PROMISE® TECHNOLOGY, INC.

VTRAK 15100
USER MANUAL

Version 1.5 / SR2
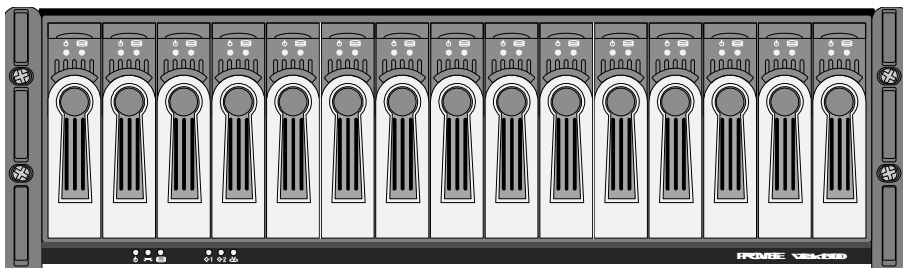
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Important data protection information

You should back up all data before installing any drive controller or storage peripheral. Promise Technology is not responsible for any loss of data resulting from the use, disuse or misuse of this or any other Promise Technology product.

Notice

Recommendations

The appearance in this manual 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.

Contents

Chapter 1: Introduction

- About This Manual (below)
- Overview (page 2)
- Architectural Description (page 3)
- Specifications (page 5)

Thank you for purchasing Promise Technology's VTrak external disk array subsystem.

About This Manual

This *User Manual* describes how to setup, use and maintain the VTrak 15100 external disk array subsystem. It also describes how to use the built-in command-line utility (CLU) and WebPAM PRO management software.

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

Also included are four levels of notices:

Note

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

Important

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

Caution

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

Warning

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

Overview

VTrak provides data storage solutions for applications where high performance and data protection are required. The failure of any single drive will not affect data integrity or accessibility of the data in a RAID protected logical drive.
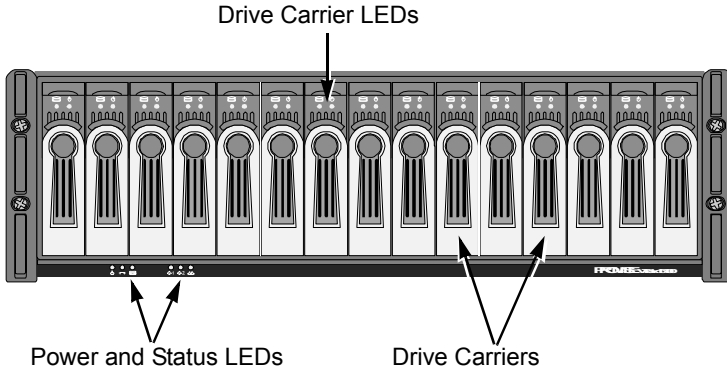
Figure 1. VTrak 15100 front view

A defective drive may be replaced without interruption of data availability to the host computer. If so configured, a hot spare drive will automatically replace a failed drive, securing the fault-tolerant integrity of the logical drive. The self-contained hardware-based RAID logical drive provides maximum performance in a compact external chassis.
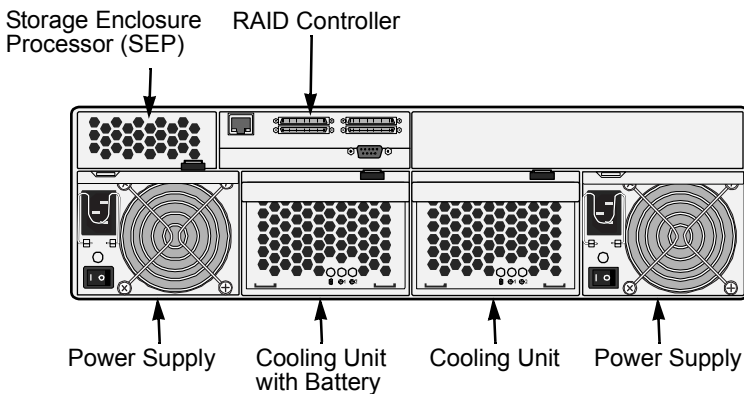
Figure 2. VTrak 15100 rear view

The VTrak 15100 is an external disk array subsystem with a capacity of fifteen individual Serial ATA or (parallel) ATA disk drives.

The two standard LVD SCSI interface provides compatibility with any system that utilizes a SCSI interface. No vendor unique commands are required for the operation of the VTrak subsystem.

Architectural Description

The VTrak 15100 is a Direct Attached Storage (DAS) subsystem consisting of 15 disk drive bays, a 3U enclosure with mid-plane, RAID controller, power and cooling units, and enclosure processor all in one cable-less chassis design. Multiple fans and power supplies provide redundancy to ensure continued usage during component failure. The RAID controller is hardware based and controls all logical drive functions transparently to the host system. VTrak appears to the computer's operating system as a standard SCSI drive or drives. Features and Benefits

Feature	Benefit
3U 19-inch wide enclosure	Installs easily in any standard rackmount.
Supports RAID levels 0, 1, 3, 5, 10 and 50	Allows system to be tuned for maximum performance.
Supports online logical drive (array) expansion	Lets you add disk drives to an existing logical drive without interrupting data accessibility
Supports online RAID migration	Allows you to convert a logical drive from one RAID level to another without interrupting data accessibility
Supports Parallel ATA drives (with a Promise adapter card)	Allows you to use existing ATA disk drives.
Supports logical drive migration from other Promise RAID products	Allow you to seamlessly move your existing logical drives to VTrak without recreating them.
S.M.A.R.T. monitoring	Warns of disk drive degradation and potential failure.
Dual-channel standard SCSI-3 (Ultra 160) drive to host	Compatible with all SCSI-3 or SCSI-2/LVD host adapters. No special OS drivers used.
Up to 20K IOPS (over two SCSI ports)	High processing rate.

Feature	Benefit
200 MB/sec sustained bandwidth (over two SCSI channels)	High data thoughput.
Hardware-assisted XOR engine	High-speed parity calculation for parity type logical drives.
Supports out-of-band management through RS232 and 10/100 BaseT Ethernet connections	Allows you to manage the RAID subsystem while maximizing bandwidth on the SCSI chain.
Supports in-band SCSI management	Lets you manage multiple RAID subsystems on the same SCSI chain from the same PC.
Supports SNMP (v1) CIM and WBEM standards	API-ready for enterprise management integration.
Tagged command queuing up to 256 commands	Maximum performance in Multi-Threaded Operating Systems.
Hot-swap feature for drive carriers, power supplies, fans and battery	Allows a defective component to be replaced without interrupting data accessibility to the host system.
Tool-less field-replaceable units (FRUs)	All FRUs can be replaced without tools, saving time and effort for support personnel.
Hot-spare drives	Maintains full fault tolerant integrity by automatically rebuilding the data from a failed drive to an installed hot spare drive. Supports multiple, designated and global spares.
Automatic background data reconstruction when a drive is replaced	Logical drive is quickly back on-line with minimal user intervention.
Redundant, hot-swappable cooling units	Load sharing and full operation even with multiple failed fans.
N+1 Redundant, hot-swappable power supplies	Load sharing and full operation even with a failed power supply.
Redundant SCSI ports	Load sharing and full operation even with a failed SCSI port.

Feature	Benefit
Cluster support	Supports two-node server clusters for performance and availability
Complete cable-less design	All components easily plug directly into boards. No cables to complicate setup or maintenance.
Cache battery backup	72-hour backup for controller cache to retain data in case of power failure.
Command-line and Graphic-user interfaces	Choice of control and monitoring methods for greater flexibility.

Specifications

Drive Capacity: 15 SATA and PATA disk drives (3.5" x 1" form factor only)

External I/O Ports: Dual Ultra 160 SCSI with 68-pin VHDCI connections

Sustained Throughput: Up to 200 MBps (over two SCSI channels)

Sustained I/Os: Up to 20,000 I/Os per second

Data Cache: Up to 512 MB predictive data cache with automatic write cache destaging and 72-hour battery backup protection (256 MB, standard)

Supported RAID Levels:

- RAID 0
- RAID 1
- RAID 3
- RAID 5
- RAID 10
- RAID 50

Any combination of these RAID levels can exist at once on separate logical drives. See page 175 for more information on RAID.

RAID Flexibility: Configurable RAID stripe depth – 4, 8, 16, 32 or 64 sectors per disk.

Rebuild priority tuning: Adjustment of minimum I/O reserved for server use during rebuild.

Hot-spares: Multiple global and designated hot spares.

Maximum Disks & LUNs: 15 in any combination of RAID levels and drive types.

Supported Disk Interfaces: Serial ATA (SATA), Parallel ATA (with optional Promise adapter).

Supported Operating Systems:

• Windows 2000	• Windows XP Professional
• Windows 2003	• RedHat Linux
• Mac OS X	• SuSE Linux

Current: 8 A @ 100 VAC; 4 A @ 200 VAC (max. rating with two power cords)

Power Consumption: 440 watts

Power Supply: Dual 500 W, 100–240 VAC auto-ranging, 50–60 Hz, dual hot swap and redundant with PFC, N+1 design

Thermal Output: 1590 BTU/hour (max current)

Operating Temperature: 41° to 104°F (5° to 40°C)

Non-operational Temperature: -40° to 140°F (-40° to 60°C)

Relative Humidity: Maximum 90%

Vibration: Random, 0.21 grms, 5 to 500 Hz, 30 Mins, X, Y, Z axis

Management Tools: WebPAM Professional, Command Line Utility

Management Interfaces: Ethernet, RS-232 (Serial)

Management Protocols: SNMP, SSL, WBEM, Telnet

Notification: Email, audible, and visible alarms

Dimensions: Height, 5.0 in. (12.7 cm); Width, 17.6 in (44.8 cm); Depth, 26.0 in (66.0 cm)

Weight: 66 lbs (30 Kg) without drives; Approx. 84 lbs (38 Kg) with 15 drives

Safety Certifications: CE, FCC Class A, BSMI, VCCi, cUL, TUV, MIC

Maximum SCSI Cable Length: 39 ft (12 m) total

Maximum VTrak units per SCSI Channel: 8

Limited Warranty: 3 Years (See page 216 for details)

FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two 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.

Chapter 2: Installation

- Unpack the VTrak storage subsystem (below)
- Mount VTrak 15100 in a rack (page 8)
- Install disk drives (page 9)
- Verify the SCSI HBA Card (page 15)
- Connect the SCSI Cables (page 16)
- Set Up Network and Serial Connections (page 22)
- Connect the Power (page 23)
- Set Management Port IP Address (page 25)
- Set Up a Management Connections (page 25)
- Install WebPAM PRO (page 31)

Unpack the VTrak

The VTrak box contains the following items:

- VTrak 15100 Unit
- Quick Start Guide
- Null Modem Cable
- (2) SCSI Terminators
- Left and right mounting rails

- (2) 1.0m External VHDCI SCSI cables
- (64) Screws for disk drives (4 spares)
- (2) 1.5m Power cords
- CD with WebPAM PRO Software, User Manual and Quick Start Guide

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Warning

The electronic components within the VTrak disk array are sensitive to damage from Electro-Static Discharge (ESD). Observe appropriate precautions at all times when handling the VTrak or its subassemblies.

Important

In order to work with VTrak, the SCSI Host Bus Adapter (HBA) card you select for the Host PC must meet requirements. See page 15.

Mount VTrak 15100 in a Rack

Vertical Rack Post

VTrak 15100

Direct attach to post

Mounting Rail
(included)
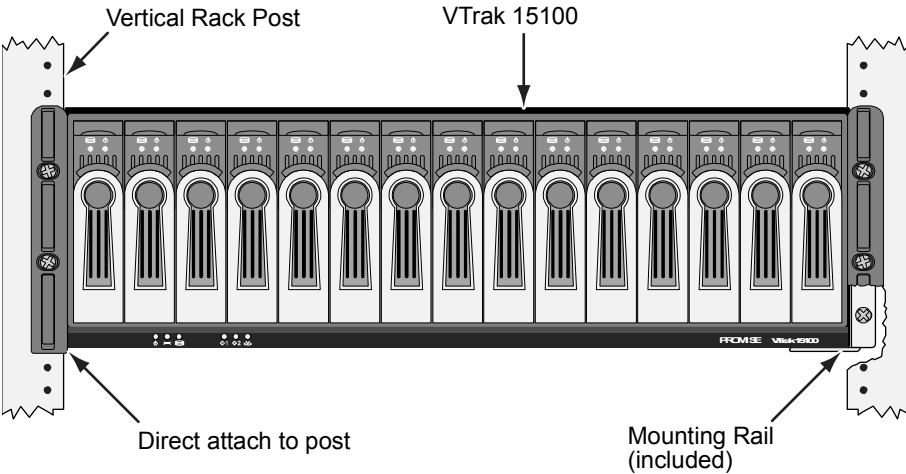
Figure 1.   Rackmounted VTrak 15100

The VTrak 15100 installs directly to the rack with or without using the supplied mounting rails.

Rack front post

VTrak attaching screw

Rail adjustment screw

VTrak subsystem

Rack rear post

Mounting
Rail

Back side
of post

Rail attaching screw
(not included)

Back side of post

Rail attaching screw
(not included)
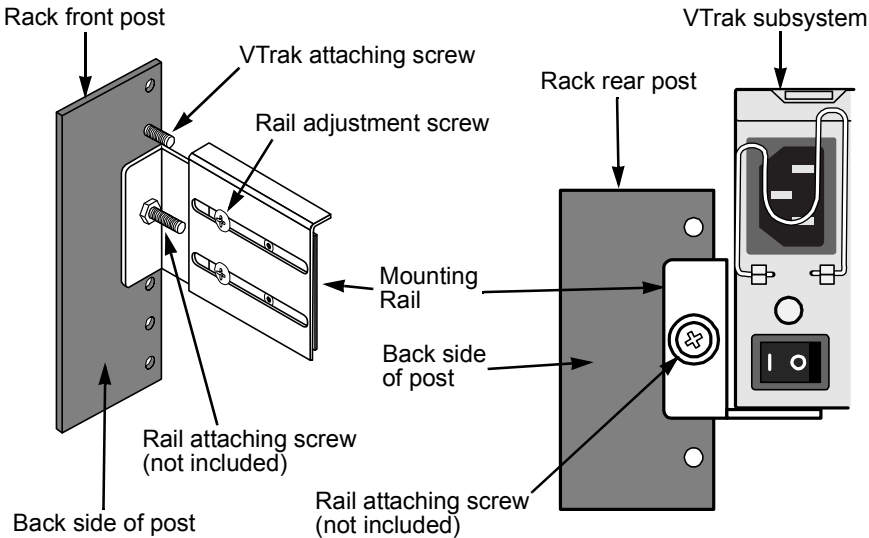
Figure 2.   Mounting rail installation

If you plan to use the mounting rails, follow this procedure to install them:

1. Attach one end of the rail to the back side of the rack's front post.
2. Reposition the adjusting screws as needed to fit the rail to the rack properly.
3. Attach the other end of the rail to the back side of the rack's rear post.
4. Repeat steps 1 through 3 to attach the other rail.
5. Square the rails in the rack and tighten the attaching screws.
6. Set the VTrak onto the rails.
7. Attach the VTrak to the rack's front posts with the screws provided.

Caution

Do not pull or push the handles on the Power Supplies or the Controller units in order to move the VTrak. Hold the VTrak by the housing only.

Install Disk Drives

Before using the VTrak you must first populate it with Serial ATA (SATA) disk drives. You can also use Parallel ATA (PATA) disk drives with the optional SATA-to-PATA adapters available from Promise Technology. The VTrak 15100 can support up to fifteen disk drives and provide the RAID configurations listed below.

See Chapter 7, page 175 for a complete explanation of RAID on VTrak.

RAID Configuration	Number of disk drives	
	Minimum	Maximum
RAID 0	1	15
RAID 1	2	2*
RAID 3	3	15
RAID 5	3	15
RAID 10	4	14
RAID 50	6	14
* RAID 1 logical drives work in matched pairs. VTrak supports up to seven (7) RAID 1 logical drives.		

Important

Before installing a Parallel ATA disk drive, be sure the jumpers on the disk drive are set for *master* operation. *Never* set a drive for slave operation.

Note

You can use disk drives of different manufacturers and sizes. In logical drives with different drive sizes, the drives are forced to equal the capacity of the smallest physical drive.

Drive Carrier Latch Handle   VTrak Chassis
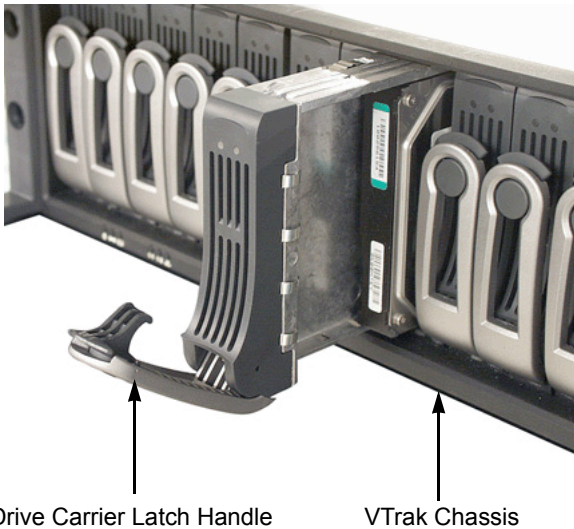
Figure 3.   VTrak 15100 Disk Drive access

To remove a Drive Carrier from the VTrak, pull the Drive Carrier Latch Handle and remove an unused Drive Carrier (see Figure 2, page 8).
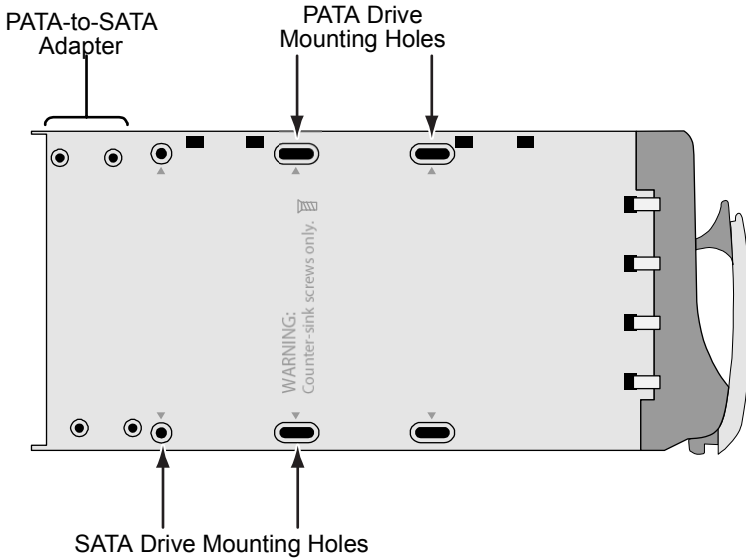
Figure 4. Drive Carrier mounting holes

Note that the Drive Carrier has several mounting holes (above). Those marked with a triangle are for disk drives.

Caution

Be sure to install the counter-sink screws supplied with the VTrak. Use of other types of screws can damage the adjacent drives.

Serial ATA Disk Drives

Serial ATA Disk Drive

Figure 5. SATA Disk Drives mount at the front of the carrier

1. Carefully lay the drive into the drive carrier at the front, so that the screw holes on the bottom line up.
2. Insert the screws through the holes in the Drive Carrier and into the bottom of the disk drive (see Figure 4, page 11).
   • Install only the screws supplied with the VTrak.
   • Install four screws per drive.
   • Snug each screw. Be careful not to over tighten.
3. Reinstall the drive carrier into the VTrak chassis.
4. Repeat these steps until all of your disk drives are installed.

Parallel ATA Disk Drives

In order to use Parallel ATA disk drives in VTrak, you must first install a PATA-to-SATA adapter available from Promise Technology.
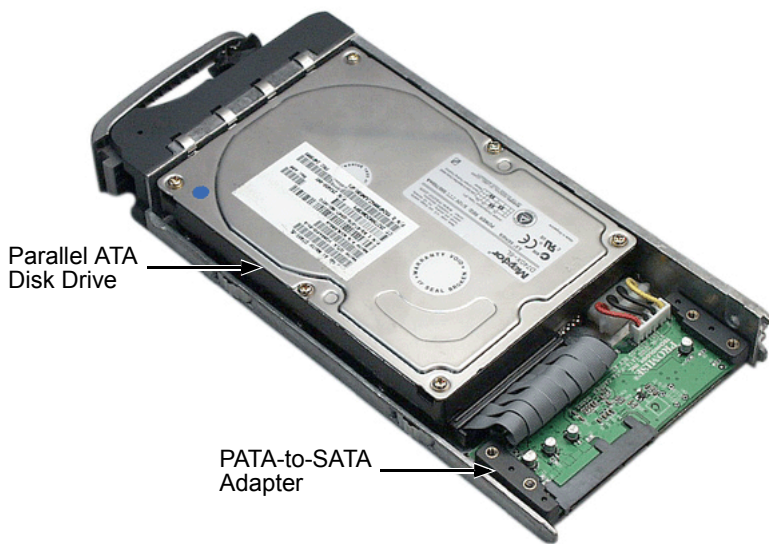
Figure 6. PATA Disk Drives require a PATA-to-SATA adapter

1. Obtain the needed quantity of PATA-to-SATA adapters from your Promise distributor.

2. Carefully lay the converter into the drive carrier, with the SATA connection facing forward (see Figure 5), so that the screw holes on the bottom line up (see Figure 3).

3. Install the four screws that came with the adapter.

4. Lay the carrier on a flat surface. Hold a disk drive in one hand and connect the power and data cables with the other.

5. Carefully lay the drive into the carrier so that the screw holes on the bottom line up (see Figure 4).

6. Insert Promise-supplied screws through the holes in the drive carrier and into the bottom of the disk drive.

7. Slide the assembled drive carrier back into the chassis and press the handle forward to secure the Drive Carrier.

8. Repeat these steps until all of your disk drives are installed.

Caution

If you plan to operate your VTrak with fewer than 15 disk drives, install all 15 Drive Carriers into the enclosure, to ensure proper airflow for cooling.

Important

Be sure each drive is securely fastened to its carrier. Proper installation ensures adequate grounding and minimizes vibration. Do not install drives with fewer than four screws.

Note

Previous array enclosures from Promise required you to latch the drive carrier handle in order to power the drive. VTrak uses the handle only to lock the carrier in place.

Drive Numbering

Each disk drive in VTrak is identified by a number used for creating and managing logical drives. VTrak numbers disk drives from left to right. Numbers a stamped above each drive bay for easy indentification.

Figure 7. VTrak disk drives are numbered left to right

Verify the SCSI HBA Card

Data travels between the Host PC and the VTrak storage system through a SCSI connection. Therefore, the SCSI HBA card is an essential part of the Host PC and VTrak system.

The table below lists the minimum and preferred specifications for a SCSI HBA card.

	Minimum	Preferred
Data Transfer Rate	80 MB/s	160 MB/s
PCI Bus	32-bit	64-bit
PCI-X Bus	no	yes
External Connector	68-pin HD*	68-pin VHDCI
Cable Interface	LVD	LVD
Supports LUNs	yes	yes
* Requires use of a 68-pin HD to 68-pin VHDCI SCSI cable (available from Promise Technology).		

Refer to your system and/or SCSI HBA manual for these specifications.

VTrak has a peak sustained thoughput of 100 MB/s per channel. Using an 80 MB/s SCSI card will result in a performance bottleneck under certain conditions.

Note

For applications where two SCSI HBA cards are required, you can use a dual-channel SCSI HBA card.

Note that many single-channel SCSI HBA cards have multiple connectors. Be sure your card really is dual-channel.

If you connect two SCSI channels to a single-channel SCSI HBA card, only one channel will function.

Connect the SCSI Cables

Installation of the VTrak is very similar to a standard SCSI drive. The SCSI connector accepts the Very High Density Connector Interface (VHDCI), 68-pin, Low Voltage Differential (LVD) SCSI cable used on many SCSI devices.
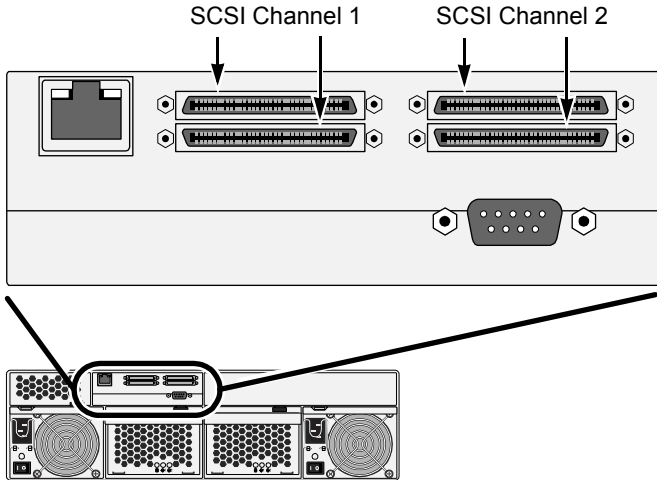
Figure 8.   VTrak 15100 SCSI connections

When you attach the SCSI cables, you can use either the upper or lower connector for each channel. The connectors are non-directional, there is no SCSI in / SCSI out.

Caution

To prevent possible damage to the VTrak or your Host PC, ensure that the power to both units is OFF before connecting the SCSI cables.

Important

VTrak has two SCSI channels. When you attach a SCSI cable to the connector of one channel, be sure to attach a terminator to the other connector of the *same* channel. See Figure 8, above.

The VTrak has four 68-pin, VHDCI SCSI connectors and two separate SCSI channels. These connectors are used in one of five ways:

- One VTrak, one Host PC, one SCSI HBA card
- One VTrak, one Host PC, two SCSI HBA cards
- One VTrak, two Host PCs, one SCSI HBA card in each
- Two (or more) VTraks, one Host PC, one SCSI HBA card (daisy chain)
- Two VTraks, one Host PC, two SCSI HBA cards

VTrak makes use of SCSI Target IDs (TIDs) and Logical Unit Numbers (LUNs) to enable multiple VTrak arrays managed by a single Host PC. How to set TIDs and LUNs is explained on page 85 and page 92. At this point, proceed with the connection of SCSI cables following industry standard guidelines and the illustrations on the following pages.

Caution

Proper termination and SCSI-3 compliant cables are required for the system to operate correctly. Two external SCSI terminators and a SCSI-3 compliant cables are included with the VTrak 15100.

SCSI Terminator

When the VTrak is the last SCSI device in the chain you must install the Promise-supplied (or equivalent) external SCSI terminator on both SCSI Connectors (see below). The SCSI cable or terminator can attach to either SCSI connector. If you use a SCSI channel, you must attach a SCSI Terminator to it.
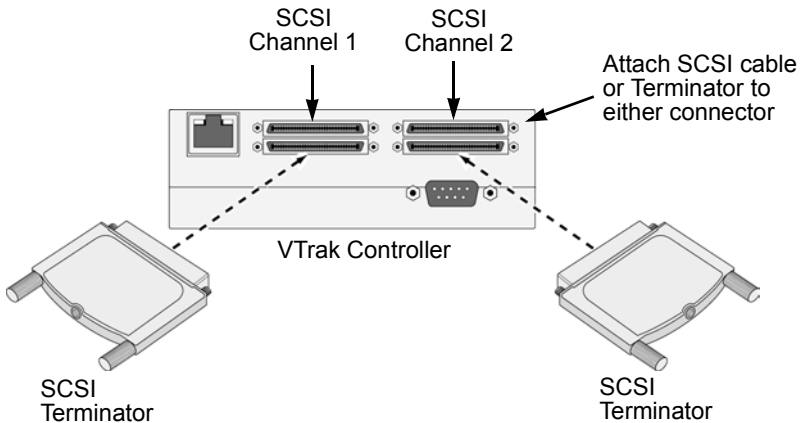
Figure 9. If you use a SCSI channel, attach a terminator to it

One VTrak, one Host PC, one SCSI HBA card

This is the simplest arrangement.

SCSI Terminator

SCSI HBA Card

VTrak

SCSI Cable

Host PC

Connect to either channel 1 or 2
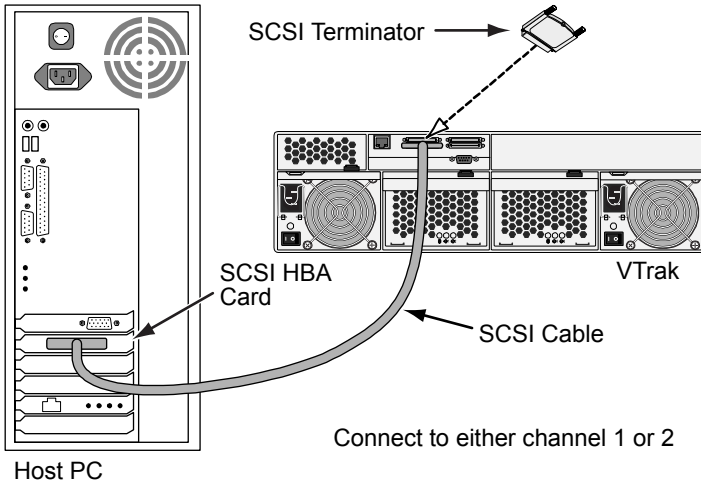
Attach the SCSI cable to either of VTrak's SCSI channels.

One VTrak, one Host PC, two SCSI HBA cards

SCSI Terminators

SCSI HBA cards

VTrak

SCSI Cables
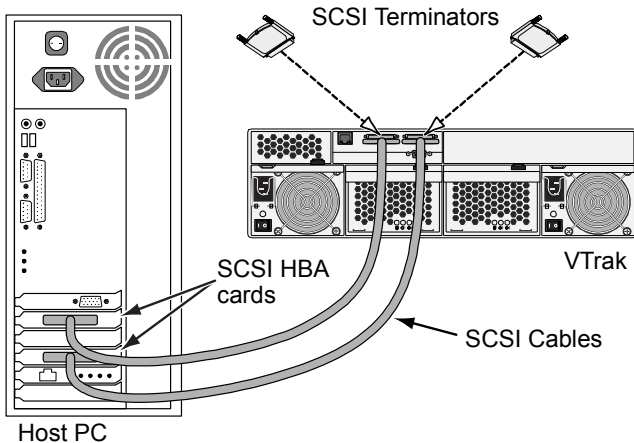
Host PC

You can use a dual-channel SCSI HBA card for this application.

One VTrak, two Host PCs, one SCSI HBA card in each

This arrangement allows you to manage the same VTrak from two different Host PCs.
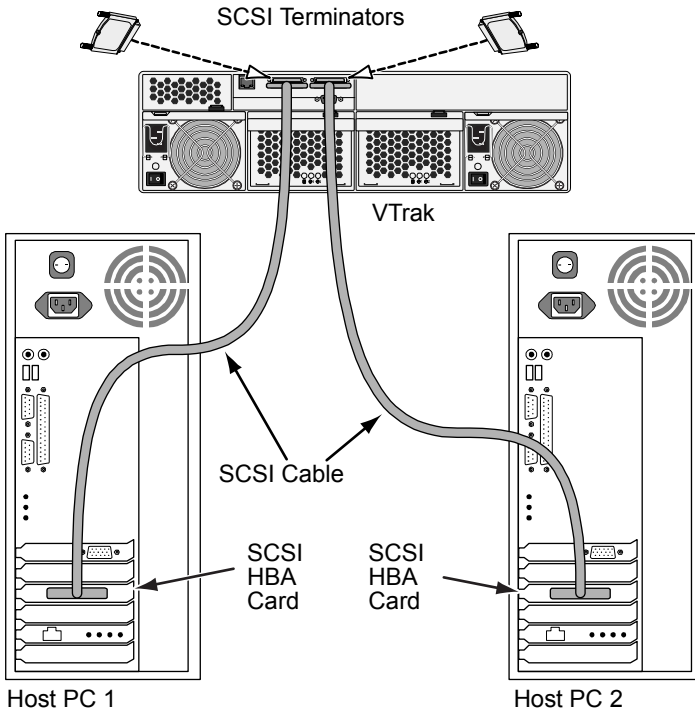
Two VTraks, one Host PC, one SCSI HBA card (daisy chain)

A Host PC with one SCSI card can manage up to eight VTraks in a chain.
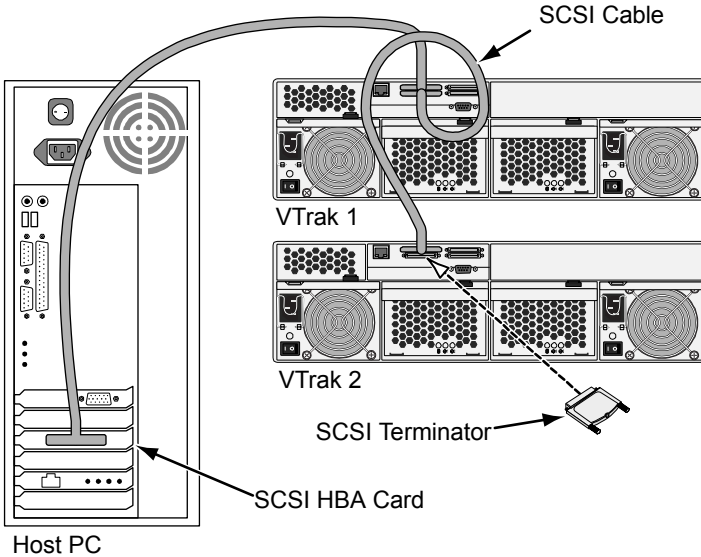
Do the following when daisy-chaining VTraks:

1. Use a 68-pin VHDCI cable to attach each VTrak array to the SCSI chain.

    You can connect up to eight (8) VTraks on the same SCSI chain.

2. Set a different SCSI Target ID for each VTrak.

    For example, a daisy chain of six VTraks could have these assignments:

    VTrak 1 . . . . Target ID 1
    VTrak 2 . . . . Target ID 2
    VTrak 3 . . . . Target ID 3
    VTrak 4 . . . . Target ID 4
    VTrak 5 . . . . Target ID 5
    VTrak 6 . . . . Target ID 6

    See page 48 (WebPAM PRO) or page 55 (CLU) for instructions how to set SCSI Target IDs.

3. Install a SCSI terminator on the last VTrak in the chain.

Two VTraks, one Host PC, two SCSI HBA cards

A Host PC manages two VTraks through separate SCSI connections. An an alternative to daisy chaining, it can provide increased I/O performance.
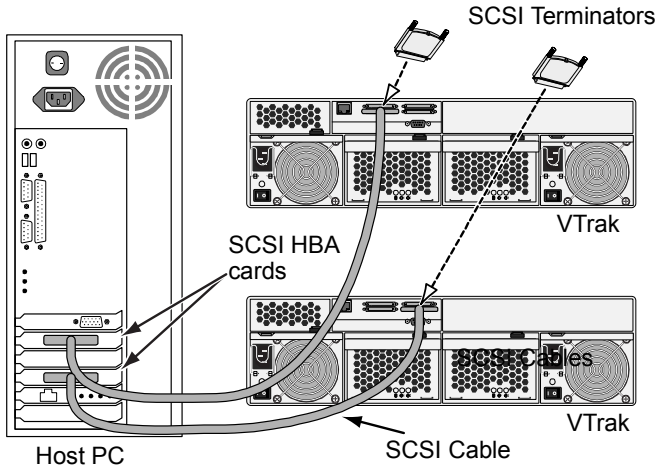
You can use a dual-channel SCSI HBA card for this application.

