



SUPERTRAK
EX8300, EX8350
USER MANUAL

Version 1.0

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Recommendations

In the manual, the appearance of products made by other companies, including, but not limited to software, servers and 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.

Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult Promise Technology, Inc. or an experienced radio/TV technician for help.

This device complies with Part 5 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



Caution

Only digital device equipment CERTIFIED CLASS B should be attached to this equipment and that must have shielded cables.

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Chapter 1: Introduction

- About This Manual, below
- Product Overview (page 2)
- WebPAM Management Software (page 3)

Thank you for purchasing one of Promise Technology's SuperTrak EX8300 or EX8350 RAID controllers.

About This Manual

This *User Manual* describes how to setup, use and maintain the FastTrak RAID controller. It also describes how to use the Web-Based Promise Array Management (WebPAM) RAID management software.

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.

Product Overview

SuperTrak EX8300 and EX8350 are Serial ATA RAID controllers. When used with WebPAM software, the SuperTrak RAID Controllers offer a feature-rich, secure and versatile enterprise-wide ATA RAID solution. In addition, the SuperTrak EX Series supports RAID expansion. The resulting RAID environment allows users and administrators to configure, manage, and monitor everything from single logical drives on local systems to logical drive networks residing in offsite locations.

The SuperTrak EX8300 and EX8350 RAID Controller cards support 1.5 Gb/s and 3.0 Gb/s Serial ATA hard drives. At their core, all both FastTrak cards provide advanced RAID management functions: creating logical drives, monitoring them, keeping them online and operating at optimum efficiency. FastTrak can also perform many other tasks, such as:

- Create logical drives at various RAID levels (0, 1, 5, 10, and JBOD), depending on the application being used
- Set up a network of SuperTrak RAID servers (all running under different RAID levels) and monitor those servers from any workstation on the network
- Create a series of SuperTrak RAID networks at any number of offsite locations
- Monitor and/or repair SuperTrak RAID logical drives using the Internet from an offsite location—all without compromising the integrity of secure servers

XOR Microprocessor

The SuperTrak EX8300 and EX8350 Controllers have an onboard microprocessor for XOR calculations, which offloads the parity calculation workload from the main CPU and transfers it to the controller card, boosting the performance of the entire system.

Hot-Swapping

Each SuperTrak EX8300 and EX8350 can support up to eight Serial ATA disk drives. With either Controller card you can configure the drives as RAID levels 1, 5 or 10. Attached drives can be *hot swapped* when used with the optional Promise SuperSwap drive enclosures.

WebPAM Management Software

The Web-Based Promise Array Management (WebPAM) software offers local and remote management and monitoring of all FastTrak logical drives that exist anywhere on a network. Browser-based GUI provides email notification of all major events/alarms, memory cache management, drive event logging, logical drive maintenance, rebuild, and access to all components in the RAID configuration (server, controller, logical drives, physical drives, and enclosure). For information on using WebPAM, refer to page 49.

Chapter 2: Installation

- Packing list, below
 - Install the SuperTrak EX8300 Card (page 6)
 - Install the SuperTrak EX8350 Card (page 7)
 - Installing the Disk Drives (page 8)
 - Create a Logical Drive (page 10)
 - WebPAM Installation (page 14)
-

Packing List

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

- SuperTrak EX8300 or EX8350 Controller card
- Quick Start Guide
- Eight 1.0m (39-inch) Serial ATA disk drive data cables
- Four Y power splitter cables
- CD with Drivers, Web-Based Promise RAID Management (WebPAM) software, *SuperTrak EX8300, EX8350 User Manual*

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



Warning

The electronic components on the SuperTrak RAID Controller card are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the SuperTrak 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.



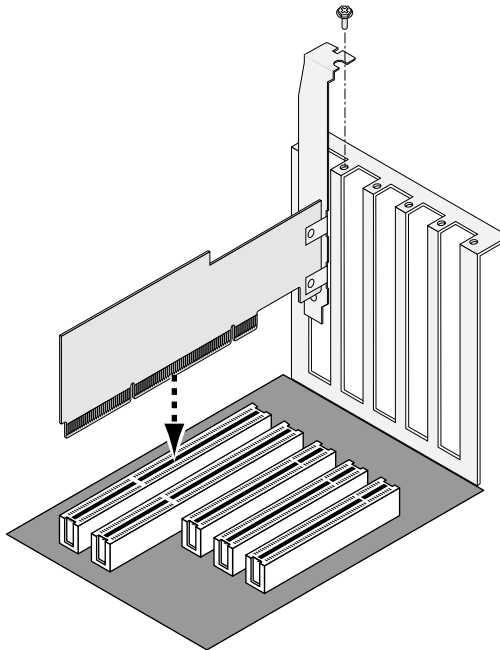
Note

The SuperTrak EX8300 and EX8350 RAID Controller cards are PCI Plug-n-Play (PnP) devices. No changes are necessary in the motherboard CMOS/BIOS Setup for resources or drive types in most applications.

Install the SuperTrak EX8300 Card

The SuperTrak EX8300 card fits into any available 3.3-volt PCI-X slot. You cannot plug the SuperTrak card into a 5-volt PCI slot.

1. Remove the cover of your system.
2. Remove the inside slot cover of an available PCI-X slot on the motherboard.

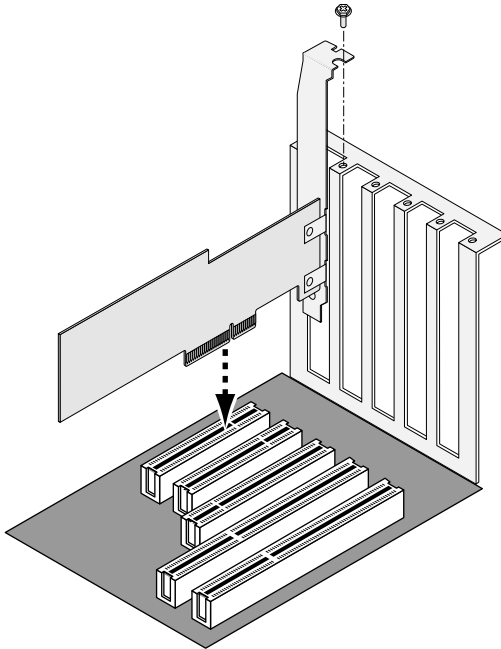


3. Install the SuperTrak card into the open slot (above).
4. Fasten the SuperTrak card bracket to the system case (above).
5. Attach your system case's 2- or 4-pin LED cable to the LED connector on the SuperTrak card (see page 9).

Install the SuperTrak EX8350 Card

The SuperTrak EX8350 card fits into any available 3.3-volt PCI-Express X4 slot. You can also plug the SuperTrak card into a PCI-Express X8 slot.

1. Remove the cover of your system.
2. Remove the inside slot cover of an available PCI-Express slot on the motherboard.



3. Install the SuperTrak card into the open slot (above).
4. Fasten the SuperTrak card bracket to the system case (above).
5. Attach your system case's 2- or 4-pin LED cable to the LED connector on the SuperTrak card (see page 9).

Installing the Disk Drives



Important

If you wish to include your current bootable Serial ATA drive using the Windows operating system as part of a bootable Mirrored (RAID 1) logical drive on your SuperTrak card, do NOT connect the disk drive to the SuperTrak yet. You MUST install the Windows driver software first onto this drive while it is still attached to your existing disk drive controller.

The SuperTrak EX-Series RAID Controller card supports 1.5-Gb/s and 3.0-Gb/s Serial ATA disk drives. For optimal performance, install disk drives of the same model and capacity. The drives' matched performance allows the logical drive to function better as a single drive.

Level	Number of Drives
RAID 0	2 or more
RAID 1	2 only
RAID 5	3 or more
RAID 10	4 only
JBOD	1 or more

The table above shows the number of drives required for each RAID level.

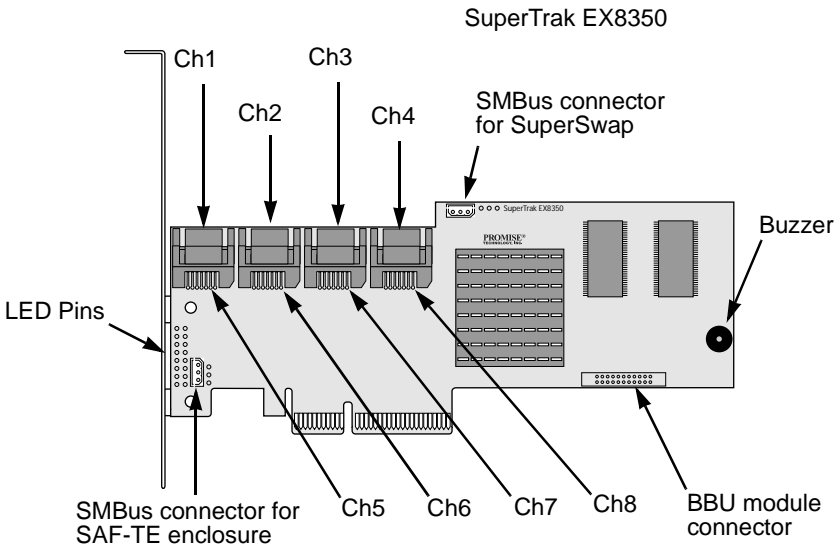
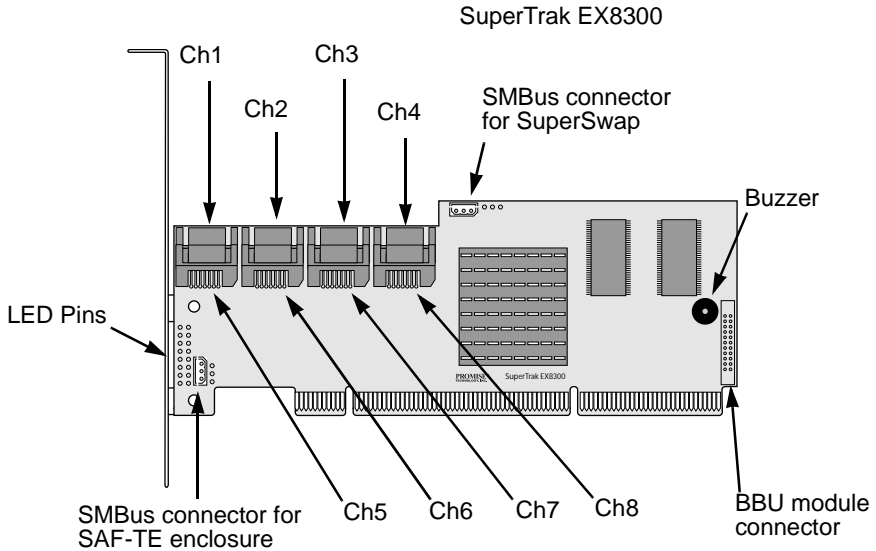
1. Install the disk drives into the disk drive bays of your system.

If you are using SuperSwap Enclosures, the SMBus ID of each disk drive must match the Channel number.



Caution

If you plan to use a removable disk drive enclosures other than Promise Technology's SuperSwap, be sure it meets the SAF-TE standard. Other enclosures are not supported and may result in performance loss or other undesired results.

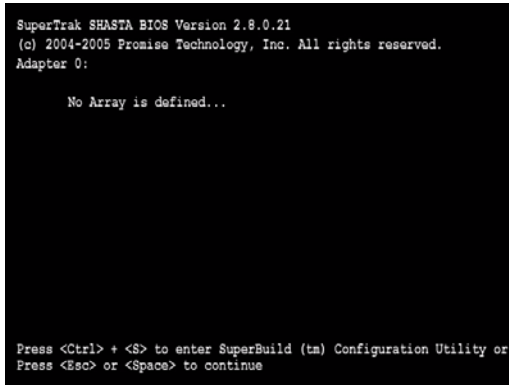


2. Attach one Serial ATA data cable to each disk drive. Then attach the other ends of the cables to the connectors on the SuperTrak card (above).
3. Attach the Y-cable power splitters to each of the disk drives.

Create a Logical Drive

You will now use the onboard SuperBuild BIOS utility to create a logical drive with the attached drives. Even if you plan to use the WebPAM software to manage your logical drive, you can still create your first logical drive using the SuperBuild Utility, as described here.

For an explanation of the logical drive concepts, see “Chapter 6: Technology Background” on page 103 of this manual.

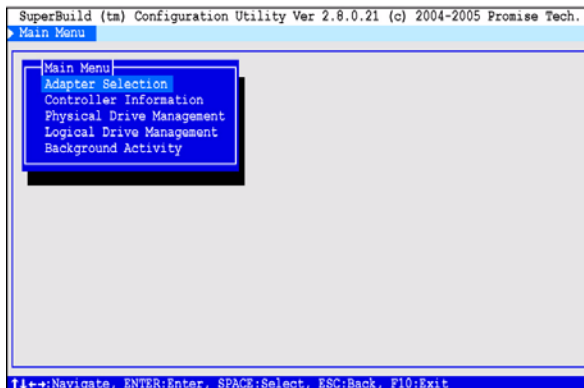


```
SuperTrak SHASTA BIOS Version 2.8.0.21
(c) 2004-2005 Promise Technology, Inc. All rights reserved.
Adapter 0:

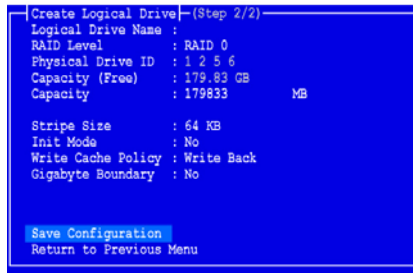
      No Array is defined...

Press <Ctrl> + <$> to enter SuperBuild (tm) Configuration Utility or
Press <Esc> or <Space> to continue
```

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



The Create Logical Drive Step 2/2 screen appears, with default logical drive settings.



6. Press the arrow keys to highlight Logical Drive Name and press Enter.
Type a name for your logical drive and press Enter.
7. To change the RAID Level, highlight RAID Level and press Enter.
In the popup menu, highlight your choice of RAID Level and press Enter.
The available RAID Levels depend on the number of physical drives you selected for this logical drive.
8. To use less than the full physical drive capacity for this logical drive, highlight Capacity and press Enter.
Type the capacity in MB to allocate to this logical drive.
Later, you can assign the unused capacity to a second logical drive.
9. To change the Stripe Size, highlight Stripe Size and press Enter.
Highlight your choice of 32, 64 or 128 KB and press Enter.
10. To change the Initialization Mode, highlight Init Mode and press Enter.
Highlight your choice of No, Quick or Full initialization and press Enter.
11. To change the Write Cache Policy, highlight Write Cache Policy and press Enter.
Highlight your choice of Write Through or Write Back and press Enter.
12. To change the Gigabyte Boundary feature, highlight Gigabyte Boundary and press Enter.

Highlight your choice of No or Yes and press Enter.

```

Create Logical Drive (Step 2/2)
Logical Drive Name : LogDrv A
RAID Level         : RAID 5
Physical Drive ID  : 1 2 5 6
Capacity (Free)    : 179.83 GB
Capacity           : 179833          MB

Stripe Size       : 64 KB
Init Mode          : Quick
Write Cache Policy : Write Back
Gigabyte Boundary  : Yes

Save Configuration
Return to Previous Menu
  
```

Highlight Save Configuration and press Enter.

```

Logical Drive Management
ID   Logical Drive Name   Capacity   Status
0    LD1                  179.83 GB  Ok
-    -                    -          -
-    -                    -          -
-    -                    -          -
-    -                    -          -
-    -                    -          -
-    -                    -          -
-    -                    -          -
-    -                    -          -

Create Logical Drive
Delete Selected Logical Drive
Return to Previous Menu
  
```

The Logical Drive Management screen appears with your new logical drive. At this point you can create additional logical drives, if there is physical drive space available.

13. Press the F10 key to exit the SuperBuild utility and press Y to confirm and restart the 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.

WebPAM Installation



Important

Install the SuperTrak software drives for your operating system before installing WebPAM. See “Chapter 3: Installing Software 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 SuperTrak RAID Controller card (the “Host PC”).

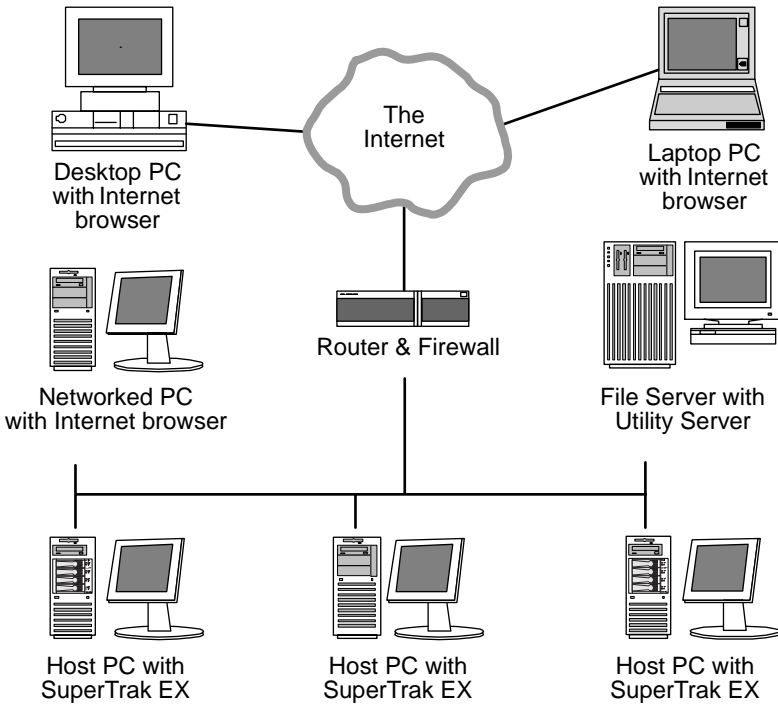


Figure 14. WebPAM on a network

Java Runtime Environment

If you are planning to use other applications that rely on JRE or JDK, always install them first before you install WebPAM. WebPAM will use the existing JRE rather than installing a second one.

WebPAM will install JRE 1.4 on your system unless you already have JRE or JDK versions 1.3.0 or 1.4.

Operating System Support

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

- Windows 2000
- Windows XP Professional
- Windows 2003
- Red Hat 8.0, 9.0, EL 3.0, EL 4.0
- SuSE 9.1, 9.2, ES 9.0

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

Install WebPAM

Windows

Follow these steps to install WebPAM PRO 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 on the Install CD's icon to open it.
4. Double-click on the Installer icon to launch it (right).
The first WebPAM PRO installation dialog box appears.
5. Follow the prompts in the installation dialog box.



Linux

Follow these steps to install WebPAM PRO 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 on the **webpam...bin** icon to begin installation (right).
4. When the Run or Display? dialog box appears, click *Run in Terminal*.



webpamxxxx.bin

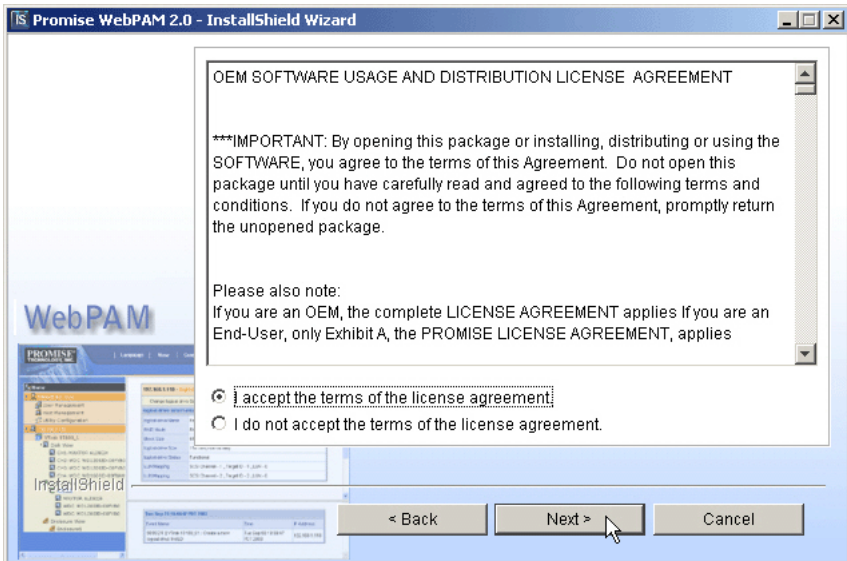
After several moments, the Terminal window closes and the first WebPAM PRO installation dialog box appears.

