VTrak™ M-Class SATA RAID Storage System *(vertical, repeated)*

It's All About Your Data

VTrak M-Class Product Comparison

	iSCSI			Fibre Channel			U320 SCSI		
	M500i	M300i	M200i	M500f	M300f	M200f	M500p	M300p	M200p
Host Interface	Dual 1Gb iSCSI TOE						Dual SCSI Ultra320		
Hot-Swap Drives Supported	15	12	8	15	12	8	15	12	8
Rack Size	3U	2U	2U	3U	2U	2U	3U	2U	2U
RAID Levels Supported	0,1,1E, 5, 10, 50			0,1,1E, 5, 10, 50			0,1,1E, 5, 10, 50		
Drive Types	SATA, 1.5/ 3.0Gb			SATA, 1.5/ 3.0Gb			SATA, 1.5/ 3.0Gb		
LUN Supported	256			256			256		
LUN Masking	Yes			Yes			Yes		
Hosts Supported	32			32			32		
Hot-Swap N+1 Power Supplies	Yes			Yes			Yes		
NCQ & TCQ Support	Yes			Yes			Yes		

VTrak Feature Overview

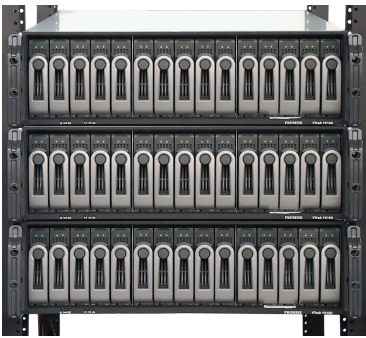**RAID Fault Tolerance and Robustness Features**
- Online Capacity Expansion (OCE) and RAID Level Migration (RLM) to add capacity on the fly
- PerfectRAID™ technology for disk error handling & recovery
- Write hole, Read check, Write check, SMART support and multiple error handling
- Predictive Data Migration (PDM) preemptively detects possible drive loss and migrates data ahead of failure
- Automatic/manual rebuild using multiple global or dedicated hot spare drives
- Non-Volatile Error and event logging

Advanced Performance Features
- Read cache, Write cache; Write-back and Write-through: Write-back for maximum write performance and write-through for data protection
- Adaptive Cache Management (ACM) automatically adjusts predictive caching based on data types
- Uses packet commands and interrupt coalescing to minimize interrupts for better performance
- Elevator seek streamlines commands based on where data is located on the disk
- 64-bit RAID engine processes commands at blazing speed

Embedded Promise Array Management Software
- Embedded web management means no software to install anywhere
- Provides local and remote access to Promise RAID systems over the Internet via any web browser
- Creates, deletes, expands, and converts disk arrays remotely
- Monitors drive and enclosure status and provides online event logging
- Provides e-mail notifications of disk, array, controller or enclosure events such as error or degrade conditions

* Check www.promise.com for latest operating system and hard drive support.

The Promise Technology Advantage

Dependability, Innovative Design, Performance, Reliability The VTrak M-Class is based on Promise's field proven fourth generation RAID engine. This is the fourth generation of a RAID engine that has successfully powered tens of thousands of customer applications for the last five years. In addition to our outstanding feature set, there are numerous reasons for the Promise Advantage.

- **Commitment and the focus to deliver and support innovative storage products**
- **Designed in-house for complete control from start to finish**
- **"One Stop Shopping" with a wide range of external DAS / SAN products for various applications**
- **Key enterprise features for a mid-range price drives new applications**
- **Uncompromised and unparallel customer support with 24 x 7 (Effective 08/01/05) availability and advanced field replacement program (For VTrak only and in certain territories)**
- **ISO 9000 and ISO 14001:2 compliance from R& D to manufacturing**
- **Using best of class materials to create the highly reliable and cost effective products**
- **300 years of total engineering experience in RAID FW, Mgmt SW, Storage Application, Hardware, Mechanical, Test and Quality Control**
- **Open architecture lets the customer decide what components--from drives to initiators--that they want to use.**

Business Value

A robust, high-performance, multi-port SAN ready RAID storage array that delivers advanced data protection in a cost-effective, easy-to-manage solution to address the storage needs of entry level to midrange business applications.

