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TECHNOLOGY, INC.

Product Launch

FastTrak SX4000™

**Ultra ATA RAID 0, 1, 0+1, & 5 Host Adapter
For 66MHz PCI Motherboards**



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Positioning

The 4-channel FastTrak™ SX4000 host adapter closes the gap for network and workstation professionals with more limited budgets who desire the highest level of fault tolerance and storage capacity for organization or client data. SX4000 offers the major benefit of enterprise-level/server-level data protection for smaller network operating systems, data, and applications without the historically high price tag or intimidating skillset required by SCSI or Fibre Channel RAID.

FastTrak SX4000 offers a host-managed approach to RAID 5 for up to 4 low-cost, high performance/capacity Ultra ATA drives purchased off-the-shelf. This results in a lowered total cost of ownership for server-attached and workstation storage.

The straightforward host adapter employs a dedicated onboard XOR hardware engine for calculating parity data under RAID 5 and provides a single DIMM memory slot to handle up to 256MB DRAM (minimum 64MB required) of cache memory.

When deployed on 66MHz PCI bus-based motherboards, SX4000 allows larger programs and operating systems like Windows 2000, XP, and Linux to take full advantage of the expanded bus data bandwidth and huge single drive volume array capacities to load, store, and protect data faster and more reliably because of RAID 5. The card also supports RAID 0 (for striping performance), RAID 1 (for mirrored data protection) and RAID 0+1 (striping plus mirroring).

Only Promise FastTrak SX4000 provides proven Ultra ATA compatibility based on the world's best-selling Ultra ATA ASIC designed by Promise. No other controller card manufacturer or RAID card manufacturer can make this claim for ATA/IDE technology. The card is operating system compatible with most major PC operating systems including Windows XP/2000/NT; RedHat Linux 7.2/7.3; TurboLinux Server 6.5/7.0; SuSE Linux 7.3/8.0; and Caldera OpenLinux. 3.1/3.1.1.

Target Audiences

With FastTrak SX4000, users of a desktop standard PC up to midrange-level server can build huge multi-drive arrays with high fault tolerance at 1/3 the cost of SCSI-based RAID 5 solutions. The substantially lower price point opens the world of RAID 5 to a wide variety of new PC market segments that have the following basic characteristics:

- Up to 100 user access
- Greater storage requirements
- Greater fault tolerant data protection
- Lower IT budgets (compared with larger enterprise IT departments)
- PentiumIII/IV/Athlon-based PCs

Environments

FastTrak SX4000 helps users in a variety of storage environments that include:

Entry-level small office networks
Mid-range server
Professional Single user workstation

Applications

With its high level of fault tolerance, storage capacity, coupled use of a higher performance PC or server, FastTrak SX4000 provides easy configuration and entry for the following applications:

Network server
Media server applications such as video, 3D graphics, imaging and CAD
Web server
File server
E-commerce
Email
Database
Workgroups

Channel Benefits (Resellers, VARs, System Integrators)

ATA RAID, and RAID 5 in particular, represents a tremendous opportunity to build "whitebox" or "house-branded" systems for small, growth-oriented businesses and allows great flexibility and versatility for channel members to offer more customer value than off-the-shelf namebrands.

Creating disk array storage environments with ATA drives allow channel members to take full advantage of the huge growth for storage and servers today. According to Dataquest, Windows 2000 and Windows XP server shipments will increase by 24% annually from 2.1 million units in 1999 to 5 million by 2003. Mountainview-based DISK/TREND also projects that disk array revenues from single



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user systems will continue to grow by 9% annually through 2002 from \$38 million to \$54 million.

Network-based disk array sales should grow by 17% annually for the same period from \$9.2 billion to \$17.3 billion.

What's Special About FastTrak SX4000?

Using the tremendous advances in host CPU power, onboard chipset development, and Ultra ATA drive capabilities, FastTrak SX4000 offers enterprise-level RAID 5 data protection for economy-minded server and workstation users without sacrificing processing power or RAID features. Users can build high-end RAID storage using professional RAID creation and management tools for a fraction of SCSI or Fibre Channel storage. With its onboard cache memory and XOR data parity calculation, SX4000 assures high levels of storage performance with solid fault tolerance. And SX4000 accepts off-the-shelf, easily-available Ultra ATA drives so users can build RAID 5 storage arrays with near 1/2 Terrabyte capacity at unheard of price points.