WebPAM Installation for Windows and Linux, continued

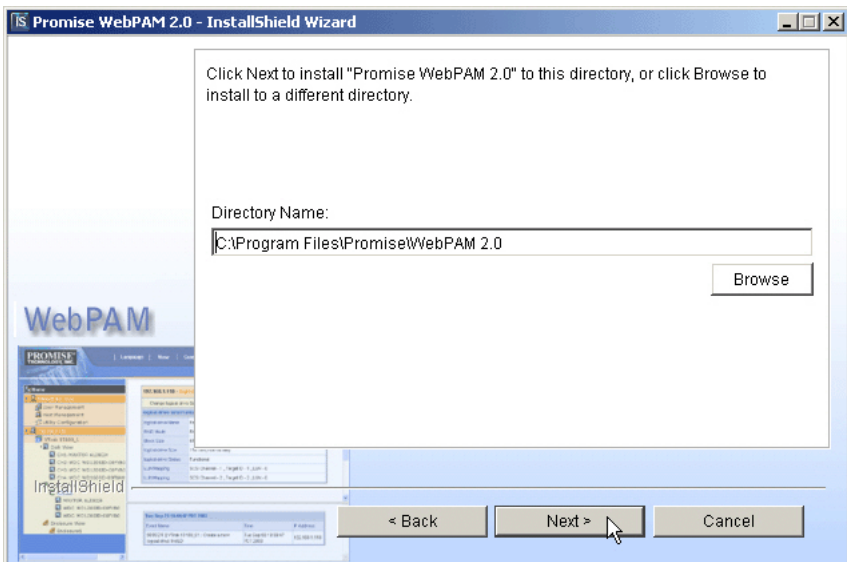
The first WebPAM installation dialog box appears, as shown below.



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



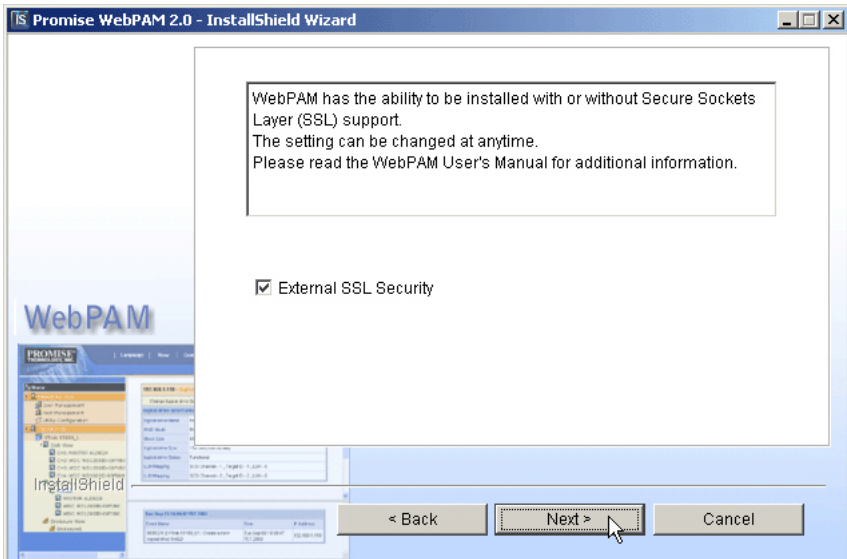
6. When the License Agreement appears (above), click the "I accept the terms of the license agreement" radio button. Then click the **Next** button.



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\PromiseWebPAM 2.0**. 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 on the **Back** button, then the **Next** button.

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



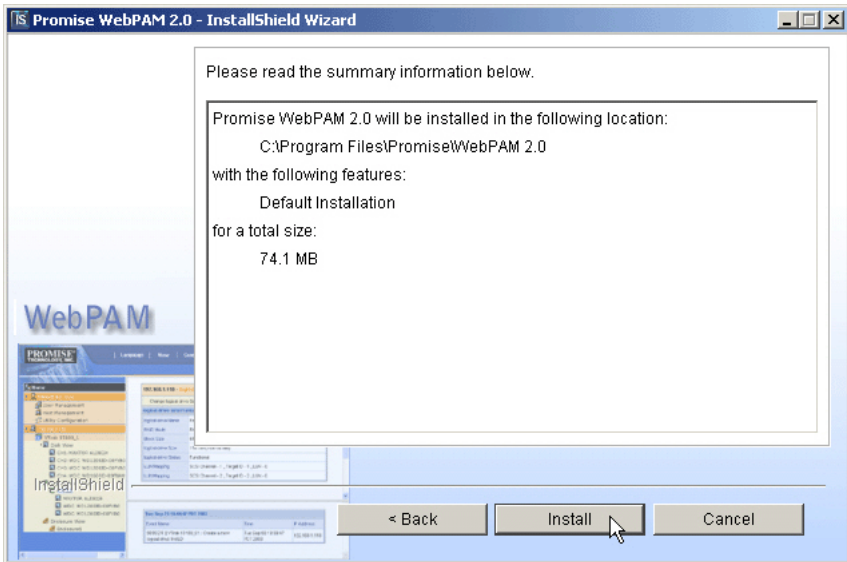
8. When the SSL Security Options screen appears (above), you can check External Security. An explanation follows.

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

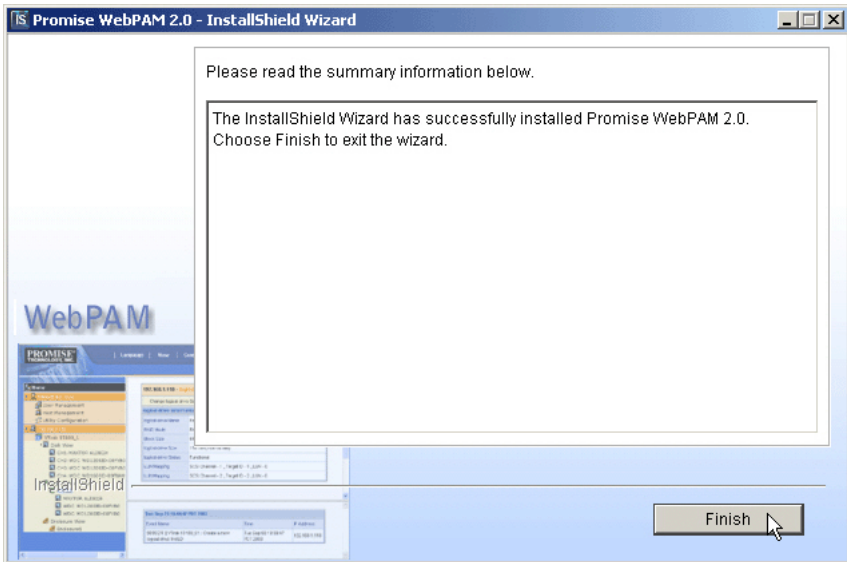
Security options are invisible to authorized users.

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

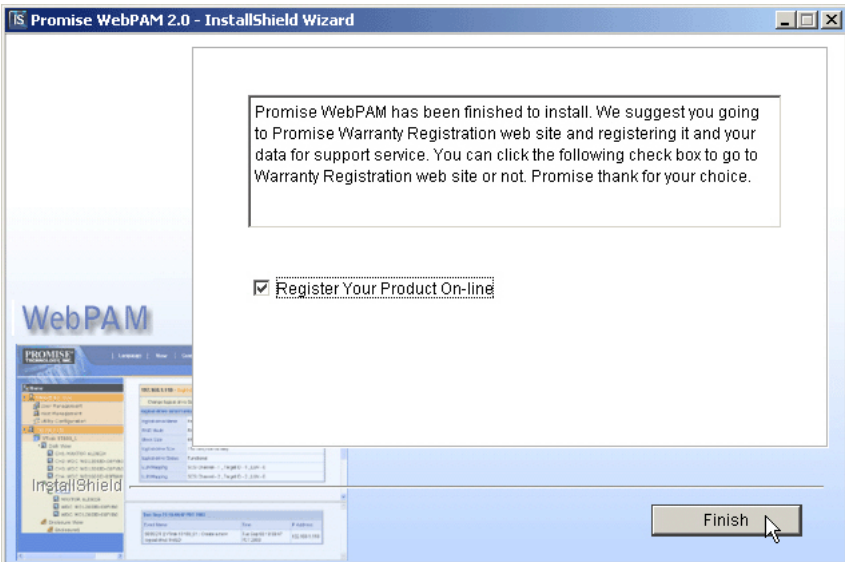
Click the **Next** button when you have made your choice.



9. When the Installation Summary screen appears (above), review your choices.
To make changes, click the **Back** button.
To continue, click the **Install** button.



10. When the Install Complete screen appears (above), the installation process is finished. Click the **Finish** 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 VTrak 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 49 for information about using WebPAM.

Chapter 3: Installing Software Drivers

Following are driver installation procedures for the SuperTrak EX8300 and EX8350 RAID Controller cards. Download the latest drivers from the Promise Technology website at www.promise.com.

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SuSE Linux 9.1, 9.2, ES 9.0	
Install Driver During New OS Installation: Single Processor	29
Install Driver During New OS Installation: Multi-Processor	29
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Windows Server 2003

Install Driver During New OS Installation

1. Start the installation: 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 Setup window is generated, press S to specify an Additional Device(s)
3. Insert the Promise Technology driver diskette into drive A: and press Enter.
4. Choose *Windows 2003 Promise SuperTrak EX8300/8350 (tm) Controller* from the list that appears on screen, and then press the Enter. 1. Press S to use the driver on the floppy disk and then press Enter to continue with installation.
5. The Windows 2003 Setup screen will appear again saying "Setup will load support for the following mass storage devices:" The list will include *Windows 2003 Promise SuperTrak EX8300/8350 (tm) Controller*.
Note: If you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, continue to the next step.
6. From the Windows Setup screen, press the Enter. Setup will now load all device files and then continue the Windows installation.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Install Driver in an Existing System



Important

If you plan to move the boot drive containing the existing Windows Server 2003 operating system to the SuperTrak card, you **MUST** load the SuperTrak driver to the boot drive while it is still attached to your existing hard drive controller.

Do not attach the boot drive to the SuperTrak card before completing this step.

After installing the SuperTrakSuperTrak card and rebooting your system, Windows setup will show a Found New Hardware dialog box.

1. Insert the Promise SuperTrak Driver diskette in the A: drive.
2. When the New Hardware Wizard appears, select *Install from a list or specific location (advanced)* and click *Next*.
3. Under Please choose your search and installation options, select *Don't search. I will choose the driver to install* and click *Next*.

4. Under Select the device driver you want to install, click *Have Disk...*
5. Under Install from Disk, type **A:\wnet** wnet and click *OK*.
6. Under Select the device driver you want to install, click *Next*.
7. If a warning about Windows Logo testing appears, click *Continue Anyway*.
8. Under Completing the Found New Hardware Wizard, click *Finish*.
9. If the New Hardware Wizard appears again, close it.
10. Click *Yes* to restart your PC.
11. Remove the Promise SuperTrak Driver diskette.
12. When the Found New Hardware Wizard appears a second time, select *Install the Software Automatically (Recommended)* and click *Next*.
13. If a warning about Windows Logo testing appears, click *Continue Anyway*.
14. Under Completing the Found New Hardware Wizard, click *Finish*.

Note: Check the readme file, included with the driver files, for instructions on installing the RAID Console.

Confirm Installation

1. From the Windows Desktop, open the Control Panel from My Computer.
2. Click on Performance and maintenance.
3. Click on the System icon.
4. Choose the Hardware tab, and then click the Device Manager button.
5. Click the + in front of SCSI controllers. *Windows 2003 Promise SuperTrak EX8300/8350 (tm) Controller* should appear.

Windows XP

Install Driver During New OS Installation

1. Start the installation: 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 Setup window is generated, press S to specify an Additional Device(s)
3. Insert the Promise Technology driver diskette into drive A: and press Enter.
4. Choose *WinXP Promise SuperTrak EX8300/8350 (tm) Controller* from the list that appears on screen, and then press the Enter. 1. Press S to use the driver on the floppy disk and then press Enter to continue with installation.
5. The Windows XP Setup screen will appear again saying "Setup will load support for the following mass storage devices:" The list will include *WinXP Promise SuperTrak EX8300/8350 (tm) Controller*.

Note: If you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, continue to the next step.

6. From the Windows Setup screen, press the Enter. Setup will now load all device files and then continue the Windows XP installation.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Install Driver in an Existing System



Important

If you plan to move the boot drive containing the existing Windows Server 2003 operating system to the SuperTrak card, you **MUST** load the SuperTrak driver to the boot drive while it is still attached to your existing hard drive controller.

Do not attach the boot drive to the SuperTrak card before completing this step.

After installing the SuperTrak card and rebooting your system, Windows setup will show a Found New Hardware dialog box.

1. Insert the Promise SuperTrak Driver diskette in the A: drive.
2. When the New Hardware Wizard appears, select *Install from a list or specific location (advanced)* and click *Next*.
3. Under Please choose your search and installation options, select *Don't search. I will choose the driver to install* and click *Next*.
4. Under Select the device driver you want to install, click *Have Disk...*
5. Under Install from Disk, type **A:\winxp** and click *OK*.
6. Under Select the device driver you want to install, click *Next*.
7. If a warning about Windows Logo testing appears, click *Continue Anyway*.
8. Under Completing the New Hardware Wizard, click *Finish*.
9. If the New Hardware Wizard appears again, close it.
10. Click *Yes* to restart your PC.
11. Remove the Promise SuperTrak Driver diskette.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Confirm Installation

1. From the Windows Desktop, open the Control Panel from My Computer.
2. Click on Performance and maintenance.

3. Click on the System icon.
4. Choose the Hardware tab, and then click the Device Manager button.
5. Click the + in front of SCSI controllers. *WinXP Promise SuperTrak EX8300/8350 (tm) Controller* should appear.

Windows 2000

Install Driver During New OS Installation

1. Start the installation: 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 Setup window is generated, press S to specify an Additional Device(s)
3. Insert the Promise Technology driver diskette into drive A: and press Enter.
4. Choose *Win2000 Promise SuperTrak EX8300/8350 (tm) Controller* from the list that appears on screen, and then press the Enter.
5. The Windows Setup screen will appear again saying "Setup will load support for the following mass storage devices:" The list will include *Win2000 Promise SuperTrak EX8300/8350 (tm) Controller*.

Note: If you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, continue to the next step.

6. From the Windows Setup screen, press the Enter. Setup will now load all device files and then continue the Windows installation.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Install Driver in an Existing System



Important

If you plan to move the boot drive containing the existing Windows Server 2003 operating system to the SuperTrak card, you **MUST** load the SuperTrak driver to the boot drive while it is still attached to your existing hard drive controller.

Do not attach the boot drive to the SuperTrak card before completing this step.

After installing the SuperTrak card and rebooting your system, Windows setup will show a Found New Hardware dialog box.

1. When the New Hardware Wizard appears, click *Next*.

2. Insert the Promise SuperTrak Driver diskette in the A: drive.
3. Under Install Hardware Device Drivers, select *Search for a suitable driver...* and click *Next*.
4. Under Locate Driver Files, uncheck *Floppy disk drives and CD-ROM drives*. Check *Specify a Location* and click *Next*.
5. Under Insert the manufacturer's installation disk, type **A:\win2000** and click *OK*.
6. Under Driver Files search Results, when *a:\Win2000\ft8300.inf* should appear, click *Next*.
7. If a Digital Signature Notice appears, click *Yes*.
8. Under Completing the New Hardware Wizard, click *Finish*.
9. Click *Yes* to restart your PC.
10. Remove the Promise SuperTrak Driver diskette.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Confirm Installation

1. From the Windows Desktop, open the Control Panel from My Computer.
2. Click on the System icon.
3. Choose the Hardware tab, and then click the Device Manager button.
4. Click the + in front of SCSI controllers. *Win2000 Promise SuperTrak EX8300/8350 (tm) Controller* should appear.

Red Hat Linux 8.0, 9.0, EL 3.0, EL 4.0

Install Driver During New OS Installation

1. Start the RedHat Linux Installation by booting with the installation diskette or bootable CD ROM.
2. At the *Welcome to Red Hat Linux ...* installation screen, a prompt labeled *boot:* will appear at the bottom of the screen. Type **linux dd** 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*. At the *Devices* dialog box, insert the SuperTrak driver diskette in the floppy drive and click *OK*.
5. When the *Devices* dialog box appears, select *Add Device*.
6. When the Installer asks, *What kind of device would you like to add?*, select *SCSI*.

7. Scroll down to the *Promise SuperTrak EX8300/8350 (tm) Controller* and click *OK*.
8. When the Installer displays *Promise SuperTrak EX8300/8350 (tm) Controller* has been found, click *Done*.
9. Continue with the installation normally.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Install Driver in an Existing System

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

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

SuSE Linux 9.1, 9.2, ES 9.0

Install Driver During New OS Installation: Single Processor

1. Insert the install CD into CD-ROM drive.
2. When the boot: picture prompts for an installation option, add the following line to the input box: **acpi=oldboot**.
3. Press the left Alt key and insert the SuperTrak driver diskette into the floppy drive.
4. Finish the installation normally.

Note: Check the readme file, included with the downloaded driver files, for instructions on installing the RAID Console.

Install Driver During New OS Installation: Multi-Processor

1. Set the BIOS to boot from the CD-ROM.
2. Insert the install CD into CD-ROM drive.

3. When the boot: prompt appears on the bottom of the screen, type **acpi=oldboot** into the lower input box.
4. Press the left Alt key and insert the SuperTrak driver diskette into the floppy drive.
5. Finish the installation normally.

Install Driver in an Existing System

1. Insert the SuperTrak driver diskette into the floppy drive.
2. Type the following commands:

```
# mount /dev/fd0 /media /floppy
# cd /media /floppy
# ./install
# insmod SuperTrak
# umount /media /floppy
```
3. Remove the SuperTrak driver diskette from the floppy drive.

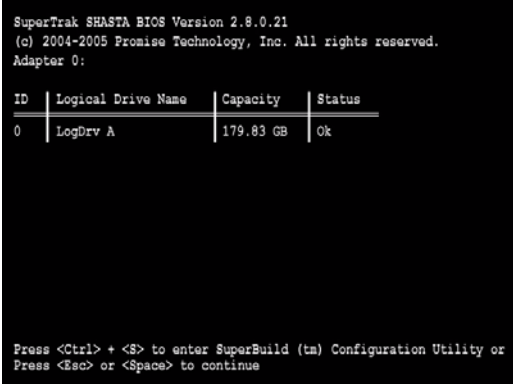
Chapter 4: SuperBuild™ Utility

- SuperTrak BIOS (below)
- Main Menu (page 32)
- Adapter Selection (page 33)
- Controller Information (page 33)
- Physical Drive Management (page 34)
- Display Logical Drives (page 35)
- Create a Logical Drive (page 35)
- Delete Logical Drive (page 38)
- Rebuild a Logical Drive (page 39)
- Initialize a Logical Drive (page 40)
- Synchronize a Logical Drive (page 42)
- Migrate a Logical Drive (page 44)
- Logical Drive Problems (page 47)

SuperTrak BIOS

This section explains the information that you can obtain from the SuperTrak BIOS.

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



```
SuperTrak SHASTA BIOS Version 2.8.0.21
(c) 2004-2005 Promise Technology, Inc. All rights reserved.
Adapter 0:

  ID | Logical Drive Name | Capacity | Status
  ---|---|---|---
  0  | LogDrv A           | 179.83 GB | Ok

Press <Ctrl> + <$> to enter SuperBuild (tm) Configuration Utility or
Press <Esc> or <Space> to continue
```

The SuperTrak BIOS screen displays the following information:

Adapter – Up to two SuperTrak controllers are supported, shown as Adapter 0 and Adapter 1.

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

Logical Drive Name – The user-assigned name of the logical drive

Capacity – The data capacity of the logical drive in GB (Gigabytes).

Status – Shows one of seven logical drive conditions:

Ok – 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 levels 1, 5, and 10, the logical drive contains a failed disk drive. If there is a hot spare drive, the logical drive will rebuild automatically. You must identify and replace the failed disk drive.

Offline – The logical drive is no longer operational and the SuperBuild 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 levels 1, 5, 10 and 50, at least two or more disk drives in the logical drive have failed.

For a RAID 0 or JBOD logical drive, at least one disk drive has failed.

