

# RAIDPro™

## ***External, Easy to Use RAID Storage for NetWare and Windows NT***

RAIDPro represents a new class of RAID storage solution. It is the first external storage system that delivers high-end RAID functionality, yet is priced competitively with internal storage. Specifically tailored to meet the needs of entry level and midrange PC servers, RAIDPro combines high-resiliency features into a compact, plug-and-play enclosure that can be easily installed and is simple to use. It is the industry's most robust entry level storage system, delivering unparalleled ease-of-use, exceptional resiliency, superb performance, and complete reliability at an affordable price.

### **Server-Independent Storage**

Unlike internal "captive" storage, RAIDPro is external and independent of the server. External storage provides a number of inherent advantages over internal storage. One advantage is higher resiliency, thereby improving system uptime and availability. It also provides a much faster recovery time in the event of a server failure. And external storage is more easily migrated and redeployed as requirements change, resulting in investment protection over the life of the storage system. Server-independence also allows standardization across a variety of server platforms, lowering the cost for spares and maintenance.

### **Easy to Use**

RAIDPro is truly a plug-and-play RAID storage solution. All RAIDPro systems come pre-configured for RAID level 5 with the drive modules already installed, making installation and set-up surprisingly simple.

The six-bay RAIDPro enclosure features the DGR™ RAIDCard™, which delivers unparalleled ease-of-use and maintenance. DGR allows system administrators to quickly and easily add capacity and change RAID levels on the fly. The result is significantly reduced administration costs, simpler upgrade processes, and optimal RAID level tuning.

RAIDPro also offers broad configurability across NetWare and Windows NT servers with PCI bus architecture. Support for RAID levels 0, 1, 0+1, 3, and 5 make it easy to accommodate a wide range of applications.

### **DGR RAIDCard**

The RAIDPro DGR (Dynamic Growth and Reconfiguration) RAIDCard has revolutionized the process of reconfiguring RAID systems. It is the first RAID controller to allow both on-the-fly capacity expansion and on-the-fly RAID level conversion. This greatly simplifies maintenance and allows users uninterrupted access to data during any reconfiguration activity. DGR also provides considerable time savings. In the past, adding capacity could take many hours—and it occurred off-line. With DGR, time requirements for adding storage are reduced from numerous hours to less than 5 minutes. And fine-tuning each application for maximum performance becomes a simple operation—DGR allows for migration between RAID levels 0, 1, 0+1, 3, and 5 while remaining continuously on-line and accessible to users.

### **Two Configurations**

The robust RAIDPro architecture is available in two configurations, RAIDPro VL, for exceptional value, and RAIDPro XL, for the highest performance.

RAIDPro VL meets entry level server application needs, providing high resiliency and exceptional ease-of-use at a great value. The system features a one-channel DGR VL RAIDCard, and 4 MB to 16 MB of controller cache RAM. The six-bay enclosure supports 2.1 GB or 4.3 GB drive modules for capacities up to 25.8 GB (RAID 0) per enclosure. Two RAIDPro VL enclosures can be daisy-chained, allowing a minimal initial invest-



ment and the ability to add capacity (up to 51.6 GB, RAID 0) as needed.

RAIDPro XL offers more flexibility and higher performance to satisfy a broader range of entry level and midrange server needs. RAIDPro XL features a two-channel DGR XL RAIDCard and 16 MB to 64 MB of controller cache RAM for superior performance benefits. UltraSCSI performance provides up to twice the transfer speed (up to 40 MB per second) over SCSI-2 solutions. The six-bay enclosure supports 4.3 GB high-performance drive modules for capacities up to 25.8 GB (RAID 0) per enclosure. And, with two channels, the DGR XL RAIDCard provides exceptional performance when RAIDPro is scaled to two enclosures. One enclosure is supported per channel for capacities up to 51.6 GB (RAID 0).

### VantagePoint™

RAIDPro XL includes a single server license for VantagePoint network storage management software from Storage Dimensions. VantagePoint can be purchased separately for RAIDPro VL. RAIDPro is an ideal solution for multiple distributed storage systems located in nationwide, or worldwide, branch sites. With the optional multi-server version of VantagePoint, all RAIDPro systems can be easily monitored by the system administrator from one central location via a single workstation console. The GUI-based VantagePoint software provides information on system configuration, drive and controller inventory, array status, and storage system performance. It also includes an alarm capability that

