive to use in the rebuild.
Available drives have a black frame. Selected drives have a red frame.
5. Click the **Start Now** button.

You can monitor Rebuild progress on the Logical Drive Rebuild tab.



Click the respective buttons to pause and resume the Rebuild.

Click the **Abort** button to stop the Rebuild. After an abort, click the **Restart** button to start the Rebuild from the beginning (zero percent).

Scheduled

Scheduling allows you to perform the Rebuild at a time when there is less demand on the RAID system.

To schedule a Rebuild:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon of the logical drive you want to rebuild.
3. Click the **Rebuild** tab in Management View.

Logical Drive Information Help

Information Settings Migration **Rebuild** Synchronization Initialization Activation

✓ Select available drive(s) to rebuild.

Drive on Port 2 - 60.01 GB
Assigned LD 1-01
59.94 GB

Drive on Port 4 - 60.01 GB
Assigned LD 1-02
59.94 GB

☒ Selected ☐ Available ☐ Invalid

Start Now

✓ Schedule

☐ Disable ☒ Enable

Start At :

Example 10:30 09/21/2004(hh:mm MM/dd/yyyy)

Schedule

4. Select the physical drive you want to rebuild.
Available drives have a black frame. Selected drives have a red frame.
5. Click the **Enable** option.
6. From the dropdown menus, select a start time.
Start time is based on a 24-hour clock.
7. Click the **Start At** field to display a popup calendar.
8. Click the start date in the calendar or enter a date manually.
9. Click the **Schedule** button.

Cancelling a Schedule

To cancel the scheduled Rebuild:

1. Click the Logical Drive View icon in Tree View.
2. Click the Logical Drive icon.
3. Click the **Rebuild** tab in Management View.
4. Click the **Disable** option.

Automatically After Drive Replacement

Automatic rebuilding after you replace the failed drive is possible under the following conditions:

- The logical drive is a RAID 1, 5, or 10.
See “Creating a Logical Drive” on page 80.
- The replacement drive has adequate capacity.
- Automatic Rebuild Status is Enabled.
See “Making Controller Settings” on page 68.

WebPAM will report the automatic rebuild in its user interface, as well as via popup messages, and via email, depending on your settings (see page 57).

Automatically using a Hot Spare Drive

Automatic rebuilding using a hot spare drive is possible under the following conditions:

- The logical drive is a RAID 1 or a three-drive RAID 5.
See “Creating a Logical Drive” on page 80.
- You have a hot spare drive with adequate capacity.
See “Creating a Spare Drive” on page 107.
- Automatic Rebuild Status is Enabled.
See “Making Controller Settings” on page 68.

WebPAM will report the automatic rebuild in its user interface, as well as via popup messages, and via email, depending on your settings (see page 57).

You can replace the failed physical drive at your convenience.

Automatically using a Free Drive

Automatic rebuilding using a free (unassigned) physical drive is possible under the following conditions:

- The logical drive is a RAID 1 or a three-drive RAID 5.
See “Creating a Logical Drive” on page 80.
- There is a free (unassigned) physical drive with adequate capacity.
- Automatic Rebuild Status is Enabled.
See “Making Controller Settings” on page 68.
- Automatic Rebuild Policy is set to Free & Spare.
See “Making Controller Settings” on page 68.

WebPAM will report the automatic rebuild in its user interface, as well as via popup messages, and via email, depending on your settings (see page 57).

You can replace the failed physical drive at your convenience.

Synchronizing a Logical Drive

Synchronization refers to an automated process of checking and correcting data and parity. Unlike a Rebuild, Synchronization is a maintenance operation.

Redundancy Check is an automated process of checking data and parity but it only reports and does not correct, any inconsistencies that it finds.

Synchronization and Redundancy Check apply to RAID 1, 5, and 10 logical drives. When an logical drive is first created and you choose *Full Initialization*, the same action as Synchronization takes place.

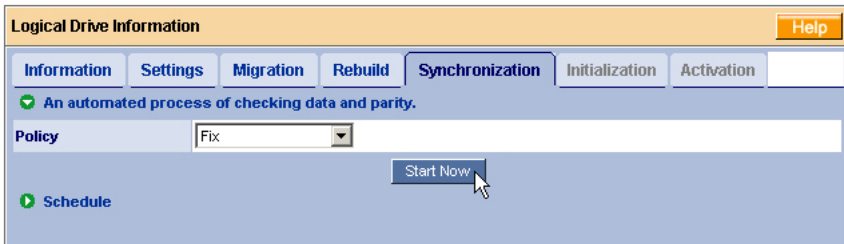
You can set up a Synchronization or Redundancy Check to:

- Begin immediately (on demand).
- Begin at the time and date you specify. See page 98.

On Demand

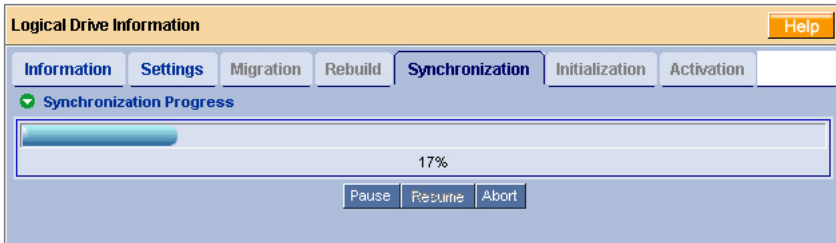
To Synchronize or Redundancy Check a logical drive:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon of the logical drive you want to synchronize.
3. Click the **Synchronization** tab in Management View.



4. From the Policy dropdown menu, choose:
 - *Fix* if you want Synchronization
 - *Redundancy Check* if you do not want to correct inconsistencies
5. Click the **Start Now** button.

You can monitor Synchronization or Redundancy Check progress on the Synchronization tab.



Click the respective buttons to pause, resume, or abort the Synchronization or Redundancy Check.

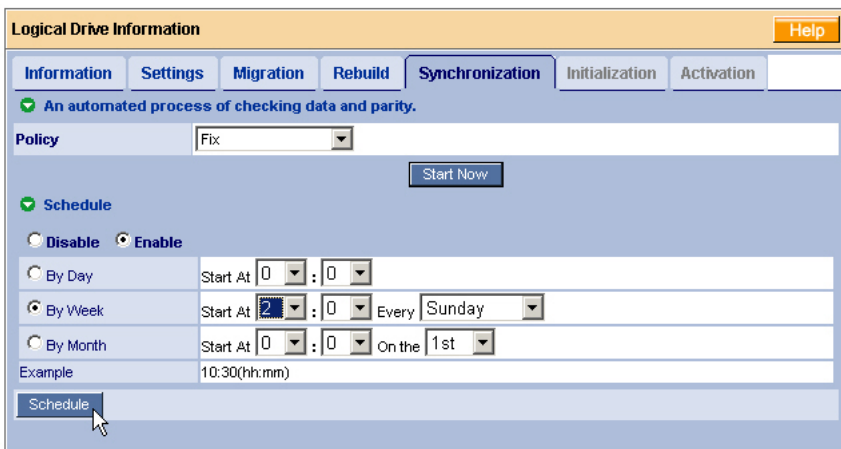
Scheduled

Scheduling allows you to perform the Synchronization or Redundancy Check at a time when there is less demand on the RAID system.

Synchronization and Redundancy Check are recurring operations. For this reason, there is no date setting.

To schedule a Synchronization or Redundancy Check:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon of the logical drive you want to synchronize.
3. Click the **Synchronization** tab in Management View.



4. From the Policy dropdown menu, choose:
 - *Fix* if you want Synchronization
 - *Redundancy Check* if you do not want to correct inconsistencies
5. Click the **Enable** option.
6. Click the **by Day, by Week** or **by Month** option.
7. From the dropdown menus, select a start time and a day of the Week or Month, if applicable.

Start time is based on a 24-hour clock.
8. Click the **Schedule** button.

Cancelling a Schedule

To cancel a scheduled Synchronization or Redundancy Check:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon.
3. Click the **Synchronization** tab in Management View.
4. Click the **Disable** option.