Init – The logical drive is initializing

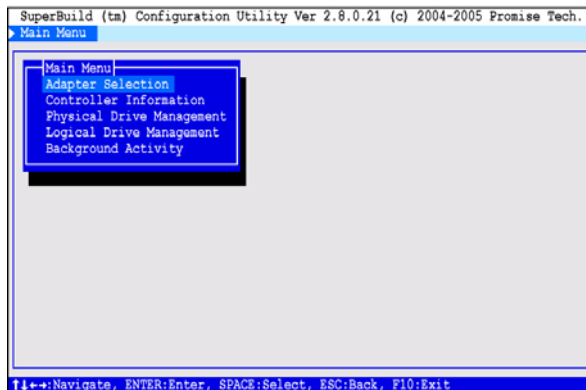
Migration – The logical drive is migrating (changing RAID level) or expanding (adding physical drives)

Synchron – The logical drive is synchronizing

Rebuild – The logical drive is rebuilding after a disk drive failure

Main Menu

When the SuperTrak BIOS displays on your computer screen, press Ctrl-S to launch the SuperBuild utility and display the Main Menu.



The Main Menu (above) has five options:

- Adapter Selection – Select which of two SuperTrak controllers you want to access

- Controller Information – Memory type and size, Firmware and BIOS version numbers, and address information that may be helpful for diagnostic purposes
- Physical Drive Management – A list of disk drives attached to the SuperTrak controller, their ID (channel) numbers, model numbers, capacity and status
- Logical Drive Management – A list of logical drives plus create and delete logical drive functions
- Background Activity – A list of logical drives, any current background activity, logical drive status and percentage of activity completed. Background activities include: Rebuild, Initialize, Synchronize, Migrate and Pause/Resume

Adapter Selection

The SuperBuild Configuration utility supports up to two SuperTrak RAID Controller cards in the same Host PC. Adapter selection enables you to select which of the two SuperTrak controllers is accessed by the utility.

1. In the Main Menu, highlight Adapter Selection and press Enter.
2. Highlight Adapter1 or Adapter2 and press Enter.

The selected Adapter (SuperTrak card) will display in the SuperBuild utility.

The SuperTrak BIOS and SuperBuild utility identify the SuperTrak cards differently, as shown in the table below.

	SuperTrak BIOS	SuperBuild Utility
First SuperTrak	Adapter 0	Adapter 1
Second SuperTrak	Adapter 1	Adapter 2

Controller Information

The SuperBuild utility displays information about the selected SuperTrak controller.

1. In the Main Menu, highlight Controller Information and press Enter.

The information includes:

Vendor – Promise Technology, Inc.

Model – SuperTrak EX8300 or EX8350

Memory Type – ECC (Error Correcting Code, checks for errors and corrects them automatically)

Memory Size – 128 MB

Firmware Version – The version number of the firmware currently installed on the SuperTrak controller. Firmware is upgradable. Contact Promise Technical Support for more information

BIOS Version – The version number of the BIOS currently installed on the SuperTrak controller. BIOS is upgradable. Contact Promise Technical Support for more information

PCI Func Address – The functional address of the SuperTrak card in the Host PC. Used for advanced diagnostics

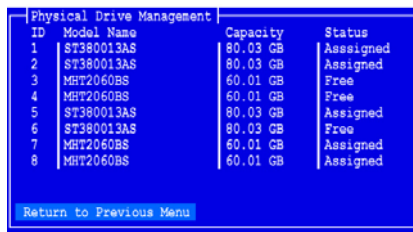
PCI Base Address – The base address of the SuperTrak card in the Host PC. Used for advanced diagnostics

2. Highlight Return to Previous Menu and press Enter.

Physical Drive Management

The SuperBuild utility displays information about the physical (disk) drives attached to the SuperTrak controller.

1. In the Main Menu, highlight Physical Drive Management and press Enter.



ID	Model Name	Capacity	Status
1	ST380013AS	80.03 GB	Assigned
2	ST380013AS	80.03 GB	Assigned
3	MHT2060BS	60.01 GB	Free
4	MHT2060BS	60.01 GB	Free
5	ST380013AS	80.03 GB	Assigned
6	ST380013AS	80.03 GB	Free
7	MHT2060BS	60.01 GB	Assigned
8	MHT2060BS	60.01 GB	Assigned

Return to Previous Menu

The information includes:

ID – The channel number of the SuperTrak controller to which the disk drive is attached

Mode Name – The disk drive manufacturer's model name for the drive

Capacity – Data capacity of the disk drive in GB

Status – Assigned (to a logical drive) or Free. A disk drive assigned as a hot spare in WebPAM is displayed as Free in the SuperBuild utility.

2. Highlight Return to Previous Menu and press Enter.

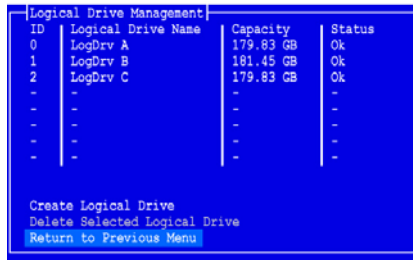
Logical Drive Management

The SuperBuild utility displays information about the logical drives on the SuperTrak controller and enables you to create and delete logical drives.

For an explanation of the logical drive concepts, see “Chapter 6: Technology Background” on page 103 of this manual.

Display Logical Drives

1. In the Main Menu, highlight Logical Drive Management and press Enter. The Logical Drive Management screen displays.



ID	Logical Drive Name	Capacity	Status
0	LogDrv A	179.83 GB	Ok
1	LogDrv B	181.45 GB	Ok
2	LogDrv C	179.83 GB	Ok
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Create Logical Drive
Delete Selected Logical Drive
Return to Previous Menu

The information includes:

ID – The consecutive number of the logical drive in the order it was created, beginning with 0

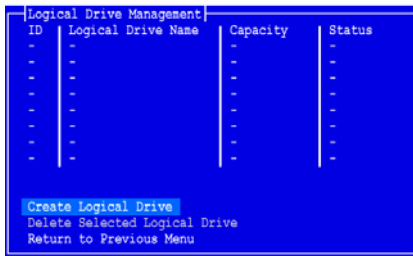
Logical Drive Name – The user-assigned name for the logical drive

Capacity – Data capacity of the logical drive in GB

Status – Shows one of seven logical drive conditions: Ok, Critical, Offline, Init, Migration, Synchron and Rebuild. See page 31 for definitions

Create a Logical Drive

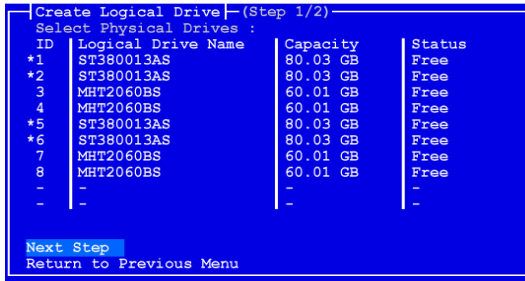
1. In the Main Menu, highlight Logical Drive Management and press Enter. The Logical Drive Management screen displays.



ID	Logical Drive Name	Capacity	Status
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Create Logical Drive
Delete Selected Logical Drive
Return to Previous Menu

2. Highlight Create Logical Drive and press Enter.
The Create Logical Drive Step 1/2 screen appears.



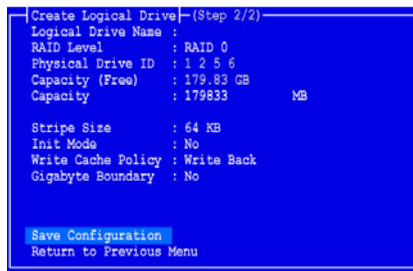
Use this screen to select the physical drives for your logical drive.

3. Press the arrow keys to highlight a physical drive. Then press the spacebar to select the physical drive.

An asterisk (*) appears at the left of each selected physical drive.

When you have selected all your physical drives, highlight Next Step and press Enter.

The Create Logical Drive Step 2/2 screen appears, with default logical drive settings.



4. Press the arrow keys to highlight Logical Drive Name and press Enter.
Type a name for your logical drive and press Enter.
5. To change the RAID Level, highlight RAID Level and press Enter.
In the popup menu, highlight your choice of RAID Level and press Enter.
The available RAID Levels depend on the number of physical drives you selected for this logical drive.
6. To use less than the full physical drive capacity for this logical drive, highlight Capacity and press Enter.
Type the capacity in MB to allocate to this logical drive.
Later, you can assign the unused capacity to a second logical drive.

7. To change the Stripe Size, highlight Stripe Size and press Enter.
Highlight your choice of 32, 64 or 128 KB and press Enter.
8. To change the Initialization Mode, highlight Init Mode and press Enter.
Highlight your choice of No, Quick or Full initialization and press Enter.
9. To change the Write Cache Policy, highlight Write Cache Policy and press Enter.
Highlight your choice of Write Through or Write Back and press Enter.
10. To change the Gigabyte Boundary feature, highlight Gigabyte Boundary and press Enter.
Highlight your choice of No or Yes and press Enter.

```

Create Logical Drive (Step 2/2)
Logical Drive Name : LogDrv A
RAID Level         : RAID 5
Physical Drive ID  : 1 2 5 6
Capacity (Free)    : 179.83 GB
Capacity           : 179833      MB

Stripe Size       : 64 KB
Init Mode         : Quick
Write Cache Policy : Write Back
Gigabyte Boundary : Yes

Save Configuration
Return to Previous Menu

```

Highlight Save Configuration and press Enter.

```

Logical Drive Management
ID   Logical Drive Name   Capacity   Status
0    LDI                   179.83 GB  Ok
-    -                    -          -
-    -                    -          -
-    -                    -          -
-    -                    -          -
-    -                    -          -
-    -                    -          -
-    -                    -          -

Create Logical Drive
Delete Selected Logical Drive
Return to Previous Menu

```

The Logical Drive Management screen appears with your new logical drive. At this point you can create additional logical drives, if there is physical drive space available.

11. Press the F10 key to exit the SuperBuild utility and press Y to confirm and restart the computer.

- Press Y to confirm logical drive deletion.

```

|Logical Drive Management|
ID | Logical Drive Name | Capacity | Status
0 | LogDrv A | 179.83 GB | Ok
1 | LogDrv C | 179.83 GB | Ok
- | - | - | -
- | - | - | -
- | - | - | -
- | - | - | -
- | - | - | -
- | - | - | -

Create Logical Drive
Delete Selected Logical Drive
Return to Previous Menu

```

The selected logical drive is removed from the list.

Background Activity

The SuperBuild utility provides maintenance, repair and enhancement functions for your logical drives, including Rebuild, Initialization, Synchronization and Migration.

Rebuild a Logical Drive

Fault-tolerant (RAID 1, 5 and 10) logical drives go *Critical* when a disk drive fails. The Rebuild operation enables you to replace the failed disk drive in your logical drive. You must have a Free disk drive of adequate size on your Host PC system in order to do a Rebuild.

To Rebuild a logical drive:

- In the Main Menu, highlight Background Activity and press Enter.

The Background Activity screen displays.

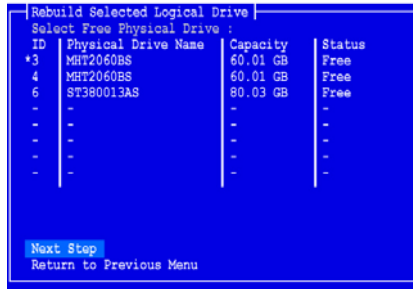
```

|Background Activity|
Device | Type | Status | Percentage
*LD 0 | No BGA | Critical | N/A
LD 1 | No BGA | Ok | N/A
- | - | - | -
- | - | - | -
- | - | - | -
- | - | - | -
- | - | - | -
- | - | - | -

Rebuild Selected Logical Drive
Initialize Selected Logical Drive
Synchronize Selected Logical Drive
Migrate Selected Logical Drive
Pause Selected Logical Drive
Return to Previous Menu

```

- Highlight the critical logical drive and press the spacebar to mark it. An asterisk (*) appears at the left of the selected logical drive.
- Highlight Rebuild Selected Logical Drive and press Enter. The Rebuild Selected Logical Drive screen appears.



4. Highlight the Free physical (disk) drive you want to use for the rebuild and press the spacebar to mark it.
An asterisk (*) appears at the left of the selected physical drive.
5. Highlight Next Step and press Enter.
6. Press Y to confirm the Rebuild operation on the selected logical drive.
The Rebuild begins immediately. The length of time required depends on the size of the logical drive and other operations.

Pause

To pause the Rebuild:

1. In the Main Menu, highlight Background Activity and press Enter.
The Background Activity screen displays.
2. Highlight the rebuilding logical drive and press the spacebar to mark it.
An asterisk (*) appears at the left of the selected logical drive.
3. Highlight Pause Selected Background Activity and press Enter.
4. Press Y to confirm the pause.
The Status of the rebuilding logical drive changes to Paused.

Resume

To resume the Rebuild:

1. In the Main Menu, highlight Background Activity and press Enter.
The Background Activity screen displays.
2. Highlight the Rebuild logical drive and press the spacebar to mark it.
An asterisk (*) appears at the left of the selected logical drive.
3. Highlight Rebuild Selected Logical Drive and press Enter.
4. Press Y to confirm the Rebuild.
The Status of the rebuilding logical drive changes to Running.

Initialize a Logical Drive

To initialize a logical drive is to erase all information on the physical (disk) drives that belong to the logical drive. This action is helpful when the disk drives have been previously used or when you want to keep a logical drive but remove all the data.

You can specify initialization when you create a logical drive or do it later. The procedure show below is for existing logical drives. If you initialize the logical drive when you created it, you do not need to initialize it again.

There are two levels of initialization:

- Quick – Erases the Master Boot Record (MBR) on all disk drives
- Full – Erases the MBR and all of the data on all disk drives



Caution

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

To initialize a logical drive:

1. In the Main Menu, highlight Background Activity and press Enter.

The Background Activity screen displays.

```

Background Activity
-----
Device  Type      Status   Percentage
LD 0    No BGA     Ok       N/A
*LD 1   No BGA     Ok       N/A
-----
-
-
-
-
-
-
-
-
-
-
-
-
Rebuild Selected Logical Drive
Initialize Selected Logical Drive
Synchronize Selected Logical Drive
Migrate Selected Logical Drive
Pause Selected Logical Drive
Return to Previous Menu
  
```

2. Highlight the logical drive you want to initialize and press the spacebar to mark it.

An asterisk (*) appears at the left of the selected logical drive.

3. Highlight Initialize Selected Logical Drive and press Enter.

The Initialize Selected Logical Drive screen appears.

```

Initialize Selected Logical Drive
-----
Select Initialize Mode : Full
-----
Next Step
Return to Previous Menu
  
```

4. Highlight Select Initialization Mode and press Enter.

5. From the popup list, highlight Quick or Full, then press Enter.
Quick erases the MBR only. Full erases the MBR and all the data.
6. Highlight Next Step and press Enter.
7. Press Y to confirm the Initialization operation on the selected logical drive.
The Initialization begins immediately. A quick initialization takes only a moment. The length of time for a full initialization required depends on the size of the logical drive and other operations.

Pause

To pause a Full Initialization:

1. In the Main Menu, highlight Background Activity and press Enter.
The Background Activity screen displays.
2. Highlight the initializing logical drive and press the spacebar to mark it.
An asterisk (*) appears at the left of the selected logical drive.
3. Highlight Pause Selected Background Activity and press Enter.
4. Press Y to confirm the pause.
The Status of the initializing logical drive changes to Paused.

Resume

To resume a Full Initialization:

1. In the Main Menu, highlight Background Activity and press Enter.
The Background Activity screen displays.
2. Highlight the initializing logical drive and press the spacebar to mark it.
An asterisk (*) appears at the left of the selected logical drive.
3. Highlight Initialize Selected Logical Drive and press Enter.
4. Press Y to confirm the Initialization.
The Status of the initializing logical drive changes to Running.

Synchronize a Logical Drive

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

There are two levels of synchronization:

- Fix – Find and correct data and parity inconsistencies
- Check – Find and report data and parity inconsistencies, without correction.
This process is sometimes called a Redundancy Check.

Synchronization applies to fault tolerant (RAID 1, 5 and 10) logical drives. When an logical drive is first created and you select Full Initialization, the same action as Synchronization takes place.

To Synchronize a logical drive:

1. In the Main Menu, highlight Background Activity and press Enter.
The Background Activity screen displays.

Device	Type	Status	Percentage
LD 0	No BGA	Ok	N/A
*LD 1	No BGA	Ok	N/A
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Rebuild Selected Logical Drive
 Initialize Selected Logical Drive
 Synchronize Selected Logical Drive
 Migrate Selected Logical Drive
 Pause Selected Logical Drive
 Return to Previous Menu

2. Highlight the logical drive you want to synchronize and press the spacebar to mark it.
An asterisk (*) appears at the left of the selected logical drive.
3. Highlight Synchronize Selected Logical Drives and press Enter.
The Synchronize Selected Logical Drive screen appears.

Synchronize Selected Logical Drive
Select Synchronize Mode : Fixed
Next Step
Return to Previous Menu

4. Highlight Select Synchronization Mode and press Enter.
5. From the popup list, highlight Fixed or Check, then press Enter.
Fixed finds and *corrects* data and parity inconsistencies.
Check finds and *reports* data and parity inconsistencies.
6. Highlight Next Step and press Enter.
7. Press Y to confirm the Synchronization operation on the selected logical drive.
The Synchronization begins immediately. The length of time required depends on the size of the logical drive and other operations.

Pause

To pause the Synchronization:

1. In the Main Menu, highlight Background Activity and press Enter.

The Background Activity screen displays.

2. Highlight the synchronizing logical drive and press the spacebar to mark it. An asterisk (*) appears at the left of the selected logical drive.
3. Highlight Pause Selected Background Activity and press Enter.
4. Press Y to confirm the pause.

The Status of the synchronizing logical drive changes to Paused.

Resume

To resume the Synchronization:

1. In the Main Menu, highlight Background Activity and press Enter. The Background Activity screen displays.
2. Highlight the synchronizing logical drive and press the spacebar to mark it. An asterisk (*) appears at the left of the selected logical drive.
3. Highlight Synchronize Selected Logical Drive and press Enter.
4. Press Y to confirm the Synchronization.

The Status of the synchronizing logical drive changes to Running.

Migrate a Logical Drive

Migration is the process of changing the RAID level of an existing logical drive. Expansion is the process of adding more physical drives to a logical drive while keeping the same RAID level.

The Migration feature applies to certain combinations of RAID level and number of physical drives, as described in the table below.

From	To	Result
RAID 0: 1 or 2 drives	RAID 5: 3 to 8 drives	Increased performance and capacity, adds redundancy
	RAID 10: 4 drives	
RAID 0: 3 drives	RAID 5: 4 to 8 drives	Increased performance and capacity, adds redundancy
RAID 1: 2 drives	RAID 5: 3 to 8 drives	Increased performance and capacity
	RAID 10: 4 drives	
RAID 10: 4 drives	RAID 5: 4 to 8 drives	Increased capacity

The Expansion feature applies only to RAID 0 and RAID 5 logical drives. You can add physical drives to a logical drive, up to eight drives, the maximum number supported by the SuperTrak controller.

Migration and Expansion are not available for JBOD.

For more information, see “Migration and Expansion” on page 113.

To Migrate a logical drive:

1. In the Main Menu, highlight Background Activity and press Enter. The Background Activity screen displays.

```

Background Activity |
Device  Type           Status   Percentage
*LD 0   No BGA             Ok      N/A
LD 1   No BGA             Ok      N/A
-       -                 -       -
-       -                 -       -
-       -                 -       -
-       -                 -       -
-       -                 -       -
-       -                 -       -
-       -                 -       -
Rebuild Selected Logical Drive
Initialize Selected Logical Drive
Synchronize Selected Logical Drive
Migrate Selected Logical Drive
Pause Selected Logical Drive
Return to Previous Menu
  
```

2. Highlight the logical drive you want to migrate and press the spacebar to mark it. An asterisk (*) appears at the left of the selected logical drive.
3. Highlight Migrate Selected Logical Drive and press Enter. The Migrate Selected Logical Drive Step 1/2 screen appears.

```

Migrate Selected Logical Drive | (Step 2/2)
Select Free Physical Drive :
ID  Physical Drive Name  Capacity  Status
3  MHT2060BS             60.01 GB  Free
4  MHT2060BS             60.01 GB  Free
*6  ST380013AS            80.03 GB  Free
-  -                     -         -
-  -                     -         -
-  -                     -         -
-  -                     -         -
-  -                     -         -
-  -                     -         -
Next Step
Return to Previous Menu
  
```

4. Highlight the Free physical (disk) drives you want to add to your logical drive and press the spacebar to mark them. An asterisk (*) appears at the left of the selected physical drive.
5. Highlight Next Step and press Enter. The Migrate Selected Logical Drive Step 2/2 screen appears.

```

Migrate Selected Logical Drive | (Step 2/2)
Select Translate Mode : RAID 5
Next Step
Return to Previous Menu
  
```

6. Highlight Select Translation Mode and press Enter.
7. From the popup list, highlight the target RAID level you want, then press Enter.