With one to eight VTraks connected to each SCSI HBA card, you can use as many SCSI HBA cards as your PC will support.

Connect the Management Cables

VTrak 15100 has two types of Management connections:

- Management Port connection – Enables you to monitor the VTrak over your network using the WebPAM PRO Software. VTrak supports Ethernet and Telnet protocols.
- RS-232 Serial connection – Enables the Command Line Utility (CLU) on your PC to monitor and control VTrak.
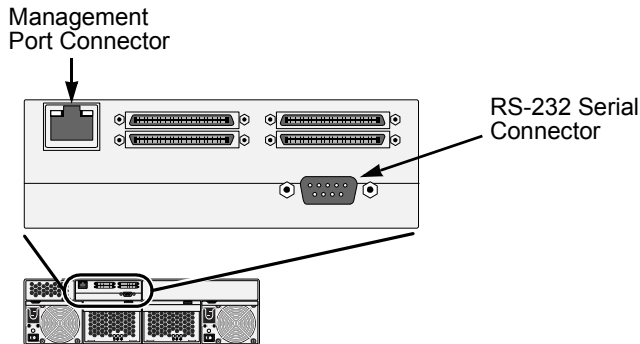
Figure 4.   VTrak 15100 serial and network connections

Management Port Connection

The Network connection is for using WebPAM PRO over the network and also for using the CLU through a Telnet connection.

1. Arrange with your Network Administrator to provide a network connection for the VTrak.
2. Attach the network cable to the network connector on the VTrak..

Caution

Do not attempt to connect an Ethernet cable, regular or cross-over, directly between the VTrak and your PC. This is a network connection and requires a hub or switch.

RS-232 Serial Connection

The serial connection uses the null modem cable provided with the VTrak.

1. Attach the null modem cable to the RS-232 serial port on your PC.
2. Attach the other end of the null modem cable to the serial port on the VTrak.

Macintosh Users

If your Host PC is an Apple Macintosh, you do not have the RS-232 serial port needed to set-up a Management connection.

Promise has developed a Telnet utility for the Macintosh that establishes a Telnet connection between the Macintosh PC and the VTrak without an initial setup though an RS-232 serial connection. See MacOS X on page 28 for more information.

As an alternative, obtain the following items to make a serial connection:

• A USB to DB-9 serial converter
• Terminal emulation software

Several manufacturers offer USB to DB-9 serial converters and cables. For terminal emulation software, go to:

http://homepage.mac.com/dalverson/zterm/

Download and install the ZTerm software onto your system.

Connect the Power

Warning

Power supplies can contain over 240 volts. This high voltage, if mishandled, can cause serious injury or death.

Do not touch or handle a power cable or power supply unless you have been trained and prepared to perform this task.

VTrak systems will operate on either 115 volts AC or 230 volts AC. The VTrak 15100 includes two replaceable power supply modules with autosense voltage selection and Power Factor Correction (PFC).

Retaining Bail

Power Connection

Power Switch

Cooling Fan
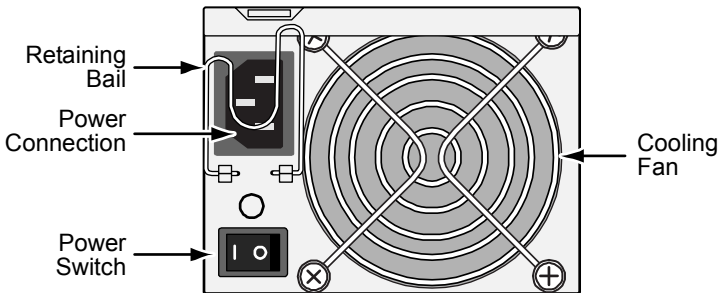
Figure 11. Power Connections and Switch

Plug the power cords into the power connections on both power supplies. Use the retaining bails to hold the power cords in place and prevent an accidental disconnection.

Turn both power supplies on.

When the power is switched on, the LEDs on the front of the VTrak will light up.
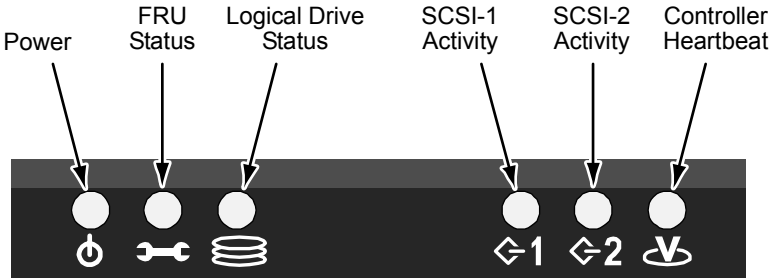
Figure 12.VTrak 15100 Displays

When boot-up is finished and the VTrak is functioning normally:

• Controller LED blinks green once per second for five seconds, goes dark for ten seconds, then blinks green once per second for five seconds again.

• Power, FRU and Logical Drive LEDs display green continuously.

• SCSI LEDs flash green if there is activity on that channel.

There are two LEDs on each Drive Carrier. They report the presence of power and a disk drive, and the current condition of the drive.
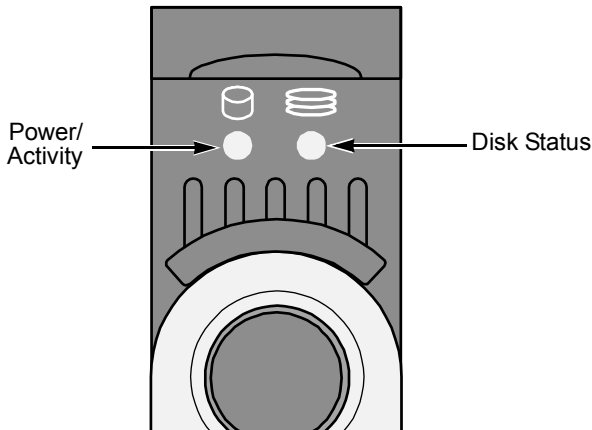
Figure 13.VTrak 15100 Disk Carrier LEDs

After a few moments the Power/Activity and Disk Status LEDs should display green.

If there is no disk drive in the carrier, the Disk Status LED will display green while the Power/Activity LED will remain dark.

Set-up Management Connections

As explained earlier, VTrak 15100 has two types of Management connections:

- Network – Supports the CLU and WebPAM PRO
- RS-232 Serial – Supports the CLU

The physical (cable) connections for these are described in an earlier section. If you have not made these connections, do so before continuing.

Use the following procedures to enable Management connections for VTrak. Terminal Emulation is required in all cases. The others are required depending on the Management connections you choose.

Terminal Emulation

Terminal emulation is the means of communication over an RS-232 serial connection. In the following procedure, you will establish a Terminal Emulation link between the Host PC and the VTrak.

Regardless of your choice of management connection, you must first establish a Terminal Emulation connection.

If you are using a Macintosh PC and have no provision for a RS-232 connection, see the instructions under MacOS X on page 28.

1. Obtain from your network administrator a static IP address for your VTrak.
2. Change your PC's COM Port settings to agree with the following:
    - Bits per second: 115200
    - Data bits: 8
    - Parity: None
    - Stop bits: 1
    - Flow control: none
3. Start your PC's terminal emulation program.
4. Press Enter once to launch the CLU.

    The CLU Main Menu appears (below) and is ready to use.
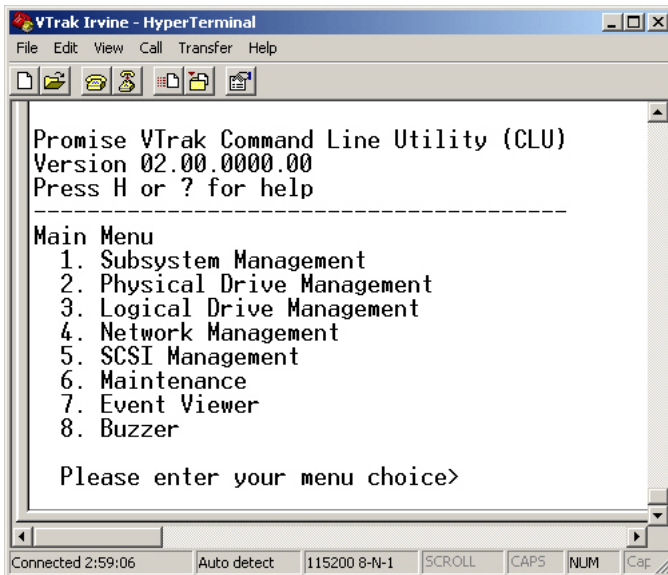
For a full list of CLU capabilities and functions, see Chapter 5 the *VTrak 15100 User Manual*.

Set IP Addresses and Subnet Mask

This procedure is required for a network connection to the VTrak. In order for the network connection to work, you must set the IP addresses of the Management Port and Gateway, and set the Subnet Mask.

If you do not plan to use a network connection, you can skip to the next procedure.

VTrak's Management Port can only use a static IP address. It will not accept a dynamic IP address from a DHCP server.

1. At the CLU main menu, press 4 and Enter to select Network Management.

   The Network Management Menu appears.

   ```
   --------------------------------------------------------------------
   Management Port IP Address: 10.0.0.2
   Subnet Mask: 255.0.0.0
   Gateway IP Address: 0.0.0.0
   Telnet: disabled
   TFTP Server IP Address: 0.0.0.0
   SNMP Name: Sonoma
   ```

SNMP Location: Promise

Network Management
   1. Management Port
   2. Telnet
   3. TFTP Server
   4. SNMP
   5. Ping
   R. Return to previous menu

   Please enter your menu choice>**1**

2.   Press 1 and Enter to select Management Port.

   Management Port IP Address: 10.0.0.2
   Subnet Mask: 255.0.0.0
   Gateway IP Address: 0.0.0.0

   Management Port
   1. Management Port IP
   2. Subnet Mask
   3. Gateway
   R. Return to Previous Menu

   Please enter your menu choice>**1**

3.   Press 1 and Enter to change the management port IP address.

   --------Configure Management Port IP address--------

   Current management port IP Address: 10.0.0.2
   Modify management port IP address(y/n)?>**y**
   New management port IP address>**192.168.1.56** (an example only)

   New management port IP address: 192.168.1.56

   Press Enter key to return

4.   Press Y and Enter to modify the management port IP address.

5.   Type the new IP address and press Enter.

   The CLU confirms the new management port IP address.

6.   Press Enter to return to the Management Port menu.

7.   Repeat steps 3 though 6 to set the Subnet mask and Gateway IP address

8.   Restart the VTrak.

Important

All three settings must be correct in order for WebPAM PRO to connect to the VTrak.

Set Up Telnet Connection

A Telnet connection allows you to access VTrak's CLU over the network. This allows RAID management over a greater distance from the VTrak itself.

This procedure is required for a Host PC that does not have an available RS-232 serial port.

The CLU screen looks and works exactly the same over a Telnet connection as it does over a serial connection.

Enable Telnet on VTrak

Telnet is the means of using the CLU over a network connection. VTrak's Telnet service is disabled by default. Follow these instructions to enable Telnet.

Windows and Linux

1. Connect the RS-232 cable between the Host PC and VTrak.

   Refer to Step 7 on page 25 for the RS-232 settings and setup.
2. Launch HyperTerminal or Minicom.
3. In the CLU Main Menu, select Network Management > Telnet and choose Enable/disable Telnet.

This action enables the Telnet support.

MacOS X

Since the Macintosh has no RS-232 port, you will enable the Telnet service through the network using a Telnet utility.

1. Download the Promise Telnet utility for Mac, file name *telnetenable.bin* and copy it to a convenient folder.
2. Open a Terminal window.
3. Change the file mode of *telnetenable.bin* to executable (example: **chmod 777 telnetenable**).
4. Ping the VTrak box over the network to be sure it is connected (example: **ping 10.0.0.2**).

   VTrak's default Management port IP address is 10.0.0.2.

If the VTrak does not respond, take the necessary action to establish a network connection.

5. Launch the Telnet utility, and run **telnetenable** [IP address of the VTrak].

6. When you see "Telnet port enabled", run **telnet IP-address 2300**.

   Use **./telnetenable IP-address** to enable the telnet port and **./telnetenable IP-address 0** to disable it.

Make a Telnet Connection

To start the telnet program,

1. Go to the command line prompt (Windows) or click the terminal icon (Linux), then run:

   telnet 192.168.1.56 2300

   The IP address above is only an example. Use your VTrak's Management port IP address. *2300* is the Telnet port for the VTrak.

   The telnet login screen appears:

   Telnet Login
   Please enter your user name>**administrator**
   Please enter the password for user administrator>*******

2. Type the user name and password.

   The default user name is *administrator*. The default password is *password*.

   The CLU Main Menu appears.

   Main Menu
      1. Subsystem Management
      2. Physical Drive Management
      3. Logical Drive Management
      4. Network Management
      5. SCSI Management
      6. Background Activity
      7. Event Viewer
      8. Buzzer

      Please enter your menu choice>**4**

3. Press 4 and Enter to select Network Management.

   The Network Management Menu appears.

   Network Management
      1. Telnet
      2. Management Port
      3. TFTP Server
      4. Gateway

        5. SNMP
        6. Subnet Mask
        R. Return to previous menu

        Please enter your menu choice>**1**

4.   In the Network Management Menu, press 1 and Enter to select Telnet.

      The Telnet setting menu appears.

        Current Telnet Setting:
          Telnet: disabled
          Timeout: xxxxx seconds
          Port: 2300
          User Name: administrator

        Telnet Settings
        1. Enable/Disable Telnet
        2. Timeout
        3. Change user name
        4. Change password
        5. Reset to default setting

        Please enter your menu choice>**1**

        Enable Telnet (y/n)?>**y**

5.   Press 1 and Enter to select Enable Telnet, the press Y and Enter to confirm.

6.   Press R and Enter twice to return to the CLU Main Menu.

Install WebPAM PRO Software

Web-Based Promise Array Management—Professional (WebPAM PRO) software provides a browser-based graphic user interface used to monitor and manage VTrak and its logical drives. Because it works over your network, it can monitor and control multiple VTraks. WebPAM PRO consists of two components:

- Utility Server – WebPAM PRO software you install
- CIMOM Agent – WebPAM PRO component preinstalled on the VTrak

Utility Server Installation Locations

When you install WebPAM PRO, you are installing the *Utility Server*. Where you install WebPAM PRO depends on your management connection. If you plan to use the VTrak Management (network) port, there are three possible locations.

- A networked PC
- A network file server
- The Host PC

Installation Guidelines

When you install WebPAM PRO on a network, follow these rules.

- Install the Utility Server only on a PC or Server that is permanently connected to your network.
- Install only one instance of the Utility Server on your network.

Operating System Support

On the PC or server where you install WebPAM PRO, Promise Technology recommends:

- Windows 2000
- Windows XP Professional
- Windows 2003
- RedHat Linux
- SuSE Linux

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

Important

WebPAM PRO's Utility Server does not run on MacOS.

CIMOM Agent

VTrak ships from the factory with a CIMOM agent installed.*.*

The
Internet

Desktop PC
with Internet
browser

Laptop PC
with Internet
browser

Router & Firewall

Networked PC
with Internet
browser

Networked PC
with Utility Server

Host PC
with a single
VTrak Subsystem

Host PC
with multiple
rackmounted VTrak
Subsystems
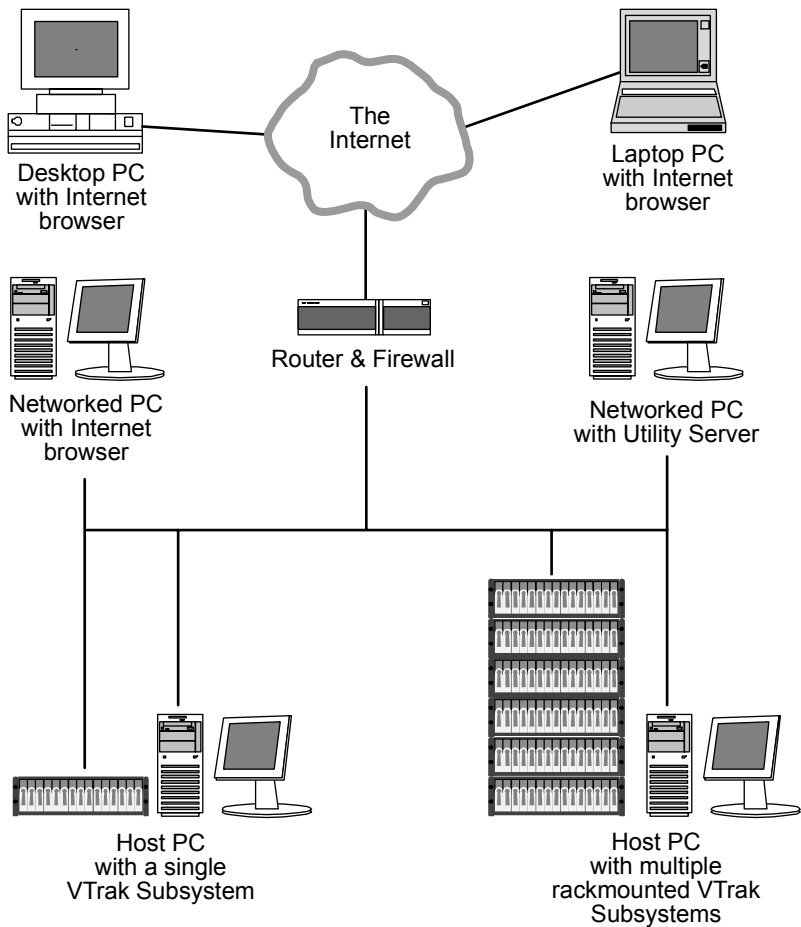
Figure 7.   WebPAM PRO on a network

Internet Browser

Typically an Internet browser comes with your operating system. WebPAM PRO does not include a browser. For computers that will remotely monitor and manage the RAID, the Internet Browser is the only software required.

Your Internet Browser provides the means for you to monitor and configure your Promise RAID products using WebPAM PRO. You can use the most recent versions of either Internet Explorer or Netscape Navigator.

Before you start…

1. Obtain the IP addresses of these devices:
    *   The PC or server where you plan to install WebPAM PRO
    *   The VTrak(s) you plan to monitor

2. If you currently have either of these on your computer:
    *   Promise Array Manager (Windows PAM)
    *   An earlier version of WebPAM or WebPAM PRO

    Completely remove them before installing WebPAM PRO. Failure to do so will result in compatibility problems. See Uninstall WebPAM PRO on page 39.

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

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

Install WebPAM PRO

Windows

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

1. Boot 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, as shown on the next page.

PromiseWebPAM

Linux

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

1. Boot 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).

webpamxxxx.bin

4. When the Run or Display? dialog box appears, click *Run in Terminal*.

   After several moments, the Terminal window closes and the first WebPAM PRO installation dialog box appears, as shown on the next page.

Installation Under Windows and Linux, continued

In the following examples, the Windows install screens are shown. Linux install screens have a slightly different appearance but the information, choices and actions required are exactly the same.
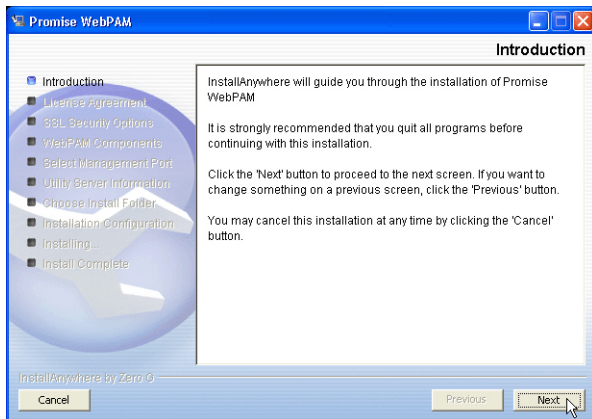
1. When the Introduction screen appears (above), click the Next button.
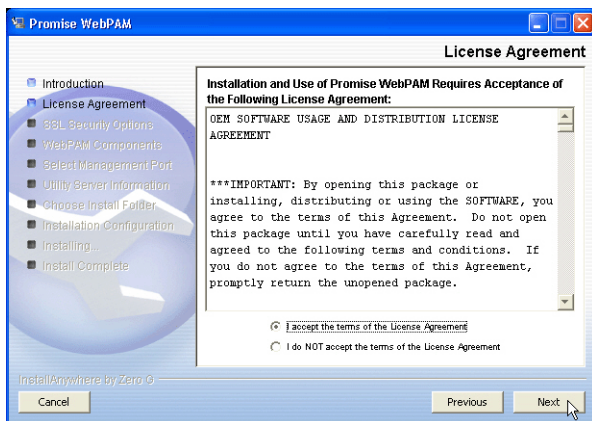
2. When the License Agreement appears (above), click the "I accept the terms..." radio button, then click the Next button.

   If you do not accept the terms of the Agreement, the installation will stop.

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

	External – 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.

4. When the Utility Server Information screen appears (below), enter the requested network addresses.
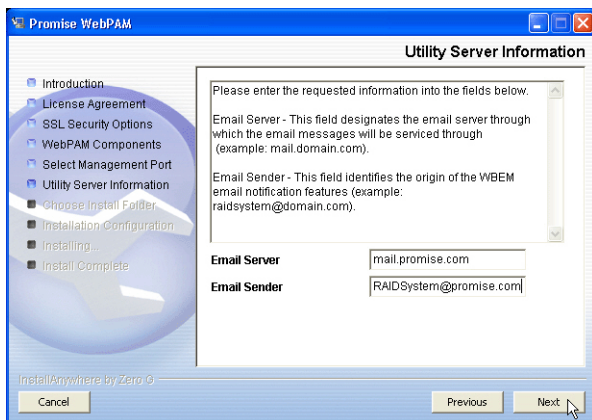
You must enter correct information for Email Server and Email Sender or the installation will not proceed.

Email Server – Type in the name of your company's email server.

Email Sender – Type in the email address of the person responsible for maintaining the RAID. This address will be the return address on all email notifications sent from the Utility Server to all recipients.

Click the Next button when you are finished.

5. When the Choose Install Folder screen appears (below), make your selection of a folder for the WebPAM PRO applications you are installing.
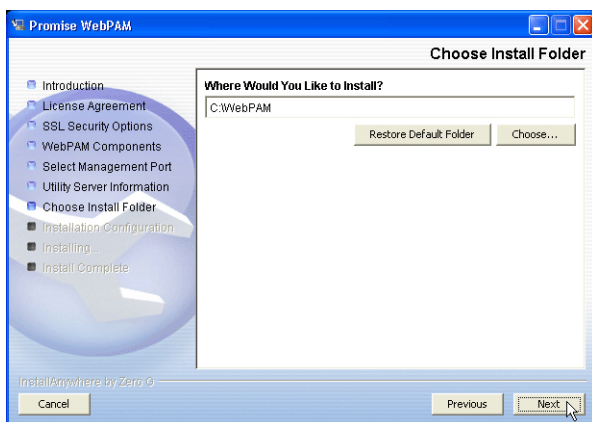
The default folder is **C:\WebPAM**. If you want a different folder, type its location and click the Choose... button.

If you change your mind and want the default location, click on the Restore Default Folder button.

Click the Next button when you are finished.
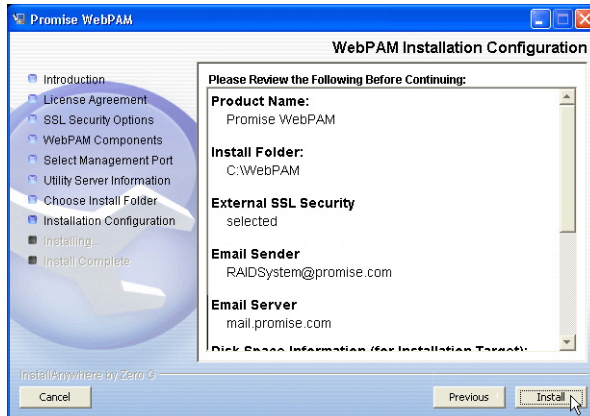
6. When the WebPAM PRO Installation Configuration screen appears (above), take a moment to review your choice of install folder and the available disk space on the target hard drive.

- If you need to make changes, click the Previous button to return to the Install Folder screen.
- If you are satisfied with the proposed installation, click the Install button.
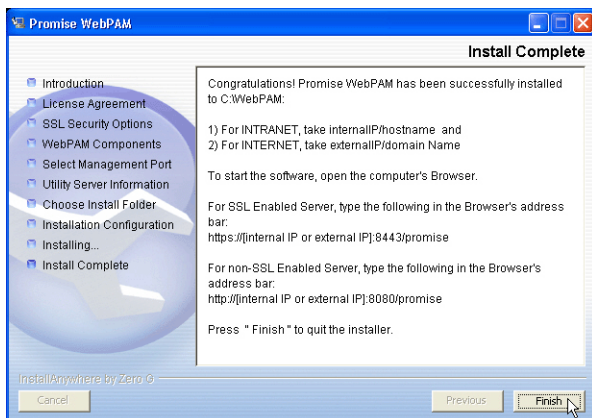
7.   When the Install Complete screen appears (above), the installation process is finished. Click the Finish button to go to the Promise Registration website.

✓	**Important** Registration of your VTrak and WebPAM PRO 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 PRO installation.

Uninstall WebPAM PRO

When you upgrade to a newer version of WebPAM PRO, you must first remove the current version from your PC/Server.

Windows

To uninstall WebPAM PRO from your PC/Server.

1.   Go to Start > Settings > Control Panel and double-click on the Add or Remove Programs icon.

2.   Select Promise WebPAM from the Currently installed programs list and click the Change/Remove button.

     The Uninstall Promise WebPAM dialog box appears.

3.   Click the Uninstall button.

     Several boxes can appear during the process. Finally, the Uninstall Promise WebPAM dialog box appears again.

4.   Click the Done button.

5.   Navigate to the root directory of your C: drive.

6.   Delete the WebPAM directory.

This completes the WebPAM PRO uninstall process. Your PC/Server is now ready to install a newer version of WebPAM PRO.

Linux

To uninstall WebPAM PRO from your PC/Server.

1.   Open a Terminal window.

2.   Navigate to the /root/WebPAM/UninstallerData directory.

3.   Type **sh uninstall.sh** and press Enter.

The Uninstall Promise WebPAM dialog box appears.

4.   Click the Uninstall button.

Several boxes can appear during the process. Finally, the Uninstall Promise WebPAM dialog box appears again.

5.   Click the Done button.

This completes the WebPAM PRO uninstall process. Your PC/Server is now ready to install a newer version of WebPAM PRO.

Chapter 3: Setup

- • VTrak Setup with WebPAM PRO (below)
- • VTrak Setup with the CLU (page 52)

After installation, the next step is to configure VTrak. You can do this with WebPAM PRO or the Command Line Utility (CLU), whichever you prefer.

This Chapter only deals with basic functions needed to setup a new VTrak. For a full discussion of VTrak functions, refer to WebPAM PRO on page 59 and the CLU on page 107.

VTrak Setup with WebPAM PRO

Set up with WebPAM PRO consists of the following steps:

1. Log-in to WebPAM PRO (below)
2. Add a Subsystem (page 44)
3. Access a Subsystem (page 45)
4. Create a Logical Drive (page 46)
5. Assign a SCSI Target ID (page 55)
6. Assign a RAID Console LUN (page 49)
7. Log-out of WebPAM PRO (page 51)
8. Internet connection using WebPAM PRO (page 51)

Log-in to WebPAM PRO

1. Launch your Browser.
2. In the Browser address field, type in the IP address of the PC/Server where you installed WebPAM PRO, as explained below. Do not type the VTrak's IP address.

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

   If you chose the External Security option during WebPAM PRO installation (see page 36), use the *Secure* connection.

Regular Connection

- • WebPAM PRO uses an HTTP connection. . . . . .http://
- • Enter the PC/Server's IP address 192.168.1.198
- • Enter the Port number . . . . :8080
- • Add promise to launch WebPAM PRO . . . . /promise

Together, your entry looks like this:

http://192.168.1.198:8080/promise

Secure Connection

- WebPAM PRO uses a secure HTTP connection . . . . .https://
- Enter the PC/Server's IP address 192.168.1.198
- Enter the Port number . . . . :8443
- Add promise to launch WebPAM PRO . . . . /promise

Together, your entry looks like this:

https://192.168.1.198:8443/promise

Note that the IP address shown above is only an example. The IP address you type into your browser will be different.

3. When the opening screen appears, log in as **administrator** and type in the default password, which is **password**. The login and password are case sensitive.
4. Click the Sign in button.

	Important
	Immediately after installation, change the Administrator's password. Make the change under User Management. Each user you create will have his/her own login ID and password.

	Note
	Make a Bookmark (Netscape Navigator) or set a Favorite (Internet Explorer) of the Login Screen so you can access it easily next time.

After sign-in, the WebPAM PRO opening screen appears.
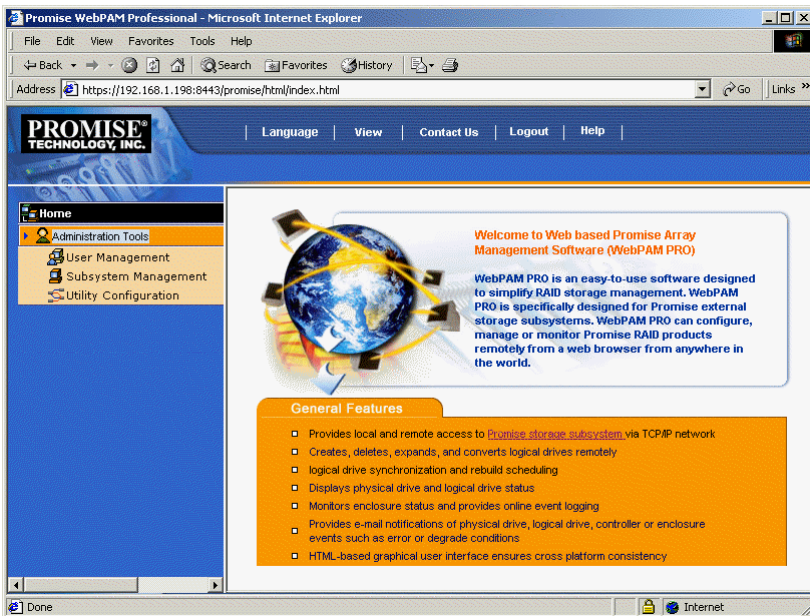
The first time you log in to WebPAM PRO, there will be no Subsystems (VTraks) or Users in the system. Promise recommends that you create the Subsystem(s) first, then add the User(s).

Create a New Host (VTrak)

1. Click on Administrator Tools to display the menu (above, left).
2. Click on the Host Management button (above, left). The Host Management List appears (above, right).

3. Click the Add Host button (above). The Host Information screen appears (below).

4. Type in the IP Address of the VTrak (not the PC/server) you want to add.
5. Check the appropriate box to indicate which Promise product the Host controls, in this case, *UltraTrak/VTrak*.
6. When you are done, click the Submit button.

The new Host is added to Host Management and also appears in the Tree View.

Access a Host

The WebPAM PRO CIMOM Agent resides on the VTrak and sends the monitoring data to the Utility Server and on to the Browser. In Tree View, a newly created Host looks like this:
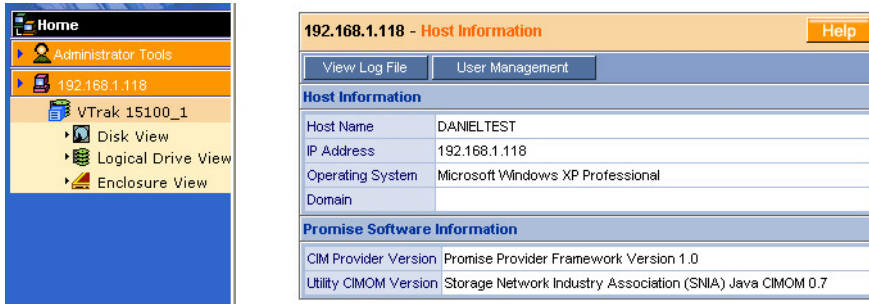
Each host is identified by an icon and its IP Address. Below it, the Controller appears. A host (VTrak) is made up of:

     Controller – The Promise VTrak

     Disk View – Shows all hard drives, assigned or not

     Logical Drive View – Shows all logical drives under this Controller

     Enclosure View – Monitors status of external RAID enclosures

	Notes
	• If you do not see these details in the Tree View, it means your network connection to VTrak is not working. Restore your connection before proceeding.
	• If you do not see anything, lower your browser's security settings.

Create a Logical Drive
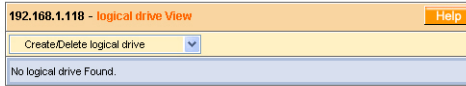
1. Click on the Logical Drive View ⚏ icon. In the Management window, all logical drives belonging to this controller appear (above). Since this VTrak is newly activated, there are no logical drives yet.
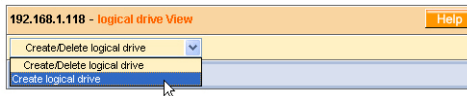
2. Click on Create/Delete logical drive menu in the Logical Drive View window (above) and select Create logical drive. The Create Logical Drive window appears.
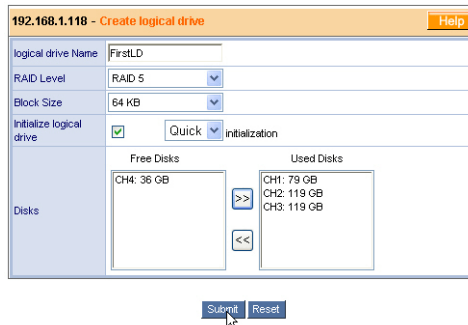
Type in a Logical Drive name, select RAID Level and Block Size.

See Chapter 7 for an explanation of RAID concepts.

Notes

- The available RAID selection depends on which Promise product you have and the number of disk drives available.
- The default Block size is 64KB.
- Promise recommends checking *Initialize Logical Drive*.

3. If you want to initialize the disk drives in your logical drive, check the Initialize Logical Drive box. Then select the type of Initialization from the drop-down menu:

   Quick – Erases the Reserve Sector, which contains the logical drive data on each disk drive.

   Full – Erases all data on the disk drives.

4. Select the Free Disks you want to use and click the >> button or double-click on the disks to move them to the Used Disks field.