Special Features are:

- ☐ Supports low-cost Ultra ATA drives including Ultra ATA/133¹, Ultra ATA/100, Ultra ATA/66 and others. Provides advanced CRC error-checking at higher drive speeds
- ☐ Supports 66MHz PCI bus motherboards capable of transferring data up to 266MB per second (backward compatible with 33MHz PCI bus transfers of 133MB/sec)
- ☐ Provides RAID 5 XOR data parity calculation to protect data on attached hard drives in the event of a hard disk failure.
- ☐ Accepts up to 256MB SDRAM (64MB minimum required²) cache memory
- ☐ Supports use of hot spare drive for immediate drive rebuilding in event of drive failure
- ☐ Onboard BIOS recognizes and configures attached drives for optimum speed¹ and full capacity
- ☐ BIOS supports 48-bit large LBA mode to allow use of drives exceeding 137GB
- ☐ Easy installation and RAID setup lets all users quickly create the type of RAID their environment requires
- ☐ Offers graphical user interface (Windows NT/2000/XP) that remotely and locally alerts user in case of drive failure and identifies failed drive but continues to allow user to save and retrieve data from working drive (or pair of drives)
- ☐ Works with Windows XP/2000/NT; RedHat Linux 7.2/7.3; TurboLinux Server 6.5/7.0; SuSE Linux 7.3/8.0; and Caldera OpenLinux. 3.1/3.1.1.
- ☐ Supported and tested by major hard disk drive manufacturers

¹ Supports Ultra ATA/133 speed on data reads; Ultra ATA/100 speed on data writes

² Memory not included

Key Facts, Features and Benefits

Supports Current Ultra ATA Drives

Proven BIOS instantly recognizes and supports up to Ultra ATA/133¹ drives with backward compatibility for older Ultra ATA models. Full support of Ultra ATA/100 specifications, including 100MB/sec burst data transfer rates and CRC error-checking at high data transfer speeds. Automatically recognizes and configures drives for their optimum speed².

Supports 66MHz and 33MHz PCI Bus Motherboards

Promise FastTrak SX series of ATA RAID products support 66MHz PCI bus motherboards to provide up to 266 MB per second data transfers across the PCI bus. This permits sustained data transfers that exceed 33MHz PCI bus transfers of 133MB/sec and assures maximum data throughput.

RAID 5 for Enterprise-Level Data Protection

Under RAID 5, FastTrak SX4000 offers one of the highest levels of protection from a failed drive available in storage today, RAID 5. Stored data is striped over all attached drives (3 drives minimum) for storage capacity and performance. In addition, the card continuously generates and stripes XOR parity data among the drives. This allows SX4000 to rebuild data if a drive fails without needing to create an exact mirror of all stored data. Users benefit from greater storage capacity equal to up to three of the arrayed drives (parity data makes up the rest of the data in the array) and performance.

Should a drive fail, SX4000 maintains user access to data by onboard parity calculation. Once a drive is replaced, SX4000 rebuilds data on the drive automatically. The user keeps working without losing data even if one drive fails. SX4000 also supports using a hot spare drive to immediately replace a failed drive for immediate data rebuilding under RAID 1, or 5.

Hot Swap Support

When drives are contained in optional removable SuperSwap™ 1000 chassis, FastTrak SX4000 running fault tolerant RAID 1 (drive mirroring), RAID 0+1 (two-drive mirroring and striping), or RAID 5 allows for hot swap operation. This allows zero-downtime PC operation and continuous data access even if a failed drive is being replaced because the PC server remains running. SuperSwap chassis protect all system components during hot swap and are monitored by the Promise Array Management Utility (PAM) for voltage, temperature, and fan operation.

48-Bit Large LBA

FastTrak SX4000 BIOS supports 48-bit large LBA mode that permits use of drives that exceed 137GB each for extended storage capacity.

¹ Supports Ultra ATA/133 speed on data reads; Ultra ATA/100 speed on data writes

² Recognizes storage capacity of Ultra ATA/133 drives running at Ultra ATA/100 speed

Independent Master-Channel Design Simplifies Data Handling

SX4000 uses four data channels to effectively allow maximum data throughput and handling of RAID striping versus other Ultra ATA host adapters or controllers. Drives can be moved around on each channel of the card without adversely affecting the array's performance or setup.

CRC Data Protection Support

For Ultra ATA drives, FastTrak SX4000 supports enhanced data protection called Cyclical Redundancy Checking to check data integrity at high speeds.

Onboard XOR Parity Calculation

Under RAID 5, SX4000 provides an onboard, hardware-based parity engine to optimize CPU processing for data handling which improves overall performance for servers and workstations, particularly under multiple user requests and saves.

Co-exists with Other Controllers

Like other Promise ATA RAID products, SX4000 co-exists with onboard IDE motherboard ports. This allows the user to use their Ultra ATA RAID storage subsystem separately from the boot drive (used particularly in audio/video applications) or simply add more IDE devices to the motherboard.

BIOS RAID Utility

The built-in FastBuild™ automenu allows quick and easy array creation and deletion.

Promise Array Management (PAM) Software

The bundled GUI locally and remotely monitors status of arrays under Windows, hard drives, and optional Promise SuperSwap hot swap enclosures via TCP/IP. PAM warns of drive failure in any array. Allows rebuild of arrays in case of drive replacement. Synchronization feature assures scheduled maintenance of fault tolerant arrays.

Operating System Support

SX4000 supports Windows XP/2000/NT; RedHat Linux 7.2/7.3; TurboLinux Server 6.5/7.0; SuSE Linux 7.3/8.0; and Caldera OpenLinux. 3.1/3.1.1.