The available target RAID levels depend on your current RAID level and the number of physical drives you chose to add.

8. Highlight Next Step and press Enter.
9. Press Y to confirm the Migrate operation on the selected logical drive.

The Migrate operation begins immediately. The length of time required depends on the size of the logical drive and other operations.

Pause

To pause the Migration:

1. In the Main Menu, highlight Background Activity and press Enter.
The Background Activity screen displays.
2. Highlight the migrating logical drive and press the spacebar to mark it.
An asterisk (*) appears at the left of the selected logical drive.
3. Highlight Pause Selected Background Activity and press Enter.
4. Press Y to confirm the pause.

The Status of the migrating logical drive changes to Paused.

Resume

To resume the Migration:

1. In the Main Menu, highlight Background Activity and press Enter.
The Background Activity screen displays.
2. Highlight the migrating logical drive and press the spacebar to mark it.
An asterisk (*) appears at the left of the logical drive.
3. Highlight Migrate Selected Logical Drive and press Enter.
4. Press Y to confirm the Migrate operation.

The Status of the migrating logical drive changes to Running.

Logical Drive Problems

While disk drives are highly reliable, on occasion a disk drive can fail. Fault-tolerant (RAID 1, 5 and 10) logical drives go *Critical* when a disk drive fails. Non-fault-tolerant logical drives (RAID 0) and JBOD go *Offline* when a disk drive fails.

When you boot your system, the SuperTrak BIOS screen informs you if there is a critical or offline logical drive.

```

SuperTrak SHASTA BIOS Version 2.8.0.21
(c) 2004-2005 Promise Technology, Inc. All rights reserved.
Adapter 0:

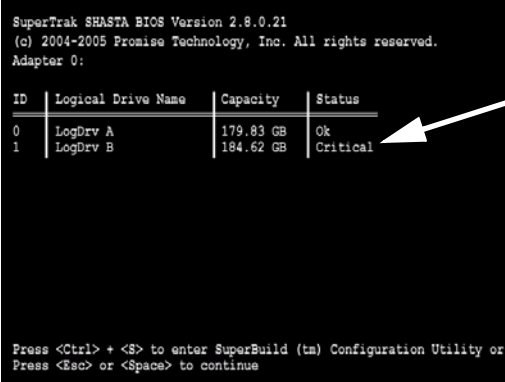
```

ID	Logical Drive Name	Capacity	Status
0	LogDrv A	179.83 GB	Ok
1	LogDrv B	184.62 GB	Critical

```

Press <Ctrl> + <$> to enter SuperBuild (tm) Configuration Utility or
Press <Esc> or <Space> to continue

```



Logical Drive Critical

For a critical logical drive:

1. Press Ctrl-S to access the SuperBuild utility.
2. Rebuild the logical drive.
See “Rebuild a Logical Drive” on page 39.
3. Replace the failed disk drive.

See the *SuperSwap User Manual* or your PC’s User Manual for more information about replacing a disk drive.

Logical Drive Offline

When two disk drives have failed, the logical drive goes offline and cannot be rebuilt. If you can restore one of the failed disk drives to operation, the logical drive will be critical and you can rebuild it.

For an offline RAID 1, 5 or 10 logical drive:

1. Shut down the Host PC.
2. Open the case and check the power and data connections to each disk drive.
3. Correct any loose or faulty connections.

For an offline RAID 0 or JBOD, see “RAID 0 and JBOD” below.

Hot Spare Drives

The WebPAM software includes a hot spare drive feature. See

If a hot spare drive is available, the SuperTrak Controller will automatically begin rebuilding the logical drive with the hot spare. You must replace the failed drive, which becomes the new hot spare.

If a hot spare drive is not available, you must replace the failed drive, after which the SuperTrak controller will automatically rebuild the logical drive.

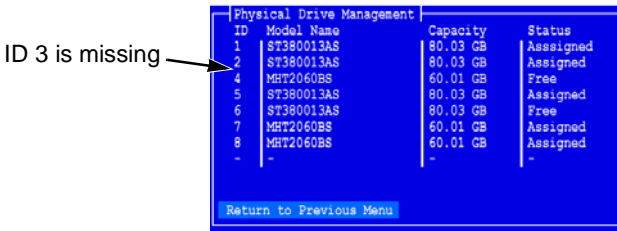
For more information about hot spare drives, see “Spare Drives” on page 99 and “Hot Spare Drive(s)” on page 112.

In either case, you must identify the failed drive so you can replace it. See “Identify a Failed Drive” below.

Identify a Failed Drive

To identify a failed disk drive:

1. In the Main Menu, highlight Physical Drive Management and press Enter.



2. Check the list of physical drives against the actual disk drives attached to the SuperTrak controller.

In the example above, there is not disk drive for ID 3. Assuming you installed a disk drive onto Channel 3 of the SuperTrak controller, this is the failed disk drive.

See page 9 for a diagram of Channel numbers on the SuperTrak controller.

RAID 0 and JBOD

Because RAID 0 and JBOD logical drives are not fault-tolerant, there is no way to rebuild the logical drive when a disk drive fails. After you replace the failed disk drive, you must create a new logical drive and copy your data to it from a backup source.

Chapter 5: WebPAM

- Log-in to WebPAM (page 49)
- Log-out of WebPAM (page 50)
- User Management (page 51)
- Host Management (page 59)
- Utility Configuration (page 60)
- SuperTrak (page 61)
- Controller (page 62)
- Physical Drives (page 66)
- Logical Drives (page 76)
- Enclosures (page 97)
- Spare Drives (page 99)
- Battery (page 101)

Log-in to WebPAM



Double-click on 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 (see page 18), use the *Regular* connection.

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

Regular Connection

- WebPAM uses an HTTP connection http://
- Enter the Host PC's IP address 127.0.0.1
- Enter the Port number :8080
- Add to launch WebPAM /promise

Together, your entry looks like this:

http://127.0.0.1:8080/promise

Secure Connection

- WebPAM uses a secure HTTP connection https://
- Enter the Host PC's IP address 127.0.0.1
- Enter the Port number :8443
- Add to launch WebPAM /promise

Together, your entry looks like this:

https://127.0.0.1:8443/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.

3. When the opening screen appears, type **admin** in the Login ID field. The WebPAM login and password (when used) are case sensitive.
4. Click the **Sign in** button.

Log-out of WebPAM

There are two ways to log out of WebPAM PRO:

- 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.

User Management

- Add a User (below)
- Event Notification (page 52)
- Delete a User (page 55)
- Change a User's Password (page 55)
- Change a User's Email Address (page 56)
- Change a User's Access Rights (page 57)

Add a User

1. In Tree View, click on the User Management  icon.
2. Click on the Create tab.

User Management
Help

Information
Create
Delete

✔ **User Creation**

User ID	sammy <small>(4-20 character(s))</small>
Display Name	Samuel Adams
Password	***** <small>(0-8 character(s))</small>
Retype Password	*****
Email	sadams@promise.com

✔ **Host User Rights**

Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
localhost	✔	✔	✔	✔

Submit
Reset


3. Type a User ID into the User ID field.
This will be the User's login name.
4. Type the user's display name into the Display Name field.
This 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.

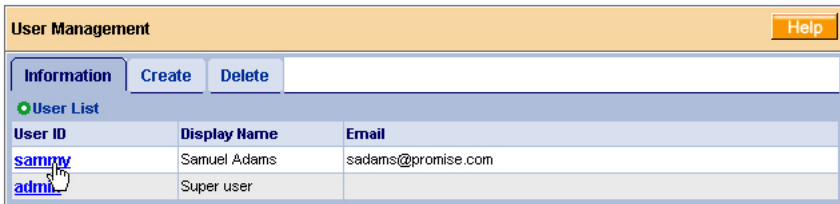
- Under Host User Rights, check the boxes to select rights for this user.

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

- Click on the **Submit** button.

Event Notification

- In Tree View, click on the User Management  icon.



- Click on the User ID link.
- Click on the Settings tab.

Select Events Help

Information **Settings** **Events**

localhost(192.168.1.184)

Email Notification

Select All Events

Select All Information Events Select All Warning Events Select All Critical Events

Disk Events

Disk Plugged In Disk BSL Update Disk BSL Cleared

Disk Error Fixed Bad Block Remapped Disk Patrol Progress

Enclosure Voltage5 Error Enclosure Voltage12 Error Enclosure Temperature Error

Battery Temperature Error Battery voltage Error Battery Communication Error

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 on the **Submit** button.

Event Notification Severity Levels

Information Events

Disk Plugged In
Disk BSL Update
Disk BSL Cleared
Disk Error Fixed
Bad Block Remapped
Disk Patrol Progress
Disk Media Patrol Started
Disk Media Patrol Completed
Disk Media Patrol Paused
Disk Media Patrol Resumed
Disk Media Patrol Aborted
Disk Media Patrol Aborted with Error
Array Online
Array Created
Array Deleted
Array Cache Mode Changed
Synchronization Requested
Synchronization Started
Synchronization Completed
Synchronization Paused
Synchronization Resumed
Synchronization Aborted
Synchronization Progress
Redundancy Check Started
Redundancy Check Completed
Redundancy Check Paused
Redundancy Check Resumed
Redundancy Check Aborted
Redundancy Check Progress
Redundancy Check Aborted with Error
Rebuild Started
Rebuild Completed
Rebuild Paused
Rebuild Resumed
Rebuild Aborted
Rebuild Progress
Background Initialization Progress
Background Initialization Started
Background Initialization Completed
Background Initialization Paused
Background Initialization Resumed
Background Initialization Aborted

Information Events, continued

Migration Started
Migration Completed
Migration Paused
Migration Resumed
Migration Aborted
Migration Progress
Battery Becomes Normal


Warning Events

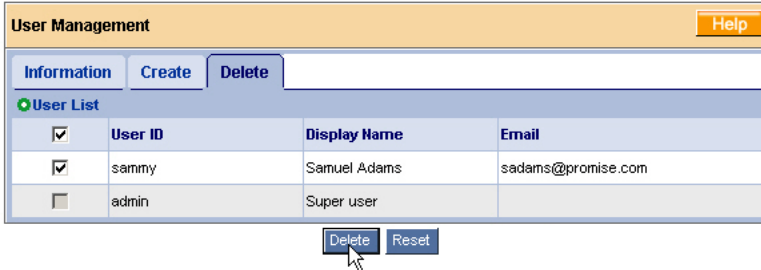
Synchronization Aborted with Error
Redundancy Check Rejected
Redundancy Check Inconsistency Fixed
Rebuild Aborted with Error
Background Initialization Aborted with Error
Migration Aborted with Error
Battery Temperature Unstable
Battery Voltage Unstable
Battery Not Functioning

Critical Events

Disk Unplugged
Disk Setdown
Disk Timeout
Disk ECC Error
Disk Non-ECC Error
Disk S.M.A.R.T. Error
Array Offline
Array Degrade
Redundancy Check Inconsistency Found
Redundancy Check Inconsistency Fixed
Enclosure Fan Error
Enclosure Voltage 3.3 Error
Enclosure Voltage 5 Error
Enclosure Voltage 12 Error
Enclosure Temperature Error
Battery Temperature Error
Battery Voltage Error
Battery Communication Error

Delete a User

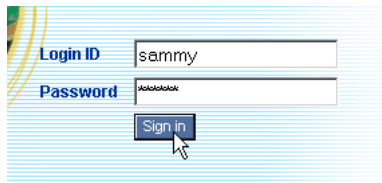
1. In Tree View, click on the User Management  icon.
2. Click on the Delete tab.



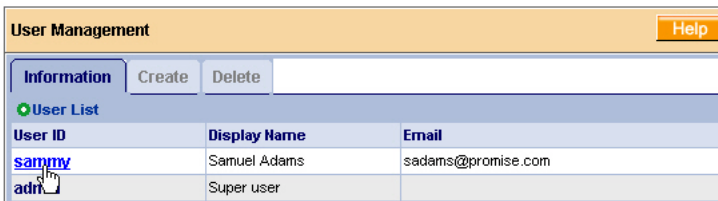
3. Check the box to the left of the user you want to delete.
4. Click the **Delete** button.
5. In the Confirmation box, click the **OK** button.

Change a User's Password

In WebPAM, each user can change his/her own password. To change a user's password:



1. Log into WebPAM under the User name.



2. Click on your User ID link.

User Management
Help

Information

Settings

Events

+
User Settings

User ID	sammy
Display Name	<input type="text" value="Samuel Adams"/> <small>(4-20 numbers and/or letters)</small>
Old Password	<input type="password" value="*****"/>
New Password	<input type="password" value="*****"/> <small>(0-8 numbers and/or letters)</small>
Retype Password	<input type="password" value="*****"/>
Email	<input type="text" value="sadams@promise.com"/>

+
Host User Rights

Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
localhost	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Submit
Reset

3. Type the current password in the Old Password field.
4. Type a new password in the New Password field.
5. Retype the new password in the Retype Password field.
6. 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.

Change 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:

User Management
Help

Information

Create

Delete

+
User List

User ID	Display Name	Email
sammy	Samuel Adams	sadams@promise.com
adm	Super user	

1. Click on the User ID link for the user whose email address will change.

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

- User ID: sammy
- Display Name: Samuel Adams
- Old Password: *****
- New Password: *****
- Retype Password: *****
- Email: sadams@promise.com

Below the form is a table for 'Host User Rights':

Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
localhost	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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

2. Type a new email address in the Email field.
3. Click the **Submit** button.

Change 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' interface with the 'Information' tab selected. The 'User List' section contains the following table:

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

2. Click on the User ID link for the user whose access rights will change.

User Management Help

Information
Settings
Events

✓ User Settings

User ID	sammy
Display Name	<input style="width: 90%;" type="text" value="Samuel Adams"/> <small>(4-20 numbers and/or letters)</small>
Old Password	<input style="width: 90%;" type="password" value="*****"/>
New Password	<input style="width: 90%;" type="password" value="*****"/> <small>(0-8 numbers and/or letters)</small>
Retype Password	<input style="width: 90%;" type="password" value="*****"/>
Email	<input style="width: 90%;" type="text" value="sadams@promise.com"/>

✓ Host User Rights

Host Name	Creation Rights	Deletion Rights	Maintenance Rights	Notification Rights
localhost	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>


- Under Host User Rights, check the boxes to select rights for this user.

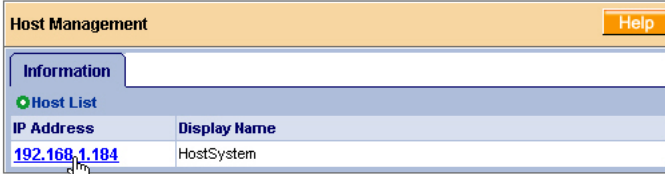
Right	Meaning
Creation	Permission to create a logical drive and a spare drive
Deletion	Permission to delete a logical drive and a spare drive
Maintenance	Permission to migrate, rebuild and synchronize a logical drive; to run Media Patrol on a physical drive; make controller and physical drive settings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

- Uncheck the boxes of rights to be deleted.
- Click the **Submit** button.

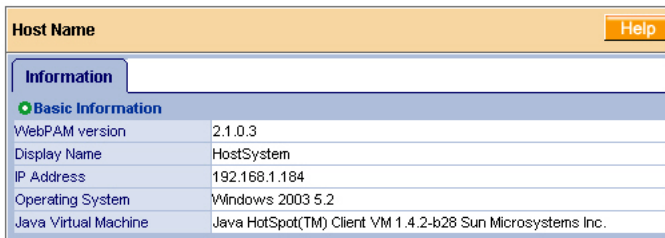
Host Management

This function provides information only. There are no user settings. To access Host Management:

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



2. Under Host List, click on the link to the host you want to see.
The Host PC link always 127.0.0.1.



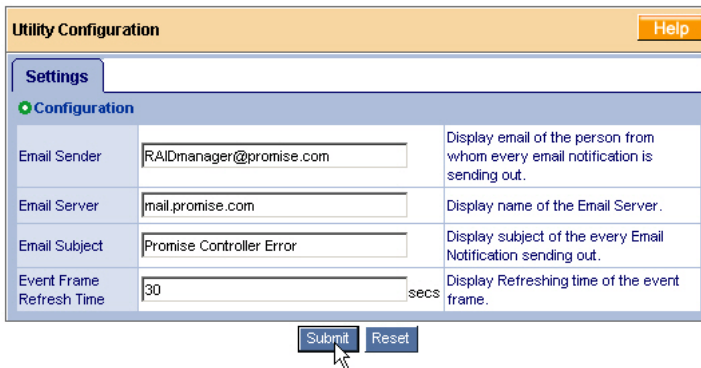
The Information tab displays with information about the Host PC.

- 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 192.168.1.184 refer to a Host PC accessed over the network.
- Operating System – The Operating System running on the Host PC.
- Java Virtual Machine – The version number of JVM running on the Host PC.

Utility Configuration

Use this function to make email settings for WebPAM and also to set the refresh interval for the Event Frame.

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

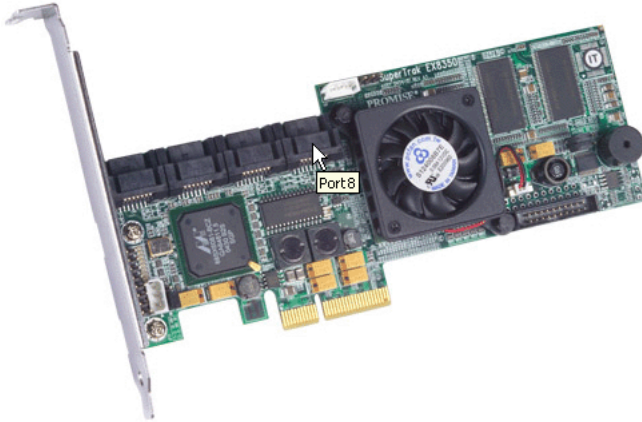


Utility Configuration		Help
Settings		
Configuration		
Email Sender	<input type="text" value="RAIDmanager@promise.com"/>	Display email of the person from whom every email notification is sending out.
Email Server	<input type="text" value="mail.promise.com"/>	Display name of the Email Server.
Email Subject	<input type="text" value="Promise Controller Error"/>	Display subject of the every Email Notification sending out.
Event Frame Refresh Time	<input type="text" value="30"/> secs	Display Refreshing time of the event frame.
<input type="button" value="Submit"/> <input type="button" value="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.

SuperTrak

The SuperTrak–Information tab displays a photograph of the SuperTrak SX-Series RAID Controller installed in your system.



WebPAM will display the SuperTrak controller installed in your system.


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

With the screen displayed, move your cursor over key components of the SuperTrak controller card to see a Tool Tip popup message that identifies the component, as shown above.

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

Controller

- Controller Information (below)
- Controller Settings (page 63)
- Controller Schedule (page 64)
- Controller Lock (page 65)

The term Controller refers to the device that controls your RAID. To access the controller, click on the Controller  icon in Tree View.

Controller Information

Controller Help			
Information	Settings	Schedule	Lock
<input checked="" type="checkbox"/> Basic Information			
Product Name	SuperTrak EX8350		
BIOS Version	2.8.0.21		
Firmware Version	1.0.0.23		
Driver Version	2.8.0.12		
<input checked="" type="checkbox"/> Hardware Information			
Maximum Number of Port(s)	8		
Maximum Physical Drive(s)	8		
Maximum Logical Drive(s)	16		

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.
- **Firmware Version** – Version number of the controller’s firmware.
- **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.

Controller Settings

Controller		Help	
Information	Settings	Schedule	Lock
View/Change Controller Parameter			
Rebuild Rate	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High		
Media Patrol Rate	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High		
Migration/Expansion Rate	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High		
Initialization Rate	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High		
Synchronization Rate	<input type="radio"/> Low <input checked="" type="radio"/> Medium <input type="radio"/> High		
Automatic Rebuild Status	<input checked="" type="radio"/> Enable <input type="radio"/> Disable		
Automatic Rebuild Policy	<input type="radio"/> Free & Spare <input checked="" type="radio"/> Spare		
Buzzer Status	<input checked="" type="radio"/> Enable <input type="radio"/> Disable		
S.M.A.R.T. Status	<input checked="" type="radio"/> Enable <input type="radio"/> Disable		
S.M.A.R.T. Check Polling Interval	30	Second(s)	
Submit Reset Default			

Click on the Settings tab to access controller settings.