5. Click the Submit button when you are done. A confirmation popup message appears when the logical drive has been created.
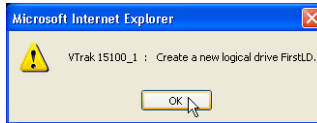
6. Click OK in the confirmation message.
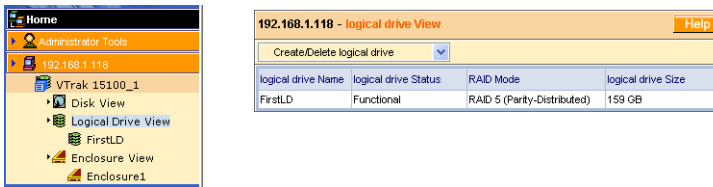
   The new logical drive appears in the Logical Drive View list (above).

   If you selected Full Initialization, that process will continue for some time.
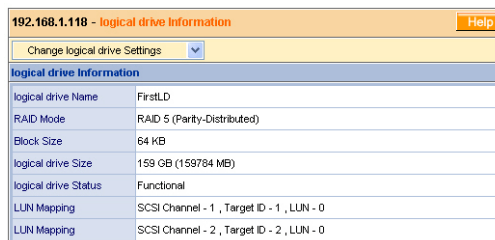
   When Logical Drive Status shows *Functional*, you have completed logical drive creation on VTrak. In order to use this logical drive read and write data, you must partition and format it using the PC's operating system.

   See Chapter 4 for a full discussion of logical drive creation and management using WebPAM PRO.

Assign a SCSI Target ID

VTrak has two SCSI channels. Each channel can have up to 16 Target ID (TID) numbers. The default TID is 0 (zero). This assignment may conflict with your SCSI Host Bus Adapter card. To add, change or delete Target ID numbers:

1. Click on the Controller 🖥 icon. The Controller Information window appears (below).

192.168.1.118 - **Controller Information**		Help
Controller Settings ▼		
Controller Settings		
Change IPAddress	Release Lock	
Change Console LUN Settings		
Change Target IDs		Alias - Tech Pubs VTrak
Disable Audible Alarm		
FW Version	00.00.0000.25	Controller Serial No. - PROMISE
IP Address	192.168.1.126	Gateway IP Address - 0.0.0.0
TFTP IP Address	192.168.1.101	Subnet Mask - 0.0.0.0
TIDs Assigned	SCSI Channel 1 - [3, 4, 5, 6]	SCSI Channel 2 - [2]
Promise RAID Console	SCSI Channel 1 , Target ID - 3 , LUN - 3	SCSI Channel 2 , Target ID - 2 , LUN - 5
Hardware Information		
Memory Size	256 MB	
Memory Type	SDRAM - ECC	
Channel Count	15	

2. In the Controller Information window, click on the Controller Settings menu and select Change Target IDs (above). The Change Target IDs window appears (below).

192.168.1.118 - **Change Target IDs**		Help
SCSI Channel	**Select New Target IDs**	
1	☐0 ☐1 ☑2 ☐7 ☐8 ☐9 ☐10 ☐11 ☐12 ☐13 ☐14 ☐15	
2	☐0 ☐1 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☑9 ☐10 ☐11 ☐12 ☐13 ☐14 ☐15	
	Submit Reset	

3. In the Change Target IDs window, select the new Target IDs for each channel.
4. When you are done, click Submit.

192.168.1.118	
Invoked Method	**Result**
Set TIDs for SCSI Channel 1	TIDs for SCSIChannel 1 are changed successfully
Set TIDs for SCSI Channel 2	TIDs for SCSIChannel 2 are changed successfully

The above window informs you of successful Target ID changes.

Assign a RAID Console LUN

The Promise RAID Console is how VTrak's RAID controller communicates with the PC. Each SCSI channel has one Logical Unit Number (LUN) for the RAID Console. The default RAID Console LUN for both SCSI channels is 7. To change the LUN:

1. Click on the Controller 🗐 icon. The Controller Information window appears (below).

192.168.1.118 - Controller Information			Help
Controller Settings ▾			
Controller Settings	Release Lock		
Change IPAddress			
Change Console LUN Settings			
Change Target IDs		Alias - Tech Pubs VTrak	
Disable Audible Alarm			
FW Version	00.00.0000.25	Controller Serial No. - PROMISE	
IP Address	192.168.1.126	Gateway IP Address - 0.0.0.0	
TFTP IP Address	192.168.1.101	Subnet Mask - 0.0.0.0	
TIDs Assigned	SCSI Channel 1 - [3, 4, 5, 6]	SCSI Channel 2 - [2]	
Promise RAID Console	SCSI Channel 1 , Target ID - 3 , LUN - 3	SCSI Channel 2 , Target ID - 2 , LUN - 5	
Hardware Information			
Memory Size	256 MB		
Memory Type	SDRAM - ECC		
Channel Count	15		

2. In the Controller Information window, click on the Controller Settings menu and select Change Console LUN Settings (above). The Change Console LUN Settings window appears (below).

192.168.1.118 - Change Console LUN Settings		Help
SCSI Channel	**Select SCSI TID**	**Select New LUN for Console**
1	Select ▾	▾
2	Select	▾
	3	
	4	
	5	
	6	
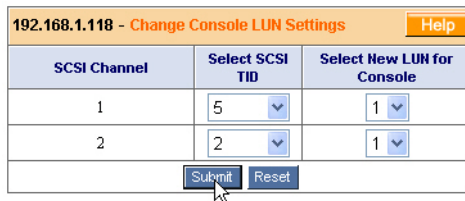
3. In the Console LUN Settings window, select the SCSI Target ID whose LUN you want to change.

4. Then select the LUN you want to assign to that Target ID.

5. Click Submit when you are done.

This completes the change procedure for the Console LUN.

Log-out of WebPAM PRO

There are two ways to log out of WebPAM PRO:

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

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

Internet Connection using WebPAM PRO

The above instructions cover connections between VTrak and WebPAM PRO over your company network. It is also possible to connect to a VTrak from the Internet.

Your MIS Administrator can tell you how to access your network from outside the firewall. Once you are logged onto the network, you can access the VTrak using its IP address.

Please note that only the PC with the SCSI connection can read and write data to the logical drives on the VTrak. However, other PCs can monitor the VTrak from virtually any location.

VTrak Setup with the CLU

	Notes
[pencil icon]	• If you worked though the Setup procedure above using WebPAM PRO, your VTrak setup is complete. There is no need to repeat the Setup with the CLU.
	• See Chapter 5 for a full explanation of the CLU functions.

Set up with the CLU consists of the following steps:

1. CLU Connection (below)
2. Create a Logical Drive
   - Automatically (page 53)
   - Manually (page 54)
3. Assign a SCSI Target ID (page 55)
4. Exit the CLU (page 57)

CLU Connection

Before you begin, be sure the null modem cable is connected between the Host PC and VTrak, and that both machines are booted and running.

1. Start your PC's terminal emulation program.
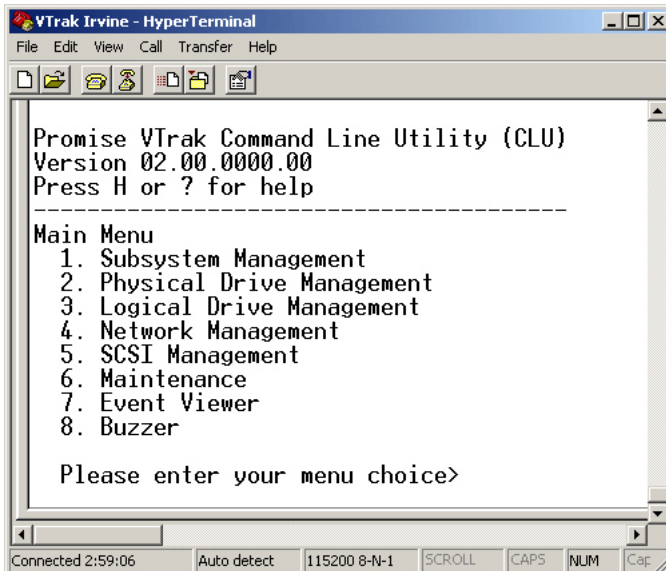
2.   Press Enter once to launch the CLU.

Create a Logical Drive

The following procedures provide the basic steps needed to create a logical drive and get your VTrak running quickly. You may create your logical drive automatically or manually.

You might prefer to let VTrak to create the logical drive automatically if you are new to RAID technology or you are satisfied with VTrak's default settings.

Create a Logical Drive Automatically

Use this feature to quickly build a logical drive using all available disk drives. You specify the RAID level. The other options are chosen automatically. See page 189 for a discussion of RAID Levels and the number of drives each supports.

1.   Press 1 and Enter to access the Logical Drive Auto Creation feature.

> *************Logical Drive Auto Creation************
> Total --6-- free Physical Drives
>
> RAID Mode Options:
> 0 - RAID 0 (Striping)
> 1 - RAID 1 (Mirroring)
> 3 - RAID 3 (Parity)
> 5 - RAID 5 (Parity Distributed)
> 10 - RAID 10 (Striping/Mirroring)
> 50 - RAID 50
>
> Please enter RAID mode(0,1,3,5,10,50)>**50**

The Auto Creation tells you how many disk (physical) drives are free and which RAID modes (levels) are possible.

2.   Type the RAID mode you want and press Enter.

The proposed specifications for the new logical drive appear

> Logical Drive Auto Creation Information:
> Name: LogicalDrive
> Number of Physical Drives: 6
> RAID mode: RAID 50
> Stripe block size: 64KB
> SMART check: enabled
> Initialization: full
>
> Create Logical Drive now(y/n)?>**y**

3.   If you agree with the specifications, press Y and Enter.

If you disagree, press N and Enter. Then select *Create New Logical Drive* (below) and input your own settings.

In order to use this logical drive to read and write data, you must partition and format it using the Host PC's operating system.

Create a Logical Drive Manually

Use this feature to manually build a logical drive to meet your own requirements or to use less than the full number of available disk drives. See Chapter 7 for a discussion of RAID Levels, the number of drives each supports and an explanation of the available options.

1. Press 2 and Enter to access the Create New Logical Drive feature.

```
**************Define New Logical Drive**************
  Total 3 Physical Drives



  *******Physical Drives Selection*******
  Id       Name              Size
  ----------------------------------------
  3        Maxtor 6Y080M0      81 GB
  4        Maxtor 6Y080M0      81 GB
  5        Maxtor 6Y080M0       81 GB

  Enter Physical Drive ids and/or id ranges
  separated by commas. For example: 1,5,8-15.
  Press R to continue after you have finished
  selecting Physical Drives.
  Your input?>3-5
```

2. Choose the physical drives for your logical drive and press Enter.

```
  *******Physical Drives Selection*******
  Id       Name              Size
  ----------------------------------------
  *3       Maxtor 6Y080M0      81 GB
  *4       Maxtor 6Y080M0      81 GB
  *5       Maxtor 6Y080M0       81 GB

  Enter Physical Drive ids and/or id ranges
  separated by commas. For example: 1,5,8-15.
  Press R to continue after you have finished
  selecting Physical Drives.
  Your input?>r
```

3. When you have selected all the physical drives, press R and Enter.

RAID Mode Options:
 0 - RAID 0 (Striping)
 1 - RAID 1 (Mirroring)
 3 - RAID 3 (Parity)
 5 - RAID 5 (Parity Distributed)
10 - RAID 10 (Striping/Mirroring)
50 - RAID 50

Please enter RAID mode(0,1,3,5)>**5**

The prompt displays available RAID modes.

4.   Type the RAID mode (level) for your logical drive and press Enter.

Stripe Block Size (4, 8, 16, 32 or 64) in KB?>**64**
Enter the Logical Drive name>**LogDrv1**
Enable initialization(y/n)?>**y**
Full or quick initialization(f/q)?>**q**
Quick initialization enabled

5.   Type the stripe block size, logical drive name, whether you want initialization
and if so, quick or full. Press Enter after each input.

If you chose RAID 1, you will not see a stripe block size. After the last item, a
list of your logical drive specifications displays.

Logical Drive creation information:
Name: LogDrv1
Number of Physical Drives: 3
RAID mode: RAID 5
Stripe block size: 64KB
SMART check: enabled

Create Logical Drive now(y/n)?>**y**

6.   Review the list. If you agree with the list, press Y and Enter. If you disagree
with the list, press N and Enter, then select *Create New Logical Drive* again.

In order to use this logical drive to read and write data, you must partition and
format it using the Host PC's operating system.

Assign a SCSI Target ID

 VTrak has two SCSI channels. Each channel can have up to 16 Target ID (TID)
numbers. The default TID is 0 (zero). This assignment might conflict with your
SCSI Host Bus Adapter card. To add, change or delete Target ID numbers:

1.   Press 5 to select *SCSI Management*.

SCSI Channel 1, Initiator 5, TID 1 Transfer Speed: 5 Mb/s

        SCSI Channel 1, Initiator 5, TID 2 Transfer Speed: 5 Mb/s
        Channel 1 IO Statistics: read count 0, read bytes 0
        Channel 1 IO Statistics: write count 0, write bytes0
        Channel 2 IO Statistics: read count 0, read bytes 0
        Channel 2 IO Statistics: write count 0, write bytes 0
        SCSI Channel 1 TIDs: 0
        SCSI Channel 2 TIDs: 0
        RAID Console: disabled

        SCSI Management
         1. Channel TID
         2. RAID Console LUN
         R. Return to Previous Menu

        Please enter your menu choice>

2.   Press 1 and Enter to select Channel TID.

     The screen appears as shown below:

        ****Modify SCSI Channel TID****
        SCSI Channel #   TIDs
         ----
         1   0
         ----
         2   0

        Please select the SCSI channel(1–2)
        Press R to return after finished>**1**

3.   Press the number of the SCSI channel whose TIDs you want to modify and
     press Enter.

        Modify TIDs for SCSI channel 1(y/n)?>**y**

4.   Press Y to confirm that you want to make a change.

     Note that the TID numbers you type will overwrite the existing ones. Type all
     the TIDs you want for this channel, including any numbers you previously
     assigned.

        Enter the new TIDs>**0,1,2,3**

5.   Type the numbers of the TIDs you want to for this SCSI channel with a
     comma between each number. Press Enter to continue.

     The CLU responds:

        TIDs for SCSI channel 1 changed
        Press Enter key to return

6.   Press Enter to verify the new TIDs.

```
****Modify SCSI Channel TID****
SCSI Channel #        TIDs
---------------------------------
1                       0
                        1
                        2
                        3
---------------------------------
2                       0
```

Please select the SCSI channel(1–2)
Press R to return after finished>**r**

7. Press R and Enter to return to the SCSI submenu.

Exit the CLU

Close the terminal emulation window to exit the CLU.

Chapter 4: Management with WebPAM PRO

This chapter describes using WebPAM to monitor and manage your RAID system. The chapter is divided into sections for major WebPAM components as shown above.

VTrak Status Indicators

Even though WebPAM PRO offers comprehensive monitoring of VTrak, the LED indicators on the VTrak unit provide important status information.

When the power is switched on, the LEDs on the front of the VTrak will light up.

Figure 1.   VTrak 15100 Front Panel LEDs

When boot-up is finished and the VTrak is functioning normally:

- Controller LED blinks green once per second for five seconds, goes dark for ten seconds, then blinks green once per second for five seconds again.
- Power, FRU and Logical Drive LEDs display green continuously.
- SCSI LEDs flash green if there is activity on that channel.

See the table below.

LEDs	State				
	Dark	Steady Green	Flashing Green	Amber	Red
Power	System Off	Normal	n/a	n/a	n/a
FRU*	System Off	Normal	n/a	Fan or Battery Problem	Fan or Battery Failed
Logical Drive	System Off	Normal	n/a	Logical Drive Critical	Logical Drive Offline
SCSI-1 SCSI-2	No Activity	n/a	Activity	n/a	n/a
Controller	System Off	n/a	Normal**	n/a	n/a

* Field Replacement Unit. "n/a" means this state does not apply to this LED.

** Five green blinks, one per second; dark 10 seconds; five green blinks.

Drive Status Indicators

There are two LEDs on each Drive Carrier. They report the presence of power and a disk drive, and the current condition of the drive..

Figure 2. VTrak 15100 Disk Carrier LEDs

The VTrak spins up the disk drives sequentially in order to equalize power draw during start-up. After a few moments the Power/Activity and Disk Status LEDs should display green.

LEDs	State				
	Dark	Steady Green	Flashing Green	Amber	Red
Power/ Activity	No Drive	Drive Present	Activity	n/a	n/a
Status	No Power	Drive OK	n/a	Drive Rebuilding	Drive Error
"n/a" means this state does not apply to this LED.					

Audible Alarm

VTrak's audible alarm (buzzer) has four sound patterns:

- Beep. Beep. Beep. – Indicates that a logical drive is rebuilding
- Beep-beep, beep-beep, beep-beep. – Indicates that a logical drive is critical
- Beep-beep-beep. Beep-beep-beep. – Indicates a problem with a field replaceable unit (FRU)
- 10 second continuous beep – Indicates that a logical drive is offline

Log-in/Log-out

Log-in to WebPAM PRO

1. Launch your Browser.
2. In the Browser address field, type in the IP address of the PC or Server where you installed WebPAM PRO, as explained below. Do not type the VTrak's IP address..

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

    If you chose the External Security option during WebPAM PRO installation (see page 36), use the *Secure* connection.

Regular Connection

*   WebPAM PRO uses an HTTP connection. . . . . .http://
*   Enter the Utility Server's IP address 192.168.1.118
*   Enter the Port number . . . . :8080
*   Add promise to launch WebPAM PRO . . . . /promise

Together, your entry looks like this:

> **http://192.168.1.118:8080/promise**

Secure Connection

*   WebPAM PRO uses a secure HTTP connection . . . . .https://
*   Enter the Utility Server's IP address 192.168.1.118
*   Enter the Port number . . . . :8443
*   Add promise to launch WebPAM PRO . . . . /promise

Together, your entry looks like this:

> **https://192.168.1.118:8443/promise**

Note that the IP address shown above is only an example. The IP address you type into your browser will be different.

3.   When the opening screen appears, type your username in the Login ID field and your password in the Password field. The login and password are case sensitive.

If this is the first time you are running WebPAM PRO, log in as **administrator** and type in the default password, which is **password**. The login and password are case sensitive

4.   Click the Sign in button.

After sign-in, the WebPAM PRO opening screen appears.

Important

Immediately after installation, change the Administrator's password. Make the change under User Management. Each user you create will have his/her own login ID and password.

After sign-in, the WebPAM PRO opening screen appears.
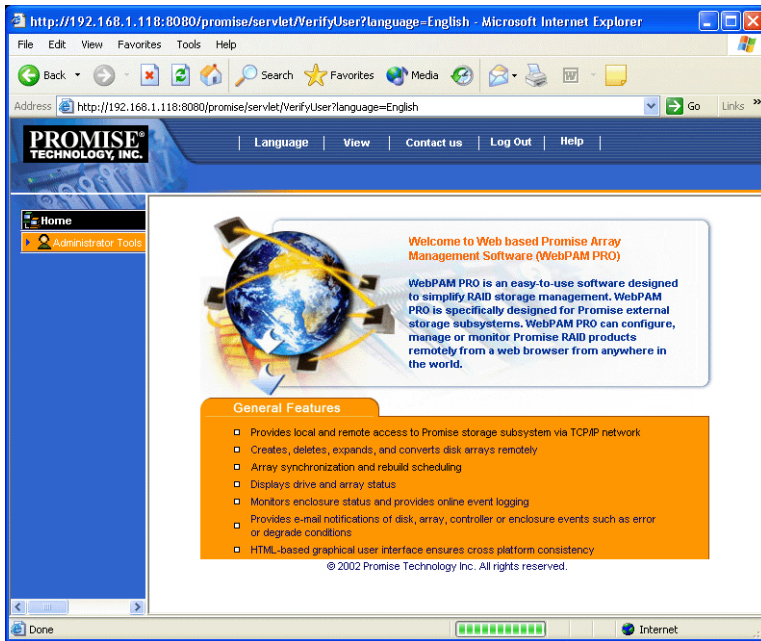
Figure 3. WebPAM PRO Opening Screen

If you setup your VTrak using WebPAM PRO (see Chapter 3) you will have one Host, the Administrator as the only User and one logical drive.

If this is the first time you are logging in to WebPAM, there will be no Hosts (VTraks) or Users in the system. Promise recommends that you create the Host(s) first, then create the User(s).

Log-out of WebPAM PRO

There are two ways to log out of WebPAM:

•   Close your browser window

•   Click Logout on the WebPAM banner (below)

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

Host Management

- Create a Host (below)
- Host User Rights (page 66)
- Access a Host (page 67)
- Host Management Window(page 68)
- View Event Log (page 68)
- Delete a Host (page 69)

Create a Host (Add a VTrak)
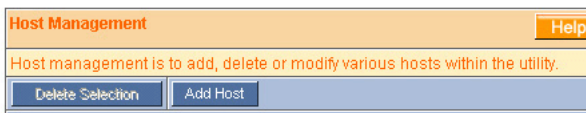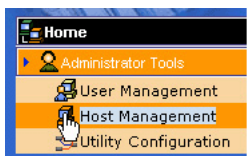
1. Click on Administrator Tools to display the menu (above, left).
2. Click on the Host Management button (above, left). The Host Management List appears (above, right).
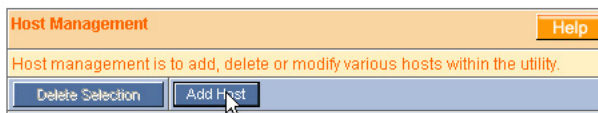
3. Click the Add Host button (above). The Host Information screen appears (below).

4. Type in the IP Address of the VTrak (not the PC or server) you want to add.
5. Check the UltraTrak/VTrak box.

6. When you are done, click the Submit button.

The new Host is added to Host Management and also appears in the Tree View.

Host User Rights

1. Click the Host Management ![icon] icon under Administration Tools. This window displays a list of Hosts (VTraks) configured to this WebPAM installation.

2. Click on the hypertext link to see an individual Host.

This window provides access information on an individual Host (VTrak) and editing user permissions.

3. Check the permissions this User will have.

Right	Meaning
Creation	Permission to create, convert and expand a logical drive; and make Controller settings
Deletion	Permission to delete a logical drive
Maintenance	Permission to rebuild and synchronize a logical drive
Notification	Permission to receive notification of events affecting the logical drive

4. When you are done, click the Submit button. The Host Management window appears again. Your changes take effect immediately.

To restore previous settings before you submit them, click the Reset button.

Access a Host

The WebPAM CIMOM Agent resides on the Host (VTrak) and sends the monitoring data to the Utility Server and on to the Browser. In Tree View, a newly created Host looks like this:
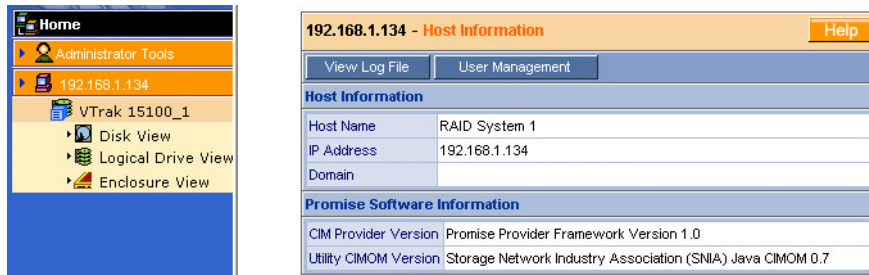
Each host is identified by an icon and its IP Address or Hostname.

Below it, the Controller appears. A Host (VTrak) is made up of:

 VTrak Controller – The Promise RAID Product

 Disk View – Shows all hard drives, assigned or not

 Logical Drive View – Shows all logical drives for this Controller

 Enclosure View – Monitors status of external RAID enclosures

Host Management Window

To access the Management Window for an individual Host (VTrak), click on the

Host 🖥 icon in Tree View. The result is a different window than clicking the Host Management icon described above.
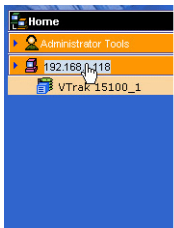
From this point, you can:
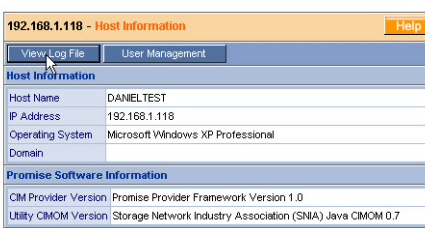
• View the Logfile
• Access Host User Rights (Administrator only)

View Event Log

The Event Window shows events as they happen. It is not the same as the Event Log, however. To see the Event Log:

1. In Tree View, click on the Host icon for the VTrak whose log you want to see (above, left).

2. In the Management Window, click on the View LogFile button (above, right). The LogFile window appears (below).
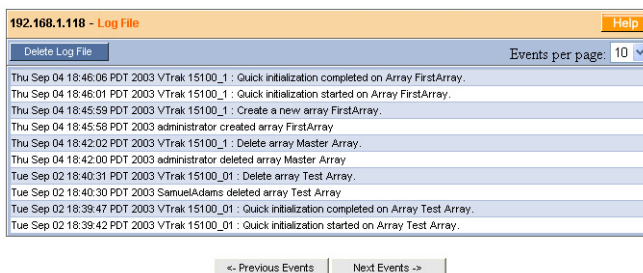
In the LogFile window, you can view all events pertaining to an individual Host (VTrak). Click the Previous Events and Next Events buttons to see the entire contents. The LogFile is saved automatically.

You must log in as the Administrator in order to delete the Logfile. To delete it, click the Delete LogFile button.

Delete a Host

To delete a Host (VTrak):

1. Click the Host Management 🖳 icon under Administrative Tools. The Host List appears.

2. Under Select for Deletion, click the checkbox of the Host you wish to delete.

3. Click the Delete Selection button.

	Notes
	• WebPAM will remove the link from the VTrak to your local browser. This action does not change or delete the RAID itself. • If you delete a Host with users assigned to it, the user rights are also deleted.

User Management

- Create a User (below)
- Delete a User (page 77)
- Manage User Rights (page 78)

- Change Password (page 79)
- Setup User Alert Notification (page 80)

Create a User
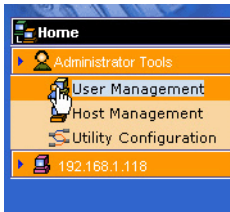
1. Click the User Management icon (above, left). The User List appears (above, right). Initially, there is only an account for the Administrator.

2. Click the Create User button (above). The Create User panel appears (below).

3. Type in the first User's name, password and password confirmation. The User's name and password are case sensitive. Do not put spaces in the User's name or password.

To receive email alerts, check the Assign Email Notification box.

Check the permissions this User will have.

Right	Meaning
Creation	Permission to create, convert and expand a logical drive; and make Controller settings
Deletion	Permission to delete a logical drive
Maintenance	Permission to rebuild and synchronize a logical drive
Notification	Permission to receive notification of events affecting the logical drive

Note

If no Hosts (VTraks) have been created yet, no machines will appear in the permissions list. You can add Hosts and specify the permissions later.

4.   Click the Submit button when you are done.

Notes

• The User can change his/her User Name, Password, email address at any time.
• A User cannot change his/her own Rights.
• The Administrator can change a User's Rights, as well as create and delete Users.

If you checked Email Notification above, when you click the Submit button, you will see the Event Selection screen.

5.   Type in the User's email address.
6.   Select the alert events you want reported via email. To save time and effort, check *Critical Events, All Events,* or the component-specific boxes.

The table below lists all events and their meanings. Critical events are marked with an asterisk (*)

Item	Meaning
Critical Events*	Events of major importance.
All Events	All monitored events are reported.
Controller Event Notification	All events related to the Controller are reported.
Controller Unknown Error	Unspecified problem with the Controller.
Data Parity Error	Detected possible SCSI data parity error.
Command Parity Error	Detected possible SCSI command parity error.
Bus Reset	The Initiator sent a command to reset the SCSI bus.
Unrecoverable Error	VTrak must restart to recover from an error.
Abort Task	A task was aborted.
Clear ACA	Clear an auto contingent alliance condition.
LUN Reset	A LUN was reset.
Initiator Error	Detected possible error on the SCSI HBA card.
Illegal Secondary Identify	A target received a second Identify message with a different LUN.
Message Parity Error	Detected possible parity error in message between initiator and target.
Bus Reboot	The VTrak system has rebooted.
Connection Event Notification	All events related to Host to VTrak/UltraTrak connection.
VTrak Connection Connected	Connection between VTrak and Host PC was successful
VTrak Connection Lost	Connection between VTrak and Host PC has failed
Disk Event Notification	All events related to the disk drives.

Item	Meaning
Disk Down*	A disk drive has been set down due to some kind of error.
Disk Plugged In	A disk drive has been plugged into the logical drive.
Disk Access Retry	The Controller repeats an attempt to access a disk drive.
Disk CRC Error	A CRC error has occurred on a disk drive.
Disk SMART Failed*	A SMART error has been reported on a disk drive.
Disk ECC Error	A ECC error has occurred on a disk drive.
Disk Bad Sector*	A bad sector has been identified on a disk drive.
Disk Reserve Sector Error	A error has occurred on the reserve sector of a disk drive.
Disk Time Out	A disk drive has timed out.
Logical Drive Event Notification	All events related to logical drives.
Create Logical Drive	A logical drive has been created.
Delete Logical Drive	A logical drive has been deleted.
Logical Drive Critical*	Malfunctioning disk drive, fault tolerance lost.
Logical Drive Offline*	Two malfunctioning disk drives, data access lost.
Logical Drive Migration Started	A logical drive began expansion and/or change of RAID level.
Logical Drive Migration Completed	A logical drive finished expansion and/or change of RAID level
Logical Drive Migration Stopped	A logical drive expansion and/or change of RAID level halted before completion.
Logical Drive Rebuild Start	A logical drive began a rebuild.
Logical Drive Rebuild Completed	A logical drive finished a rebuild.

Item	Meaning
Logical Drive Rebuild Stopped	A logical drive rebuild halted before completion.
Logical Drive Synchronization Start	A logical drive began synchronizing.
Logical Drive Synchronization Completed	A logical drive finished synchronizing.
Logical Drive Synchronization Stopped	A logical drive stopped synchronizing before completion.
Logical Drive Synchronization Comparison Error*	A comparison error was detected during synchronization.
Logical Drive Synchronization Internal Error*	An internal error was detected during synchronization.
Logical Drive Full Initialization Start	Full initialization has begun on a logical drive.
Logical Drive Full Initialization Completed	Full initialization finished on a logical drive.
Logical Drive Full Initialization Stopped	Full initialization on a logical drive halted before completion.
Logical Drive Quick Initialization Start	Quick initialization has begun on a logical drive.
Logical Drive Quick Initialization Completed	Quick initialization finished on a logical drive.
Logical Drive Quick Initialization Stopped	Quick initialization on a logical drive halted before completion.
Logical Drive Percent Completed	A progress report on logical drive operations taking place.
Enclosure Event Notification	All events related to the enclosure.

Item	Meaning
Enclosure Power Down*	Power to the enclosure is OFF.
Enclosure Power Up	Power to the enclosure is ON.
Enclosure Unknown Error*	Unspecified problem with the Enclosure.
Enclosure Over Temperature*	Enclosure is running too hot.
Enclosure Fan Stop*	One of the fans has stopped working.
Enclosure 3.3 Volt out of Range	3.3 Volt power is out of specification.
Enclosure 5 Volt Range*	5 Volt power is out of specification.
Enclosure 12 Volt Range*	12 Volt power is out of specification.
Battery Temperature Rise	Battery is heating up. Battery ceases to charge above 45°C or discharge above 60°C.
Battery Temperature Dropped	Battery is cooling down.
Battery Capacity below threshold	Battery is too weak to function.
Battery Capacity Normal	Battery is ready for use.
Battery Discharging	Battery is leaking power.
Battery Charging	Battery is recharging.
Battery Maintenance Mode	Discharge and recharge to test battery condition. Happens automatically once every two months.
Battery life ended	Battery is dead. Replace it.

See page 191 for instructions on what to do when any of these messages appears.

7.   When you are finished selecting Events, click the Submit button.

User Management			Help
User Management is management of User Profiles for the utility. From here, Administrator can create, delete, modify any user of this utility.			
Delete Selection	Create User		
Select for Deletion	**User Name**	**Edit User**	
☐	1. SamuelAdams	SamuelAdams	
☐	2. administrator	administrator	

The new User appears under User Management (above).

Note

The User can change his/her email address and Notification selections at any time.

Delete a User

To delete a User:

1.   Click the User Management 🖧 icon under Administrator Tools. A list of Users appears (below).

User Management			Help
User Management is management of User Profiles for the utility. From here, Administrator can create, delete, modify any user of this utility.			
Delete Selection	Create User		
Select for Deletion	**User Name**	**Edit User**	
☑	1. SamuelAdams	SamuelAdams	
☐	2. administrator	administrator	

2.   Click the checkbox of the User you wish to delete.

3.   Click the Delete Selection button.

Note

WebPAM will maintain at least one user with full access, typically the Administrator. This action prevents you from being locked out of the application and having to reload it.

Manage User Rights
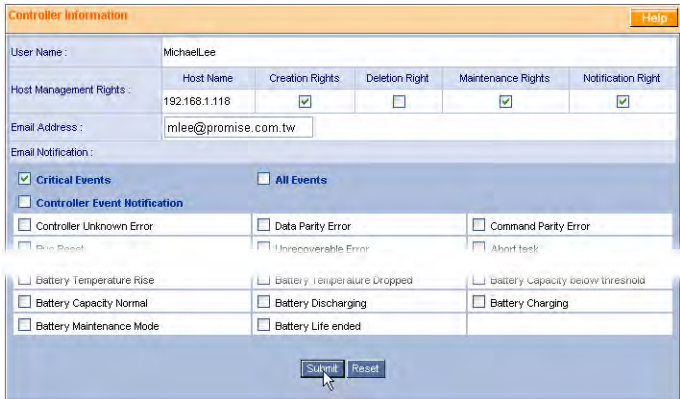
You setup User Rights for each Host (VTrak) and each User individually. The Host must exist before you can set-up User Rights for it.

1. Click the User Management icon under Administrator Tools. A list of Users appears (below).

2. Click on the hypertext link in the Edit User column for the User you want to manage. The Modify/View User screen appears.

(In the above example, the screen is shortened to save space.)