Viewing Logical Drive Initialization

When logical drive is first created, you can choose one of three methods for initialization:

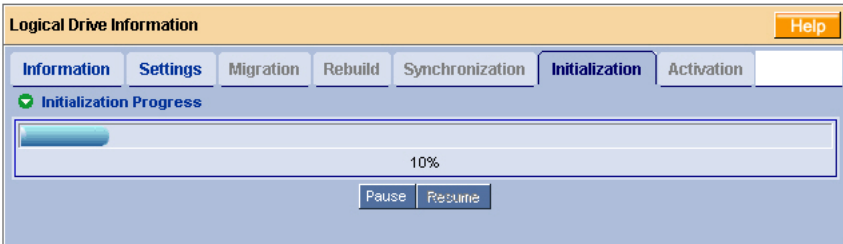
- **Fast Initialization** – Erases the reserve and master boot sectors of the physical drives being added to the logical drive.
- **Full Initialization** – Erases all sectors of the physical drives being added to the logical drive. Available for RAID 1, 5, and 10.
- **None** – No initialization. This choice is not recommended.

When you choose *Full Initialization*, the process takes some time, depending on the size of the physical drives selected for the logical drive. The Initialization tab enables you to view the initialization progress on your logical drive.

To view Initialization progress:

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon.
3. Click the **Initialization** tab in Management View.

You can monitor Initialization progress on the Initialization tab.



Click the respective buttons to pause and resume the Initialization.

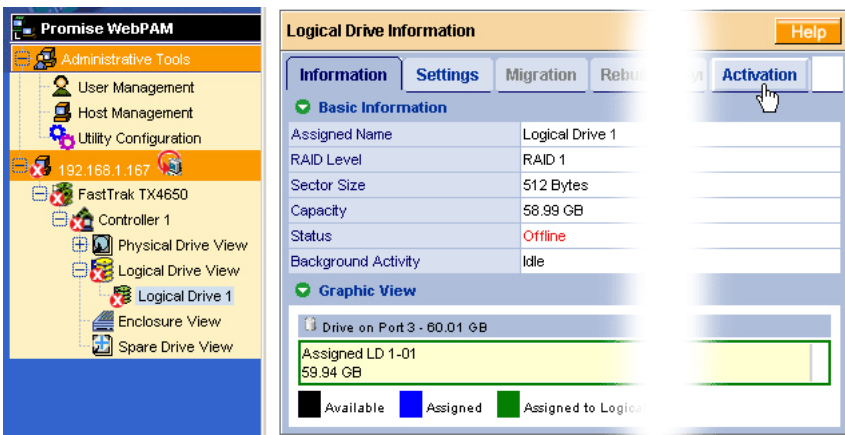
To abort an Initialization, you must delete the logical drive. See “Deleting a Logical Drive or JBOD” on page 88.

Activating a Logical Drive

This feature enables you to convert a RAID 1 logical drive from *offline* to *critical* status, so you can rebuild the logical drive and access your data. This condition occurs when a single physical (disk) drive from a RAID 1 logical drive is connected to the FastTrak Controller card.

This feature does not apply to an offline RAID 0, 5, or 10 logical drive or to JBOD.

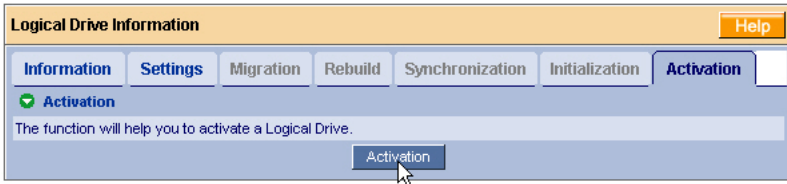
In the example below, icons of a white X within a red circle appear over the FastTrak, Controller, Logical Drive View, and Logical Drive icons. In Management View, the status is shown as *Offline*.



To activate an offline RAID 1 logical drive:

1. Click the Logical Drive View  icon in Tree View.

2. Click the Logical Drive  icon of the offline logical drive.
3. Click the **Activation** tab in Management View.



4. Click the **Activation** button.

The logical drive converts to *Critical* status. You can now rebuild the logical drive. See “Rebuilding a Logical Drive” on page 93.

Responding to a Critical or Offline Logical Drive

When a Physical Drive Fails in a RAID 0 Logical Drive

A non-fault tolerant logical drive—RAID 0—goes offline when a physical (disk) drive is removed or fails. Since the logical drive is not fault tolerant, the data stored in the logical drive is no longer accessible.

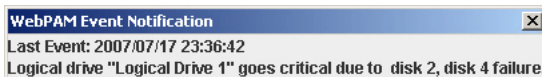
If one physical drive fails, all of the data on the RAID 0 logical drive is lost. You must replace the failed drive. If the logical drive had more than one physical drive, delete the logical drive and re-create it. Then restore the data from a backup source.

When a Physical Drive Fails in a RAID 1, 5, or 10 Logical Drive

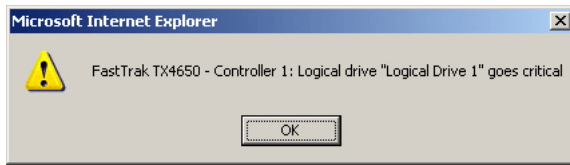
A RAID 1, 5, or 10 logical drive goes critical when a physical (disk) drive is removed or fails. Due to the fault tolerance of the logical drive, the data is still available and online. However, once the logical drive goes critical, it has lost its fault tolerance and performance may be adversely affected.

The following will occur when a physical drive fails or goes offline:

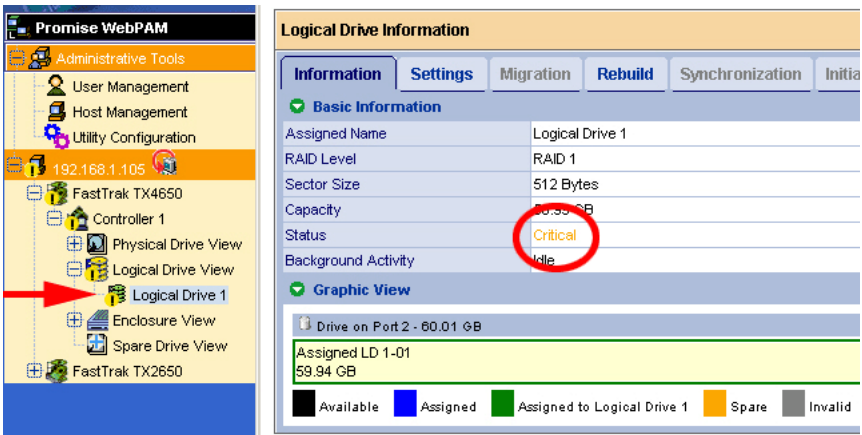
- The FastTrak Controller’s audible alarm sounds (if the alarm is enabled).
- The SuperSwap Status LED changes from green to red.
- WebPAM displays a message in the upper right corner of the Host PC’s monitor screen. This message appears even when your browser is closed.



- WebPAM displays a popup message.



- WebPAM sends you an email message (if Event Notification is enabled).
- WebPAM reports the condition in Tree View and Management View.



In the example above, amber! icons appear over the FastTrak, Controller, Logical Drive View, and Logical Drive icons. Click the Logical Drive View  or Logical Drive  icons to verify the condition of the logical drive.

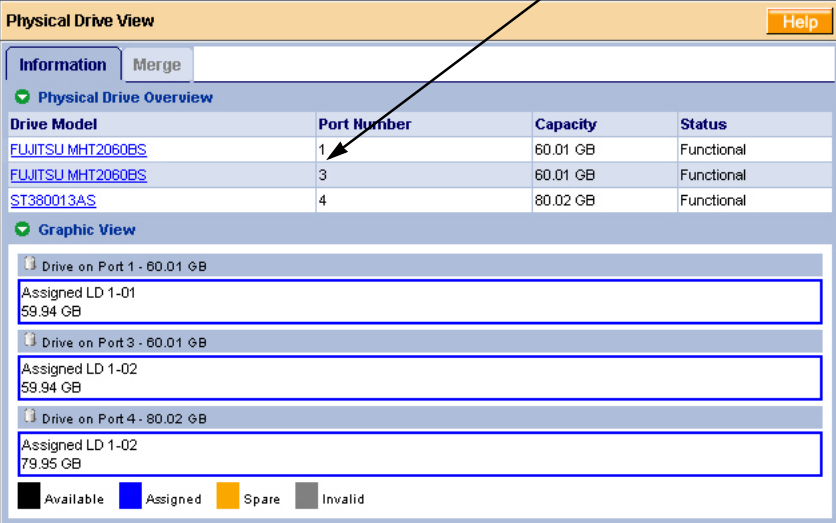
In this example, the Status is *Critical* and Background activity is *Idle*. This combination indicates that there is no automatic rebuild, so you must take action to restore the logical drive:

1. Identify the failed physical drive.
2. Replace the failed physical drive.
3. Rebuild your logical drive.

Identify the Failed Physical Drive

Click the Physical Drive View  icon in the WebPAM user interface. Look for a missing physical drive. A drive that used to be present but is suddenly absent is the failed physical drive.