- **Rates** – Allocates system resources between the background process (such as Rebuild, Media Patrol, 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.

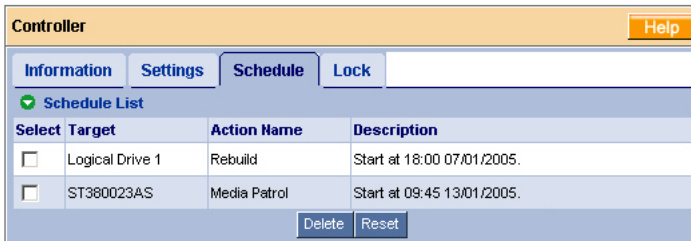
A *Low* setting assigns most of the system resources to handling read/write requests. Read/write requests are handled at nearly normal speed while the background processes take longer.

- **Automatic Rebuild Status** – When enabled, and a hot spare drive is available, a critical or degraded logical drive will rebuild itself automatically. Automatic Rebuilding applies to RAID 1 and 3-drive RAID 5 logical drives only.
- **Automatic Rebuild Policy** – Selects which physical drives to use as hot spares: Spare drives and Free drives or designated Spare drives only.
- **Buzzer** – When enabled, the SuperTrak 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 disk drive software. When enabled,


the SuperTrak controller polls the disk drives for SMART information and reports it to you.


- **S.M.A.R.T. Check Polling Interval** – The SuperTrak 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.

Controller Schedule

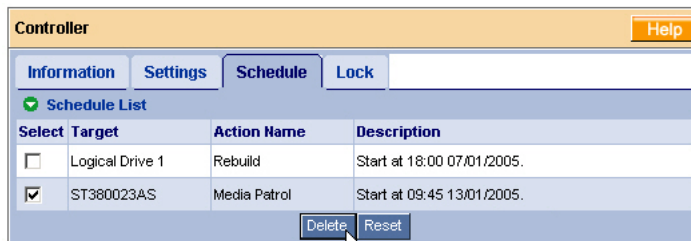


Click on the Schedule tab to access scheduled background processes (such as Rebuild, Media Patrol, Expansion/Migration, Initialization and Synchronization).


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

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

Delete a Scheduled Process





To delete a scheduled process:

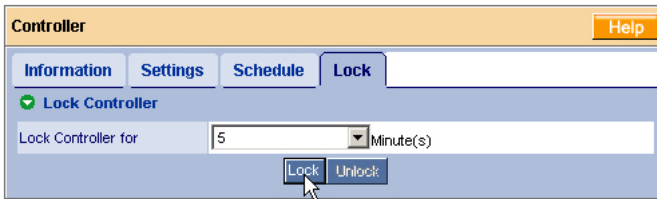
1. Click on the Controller  icon in Tree View.
2. Select the Schedule tab in Management View.
3. Check the box to the left of the process you want to delete.

4. Click the **Delete** button.
5. In the Confirmation box, click the **OK** button.

Alternative method to delete a scheduled process:


1. Go to its function tab under the Physical Drive  icon or Logical Drive  icon.
2. Under Schedule, click the **Disable** radio button.

Controller Lock



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:

1. Click on the Controller  icon in Tree View.
2. Select the Lock tab in Management View.
3. From the dropdown menu, select a period of time to hold the lock.
The lock time range is 1 to 30 minutes.
4. Click on the **Lock** button to set the lock.
The lock will release itself automatically at the end of the period you specified.
5. To release the lock before the scheduled time, click the **Unlock** button.

Physical Drives

- Physical Drive View (below)
- Split a Physical Drive (page 67)
- Merge a Physical Drive (page 68)
- Media Patrol Schedule (page 69)
- Physical Drive Information (page 70)
- Physical Drive Settings (page 71)
- Physical Drive Media Patrol (page 72)
- Physical Drive Bad Sector Log (page 73)
- Locate a Physical Drive (page 74)

Physical Drive View

The screenshot shows the 'Physical Drive View' window with a 'Help' button in the top right. Below the title bar are tabs for 'Information', 'Split', 'Merge', and 'Media Patrol Schedule'. The main content is divided into two sections: 'Physical Drive Overview' and 'Graphic View'.

Physical Drive Overview

Drive Model	Port No.	Capacity	Status
ST340014AS	1	37.27 GB	Functional
ST380023AS	2	74.53 GB	Functional
ST380013AS	3	74.53 GB	Functional
ST380013AS	4	74.53 GB	Functional

Graphic View


Drive on Port 1 - 37.27 GB
Free: 37.27 GB

Drive on Port 2 - 74.53 GB
Free: 74.47 GB

Drive on Port 3 - 74.53 GB
Free: 111.73 GB

Drive on Port 4 - 74.53 GB
Free: 74.53 GB

Legend: Available (black), Assigned (blue), Spare (yellow), Invalid (grey)

To access Physical Drive View, click on the Physical Drive View  icon in Tree View. From this window, you can click on the links to access information and functions of individual physical drives and use the Split and Merge feature.

Split a Physical Drive

The action of splitting a physical drive effectively divides a single physical drive into two drives. Each of the two portions can be used by separate logical drives.




Notes

- You can split a physical drive only once.
- The physical drive must be Free. You cannot split a physical drive assigned to a Logical Drive, JBOD or Spare.
- You cannot assign a split drive as a Spare drive.

You can split a physical drive only once.

Select	Port No.	Capacity
<input type="checkbox"/>	1	37.27 GB
<input checked="" type="checkbox"/>	2	74.53 GB
<input type="checkbox"/>	3	74.53 GB
<input type="checkbox"/>	4	74.53 GB


To split a physical drive:

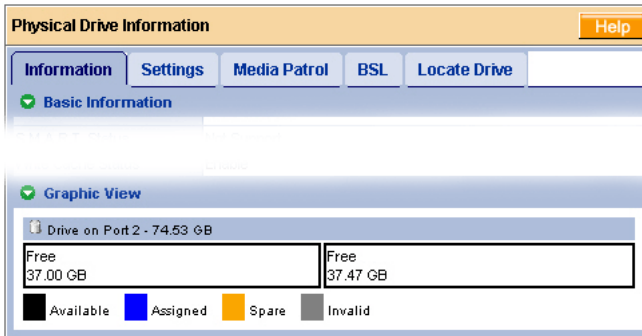
1. Click on the Physical Drive View  icon in Tree View.
2. Click on the Split tab in Management View.
3. Enter a portion size in the Split Size field.

You can enter a value from 1 GB up to the capacity of the physical drive. The value you enter will be the size of the first portion. The remaining drive capacity will be the size of the second portion.

This value will apply to all physical drives you select for the split operation.

4. Check the box(es) to the left of the physical drive(s) you want to split.
5. Click the **Submit** button.

Click on the Physical Drive  icon to see the results of your split operation.



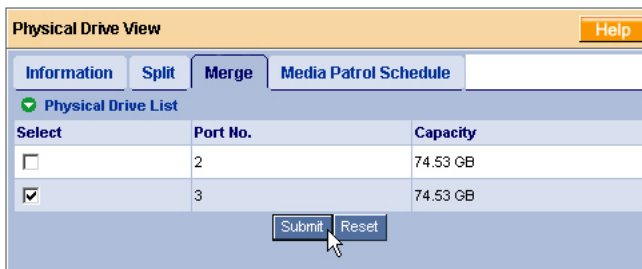
The image above was shortened to fit into the available space.

In the example above, note that the first portion is 37 GB as specified in the Split operation. The second portion is the physical drive's capacity minus the split size (74.47 – 37.00 = 37.47 GB).


Merge a Physical Drive

The action of merging a physical drive reunites the two portions of a split drive back into a single physical drive.

The Merge function is not available when either or both portions of the physical drive are assigned to a logical drive.



To merge a physical drive:

1. Click on the Physical Drive View  icon in Tree View.
2. Click on the Merge tab in Management View.
3. Check the box(es) to the left of the physical drive(s) you want to merge.
4. Click the **Submit** button.

Click on a Physical Drive  icon to see the results of your merge operation.


Media Patrol Schedule

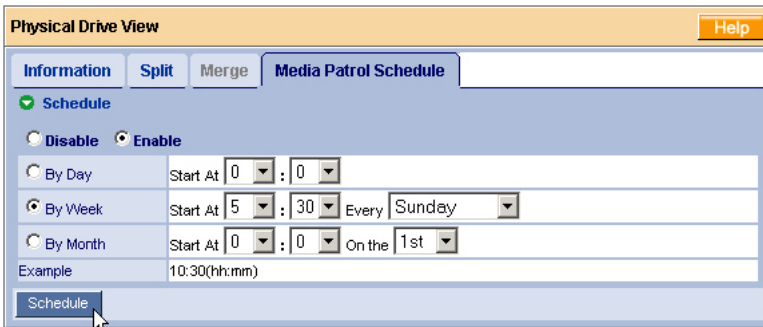
The Physical Drive View–Media Patrol tab allows you to start Media Patrol on all physical drives. You can also run Media Patrol on individual physical drives, see page 72.

Media Patrol is a routine maintenance procedure that checks the magnetic media on each disk 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, 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 73). This action triggers a BSL update message and an email message if you enabled that notification option (see page 52).

To schedule Media Patrol:

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



Physical Drive View Help

Information Split Merge **Media Patrol Schedule**

Schedule

Disable Enable

By Day Start At 0 : 0

By Week Start At 5 : 30 Every Sunday


By Month Start At 0 : 0 On the 1st

Example 10:30(hh:mm)

Schedule



3. Click on the **Enable** radio button.
4. Click on the **by Day, by Week** or **by Month** radio button.
5. 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.

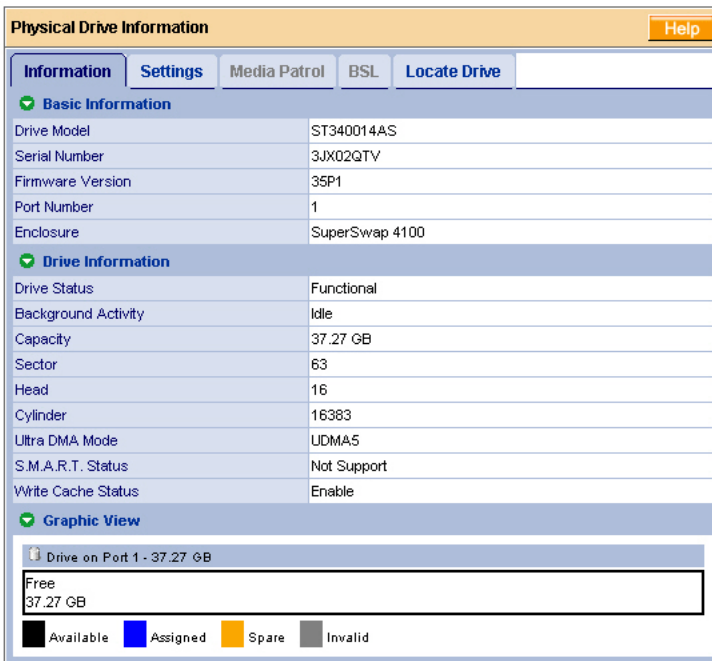
To cancel the scheduled Media Patrol operation:

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

Physical Drive Information

To access information about a physical drive:

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



Physical Drive Information Help

Information Settings Media Patrol BSL Locate Drive

Basic Information

Drive Model	ST340014AS
Serial Number	3JX02QTV
Firmware Version	35P1
Port Number	1
Enclosure	SuperSwap 4100

Drive Information

Drive Status	Functional
Background Activity	Idle
Capacity	37.27 GB
Sector	63
Head	16
Cylinder	16383
Ultra DMA Mode	UDMA5
S.M.A.R.T. Status	Not Support
Write Cache Status	Enable

Graphic View

Drive on Port 1 - 37.27 GB

Free	37.27 GB
------	----------

Available
 Assigned
 Spare
 Invalid



The information tab displays the following information:

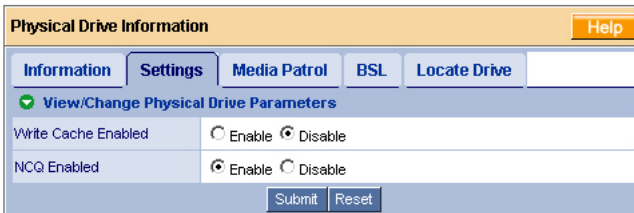
- **Drive Model** – The disk drive manufacturer’s model name or number.
- **Serial Number** – The serial number of this disk drive.
- **Firmware Version** – The version number of the firmware on this disk drive.
- **Enclosure** – The model of SuperSwap enclosure in which the disk drive is installed. If there is no SuperSwap enclosure, the field says None.

- **Drive Status** – The operational of this disk drive. Functional means normal. Others include Offline.
- **Background Activity** – The current background activity affecting this disk drive. Idle means no activity. Others include Initializing and Rebuilding.
- **Capacity** – The data capacity of this disk drive in GB.
- **Sector** – The number of sectors on this disk drive.
- **Head** – The number of heads on this disk drive.
- **Cylinder** – The number of cylinders on this disk drive.
- **Ultra DMA Mode** – The UDMA mode in which this disk drive currently operates.
- **S.M.A.R.T. Status** – SMART, an acronym for Self-Monitoring Analysis and Reporting Technology, is a feature of the disk drive software. When this feature is supported, the drive will pass SMART information to the SuperTrak controller when it polls the physical drives.
- **Write Cache Status** – Indicates whether the disk drive's write cache is Enabled or Disabled. You can change this status under the Settings tab (see below).

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. To access the physical drive setting:

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



The screenshot shows a web interface titled "Physical Drive Information" with a "Help" button in the top right. Below the title is a navigation bar with tabs: "Information", "Settings" (which is selected), "Media Patrol", "BSL", and "Locate Drive". Under the "Settings" tab, there is a green checkmark icon and the text "View/Change Physical Drive Parameters". Below this, there are two rows of settings:

- "Write Cache Enabled" with radio buttons for "Enable" and "Disable". The "Disable" radio button is selected.
- "NCQ Enabled" with radio buttons for "Enable" and "Disable". The "Enable" radio button is selected.

At the bottom of the settings area, there are two buttons: "Submit" and "Reset".

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



Physical Drive Media Patrol

The Physical Drive–Media Patrol tab allows you to start Media Patrol on an individual physical drive. You can also run Media Patrol on all physical drives at the same time, see page 69.

Media Patrol is a routine maintenance procedure that checks the magnetic media on each disk 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, 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 73). This action triggers a BSL update message and an email message if you enabled that notification option (see page 52).

To start Media Patrol immediately:

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



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

To schedule Media Patrol to run at a later time:

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

- Click on 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 0 : 0 Every Sunday



By Month Start At 2 : 30 On the 5th

Example 10:30(hh:mm)

Schedule

- Click on the Enable radio button.
- Click on the **by Day, by Week** or **by Month** radio button.
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.
- Click the **Schedule** button.



To cancel the scheduled Media Patrol operation:

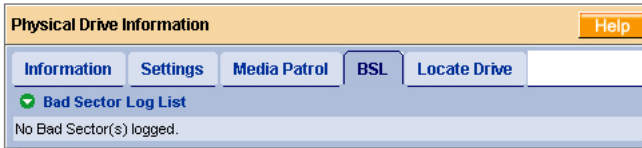
- Click on the Physical Drive View  icon in Tree View.
- Click on the Physical Drive  icon.
- Click on the Media Patrol tab in Management View.
- Click the **Disable** radio button.

Physical Drive 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 access a physical drive's bad sector log:

- Click on the Physical Drive View  icon in Tree View.
- Click on the Physical Drive  icon.
- Click on 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 52).

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 or 10) logical drives, the SuperTrak 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.
- On non-fault-tolerant (RAID 0) 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.

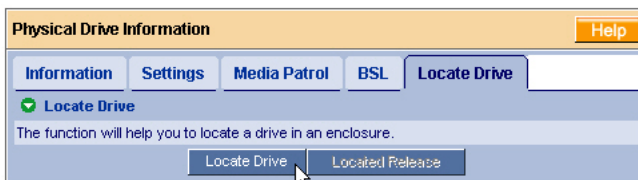
See “Logical Drive Rebuild” on page 87 and “Logical Drive Critical / Offline” on page 93.

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

Locate 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 on the Physical Drive View  icon in Tree View.
2. Click on the Physical Drive  icon.
3. Click on 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.

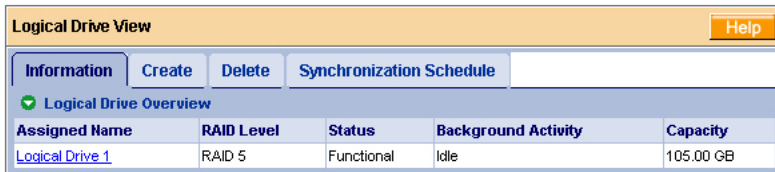
If you do not remove the physical drive, click on the **Located Release** button to stop the Status LED from blinking. For more information, see the *SuperSwap User Manual*.

Logical Drives

- Logical Drive View (below)
- Create a Logical Drive (page 76)
- JBOD (page 80)
- Delete a Logical Drive (page 81)
- Logical Drive Information (page 81)
- Logical Drive Settings (page 82)
- Logical Drive Mapping (page 83)
- Logical Drive Migration and Expansion (page 83)
- Logical Drive Rebuild (page 87)
- Synchronize/Redundancy Check All Logical Drives (page 89)
- Logical Drive Synchronization/Redundancy Check (page 91)
- Logical Drive Initialization (page 93)
- Logical Drive Activation (page 93)

Logical Drive View

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




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

Create a Logical Drive

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

To create a new logical drive:

1. Click on the Logical Drive View  icon.
2. Click on the Create tab.

Select RAID Level

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

- RAID 0** - Data striped across 2 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 drives, for double drive failure protection
- JBOD** - Just a Bunch Of Drives: independent connected drives with no RAID interconnection

<< Prev Next >>

3. Select the radio button beside the RAID level you want for your logical drive. WebPAM displays the RAID levels you can use with the available disk drives. You can also select JBOD on this screen.

See “Choosing a RAID Level” on page 109 for information about the advantages and requirements of the available RAID levels and JBOD.

Select Drive Type

Please select free drives or one logical drive that still have available space.

Select Drive Type

- Free Drives
- Logical Drive 1
- Manual Selection

<< Prev Next >>

4. In the Select Drive Type screen, click on the radio button for one of the following:

- **Free Drives** – Select all Free (unassigned) disk drives
- **Logical Drive** – Select the Free portion of disk drives whose other portion is assigned to a Logical Drive
- **Manual Selection** – Select your disk drives manually

The available choices depend on the RAID level you selected and the disk drives available.

5. Click the **Next** button.

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 on the disk drives to select them.
Available drives have a black frame. Selected drives have a red frame.
8. Click the **Next** button.
If you selected JBOD, click the **Finish** button on the Select Drives screen.
This completes the creation process for JBOD.

9. Enter a name for the logical drive in the field provided.
10. Click the **Next** button.

Final Settings

Confirm your choices. Make any changes here.