3. In the Modify/View User screen, specify the User Rights:.

Right	Meaning
Creation	Permission to create, convert and expand a logical drive; and make Controller settings
Deletion	Permission to delete a logical drive

| Maintenance | Permission to rebuild and synchronize a logical drive |
| Notification | Permission to receive notification of events affecting the logical drive |

You can also set these permissions from the Host User Rights screen.
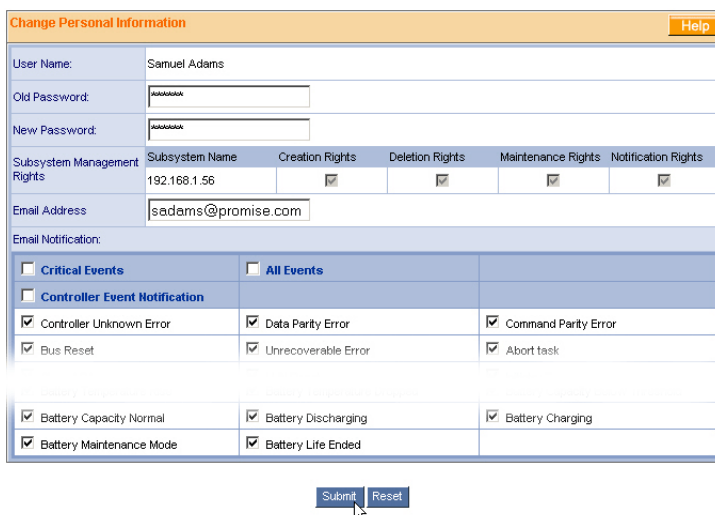
4.   When you are done, click the Submit button. The User list appears again. Your changes take effect immediately.

To restore the previous settings *before* you submit them, click the Reset button.

Change Password

Each User can change his/her password. If the User has email alert notification, he/she can also change the email address and selection of events.

1.   Click the Personal Information 🖳 icon under Administration Tools.

(In the above example, the screen is shortened to save space.)

2.   Change the password, email address or event selection as required.

3.   When you are done, click the Submit button at the bottom of the screen.

Note

If a User forgets his/her password, the Administrator must delete the user account and create a new one.

Setup Email Alert Notification

WebPAM can alert you to the problems and processes happening to your RAID through email messages. You setup Email Notification for each Host (VTrak) and each User individually. A Host must exist before you can set-up Email Notification for it.
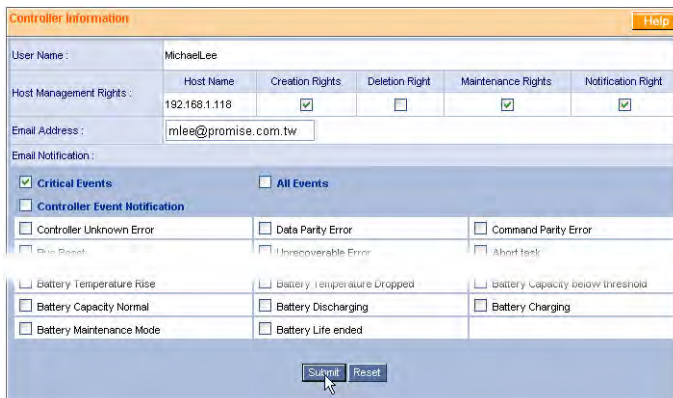
These steps describe how to setup the email function.

1. Click the User Management icon under Administrator Tools. A list of Users appears (below).

2. Click on the hypertext link in the Edit User column for the User you want to manage. The Modify/View User screen appears.

(In the above example, the screen is shortened to save space.)

3. Enter the email address if this user will receive email notifications.

4. Select the alert events you want reported via email. To save time and effort, check *Critical Events, All Events,* or the component-specific boxes.

    See page 73 for a list of events and their meanings.

5. When you are done, click the Submit button. The User list appears again. Your changes take effect immediately.

To restore the previous settings *before* you submit them, click the Reset button.

Controller Management

A Controller is the device that makes your Promise RAID system work.

Figure 6. Controller in Tree View.

Each Controller is composed of:

Disk View – Shows all hard drives, assigned or not

Logical Drive View – Shows all logical drives for this Controller

Enclosure View – Monitors status of external RAID enclosures

To access the Controller, click on the Controller icon. The Controller screen will display (below).

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Figure 7. Controller Information Screen.

The controller screen (above) shows information about the firmware version, network IP addresses, SCSI Target IDs and LUNs, Memory, Channels and the status of Logical Drives, Disk Drives and the Enclosure.

Set / Release Lock

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. You must have Maintenance Rights to use this function.

*   To set the lock, click the Set Lock button.
*   To release the lock, click the Release Lock button.

Only the Administrator has access to the Release All Locks button.

The User who sets the lock is the only one who can release it. Be sure to release the lock when finish your maintenance procedure, so other Users are not locked out.
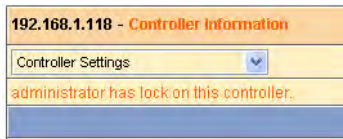
Users who attempt to access a locked controller see the username of the individual who locked it (above).

The status of the lock buttons depends on the current situation of the controller. For example, if the controller already locked, both Lock buttons will be grayed out.

Change IP Address

Correct IP settings are essential for your PC and VTrak to communicate. You make initial settings during setup and again when the addresses change on your network. You must have Creation Rights to access this function.
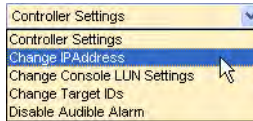
1. Click on the Controller Settings menu and select Change IP Address.

    The Change IP Address screen displays.

2. In the Change IP Address screen, enter or change the IP addresses for the VTrak, your Gateway and your TFTP (FTP) Server, or enter or change your Subnet Mask.
3. Click the Submit button when you are done.

Change Console LUN

The RAID Console LUN is the Controller's SCSI address. LUN stands for Logical Unit Number. Essentially it is a subdivision of a SCSI Target ID.

The default setting for the RAID Console is TID 0, LUN 7. This setting is adequate for most WebPAM and RAID subsystem configurations. If an address conflict occurs, you might have to change the Console LUN setting. You must have Creation Rights to access this function.

To access the Console LUN Settings:
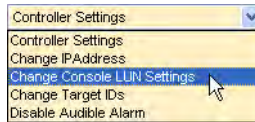
1. Click on the Controller Settings menu and select Change Console LUN Settings.

   The Change Console LUN screen displays.

2. For SCSI Channel 1, in the center column, select the SCSI Target ID number under which you want to set the Console LUN.
3. In the right column, select the LUN for the Console.
4. Repeat steps 2 and 3 for SCSI Channel 2.
5. Click the Submit button when you are done.

Change SCSI Target ID

The term *Target ID* refers to the SCSI address of the two channels on the RAID subsystem. A SCSI bus has an Initiator, such as the SCSI card inside the PC, and at least one Target, such as the Controller and Logical Drives inside the RAID subsystem. Each target must have its own address or Target ID number. Target IDs can be divided into Logical Unit Numbers (LUNs) to extend the number of available addresses.

The default TID settings for both SCSI channels is 0. This setting is adequate for most WebPAM and RAID subsystem configurations. If an address conflict occurs,

you might have to change the TID setting. You must have Creation Rights to access this function.

1. Click on the Controller Settings menu and select Change Target IDs.

    The Change Target IDs screen displays.

2. Select the SCSI Target IDs you want to use on SCSI Channel 1.

3. Select the SCSI Target IDs you want to use on SCSI Channel 2.

4. Click the Submit button when you are done.

	Note
	Rather than creating multiple Target IDs, use one Target ID and assign a LUN to each logical drive.

Change Alarm Setting

Your VTrak is equipped with an audible alarm to call your attention to any logical drive problems that might arise. The alarm has four signals:

• Beep. Beep. Beep. – Indicates that a logical drive is rebuilding

• Beep-beep, beep-beep, beep-beep. – Indicates that a logical drive is critical

• Beep-beep-beep. Beep-beep-beep. – Indicates a problem with a field replaceable unit (FRU)

• 10 second continuous beep – Indicates that a logical drive is offline

See page 159 for more information about field-replaceable components. See page 191 for a discussion of critical and offline logical drives.

The default alarm setting is ON. You must have Creation or Maintenance Rights to access this function.
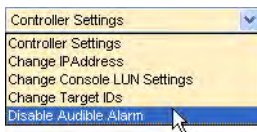
1. Click on the Controller Settings menu and select Disable Audible Alarm.

    A confirmation message displays.

2. In the confirmation message, click OK to disable to audible alarm.

Repeat the same procedure to enable the audible alarm.
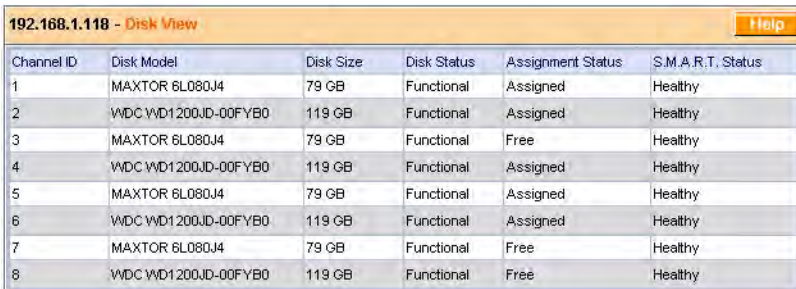
Disk Drive Management

- • Disk View (below)
- • Disk Information (page 89)

Disk View

The Disk View shows all of the disk drives working under this Controller.

To access Disk View, click on the 🔽 icon. The Disk View screen will display.

Channel ID	Disk Model	Disk Size	Disk Status	Assignment Status	S.M.A.R.T. Status
1	MAXTOR 6L080J4	79 GB	Functional	Assigned	Healthy
2	WDC WD1200JD-00FYB0	119 GB	Functional	Assigned	Healthy
3	MAXTOR 6L080J4	79 GB	Functional	Free	Healthy
4	WDC WD1200JD-00FYB0	119 GB	Functional	Assigned	Healthy
5	MAXTOR 6L080J4	79 GB	Functional	Assigned	Healthy
6	WDC WD1200JD-00FYB0	119 GB	Functional	Assigned	Healthy
7	MAXTOR 6L080J4	79 GB	Functional	Free	Healthy
8	WDC WD1200JD-00FYB0	119 GB	Functional	Free	Healthy

192.168.1.118 - Disk View — Help

Channel ID – The Controller channel to which each disk drive is attached. Only channels with a disk drive appear in the list. If you have a drive on a channel but it does not show in Disk View, something is wrong with the drive or there is a bad connection.

Disk Model – Refers to the drive manufacturer's identification.

Disk Size – The effective data storage capacity in gigabytes. This is total capacity, not available capacity.

Disk Status – Refers to functional status of an individual hard disk drive.

- • *Functional* means normal.
- • *Needs Rebuilding* means that this drive needs to have its data rebuilt.
- • *Rebuilding* means this drive is the Target Drive of the rebuild operation that is in progress.

Assignment Status – Indicates whether the disk drive is free or assigned.

- • *Free* means available for use in a logical drive.
- • *Assigned* means that currently belongs to a logical drive.

Note: If you assign a disk drive as a hot spare, its Assignment will still show Free, since it does not yet belong to a logical drive.

S.M.A.R.T. Status – Refers to Self-Monitoring Analysis and Reporting Technology, a form of predictive failure analysis that examines disk drive behavior for indications of a coming failure.

- *Healthy* means there are no indications of trouble.
- *Alert* means there have been indications that the disk drive could fail soon. If you see an alert, back up your data, then remove and test the disk drive.

You must enable SMART function for each logical drive.

Disk Information

The Disk Drive View shows detailed information pertaining to a single disk drive.

To access Disk Drive View, click on the 🔵 icon. The Disk Drive View screen will display.

Disk Model – Refers to the drive manufacturer's identification.

Disk Status – Refers to functional status of an individual hard disk drive.

- *Functional* means normal.
- *Needs Rebuilding* means that this drive needs to have its data rebuilt.
- *Rebuilding* means this drive is the Target Drive of the rebuild operation that is in progress.

Disk Size – Is the effective data storage capacity in gigabytes. This is total capacity, not available capacity.

Mode Setting – is the performance level (data transfer speed) at which the disk drive is running. This statistic applies to Parallel ATA disk drives only. Under some conditions, a mode setting could be reported for a Serial ATA drive, but it has no meaning.

Assignment Status – Indicates whether the disk drive is free or assigned.

- Free means available for use in a logical drive.
- Assigned means that currently belongs to a logical drive.

Note: If you assign a disk drive as a hot spare, its Assignment will still show Free, since it does not yet belong to a logical drive.

Channel ID – Is the Controller channel to which each disk drive is attached. If you have a drive on a channel but it does not appear in WebPAM, there is an unlocked drive carrier (UltraTrak) or a bad connection.

S.M.A.R.T. Status – Refers to Self-Monitoring Analysis and Reporting Technology, a form of predictive failure analysis that examines disk drive behavior for indications of a coming failure.

- *Healthy* means there are no indications of trouble.
- *Alert* means there have been indications that the disk drive could fail soon. If you see an alert, back up your data, then remove and test the disk drive. You must enable SMART function for each logical drive.

Firmware Version – Refers to the Promise controller, not the disk drive.

Serial Number – Is the manufacturer's serial number for this disk drive. This feature allows you to obtain the number for warranty or support purposes without removing it from the enclosure.

LUN Mapping – Describes which Target IDs and LUNs are selected for this drive on each VTrak SCSI channel.

Logical Drive Management

- Create a Logical Drive (below)
- Logical Drive LUN Setting (page 92)
- Logical Drive Functions (page 94)
- Logical Drive Critical Status (page 96)
- Rebuild a Logical Drive (page 98)

- Migrate a Logical Drive (page 99)
- Synchronize a Logical Drive (page 101)
- Synchronization Schedule (page 102)
- Delete a Logical Drive (page 104)

Create a Logical Drive

You must have Creation Rights to perform this function.

1. Click on the Logical Drive View 🗄 icon. The Logical Drive View Window appears.

2. Click on the Create/Delete logical drive menu and select Create logical drive. The Create Logical Drive screen will display.

3. In the Logical Drive Name field, type in a name for your logical drive.
4. In the RAID Level drop-down menu, select the type of RAID you want. The available choices will vary depending on which Promise product you have.

5. In the Block Size drop-down menu, select the Block Size you want for your logical drive.

6. In the Initialize Logical Drive box, check the box to enable, uncheck to disable. Then select the type of Initialization from the dropdown menu:

   Quick – Erases the Reserve Sector, which contains the logical drive data on each disk drive.

   Full – Erases all data on the disk drives. This choice takes additional time before the logical drive is ready.

7. In the Free Disks list, highlight the disk drives to use in your logical drive and click the **>>** button. Or double-click on the disk drive.

   The drive will move to the Used Disks list.

8. Click the Submit button to create your logical drive.

   You will be transferred to the Logical Drive View page

See Chapter 7 for information on RAID Levels, the required number of Disk Drives and RAID controller capabilities.

	Notes
	• The available RAID selection depends on which Promise product you have and the number of disk drives available.
	• The default Block size is 64KB.
	• Promise recommends checking *Initialize Logical Drive*.

If you checked the Initialize Logical Drive box and selected Full Initialization, the process of initialization will continue for some time. When Initialization is done, you can partition and format the logical drive.

Logical Drive LUN Setting

This function selects the SCSI Target IDs and Logical Unit Numbers (LUNs) for a logical drive. On a RAID system where many logical drives exist, different TIDs and LUNs are used to avoid conflicts on the SCSI bus. You must have Creation Rights to access this function.

To set or change TID and LUN settings for the logical drive:

1. Click on the Logical Drive View ![icon] icon. The Logical Drive View Window appears
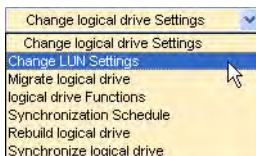
2. From the logical drive screen, click on the Change logical drive Settings menu.

3. Select *Change LUN Settings*.

    The Change LUN Settings window displays.
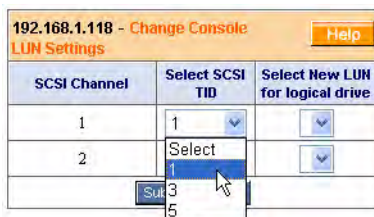
4. On the Change LUN Settings window, click the drop-down menu under Select SCSI TID and select a Target ID number for Channel 1.
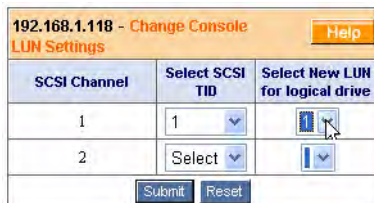
5. Click the drop-down menu under Select New LUN for logical drive and select a LUN number.

6. Repeat the TID and LUN selection for Channel 2.
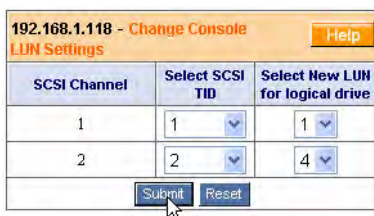
7.   When you are finished, click the Submit button.

	Note
	Rather than creating multiple Target IDs, use one Target ID and assign a LUN to each logical drive.

Logical Drive Functions

Logical drive functions include auto rebuild and hot spare settings, S.M.A.R.T. check, cache policy and rebuild, synchronize and migrate priorities.

1.   Click on the Logical Drive View 🗄 icon. The Logical Drive View Window appears
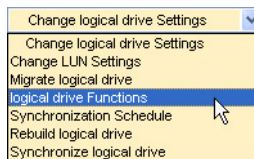
2.   From the logical drive screen, click on the Change logical drive Settings menu.

3.   Select *Logical Drive Functions*.

The View/Change logical drive information window appears.

4.   Make your selections as desired. For an explanation of the features and choices, see the table on the following page.

5. Click the Submit button when you are done.

Feature	Explanation	Choice
Enable Auto Rebuild	Allows your logical drives to rebuild themselves automatically.	Enable or disable
Enable Dedicated 'Hot Spare	Activates the dedicated hot spare drive feature for this logical drive.	Enable or disable
Select Hot Spare Channel	Allows you to designate the disk drive in a specific channel as the hot spare for this logical drive.	Any unassigned disk drive
Enable S.M.A.R.T. Check	Activates SMART checking for the disk drives in this logical drive.	Enable or disable
Enable Hard Disks's Write Cache	Activates the write caches for the disk drives in this logical drive.	Enable or disable
Enable Write Back	Activates write-back feature of the caches for the disk drives in this logical drive.	Enable or disable
Automatic Flush Frequency	Specifies the flush frequency for the controller cache in seconds. Zero means deactivated.	2 to 60
For the following three features, a High setting speeds the background operation while slowing foreground read/write operations. A Low setting favors the read/write.		
Set Rebuild Priority	Allocates system resources between read/write operations and rebuilding.	High or low
Set Synchronize Priority	Allocates system resources between read/write operations and synchronizing.	High or low
Set Migration Priority	Allocates system resources between read/write operations and migrating.	High or low

Logical Drive Critical Status

When WebPAM detects a fault in the Logical Drive, Enclosure or any other component, it signals with a warning icon over the affected components in Tree View (below).
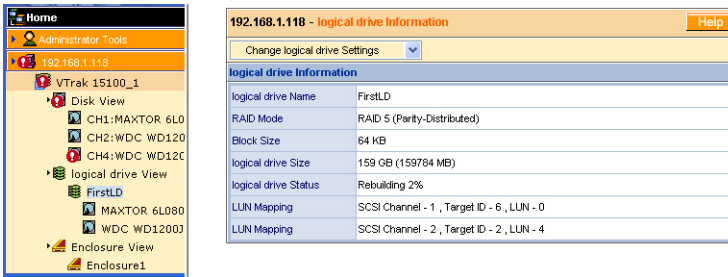
The Promise RAID Controller will also detect the fault and sound an audible alarm: two short beeps, repeated. The Logical Drive icon on the front of the VTrak enclosure changes to amber.
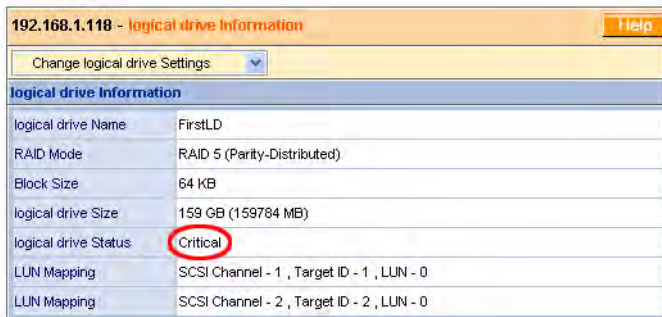
When this condition appears, click on each component to discover the faulty one below it. The last component is the source of the fault.

In the example above, a disk drive has failed. As a result, the RAID has lost its redundancy, although it can still read and write data.

When a disk drive fails, it disappears from the WebPAM interface. You can identify the failed drive under Disk View, noting that there is no drive showing for Channel 3. The failed drive displays a red Status LED.

The Promise RAID controller will automatically attempt to activate a hot spare drive and rebuild it to become part of the logical drive (above). The drive in Channel 4 is the hot spare drive in this example.

If the hot spare feature is deactivated or no hot spare drive is available, the controller wait until you install a replacement drive.

During rebuild, the alarm sounds a single short beep, repeated. The disk drive being rebuilt displays an amber Status LED.

Important

If you use a disk drive that has been used before in a VTrak logical drive, you must wipe (erase) the Reserve Sector of the disk drive before VTrak will accept it and rebuild to it. See page 129.

During rebuilding, you can still read and write data to the logical drive. However, fault tolerance is lost until the logical drive is restored to Functional status.

Rebuild a Logical Drive

When a disk drive fails and you manually replace it with a new one, you must rebuild the new drive to restore data redundancy. Normally, the rebuild process begins automatically. You can also perform a rebuild manually.

You must have Maintenance Rights to perform this function.

Follow these steps to rebuild your logical drive:

1. In Tree View, click the icon of the logical drive you want to rebuild.
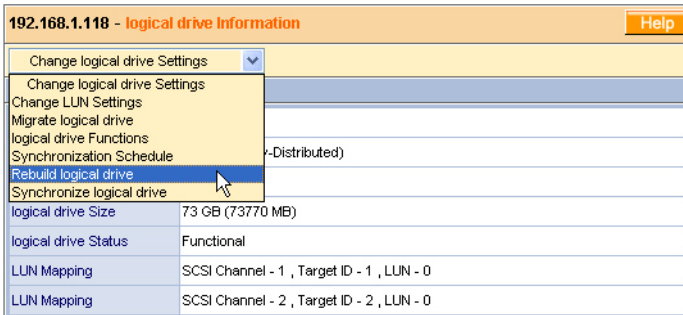
2. In the Management Window, click on the Change Logical Drive Settings and select *Rebuild Logical Drive* from the dropdown menu (above). The Rebuild Logical Drive screen appears.
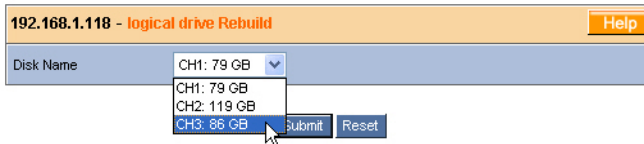
3. In the Disk Name dropdown menu, select the replacement disk drive by its Channel number.

If you select a disk drive that was used previously in a VTrak logical drive, you must wipe (erase) the Reserve Sector of the disk drive before VTrak will accept it and rebuild to it. See page 129.

4.   Click the Submit button when you are done. The Logical Drive Management function screen returns and the logical drive begins rebuilding. The alarm sounds a series of single, short beeps during the Rebuild process.

Mon Sep 15 18:07:14 PDT 2003		
Event Name	Time	IP Address
99 || Rebuilding on FirstLD has completed 5%.	Mon Sep 15 18:07:16 PDT 2003	192.168.1.118
99 || Rebuilding on FirstLD has completed 4%.	Mon Sep 15 18:07:01 PDT 2003	192.168.1.118
99 || Rebuilding on FirstLD has completed 3%.	Mon Sep 15 18:06:45 PDT 2003	192.168.1.118
99 || Rebuilding on FirstLD has completed 2%.	Mon Sep 15 18:06:27 PDT 2003	192.168.1.118
99 || Rebuilding on FirstLD has completed 1%.	Mon Sep 15 18:06:12 PDT 2003	192.168.1.118
983040 || VTrak 15100_1 : Rebuild begun on Array FirstLD.	Mon Sep 15 18:05:55 PDT 2003	192.168.1.118
851978 || VTrak 15100_1 : Disk Plugged in: 3.	Mon Sep 15 18:00:19 PDT 2003	192.168.1.118

Watch the Event Frame for progress (above).

Migrate a Logical Drive

To migrate a logical drive is to:

•   Change its RAID level and/or

•   Increase the number of disk drives

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

1.   Click on the Logical Drive ![icon] icon. The Logical Drive Window appears.


```
Change logical drive Settings    ▼
   Change logical drive Settings
Change LUN Settings
Migrate logical drive
logical drive Functions          ⬚
Synchronization Schedule
Rebuild logical drive
Synchronize logical drive
```
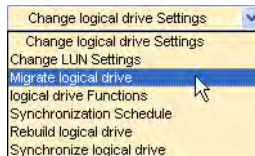
2.   From the logical drive screen, click on the Change logical drive Settings menu.

3.   Select *Migrate logical drive*. The logical drive Migration window displays.
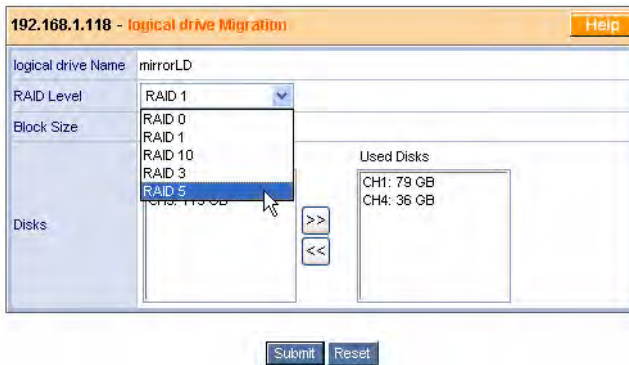
4.   If you want to *change RAID level*, select the new RAID level from the dropdown menu. The RAID levels shown are those possible to achieve from the existing logical drive and available disk drives.
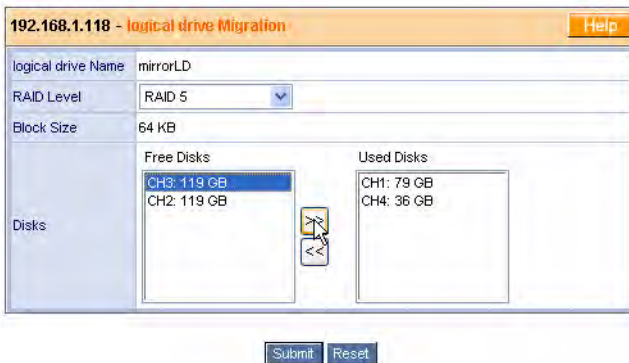
5.   If you want to *add disk drives*, select the drives under Free Disks, then click the **>>** button to move them to the Used Disks window.

6.   Click the Submit button when you are done.

     You will be transferred to the Logical Drive page.

Synchronize a Logical Drive

Synchronization is a routine maintenance procedure for fault-tolerant logical drives (those with redundancy) that ensures all the data matches exactly.

During Synchronization, you will have access to the logical drive, but it will respond more slowly to read/write tasks because of the additional operation. The time required for Synchronization depends on the size of the logical drive.

You can initiate this procedure manually or select Synchronization Schedule from the Change Logical Drive Settings menu to set this function to occur automatically.

Promise recommends synchronizing your logical drive(s) once a month. You must have Maintenance Rights to perform this function.

To manually synchronize a logical drive:

1.   Click on the Logical Drive ![icon] icon. The Logical Drive Window appears.

2.   Click on the Change logical Drive Settings menu and select *Synchronize logical drive*.

3.   Click OK on the confirmation dialog box.

The Synchronization process will conclude automatically. An event message will notify you when synchronization is done.

	Notes
![pencil icon]	• The logical drive must be Functional in order to be synchronized. Correct any problems before proceeding.
	• Depending on the number and capacity of your disk drives, synchronization can take many hours. Consider using WebPAM's Synchronization Schedule feature.

Synchronization Schedule

The Synchronization Scheduler function allows you to schedule the automatic synchronizing of your logical drive(s) at the most convenient time. Since synchronization tends to slow logical drive performance, the most efficient approach is to schedule it when the logical drive is doing the least work, such as a weekend or early morning.

Promise recommends synchronizing your logical drive(s) once a month. You must have Maintenance Rights to perform this function.

1. Click on the Logical Drive 🗄 icon. The Logical Drive Window appears.
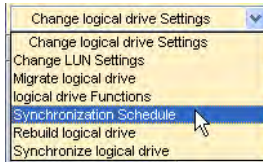
2. Click on the Change Logical Drive Settings menu and select *Synchronization Schedule*.

3. Click on the button corresponding to the unit of time that best fits your schedule: By Minute, By Hour, By Day, By Week or By Month.

In the fields to the right of the button you clicked, enter the appropriate value(s).

- By Minute, type the number of minutes from 30 to 59.
- By Hour, type the number of hours from 1 to 23.
- By Week, type the a hours as above, then select a day of the week from the drop-down menu.

- By Month, type the a hours as above, then select a day of the month (through the 28th) from the drop-down menu.

4. For By Week and By Month, select the day of the week or the day of the month (through the 28th) from the drop-down menu.

5. When you are done, click the Submit button.

Notes

- A logical drive must be Functional in order to be synchronized. Before the scheduled operation, check the logical drive and correct any problems.

- You can synchronize your logical drive on demand. Select Synchronize logical drive from the Change logical Drive Settings menu.

Delete a Logical Drive

During the WebPAM setup procedure, you used the CLU to create a temporary logical drive in order for WebPAM to connect with VTrak. If you wish to delete it and make the disk drive(s) available for other uses, follow these steps.

You must have Deletion Rights to perform this function.

1. Click on the Logical Drive View icon. In the Management window, all logical drives belonging to this controller appear.
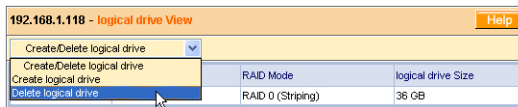
2. Click on Create/Delete Logical Drive tab in the logical drive window (above) and select *Delete logical drive*. The Delete logical drive window appears.
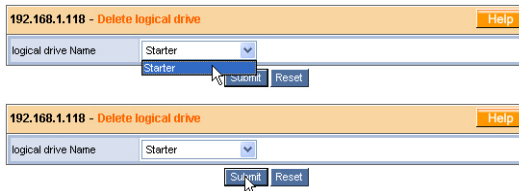
3. In the Delete logical drive window, select your temporary logical drive name from the drop-down menu and click the Submit button. A verification dialog box appears.
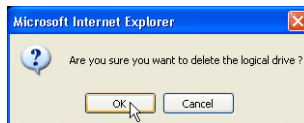
4. Click OK in the verification dialog box to delete the logical drive.

Enclosure Management

- Enclosure View (below)
- Enclosure Information (page 106)

Enclosure View

The Enclosure View lists all enclosures running under the selected controller. There can be multiple enclosures but often there is only one.

To access it, click on the Enclosure View ![icon] icon. All enclosures will display.

Name	Status	Enclosure Type
Enclosure1	Functional	VTrak 15100

192.168.1.118 - Enclosure View   Help

The Status field of the Enclosure View lists any problems a specific enclosure might have.

Click on the Enclosure name (such as Enclosure1) in Tree View for additional information.

Enclosure Information

The Enclosure screen provides server-level monitoring capabilities of VTrak.

To access Enclosure Information, click on the Enclosure ![icon] icon. The information screen will display.
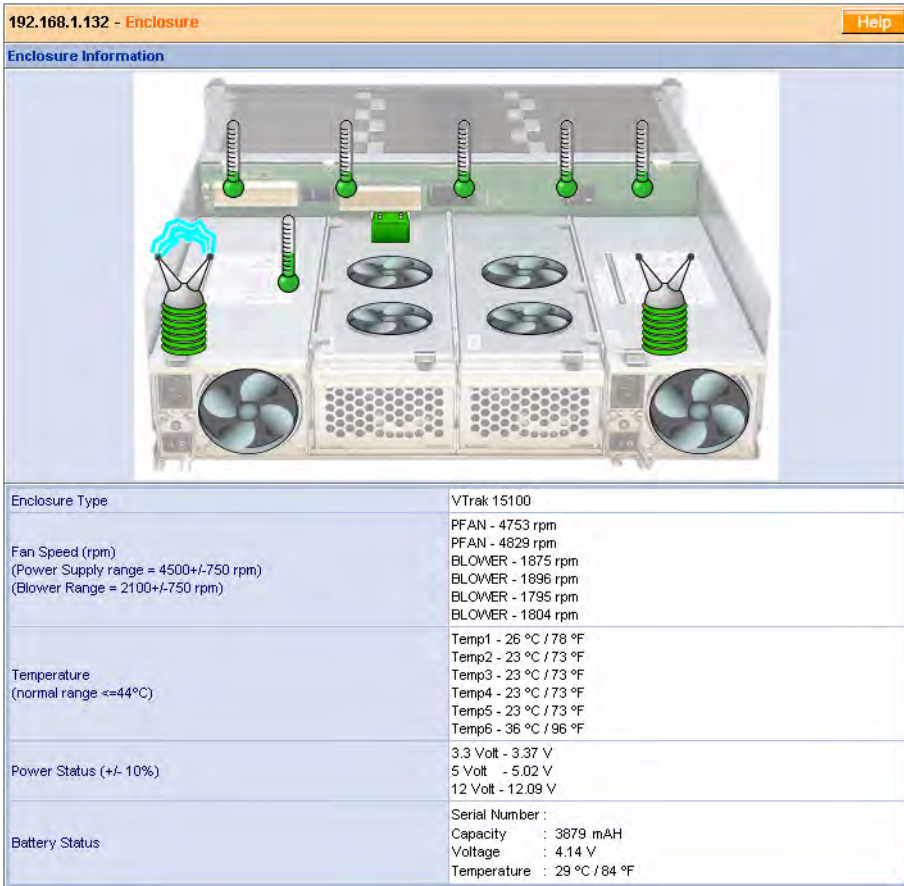
Enclosure provides monitoring of fan ffunction, temperature tsub-system voltage and battery condition inside the VTrak. Normal and actual values are cited.

If an icon turns red or shows a red circle-X ![red circle-X], the component it represents is malfunctioning and requires your attention. See *Enclosure Problems* in Chapter 8 for more information. Using the Enclosure screen you can quickly identify a failing component and arrange for its replacement.

Chapter 5: Management with the CLU

VTrak Status Indicators

Even though the Command Line Utility offers comprehensive monitoring of VTrak, the LED indicators on the VTrak unit provide important status information.

When the power is switched on, the LEDs on the front of the VTrak will light up.

Figure 1. VTrak 15100 Front Panel LEDs

When boot-up is finished and the VTrak is functioning normally:

- Controller LED blinks green once per second for five seconds, goes dark for ten seconds, then blinks green once per second for five seconds again.
- Power, FRU and Logical Drive LEDs display green continuously.
- SCSI LEDs flash green if there is activity on that channel.

See the table below.