### RAIDPro Features

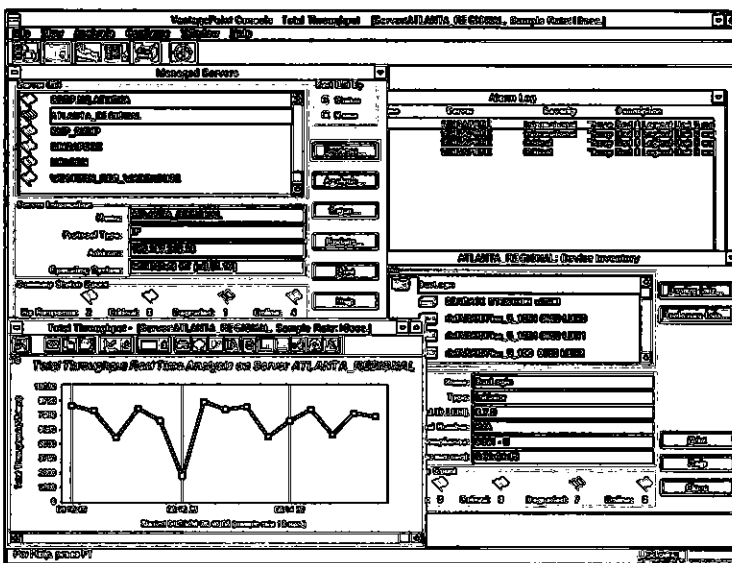
RAIDPro VL	RAIDPro XL
Available in a base configuration of three drives, using 2.1 GB or 4.3 GB drives	Available in a base configuration of three 4.3 GB high-performance drives
Supports RAID levels 0, 1, 0+1, 3, 5	Supports RAID levels 0, 1, 0+1, 3, 5
One-channel DGR VL RAIDCard; (SCSI-2)	Two-channel DGR XL RAIDCard; (UltraSCSI)
4 MB to 16 MB controller cache RAM	16 MB to 64 MB controller cache RAM
Optional battery backup module	Optional battery backup module
VantagePoint storage management software can be purchased separately	Free single-server version of VantagePoint storage management software

provides notification of system status changes via pager or e-mail.

### High-Availability Design

The high-availability RAIDPro enclosure design includes triple redundant power supplies and dual redundant cooling fan modules. The main power input includes a cable lock guard for added security. Disk drives, power supplies, and fans are all hot-swappable under load. RAIDPro also supports multiple hot spare disk drives, increasing the system's resiliency in the event of a drive failure. An optional battery backup module provides additional data protection. In the event of a power failure, cache contents are preserved for up to 72 hours, reducing the chance of data corruption.

RAIDPro is also SAF-TE (SCSI Accessed Fault Tolerant Enclosure) version 1.0 compliant, providing extensive monitoring capabilities. Each system component is continually polled for status. LED indicators inform the system administrator at a glance of the state of the drive modules, cooling fans, power supplies, enclosure temperature, and enclosure termination. In addition, an audible alarm notifies the system administrator in the event of any system status changes, making RAIDPro extremely easy to service and maintain.



**The VantagePoint management console runs on a Windows NT or Windows workstation. Multiple screens can be displayed, allowing you to view system configuration, drive and controller inventory, array status, enclosure conditions, and storage system performance. A log of alarm activity can also be displayed. For NetWare, the console can function as a part of Novell's ManageWise or as a stand-alone console in systems not running ManageWise.**