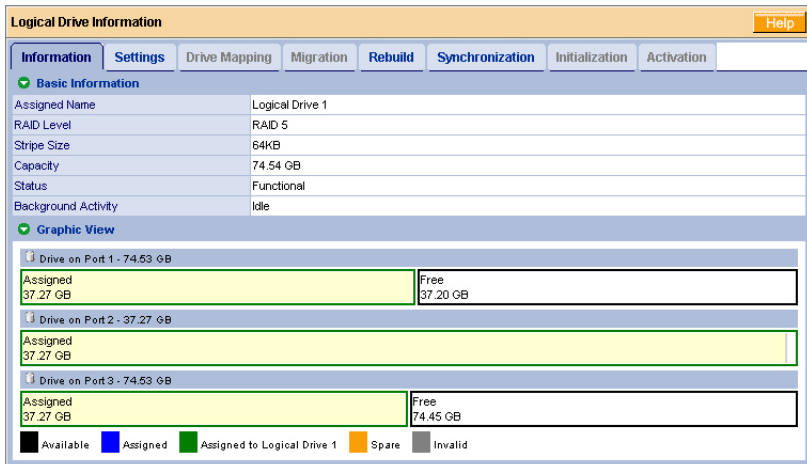
Name	Logical Drive 1
RAID Level	RAID 5
Logical Drive Size	Maximum Capacity
Stripe Block Size	64 KB
Write Cache	Auto Switch
Gigabyte Boundary	GigaByte Boundary
Initialization	Fast Initialization


<< Prev Finish

11. Select a Stripe Block Size from the dropdown menu.

Choose from 32, 64 or 128 KB. The size selected affects how SuperTrak sends and receives data blocks to and from the drives. In general, a larger block size is better when handling large data transfers (such as A/V editing and graphics) while a smaller size is better when handling email and other common server data. The default is 64KB. When in doubt, use the default value.
12. Select a Write Cache policy from the dropdown menu.
 - **Auto Switch** – The setting is made automatically. This is the default.
 - **Write Back** – Increases performance but can result in data loss in the event of a power failure.
 - **Write Through** – Slower but more secure.
13. Select a Gigabyte Boundary policy from the dropdown menu.
 - **GigaByte Boundary** – Rounds the size of the logical drive down to the nearest whole gigabyte. It allows you to install a slightly smaller (within 1 GB) replacement drive, should the need arise. This is the default.
 - **None** – No Boundary function.
14. Select an Initialization policy from the dropdown menu.
 - **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.
 - **None** – No initialization. This choice is not recommended.
15. 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.

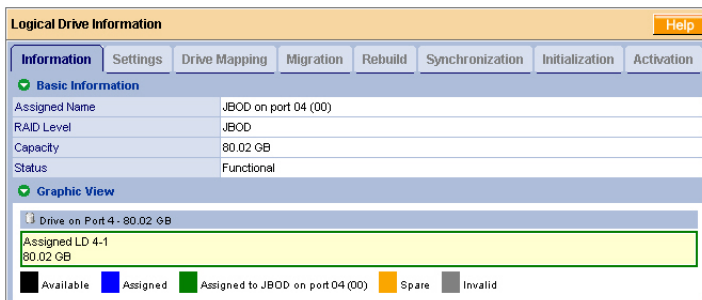


Click on the Logical Drive  icon to see all of the information about your new logical drive.

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 127 for more information.

JBOD

In WebPAM, JBOD is created, managed and deleted the same as a logical drive. You can also use the SuperTrak BIOS for this purpose. See the *SuperTrak User Manual* for more information on the BIOS.



JBODs do not have Settings, Rebuild, Migration, Synchronization or other functions that pertain to Logical 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 SuperTrak controller and WebPAM.


Delete a Logical Drive

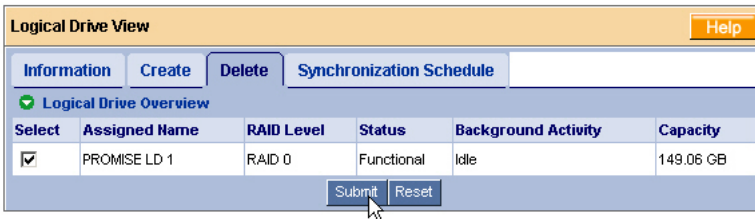


Warning

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:

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




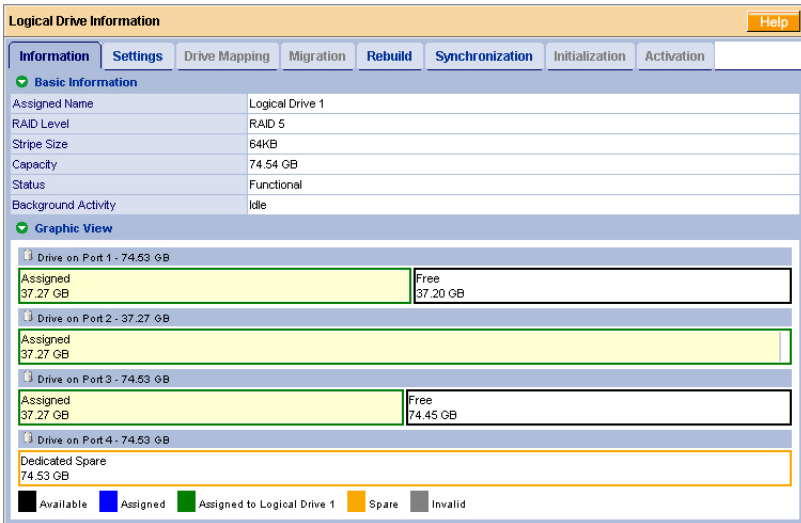
3. Check the box to the left of the logical drive you want to delete.
4. Click the **Submit** button.
5. In the Confirmation box, click the **OK** button.
6. In the Warning box, click the **OK** button.

The selected logical drive is deleted.

Logical Drive Information

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



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

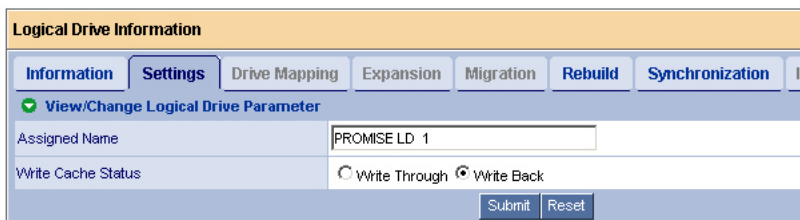


From this screen, you can click on the links to access the Settings, Drive Mapping, Migration, Rebuild, Synchronization, Initialization and Activation features. The features that apply to this logical drive have blue tabs. Features that do not apply have grayed tabs.

Logical Drive Settings

Logical Drive Settings allows you to assign a name to a logical drive and to change its controller cache settings. To access logical drive settings:

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





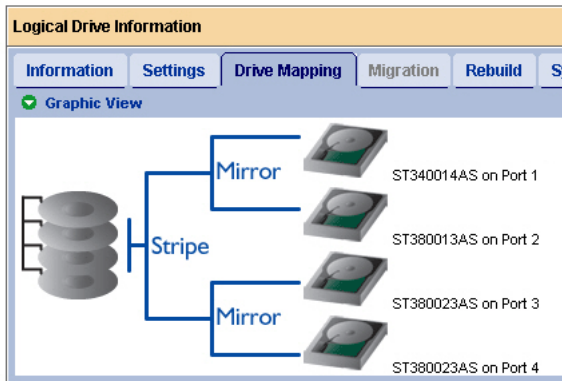
4. Enter a name in the Assigned Name field, as desired.
5. Click the radio button to select *Write Through* or *Write Behind* cache status.

- **Write Back** – Increases performance but can result in data loss in the event of a power failure. This is the default.
 - **Write Through** – Slower but more secure.
6. Click the **Submit** button when you are done.

Logical Drive Mapping

This feature applies to RAID 10 logical drives only. To access logical drive settings:

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



The Drive Mapping tab shows how the stripe and mirror components of the RAID 10 logical drive are mapped to the physical drives.

Logical Drive Migration and Expansion

The Logical Drive—Migration tab enables you to migrate or expand a logical drive. Migration is the process of changing the RAID level of an existing logical drive. Expansion is the process of adding more physical drives to a logical drive while keeping the same RAID level.

The Migration feature applies to certain combinations of RAID level and number of physical drives, as described in the table below.

From	To	Result
RAID 0: 1 or 2 drives	RAID 5: 3 to 8 drives	Increased performance and capacity, adds redundancy
	RAID 10: 4 drives	
RAID 0: 3 drives	RAID 5: 4 to 8 drives	Increased performance and capacity, adds redundancy
RAID 1: 2 drives	RAID 5: 3 to 8 drives	Increased performance and capacity
	RAID 10: 4 drives	
RAID 10: 4 drives	RAID 5: 4 to 8 drives	Increased capacity

The Expansion feature applies only to RAID 0 and RAID 5 logical drives. You can add physical drives to a logical drive, up to eight drives, the maximum number supported by the SuperTrak controller.



Migration and Expansion are not available for JBOD.

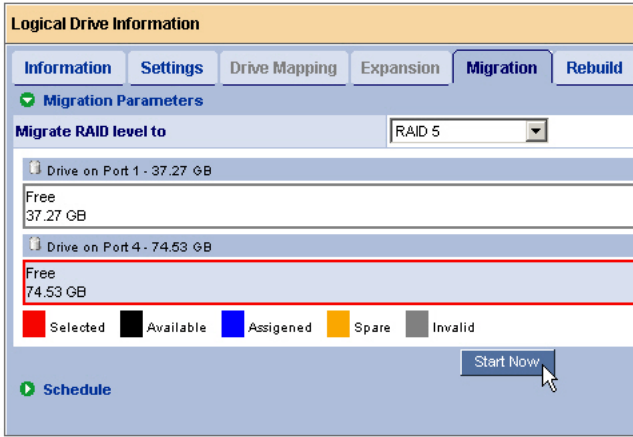
For more information, see “Migration and Expansion” on page 113.

You can set up an Migration to begin immediately (on demand) or schedule a Migration for a time when there is less demand on the RAID system.

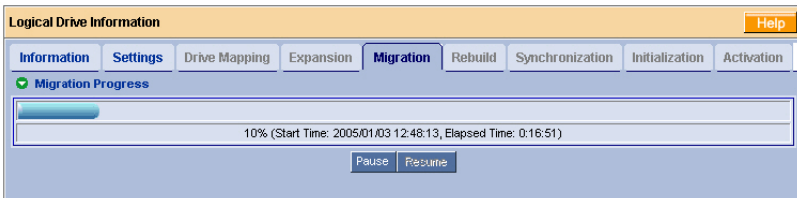
On Demand

To migrate a logical drive:

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





4. If the Migration or Expansion requires additional physical drives, click on a free physical drive to select it.
Available drives have a black frame. Selected drives have a red frame.
5. Click the **Start Now** button.



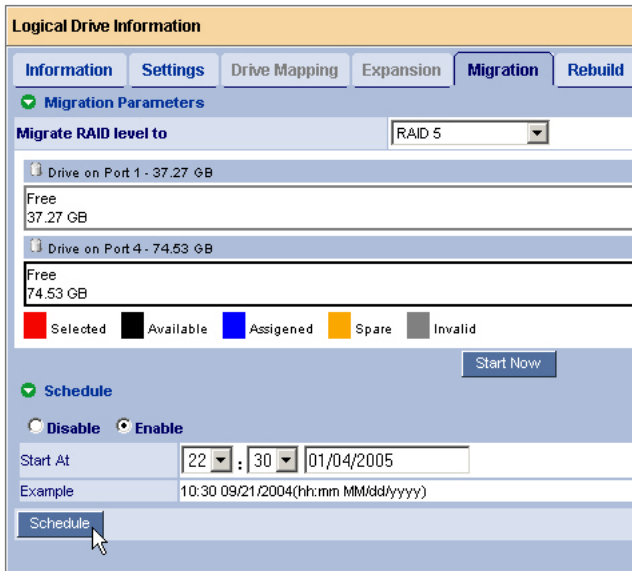
You can monitor Migration or Expansion progress on the Logical Drive Migration tab. Click the respective buttons to pause and resume the Migration.

Scheduled

To schedule a Migration or Expansion:

1. Click on the Logical Drive View  icon in Tree View.
2. Click on the Logical Drive  icon of the logical drive you want to migrate or expand.



3. Click on the Migration tab in Management View.



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

Cancel a Schedule

If you want to cancel the scheduled Migration, do the following:

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

Logical Drive Rebuild



Rebuild refers to the process of repairing a logical drive by reconstruction the data on one of its physical drives. This feature only applies to logical drives with redundancy, RAID 1, RAID 5 and RAID 10.

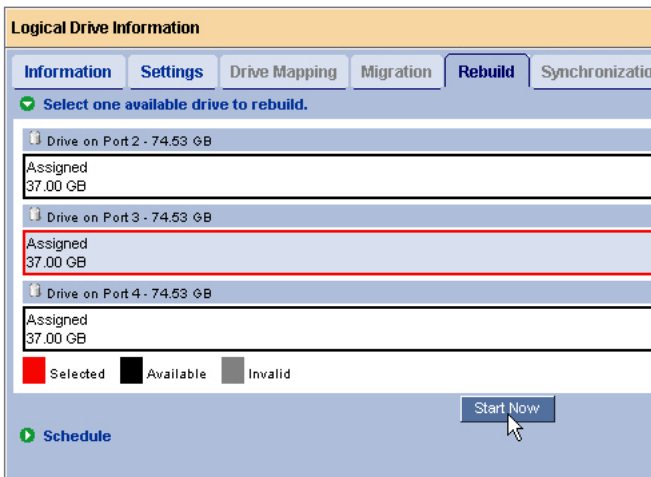
You can set up a Rebuild to:

- Begin immediately (on demand)
- Schedule a Rebuild for a time when there is less demand on the RAID system
- Begin automatically when a logical drive goes critical or degraded (see “Create a Spare Drive” on page 99)

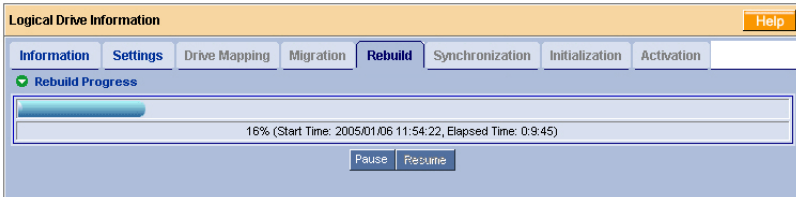
On Demand

To rebuild a logical drive:

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





4. Select the logical drive you want to rebuild.
Available drives have a black frame. Selected drives have a red frame.
5. Click the **Start Now** button.

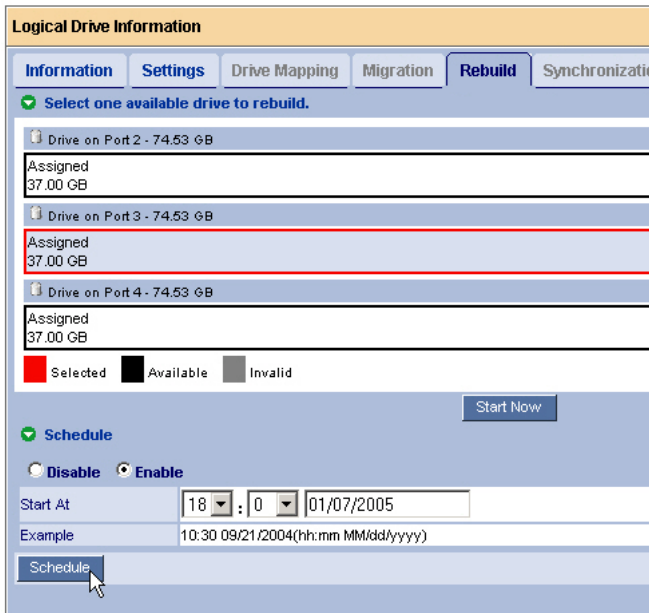


You can monitor Rebuild progress on the Logical Drive Rebuild tab. Click the respective buttons to pause and resume the Rebuild.

Scheduled

To schedule a Rebuild:

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





4. Select the physical drive you want to rebuild.
Available drives have a black frame. Selected drives have a red frame.
5. Click on the **Enable** radio button.

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

Cancel a Schedule

If you want to cancel the scheduled Rebuild, do the following:

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

Automatic Rebuild

Automatic rebuilding of a logical drive is possible under the following conditions:

- The logical drive is a RAID 1 or a 3-drive RAID 5.
See “Create a Logical Drive” on page 76.
- There is a spare drive present in the RAID system.
See “Create a Spare Drive” on page 99.
- Automatic Rebuild Status is enabled in the Controller Settings.
See “Controller Settings” on page 63.

If the three above conditions are met, a logical drive will replace a faulty disk drive and rebuild itself automatically. WebPAM will report the critical logical drive and automatic rebuild in its user interface as well as via popup messages. Depending on your Event Notification settings (see page 52), WebPAM can also notify you via email message.

When the automatic rebuild operation is completed, you must remove and replace the faulty physical drive with a new one.

See “Replace the Failed Disk Drive” on page 95 and the *SuperTrak User Manual* and *SuperSwap User Manual* for more information on replacing a physical drive.

Synchronize/Redundancy Check All Logical Drives


The Logical Drive View–Synchronization Schedule tab enables you to synchronize all logical drives. You can also synchronize an individual logical drive, see page 91.

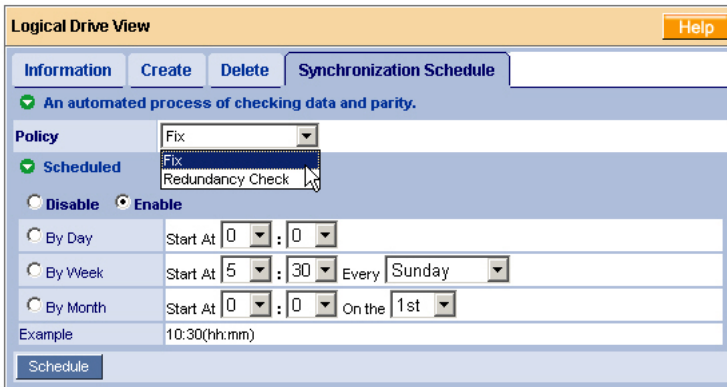
Synchronization refers to an automated process of checking and correcting data and parity. Unlike a Rebuild, Synchronization is a maintenance operation.

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, RAID 5 and RAID 10 logical drives. When an logical drive is first created and you select Full Initialization, the same action as Synchronization takes place.


To schedule Synchronization for all logical drives:

1. Click on the Logical Drive View  icon in Tree View.
2. Click on the Synchronization Schedule tab in Management View.



3. In the Policy dropdown menu, select *Fix* if you want Synchronization or *Redundancy Check* if you do not want to correct inconsistencies.
4. Click on the **Enable** radio button.
5. Click on the **by Day**, **by Week** or **by Month** radio button.
6. 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.
7. Click the **Schedule** button.

If you want to cancel the scheduled Synchronization, do the following:

1. Click on the Logical Drive View  icon in Tree View.
2. Click on the Synchronization tab in Management View.
3. Click on the **Disable** radio button.

Logical Drive Synchronization/Redundancy Check

Synchronization refers to an automated process of checking and correcting data and parity. Unlike a Rebuild, Synchronization is a maintenance operation. You can also synchronize all logical drives at the same time, see page 89.



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

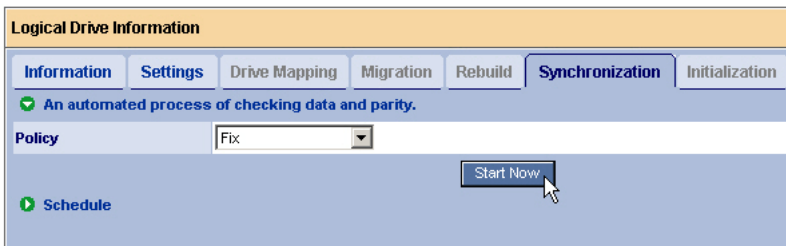
Synchronization and Redundancy Check apply to RAID 1, RAID 5 and RAID 10 logical drives. When an logical drive is first created and you select Full Initialization, the same action as Synchronization takes place.

You can set up a Synchronization or Redundancy Check to begin immediately (on demand) or schedule a Synchronization or Redundancy Check for a time when there is less demand on the RAID system.

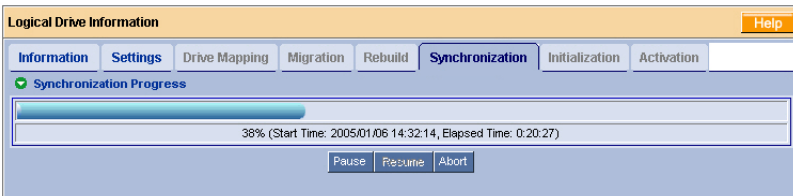
On Demand

To Synchronize or Redundancy Check a logical drive:

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





4. In the Policy dropdown menu, select *Fix* if you want Synchronization or *Redundancy Check* if you do not want to correct inconsistencies.
5. Click the **Start Now** button.