LEDs	State				
	Dark	Steady Green	Flashing Green	Amber	Red
Power	System Off	Normal	n/a	n/a	n/a
FRU*	System Off	Normal	n/a	Fan or Battery Problem	Fan or Battery Failed
Logical Drive	System Off	Normal	n/a	Logical Drive Critical	Logical Drive Offline
SCSI-1 SCSI-2	No Activity	n/a	Activity	n/a	n/a
Controller	System Off	n/a	Normal**	n/a	n/a
* Field Replacement Unit. "n/a" means this state does not apply to this LED. ** Five green blinks, one per second; dark 10 seconds; five green blinks.					

See page 159 for more information about field-replaceable components.
See page 201 for a discussion of critical and offline logical drives.

Drive Status Indicators

There are two LEDs on each Drive Carrier. They report the presence of power and a disk drive, and the current condition of the drive.

Power/ Activity   Disk Status

Figure 2.   VTrak 15100 Disk Carrier LEDs

The VTrak spins up the disk drives sequentially in order to equalize power draw during start-up. After a few moments the Power/Activity and Disk Status LEDs should display green.

LEDs	State				
	Dark	Steady Green	Flashing Green	Amber	Red
Power/ Activity	No Drive	Drive Present	Activity	n/a	n/a
Status	No Power	Drive OK	n/a	Drive Rebuilding	Drive Error
"n/a" means this state does not apply to this LED.					

See page 201 for a discussion of rebuilding and failed disk drives.

Audible Alarm

VTrak's audible alarm (buzzer) has three sound patterns:

- Beep. Beep. Beep. – Indicates that a logical drive is rebuilding
- Beep-beep, beep-beep, beep-beep. – Indicates that a logical drive is critical
- Beep-beep-beep. Beep-beep-beep. – Indicates a problem with a field replaceable unit (FRU)
- 10 second continuous beep – Indicates that a logical drive is offline

See page 159 for more information about field-replaceable components.
See page 201 for a discussion of critical and offline logical drives.

CLU Connection

Before you begin, be sure the null modem cable is connected between the Host PC and VTrak, and that both machines are booted and running.

1.   Start your PC's terminal emulation program.
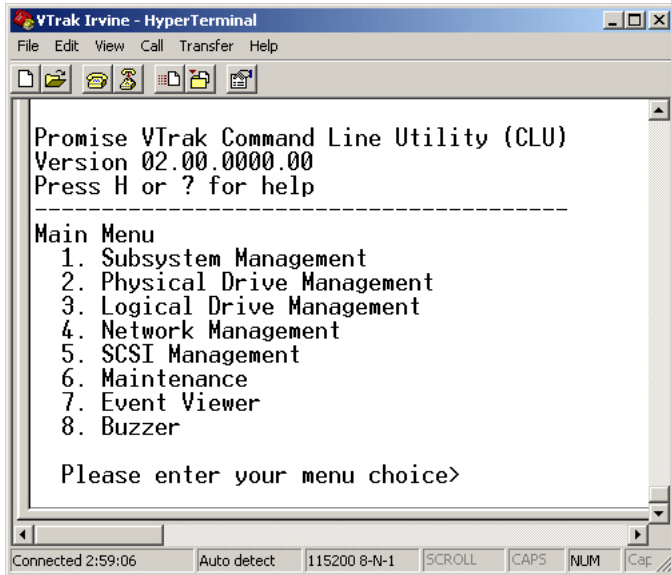
2.   Press Enter once to launch the CLU.

There are eight functional groups in the CLU:

Subsystem Management – Allows you view controller information, change parameters, monitor the enclosure, update the firmware and reboot the VTrak.

Physical Drive Management – Enables you to view disk drive assignments and parameters, wipe boot and reserve sectors, change disk drive settings and perform diagnostics.

Logical Drive Management – Allows you to view logical drive information, create and delete logical drives; change LUN settings, cache policy, hot spare policy, retry count, SMART settings; rebuilding, synchronization and migration priorities.

Network Management – Make Management Port, Telnet, and SNMP settings, set IP address for management port, TFTP server and gateway; and set subnet mask.

SCSI Management – Set channel TIDs and Console LUN.

Maintenance – Enable or disable the Maintenance Activity Monitor and Media Patrol; migrate Logical Drives; manually rebuild, synchronize, run PDM and Redundancy Check on Logical Drives.

Event Viewer – View the event log.

Buzzer – Enable, disable or silence the buzzer (audible alarm).

Exit the CLU

Close the terminal emulation window to exit the CLU.

Index to CLU Functions

The index below is designed to help you navigate to the submenu where each function is located. The paths in this index does not activate the functions.

All directions begin at the CLU Main Menu. From that point, the keystrokes are listed to take you to the appropriate submenu. Many SCSI functions require you to pick a Port Number (port no.) before the function submenu will appear. In some cases, you will specify a Logical Drive by its ID number.

For example:

Hot Spare Policy - Main Menu, 3 Enter, 4 Enter

1. Start at the Main Menu.
2. Press 3 and Enter. The Logical Drive Management submenu appears.

```
ID  Name       RAID  SBS   CAP     Member PDs  Status
--------------------------------------------------------------------------------
1   LogDrv1    5     64K   239GB   1-2,4       Functional
2   LogDrv2    1     64K   35GB    3,5         Functional
--------------------------------------------------------------------------------
```

```
Logical Drive Management
 1. Logical Drive Auto Creation
 2. Create New Logical Drive
 3. Delete Logical Drive
 4. Modify Logical Drive Parameters
 5. PDM Auto Start Option
 R. Return to Previous Menu

   Please enter your menu choice>4
```

3. Press 4 and Enter. Because there is more that one Logical Drive, the CLU asks to specify the one you want by ID number.

```
   Enter the Logical Drive ID>2
```

4. Press 2 and Enter to select Logical Drive ID 2. The Modify Logical Drive
    Parameters submenu displays:

```
-------------------------------------------------------------------------
Logical Drive 2 Parameters:
Name:              LogDrv2          RAID Level:    1
Stripe Block Size  64K              Capacity:      35 GB
Member PDs:        3,5              Smart Check:   On
Cache Policy:      Write Through    Retry Count:   2
Auto Rebuilding:   On               Hot Spare:     Global
Priority: High(RBLD), High(SYNC), High(Migration)
SCSI Mapping:      CH 1   LUN 1
SCSI Mapping:      CH 2   LUN 1
-------------------------------------------------------------------------------

Modify Logical Drive 2 Parameters
 1. SCSI Assignment
 2. Cache Policy
 3. Retry Count
 4. Enable/Disable SMART
 5. Name
 6. Priority
 7. Hot Spare Policy
 8. Auto Rebuilding
 R. Return to Previous Menu
```

5. From this submenu, press 7 and Enter to access the Hot Spare Policy
    function.

    Current hot spare policy:
    Global

    Change to Dedicated hot spare policy for LD 2(y/n)?>**y**

6. Press Y and Enter to change the Hot Spare Policy to Dedicated.

    In this example, there was only one free physical drive meeting this Logical
    Drive's requirements, so it was automatically chosen.

The Parameters and Submenu appear with the new Hot Spare setting.

```
--------------------------------------------------------------------------------
Logical Drive 2 Parameters:
Name:            LogDrv2          RAID Level:    1
Stripe Block Size  64K            Capacity:      35 GB
Member PDs:      3,5              Smart Check:   On
Cache Policy:    Write Through    Retry Count:   2
Auto Rebuilding:  On              Hot Spare:     Dedicated(6)
Priority: High(RBLD), High(SYNC), High(Migration)
SCSI Mapping:    CH 1   LUN 1
SCSI Mapping:    CH 2   LUN 1
---------------------------------------------------------------------------------

Modify Logical Drive 2 Parameters
 1. SCSI Assignment
 2. Cache Policy
 3. Retry Count
 4. Enable/Disable SMART
 5. Name
 6. Priority
 7. Hot Spare Policy
 8. Auto Rebuilding
 R. Return to Previous Menu

Please enter your menu choice>
```

This concludes the example.

CLU Index

A

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W

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This is the end of the CLU Index.

Controller Management

1. From the Main menu, press 1 and Enter, then 1 and Enter again to access Controller Managment. The result looks like this:

        ---------------Controller information---------------
         Product: VTrak 15100
         Controller Serial Number: 002G03O01300069
         Controller Label: SATA RAID
         Firmware Revision: 01.02.0000.54
         Hardware Revision: 0.1.0.2
         SEP Revision: 1.01
         Management Port IP Address: 192.168.1.56
         Telnet: enabled
         Date: 2004-5-10
         Time: 2:45:15

        Controller Management
         1. View Controller Information
         2. Modify Controller Parameters
         3. Firmware Update
         4. VPD
         5. Reboot
         R. Return to Previous Menu

        Please enter your menu choice>

2. Press the number of the option you want plus Enter to move to the next submenu.

Functions Under Controller Management

- View Controller Information – Serial and revision numbers, IP addresses, cache size, SCSI port information
- Modify Controller Parameters – Modify the Controller Label (name) and change the date and time
- Firmware Update – Update VTrak's firmware. See page 160 for more information
- VPD – Displays information from these controller boards: Storage Enclosure Processor, Main Controller, Controller Daughter Card, Battery, Fans, Power Supplies and Backplane
- Reboot – Reboot the VTrak subsystem

Enclosure Management

From the Main menu, press 1 and Enter then 2 and Enter to access Enclosure Managment. The result looks like this:

```
Enclosure Management
 1. Fan Speed
 2. Buzzer
 3. Temperature
 4. Voltage
 5. Battery

R. Return to Previous Menu
```

Fan Speed

From the Enclosure Management menu, press 1 and Enter to access Fan Speed.

```
****************Fan Speed***************
Fan #     RPM     Normal Operational Range
-----------------------------------------------------------
1         4753     3750-5250
2         0        3750-5250
3         1917     1350-2850
4         1928     1350-2850
5         1804     1350-2850
6         1804     1350-2850
```

In this example, Fan 2 is not turning. This condition can cause overheating of the VTrak subsystem. A broken fan requires replacement, even if the VTrak temperature readings are currently normal.

Fans 1 and 2 are located on the Power Supplies. As a result, Power Supply 2 requires replacement even if the power output levels are OK.

For information on fan replacement, see page 166.

Buzzer

From the Enclosure Management menu, press 2 and Enter to access the Buzzer (Beeper). You can also access the Buzzer from the Main menu.

```
Buzzer
 1. Silence Buzzer
 2. Enable Buzzer
 R. Return to Previous Menu

 Please enter your menu choice>2

 Enable buzzer(y/n)?>y
```

Press 2 and Enter to enable or disable the buzzer. Press Y and Enter to confirm.

Press 1 and Enter to silence the buzzer. Press Y and Enter to confirm.

Silence means to cancel the audible alarm for the current event only. If another event happens, the buzzer will sound again.

Temperature

From the Enclosure Management menu, press 3 and Enter to access Temperature.

```
*******************Temperature*******************
```

Temperature #	Celsius	Fahrenheit	Normal Operational Range
1	27	80	<= 45 Celsius
2	27	80	<= 45 Celsius
3	24	75	<= 45 Celsius
4	23	73	<= 45 Celsius
5	24	75	<= 45 Celsius
6	38	100	<= 55 Celsius

```
Press Enter key to return
```

Look for a temperature measurement above the Normal Operational Range. An elevated temperature can be the result of a failed fan or blocked cooling passages. Temperature #6 has a higher range because it is located directly above the main controller board.

Voltage

From the Enclosure Management menu, press 4 and Enter to access Voltage.

```
******************Voltage****************
#         Voltage(volts      Normal Operational Range
------------------------------------------------------------------
1         3.39               2.96-3.63
2         5.16               4.48-5.51
3         12.09              0.76-13.19

Press Enter key to return
```

VTrak has three power buses, 3.3V, 5V and 12V. If a voltage is out of normal operational range, there could be problem with the power supply(ies). Note that bus voltage is the combined output of both power supplies. Therefore do not condemn a power supply based on this voltage reading alone.

For information on power supply replacement, see page 165.

Battery

From the Enclosure Management menu, press 5 and Enter to access Battery.

```
***************Battery**************
Battery Information:
Voltage: 4.13 volts
Capacity: 3841 mAH
Temperature: 29 Celsius (84 Fahrenheit)

 Press Enter key to return
```

A battery is supplied with VTrak to power the cache in the event of a power failure. When fully charged, the battery can supply power up to 72 hours.

For information on battery replacement, see page 171.

For more information on Troubleshooting, see page 191.

Subsystem Management

- Controller Management (below)
- Enclosure Management (page 124)

Controller Management

- View Controller Information (below)
- Modify Controller Parameters (below)
- Firmware update (page 122)
- VPD (page 123)
- Reboot (page 124)

View Controller Information

1. Press 1 and Enter to view controller information. The result looks like this:

   ```
   ---------------Controller information---------------
    Product:  VTrak 15100
    Controller Serial Number: N300A0390009
    Controller Label: Promise SATA
    Firmware Revision: 01.02.0000.50
    Hardware Revision: 0.1.0.2
    SEP Revision: 0.25
    Telnet: enabled
    Management Port IP Address: 192.168.10.203
    Subnet Mask: 255.255.255.0
    TFTP Server IP Address: 192.168.10.11
    Date: 2004-4-6
    Time: 12:25:49
    DDR (ECC) Size: 256MB
    SCSI Channel 1 TIDs:  1
    SCSI Channel 2 TIDs:  1
   ```

2. Press any key to return to the Controller Management menu.

Modify Controller Parameters

1. Press 2 and Enter to access controller parameters. The following menu appears:

   ```
   ----------------------------------------------------
   Modify controller parameters
      1. Controller Label
      2. Date and time
      R. Return to previous menu
   ```

2. Press 1 and Enter to change the controller label (name)

```
---------------Modify Controller Label--------------
  Current controller label: SATA RAID
  Modify controller label(y/n)?>y
  Enter the new controller label>SATA RAID System
  Controller label has been set to SATA RAID System
  Press Enter key to return
```

3. Press Y and Enter to confirm the label change.
4. Type the new label name and press Enter.
5. Press Enter to return to the Modify Controller Parameters menu.

1. Press 2 and Enter to set the date and time.

```
-----------------Modify Date & Time-----------------

  Current Date: 2004-4-6
  Current Time:  8:53:14
  Modify date(y/n)?>y
  Enter the new year>2004
  Enter the new month>4
  Enter the new day>5

  Modify time(y/n)?>y
  Enter the new hour>5
  Enter the new minute>50
  Enter the new second>30

  Current Date: 2004-4-5
  Current Time:  5:50:30
  Press Enter key to return
```

2. Press Y and Enter to confirm the date or time change.
3. Type the new year, press Enter; new month, press Enter; and new day and press Enter.
4. Repeat the same steps for time set.
5. Press Enter to return to the Modify Controller Parameters menu.

Firmware Update

Use this function to set the IP address of the TFTP server and to specify the firmware file name. See page 160 for the complete procedure.

1. Press 3 to access Firmware Update.

```
  Current management port IP address: 10.0.0.2
  Current TFTP Server IP Address: 10.0.0.16
  Modify TFTP Server IP address(y/n)?>y
  Enter the new TFTP Server IP address>192.168.1.157
  New TFTP Server IP address is 192.168.1.157
```

Enter the firmware file name on TFTP server>**VTrak-FW-v1.2.img**
Update firmware for VTrak 15100 now(y/n)?>**y**
File Vtrak-FW-v1.2.img, TFTP Server 192.168.1.157
updating started, please wait...

Please note that the new firmware will take effect
only after VTrak 15100 is rebooted.

2. Reboot the VTrak to make the new firmware effective.

VPD

Vital Performance Data (VPD) refers to the condition of major VTrak components. Use this information for diagnosis, consulting with Promise Technical Support and when you order replacment parts.

- SEP Board
- Main (Controller) Board
- Daughter Board
- Battery Board

- Fan Boxes
- Power Supplies
- Backplane
- Back Plane Box

1. Press A to see a summary.

Summary of VPD Content:

Component	Part Number	Serial Number	Rev	Date
SEP Board	P100R15SA014000	003A03O20100091	3	2003-10-22
Main Board		001G03O01400119	3	2004-02-12
Battery Board				2004-01-27
Fan Box 1	P100R15SA014000	004A03O20000135	3	2003-10-30
Fan Box 2	P100R15SA014000	004A03O20000134	3	2003-10-30
Power Supply 1	P100R15SA014000	006B03O40900106	3	2003-11-11
Power Supply 2	P100R15SA014000	006B03O40900108	3	2003-11-11
Back Plane Box	P100R15SA014000	002G03O01300069	3	2003-10-27
Daughter Board	P29R15S20000010	008D03910400028	2	2004-02-12

2. Press the number of an individual component to see complete information on that component. In this example, press 2 for Main Board.

VPD Information for Main Board:
Signature: PT
Check Sum: 0xe7e8
Board ID: 1
Mfg Part:
Mfg S/N: 001G03O01400119
Mfg Rev: 3

```
Mfg Month:   2
Mfg Date:    12
Mfg Year:    4
WWN:           0 0 0 0 0 0 0 0
MAC Block1 Size:        0
MAC Block1 Address:     00 00 00 00 00 00
MAC Block2 Size:        0
MAC Block2 Address:     00 00 00 00 00 00
MAC Block3 Size:        0
MAC Block3 Address:     00 00 00 00 00 00
SCSI Name prefix:
Check Sum:           0x0
```

The same data categories are shown for all components, although some may not apply.

3.   Press Enter to return to the VPD information menu.

Reboot

Press 5 and Enter to reboot the VTrak. You must confirm your selection twice.

```
Promise VTrak Command Line Utility (CLU)
Version 02.00.0000.00
Press H or ? for help
All rights reserved by Promise Technology, Inc. 2003-2005
--------------------------------------------------------
Main Menu
 1. Subsystem Management
 2. Physical Drive Management
 3. Logical Drive Management
 4. Network Management
 5. SCSI Management
 6. Background Activity
 7. Event Viewer
 8. Buzzer
 Please enter your menu choice>
```

The VTrak is done rebooting when the Main Menu (shown above) appears on the CLU screen.

Enclosure Management

Enclosure Management refers to the basic functions of the VTrak enclosure:

- Fan Speed
- Buzzer
- Termperature

- Voltage
- Battery

Fan Speed

Press 1 and Enter to check fan speed.

```
*******************Fan Speed******************
Fan #    RPM        Normal Operational Range
---------------------------------------------
1        4560       3750-5250
2        5125       3750-5250
3        1962       1350-2850
4        1973       1350-2850
5        1875       1350-2850
6        1875       1350-2850
```

Fans 1 and 2 are part of the power supplies. Fans 3 through 6 are in the fan boxes. If a fan outside its normal range, it could be failing. If an fan speed shows zero, the fan is disconnected or has failed.

Buzzer

Use this feature to enable or disable VTrak's buzzer (audible alarm). You can also temporarily silence the buzzer.

The Silence Buzzer function cancels the buzzer only for the current event that triggered the buzzer, such as a critical array. When the logical drive starts rebuilding, the buzzer would sound again.

1. Press 8 and Enter to access the Buzzer setting.

    Buzzer
    1. Silence Buzzer
    2. Enable Buzzer
    3. Disable Buzzer
    R. Return to Previous Menu

    Please enter your menu choice>**2**

    Enable buzzer(y/n)?>**y**

2. Press 1, 2, or 3 as desired and Enter to make your selection.

    Press Y and Enter to confirm.

    Buzzer
    1. Silence Buzzer
    2. Enable Buzzer
    3. Disable Buzzer
    R. Return to Previous Menu

Please enter your menu choice>**r**

3.   Press R and Enter to return to the Main Menu.

See page 109 for a list of buzzer sounds.

Temperature

Press 3 and Enter to check the VTrak's internal temperature.

```
************************Temperature***********************
Temperature #    Celsius    Fahrenheit   Normal Operational Range
-----------------------------------------------------------
1                29         84           <= 45 Celsius
2                27         80           <= 45 Celsius
3                24         75           <= 45 Celsius
4                24         75           <= 45 Celsius
5                25         77           <= 45 Celsius
6                36         96           <= 55 Celsius
```

Temperature values 1 through 5 are measured along the backplane. Value 6 is measured at the controller. A temperature value above normal range reflects a cooling problem.

Voltage

Press 4 and Enter to check VTrak's internal system voltages.

```
*********************Voltage********************
#   Voltage (volts)   Normal Operational Range
------------------------------------------------
1    3.39             2.96 - 3.63
2    5.16             4.48 - 5.51
3    12.16            10.76 - 13.19
```

Temperature value 1 is the 3-volt circuit; value 2 is the 5-volt circuit; and value 3 is the 12-volt circuit. A voltage value outside the normal range reflects a power supply problem.

Battery

VTrak has a battery to power the cache memory in case of a power failure. The battery is maintained as a part of normal system operation.

Press 5 and Enter to check battery condition.

```
***********************Battery***********************
Battery normal
```

If the battery reports voltage or temperature unstable or out-of-range, this indicates a problem. If it says no battery found, the battery is either disconnected or not installed.

Physical Drive Management

The term *Physical Drive* refers to a Hard Disk Drive, as compared to a *Logical Drive* that is made up of one or more physical or disk drives. This manual uses the terms physical drive and disk drive interchangeably.

From the Main Menu, press 2 and Enter to access Physical Drive Management.

```
**********Physical Drive (PD) Assignment**********
ID  Name            Capacity   Write Cache   Status
-------------------------------------------------------------------------
1   ST3160023AS     159 GB     Enabled       Assigned In LD 1
2   WDC WD1200JD    119 GB     Enabled       Error
3   WDC WD1200JD    119 GB     Enabled       Assigned In LD 1
4   WDC WD1200JD    119 GB     Enabled       Assigned In LD 1
5   Maxtor 6Y080M0  81 GB      Disabled      Free
7   ST3160023AS     159 GB     Enabled       Dedicated for LD 1
-------------------------------------------------------------------------
Physical Drive Management
 1. View Parameters
 2. Enable/Disable Write Cache
 3. Wipe Out Boot Sector
 4. Wipe Out Reserved Sector
 5. Blink Led
 6. Diagnostics
 7. IO Statistics
 R. Return to Previous Menu

    Please enter your menu choice>
```

The physical drive assignment lists all disk drives by their placement in the VTrak chassis, from left to right, 1 to 15, along with make, model, capacity, write cache status and assignment status.

Status is reported for each disk drive as follows:

- **Free** – Not assigned to any logical drive
- **Assigned in LD 1** – Assigned to logical drive 1
- **Dedicated for LD 1** – Assigned as a dedicated hot spare for logical drive 1
- **Error** – This drive is present but offline. You cannot use this drive
- **No ID number** – There is no drive in this channel or VTrak does not recognize the drive

If you know a disk drive is good but VTrak shows an Error, wipe the drive's reserve sector. From the Physical Drive Management menu, press 7 and Enter.

If VTrak does not recognize a disk drive, check for proper installation into the drive carrier and verify that the carrier is properly inserted into the slot. See page 9.

View Parameters

1. Press 1 and Enter to view the parameters of the selected disk drive.

2. Type the ID number of the disk drive you want to see and press Enter.

> ------Physical Drive 1 Parameters------
> Name: ST3160023AS
> Serial Number: 3JS0SZ8Y
> Firmware Version: CQ14
> Maximum LBA: 312319601
> Capacity: 159 GB
> Mode Setting: UDMA 5
> Write Cache Status: disabled
> SMART Status: SMART check disabled
>
> Press Enter key to return

3. Press Enter to return to the Physical Drive Management menu.

Enable/Disable Write Cache

All disk drive write caches are disabled by default. You must enable them individually using this function.

1. Press 2 and Enter to enable or disable the write cache in the selected disk drives.

> Enter PD IDs and/or ID ranges>**2**
> Changing write cache option for PD 2 ...
>
> Press Enter key to return

2. Type the ID numbers of the physical drives for which you want to change the Write Cache option and press Enter.

This function simply reverses the current setting of the selected drives. For example, it will enable the write caches in all selected drives only if they are all currently disabled.

3. Press Enter to return to the Physical Drive Management menu.

Wipe Out Boot Sector

When a disk drive is bootable, it contains a boot sector. In some cases, a boot sector is undesireable when the disk drive is used in a logical drive. This feature erases the boot sector from the disk drive.

1. Press 3 and Enter to wipe the boot sector from the selected disk drives.

   Enter PD IDs and/or ID ranges>**5**
   Total 1 PD has been selected.
    Wipe out boot sector for PD 5(y/n)?>**y**

   Wiping out boot sector for PD 5 ...
   Press Enter key to return

2. Type the ID numbers of the physical drives for which you want to cerase the boot sector and press Enter.

3. Press Enter to return to the Physical Drive Management menu.

Wipe Out Reserve Sector

When a disk drive belongs to a logical drive, information about that arrangement is stored in the Reserve sector. In some cases, the RAID controller will not use a disk drive that has information in its Reserve sector.

For example, a disk drive that is part of a logical drive fails. If you replace the failed drive with a drive that was previously used in a logical drive, VTrak will not use it to rebuild the present logical drive. You must erase the Reserve sector on the replacement drive first.

1. Press 4 and Enter to wipe the Reserve sector from the selected disk drives.

   Enter PD IDs and/or ID ranges>**6**
   Total 1 PD has been selected.
    Wipe out boot sector for PD 6(y/n)?>**y**

   Wiping out boot sector for PD 6 ...
   Press Enter key to return

2. Type the ID numbers of the physical drives for which you want to cerase the Reserve sector and press Enter.

3. Press Enter to return to the Physical Drive Management menu.

Blink LED

This function causes the Disk Status LED for the specified disk drive to blink (right). This action helps you quickly identify the disk drive you are working on.

1. Press 5 and Enter to access Blink LED.
2. Type the ID number of the disk drive whose LED you want to blink and press Enter.
3. Press Enter to return to the Physical Drive Management menu.
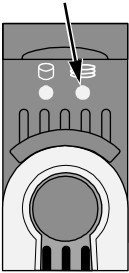
Diagnostics

This function runs the disk drive manufacturer's internal diagnostic program and reports on remapping due to bad sectors on a free disk drive (not assigned to a logical drive). A high level of bad sector remapping signals drive problems.

1. Press 6 and Enter to access Diagnostics.

   Brief testing status for free Physical Drives:

   ```
   ID   Self Test                          Remapping
   ----------------------------------------------------------------------
   3    N/A                                total 32, used 0
   5    N/A                                total 32, used 0
   6    N/A                                total 32, used 0
   ----------------------------------------------------------------------
   Diagnostics
    1. Short Self Test
    2. Long Self Test
    3. Detail Report
    4. Remapping Table
    5. Stop Self Test
    R. Return to Previous Menu

   Please enter your menu choice>1
   Enter Physical Drive ID>3
   ```

2. Type the Diagnostic operation you want and press Enter.

   The Short Self Test takes up to 60 seconds. The Long Self Test takes up to 60 minutes.

3. Type the ID number of the disk drive you want to test and press Enter.

   ```
   Note: this test might take up to 60 seconds to complete
   Check results later on using Report menu

   Press Enter key to return
   ```

4. Press Enter to return to the Physical Drive Management menu.

5. Press 6 and Enter to again access Diagnostics.

    The results of the test are displayed.

    Brief testing status for free Physical Drives:

    ```
    ID   Self Test                          Remapping
    -------------------------------------------------------------------------
    3    self test completed                total 32, used 0
    5    N/A                                total 32, used 0
    6    N/A                                total 32, used 0
    -------------------------------------------------------------------------
    Diagnostics
     1. Short Self Test
     2. Long Self Test
     3. Detail Report
     4. Remapping Table
     5. Stop Self Test
     R. Return to Previous Menu

    Please enter your menu choice>3
    Enter Physical Drive ID>3
    ```

6. Press 3 and Enter for a detailed report.

7. Type the ID number of the disk drive you want reported and press Enter.

    Drive Name: Maxtor 6Y080M0
    Drive Ser#: Y3K88AWE

    Self Test Status:
    The previous self-test completed without any error.

     Press Enter key to return

8. Press Enter to return to the Physical Drive Management menu.

	Note
	If there is a problem with a disk drive, please contact the Technical Support of the disk drive manufacturer. Promise is not authorized to support the disk drives themselves.

Stop a Self Test

1. Press 6 and Enter to access Diagnostics.
2. Press 5 and Enter to stop the Self Test.

I/O Statistics

This function keeps count statistics on the total of read and write input/outputs and transactions the disk drives have performed. These figures are for information only.

1. Press 7 and Enter to access I/O Statistics.

   Physical Drives IO Statistics:

ID	Name	Read Count	Read TRANS	Write Count	Write TRANS
1	ST3160023AS	524434	2516 Mb	1048576	1066 Mb
2	WDC WD1200JD	625306	3146 Mb	3497525	2443 Mb
3	Maxtor 6Y080M0	321986	1743 Mb	2752876	1395 Mb

   Press Enter key to return

   Read and Write Counts record the number of input/output transactions.

   Read and Write Transactions record the volume of data in Megabytes.

2. Press Enter to return to the Physical Drive Management menu.

Logical Drive Management

From the Main Menu, press 3 and Enter to access Logical Drive Management. This are deals with logical drive that you create, in contrast to physical drives which are covered under a separate menu.

    PD: physical drive,   LD: logical drive
    SBS: stripe block size, CAP: capacity,   SYNC: synchronization
    INIT: initialization,   RBLD: rebuild,   RC: redundancy check
    MP: media patrol,   PDM: predictive data migration

PDM Auto Start option: Disabled

ID	Name	RAID	SBS	CAP	Member PDs	Status
1	LogDrv1	5	64K	239GB	1-2,4	Functional
2	LogDrv2	1E	64K	265GB	3,5,7	SYNC 50%

Logical Drive Management
 1. Logical Drive Auto Creation
 2. Create New Logical Drive
 3. Delete Logical Drive
 4. Modify Logical Drive Parameters
 5. PDM Auto Start Option
 R. Return to Previous Menu

 Please enter your menu choice>

The Logical Drive Magement submenu lists all logical drives in the order of their creation, along with name, RAID level, Stripe Block Size, Capacity, physical drives used and its status.

Status is reported for each logical drive as follows:

- **Functional** – Normal operation
- **Critical** – A physical drive has failed, the logical drive is available but fault tolerance has been lost
- **Offline** – The logical drive is offline and unavailable
- **INIT x%** – Initialization, done at logical drive creation. The logical drive is clearing old, unusuable data from the disk drives.
- **RBLD x%** – Rebuild, a repair operation. The logical drive is rebuilding data or parity to a replacement drive. The target disk drive is cited by ID number. The logical drive is available
- **SYNC x%** – Synchronization, a maintenance operation. The logical drive checks the data and parity and corrects inconsistencies. The logical drive is available
- **PDM x%** – Predictive Data Migration, a maintenance operation. The logical drive moves data from a suspect disk drive to a replacement. The target disk drive is cited by ID number. This action anticipates and prevents a disk drive failure and resulting Critical Status. A replacement disk drive is required. The logical drive is available
- **RC x%** – Redundancy Check. The logical drive is checking data to verify that redundancy or parity match. Unlike Synchronizing, no corrections are made. The logical drive is available
- **MP x%** – Media Patrol. The logical drive is checking disk drives to verify the condition of the magnetic media. Unlike Synchronizing, no corrections are made. The logical drive is available

To create a logical drive, see page 134.

To specify a hot spare drive, see page 139.

If you know a disk drive is good but VTrak shows an Error, wipe the drive's reserve sector. See page 129.

Logical Drive Auto Creation

Use this feature to quickly build a logical drive using all available disk drives. You specify the RAID level. The other options are chosen automatically. See page 175 for a discussion of RAID Levels and the number of drives each supports.

1. Press 1 and Enter to access the Logical Drive Auto Creation feature.

```
************Logical Drive Auto Creation***********
Total --6-- free Physical Drives

RAID Mode Options:
 0  - RAID 0  (Striping)
 1  - RAID 1  (Mirroring)
 3  - RAID 3  (Parity)
 5  - RAID 5  (Parity Distributed)
 10 - RAID 10 (Striping/Mirroring)
 50 - RAID 50

Please enter RAID mode(0,1,3,5,10,50)>50
```

The Auto Creation tells you how many disk (physical) drives are free and which RAID modes (levels) are possible.

2. Type the RAID mode you want and press Enter.

    The proposed specifications for the new logical drive appear

    ```
    Logical Drive Auto Creation Information:
    Name: LogicalDrive
    Number of Physical Drives: 6
    RAID mode: RAID 50
    Stripe block size: 64KB
    SMART check: enabled
    Initialization: full

    Create Logical Drive now(y/n)?>y
    ```

3. If you agree with the specifications, press Y and Enter.

    If you disagree, press N and Enter. Then select *Create New Logical Drive* (below) and input your own settings.

    In order to use this logical drive to read and write data, you must partition and format it using the Host PC's operating system.

Create New Logical Drive

Use this feature to manually build a logical drive to meet your own requirements or to use less than the full number of available disk drives. See page 175 for a discussion of RAID Levels, the number of drives each supports and an explanation of the available options.

1. Press 2 and Enter to access the Create New Logical Drive feature.

    ```
    **************Define New Logical Drive**************
     Total 3 Physical Drives

     *******Physical Drives Selection*******
     Id      Name                    Size
    ```

```
-----------------------------------------------------
3            Maxtor 6Y080M0           81 GB
4            Maxtor 6Y080M0           81 GB
5            Maxtor 6Y080M0           81 GB
```

Enter Physical Drive ids and/or id ranges
separated by commas. For example: 1,5,8-15.
Press R to continue after you have finished
selecting Physical Drives.
Your input?>**3-5**

2. Choose the physical drives for your logical drive and press Enter.

```
     *******Physical Drives Selection*******
   Id        Name                    Size
   -----------------------------------------------------
   *3        Maxtor 6Y080M0          81 GB
   *4        Maxtor 6Y080M0          81 GB
   *5        Maxtor 6Y080M0          81 GB
```

Enter Physical Drive ids and/or id ranges
separated by commas. For example: 1,5,8-15.
Press R to continue after you have finished
selecting Physical Drives.
Your input?>**r**

3. When you have selected all the physical drives, press R and Enter.

```
   RAID Mode Options:
    0  - RAID 0  (Striping)
    1  - RAID 1  (Mirroring)
    3  - RAID 3  (Parity)
    5  - RAID 5  (Parity Distributed)
   10 - RAID 10 (Striping/Mirroring)
   50 - RAID 50
```

Please enter RAID mode(0,1,3,5)>**5**

The prompt displays available RAID modes.

4. Type the RAID mode (level) for your logical drive and press Enter.

```
   Stripe Block Size (4, 8, 16, 32 or 64) in KB?>64
   Enter the Logical Drive name>LogDrv1
   Enable initialization(y/n)?>y
   Full or quick initialization(f/q)?>q
   Quick initialization enabled
```

5. Type the stripe block size, logical drive name, whether you want initialization
   and if so, quick or full. Press Enter after each input.