No drive on Port 2



Drive Model	Port Number	Capacity	Status
FUJITSU MHT2060BS	1	60.01 GB	Functional
FUJITSU MHT2060BS	3	60.01 GB	Functional
ST380013AS	4	80.02 GB	Functional

Graphic View

- Drive on Port 1 - 60.01 GB
 - Assigned LD 1-01
 - 59.94 GB
- Drive on Port 3 - 60.01 GB
 - Assigned LD 1-02
 - 59.94 GB
- Drive on Port 4 - 80.02 GB
 - Assigned LD 1-02
 - 79.95 GB

Available
 Assigned
 Spare
 Invalid

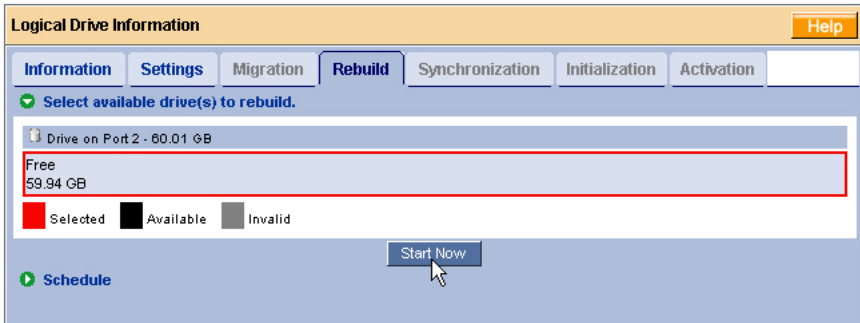
In this example, there were four physical drives connected to the FastTrak Controller. Notice that there is no drive reported on Port 2. The failed drive is connected to Port 2.

Replace the Failed Physical Drive

Replace the failed physical drive with a new one of equal or greater capacity. Then rebuild the logical drive. See “Connecting the FastTrak Card” on page 10 and the *SuperSwap User Manual* for more information about replacing a physical drive.

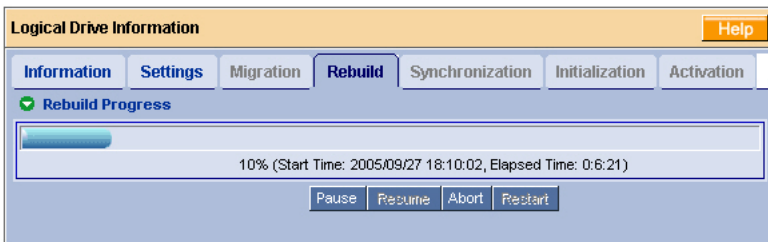
Rebuild Your Logical Drive

1. Click the Logical Drive View  icon in Tree View.
2. Click the Logical Drive  icon of the logical drive you want to rebuild.
3. Click the **Rebuild** tab in Management View.



4. Select the physical drive you just replaced.
5. Click the **Start Now** button.

You can monitor Rebuild progress on the Logical Drive Rebuild tab.



When the Rebuild is finished, your logical drive will be Functional again.

If you have a RAID 1 or a three-drive RAID 5 logical drive, you can set up your system to rebuild the logical drive automatically. See “Rebuilding a Logical Drive” on page 93 for more information.

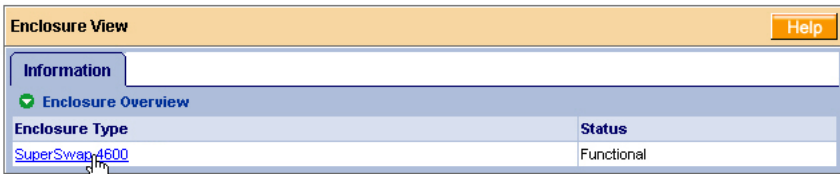
Managing Enclosures

- Viewing Enclosures (page 105)
- Viewing Enclosure Information (page 105)

Viewing Enclosures

Enclosure View provides a list of all enclosures currently installed in the Host PC.

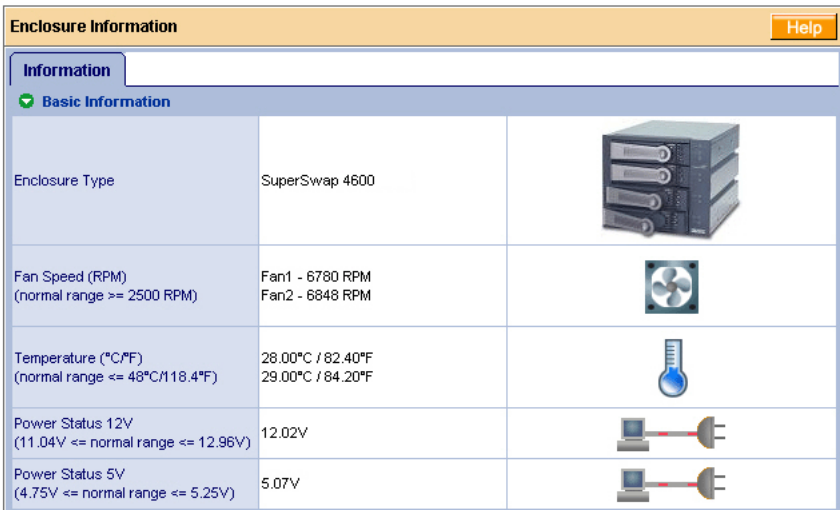
To view a list of your enclosures, click the Enclosure View  icon in Tree View.



Viewing Enclosure Information

To access information about an Enclosure:

1. Click the Enclosure View  icon in Tree View.
2. Click the Enclosure  icon.



The information tab displays the following information:

- **Enclosure Type** – The manufacturer’s model name or number.
- **Fan Speed** – The RPM of the enclosure’s cooling fans.
- **Temperature** – The internal temperature of the enclosure. Each reading reflects a separate measurement.
- **Power Status** – The voltages supplied by the enclosure’s 12V and 5V systems.

The Fan, Temperature and Power icons change color when an error is indicated, as shown below.



	LEDs		
State	Status	Activity	Enclosure
Green	Physical drive is present and ready	Physical drive is present and ready	Normal status
Blinking	n/a	Read/write activity	n/a
Amber	Physical drive: • is spinning up • is critical • is rebuilding • reports a SMART error	n/a	1 incident (see below) Enclosure is critical but still functional Attention required
Red	Physical drive: • is offline • is not installed	n/a	2 or more incidents (see below)
Dark	Power is off	Physical drive: • has failed • is not installed	Physical drives are spinning up
An incident refers to one occurrence of out-of-range voltage, temperature or fan speed. Any incident requires immediate attention.			

For more information on Enclosures, replacing physical drives and other repair operations, refer to the *SuperSwap User Manual*.

Managing Spare Drives

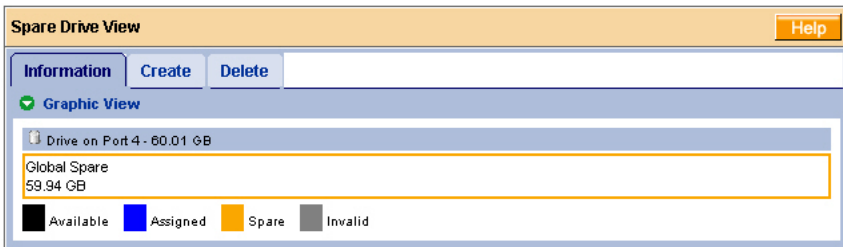
- Viewing Spare Drives (page 107)
- Creating a Spare Drive (page 107)
- Deleting a Spare Drive (page 108)

A spare drive is a physical drive designated to function as a hot spare drive. A hot spare drive replaces a failed physical drive automatically. See “Rebuilding a Logical Drive” on page 93 for more information.