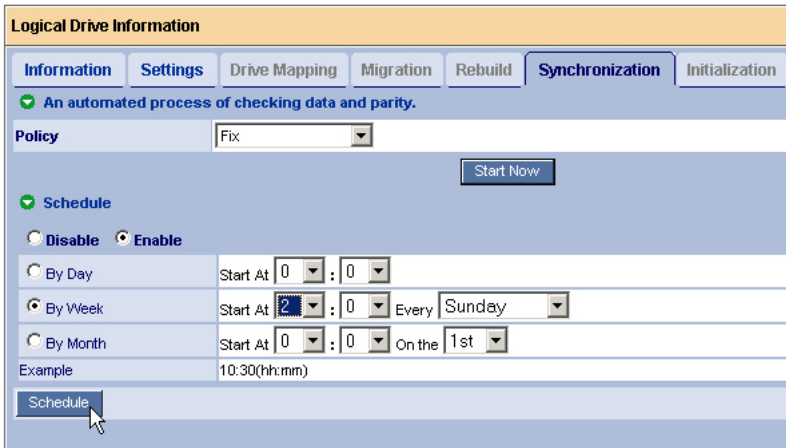


You can monitor Migration progress on the Logical Drive Migration tab. Click the respective buttons to pause, resume or abort the Synchronization or Redundancy Check.

Scheduled

To schedule a Synchronization or Redundancy Check:

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



Logical Drive Information

Information Settings Drive Mapping Migration Rebuild **Synchronization** Initialization

An automated process of checking data and parity.

Policy

Schedule

Disable **Enable**

By Day Start At :

By Week Start At : Every

By Month Start At : On the

Example 10:30(hh:mm)

4. In the Policy dropdown menu, select *Fix* if you want Synchronization or *Redundancy Check* if you do not want to correct inconsistencies.
5. Click on the **Enable** radio button.
6. Click on the **by Day, by Week** or **by Month** radio button.
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.

Cancel a Schedule

If you want to cancel the scheduled Synchronization or Redundancy Check, do the following:

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



3. Click on the Synchronization tab in Management View.
4. Click on the **Disable** radio button.

Logical Drive Initialization

When logical drive is first created, you can select one of three choices for initialization:

- **Quick 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.
- **None** – No initialization. This choice is not recommended.

When you select 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 pause the initialization process so that more of SuperTrak's resources are available for other operations. When the other operations are done, you can resume the initialization of your new logical drive.

1. Click on the Logical Drive View  icon in Tree View.
2. Click on the Logical Drive  icon of the logical drive whose initialization you want to pause.
3. Click on the Initialization tab in Management View.
4. Click the **Pause** button.
The initialization process stops.
5. Click the **Resume** button.
The initialization resumes from the point where you paused it.

Logical Drive Activation

This feature enables you to designate a hot plug-and-play logical drive. It will become available in a future release of the SuperTrak Controller card.

Logical Drive Critical / Offline

A fault-tolerant logical drive—RAID 1, 5 or 10—goes critical when a 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.

If the fault was caused by a failed disk drive that was removed, the drive must be replaced by another drive, either identical or larger, in order for the RAID system to rebuild and restore optimal configuration.

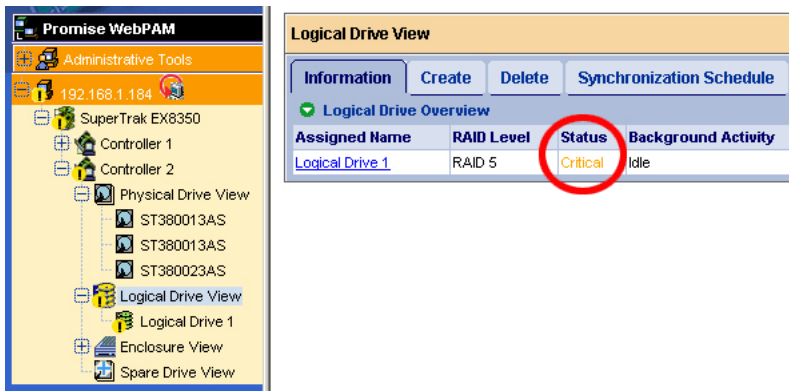
A non-fault tolerant logical drive—RAID 0—goes offline when a disk drive is removed or fails. Since the logical drive is not fault tolerant, the data stored in the disk array is no longer accessible.



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

When a Disk Drive Fails

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

- The SuperTrak Controller's audible alarm, if enabled, will sound
- The SuperSwap Status LED changes from green to red
- WebPAM reports the condition in Tree View, with popup messages and, if Event Notification is set up, email messages
- If you have a RAID 1 or a 3-drive RAID 5 logical drive with a hot spare drive properly configured, the logical drive will automatically rebuild itself using the spare drive




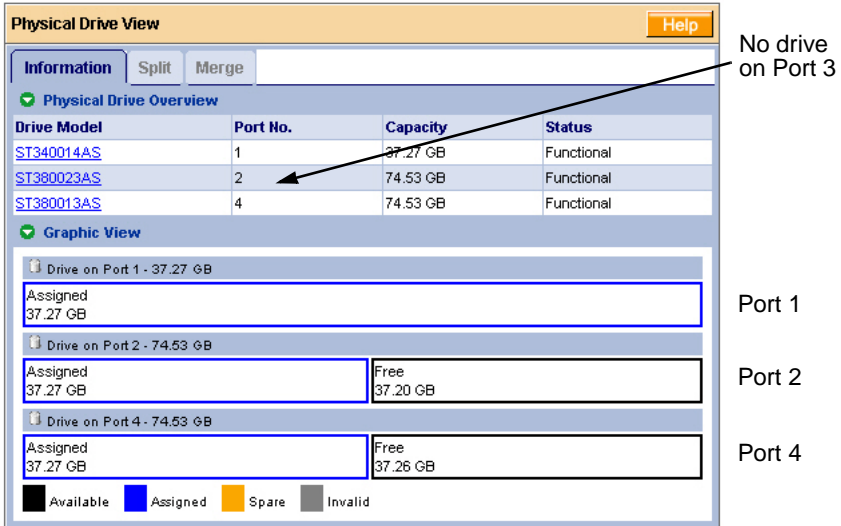
In the example above, amber ! icons appear over the SuperTrak, Controller, Logical Drive View and Logical Drive icons. Click on the Logical Drive View  or Logical Drive  icons to verify the condition of the logical drive.

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

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

Identify the Failed Disk Drive

Click on 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 disk drive.



The screenshot shows the 'Physical Drive View' window. At the top, there are tabs for 'Information', 'Split', and 'Merge', and a 'Help' button. Below the tabs is a 'Physical Drive Overview' section with a table:

Drive Model	Port No.	Capacity	Status
ST340014AS	1	37.27 GB	Functional
ST380023AS	2	74.53 GB	Functional
ST380013AS	4	74.53 GB	Functional

Below the table is a 'Graphic View' section showing the drive layout for three ports: Port 1, Port 2, and Port 4. Port 3 is missing. The graphic view shows the following details:

- Port 1: Drive on Port 1 - 37.27 GB. Assigned 37.27 GB.
- Port 2: Drive on Port 2 - 74.53 GB. Assigned 37.27 GB, Free 37.20 GB.
- Port 4: Drive on Port 4 - 74.53 GB. Assigned 37.27 GB, Free 37.26 GB.



At the bottom, there is a legend: Available (black), Assigned (blue), Spare (yellow), Invalid (grey). An arrow points from the text 'No drive on Port 3' to the missing Port 3 in the graphic view.

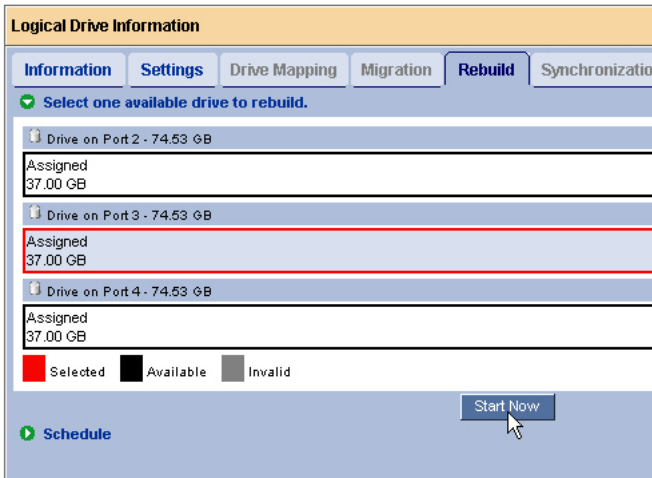
In this example, there were four disk drives connected to the SuperTrak Controller. Notice that there is no drive on Port 3. This is the failed drive.

Replace the Failed Disk Drive

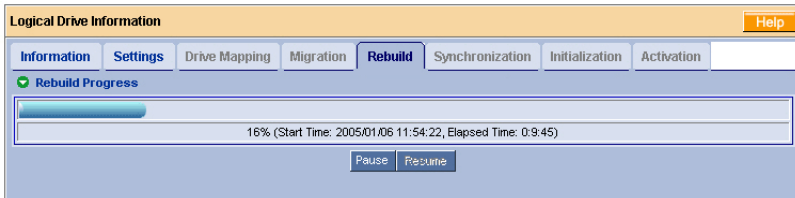
Replace the failed disk drive with a new one of equal or greater capacity. Then rebuild the logical drive. See the *SuperTrak User Manual* and *SuperSwap User Manual* for more information about replacing a disk drive.

Rebuild Your Logical Drive

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




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

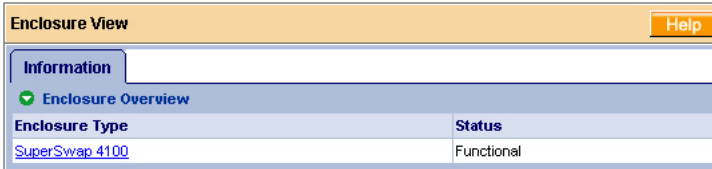


You can monitor Rebuild progress on the Logical Drive Rebuild tab. Click the respective buttons to pause and resume the Rebuild. When the Rebuild is finished, your logical drive will be Functional again.

Enclosures

Enclosure View



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

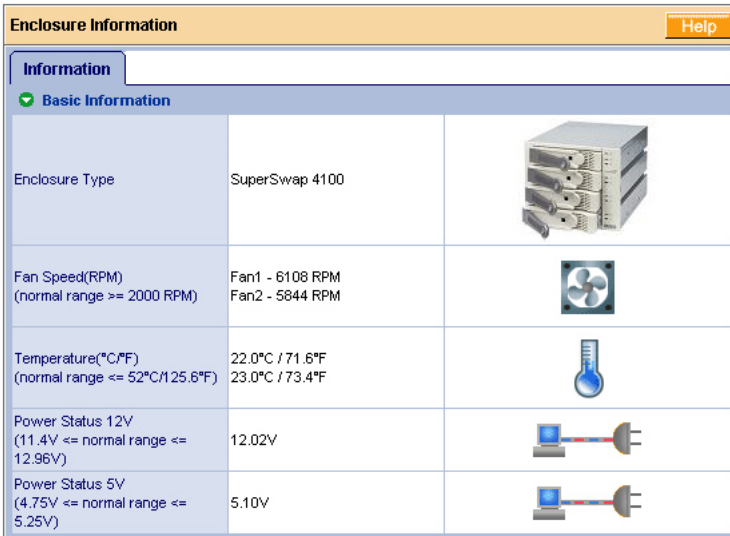


From this window, you can click on the links to access information and functions of individual Enclosures.

Enclosure

To access information about an Enclosure:

1. Click on the Enclosure View  icon in Tree View.
2. Click on 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	Disk drive is present and ready	Disk drive is present and ready	Normal status
Blinking	n/a	Read/write activity	n/a
Amber	Disk drive: <ul style="list-style-type: none"> • 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	Disk drive: <ul style="list-style-type: none"> • is offline • is not installed 	n/a	2 or more incidents (see below)
Dark	Power is off	Disk drive: <ul style="list-style-type: none"> • has failed • is not installed 	Disk drives are spinning up
An incident refers to one occurrence of out-of-range voltage, temperature or fan speed. Any incident requires immediate attention.			

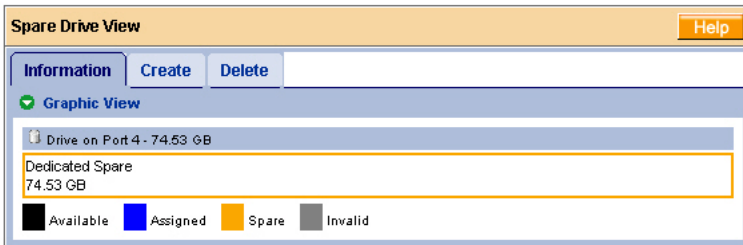
For more information on Enclosures, replacing disk drives and other repair operations, refer to the *SuperSwap User Manual*.

Spare Drives

A spare drive is a physical drive designated to function as a hot spare drive. A hot spare drive automatically replaces a failed physical drive. You can also set the Controller to rebuild a logical drive from a Free disk drive. See “Controller Settings” on page 63 and “Logical Drive Rebuild” on page 87 for more information on how spare drives work.

Spare Drive View


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

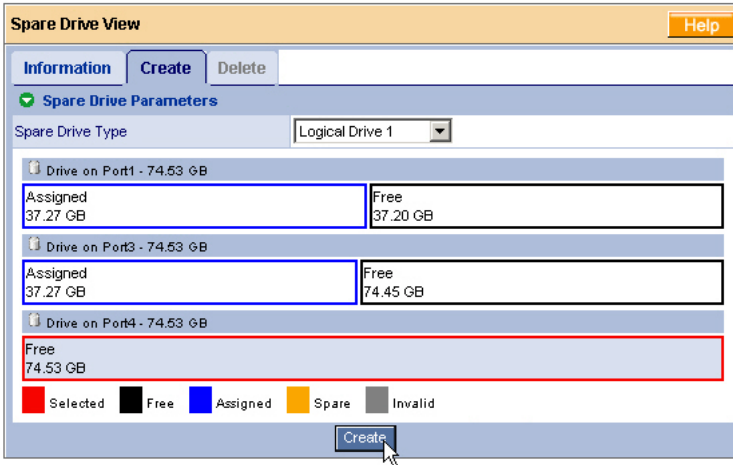


From this screen, you can view the current Spare Drives and click on the tabs to access the Create and Delete features.

Create a Spare Drive

To create a spare drive:

1. Click on the Logical Drive View  icon.
2. Click on the Create tab.




3. From the Logical Drive dropdown menu, select
 - **Global Spare** – This Spare Drive can be used by any qualified Logical Drive.
 - **Logical Drive** – The name of the logical drive to which this Spare Drive will be assigned or dedicated.
4. Click on a disk drive to select it.

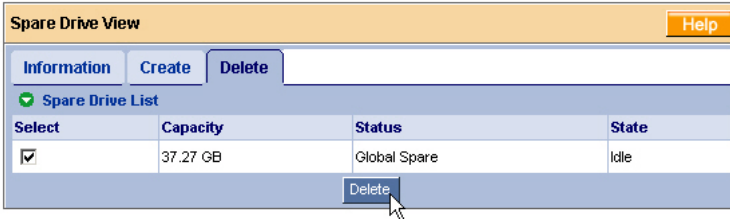
Available drives have a black frame. Selected drives have a red frame. Drives with a blue frame are assigned to a logical drive. You cannot assign a split drive as a spare drive.
5. Click the **Create** button.

The new Spare Drive appears under Physical Drive View and Spare Drive View.

Delete a Spare Drive

To delete a spare drive:

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




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

The selected spare drive is deleted.

Battery

The Information tab displays information about the cache-backup battery.

To access the Controller–Information tab, click on the Battery  icon in Tree View.

- **Temperature** – The battery's operating temperature.
The battery normally has the same temperature as the inside of the PC where it is installed, typically below 38°C or 100°F.
If the battery temperature rises above this value, determine whether the PC is overheating.
If the PC is OK but the battery is too hot, the battery is not accepting a charge properly and you must replace it.
- **Voltage** – The battery supplies 3.3V to back up the controller cache in the event of a power failure. If battery voltage drops below this value, the battery is not accepting a charge properly and you must replace it.

If the Battery icon does not appear in Tree View, the battery is either disconnected or was not installed.

Chapter 6: Technology Background

- Introduction to RAID (below)
 - Choosing a RAID Level (page 109)
 - JBOD – Single Drive (page 108)
 - Choosing Stripe Block Size (page 111)
 - Gigabyte Boundary (page 111)
 - Initialization (page 111)
 - Hot Spare Drive(s) (page 112)
 - Partition and Format the Logical Drive (page 112)
 - Cache Settings (page 113)
 - Migration and Expansion (page 113)
-

Introduction to RAID

RAID (Redundant Array of Independent Disks) allows multiple disk drives to be combined together in 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 109. 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 disk 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.

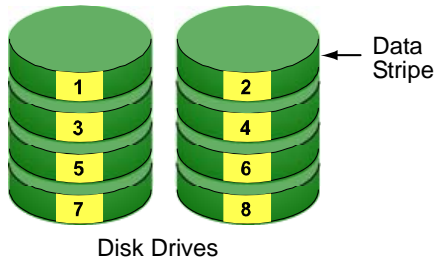


Figure 1. RAID 0 Striping interleaves data across multiple drives

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

RAID 0 logical drives on FastTrak consist of one or more disk drives.

RAID 1 – Mirror

When a logical drive is mirrored, identical data is written to a pair of disk 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 disk drive fails or has errors, the other mirrored disk drive continues to function. This is called Fault Tolerance. Moreover, if a spare disk 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.

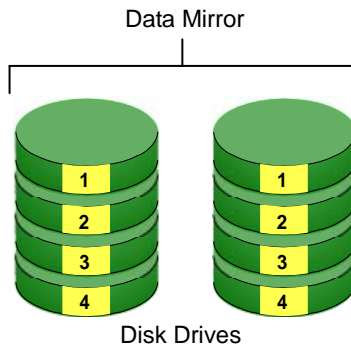


Figure 2. RAID 1 Mirrors identical data to two drives

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

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

RAID 5 – Block Striping with Distributed Parity

RAID 5 organizes data across the disk drives of the logical drive, and stores parity information on to a disk drive dedicated to this purpose. This organization allows increased performance by accessing multiple disk drives simultaneously for each operation, as well as fault tolerance by providing parity data. In the event of a disk drive failure, data can be re-calculated by the RAID system based on the remaining data and the parity information.

Parity data is distributed across the disk drives along with the data blocks. In each case, the parity data is stored on a different disk than its corresponding data block.

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.

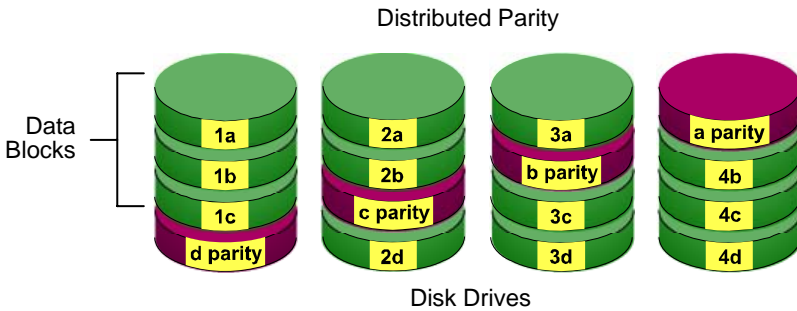


Figure 3. RAID 5 Stripes all drives with data and parity information

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

RAID 5 logical drives on FastTrak consist of 3 or 4 disk drives.

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 disk 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.

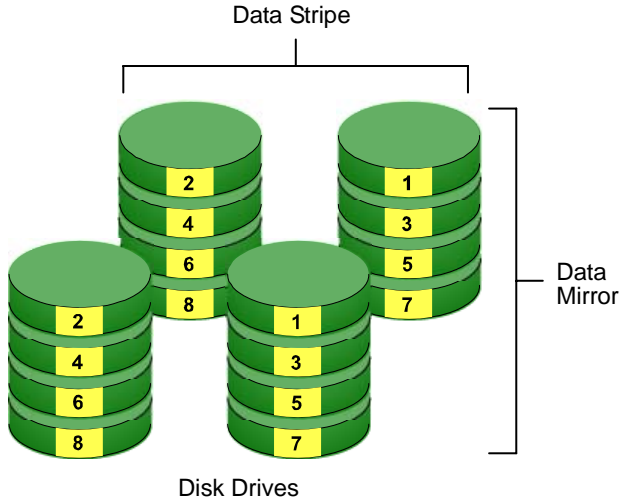


Figure 4. RAID 10 takes a data mirror on one drive pair and stripes it over two drive pairs

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 disk drives fail.

RAID 10 logical drives on FastTrak consist of 4 disk drives.