If you chose RAID 1, you will not see a stripe block size. After the last item, a list of your logical drive specifications displays.

Logical Drive creation information:
Name: LogDrv1
Number of Physical Drives: 3
RAID mode: RAID 5
Stripe block size: 64KB
SMART check: enabled

Create Logical Drive now(y/n)?>**y**

6. Review the list. If you agree with the list, press Y and Enter. If you disagree with the list, press N and Enter, then select *Create New Logical Drive* again.

    In order to use this logical drive to read and write data, you must partition and format it using the Host PC's operating system.

Delete Logical Drive

Use this feature to delete an existing logical drive. Be careful when deleting logical drives and be sure the logical drive you delete is the one you intended to delete.

1. Press 3 and Enter to select Delete Logical Drive

    ```
    ****************Delete Logical Drive****************
    Id        Name          Mode        Size
    ---------------------------------------------------------
    1         LogDrv1       RAID5       239 GB
    2         LogDrv2       RAID3       198 GB
    ```

    Select the Logical Drive ID to delete
    Press R to return after finished>**2**
    Delete Logical Drive 2(y/n)?>**y**

2. Type the ID number of the logical drive you wish to delete and press Enter.
3. To confirm deletion, press Y and Enter. To cancel, press N and Enter.

    ```
    ****************Delete Logical Drive****************
    Id        Name          Mode        Size
    ---------------------------------------------------------
     1        LogDrv1       RAID5       239 GB
    ```
    Select the Logical Drive ID to delete
    Press R to return after finished>**r**

4. When you are done deleting logical drives, press R and Enter to return to the Logical Drive Management menu.

Modify Logical Drive Parameters

Press 4 and Enter to access the Modify Logical Drive Parameters menu. If you have more than one logical drive, specify the one you want by its ID number and press Enter. Above the menu is a table of the current settings for this logical drive.

```
--------------------------------------------------------------------------
Logical Drive 2 Parameters:
 Name:           LogDrv2          RAID Level:   1
 Stripe Block Size:  64K          Capacity:     35 GB
 Member PDs:       3,5            Smart Check:  On
 Cache Policy:     Write Through   Retry Count:  2
 Auto Rebuilding:   On            Hot Spare:    Global
 Priority: High(RBLD), High(SYNC), High(Migration)
 SCSI Mapping:     CH 1   LUN 1
 SCSI Mapping:     CH 2   LUN 1
--------------------------------------------------------------------------
Modify Logical Drive Parameters
 1. SCSI Assignment
 2. Cache Policy
 3. Retry Count
 4. Enable/Disable SMART
 5. Logical Drive Name
 6. Priority
 7. Hot Spare Policy
 8. Auto Rebuilding Option
 R. Return to Previous Menu
```

SCSI Assignment

Use this feature to change the SCSI LUN assignments for a logical drive.

Note: To hide a logical drive from an SCSI port, set its LUN to 255. To reveal it, reset the LUN to one of those listed beside the prompt.

1. Type 1 and Enter to access SCSI Assignment.

    Modify LUN for SCSI port 1, Logical Drive 2(y/n)?>**y**

2. Type Y and Enter to confirm.

    Enter the new LUN (2,3,4,5,6,7,8,9,10,11,12,13,14,15)>**3**
    LUN is set to 3 for SCSI port 1 Logical Drive 2

    Press Enter key to return

    Modify LUN for SCSI port 2, Logical Drive 2(y/n)?>**n**

3. Type the new LUN for SCSI port 1 and press Enter.

4. To change the LUN for SCSI port 2, press Y and Enter. Then type the new LUN and press Enter.

To leave the LUN for SCSI port 2 unchanged, press N and Enter.

5. To return to the Modify Logical Drive Parameters menu, press Enter.

Cache Policy

Use this feature to switch the logical drive cache policy between *Write Through* and *Write Back*. Write Through is more secure but Write Back provides better performance. Write Back temporarily stores data in the cache where VTrak's battery protects the data in the event of a power failure.

1. Type 2 and Enter to access Cache Policy.
2. Type Y and Enter to confirm. The new policy displays.
3. To return to the Modify Logical Drive Parameters menu, press Enter.

Retry Count

Use this feature to adjust the number of retries the RAID controller allows a logical drive before it takes the logical drive offline.

1. Type 3 and Enter to access Retry Count.
2. Type Y and Enter to confirm.
3. Type the new retry count and press Enter.
4. To return to the Modify Logical Drive Parameters menu, press Enter.

Enable/Disable SMART

Use this feature to enable or disable the SMART check on a logical drive.

1. Type 4 and Enter to access Enable/Disable SMART.
2. Type Y and Enter to confirm The new setting displays.
3. To return to the Modify Logical Drive Parameters menu, press Enter.

Logical Drive Name

User this feature to change the name of a logical drive.

1. Type 5 and Enter to access Logical Drive Name.
2. Type Y and Enter to confirm.
3. Type the new logical drive name, up to 22 characters, and press Enter.
4. To return to the Modify Logical Drive Parameters menu, press Enter.

Priority

Use this feature to set the logical drive priorities for:

• Rebuilding
• Synchronization

- Migration

A high priority means more system resources are allocated to the Rebuild, Synchronize or Migrate function and less to routine read/write activity. As a result, the Rebuild, Synchronize or Migrate goes faster but the logical drive takes longer for reads and writes. A low priority has the opposite result.

1. Type 6 and Enter to access Priority.

>   Current rebuilding priority: High
>   Current synchronization priority:High
>   Current migration priority: High
>   Change to low RBLD priority for LD 2(y/n)?>**n**

2. Press Y and Enter to change Rebuilding priority. Press N and Enter to leave it unchanged.

>   Change to low SYNC priority for LD 2(y/n)?>**n**

3. Press Y and Enter to change Synchronization priority. Press N and Enter to leave it unchanged.

>   Change to low migration priority for LD 2(y/n)?>**y**

4. Press Y and Enter to change Migration priority. Press N and Enter to leave it unchanged.

   The Screen returns to the Modify Logical Drive Priorities menu.

Hot Spare Policy

A Hot Spare is a disk drive not assigned to a logical drive but available to replace a failing disk drive that belongs to a logical drive.

A *Global* spare can be used by any logical drive that needs it. A *Dedicated* spare can only be used by a specific logical drive.

1. Press 7 and Enter to access the Hot Spare Policy.

>   Current hot spare policy:
>   Global
>   Change to Dedicated hot spare policy for LD 2(y/n)?>**y**

2. Press Y and Enter to change hot spare policy. Press N and Enter to leave it unchanged.

>   Available free Physical Drive(s):
>   8
>   9
>
>   Choose the free Physical Drive for the dedicated hot spare>**8**

3. If you change to a Dedicated hot spare drive, type the ID number of an available physical drive

The Screen returns to the Modify Logical Drive Priorities menu.

Note: Be sure Auto Rebuilding is enabled (below).

Auto Rebuilding

Use this feature to enable the automatic rebuilding of a logical drive that has gone critical. This function must be enabled in order for a hot spare drive to work. See Hot Spare Policy, above. To rebuild a logical drive manually, see page 144.

1. Press 8 and Enter to access the Auto Rebuilding Option.

   Enable auto rebuilding for Logical Drive 2(y/n)?>**y**
   Set to global hot spare policy for Logical Drive 2(y/n)?>**n**

2. Press Y and Enter to enable Auto Rebuilding. Press N and Enter to leave the setting unchanged.

3. Type Y and Enter to enable a Global hot spare policy for this logical drive. Type N and Enter to enable a Dedicated hot spare policy.

   Available free Physical Drive(s):
   8
   9

   Choose the free Physical Drive for the dedicated hot spare>**8**

4. If you select a Dedicated hot spare policy, select the hot spare drive.

   The Screen returns to the Modify Logical Drive Priorities menu.

PDM Auto Start

PDM (Predictive Data Migration) is a maintenance operation. VTrak checks the bad block remapping table and keeps a count of disk drive errors. When these reach the user-specified limits, PDM will migrate the data from the suspect disk drive to a replacement.

This action anticipates and prevents a disk drive failure and resulting Critical Status. The logical drive is available at all times. To perform PDM manually, see page 145.

1. Press 5 and Enter to access the PDM Auto Start Option.

   PDM Auto Start: Disabled
   Enable PDM Auto start(y/n)?>**y**
   Current PDM Threshold:
   Remap percentage threshold: 0%
   Error count threshold: 0

   PDM Threshold
    1. Remap Percentage

2. Error Count
R. Return to Previous Menu

Please enter your menu choice>**1**

2. Press Y and Enter to toggle PDM between Enabled and Disabled.

3. Press 1 and Enter to specify remap percentage.

Current remap percentage threshold: 0%
Change the threshold(y/n)?>**y**
Enter the new threshold(0~100)>**80**
Current remap percentage threshold: 80%

Press Enter key to return

4. Press Y and Enter to confirm a Threshold change. Then type a number between 0 and 100 for remap percentage and press Enter.

5. Press Enter to return to the PDM Threshold submenu.

6. Press 2 and Enter to specify Error Count.

7. Press Y and Enter to confirm a Threshold change. Then type an error number and press Enter.

8. Press Enter to return to the PDM Threshold submenu.

Logical Drive Operations under the Maintenance Menu

From the Main Menu, press 6 and Enter to access the Maintenance menu:

PD: physical drive,   LD: logical drive
SBS: stripe block size, CAP: capacity,   SYNC: synchronization
INIT: initialization,   RBLD: rebuild,   RC: redundancy check
MP: media patrol,   PDM: predictive data migration

Maintenance activity Monitor: Running

ID	Name	RAID	SBS	CAP	Operation	Progress
1	LogDrv1	5	64K	239GB	RBLD	27% on 9
2	LogDrv2	3	64K	265GB	None	N/A

Maintenance
 1. Maintenance Activity Monitor
 2. Migrate Logical Drive
 3. Manual Rebuild
 4. Manual PDM)
 5. Synchronization
 6. Redundancy Check

7. Media Patrol
R. Return to Previous Menu

The current Operation is reported for each logical drive as follows:

- **INIT** – Initialization, done at logical drive creation. The logical drive is clearing old, unusuable data from the disk drives.
- **RBLD** – Rebuild, a repair operation. The logical drive is rebuilding data or parity to a replacement drive. The target disk drive is cited by ID number. The logical drive is available
- **SYNC** – Synchronization, a maintenance operation. The logical drive checks the data and parity and corrects inconsistencies. The logical drive is available
- **PDM** – Predictive Data Migration, a maintenance operation. The logical drive moves data from a suspect disk drive to a replacement. The target disk drive is cited by ID number. This action anticipates and prevents a disk drive failure and resulting Critical Status. A replacement disk drive is required. The logical drive is available
- **RC** – Redundancy Check. The logical drive is checking data to verify that redundancy or parity match. Unlike Synchronizing, no corrections are made. The logical drive is available
- **MP** – Media Patrol. The logical drive is checking disk drives to verify the condition of the magnetic media. Unlike Synchronizing, no corrections are made. The logical drive is available

Maintenance Activity Monitor

The Maintenance Activity Monitor displays the progress of various logical drive operations on the CLU screen approximately every 15 seconds, as shown below.

> LogDrv1(LD #1) RBLD 15% on PD 5
> LogDrv2(LD #2) SYNC 83%
> LogDrv1(LD #1) RBLD 16% on PD 5
> LogDrv2(LD #2) SYNC 84%

1. Press 1 and Enter to access the Maintenance Activity Monitor.

    Maintenance activity monitor is currently running.
    When any maintenance activity occurs e.g. rebuilding,
    the maintenance monitor will display notification
    message on screen.

    Stop maintenance activity monitor(y/n)?>**y**

    Maintenance activity monitor stopped now
    Press Enter key to return

2. Press Y and Enter to toggle the monitor between start and stop.

3. Press Enter to return to the Maintenance menu.

Migrate Logical Drive

Use this feature to change the RAID mode (level) or a logical drive or to add more physical drives.

1. Type 2 and Enter to access Migrate Logical Drive.

2. Type the ID number for the logical drive and press Enter.

```
*******Physical Drives Selection*******
Id        Name              Capacity
----------------------------------------
7         ST3160023AS       159 GB
8         ST3160023AS       159 GB
9         ST3160023AS       159 GB

Enter Physical Drive ids and/or id ranges
separated by commas. For example: 1,5,8-15.
Press R to continue after you have finished
selecting Physical Drives.
Your input?>7,9
```

3. Type the ID number(s) for the disk drive(s) you want to add and press Enter.

```
*******Physical Drives Selection*******
Id                   Name    Capacity
----------------------------------------
*7                   ST3160023AS159 GB
 8                   ST3160023AS159 GB
*9                   ST3160023AS159 GB

2 Physical Drives have been selected.
Enter Physical Drive ids and/or id ranges
separated by commas. For example: 1,5,8-15.
Press R to continue after you have finished
selecting Physical Drives.
Your input?>r
```

4. Type R and Enter when you are finished adding disk drives.

```
Destination RAID mode selection for LD migration
RAID Mode Options:
0  - RAID 0  (Striping)
1  - RAID 1  (Mirroring)
3  - RAID 3  (Parity)
5  - RAID 5  (Parity Distributed)
```

> 10 - RAID 10 (Striping/Mirroring)
> 50 - RAID 50
>
> Please enter RAID mode(0,1,3,5)>5

5. Type the new RAID level you want for the logical drive.

    A list of possible levels appears in parentheses beside the prompt.

    > Migrate Logical Drive 1 now(y/n)?>**y**

6. Press Y and Enter to confirm logical drive migration.

    Press N and Enter to cancel the operation.

    The Screen returns to the Modify Logical Drive Priorities menu.

    If the Maintenance Activity Monitor is enabled, you can watch the Migration progress on your monitor.

Manual Rebuild

Use this feature to rebuild a logical drive manually. Your system must meet the following conditions:

*   Auto Rebuilding Option is disabled. See page 140.
*   The logical drive is Critical
*   A free disk drive of equal or larger size is available

With the above conditions met, proceed with the manal rebuild.

1. Press 3 and Enter to rebuild a logical drive manually.

2. Choose the ID number of the logical drive you want to rebuild and press Enter.

    A list of available, qualified disk drive appears.

    > Available free Physical Drive(s)**:**
    > 1
    > 2
    > 7
    >
    > Choose the free Physical Drive for rebuilding>**2**
    > Rebuild Logical Drive 1 on Physical Drive 2 now(y/n)?>**y**

3. Choose the ID number of a free physical drive to rebuild your logical drive and press Enter.

    Press Y and Enter to confirm.

    The Screen returns to the Modify Logical Drive Priorities menu.

    If the Maintenance Activity Monitor is enabled, you can watch the Rebuild progress on your monitor.

Manual PDM

Preventive Data Migration (PDM) refers to a feature that monitors disk drives and replaces an unhealthy disk drive before the logical drive goes critical. PDM can run automatically. See page 140.

PDM for Logical Drive allows you to replace a suspect disk drive manually, while keeping the logical drive functional and available.

1. Press 4 and Enter to use PDM on a logical drive.

    ```
    **************PDM for Logical Drive(LD)**************
    Id   Logical Drive Name      Mode    Size
    ---------------------------------------------------------------
    1    LogicalDrive1           RAID5   237 GB
    2    LogDrv4                 RAID3   107 GB
    ```

    Select the LD Logical Drive ID for PDM
    Press R to return after finished>**2**

2. Choose the ID number of the logical drive for PDM and press Enter.

    Enter the unhealthy PD ID(1,5,6)>**6**

    Enter the spare PD ID(2,3,7)>**7**

    Start PDM for Logical Drive 1 (y/n)?>**y**

3. Choose the ID number of the unhealthy disk (physical) and press Enter.

    A list of logical drive member disks appears beside the prompt.

4. Choose the ID number of the spare disk (physical) and press Enter.

    A list of available spare disks appears beside the prompt.

5. Press Y and Enter to confirm.

    ```
    **************PDM for Logical Drive(LD)**************
    Id   Logical Drive Name      Mode    Size
    ---------------------------------------------------------------
    1    LogicalDrive1           RAID5   237 GB
    ```

    PDM for Logical Drive started
    Press Enter key to return

6. Press Enter to return to the Maintenance menu.

    If the Maintenance Activity Monitor is enabled, you can watch the PDM progress on your monitor.

Synchronize Logical Drive

Use this function to verify the integrity of your data across the physical drives that make up your logical drive.

1. Press 5 and Enter to access Synchronization.

Enter the Logical Drive ID>**1**
Start SYNC for LD 1(y/n)?>**y**

2. Type the ID number for the logical drive you want to synchronize and press Enter.

    Logical Drive SYNC Started
    Press Enter key to return

3. Press Enter to return to the Maintenance menu.

    If the logical drive was Functional when Synchronization began, you can pause and resume the Synchronization process with this same function.

    If the Maintenance Activity Monitor is enabled, you can watch Synchronization progress on your monitor.

Redundancy Check

Use this function to verify the integrity of your data across the physical drives that make up your logical drive.

1. Press 6 and Enter to access Redundancy Check.

    Enter the Logical Drive ID>**1**
    Start RC for LD 1(y/n)?>**y**

2. Type the ID number for the logical drive on which you want to run a Redundancy Check and press Enter.

    Logical Drive RC Started
    Press Enter key to return

3. Press Enter to return to the Maintenance menu.

    If the logical drive was Functional when the Redundancy Check began, you can pause and resume the Redundancy Check process with this same function.

    If the Maintenance Activity Monitor is enabled, you can watch the Redundancy Check progress on your monitor.

Pause/Resume

To Pause and Resume the Redundancy Check, press 6 and Enter again. Specify the Logical Drive ID as before then press Y to confirm.

Media Patrol

Use this function to verify the integrity of the magnetic media on the physical drives that make up your logical drive.

1. Press 7 and Enter to access Media Patrol.

    Current MP Information:
    MP: disabled

```
Percentage: 0%
--------------------------------------------------
Media Patrol(MP)
 1. Enable/Disable MP
 2. Pause
 R. Return to Previous Menu

Please enter your menu choice>1
Enable MP(y/n)?>y
```

2. Do one of the following:

   • Press 1 and Enter to enable/disable Media Patrol. Then press Y and Enter to confirm.

   • Or press 2 and Enter to pause/resume Media Patrol. Then press Y and Enter to confirm.

3. When you are done, press R and Enter to return to the Maintenance menu.

   If the Maintenance Activity Monitor is enabled, you can watch the Media Patrol progress on your monitor.

Network Management

From the Main Menu, press 4 and Enter to access Network Management.

The Network Management menu displays with the factory default settings shown above it.

```
Management Port IP Address: 192.168.1.22
Subnet Mask: 255.255.255.0
Gateway IP Address: 192.168.1.1
Telnet: disabled
TFTP Server IP Address: 192.168.1.81
SNMP Name: Irvine
SNMP Location: Promise
-----------------------------------------------------------------
Network Management
 1. Management Port
 2. Telnet
 3. TFTP Server
 4. SNMP
 5. Ping
 R. Return to Previous Menu

Please enter your menu choice>
```

Management Port

Use this feature to change the IP addresses for VTrak's Management port and Gateway plus the Subnet Mask.

1. Press 1 and Enter to access the Management Port settings.

    ```
    --------------------------------------------------------------------------
    Management Port IP Address: 10.0.0.2
    Subnet Mask: 255.0.0.0
    Gateway IP Address: 0.0.0.0
    --------------------------------------------------------------------------
    Management Port
     1. Management Port IP
     2. Subnet Mask
     3. Gateway
     R. Return to Previous Menu

     Please enter your menu choice>1
    ```

2. Press 1 and Enter to select Management Port IP.

    ```
    --------Configure Management Port IP address--------

    Current management port IP Address: 10.0.0.2
    Modify management port IP address(y/n)?>y
    New management port IP address>192.168.1.56 (an example only)

    New management port IP address: 192.168.1.56

    Press Enter key to return
    ```

3. Press Y and Enter to modify the management port IP address.

4. Type the new IP address and press Enter.

    VTrak confirms the new address.

5. Press Enter to return to the Network Management menu.

6. Repeat steps 1 through 5 to set the Subnet Mask and Gateway IP address

7. Reboot the VTrak for these changes to take effect.

Telnet

Telnet allows you to use the CLU to manage VTrak over a network. The Telnet screen looks the same as the CLU screen, except that you have to log in. You must enable Telnet on VTrak before you can establish a Telnet connection.

Enable/Disable Telnet

1. Press 2 and Enter to access the Telnet settings.

```
Current Telnet settings:
 Telnet:    enabled
 Timeout:   600 seconds
 Port:      2300
 User Name:  administrator
 ----------------------------------------------------
 Telnet Settings
 1. Enable/disable Telnet
 2. Timeout
 3. Change User Name
 4. Change Password
 5. Reset to Default Settings
 R. Return to Previous Menu
```

2. Press 1 and Enter to access enable/disable Telnet.

    Enable Telnet(y/n)?>**y**

3. Type Y and Enter confirm.

    You return to the Telnet Settings menu.

Timeout

1. Press 2 and Enter to access the Timeout setting.

    The timeout range and current setting display.
    Note: 31536000 seconds equal one year.

    Telnet timeout range in seconds: 60 - 31536000

    Current Telnet timeout: 600 seconds
    Enter the new Telnet timeout in seconds>**500**

2. Type the new value and press Enter.

    You return to the Telnet Settings menu.

Change User Name

1. Press 3 and Enter to access the user name setting.

    The minimum and maximum name lengths display.

    Minimum user name length is 2
    Maximum user name length is 30

    Enter the new user name>**RAIDmaster**

2. Type the new name and press Enter.

    You return to the Telnet Settings menu.

Change Password

1. Press 4 and Enter to access the password setting.

The minimum and maximum password lengths display.

Minimum password length is 2
Maximum password length is 16

Enter the new password>******

To confirm, renter the new password>******

2. Type the new password and press Enter.

3. Type the new password and press Enter again to confirm.
    Password changed successfully
    Press Enter key to return

4. Press Enter to return to the Telnet Settings menu.

Reset to Default Settings

This action will delete any Telnet settings changes you previously made.

1. Press 5 and Enter to reset the Telnet settings to the default.
     Reset to default Telnet settings(y/n)?>**y**

2. Type the new name and press Enter.
    You return to the Telnet Settings menu.

TFTP Server

VTrak uses a Trivial File Transfer Protocol (TFTP) server to download and install firmware upgrades. Use this feature to specify an IP address for your TFTP Server.

1. Press 3 and Enter to access the TFTP Server.

    ----------Configure TFTP Server IP address----------

    Current TFTP server IP Address: 10.0.0.12
    Modify TFTP server IP address(y/n)?>**y**
    New TFTP server IP address>**192.168.1.122**

2. Type Y and Enter to modify the TFTP server IP address.

3. Type the new IP address and press Enter.

    VTrak confirms the new address.

    New TFTP Server IP address: 192.168.1.122

    Press Enter key to return

4. Press Enter to return to the Network Management menu.

For more information on using a TFTP Server and updating Firmware, see page 160.

SNMP

VTrak supports Simple Network Management Protocol (SNMP). Use this feature to check your SNMP settings and view the SNMP Settings menu.

Press 4 and Enter to access SNMP.

> Current SNMP System Information:
> Name: Sonoma
> Location: Promise
> Contact person: sales
> Read only community: public
> IP addresses of trap sinks:
> -------------------------------------
> SNMP Settings
> 1. Name
> 2. Location
> 3. Contact Person
> 4. Read only Community
> 5. Trap only Community
> 6. Trap Sinks
> R. Return to Previous Menu

Name

1. Press 1 and Enter to access the SNMP name setting.

    Enter the name>**MySystem**

2. Type the new name and press Enter.

    You return to the SNMP Settings menu.

Location

1. Press 2 and Enter to access the SNMP location setting.

    Enter the location>**My Firm**

2. Type the new location and press Enter.

    You return to the SNMP Settings menu.

Contact Person

1. Press 3 and Enter to access the SNMP name setting.

    Enter the contact person>**A. Smith**

2. Type the new contact person and press Enter.

    You return to the SNMP Settings menu.

Read only Community

1. Press 4 and Enter to access the SNMP read only community setting.

    Enter the read only community>**Sales**

2. Type the new read only community and press Enter.
    You return to the SNMP Settings menu.

Trap Only Community

1. Press 5 and Enter to access the SNMP trap only community setting.

    Enter the trap only community>**Engineering**

2. Type the new trap only community and press Enter.
    You return to the SNMP Settings menu.

Trap Sinks

1. Press 6 and Enter to access the SNMP trap sinks setting.

    ```
     IP addresses of trap sinks:
    -------------------------
    IP Addresses of Trap Sinks
     1. Edit
     2. Add
     3. Delete
     R. Return to Previous Menu

    Please enter your menu choice>2
    ```

2. To add a trap sink, press 2 and Enter.

    Enter the new IP address>**192.168.1.88**

3. Type the new IP address and press Enter.
    The new address displays in the list.

    ```
     IP addresses of trap sinks:
    #1:    192.168.1.88
    -------------------------
    IP Addresses of Trap Sinks
     1. Edit
     2. Add
     3. Delete
     R. Return to Previous Menu

    Please enter your menu choice>r
    ```

4. Press R and Enter to return to the SNMP Settings menu.

Ping

Use the Ping function to verify a network connection.

1. Press 5 and Enter to access Ping.

    > Ping Test
    > Enter the IP address to ping>192.168.1.211
    >
    > Number of ping packets(1-30)?>4
    > Pinging, please wait...

2. Type the IP address of the network node you which to contact and press Enter.

3. Type the number of ping packets you with to send and press Enter.

    > PING 192.168.1.211 (192.168.1.211): 56 data bytes
    > 64 bytes from 192.168.1.211: icmp_seq=0 ttl=128 time=0.5 ms
    > 64 bytes from 192.168.1.211: icmp_seq=1 ttl=128 time=0.5 ms
    > 64 bytes from 192.168.1.211: icmp_seq=2 ttl=128 time=0.4 ms
    > 64 bytes from 192.168.1.211: icmp_seq=3 ttl=128 time=0.4 ms
    >
    > --- 192.168.1.211 ping statistics ---
    > 4 packets transmitted, 4 packets received, 0% packet loss
    > round-trip min/avg/max = 0.4/0.4/0.5 ms
    >
    > Press Enter key to return

    If all the packets return, your Ping Test was successful and you know the network connection is good.

4. Press Enter to return to the Network Management menu.

SCSI Management

- Channel TID (below)
- RAID Console LUN (page 155)

From the Main Menu, press 5 and Enter to access SCSI Management.

> SCSI Channel 1, Initiator 7, TID 0 Transfer Speed: 160 Mb/s
> Channel 1 IO Statistics: read count 524434, read transaction 240 Mb
> Channel 1 IO Statistics: write count 524288, write transaction 0 Mb
> Channel 2 IO Statistics: read count 524434, read transaction 240 Mb
> Channel 2 IO Statistics: write count 524288, write transaction 0 Mb
> SCSI Channel 1 TIDs: 0
> SCSI Channel 2 TIDs: 0
> RAID Console: disabled
> --
> SCSI Management
> 1. Channel TID
> 2. RAID Console LUN
> R. Return to Previous Menu
>
> Please enter your menu choice>

Channel TID

Use this feature to change or add Target IDs. The TIDs you enter will overwrite your previous selection.

1. Press 1 and Enter to access the SCSI Channel TID settings.

   > **************Modify SCSI Channel TID*************
   >
   > SCSI Channel #   TIDs
   > ------------------------------------
   > 1   0
   > ------------------------------------
   > 2   0
   >
   > Please select the SCSI channel(1-2)
   > Press R to return after finished>**1**
   >
   > Want to modify TIDs for SCSI channel 1(y/n)?>**y**
   > Please enter the new TIDs>**1,3,5,7,9,11**

2. Type the Channel number and press Enter.

   Type Y and Enter to confirm.

3. Type the new TIDs and press Enter.

   Remember to type any pre-existing TIDs you still want to use.

TIDs for SCSI channel 1 changed
 Press Enter key to return

***************Modify SCSI Channel TID**************

SCSI Channel #	TIDs
1	1
	3
	5
	7
	9
	11
2	0

Please select the SCSI channel(1-2)
Press R to return after finished>

4. Press R and Enter to return to the SCSI Management menu.

Rather than creating multiple Target IDs, use one Target ID and assign a LUN to each logical drive. See page 137.

RAID Console LUN

VTrak's RAID Console is required in order to use In-Band SCSI. The RAID Console is disabled by default. This feature is for future use. For now, leave it disabled.

Event Viewer

Use this function to review all events in the event queue. This information is especially helpful for troubleshooting. The most recent 1024 events will display. There is no delete event function.

1. From the Main menu, press 7 and Enter to access the Event Viewer.

    VTrak 15200 Event Information:

    Current event queue head seq ID#: 78
    Current valid seq ID# range: 0-78

Seq ID#	Severity Level	Timestamp	Description
69	Informational	4/5/2004 23:14:51	Quick initialization completed
70	Major	4/5/2004 23:16:45	Logical Drive Array1 is critica
71	Fatal	4/5/2004 23:16:45	Fatal Error for Disk 5.
72	Major	4/5/2004 23:16:45	Disk Set Down: 5.
73	Informational	4/5/2004 23:17:06	Rebuild begun on Logical
74	Major	4/5/2004 23:18:31	Logical Drive Array1 is critica
75	Informational	4/5/2004 23:18:31	Logical Drive Array1, Rebuild
76	Informational	4/5/2004 23:18:31	Delete Logical Drive Array1.
77	Informational	4/5/2004 23:18:38	Disk Plugged in: 5.
78	Warning	4/5/2004 23:19:30	Wiped out reserved sector: 5.

    q: quit, +/k: forward, -/j: backward
    s: start of event queue, e: end of event queue
    Enter: repeat the most recently used command
    Your input?>**q**

2. To move forward in the queue, press + or K.
    To move backward in the queue, press - or J.
    To move to the beginning of the queue, press S.
    To move to the end of the queue, press E.
    To repeat the most recent entry, press Enter.

3. Press Q and Enter to return to the Main Menu.

Buzzer

Use this feature to enable or disable VTrak's buzzer (audible alarm, beeper). You can also temporarily silence the Buzzer.

From the Main menu, press 8 and Enter to access the Buzzer. You can also access the Buzzer from the Main menu.

```
Buzzer
 1. Silence Buzzer
 2. Enable Buzzer
 R. Return to Previous Menu

  Please enter your menu choice>2

  Enable buzzer(y/n)?>y
```

Press 2 and Enter to toggle between enable and disable. Press Y and Enter to confirm.

Press 1 and Enter to silence the buzzer. Press Y and Enter to confirm.

Silence means to cancel the audible alarm for the current event only. If another event happens, the buzzer will sound again.

See page 109 for a list of buzzer sounds.

Chapter 6: Maintenance

- Firmware Update (page 160)
- Replace Power Supply (page 165)
- Replace Cooling Unit Fan (page 166)
- Replace Cache Battery (page 171)
- Replace SEP (page 173)
- Replace RAID Controller (page 174)

This Chapter covers the maintenance procedures for VTrak.

The power supplies, cooling unit fans and the cache battery are hot-swappable field-replaceable components.

The Storage Enclosure Processor (SEP) and RAID Controller are field-replaceable but they require you to power down the VTrak..
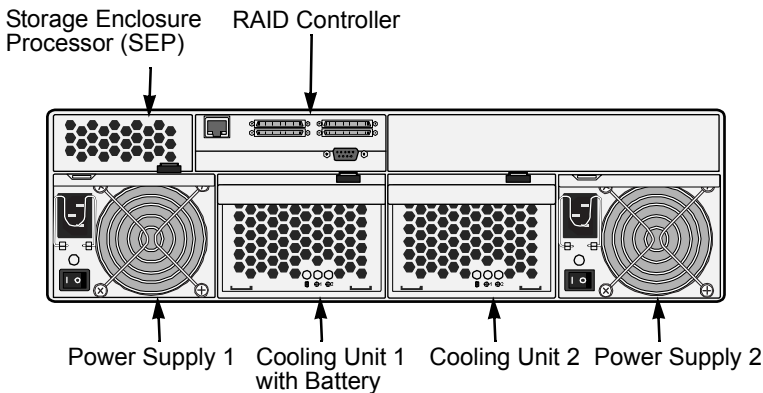
Figure 1. Field Replaceable Units (FRUs) on VTrak

The primary means to identify and diagnose problems on VTrak is to observe and interpret LED colors. A discussion of this process is found on the next two pages.

All hot-swappable components can be fully diagnosed with LEDs, although the Command Line Utility (CLU) and WebPAM each offer you additional help to make and confirm your diagnosis. See page 191 for additional information.

Firmware Update

This is the preferred firmware update method for most applications. This procedure takes about ten minutes. An alternative method based on a serial port is listed on page 163.

Use the CLU to update VTrak's firmware. In order for the firmware update to work, three things are required:

- A TFTP server
- A firmware image file
- Proper IP address settings in the CLU

The use of a TFTP server enables automation of the firmware update process.
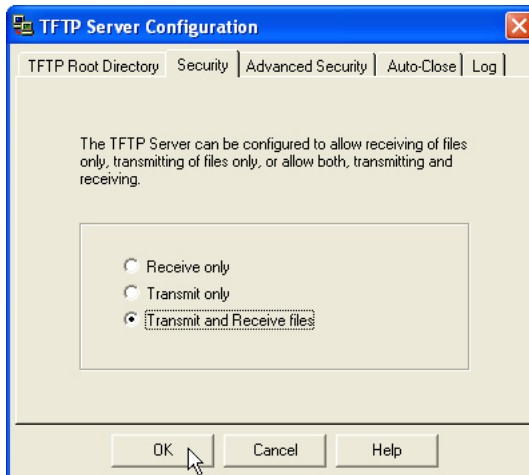
TFTP Server

1. Obtain and install TFTP Server software onto a PC or Server on your network.
2. Download the latest firmware update file from the Promise website: **www.promise.com**.

Default Directory   IP Address of TFTP Server
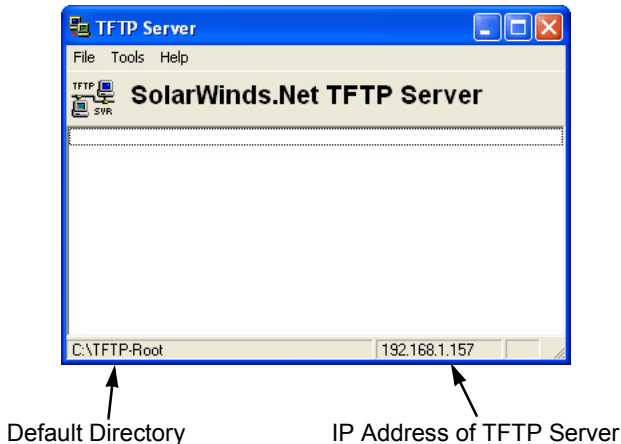
3. Extract the firmware image (.img) file to the TFTP server's default directory.