Only the FastTrak TX4650 supports a sufficient number of physical drives to configure a spare drive.

Viewing Spare Drives

Logical Drive View provides a list of all logical drives currently on the Host PC. To access Logical Drive View, click the Spare Drive View  icon in Tree View.



From this screen, you can use the Create and Delete features.

Creating a Spare Drive



Important

The spare drive must be of equal or greater capacity than the largest physical drive in your logical drive.

To create a new spare drive:

1. Click the Spare Drive View  icon.
2. Click the **Create** tab.

The Spare Drive View screen appears.

Spare Drive View Help

Information **Create** **Delete**

Spare Drive Parameters

Spare Drive Type: Global Spare

Drive on Port 1 - 80.0 GB
Free
79.95 GB

Drive on Port 3 - 80.0 GB
Free
79.95 GB

Selected Available Assigned Spare Invalid

Create

Spare Drive Type has only the default Global Spare setting.

- Click a physical drive to select it.
Available drives have a black frame. Selected drives have a red frame.
- Click the **Create** button.
The Spare Drive is created. Click on the Information tab to see it.

Deleting a Spare Drive

To delete a spare drive:

- Click the Spare Drive View  icon.
- Click the **Delete** tab.

Spare Drive View Help

Information **Create** **Delete**

Spare Drive List

Select	Capacity	Status	State
☒	79.95 GB	Dedicated Spare	Idle

Delete

- Check the box to the left of the spare drive you want to delete.
- Click the **Submit** button.
- In the Confirmation box, click the **OK** button.
The spare drive is deleted.

Chapter 6: Technology

- About FastTrak, below
 - Introduction to RAID, below
 - Choosing a RAID Level (page 116)
 - Other Logical Drive Features (page 118)
-

About FastTrak

FastTrak TX Series SATA/SAS RAID controller cards feature concurrent data channel operation and onboard BIOS. The channels on the FastTrak card 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 card contains 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.

Introduction to RAID

RAID (Redundant Array of Independent Disks) allows multiple hard drives to be combined together into a logical drive. The operating system sees the logical drive as a single storage device, and treats it as such. The RAID software and/or controller handle all of the individual drives on its own. The benefits of a RAID can include:

- Higher data transfer rates for increased server performance
- Increased overall storage capacity for a single drive designation (such as, C, D, E, etc.)
- Data redundancy/fault tolerance for ensuring continuous system operation in the event of a hard drive failure

Different types of logical drives use different organizational models and have varying benefits. Also see Choosing RAID Level on page 116. The following outline breaks down the properties for each type of RAID logical drive:

RAID 0 – Stripe

When a logical drive is striped, the read and write blocks of data are interleaved between the sectors of multiple physical drives. Performance is increased, since the workload is balanced between drives or “members” that form the logical drive. Identical drives are recommended for performance as well as data storage efficiency. The logical drive's data capacity is equal to the number of drive members multiplied by the smallest logical drive member's capacity.

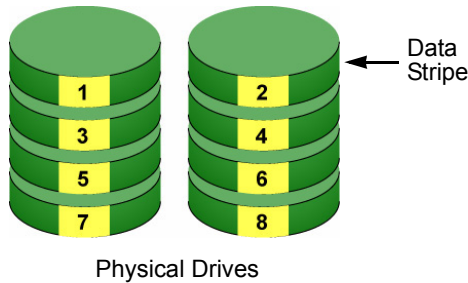


Figure 1. RAID 0 Stripe interleaves data across multiple drives

For example, one 100 GB and three 120 GB drives will form a 400 GB (4 x 100 GB) logical drive instead of 460 GB.

RAID 0 logical drives on the FastTrak TX Series RAID consist of one or more physical drives.

RAID 1 – Mirror

When a logical drive is mirrored, identical data is written to a pair of physical drives, while reads are performed in parallel. The reads are performed using elevator seek and load balancing techniques where the workload is distributed in the most efficient manner. Whichever drive is not busy and is positioned closer to the data will be accessed first.

With RAID 1, if one physical drive fails or has errors, the other mirrored physical drive continues to function. This is called Fault Tolerance. Moreover, if a spare physical drive is present, the spare drive will be used as the replacement drive and data will begin to be mirrored to it from the remaining good drive.

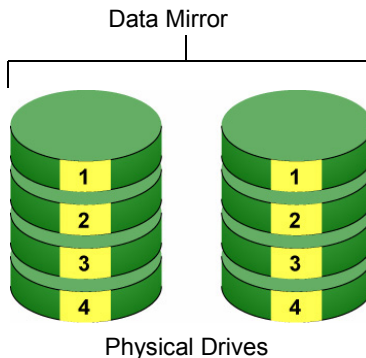


Figure 2. RAID 1 Mirrors identical data to two drives

Due to the data redundancy of mirroring, the capacity of the logical drive is only the size of the smallest physical drive. For example, two 100 GB physical drives which have a combined capacity of 200 GB instead would have 100 GB of usable storage when set up in a mirrored logical drive. Similar to RAID 0 striping, if physical drives of different capacities are used, there will also be unused capacity on the larger drive.

RAID 1 logical drives on the FastTrak TX Series consist of two physical drives.

RAID 5 – Block Striping with Distributed Parity

RAID level 5 organizes data across the physical drives of the logical drive, and distributes parity information across the physical drives along with the data blocks. This organization allows increased performance by accessing multiple physical drives simultaneously for each operation, as well as fault tolerance by providing parity data. In the event of a physical drive failure, data can be re-calculated by the RAID system based on the remaining data and the parity information.

The adjustable block size of the RAID 5 logical drive allows for performance tuning based on the typical I/O request sizes for your system. The block size must be set at the time the logical drive is created and cannot be adjusted dynamically.

RAID 5 makes efficient use of hard drives and is the most versatile RAID Level. It works well for file, database, application and web servers.

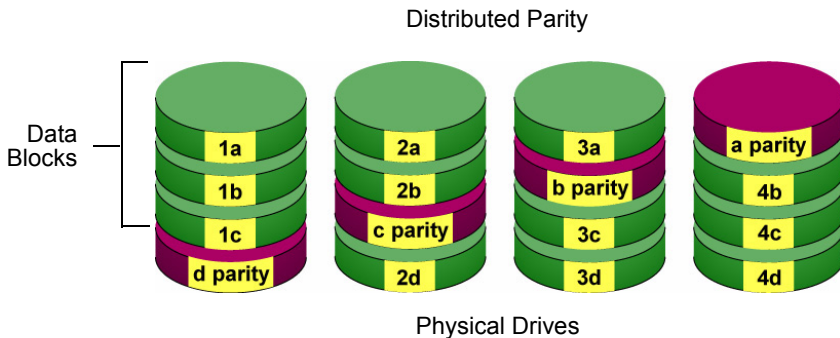


Figure 3. RAID 5 Stripes all drives with data and parity information

The capacity of a RAID 5 logical drive is the smallest physical drive size multiplied by the number of physical drives, less one. Hence, a RAID 5 logical drive with four 100 GB physical drives will have a capacity of 300 GB. A logical drive with two 120 GB physical drives and one 100 GB physical drive will have a capacity of 200 GB.

RAID 5 logical drives on the FastTrak TX4650 consist of three or four physical drives.

The FastTrak TX2650 does not support enough physical drives to create a RAID 5 logical drive.

RAID 10 – Mirror / Stripe

Mirror/Stripe combines both of the RAID 0 and RAID 1 logical drive types. It can increase performance by reading and writing data in parallel while protecting data with duplication. At least four physical drives are needed for RAID 10 to be installed. With a four-disk-drive logical drive, one drive pair is mirrored together then striped over a second drive pair.