JBOD – Single Drive

Just a Bunch of Disks (JBOD) arranges individual physical drives on the FastTrak controller the same as if they were attached to the PC's motherboard controller. The advantage is that a FastTrak Controller can accommodate up to four physical drives, more than most PC motherboards.



JBOD offers none of the performance or security advantages of a RAID logical drive. Any number of physical drives on the FastTrak Controller can be designated as JBOD.

In WebPAM, JBOD is created, managed and deleted the same as a logical drive. You can also use the FastTrak BIOS for this purpose. See the *FastTrak User Manual* for more information on the BIOS.

In addition, 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.

Choosing a RAID Level

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

RAID 0

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

Recommended Applications for RAID 0

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

RAID 1

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

Recommended Applications for RAID 1

- Accounting
- Payroll
- Financial
- 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

<ul style="list-style-type: none"> • File and Application servers • WWW, E-mail, and News servers 	<ul style="list-style-type: none"> • 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
Easy management of multiple independent disk drives	No increase in performance, capacity or fault tolerance.

Recommended Applications for JBOD

- Non-critical file storage
- Swappable data storage

Choosing Stripe Block Size

The stripe block size value can be set to 32 KB, 64 KB and 128 KB.

64 KB is the default. This selection will directly affect performance. There are two issues to consider when selecting the stripe block size.

- Choose a stripe block size equal to or smaller than the smallest cache buffer found on any disk drive in your logical drive. A larger value slows the logical drive down because disk drives with smaller cache buffers need more time for multiple accesses to fill their buffers.
- If your data retrieval consists of fixed-size data blocks, such as some database and video applications, choose that data block size as your stripe block size.

Generally speaking, email, POS and webservers prefer smaller stripe block sizes. Video and database applications prefer larger stripe block sizes.

Gigabyte Boundary

The Gigabyte Boundary feature is designed for logical drives in which a drive has failed and the user cannot replace the drive with the same capacity or larger. Instead, 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, an 80.5GB drive would be rounded down to 80GB). This can be helpful in the event that a drive fails and an exact replacement model is no longer available.

Initialization

Initialization is the process of setting all of the data bits on all of the disk drives to zero. This has the effect of erasing any existing data from the drives. This action is especially helpful in creating accurate parity in logical drives with more than four drives.

Initialization applies to RAID 0, 1, 5 and 10. It does not apply to JBOD. When you create one of these logical drives, you can specify Quick/Fast Initialization or Full Initialization. See “Create a Logical Drive” on page 35 or page 76.

The Full Initialization process begins immediately after the logical drive is created and may take some time to finish, depending on the size of the disk drives in your logical drive. Your logical drive is available while initialization is in progress.

Hot Spare Drive(s)

A hot spare is a disk drive that is connected to the logical drive system but is not assigned as a member of the logical drive. In the event of the failure of a drive within a functioning fault tolerant logical drive, the hot spare is activated as a member of the logical drive to replace a drive that has failed.

FastTrak will replace a failing disk drive in a logical drive with an unassigned drive, if one is available. The unassigned drive is not part of any logical drive. Such a drive is called a *hot spare* drive. There are two types:

- Global – An unassigned disk drive available to any logical drive on the Host PC.
- Dedicated – An unassigned disk drive that can only be used by a specified logical drive.

The hot spare policy function lets you select whether a logical drive will access any unassigned disk drive or a designated drive in the event of disk drive failure. See “Logical Drive Rebuild” on page 87 and “Create a Spare Drive” on page 99 for information.

The SuperBuild utility does not support hot spare drives.

The spare drive effectively takes the place of the failed drive and the RAID system immediately begins to rebuild data onto the drive. When the rebuild is complete, the logical drive is returned to fault tolerant status.

Maintaining a hot spare drive is a good precaution to protect your logical drive integrity in the event of drive failure.

Partition and Format the Logical Drive

Like any other type of fixed disk media in your system, a RAID logical drive must also be partitioned and formatted before use. Use the same method of partitioning and formatting on an logical drive as you would any other fixed disk.

See “Appendix A: Partition and Format” on page 127.

Cache Settings

There is a data cache on the FastTrak controller and another one on each physical disk drive. A cache holds data in volatile memory during RAID management and data transfer activity. The right combination of cache settings for your needs can improve FastTrak's efficiency and performance.

Physical Drive Write Cache – Activates the write cache on the disk drive.

Write Back Cache – Activates write-back feature of FastTrak's controller cache. A write back cache holds data after an I/O operation and tells the controller the data has been written. The data is written as soon as the disk drive is no longer busy.

This action increases availability of the logical drive. If the power fails before the data is written to the disk drive, the data will be lost.

The alternative is a write-through cache policy, which reports that the data has been written to the disk only when it actually has.

To make Cache settings, see "Create a Logical Drive" on page 76 and "Logical Drive Settings" on page 82.

Migration and Expansion

Migration is the process of changing the RAID level of an existing logical drive. Expansion is the process of adding more physical drives to a logical drive while keeping the same RAID level. See "Migrate a Logical Drive" on page 44 or "Logical Drive Migration and Expansion" on page 83 for instructions how to migrate or expand a logical drive.

The Migration feature applies to certain combinations of RAID level and number of physical drives, as described in the table below.

From	To	Result
RAID 0: 1 or 2 drives	RAID 5: 3 to 8 drives	Increased performance and capacity, adds redundancy
	RAID 10: 4 drives	
RAID 0: 3 drives	RAID 5: 4 to 8 drives	Increased performance and capacity, adds redundancy
RAID 1: 2 drives	RAID 5: 3 to 8 drives	Increased performance and capacity
	RAID 10: 4 drives	
RAID 10: 4 drives	RAID 5: 4 to 8 drives	Increased capacity

The Expansion feature applies only to RAID 0 and RAID 5 logical drives. You can add physical drives to a logical drive, up to eight drives, the maximum number supported by the SuperTrak controller.

Migration and Expansion are not available for JBOD.



Important

- The Target logical drive may require more disk drives than the Source logical drive
 - If the Target logical drive requires an EVEN number of disk drives but the Source logical drive has an ODD number, ADD a disk drive as part of the migration process
 - You cannot reduce the number of disk drives in your logical drive
 - You cannot migrate or expand a logical drive when it is Critical or performing activities such as Synchronizing or Rebuilding
-

Ranges of Logical Drive Expansion

There are limitations to how large you can expand a logical drive, depending on the size of your current logical drive.

The current PC Operating Systems support a 10-byte LBA format. This means that a logical drive can have up to 4 billion address blocks or sectors.

Multiply the number of blocks by the sector size to find the capacity of a logical drive:

4,000,000,000 blocks x 512 bytes per sector = 2,048,000,000,000 bytes of data for a 2TB drive.

Note that you cannot change the size of the sectors nor can you increase the number of address blocks above 4 billion.

As a result, there are range limits imposed upon logical drive expansion as shown in the table above. For example:

- You can expand a 2.5 TB logical drive up to 4 TB
- You can only expand a 1.9 TB logical drive up to 2 TB

See the chart on the next page.

Current LD Size	Maximum LD Expansion Size	Sector Size
8 to 16 TB	16 TB	4096 bytes
4 to 8 TB	8 TB	2048 bytes
2 to 4 TB	4 TB	1024 bytes
0 to 2 TB	2 TB	512 bytes

You can direct WebPAM to expand a logical drive beyond the maximum expansion size. However, when expansion is finished, your logical drive will be the maximum size listed in the table.

If you require a logical drive larger than the maximum expansion size:

1. Backup the data from the current logical drive.
2. Delete the current logical drive.
3. Create a new logical drive with the desired capacity.
4. Restore the data to the new logical drive.

Chapter 7: Support

- Frequently Asked Questions, below
 - Contact Technical Support, page 121
 - Limited Warranty, page 123
 - Return Product for Repair, page 125
-

Frequently Asked Questions

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

Pre-Installation (Speed, Device Types, Capacity, Cabling)

What kind of HDDs can I use for a SuperTrak EX Series logical drive?

You can use any Serial ATA hard drive(s) to create arrays on the SuperTrak EX Series. Use matching drives for multiple-drive arrays to maximize capacity usage as well as performance.

What is the maximum disk drive storage capacity of SuperTrak EX Series?

The SuperTrak EX8300 and EX8350 support up to 3.2 TB (eight 400 GB disk drives).

Will ACPI work with HDDs on the SuperTrak EX Series?

Yes. The SuperTrak Controller supports ACPI S1, S3 and S4 standby modes.

Can I use ATAPI devices on the SuperTrak EX Series?

No. The SuperTrak Controller does not support ATAPI devices.

Will the SuperTrak EX Series work with 66MHz PCI bus speed?

SuperTrak EX8300 will work with a 66MHz PCI bus, however the SuperTrak card itself requires a PCI-X slot.

SuperTrak EX8350 will work in a PCI-Express X4 or X8 slot.

How can I change the resources that the SuperTrak uses?

The SuperTrak EX8300 and EX8350 are fully PnP. This means all the resources that it uses are given to it by the PnP BIOS on the motherboard.

The SuperTrak Controller supports IRQ sharing, but this feature only works when ALL the concerned devices support it. 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 SuperTrak Controller card to a different PCI slot.

How do the SuperTrak EX Series RAID Controllers provide storage and data protection with their arrays?

The SuperTrak EX Series implements four RAID levels plus JBOD as follows:

- RAID 0 – Stripe
- RAID 1 – Mirror
- RAID 5 – Block Striping with Distributed Parity
- RAID 10 – Mirroring / Striping
- JBOD – Single disk drives

See “Introduction to RAID” on page 103 for more information.

Drive Issues

Can I add a drive to a SuperTrak EX Series logical drive via hot-swap and dynamically adjust the array size/configuration?

Yes. The SuperTrak Controller supports online logical drive expansion and migration. You must use the SuperBuild utility or the WebPAM software to expand or migrate an existing logical drive.

Do the HDDs on the SuperTrak EX Series have to be the same size?

The disk drives that you use with the SuperTrak EX Series do not have to be the same size. If the sizes differ, the SuperTrak Controller will truncate the large drive so the capacities match. The resulting difference in drive space is unusable, so avoid using disk drives of significantly different capacities.

I already have an array on a Promise FastTrak controller. Can I move that array to my new SuperTrak EX Series controller?

Yes, if your HDDs are SATA. All SuperTrak controllers read the logical drives the same way, so the HDDs can be moved from one controller to another.

I already have an array on an older SuperTrak controller. Can I move that array to my new SuperTrak EX Series controller?

No. The older series of SuperTrak controllers supports parallel ATA drives. The SuperTrak EX Series supports SATA drives.

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

Yes, but only under certain configurations. First, the other controller must address the drives as LBA, not CHS.

Second, only the following configurations allow the drive(s) to be accessed individually on another controller:

- Single-drive RAID 0 (stripe)
- One drive from a RAID 1 (mirror) logical drive
- JBOD

Other array configurations will not work for this purpose.

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

Do NOT do this! Low-level formatting hard disk drives is not only unnecessary but it generally does not correct problems commonly experienced during use.

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

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

No! Disk management software will only complicate things. The logical drive should be fully addressable by your OS as it is. Remember that some operating systems have varying limits on the sizes of partitions and logical drives that can be defined. Consult your OS documentation about partitioning larger drives. Also see "Ranges of Logical Drive Expansion" on page 114.

What system BIOS setup settings do I use for the drives on the SuperTrak EX Series controller?

A BIOS setting is required only if you want to boot your system from the logical drive on the SuperTrak controller. After your logical drive is created, partitioned and formatted, make the change in your BIOS boot order setting.

How do I partition/format my SuperTrak EX Series RAID logical drive?

The SuperTrak Controller represents the logical drive as a single disk drive to your system. Therefore, anything that you can do to a single disk drive you can do to a SuperTrak logical drive.

For example, you should use the FDISK and FORMAT utilities to partition and format the logical drive. You can format the logical drive with any file system you wish.

Installation Issues (Capacity, Booting)

How can I change the system boot sequence in order to boot from the SuperTrak EX Series logical drive?

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

If there are multiple SCSI add-in controllers in the system, then the boot sequence among them will be determined exclusively by their PCI slot priority. PCI slot #1 will be first, slot #2 second, etc. Put the SuperTrak Controller in the PCI-Express or PCI-X slot where it will be accessed ahead of other SCSI controllers if you want to boot from the logical drive.

How can I change the boot sequence between a PCI SCSI card and the SuperTrak EX Series RAID logical drive?

Since all PCI-Express and PCI-X devices are PnP, it is difficult to determine which device is addressed first. Most motherboard BIOSes have advanced options that identify devices and allow you to select which device will be assigned resources first. Otherwise you may have to physically switch the device cards on the PCI/PCI-Express/PCI-X slots so that the boot device is in the highest priority slot number (see previous question).

Post-Installation

Why can't I see the drives on the SuperTrak EX Series under FDISK?

You have not created a logical drive yet. Without a logical drive, the system will not recognize the disk drives attached to the SuperTrak Controller.

How can I obtain the latest SuperTrak drivers?

Download the latest drivers from the Promise Technology website at www.promise.com. Click on Support, then on Download.

Contact Technical Support

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

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

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

Technical Support Services

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

E-mail Support	support@promise.com
Fax Technical Support	(408) 228-1097 Attention: Technical Support
Phone Technical Support	(408) 228-1400 option 4 8:00am-5:00pm M-F Pacific Time
If you wish to write us for support:	Promise Technology, Inc. Attn: Technical Support 580 Cottonwood Drive Milpitas, CA 95035, USA

Europe, Africa, Middle East

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

Germany

E-mail Support	support-de@promise-emea.com
Fax Technical Support	+49 (0) 2 31 56 76 48 - 29 Attention: Technical Support
Phone Technical Support	+49 (0) 2 31 56 76 48 - 0 8:30am-5:00pm M-F Germany Time
If you wish to write us for support:	Promise Technology Germany Attn: Technical Support Europaplatz 9 44269 Dortmund, Germany

Italy

E-mail Support	support-it@promise-emea.com
Fax Technical Support	0039 06 367 12400 Attention: Technical Support
Phone Technical Support	0039 06 367 12626 8:30am-5:00pm M-F Italy Time
If you wish to write us for support:	Promise Technology Italy Attn: Technical Support Piazza del Popolo 18 00187 Roma, Italy

Taiwan

E-mail Support	support@promise.com.tw
Fax Technical Support	+886 3 578 2390 Attention: Technical Support
Phone Technical Support	+886 3 578 2395 (ext. 8870) 9:00am-5:30pm M-F Taiwan Time
If you wish to write us for support:	Promise Technology, Inc. Attn: Technical Support 2F, No. 30, Industry E. Rd. IX Science-based Industrial Park Hsinchu, Taiwan, R.O.C.

China

E-mail Support	support-china@promise.com
Fax Technical Support	+86-10-8857-8015 Attention: Technical Support
Phone Technical Support	+86-10-8857-8085/8095 9:00am-6:00pm M-F China Time
If you wish to write us for support:	Promise Technology China Attn: Technical Support Room 1205, Tower 3 Webok Time Center, No.17 South Zhong Guan Cun 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 disk drives attached to your FastTrak SX Series RAID Controller card, the drives must be partitioned and formatted.

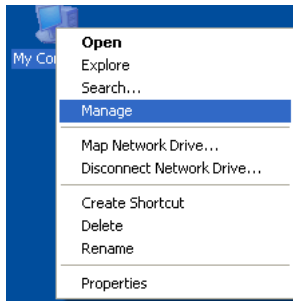
- If your drives were previously partitioned and formatted they are ready to use and you can skip this procedure
- If your drives have not been partitioned and formatted, you must do that job before you can use them

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

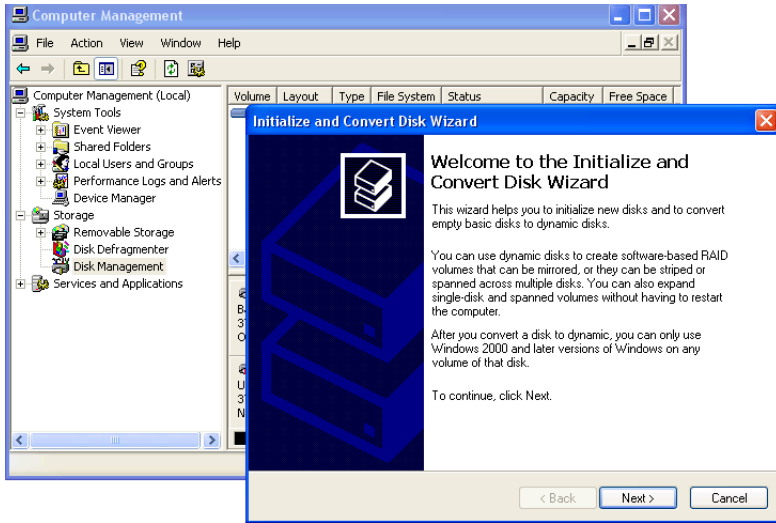


Note

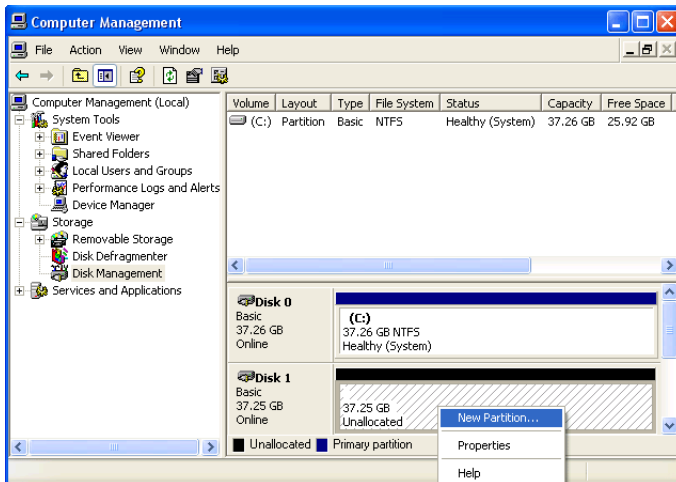
If you plan to boot your computer from this logical disk, go to Windows and Device Driver Installation under the Installation section for instructions. The instructions here are for data logical disks only.



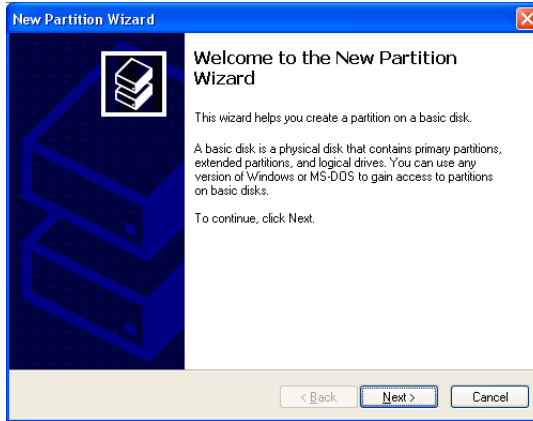
1. From the desktop, right-click on the My Computer icon and select *Manage* from the popup menu. The Computer Management window opens.
2. From the left menu, click on Disk Management. The Disk Management window opens with your new logical disk identified as Disk 1. The Initialize Wizard appears automatically.



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

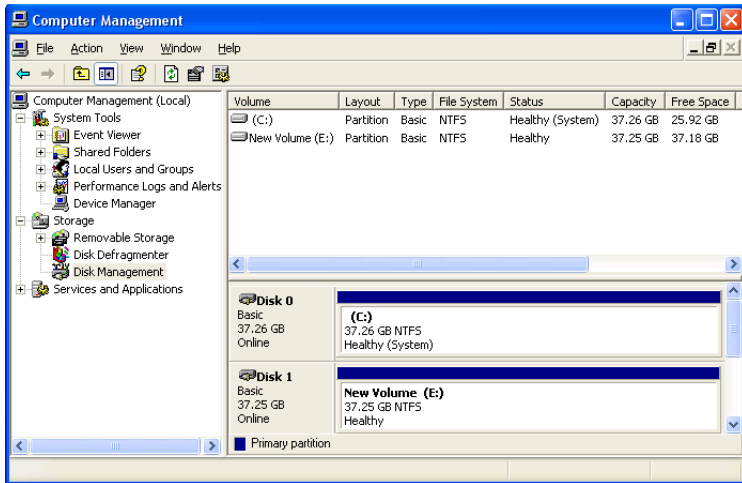


5. Right-click on the Unallocated portion of Disk 1 and select *New Partition...* from the popup menu. The New Partition Wizard appears.



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

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



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