Firmware image file
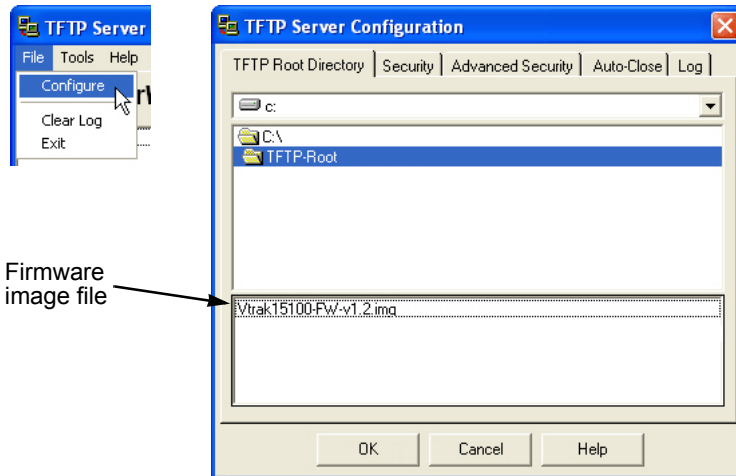
4. To verify that the TFTP server sees the firmware image file, select File > Configure and click the TFTP Root Directory tab.

    The image file will appear if the download and extraction went correctly.

5. Click the Security tab and set the TFTP server to Transmit and Receive files. Click OK when you are done.

Set IP Addresses

1. Be sure the VTrak and Host PC are running, the null modem cable is properly connected (see page 22) and you have the correct COM Port settings (see page 25).

2. Start your PC's terminal emulation program.

3. Press Enter once to launch the CLU.

4. Press 4 to select Network Management then 2 to select Management Port.

5. Verify that the Management Port has a true IP address.

6. Return to the Network Management menu and press 3 to select TFTP server.

    Current TFTP Server IP Address: 0.0.0.0
    Want to modify TFTP Server IP address(y/n)?>**y**
    Please enter the new TFTP Server IP address>**192.168.1.157**

    New TFTP Server IP address is 192.168.1.157

    Press Enter key to return

    Enter the IP address of the PC/Server where the TFTP Server was installed. The above address is only an example. See the TFTP Server window to obtain the actual IP address.

7. Return to the Main Menu.

Firmware Update

1. From the Main Menu, press 1 to select Subsystem Management.

2. Press 1 to select Controller Management then 3 to select Firmware Update.

    Please enter the firmware image file
    name on TFTP server>**VTrak15100-FW-v1.2.img**

3. Specify the name of the image file and press Enter.

    If the image file is not in the TFTP Server's default directory, type the path as well as the name. The file name shown above is only an example.

4. When the CLU informs you that the firmware update is finished, verify that the VTrak reboots itself. If it does not, reboot the VTrak manually.

    This completes the firmware update operation.

Note

You can update the SEP Firmware using the same method as the Controller, described above. The SEP uses a different file and its Firmware is revised less often.

Firmware Update – Serial Port

Use this firmware update method only when your Management Port has no network connection or the RS-232 connection is required. This procedure takes about 30 minutes.

See also the network-based firmware upgrade procedure on page 160.

	Warning
⚠️	Do not allow the firmware update process to be interrupted for any reason. An interrupted update will incapacitate controller.
	Then you must return the controller to Promise for repair.

1. Download the latest firmware update file from the Promise website: **www.promise.com.**

2. Be sure the VTrak and Host PC are running, the null modem cable is properly connected (see page 22) and you have the correct COM Port settings (see page 25).

3. Start your PC's terminal emulation program.

4. Press Enter once to launch the CLU.

5. Reboot the VTrak. Use either method:
   - From the Main Menu, press 1 and Enter twice to access the Controller Management menu. Then press 5 and Enter to select Reboot. At each of two prompts, press Y and Enter to confirm the Reboot.
   - Turn the VTrak's power switches off and then on again.

6. Watch the terminal screen for the following:

   Scrub DDR, waiting
   Platform Init Done.
   +

7. At the **+**, press the Ctrl and F keys at the same time.

   The prompt changes to >BSP.

8. At BSP> type **load -r -v -b 0x01008000 -m y**.

   Double-check your entry. Then press Enter.

   This command readies VTrak to receive a file transfer via Y-modem protocol. You have approximately 90 seconds to initiate the file transfer before the load operation times out.

9. Start the file transfer. For example, if you are using HyperTerminal:
   - Go to Transfer > Send File

- Click on the firmware image file to select it.
Example: **VTrak-01.02.000.54.img**
- Select Y-modem protocol
- Click Send

The file transfer takes about 20 minutes. When complete, the BSP> prompt will reappear.

10. At BSP> type **ptiflash -b 0x01008000**.

Double-check your entry. Then press Enter.

This command validates the firmware upgrade file then writes the binary image to VTrak's flash ROM. These actions take about 8 minutes. When complete, the BSP> prompt will reappear.

11. Type **reset** and press Enter to restart the VTrak.

This completes the firmware update operation.

Replace Power Supply
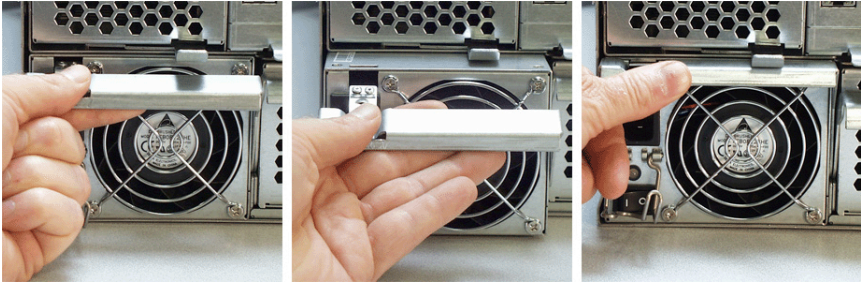
The power supply and its fan are replaced as one unit. There are no individually serviceable parts. No tools are required for this procedure.

To remove the power supply, do the following:

1. Verify that the power supply LED is amber or red.
2. Switch off the power.
3. Unplug the power cord.
4. Press the release button and pull the handle downward as shown (above, left).
5. Pull the power supply out of the VTrak enclosure (above, center).

To install the power supply, do the following:

1. Carefully slide the power supply into the enclosure.
2. Gently press the handle in and upward until it locks (above, right).
3. Plug in the power cord.
4. Switch on the power supply.
5. Verify that the new power supply LED is green.

This completes the power supply replacement procedure.

Replace Cooling Unit Fan

The blowers (scroll fans) in the cooling units are replaced as individual parts.

There are two fans in each cooling unit. No tools are required for this procedure.

Fan 1 LED   Fan 2 LED
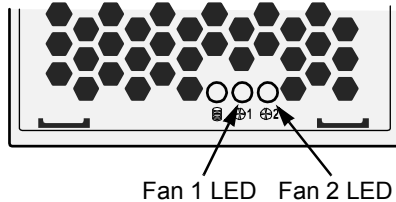
Caution

If the cooling unit you plan to remove contains the cache backup battery, your system will be vulnerable to a power failure. Temporarily set your cache policy to write-through before starting this procedure. See page 137.

To replace a fan, do the following:

1. Verify that the fan LED is amber or red and note whether it is Fan 1 or 2 (above).
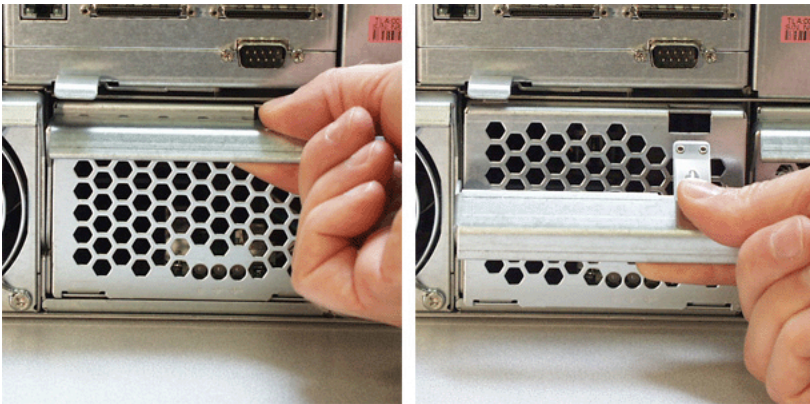
2. Press the release button and pull the handle downward as shown above.

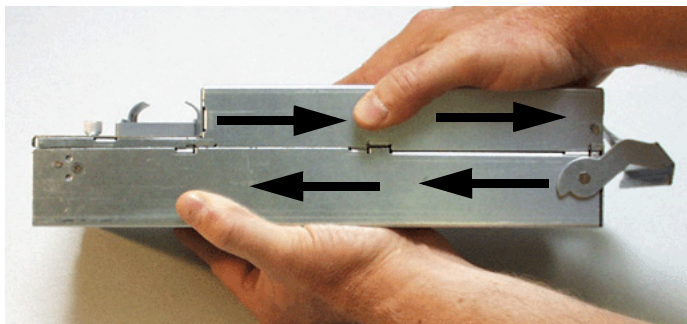3. Pull the cooling unit out of the VTrak enclosure. An example of a VTrak cooling unit appears below.

To open the cooling unit, do the following:

Loosen the
thumbscrew
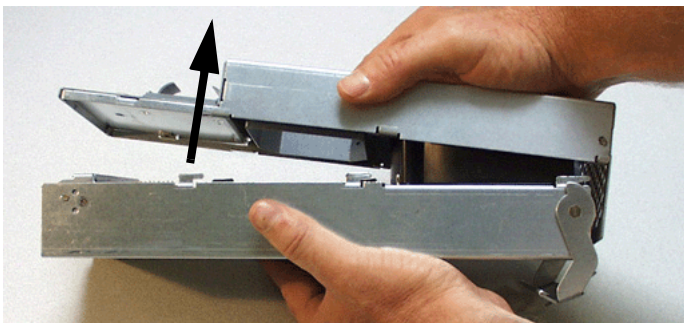
Disconnect
the battery
(if present)
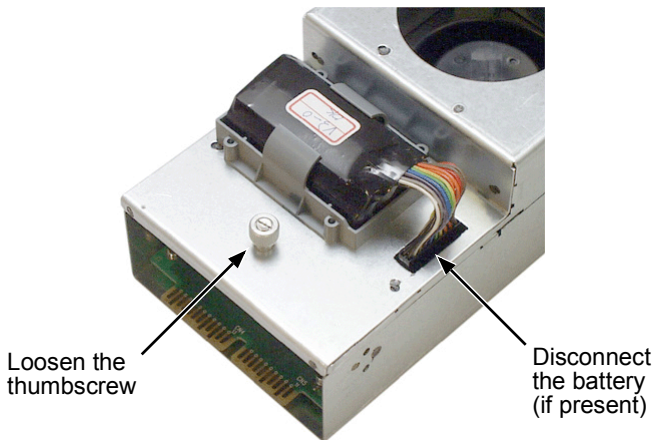
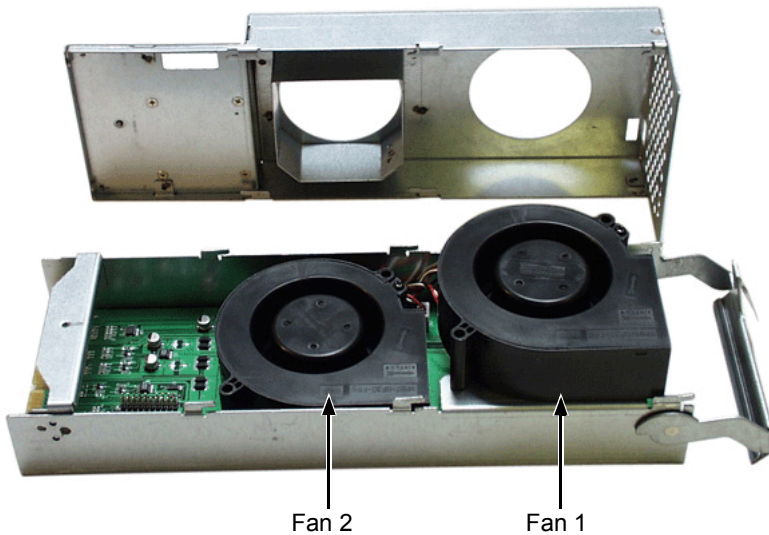4. If there is a battery on the cooling unit, disconnect the battery connector (above).

5. Loosen the thumbscrew (above). A retainer keeps the thumbscrew in place.

6. Grasp the top and bottom sections of the cooling unit with your hands as shown above.
7. Hold the lower section and pull the upper section to the right.

8.   Separate the cooling unit section to access the fans.

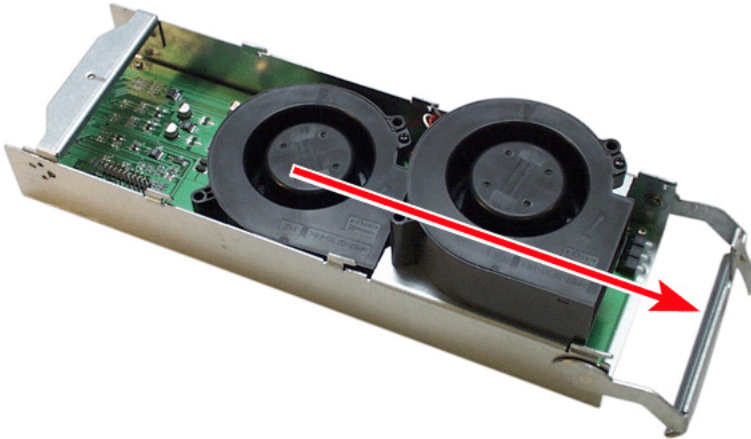Fan 2   Fan 1

The upper fan is Fan 1, the lower fan is Fan 2. From the LEDs on the cooling unit (see the diagram on page 166), you know which fan to replace.

9.   Lift the fan off the mounting pins and detach the electrical connector.

10. Attach the electrical connector of the new fan and set it in place.
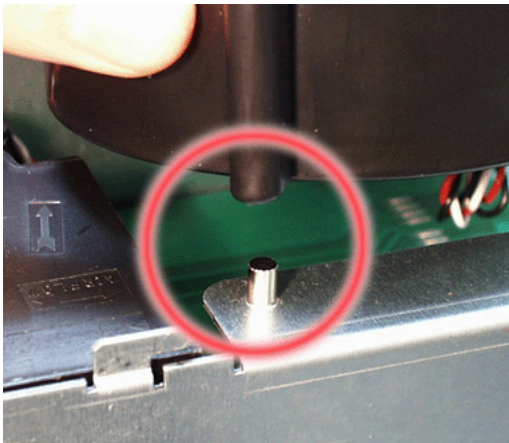
Be sure you set the fan on the mounting pins, as shown above.

Be sure the fans point outward, towards the handle (above).

11. Place the top section of the cooling unit onto the bottom section and slide the top lock it in place.
12. Tighten the thumbscrew.
13. If there is a battery on the cooling unit, reattach the battery connector.
14. Carefully slide the cooling unit into the enclosure.
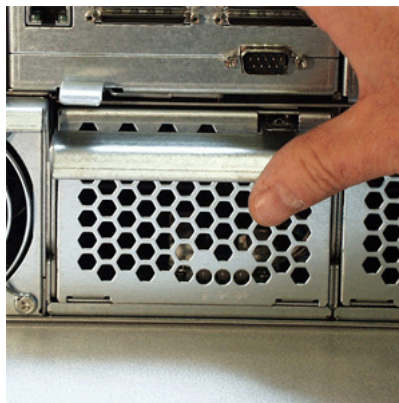
15. Gently press the handle in and upward until it locks.
16. Verify that the fan LEDs are green.

This completes the fan replacement procedure.

Replace Cache Battery

The cache battery is located in the left cooling unit. The battery is replaced as an individual part. No tools are required for this procedure.


Cautions

- There is a risk of explosion if the battery is replaced by the incorrect type.
- Dispose of used batteries according to the instructions that accompany the battery.
- While the battery is removed, your system will be vulnerable to a power failure. Temporarily set your cache policy to write-through before starting this procedure. See page 94 (WebPAM PRO) or page 137 (CLU).
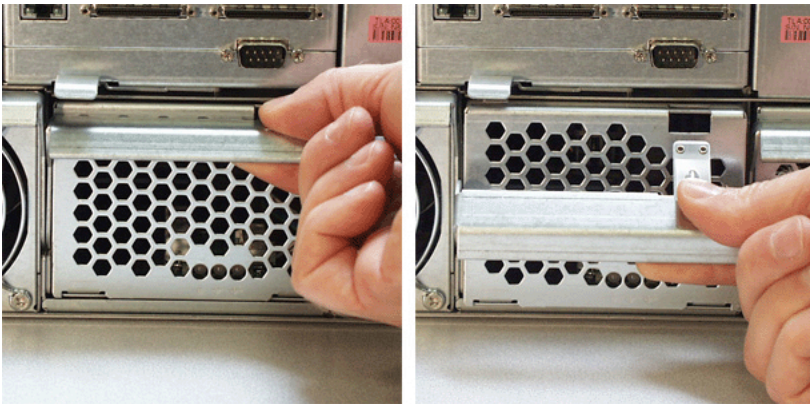
Note that the Battery LED on Cooling Unit 2 is always dark.

To replace the cache battery, do the following:
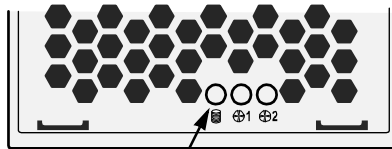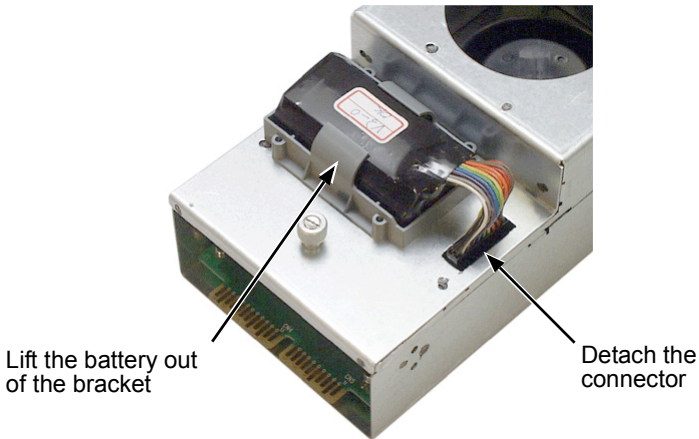

Battery LED

1. Verify that the battery LED is amber or red (above).

2. Press the release button and pull the handle downward as shown above.

3. Pull the cooling unit out of the VTrak enclosure.

Lift the battery out
of the bracket

Detach the
connector

4. Detach the connector and lift the battery out of the bracket (above).
5. Place a new battery into the bracket and attach the connector.
6. Carefully slide the cooling unit into the enclosure.

7. Gently press the handle in and upward until it locks (above).
8. Verify that the battery LED is green.

This completes the battery replacement procedure.

Replace SEP

The Storage Enclosure Processor (SEP) manages the fans, audible alarm and battery, and monitors system voltages and cooling functions. No tools are required for this procedure.

	Caution
⚠️	The SEP is NOT a hot-swappable device. Power-down the VTrak before removing it.

	Important
✓	Do not replace the SEP based on LED colors alone. Only replace the SEP when directed to do so by Promise Technical Support. See page 214.

To remove and replace the SEP, do the following:

1. Power down the VTrak.
2. Grasp the handle and pull it toward you (above, left).
3. Holding the handle, pull the SEP out of the enclosure (above, center).
4. Gently slide the new SEP into the enclosure.
5. Press on the screen to seat the SEP (above, right). The handle will swing in as the SEP is properly seated.
6. Power up the VTrak.

This completes the Storage Enclosure Processor replacement procedure.

Replace RAID Controller

The RAID Controller monitors and manages the logical drives. When this controller is replaced, all of your logical drive data and configurations remain intact because this logical drive information is stored on the disk drives.
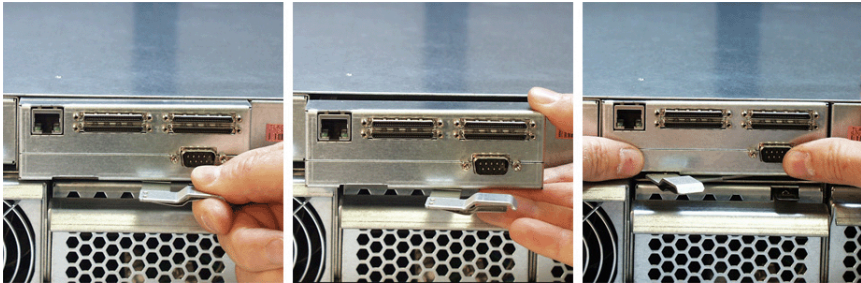
	Caution
⚠️	The RAID Controller is NOT a hot-swappable device. Power-down the VTrak before removing it.

	Important
✔️	Do not replace the RAID Controller based on LED colors alone. Only replace the RAID Controller when directed to do so by Promise Technical Support. See page 214.

To remove and replace the RAID Controller, do the following:

1. Power down the VTrak.
2. Remove the network, SCSI and null modem cables.
3. Grasp the handle and pull it toward you (above, left).
4. Grasp the Controller and pull it out of the enclosure (above, center).
5. Gently slide the new Controller into the enclosure.
6. Press on the front to seat the Controller (above, right). The handle will swing in as the Controller is properly seated.
7. Attach the network, SCSI and null modem cables.
8. Power up the VTrak.

This completes the RAID Controller replacement procedure.

Chapter 7: Technology Background

Introduction to RAID

RAID (Redundant Array of Independent Disks) allows multiple hard drives to be combined together to form one large 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 182. The following outline breaks down the properties for each type of RAID logical drive:

RAID 0 – Striping

When a disk 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.
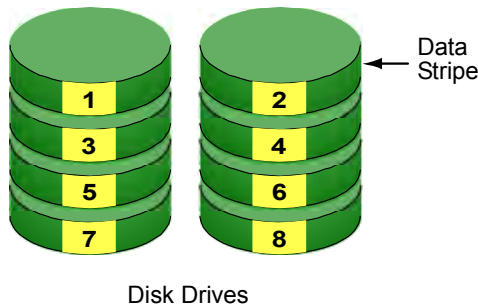

Disk Drives

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 VTrak consist of one or more disk drives.

RAID 1 – Mirroring

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.
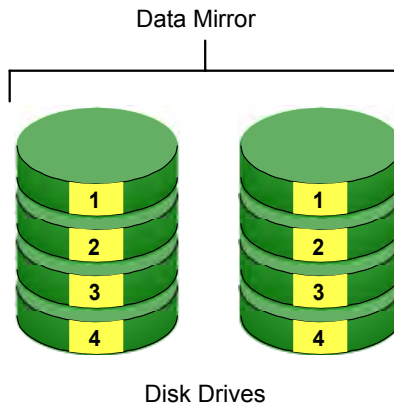
Data Mirror

Disk Drives

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 VTrak consist of two disk drives.

RAID 3 – Block Striping with Dedicated Parity

RAID level 3 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.

The adjustable block size of the RAID 3 logical drive allows for performance tuning based on the typical I/O request sizes for your system. The block size must be set at the time the logical drive is created and cannot be adjusted dynamically. Generally, RAID Level 3 tends to exhibit lower random write performance due to the heavy workload going to the dedicated parity drive for parity recalculation for each I/O.
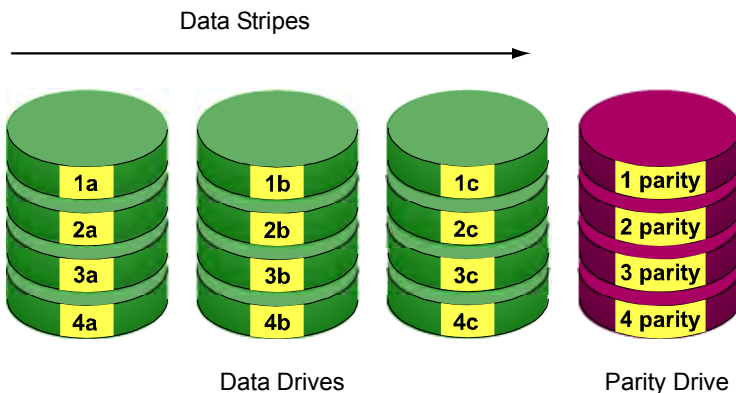

Figure 3. RAID 3 Stripes data and adds a dedicated Parity Drive

The capacity of a RAID 3 logical drive is the smallest drive size multiplied by the number of disk drives less one. Hence, a RAID 3 logical drive with (4) 100 GB disk drives will have a capacity of 300GB. A logical drive with (2) 120GB disk drives and (1) 100GB disk drive will have a capacity of 200GB.

RAID 3 logical drives on VTrak consist of 3 to 15 disk drives.

RAID 5 – Block Striping with Distributed Parity

RAID 5 is similar to RAID 3 as described above except that the 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.
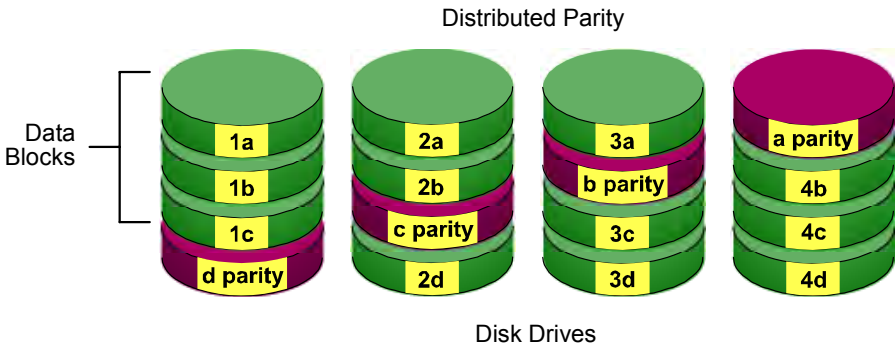

Figure 4. RAID 5 Stripes all drives with data and parity information

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 VTrak consist of 3 to 15 disk drives.

RAID 10 – Mirroring / Striping

Mirroring/Striping 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.
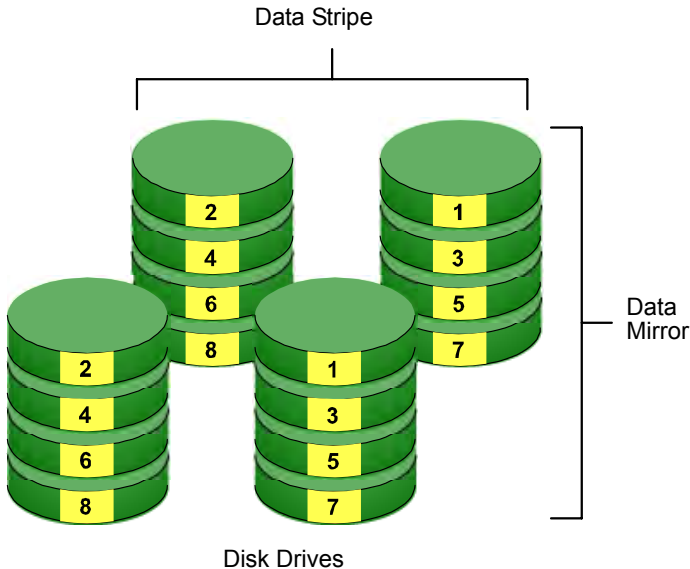

Figure 5. RAID 10 takes a data mirror on one drive pair and stripes it over two drive pairs

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 VTrak consist of 4 to 14 disk drives.

RAID 50 – Striping of Distributed Parity Logical Drives

RAID 50 combines both RAID 5 and RAID 0 features. Data is striped across disks as in RAID 0, and it uses distributed parity as in RAID 5. RAID 50 provides data reliability, good overall performance and supports larger volume sizes. RAID 50 also provides high reliability because data is still available even if two disk drives fail (one in each data stripe).
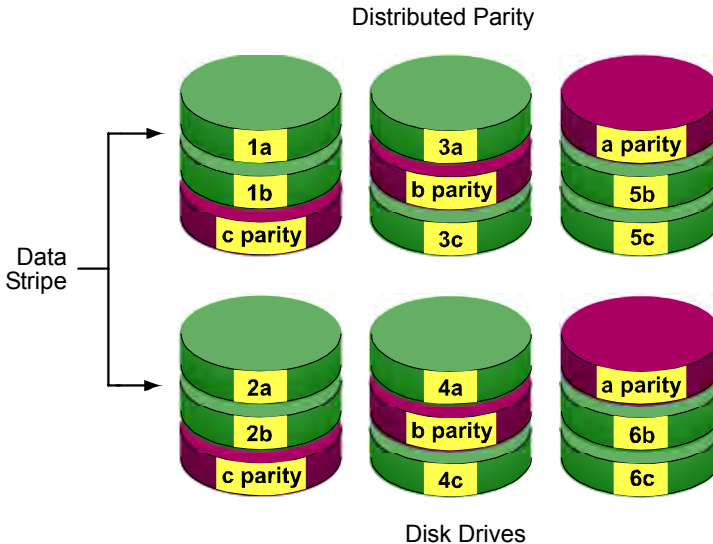

Figure 6. RAID 50 Striping of Distributed Parity logical drives

RAID 50 logical drives on VTrak consist of 6 to 15 disk drives.

Choosing a RAID Level

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

RAID 0

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

Recommended Applications for RAID 0

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

RAID 1

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

Recommended Applications for RAID 1

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

RAID 3

Advantages	Disadvantages
High Read data transfer rate Disk failure has an insignificant impact on throughput	Parity drive can become bottleneck if a lot of data is being written to the logical drive

Recommended Applications for RAID 3

- Image Editing
- Prepress Applications
- Any application requiring high throughput

RAID 5

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

Recommended Applications for RAID 5

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

RAID 10

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

Recommended Applications for RAID 10

- Imaging applications
- Database servers
- General fileserver

RAID 50

Advantages	Disadvantages
High Read data transaction rate Medium Write data transaction rate Good aggregate transfer rate High reliability Supports large volume sizes	Higher disk overhead than RAID 5

Recommended Applications for RAID 50

- File and Application servers
- Transaction processing
- Office application with many users accessing small files

Choosing Stripe Block Size

The stripe block size value can be set to 4KB, 8KB, 16KB, 32KB, and 64KB.

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. With VTrak, this feature is always enabled.

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 1, 3, 5, 10 and 50. If you create one of these logical drives automatically, the logical drive is always initialized. If you create the logical drive manually, you can choose whether to initialize.

The 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.

VTrak 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 VTrak.
- 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 page 94 (WebPAM PRO) or page 139 (CLU) for information on how to make this setting.

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.

Once the failed drive is replaced, the new drive is automatically recognized as a hot spare and will be activated in the event of a subsequent drive fault.

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.

Depending on the operating system you use, there may or may not be various capacity limitations applicable for the different types of partitions.

Cache Settings

There is a data cache on the VTrak controller and another one on each 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 VTrak's efficiency and performance.

Disk Drive Write Cache – Activates the write caches on the disk drives.

Write Back Cache – Activates write-back feature of VTrak'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.

VTrak's controller cache is equipped with a backup battery to power the cache and retain uncommitted cache data in it until regular power can be restored. Battery condition is reported by WebPAM PRO on page 106 and the CLU on page 120.

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

Where to Make Settings

In WebPAM PRO, these functions are under:

- Click on the Logical Drive View 🗄 icon and select Logical Drive Functions from the Change Logical Drive Settings menu (see page 94).

In the CLU, these functions are under:

- Drive Write Cache – From the Main Menu, press 2 Enter, 2 Enter (see page 128)
- VTrak's Cache Policy – From the Main Menu, press 3 Enter, 4 Enter, 2 Enter (see page 138)

RAID Level Migration

To *migrate* a Logical Drive is to do one or both of the following:

- Change its RAID level
- Increase the number of disk drives (sometimes called Expansion)

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

Different types of logical drives use different organizational models and have varying benefits. The following outline breaks down the properties for each type of RAID supported by Promise products.

From	To	Increase		Redundancy	
		Capacity	**Performance**	**Add**	**Lose**
RAID 50	RAID 10	•			
	RAID 3/5		•		
	RAID 0	•	•		•
RAID 10	RAID 50	•			
	RAID 3/5	•			
	RAID 0	•	•		•
RAID 3/5	RAID 50			•*	
	RAID 10		•		
	RAID 0	•	•		•
RAID 1	RAID 50	•	•		
	RAID 10	•	•		
	RAID 3/5	•	•		
	RAID 0	•	•		•
RAID 0	RAID 50	•	•	•	
	RAID 10	•	•	•	
	RAID 3/5	•	•	•	
	RAID 1			•	
* Increases the existing redundancy					

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, even if the Target Logical Drive requires fewer disk drives than the Source Logical Drive

• RAID 1 (mirroring) works with two drives only. Only a single-drive RAID 0 Logical Drive can migrate to RAID 1. Other RAID Levels use too many drives to migrate

• You cannot migrate a Logical Drive when it is Critical or performing activities such as Synchronizing, Rebuilding and PDM

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 SCSI HBA cards and 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 billiion.

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	Logical Drive 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 PRO or the CLU to expand a Logical Drive beyond the maximum expansion size. However, when expansion is finished, your Operating System will see a Logical Drive of 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 8: Troubleshooting

- VTrak is Beeping (below)
- CLU Reports a Problem (below)
- WebPAM PRO Reports a Problem (page 192)
- LEDs Display Amber or Red (page 194)
- Event Notification (page 197)
- Critical & Offline Logical Drives (page 201)
- Connection Problems (page 206)

This Chapter covers troubleshooting procedures for VTrak.

VTrak is Beeping

VTrak's audible alarm has four sound patterns:

- Beep. Beep. Beep. – Indicates that a logical drive is rebuilding
- Beep-beep, beep-beep, beep-beep. – Indicates that a logical drive is critical
- Beep-beep-beep, beep-beep-beep. – Indicates a problem with a field replaceable unit (FRU)
- 10 second continuous beep – Indicates that a logical drive is offline

See page 159 for more information about field-replaceable components.
See page 201 for a discussion of critical and offline logical drives.

CLU Reports a Problem

The CLU can report a variety of problems with the VTrak. In order to see them, the CLU must be open. Some conditions are only indicated when you select the corresponding function.

In this example, let us check logical drive status.

1. Open the CLU.
2. Select Logical Drive management > View Logical Drive information
3. Observe the status of your logical drives.

```
*********************** Logical Drive information ********************
Id    Name      Mode    Stripe Block  Size      Status
------------------------------------------------------------------------------
1     FirstLD   RAID5   64K           107 GB    Critical
```

In the example above, logical drive "FirstLD" is critical. See *Critical & Offline Logical Drives* on page 201.