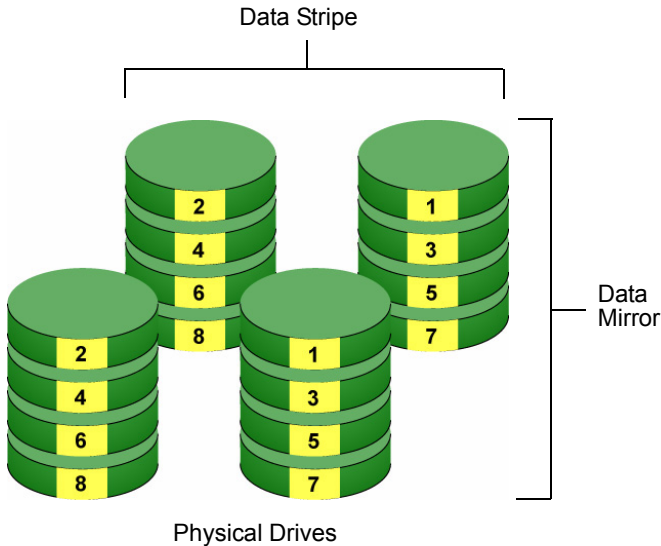


Figure 4. RAID 10 takes a data mirror on one drive pair and stripes it over two drive pairs

The data capacity is similar to a RAID 1 logical drive, with half of the total storage capacity dedicated for redundancy. An added plus for using RAID 10 is that, in many situations, such a logical drive offers double fault tolerance. Double fault tolerance may allow your logical drive to continue to operate depending on which two physical drives fail.

RAID 10 logical drives on the FastTrak TX4650 consist of four physical drives.

The FastTrak TX2650 does not support enough physical drives to create a RAID 10 logical drive.

About Dual Data Redundancy

One unique (though rarely occurring) feature of RAID 10 is dual fault tolerance. In some cases, two drives can fail simultaneously and still maintain the integrity of data. There are six combinations in which two drives can fail. The FastTrak TX 4650 protects your data array in four of those cases. Assume the drives are configured as follows:

- CH indicates channels on the FastTrak Controller card.
- A/B indicates which striped 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 array maintains data integrity if any 1, 2 combination survives.

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

JBOD – Single Drive

An alternative to RAID, JBOD capacity is equal to the size of the physical drive itself.

JBOD appears in the User Interface as one individual drive.

There are no performance or fault-tolerance features. When one disk fails, all data on that disk is lost. The other disks are unaffected.



Physical Drive

Choosing a RAID Level

There are several issues to consider when choosing the RAID Level for your FastTrak logical drive. The following discussion summarizes some advantages, disadvantages and applications for each choice.

RAID 0

Advantages	Disadvantages
Implements a striped disk logical drive, the data is broken down into blocks and each block is written to a separate physical drive I/O performance is greatly improved by spreading the I/O load across many channels and drives No parity calculation overhead is involved	Not a true RAID because it is not fault-tolerant The failure of just one drive will result in all data in an logical drive being lost Should not be used in mission critical environments

Recommended Applications for RAID 0:

- Image Editing
- Pre-Press Applications
- Any application requiring high bandwidth

RAID 1

Advantages	Disadvantages
Simplest RAID storage subsystem design Can increase read performance by processing data requests in parallel since the same data resides on two different drives	Very high disk overhead - uses only 50% of total capacity

Recommended Applications for RAID 1:

- Accounting
- Financial
- Payroll
- Any application requiring very high availability

RAID 5

Advantages	Disadvantages
High Read data transaction rate Medium Write data transaction rate Good aggregate transfer rate	Disk failure has a medium impact on throughput

Recommended Applications for RAID 5:

- File and Application servers
- WWW, E-mail, and News servers
- Intranet servers
- Most versatile RAID level

RAID 10

Advantages	Disadvantages
Implemented as a mirrored logical drive whose segments are RAID 0 logical drives High I/O rates are achieved thanks to multiple stripe segments	Very high disk overhead - uses only 50% of total capacity

Recommended Applications for RAID 10:

- Imaging applications
- Database servers
- General fileserver

JBOD

Advantages	Disadvantages
Enables you to manage a large number of physical drives from a single controller The failure of one drive has no effect upon the data in other physical drives	An alternative to RAID without any RAID advantages Should not be used in mission critical environments

Recommended Applications for JBOD:

- Any application requiring multiple physical drives but where read/write speed or fault-tolerance are not important
- Applications where low-cost operation critical

Other Logical Drive Features

Stripe Block Size

Stripe Block size is set to 16 KB for the FastTrak TX Series RAID controller card.

Initialization

Fast Initialization erases the Master Boot Record in all of the physical drives that make up the logical drive. Use this function when one or more physical drives has been used in a previous logical drive. This function is available in the FastBuild utility and in WebPAM.

Full Initialization erases all the data in all of the physical drives that make up the logical drive. Use this function when one or more physical drives has been used in a previous logical drive and you want to remove all data stored on the drive. This function is available in WebPAM.

Gigabyte Boundary

This feature is designed for fault-tolerant logical drives (RAID 1, 5, and 10). Gigabyte Boundary affects a replacement physical drive used in a logical drive. Normally, when an physical drive fails, the replacement drive must be the same capacity or larger. However, the Gigabyte Boundary feature permits the installation of a replacement drive that is slightly smaller (within 1 gigabyte) than the remaining working drive. For example, the remaining working drives can be 80.5 GB and the replacement drive can be 80.3 GB, since all are rounded down to 80.0 GB. This permits the smaller drive to be used.

Without Gigabyte Boundary, the FastTrak controller will not permit the use of a replacement physical drive that is slightly smaller than the remaining working drive(s).

Hot Spare Drive

Any extra drive that is not assigned to an array is designated *Free* in the View Drive Assignments screen (see below). In order for a free drive to serve as a hot spare drive, you must designate the free drive as a spare using the WebPAM software.

FastBuild (tm) Utility (c) 2004-2007 Promise Technology, Inc.
 [View Drives Assignments]

Channel:ID	Drive Model	Capabilities	Capacity (MB)	Assignment
1:Mas	ST380023AS	SATA 1.5G	60012	
	Extent 1		59945	Free
2:Mas	MHT2060BS	SATA 1.5G	60012	
	Extent 1		59945	LD 1-1
3:Mas	MHT2060BS	SATA 1.5G	60012	
	Extent 1		59945	LD 1-2
4:Mas	MHT2060BS	SATA 1.5G	60012	
	Extent 1		59945	LD 1-3

[Keys Available]

[↑] Up [↓] Down [ESC] Exit

Spare Drives are automatically added to an array once a disk member of the array has been detected as *failed*. To restore fault tolerance as quickly as possible, the FastTrak Controller performs an automatic data rebuild on the *spare* drive in the background without the need to restart the system. At a later time, the failed drive can be physically removed and a new drive added in its place to function as the spare drive.

This feature does not apply to FastTrak TX2650 because the controller only supports two physical drives.

Cache Setting

The cache is set to *Write Through* for the FastTrak TX Series RAID controller card.

Logical Drive Migration

To *migrate* a logical drive is to:

- Change its RAID level
- Add one or more physical drives
- Change its RAID level and add physical drives

You must use the WebPAM software to access this function. See “Migrating a Logical Drive” on page 90.

Migration takes place on an existing Functional logical drive without disturbing the existing data. While the logical drive is migrating, you can access the data as before. When migration is complete, your logical drive will have a different RAID level, a larger capacity, or both.