Competitive Pricing

FastTrak SX4000 with low-cost Ultra ATA drives provides greater storage capacity, performance, and data protection than comparable SCSI solutions at a third the cost.

What FastTrak SX4000 Means for Customers

Now you can treat the data in your small enterprise like a big enterprise -- without the huge budget or IT staff that you don't have. Simply put: you can create RAID 5 storage for servers or workstations with up to three times the capacity of a single Ultra ATA drive with data protection every time a user saves. All with the doubled bandwidth of the 66MHz PCI bus -- a growing standard among office network servers.

With FastTrak SX4000, customers can build one huge virtual drive by linking multiple drives (each exceeding 137GB) into an array that's perfect for office applications, email, web, and database management, to name a few.

For network data protection or smart business desktops, SX4000 offers on-the-fly data protection by creating a stream of parity data each time a file is saved to the RAID 5 array in addition to the user data. Should one drive fail, FastTrak SX4000 allows the PC to continue operation using the remaining data left on the working drives (user data plus parity data) without downtime or data loss. Users choose when to replace the failed drive with a new drive or replacement. Use of optional SuperSwap hot swap chassis allows for continuous data access even when replacing a failed drive since the PC remains powered on.

The Promise Technology Advantage

Unlike other companies, Promise Technology controls all the technology it creates. Promise designs, manufactures, services and markets each of its products, giving the company an edge over the competition. According to the Gartner Group/Dataquest, Promise Technology maintains a 90% market share in the ATA RAID category – a technology that Promise helped pioneer.

There are many reasons to choose Promise Technology:

- First company to produce Ultra ATA/133, Ultra ATA/100, Ultra ATA/66, and IDE caching controllers
- Leading developer of EIDE/ATAPI controller technology
- Focused on ATA RAID and Ultra ATA controller technology
- Committed to uncompromising quality, reliability and compatibility
- Dedicated to customer satisfaction
- Unmatched service and technical support

Service and Support

Promise Technology not only prides itself on providing customers with high-quality, leading edge controller products but also strives to provide the service and technical support its customers deserve. Customers are protected under the Promise Technology support umbrella.

- ☐ *Two-Year Limited Warranty* covering parts and labor.
- ☐ *Free Technical Support* is available at 408/228-6402 ext. 4 or via Promise's web site at www.promise.com.
- ☐ *Web site* (www.promise.com) includes latest drivers and utilities.
- ☐ *On-line Support* at Promise Technology's web site (www.promise.com).

Specifications/Standard Features

Drive Support	Supports Ultra ATA/133 ¹ , Ultra ATA/100, Ultra ATA/66
Controller Data Channels	Four independent channels assure maximum performance of each attached drive and RAID management
Large LBA Mode	Supports drive sizes greater than 137GB
Data Transfer Rate	Up to 266MB/sec (depends on drive speed, use of multiple drives, and presence of 66MHz PCI bus) ²
RAID Levels	RAID 0 striping of up to 4 drives for performance RAID 1 mirroring of 2 drives for fault tolerance RAID 0+1 striping/mirroring of 4 drives RAID 5 striping of user & parity data over all drives (3 drives min.)
Fault Tolerance	Parity data allows card to rebuild user data in case of drive failure under RAID 5; Mirrors data to second drive or drive pair on-the-fly for RAID 1 or 0+1; Offers hot spare feature for rebuild of failed drive for RAID 1 array; hot swap failed drive and rebuild data in background for continuous operation ³
Parity Data	Onboard hardware-based XOR engine calculates parity data from saved user data. In case of single drive failure, re-creates user data from remaining working drives
Cache Memory	Accepts up to 256MB SDRAM DIMM (64MB minimum ⁴ , non-ECC or ECC, unbuffered) to support parity calculation and I/O processing
PCI Bus Support	Compatible with 66MHz PCI motherboards; automatically backward compatible with 33MHz; PCI 2.2 compliant
Disk Array Support	Supports multiple arrays with different RAID levels; different arrays are selectable and bootable
FastBuild BIOS Auto-Menu	Provides auto configuration and optimization; view/create/delete arrays

¹ Supports Ultra ATA/133 speed on data reads; Ultra ATA/100 speed on data writes

² Backward compatible with 33MHz PCI bus for up to 133MB/sec data transfers

³ When used with optional Promise SuperSwap chassises

⁴ Memory not included

Promise Array Management Software	Locally and remotely monitors status of arrays under Windows, hard drives, optional Promise SuperSwap enclosures via TCP/IP; warns of drive failure; allows rebuilds of mirrored arrays; synchronization of hard drives; e-mail notification of errors and events
ACPI Support	Yes (S1, S3, S4)
Advanced Monitoring	Monitors S.M.A.R.T. status of attached hard drives; logs array errors and events to Windows NT/2000/XP Event Log; Linux Command Line Interface (CLI)
Operating Systems Compatibility	Windows XP/2000/NT; RedHat Linux 7.2/7.3; TurboLinux Server 6.5/7.0; SuSE Linux 7.3/8.0; and Caldera OpenLinux. 3.1/3.1.1.