WebPAM PRO Reports a Problem

WebPAM aids in troubleshooting your logical drives and enclosure by continuous monitoring and reporting to the User in the following ways:

- Displays red circles in Tree View (above)
- Sends email messages, per your configuration

- Displays popup messages, per your configuration (above)
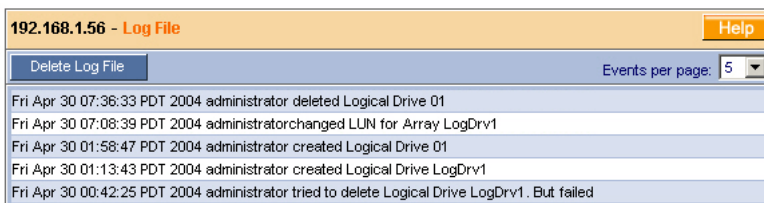
- Keeps a record in the Event Log (above)
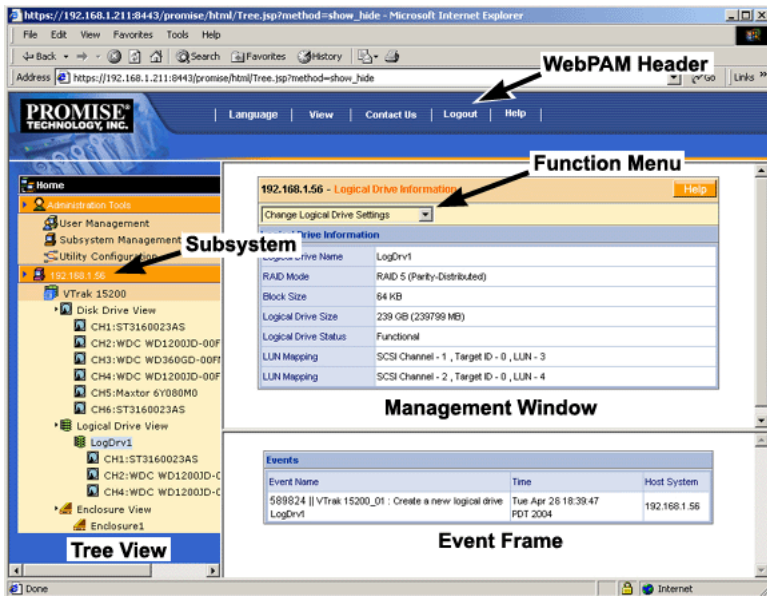
- Displays full information on the selected component the Management Window (above)

Click these links to see specific troubleshooting topics:

- Event Notification Response, page 197
- Logical Drive Critical, page 201
- Frequently Asked Questions, page 209

LEDs Display Amber or Red

Front Panel
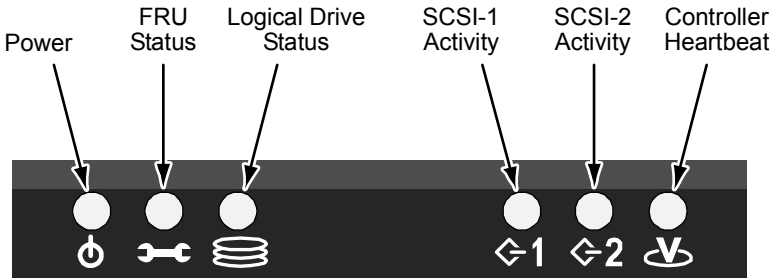
Figure 4. VTrak Front Panel LEDs

When boot-up is finished and the VTrak is functioning normally:

- Controller LED blinks green once per second for five seconds, goes dark for ten seconds, then blinks green once per second for five seconds again.
- Power, FRU and Logical Drive LEDs display green continuously.
- SCSI LEDs flash green if there is activity on that channel.

See the table below.

LEDs	State				
	Dark	**Steady Green**	**Flashing Green**	**Amber**	**Red**
Power	System Off	Normal	n/a	n/a	n/a
FRU*	System Off	Normal	n/a	Fan or Battery Problem	Fan or Battery Failed
Logical Drive	System Off	Normal	n/a	Logical Drive Critical	Logical Drive Offline
SCSI-1 SCSI-2	No Activity	n/a	Activity	n/a	n/a
Controller	System Off	n/a	Normal**	n/a	n/a
* Field Replacement Unit. "n/a" means this state does not apply to this LED.					
** Five green blinks, one per second; dark 10 seconds; five green blinks.					

See *Critical & Offline Logical Drives* on page 201.

Drive Carriers

There are two LEDs on each Drive Carrier. They report the presence of power and a disk drive, and the current condition of the drive.
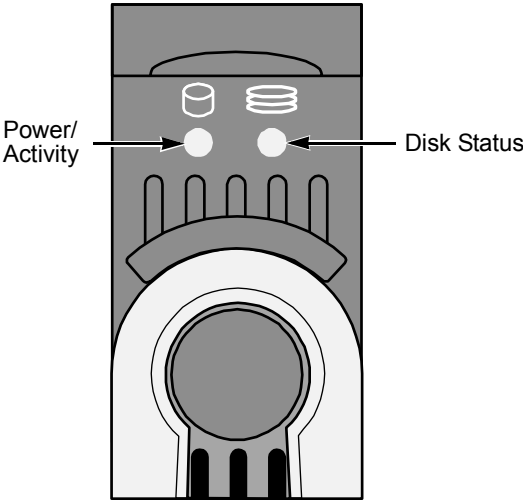
Figure 5. VTrak Drive Carrier LEDs

VTrak Disk Carrier LEDs

Under normal conditions, the Power/Activity and Disk Status LEDs should display green.

LEDs	State				
	Dark	**Steady Green**	**Flashing Green**	**Amber**	**Red**
Power/ Activity	No Drive	Drive Present	Activity	n/a	n/a
Status	No Power	Drive OK	n/a	Drive Rebuilding	Drive Error
"n/a" means this state does not apply to this LED.					

See *Critical & Offline Logical Drives* on page 201.

Back of Enclosure

When the FRU Status LED on VTrak's front panel shows Amber or Red, check the LEDs on the back of VTrak. These LEDs give the status of the field replaceable units.
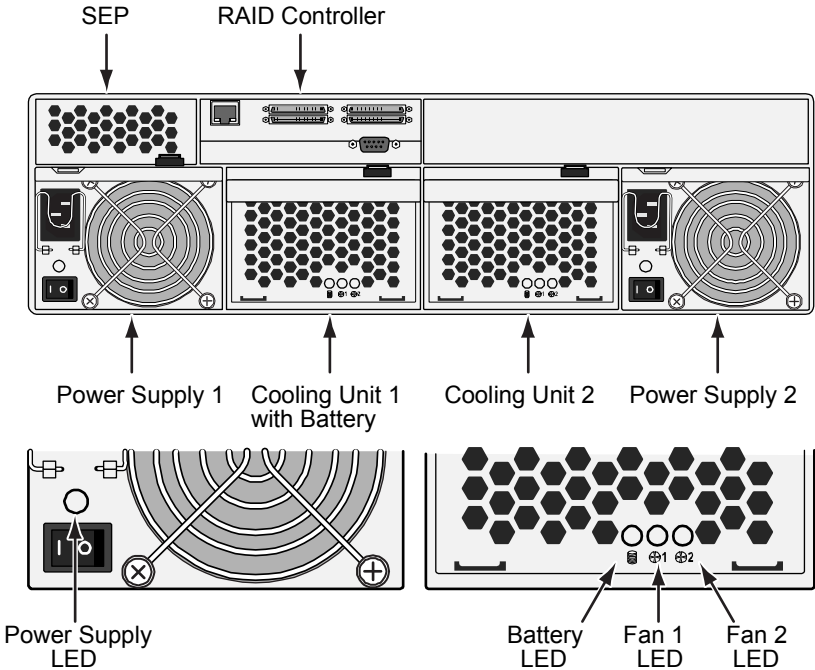
Figure 6. LEDs on the back of VTrak

Under normal conditions, the power supply, battery and fan LEDs should display green. Note that on VTrak 15100, the left cooling unit houses a cache-backup battery but the right unit does not.

LEDs	State			
	Dark	**Green**	**Amber**	**Red**
Power supply	Not detected	OK	Fan failed	Failed
Battery	Not detected	OK	Too hot or Low capacity	Failed
Fan 1 or 2	Not detected	OK	Wrong speed	Failed

To check a component's installation, follow the same procedure as replacing the component, except that you reinstall the original component rather than a new one. In most cases, this action fixes a bad connection and allows VTrak to detect the component. If this action does not correct the problem, replace the unit. See page 159 for instructions.

Event Notification

When you select Event Notification, WebPAM PRO sends popup and/or email messages regarding its status. The messages you see depend on your notification selection (see page 73) and what is currently happening in the VTrak.

The chart below gives the suggested action when the corresponding message is displayed.

Event	Action
Controller Notification	
Controller Unknown Error	Unspecified problem with the Controller.*
Data Parity Error	SCSI data parity error.*
Command Parity Error	SCSI command parity error.*
Bus Reset	The Initiator sent a command to reset the SCSI bus, to correct a problem.*
Unrecoverable Error	Restart the Promise Product to clear the problem.*
Abort Task	A normal event. Result of user action.
Clear ACA	Cleared an auto contingent alliance condition.*
LUN Reset	A normal event. Result of user action.
Initiator Error	SCSI error on the HBA card.*
Illegal Secondary Identify	A target received a second Identify message with a different LUN.*
Message Parity Error	SCSI message parity error.*
Bus Reboot	The VTrak rebooted itself.*
	* An occasional incident of one of these messages does not necessarily indicate a problem. However, if any of these messages appears repeatedly, contact Technical Support.
Connection Notification	
Connection Made	Normal result of logging in.
Connection Lost	Normal result of logging out. Also a result of poor SCSI cable or network connection.

Event	Action
Disk Notification	
Disk Down	Identify the disk drive involved. Power down the system, remove and test the drive. Replace the drive as needed.
Disk Notification, cont.	
Disk Plugged In	A disk drive has been plugged into the enclosure. Normal.
Disk Access Retry	Watch this disk drive. If problems persist, power down the system, remove and test the drive. Replace the drive as needed.
Disk CRC Error	Identify the disk drive involved. Power down the system, remove and test the drive. Replace the drive as needed.
Disk SMART Failed	Identify the disk drive involved. Power down the system, remove and test the drive. Replace the drive as needed.
Disk ECC Error	
Disk Bad Sector	
Disk Reserve Sector Error	
Disk Time Out	
Logical Drive Notification	
Create Logical Drive	A new logical drive was created. Normal.
Delete Logical Drive	A logical drive was deleted. Normal.
Logical Drive Critical	If hot-spare is enabled, logical drive will rebuild automatically with a new disk drive. Identify and replace the failed drive. Without a hot spare, the logical drive will attempt to rebuild the failed drive. If this action repeats, remove the drive for test and repair or replacement.
Logical Drive Offline	Go to the Promise website and download a document called *Array Recovery Procedures* or contact Technical Support.
Logical Drive Migration Started	Expansion or RAID level change of logical drive begun. Normal.
Logical Drive Migration Completed	Expansion or RAID level change of logical drive finished. Normal.

Event	Action
Logical Drive Migration Stopped	User aborted expansion or RAID level change. Normal.
Logical Drive Rebuild Start	Rebuild begun. This can happen automatically depending on Controller settings. Normal.
Logical Drive Notification, cont.	
Logical Drive Rebuild Completed	Rebuild finished. Normal.
Logical Drive Rebuild Stopped	User aborted Rebuild. Normal.
Logical Drive Synchronization Start	Synchronization begun. This can happen automatically depending on Controller settings. Normal.
Logical Drive Synchronization Completed	Synchronization finished. Normal.
Logical Drive Synchronization Stopped	User aborted Synchronization. Normal.
Logical Drive Synchronization Comparison Error	Data discrepancy found and corrected. If this message appears frequently, contact Technical Support.
Logical Drive Synchronization Internal Error	Data discrepancy found but not corrected. Contact Technical Support.
Logical Drive Full Initialization Start	Full Initialization started. Normal.
Logical Drive Full Initialization Completed	Full Initialization finished. Normal.
Logical Drive Full Initialization Stopped	User aborted logical drive Full Initialization. Normal.
Logical Drive Quick Initialization Start	Quick Initialization started. Normal.
Logical Drive Quick Initialization Completed	Quick Initialization finished. Normal.
Logical Drive Quick Initialization Stopped	User aborted Quick Initialization. Normal.

Event	Action
Logical Drive Percent Completed	Progress in percent of synchronizing or rebuilding a logical drive. Normal
Enclosure Notification	
Enclosure Power Down	Power switched OFF. Turn power ON.
Enclosure Notification, cont.	
Enclosure Power Up	Power is ON. Normal.
Enclosure Unknown Error	Unspecified problem with the Controller. If this message appears frequently, note any malfunctions and contact Technical Support.
Enclosure Over Temperature	Click on Enclosure1 in WebPAM to identify location of overheat condition. Verify that there is ample space around the enclosure. Check that all fans are running and airflow is not obstructed. Correct any problems.
Enclosure Fan Stop	Click on Enclosure1 in WebPAM to identify failed fan. Replace as needed.
Enclosure 3.3 Volt Range	Go to Controller management > Enclosure management > Voltage in CLU. Or click on Enclosure1 in WebPAM to check power supply status. Replace as needed.
Enclosure 5 Volt Range	
Enclosure 12 Volt Range	
Battery Temperature Rise	Click on Enclosure1 in WebPAM to check for overheat condition. Correct any problems.
Battery Temperature Dropped	Normal.
Battery Capacity below threshold	Replace Battery.
Battery Capacity Normal	Normal.
Battery Discharging	Could be a SEP problem. If this message appears repeatedly, contact Technical Support.
Battery Maintenance Mode	Normal.
Battery life ended	Replace Battery.

Critical & Offline Logical Drives

A fault-tolerant logical drive—RAID 1, 3, 5, 10 and 50—goes critical when a 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, the logical drive has lost its fault tolerance, and performance might be adversely affected.

If the fault was caused by a failed 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.

If your fault-tolerant logical drive goes offline, go to the Promise website (www.promise.com) and download a document called *Array Recovery Procedure*.

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

If one 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

VTrak provides both audible and visual indicators to alert you of a disk drive failure. The following will occur when a disk drive fails or goes offline:

- The Logical Drive LED changes from green to amber
- The Disk Carrier Status LED changes from green to red
- The audible alarm repeatedly sounds two short beeps
- WebPAM PRO and the CLU report the condition

Rebuild

Normally, the logical drive will begin rebuilding automatically. You can access your logical drive during this time but read/write performance might be slower than normal.

- If a hot spare drive is provided and enabled, the controller will activate the hot spare and rebuild logical drive information and data to it.
- If there is no hot spare drive available, the controller will wait until a replacement disk drive is installed. The logical drive will remain Critical.

To rebuild a logical drive manually, see page 98 for WebPAM or page 144 for the CLU.

With a Hot Spare Drive

After the logical drive rebuilds itself using the hot spare:

1. Replace the failed drive.
2. Check the automatic rebuild and hot spare policy to be sure your logical drive(s) recognize(s) the new drive as a hot spare.

To set up a hot spare drive, see page 94 for WebPAM or page 139 for the CLU.

Without a Hot Spare Drive

If no hot spare drive is available, the VTrak will not rebuild the logical drive and it will remain Critical.

When you install a replacement disk drive into the enclosure, the logical drive will automatically rebuild the information and data on the newly installed disk drive if Automatic Rebuild option is enabled.

To enable Automatic Rebuild and set Hot Spare Policy, see page 94 for WebPAM or page 139 for the CLU.

<table>
<tr><td></td><td>Important</td></tr>
<tr><td></td><td>If your replacement disk drive was formerly part of a different logical drive, use the CLU to wipe the reserve sector on the replacement disk drive. See page 129.</td></tr>
</table>

Enclosure Problems

WebPAM PRO displays red circles 🛑 in Tree View to identify components that need attention.
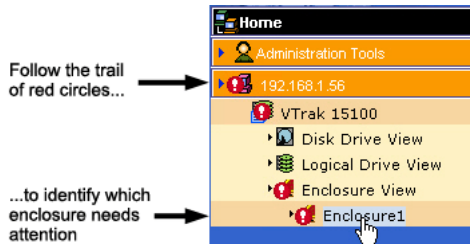
When a red circle appears over a Host in Tree View, click on the Enclosure ⛰ icon. The Enclosure screen will display (below).
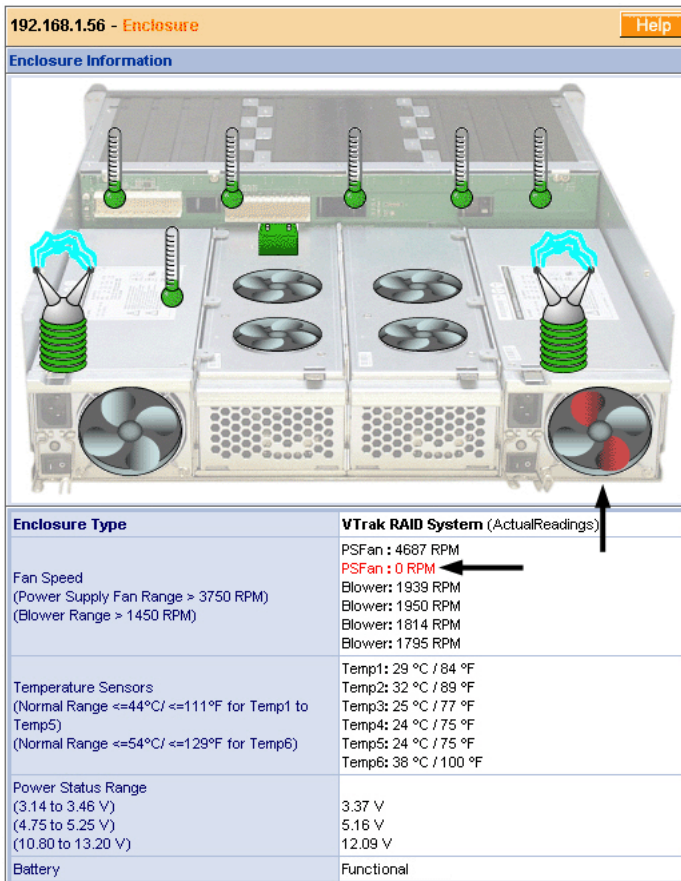
In this example, a power supply fan has stopped turning, indicating a failure. The Enclosure Diagram displays color and motion changes to identify a failed fan. In this case, you must replace the power supply.

Overheating

Temperature
Sensors

Overheating is a potentially serious condition because the excessively high temperatures can lead to disk drive failure and controller malfunction.

Overheating usually results from:

Overheating

• Fan failure

• Poor air circulation around the enclosure

WebPAM reports failed fans along with elevated temperature. On VTrak, there are two kinds of fans:

Too Warm

• Power supply, 1 fan each, 2 fans total

• Cooling units, 2 fans each, 4 fans total

Normal

If a power supply fan fails, you must replace the power supply. If a cooling unit fan fails, you can remove the cooling unit and replace only the fan itself.

Cooling Unit
Fan Condition

No tools are required for either procedure. See page 180 for instructions on replacing the fans.

OK

Replace Now

Air circulation around the VTrak enclosure may be a more complex problem. Use the thermometer icons to help you locate the specific hot spot. Check for these conditions:

Power Supply
Fan Condition

• Accumulated dust or objects blocking the fans

• Less than a minimum of 5 inches (13 cm) space between the back of the VTrak and the wall or other object

• Ambient temperature above 95°F (35°C) where the VTrak is operating

OK

To cool down a VTrak, do the following:

• Correct any problems identified above

• Power it down and let it sit for an hour or longer

Replace Now

Power Supplies

VTraks are equipped with redundant power supplies. The advantage of dual power supplies is that, should one fail, the other will continue powering the subsystem until the faulty one can be replaced. VTrak is capable of operating on a single power supply. As a result, if one power supply fails you must watch the front panel LEDs or WebPAM in order to become aware of the condition.

OK

The power supplies are hot-swappable, meaning you can leave the VTrak running when you replace the bad one. Be careful, however, to remove the faulty power supply and not the good one, or VTrak will come to an immediate stop and your data will be unavailable until the system is powered and booted again.

Replace Soon

As noted above, if a power supply fan fails, you must replace the power supply. Without the fan to cool it, the power supply will overheat and eventually fail anyway.

No tools are required for the procedure. See your page 179 for instructions on replacing a power supply.

Replace Now

Battery

Battery Condition

VTrak uses a battery as backup power for the cache. Should a power failure occur, the battery enables the cache to hold data up to 72 hours. The battery recharges during normal VTrak operation.

OK

In most cases, installing a replacement battery will correct a marginal or failed condition. The battery is located on the left cooling unit. Remove the cooling unit for access. The battery is hot-swappable.

Replace Soon

No tools are required for the procedure. See page 185 for instructions on replacing the battery.

Replace now

Connection Problems

When you install your Promise product following the instructions in the *Quick Start Guide* and *User Manual*, you should have little trouble getting your equipment to work the first time. But connection problems can arise that are not the User's or Installer's fault. Every conceivable problem cannot be covered in the documentation but some guidelines could be helpful.

Connection problems cause a majority of failures in almost any electrical system. While the installation of the cables and components was correct, they don't function properly, or at all, because:

- A connector is dirty or corroded
- A connector is loose or damaged
- A cable looks OK outside but has an open circuit inside
- The wrong cable was used

Promise products ship with a full set of new cables and terminators, as required for each specific product. Be sure to use these components because: 1.) They are the proper ones for your RAID subsystem, 2.) They are in brand-new condition, and 3.) You paid for them with the purchase of your Promise product.

SCSI Connections

The Promise VTrak has embedded technology, and uses a network connection to pass command and management information. However, the data is transmitted via the SCSI bus.

SCSI connections are both physical (outside) and electrical (inside). You can see a physical connection, you can clean it or try a different cable on it. Electrical connections are made by firmware and software, such as when you set the SCSI IDs or addresses. SCSI chains are completely intolerant of ID conflicts. If you have a conflict, the devices on your SCSI chain will not work correctly until it is resolved. The Promise VTrak uses Target IDs and LUNs for SCSI address management.

The VTrak RAID subsystem is sensitive to the presence of other devices on the SCSI chain. Promise recommends that you connect no other devices to the SCSI chain with a VTrak, except for an other VTrak.

Serial Connections

Promise products use a serial connection for a command line utility (CLU). Normally, users prefer WebPAM because of its graphic user interface. But the CLU can do all of the same jobs. And it will work when your network connection is down.

If you are unable to make a serial connection to the VTrak, and the cable is properly attached, check your PC's BIOS to be sure the serial port is enabled.

For VTrak, you must use the CLU to set the RAID subsystem's initial Management Port IP address in order for WebPAM to connect with it. This issue is discussed further under Network Connections (below).

The CLU controls and manages but it does not move data. It communicates through a null-modem cable, supplied with the Promise product. You can connect a straight-through serial cable, but it will not work for this purpose. If you do not use the CLU often, you might want to disconnect and store the cable. Consider leaving it connected, to be sure it will be there when you need it.

The CLU also works through a Telnet (network) connection.

Network Connections

The VTrak 15100 has 100 Mb connector on the back of its controller. The VTrak becomes a node on your network like any other PC, server or other component with an IP address.

Connectivity LED   Activity LED
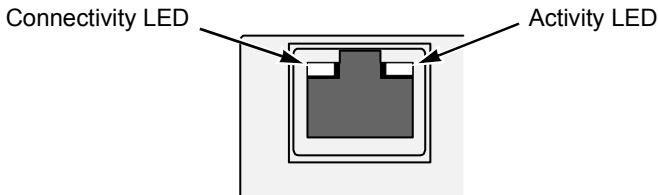
The Connectivity LED shows a steady green when a network connection is present. If the Connectivity LED is dark, there is no network connection.

The Activity LED flashes green when network activity happens. If the Activity LED is dark, there is no network activity.

VTrak's default Management Port IP address is 10.0.0.2. You must change this address to one that will work with your network. You make the initial IP address setting using the CLU, as mentioned above. You can make subsequent IP address changes using WebPAM.

Note that VTrak's Management Port requires a static IP address. It does not accept dynamic IP addresses from a DHCP server. If you have a DHCP server on your network, there is a chance that it will inadvertently assign the VTrak's IP

address to another node. You might see a warning to this effect on your monitor. If this happens, WebPAM might not be able to connect. See your IT administrator to work out a suitable arrangement.

Chapter 9: Support

- Frequently Asked Questions (below)
- How to contact Technical Support (page 214)
- Limited Warranty (page 216)
- Returning product for repair (page 217)

Frequently Asked Questions

What kind of disk drives can I use with VTrak?

VTrak was designed to use Serial ATA disk drives. You can also use Ultra ATA 133/100/66 disk drives with the optional PATA-to-SATA Adapter available from Promise Technology.

Can I take the disk drives from my UltraTrak, put them into the VTrak and keep my logical drive (array) intact?

Yes. VTrak uses the same logical drive format as UltraTrak. Contact Promise Technology to purchase PATA-to-SATA Adapter for your existing PATA drives.

Can I use my existing SCSI card with VTrak?

If the SCSI card has at least a 160 MB/s data transfer rate, supports LUNs and has a 68-pin VHDCI external connection, you can use it with VTrak.

If your SCSI card has a 68-pin HD external connector, you can purchase an optional 68-pin HDCI to 68-pin VHDCI SCSI cable from Promise Technology.

Will I get maximum performance using my current 80 MB/s SCSI card? Do I have to buy a 160 MB/s SCSI card?

The VTrak has a measured peak sustained throughput of 100 MB/s per channel. Using a 80 MB/s SCSI card will result in a performance bottleneck under certain conditions. You must estimate how frequently those conditions happen and how serious they are. Then you can decide whether to upgrade to the faster SCSI card.

How many VTrak subsystems can I connect to one SCSI chain?

You can connect up to eight (8) VTraks on a single SCSI chain.

Can I connect two SCSI cards to the same VTrak?

Yes. VTrak has two SCSI channels, which allows you to connect it to two SCSI cards, whether those cards are in the same PC or two different PCs. For more information, see page 16.

Can I connect my VTrak on the same SCSI chain with other devices?

No. Do not connect other devices to the SCSI chain with a VTrak. If you want to monitor your VTrak and run other SCSI devices from the same PC, add another SCSI card to the PC.

Can I connect my VTrak on the same SCSI chain as my Promise UltraTrak?

No. Do not connect other Promise products to the SCSI chain with a VTrak. If you want to monitor your VTrak and UltraTrak from the same PC, add another SCSI card to the PC.

How can I tell when the VTrak has fully booted?

When the VTrak is fully booted up, all six front LEDs will light up green. The right most LED will blink green once per second, while the remaining LEDs will be solid green.

How do I learn more about configuring and using my VTrak?

Read to this *VTrak 15100 User Manual*. It contains detailed information regarding configuration, troubleshooting and maintenance of your VTrak.

Why does VTrak come with a Command Line Utility?

First, to assign your VTrak an IP address in order for the WebPAM PRO management software to connect to it. Second, in the event of a network failure, you can still access the VTrak and the data stored on it.

The cable is connected, VTrak is running and I used the specified settings but the serial connection does not work. What should I do now?

Access your PC BIOS settings and enable the serial port.

I created a Host on WebPAM PRO but when I click on it, nothing happens. What is the problem?

There is a broken network connection between your PC and the VTrak, or the VTrak is powered off. Locate and fix the connection or power on the VTrak, as required.

My recently upgraded WebPAM PRO is full of errors! How do I correct this problem?

This condition is the result of installing a new version of WebPAM PRO on top of an existing installation. There are two ways to fix this problem:

- Uninstall WebPAM PRO as described on page 33, then reinstall the new version.
- If you are familiar with the Windows Registry, run regedit, navigate to the HKEY_LOCAL_MACHINE > SOFTWARE folder and delete the JavaSoft key (folder).

When I tried to uninstall WebPAM PRO on my Linux computer, the utility said it could not find two files. What is the status of the uninstall and what about the missing files?

This condition is the result of a filename error and the uninstall operation is not complete. Contact Promise Tech Support for help to handle the missing files and perform the uninstall properly.

Can WebPAM PRO connect through VTrak's Serial (RS-232) port?

No. The VTrak Serial port is only for a HyperTerminal connection.

I can access the VTrak over my company's intranet. But I can't access it from an outside Internet connection. How do I make the Internet connection work?

This condition is not related to VTrak, but is due to your firewall and network connection protocol. Contact your MIS Administrator.

With other Promise products, such as UltraTrak, I used the Host PC's IP address in WebPAM PRO to connect with the RAID subsystem. Why is VTrak different?

UltraTrak uses In-Band SCSI technology to connect with the Host PC. VTrak usually connects to the Host PC through a network connection. Therefore, it requires its own IP address.

Does VTrak 15100 support In-Band SCSI?

Yes. However, there are no applications currently available that can use it.

I tried to log into WebPAM PRO but my browser showed the message "cannot be displayed." What is the problem?

The browser decided prematurely that WebPAM PRO was not responding. Click the Refresh button. This action usually brings up the login screen.

I can access the VTrak over my company's intranet. But I can't access it from an outside Internet connection. How do I make the Internet connection work?

This condition is not related to VTrak, but is due to your firewall and network connection protocol. Contact your Network Administrator.

Why can a RAID 1 logical drive on VTrak consist of only two disk drives?

On VTrak, RAID 1 logical drives work in matched pairs. But you are not limited to just one RAID 1 logical drive. VTrak supports up to 7 RAID 1 logical drives, using up to 14 disk drives.

See page 175 for more information on the number of disk drives you can use for each RAID level.

WebPAM PRO starts but I cannot see the Tree. What should I do?

Lower the security settings in your Browser.

I have two UltraTraks and use WebPAM to monitor them. Can I use my existing WebPAM setup to monitor the VTraks also?

No. Install WebPAM PRO from the VTrak Software CD.

With other Promise products, such as UltraTrak, I used the Host PC's IP address in WebPAM PRO to connect with the RAID subsystem. Why is VTrak different?

UltraTrak uses In-Band SCSI technology to connect with the Host PC. VTrak connects to the Host PC through a network connection. Therefore, it requires its own IP address. VTrak's SCSI connection is used only to move data.

The CLU, WebPAM PRO and VTrak documentation use the term "logical drive" where earlier Promise products use the term "array." Why did this change happen?

Technically, logical drive is the correct term. Array usually refers to a group of disk drives not arranged under RAID or to the RAID subsystem. Promise adjusted its use of terms to more closely match the industry.

Are virtual drives on VTrak limited to 2.199 terabytes?

No. The 2.199 TB logical drive size limit does not apply to VTrak.

The VTrak has no LCD panel. How can I set it up and create logical drives?

There are two ways to set up VTrak and create logical drives, WebPAM PRO and the Command Line Utility. They are described in Chapters 4 and 5, respectively.

How can I be sure everything is working OK on the VTrak?

VTrak has several LEDs on the front to monitor the status of power, field replaceable units (FRUs) and logical drives. When these are green, VTrak is functioning normally.

Why do the Rebuild, Synchronize, Expand and Convert operations take so long compared to moving data?

When data is moved, the operation consists of reading, writing and checking one or more files. Rebuild, Synchronize, Expand and Convert involve reading, writing and checking all the logical block addresses or individual data blocks on each disk drive. Plus, your logical drive remains available while these operations take place. These added requirements increase complexity and take more time.

What happens if a logical drive goes critical?

On the front of VTrak, the logical drive LED turns amber and an audible alarm sounds. This condition is described for WebPAM on page 96 and Troubleshooting on page 201.

Can VTrak run using just one power supply?

Yes, it is possible to run VTrak on a single power supply. There are two power supplies so that VTrak will continue running if one of the power supply fails. But deliberately leaving one power supply off negates this advantage. Always switch on both power supplies.

Where can I find more FAQs?

Check the Promise website: **www.promise.com**.

Contacting 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.)

North & South America

E-mail Support	support@promise.com
Fax Technical Support	(408) 228-6401 Attention: Technical Support
Phone Technical Support	(408) 228-6402 7:30-5:30pm M-F Pacific Standard Time
If you wish to write us for support:	Promise Technology, Inc. Attn: Technical Support 1745 McCandless Drive Milpitas, CA 95035, USA

Europe, Africa, Middle East

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

Pacific Rim

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

China

E-mail Support	support-china@promise.com
Fax Technical Support	+86 10 6872 3940 Attention: Technical Support
Phone Technical Support	+86 10 6872 3941 9:00-6:00pm China Time
If you wish to write us for support:	Promise Technology China Attn: Technical Support Room 3115, No. 11 South Zhong Guan Cun Street Hai Dian District, Beijing 100081 P.R. China

Limited Warranty

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

- a) the product will conform to Promise's specifications;
- b) the product will be free from defects in material and workmanship under normal use and service.

This warranty:

- a) applies only to products which are new and in cartons on the date of purchase;
- b) is not transferable;
- c) is valid only when accompanied by a copy of the original purchase invoice.
- d) Is not valid on spare parts, fans, and power supplies

This warranty shall not apply to defects resulting from:

- a) improper or inadequate maintenance, or unauthorized modification(s), performed by the end user;
- b) operation outside the environmental specifications for the product;
- c) accident, misuse, negligence, misapplication, abuse, natural or personal disaster, or maintenance by anyone other than a Promise or a Promise-authorized service center.

Disclaimer of other warranties

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

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

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

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

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

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

- b) repair the product.

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

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

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

Your Responsibilities

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

Returning Product For Repair

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

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

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

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

USA and Canada:	Promise Technology, Inc. Customer Service Dept. Attn.: RMA # _____ 1745 McCandless Drive Milpitas, CA 95035
Other Countries:	Return the product to your dealer or retailer. Contact them for instructions before shipping the product.

You must follow the packaging guidelines for returning products:

•   Use the original shipping carton and packaging

•   Include a summary of the product's problem(s)

•   Write an attention line on the box with the RMA number

•   Include a copy of proof of purchase

You are responsible for the cost of insurance and shipment of the product to Promise. Note that damage incurred due to improper transport or packaging is not covered under the Limited Warranty.
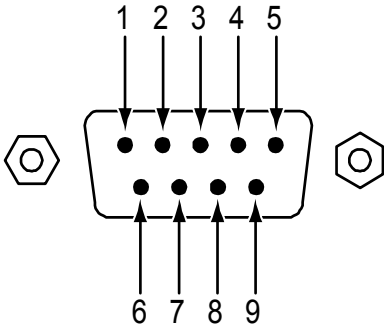
When repairing returned product(s), Promise may replace defective parts with new or reconditioned parts, or replace the entire unit with a new or reconditioned unit. In the event of a replacement, the replacement unit will be under warranty for the remainder of the original warranty term from purchase date, or 30 days, whichever is longer.

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

Appendix A: Serial Connector Pinout

Below is the pinout diagram for the RS-232 (DB-9) serial connector on all VTraks.

The diagrams represent the connector as you see it looking at the back of the VTrak.

Pin	Signal
1	—
2	RXD
3	TXD
4	—
5	GND
6	—
7	RTS
8	CTS
9	—

Index