The FastTrak TX4650 supports the following logical drive migration:

From	To	Result
RAID 0: 1 drive	RAID 0: 2, 3, or 4 drives	Increased performance and capacity
	RAID 1: 2 drives	Adds redundancy
	RAID 5: 3 or 4 drives	Adds capacity and redundancy
	RAID 10: 4 drives	Adds capacity and redundancy
RAID 0: 2 drives	RAID 0: 3 or 4 drives	Increased performance and capacity
	RAID 5: 3 or 4 drives	Adds capacity and redundancy
	RAID 10: 4 drives	Adds capacity and redundancy
RAID 0: 3 drives	RAID 0: 4 drives	Increased performance and capacity
	RAID 5: 4 drives	Adds capacity and redundancy
RAID 1: 2 drives	RAID 5: 3 or 4 drives	Increased performance and capacity
	RAID 10: 4 drives	Increased performance and capacity
RAID 5: 3 drives	RAID 5: 4 drives	Adds capacity
RAID 10: 4 drives	RAID 5: 4 drives	Increased performance and capacity

The FastTrak TX2650 supports the following logical drive migration:

From	To	Result
RAID 0: 1 drive	RAID 1: 2 drives	Add redundancy
	RAID 0: 2 drives	Add capacity



Important

- The Target logical drive may require more physical drives than the Source logical drive
 - If the Target logical drive requires an EVEN number of physical drives but the Source logical drive has an ODD number, ADD a physical drive as part of the migration process
 - You cannot reduce the number of physical drives in your logical drive, even if the Target logical drive requires fewer physical drives than the Source logical drive
 - RAID 1 (mirror) works with two physical drives only
 - You cannot migrate a logical drive when it is Critical or performing activities such as Synchronizing, Rebuilding, and PDM
 - Logical drive migration is not possible to or from JBOD
-

Ranges of Logical Drive Expansion

The Windows 2000 and Windows XP (32-bit) operating systems support a 10-byte LBA format. As a result, these OSes can only recognize 4 billion addresses. Your logical drive is limited to 2 TB of data, even if there is more space available on your physical drives.

This limitation does not apply to Windows XP (64-bit), 2003 Server, Vista, and Linux OSes with the 2.6 kernel.

You can direct WebPAM to expand a logical drive beyond the maximum expansion size. When the expansion is finished:

- WebPAM will show the logical drive in the desired size.
- Your operating system might show the logical drive 2 TB.
- Additional capacity might appear as unpartitioned and unformatted.

At this point, you can format the unpartitioned/unformatted capacity as a *second* logical drive.

Chapter 7: Support

- Frequently Asked Questions
 - Pre-Installation, below
 - Motherboard Issues (page 124)
 - System CMOS Issues (page 124)
 - Drive Issues (page 125)
 - Operating System-Related Issues (page 127)
 - Installation Issues (page 128)
 - Post-Installation (page 129)
 - Performance Tips (page 129)
 - Contact Technical Support, page 130
 - Limited Warranty, page 133
 - Return Product for Repair, page 135
-

Frequently Asked Questions

This section lists frequently asked questions and other issues with the FastTrak TX Series SATA/SAS RAID Controller card.

Pre-Installation

(Speed, Device Types, Capacity, Cabling)

What kind of hard drives can I use for a FastTrak logical drive?

You can use any Serial ATA (SATA) or Serial Attached SCSI (SAS) physical (disk) drives to create logical drives on the FastTrak TX Series RAID Controller card. Use matching drives for multiple-logical drives to maximize capacity usage as well as performance.

Will ACPI work with physical drives on the FastTrak?

Yes.

Can I use ATAPI devices on the FastTrak?

No. The FastTrak TX Series does not support ATAPI devices.

How can I change the resources that the FastTrak Controller uses?

The FastTrak TX Series is fully PnP. This means all the resources that it uses are given to it by the PnP BIOS on the motherboard. The FastTrak TX Series 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.

Motherboard Issues

Freeing additional IRQ resources

Since the FastTrak 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.

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

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 FastTrak 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 Issues

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

Yes. The FastTrak TX Series supports dynamically adjustable RAID size and RAID level. See “Migrating a Logical Drive” on page 90.

Do the physical drives on the FastTrak have to be the same size?

The physical drives connected to the FastTrak TX Series 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 physical drives of significantly different capacities.

I already have a logical drive on an older FastTrak controller. Can I move the physical drives to my new FastTrak TX Series?

Yes, provided your logical drive was built using SATA physical drives. All FastTrak controllers read the physical drives the same way so you can move them from one controller to another.

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

Only Single-drive RAID 0 and RAID 1 logical drive configurations allow a physical drive to be accessed individually on another controller. Multiple-drive RAID 0 physical drives will not work.

If I have a problem with one of the physical 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 physical 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 replacing the physical 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 in order to access the full storage capacity?

No! Disk management software will only complicate things. The logical drive should be fully addressable by your OS as it is. Some OSes have varying limits on the sizes of partitions and logical drives that can be defined. See “Ranges of Logical Drive Expansion” on page 121 and consult your OS documentation about partitioning larger logical drives.

What system BIOS setup settings do I use for the drives on the FastTrak?

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

How do I partition and format my FastTrak logical drive?

You can partition and format your logical drive using any file system you want. See “Appendix A: Partition and Format” on page 137.