Highlights

- :: 8-, 12- & 15-drive high-performance, high-capacity, rackmount storage systems
- :: SATA 3Gb/s drive support for the fastest, most feature rich solutions
- :: Dual iSCSI, Fibre Channel, SCSI 320 host ports provide high-availability SAN and cluster-friendly platform
- :: Choose either FC, iSCSI or SCSI interfaces with the same features and virtually the same performance
- :: Resilient data protection features such as Predictive Data Migration™ and PerfectRAID™ provide rock solid data protection
- :: Native Command Queuing (NCQ) and Tagged Command Queuing (TCQ) support delivers lightning fast response times
- :: LUN Masking and LUN Carving bring flexibility for multiple application and OS support on the same storage subsystem
- :: Open architecture, industry's most comprehensive support for SATA hard drives and standards-based management interfaces including SNMP, CIM and WEBEM.
- :: Support for the industry standard Disk Data Format (DDF from SNIA) ensures interoperability and drive roaming even amongst different RAID vendors
- :: Robust data protection delivers advanced midrange protection levels at an entry level price range.

VTrak™ M-Class
SATA RAID Storage System

Rock solid storage gets the job done right

Today's businesses are increasingly required to do more with less. Essential data and storage demands are constantly growing, but budgets for hardware and IT staff are not. As a result, companies need reliable, easy-to-manage mid-range storage solutions that deliver key enterprise-class features, capacity and performance without the enterprise costs. Intelligent system design drives key enterprise reliability well within the reach of today's small to medium businesses.

Cost-effective, easy to manage storage system

The Promise VTrak M-Class series is optimized for small to mid sized SANs and application clusters. The VTrak M-Class family offers compelling value, strong performance and advanced functionality. Cost effectiveness is achieved by delivering open standards, leveraging Promise SATA RAID IP, the economies of scale of standard off the shelf components and intelligent storage design. The VTrak M-Class is built around a flexible, standards-based open architecture that makes it flexible and adaptable for a broad spectrum of storage requirements. Standards-based technologies also reduce the total cost of ownership (TCO) and allow pay as you grow scalability.

Fabric attached storage for SANs and application clusters

The Promise VTrak M-Class series is optimized for organizations deploying robust, small to medium storage area networks, application clusters, disk-to-disk backup and high bandwidth storage applications. Rock solid reliability, coupled with strong data storage features deliver enterprise data protection for everyday applications. The VTrak M-Class systems offer the ease of management, performance, and data protection required by today's storage hungry applications. The VTrak M-Class system also delivers the performance and reliability needed for applications such as audio/video editing, rich media, medical imaging, and other high-bandwidth, content-rich applications. Advanced features such as LUN Masking and Carving enable storage resource sharing amongst heterogeneous operating systems including Windows, Linux, Netware, Macintosh, and Solaris. With identical features for all models the choice of interconnect is in the hands of the customer.

Transform your External Storage

Key features & benefits

Manageable:

:: Embedded web management means NO software to install anywhere
:: Manageable: remote management and notification via the embedded web GUI via Ethernet port
:: Serviceable: makes repairs a breeze with hot-swappable disks, power supplies, fans, and battery, all with tool-less removal in a fully cable-less and balanced design
:: Notification: email and message notification of critical events
:: LUN Masking and Mapping deliver advanced SAN functionality and data security

Resilient:

:: Reliable: ensures data access through advanced data guarding technologies such as Predictive Data Migration™ Media Patrol™, PerfectRAID™ and battery-backed data cache
:: Available: N+1 redundant and hot-swap power and cooling units, dual host ports, and clustering support
:: Multiple global and dedicated hot spares improve uptime

Extensible:

:: High-performance: supports sustained throughput up to 465 MB/s throughput (cache hit using both ports)
:: Flexible: supports drives from most vendors, supports SATA mixed vendor and capacity environments
:: Scalable: Pay-as-you-grow with online expansion; group additional units to accommodate growing storage needs
:: Supports DDF for industry wide hard drive interoperability and cross-vendor compatibility of data formats.