Critical logical drive status error reported during boot

```
FastTrak TX4650 (tm) BIOS Version 2.8.0.xx
(c) 2004-2007 Promise Technology, Inc. All rights reserved.

ID      MODE      SIZE      TRACK-MAPPING      STATUS
-----
1       2+1 RAID 5    55000M    6686/255/63       Critical

Problem is detected with Array : 1
Critical Status:
A disk member of an array has failed or is not responding.
Please refer to your Promise User Manual for further details.

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

If a critical status error message appears on the FastTrak BIOS startup screen for a RAID 1, 5 or 10 logical drive, a physical drive has failed or is not responding. See “Responding to a Critical or Offline Logical Drive” on page 101.

Physical drives cannot be formed into a logical drive

Physical drives must support SATA or SAS and be free of media defects in order to be added to a logical drive. Promise recommends using new identical physical drives for each logical drive. 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 TX Series RAID Controller. Only enter drive information in the Motherboard CMOS for drives attached to the onboard IDE controller.

The logical drive constantly goes critical or offline during reboot.

This condition may occur when the *Master Boot Record (MBR)* of one of the drives has become corrupt or bad. Removing (erasing) the MBR will remedy any issue related directly to a bad MBR.



Warning

Before removing the MBR of the drive(s), backup any existing data. Removal of the MBR of any physical drive permanently deletes all existing data on the drive.

To erase the MBR, follow these steps:

1. Backup any important data from the logical drive.
2. Note the logical drive information, including which drives are used, the number of physical drives, RAID Level, etc.
3. Delete the logical drive.
4. Create a new logical drive using the specifications from the previous logical drive.
5. During the logical drive creation process:
 - In FastBuild, set the Fast Init feature to ON
 - In WebPAM, select Fast or Full Initialization
6. Partition and format the logical drive using your PC's operating system. See "Appendix A: Partition and Format" on page 137.

Unable to partition or format logical drive

See "The logical drive constantly goes critical or offline during reboot," above.

Cannot rebuild RAID 1, 5, or 10 logical drive

See "The logical drive constantly goes critical or offline during reboot," above.

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

See "The logical drive constantly goes critical or offline during reboot," above.

Operating System-Related Issues

The FastTrak driver does not appear in Device Manager

The Windows Device Manager may show the FastTrak controller under Other Devices or SCSI and RAID Controllers instead of the Hard Disk

Controllers. Look under Other Devices to see if it lists a PCI Card or RAID Controller. If so, highlight this listing and click the Properties button then click 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 CANCEL. Reboot the system to complete installation of the driver.

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

You did not press the F6 key 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

You did not press the F6 key 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.

Installation Issues

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

The boot sequence is controlled by the system BIOS. The system BIOS recognizes the FastTrak TX Series RAID Controller and its logical drives as SCSI devices. This arrangement 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 drive, 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 drive?

Since all PCI and PCIe 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 among the PCI and PCIe 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 physical drives on the FastTrak Controller card under FDISK?

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

Why can't I log into WebPAM over the network?

Verify that you have the correct IP address for the Host PC where the FastTrak card is installed.

If you checked the *Local Monitoring Only* option when you installed WebPAM, you can only access WebPAM from the Host PC. To obtain network access, reinstall WebPAM and be sure you UNcheck the *Local Monitoring Only* option. See "Installing WebPAM" on page 15.

Performance Tips

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

Use FastTrak array as D: or other non-bootable drive in a striped logical drive.

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

Re-Configure PCI Latency Setting

The PCI Latency setting appears in some Motherboard BIOS. The setting governs how much time is allocated to service each PCI slot. Promise recommends a value of 64. An optimal value will vary from system to system.

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

Technical Support Services

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

United States

E-mail Support	e-Support On-Line
Fax Support	(408) 228-1097 Attn: Technical Support
Phone Support	(408) 228-1400 option 4
If you wish to write us for support:	Promise Technology, Inc. 580 Cottonwood Drive Milpitas, CA 95035, USA

The Netherlands

E-mail Support	e-Support On-Line
Fax Support	+31 (0) 40 256 9463 Attn: Technical Support
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Germany

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Fax Technical Support	+49 (0) 2 31 56 76 48 - 29 Attn: Technical Support
Phone Technical Support	+49 (0) 2 31 56 76 48 - 10
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Italy

E-mail Support	e-Support On-Line
Fax Support	0039 06 367 12400 Attn: Technical Support
Phone Support	0039 06 367 12626
If you wish to write us for support:	Promise Technology Italy Piazza del Popolo 18 00187 Roma, Italia

Taiwan

E-mail Support	e-Support On-Line
Fax Support	+886 3 578 2390 Attn: Technical Support
Phone Support	+886 3 578 2395 (ext. 8811)
If you wish to write us for support:	Promise Technology, Inc. 2F, No. 30, Industry E. Rd. IX Science-based Industrial Park Hsin-Chu 30075, Taiwan (R.O.C.)

China

E-mail Support	e-Support On-Line
Fax Support	+86-10-8857-8015 Attn: Technical Support
Phone Support	+86-10-8857-8085/8095
If you wish to write us for support:	Promise Technology China Room 1205, Tower C Webok Time Center, No.17 South Zhong Guan Cun Street Hai Dian District, Beijing 100081, 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.



Important

Obtain an RMA number from Technical Support *before* you return the product and write the RMA number on the label. The RMA number is essential for tracking your product and providing the proper service.

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 # _____
47654 Kato Road
Fremont, CA 94538

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 physical (disk) drives attached to your FastTrak TX Series SATA/SAS RAID controller card, your logical drive 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

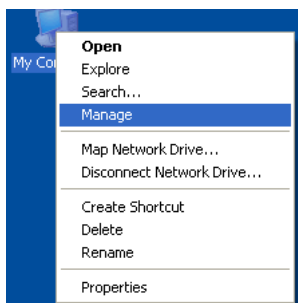
The actions of partitioning and formatting create a file structure on the physical drives with which your operating system can work. In the example below, we show how this is done in Windows. A similar procedure is required for Linux PCs. However, partitioning and formatting in Linux is not automated, therefore please refer to your system documentation for the exact procedure.



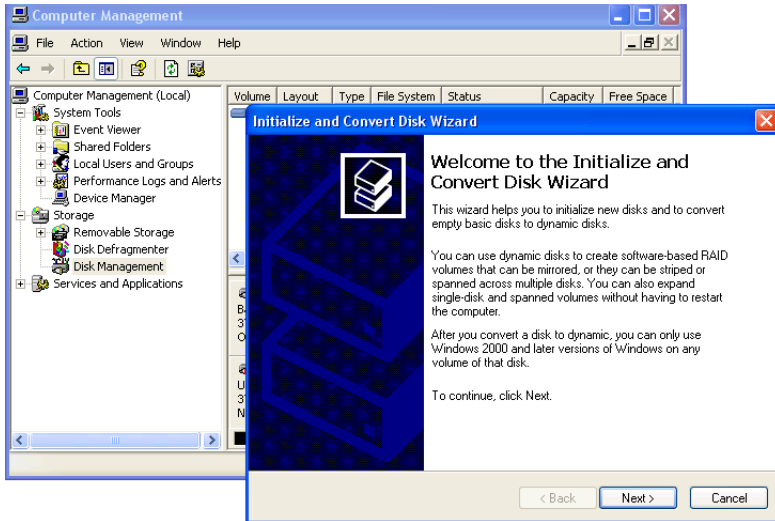
Note

If you plan to boot your computer from this logical drive, you partition and format the logical drive when you install the OS.

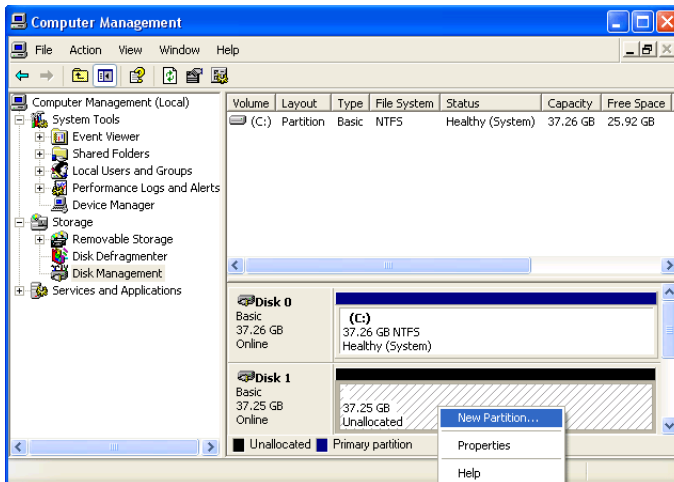
The instructions here are for non-bootable logical drives used for data storage only.



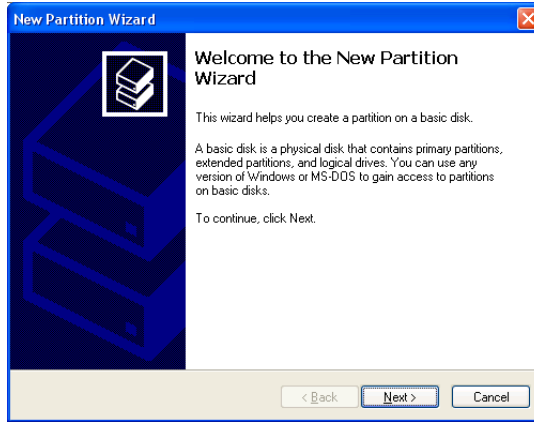
1. From the desktop, right-click the My Computer icon and select *Manage* from the popup menu. The Computer Management window opens.
2. From the left menu, click Disk Management. The Disk Management window opens with your new logical drive identified as Disk 1. The Initialize Wizard appears automatically.



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 drive.

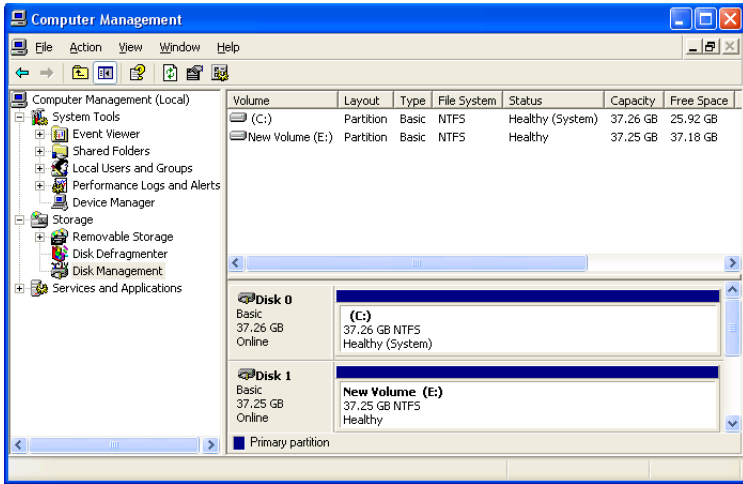


5. Right-click the Unallocated portion of Disk 1 and select *New Partition...* from the popup menu. The New Partition Wizard appears.

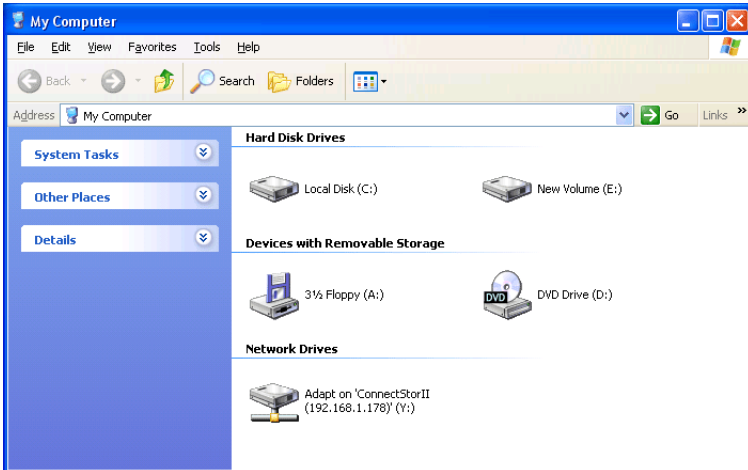


6. Click the **Next** button to start the wizard.
7. In the following windows, do the following actions. Click **Next** to move to the next window.
 - Select Primary Partition
 - Specify the maximum available partition size in MB
 - Assign the available drive letter of your choice
 - Choose Format this 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 drive will appear as a hard drive in the Disk Management window (above) and the My Computer window (below).



Appendix B: Upgrades

- BIOS and Firmware Upgrade (page 141)
 - Software Driver Upgrade (page 143)
 - WebPAM Upgrade (page 146)
-

BIOS and Firmware Upgrade

Follow this procedure to upgrade the BIOS and Firmware on your FastTrak TX Series Controller card.

The FastTrak card must be properly installed in your PC or server in order to perform the upgrade. See “Installing the FastTrak Card” on page 8 for more information.

Step 1: Preparation

To perform this procedure, you one of the following items:

- A DOS-bootable diskette and a blank DOS formatted diskette
- A USB memory stick

Step 2: Download BIOS File

1. Go to the Promise website www.promise.com/support.
2. Click *Downloads*.
3. Click the Select Product popup menu and choose *FastTrak TX4650 or TX2650* depending on which FastTrak controller you have.
4. Click the Select Category popup menu and choose *BIOS*.
5. Click the **GO** button.

The list of current BIOS options displays. Be sure you select the appropriate BIOS for your system.

6. Click BIOS you want.
7. In the File Download dialog box, click the **Save** button.
8. In the Save As dialog box, direct the file to save to a convenient location on your PC.
9. Unzip the file and copy the contents to the DOS-bootable diskette.
10. Label this diskette *FastTrak Upgrade*.

Use the upgrade diskette to install the BIOS and firmware upgrade package to the FastTrak controller. Go to step 3, below.

Step 3: Install the BIOS Package



Cautions

- Before you begin, backup any important or useful data.
 - Do NOT skip any steps in the procedure.
 - Do NOT power off your PC during the procedure.
-

1. Boot your PC from the DOS-bootable diskette.
2. When the A:\> prompt appears, remove the DOS-bootable diskette and insert the FastTrak Upgrade diskette.
3. At the A:\> prompt, type **dir** and press Enter to list the names of the files on the upgrade diskette.

The BIOS upgrade files contain the model number of the FastTrak controller, (4650 or 2650) for which they are designed, and the letters *.bin*. Note the name of the BIOS upgrade file for your FastTrak.

4. Type corresponding line at the A:\> prompt:
 - TX4650, type **pflasht3 /f 4650_sr5.bin** and press Enter
 - TX2650, type **pflasht3 /f 2650_r01.bin** and press Enter

Note that the BIOS upgrade file names shown above (4650_sr5.bin and 2650_sr5.bin) are examples only. Your BIOS upgrade file may have a different name. Type the actual name of the BIOS upgrade file on the diskette.

5. When the A:\> prompt appears, remove the upgrade diskette.
6. Reboot your PC normally.

This completes BIOS upgrade procedure.

Software Driver Upgrade

Follow this procedure to upgrade the FastTrak software drivers on your PC or server.

Step 1: Preparation

To perform this procedure, you one of the following items:

- A blank DOS formatted diskette
- A USB memory stick (Windows only)

Step 2: Download Driver Files

1. Go to the Promise website www.promise.com/support.
2. Click *Downloads*.
3. Click the Select Product popup menu and choose *Promise FastTrak TX4650* or *TX2650* depending on which FastTrak controller you have.
4. Click the Select Category popup menu and choose *Driver*.
5. Click the **GO** button.

The list of current drivers displays. Promise provides 32-bit and 64-bit versions of its drivers. Be sure you select the appropriate driver for your system.

6. Click the driver you want.
7. In the File Download dialog box, click the **Save** button.
8. In the Save As dialog box, direct the driver to save to a convenient location on your PC.
9. Copy the files to the blank, formatted diskette.

For Windows driver files: Unzip the downloaded driver package and copy the files to the diskette or memory stick.

For Linux driver files, do one of the following actions:

- On a Windows PC – Type **rawrite.exe** to extract the driver image file to the blank diskette.
- On a Linux PC – Type **dd if=<imageFileName> of=<floppyDeviceName> bs=10k** to extract the driver image file to the blank diskette.

Where <imageFileName> is the driver image file name and <floppyDeviceName> is the device name, such as /dev/ fd0.

10. Label the diskette or memory stick *FastTrak Driver*.

Use the FastTrak Driver diskette or memory stick to upgrade to the latest software driver. Go to step 3, below.

Step 3: Install the Software Drivers

Windows Vista, Server 2003, XP, and 2000

1. Do one of the following actions:
 - Insert the FastTrak Driver diskette in the A: drive.
 - Attach the FastTrak Driver memory stick to your USB port.
2. In the Start Menu, go to Settings > Control Panel. Double-click the System icon. click the Hardware tab. click the **Device Manager** button.
3. At the Device Manager, click the + icon to the left of SCSI and RAID Controllers to expand the list.
On Windows Vista click the + icon to the left of Storage controllers to expand the list.
4. Right-click **Promise FastTrak TX [4650, 2650] (tm) Controller** and choose **Update Driver...**
5. In the Hardware Update Wizard, choose *No*, not this time and click **Next**.
6. In the Hardware Update Wizard, choose *Install from a list or specific location (Advanced)* and click **Next**.
7. Under Please choose your search and installation options, choose *Don't search. I will choose the driver to install* and click **Next**.
8. Under Select the device driver you want to install, click **Have Disk...**
9. Under Install from Disk, type **A:** for the diskette or the appropriate letter for the USB memory stick and click **OK**.
10. Under Select the device driver you want to install, click **Next**.
If a warning about Digital Signature appears, click **Continue Anyway**.
11. Under Completing the Hardware Update Wizard, click **Finish**.
12. Click **Yes** to restart your PC.
13. Remove the FastTrak Driver diskette or memory stick.

Red Hat Enterprise Linux 5

1. Insert FastTrak Driver diskette into the floppy drive.
2. Log in as *root*.
3. Run **mount -r /dev/fd0 /media/floppy**.
4. Run **cd /media/floppy**.
5. Run **sh ./install**.
6. When the installer asks, "You are installing a driver on an existing OS. Is it true (y/n)?" type **Y** and press Enter.
7. Run **cd; umount /media/floppy**.
8. Remove the FastTrak Driver diskette.
9. Run **reboot** to restart the system.

SuSE Linux Server 10

1. Insert FastTrak Driver diskette into the floppy drive.
2. Log in as *root*.
3. Run **mount /dev/fd0 /media/floppy**.
4. Run **cd /media/floppy**.
5. Run **./install**.
6. Run **cd; umount /media/floppy**.
7. Remove the FastTrak Driver diskette.
8. Run **reboot** to restart the system.

WebPAM Upgrade

Follow this procedure to upgrade the WebPAM Software on your PC or server.

Step 1: Download the WebPAM File

1. Go to the Promise website www.promise.com/support.
2. Click *Downloads*.
3. Click the Select Product popup menu and choose *FastTrak TX4650 or TX2650*.
4. Click the Select Category popup menu and choose *Utility*.
5. Click the **GO** button.

The list of the current WebPAM software displays. Promise provides versions of WebPAM software for Windows and Linux. Be sure you select the appropriate version for your system.

6. Click the WebPAM you want.
7. In the File Download dialog box, click the **Save** button.
8. In the Save As dialog box, direct the software to save to a convenient location on your PC.
9. Unzip the downloaded WebPAM package.

The result is a single installer file. Go to step 2, below.

Step 2: Install WebPAM

You can install the latest version of WebPAM over an existing installation. The installer will delete the previous version and then install the new one. See "Installing WebPAM" on page 15 for installation instructions.