Cost Effective:

:: SATA drives deliver the lowest cost per GB of any drive
:: Open: ships without hard disk drives to allow flexible pay as you grow capacity, choose the vendor and capacity drive you want, when you want it, No vendor lock-in on drives

SERIAL ATA 3Gb/s

The VTrak M-Class System

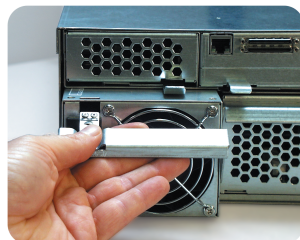### External storage designed from the drive up

With the VTrak M-Class series, Promise Technology has optimized external, rackmount- storage from the drive up for high performance and advanced data protection. The VTrak system concept is to be a flexible, extensible platform that leverages industry-standard architectures to deliver optimal performance, low-cost, and key enterprise functionality for network and direct attached storage. Rock solid data protection for all classes of data.

The VTrak M-Class series starts with a series of 2U or 3U rackmount chassis that can be populated with almost any off the shelf SATA hard drives. Next, the system incorporates key redundant, high-availability and data protection features for exceptional reliability. For high-performance, the system adds a stellar fourth generation Promise RAID controller that nearly doubles performance. On top of this, Promise adds a flexible dual host-port architecture, enabling clustering, storage consolidation and high throughput solutions. The VTrak M-Class offers an unparalleled value in a feature-rich, SAN-ready server storage system.

Promise delivers rock solid reliability within your budget

Cost-effective storage starts with the hard disk. The Promise VTrak series enables users to take full advantage of Serial ATA drives, the standard for low-cost, high-capacity and midrange-performance storage systems. VTrak users can populate the system with virtually any SATA drive, optimizing the system to meet their capacity, performance, and price requirements. To meet the demanding requirements of entry to mid-range SAN storage, the VTrak M-Class incorporates enhanced system and enclosure features that maximize reliability and prevent potential problems from operational factors like vibration, temperature, and continuous drive operation. In fact Promise has designed in new reliability features that enable the new chassis to provide some of the best rotation and vibration dampening in its class.

Hot-swap, high availability: M-class delivers

The VTrak M-Class series features key redundant systems that can be replaced without tools while the system continues to operate. The hot-swappable FRU (field replaceable unit) designs for drive carrier, power supply, cooling and battery units simplify access to primary systems. The VTrak system uses a completely cable-less design for all internal components offering plug-and-play access and eliminating potential cable failures. The critical active components that are most likely to fail are the power supply and the fans. The VTrak M-Class design features N+1 redundant power and cooling to ensure continuous operation. The unit only needs one power supply and one cooling unit to continue serving data without interruption. This extra level of redundancy provides compelling business continuance security that is well within your budget.
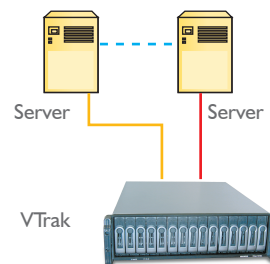
In addition to its high-availability hardware features, the VTrak M-Class family ensures data protection through advanced data guarding technologies such as Predictive Data Migration, Media Patrol, a battery-backed data cache, PerfectRAID error handling, non-volatile error logging, advanced U320 SCSI command support and enhanced SMART support.

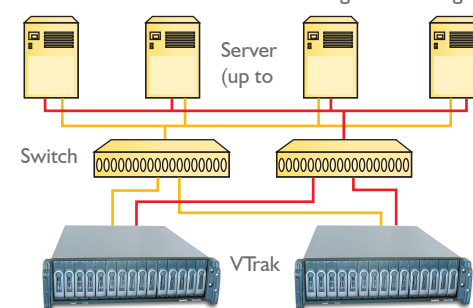### Storage and server consolidation for the mainstream

The M-Class brings a new level of storage area network aware functionality to the mid range storage market. Promises next generation RAID engine delivers advanced features such as support for up to 256 logical drives per system (each set of drives, or array, can be divided into a maximum of 32 logical drives each) and support for 32 hosts in a Storage Area Network. Since Fibre Channel and iSCSI have the same features and price the customer is free to choose their interface.

Direct attach or SAN Flexibility

Direct attach architecture
Up to two connected servers, stand-alone or clustered

SAN architecture
Connect one or two FC or Eghernet switches for SAN sharing or clustering

Server

Server   Server

Switch

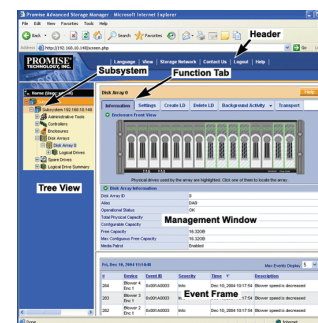VTrak   VTrak

Powerful performance keeps applications flowing

Today's back-office, disk-based backup and restore, and rich media applications require high performance. The VTrak M-Class series takes advantage of Promise's new fourth generation, 64-bit RAID engine and advanced data acceleration technologies to deliver powerful data access, enabling sustained performance of up to 400MB/s. Cache memory up to 512MB (256MB standard) brings near instant access to needed data and ensures consistent, sustainable performance. Promise's advanced Adaptive Cache Management™ technology automatically adjusts data cache policies based on data patterns to optimize performance for different application types. SATA 3G and NCQ and TCQ support deliver the highest levels of performance to your applications.

Manage your M-Class storage systems from anywhere

The VTrak M-Class family features the powerful web-based Promise Array Manager Proe--WebPAMProe-- software for simple yet powerful remote management embedded in the system. Because the management software is embedded in the box, there is no need to install any software anywhere to manage and monitor the system remotely. With Promise Array Manager, a business can effectively configure and monitor all VTrak M-Class systems anywhere in the network through an easy-to-manage Web-based user interface. All array configuration, management and reporting features are available via the web-based management and can be accessed via the Ethernet LAN port. Advanced configuration wizards speed array management. The VTrak family also supports industry-standard SNMP, CIM, and WBEM so third-party management application integration is simplified.

Vital Product Data (VPD) brings high end manageability of FRUs

Promises unique Vital Product Data technology provides all of the vital product data of all installed FRUs in the storage system to all management interfaces. VPD includes serial number, model, version, and date among other things. By providing this vital information via powerful software tools the administrator can monitor and manage all FRUs remotely without having to remove any components or be on site at the unit. This improves tech support, spares inventory management and compatibility of FRUs. This is a standard feature in the high end storage arrays; Promise is the first to bring this flexibility to the midrange.

Promise Technology's unique solutions for resilient data protection

More than state-of-the-art hardware, the VTrak M-Class series system incorporates Promise Technology's most advanced and comprehensive solutions for resilient data protection.

Predictive Data Migration™

Predictive Data Migration is Promise's unique technology that proactively detects possible drive failures before they occur and migrates data to a new healthy drive. Predictive Data Migration dramatically reduces the potential for data loss as well as the likelihood of a logical drive (array) going critical.

The VTrak system monitors its hard drives for errors, events, and other hard drive reliability indicators. If a physical drive reaches a predetermined error threshold (becomes 'sick', the data on the sick drive is copied directly to a hot-spare drive before the suspect drive fails. Since the drive is replaced in the background before it fails, the chance of data loss is dramatically reduced. Once the data is copied to the new drive the sick drive is set down and the new drive is automatically built into the affected logical drive with zero downtime. Predictive Data Migration prevents the logical drive from reaching a critical unprotected state and impacting data access. PDM is also over 300% faster than a typical RAID 5 drive rebuild. Reducing the rebuild time from days to hours. WebPAM Proe enables the administrator to manage the entire process simply and efficiently from anywhere.

PerfectRAID™

PerfectRAID is Promise's patented RAID data protection technology, a suite of data protection and redundancy features built into every Promise RAID product. PerfectRAID incorporates robust data handling and error management features including write hole prevention, read & write check tables, SMART support and multiple drive error handling and non volatile werror logging.. PerfectRAID features are also carefully matched with Promise's resilient RAID Engine Core to deliver substantial data protection. On top of the core protection techniques, the VTrak system takes advantage of advanced PerfectRAID features including Bad Block Remapping and Media Patrol. These features scan the system's drive media to ensure that even bad physical drives do not impact data availability.