	<b>Feature</b>	<b>Benefit</b>
<b>Ease of Use</b>	<b>Compact, plug-and-play RAID solution; comes pre-configured and ready to use</b>	All-in-one solution results in simple installation, set-up, and maintenance
	<b>DGR allows for adding capacity to an array and migrating between RAID levels 0, 1, 3, and 5 without having to take the system off-line to backup, initialize, and restore data</b>	Allows for growth and performance tuning without interruption to user access; saves system administrator time; reduces administrative costs
	<b>Cache read-write policies can be changed without taking the storage system off-line</b>	Allows system administrator to specify cache policies for random or sequential reads without system interruption; optimizes performance for the transaction type
	<b>Disk configuration information including drive ID is stored on each disk in the array, allowing for drive roaming</b>	Disks can be removed and reinserted in any slot; simplifies maintenance because drives don't have to be reinserted in their exact, original locations
	<b>Controller automatically disables the on board termination of the SCSI chain if a cable has been attached to its connector</b>	Reduces SCSI termination problems and simplifies administration
<b>Performance</b>	<b>Adaptive read-ahead caching automatically adjusts the caching scheme based on the type of reads being requested (random or sequential)</b>	Automatically optimizes performance for both random and sequential transaction types without any intervention or impact on system operation
	<b>Direct I/O can be specified for read requests, bypassing the cache and sending data directly from disk to host CPU memory</b>	Bypassing cache provides performance improvements on read requests
	<b>RAIDPro XL UltraSCSI performance provides transfer speeds of up to 40 MB/second</b>	Provides significantly increased performance over SCSI-2 speed of 20 MB/second
<b>Flexibility</b>	<b>RAIDPro can be easily scaled to two enclosures (up to twelve drives)</b>	Scalability allows for a minimal investment up front; capacity can be added as demand increases
	<b>Two models available to meet specific requirements—RAIDPro VL and RAIDPro XL</b>	RAIDPro VL provides a great value for entry level server needs; RAIDPro XL provides higher performance and more flexibility to meet a broader range of entry level to midrange needs
<b>Resiliency</b>	<b>Support for global hot spares allows designation of one spare for multiple drives; multiple hot spares are also supported for additional resiliency</b>	One spare can be designated for multiple drives for economies of scale; multiple hot spares reduce the urgency and amount of administrator intervention required in the event of a disk failure
	<b>Bullet-proof design with redundant, hot-swappable components</b>	High-end RAID features allow emergency or routine service to occur while the system remains on-line and accessible to users
	<b>Alarm sounds in the event of any system status changes</b>	Audible alarm quickly alerts the system administrator to changes in system status; alarm is turned off with a convenient, external silence button
<b>RAID Functionality</b>	<b>RAIDPro DGR bus-based array controller provides on-board RISC-based processing</b>	Maximizes RAID performance with minimum CPU utilization; supports RAID 0, 1, 0+1, 3, and 5
<b>Service</b>	<b>SpeedExchange<sup>SM</sup> advanced exchange warranty: 5 years on disk drives, 3 years on other components</b>	Replacement product is delivered within 24 hours if requested by noon Pacific Time
	<b>TechConnect<sup>SM</sup> technical support knowledgebase</b>	24-hour access to technical documentation and known solutions; tracks incoming support requests and provides a fast response from a technical support engineer by phone, fax, or e-mail
	<b>One year on-site support free of charge</b>	Easy nationwide access to on-site support

## Typical RAIDPro Applications

RAIDPro is specifically tailored to meet the needs of entry level and midrange PC servers. Some ideal matches for the RAIDPro feature set are included in the table below.

Server Vendor	Model	Server Vendor	Model
<b>Compaq</b>	ProSignia 200, 300, 500	<b>HP</b>	NetServer E 30, E 40, LD Pro
	ProLiant 800, 1500, 2500		
<b>IBM</b>	PC Server 310, 325, 330	<b>Dell</b>	PowerEdge 2100

## RAIDPro Models

Two RAIDPro models are available, RAIDPro VL and RAIDPro XL. All RAIDPro systems are assembled, preformatted, and tested at our manufacturing facility. They are shipped pre-configured for RAID level 5 in three-drive configurations. Additional drive modules may be ordered separately.

Description	Model Number	Number of Drives	Drive Capacity (GB)	Total Capacity Per Enclosure (GB)
<b>RAIDPro VL: Hardware RAID with single channel (SCSI-2) DGR VL RAIDCard for PCI</b>	RPVL-04-3	3	2.1	6.3-12.6
	RPVL-08-3	3	4.3	12.9-25.8
<b>RAIDPro XL: Hardware RAID with two-channel (UltraSCSI) DGR XL RAIDCard for PCI</b>	RPXL-08-3	3	4.3	12.9-25.8

\*The RAIDPro host interface kit includes RAIDPro utility software that works within the specified operating system environment (NetWare or Windows NT). The software is provided on a 1.44 MB diskette along with a cable required for the connection between the RAIDCard and the RAIDPro enclosure.

## RAIDPro Enclosure Specifications

<b>Number of power modules supplied</b>	3
<b>Number of fan modules supplied</b>	2
<b>Drive module form factor</b>	3.5" low profile
<b>Physical specifications (inches)</b>	8.75 W x 14 D x 5.25 H
<b>Weight without drive modules</b>	15 lbs, 6.8 kg
<b>Weight fully loaded (6 drive modules)</b>	27 lbs, 12.2 kg
<b>Power requirements</b>	85-264 VAC 200 W 47-63 Hz

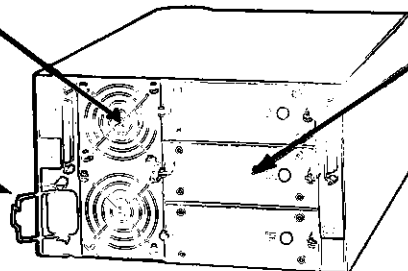
## RAIDPro Disk Drive Module Specifications

Drive model number	RPDM-2	RPDM-4
<b>Drive interface</b>	Fast/Wide SCSI-2	Fast/Wide SCSI-2 and UltraSCSI-capable
<b>Formatted capacity (GB)</b>	2.1	4.3
<b>Burst transfer rate (MB/sec)</b>	20	40
<b>Sustained transfer rate (MB/sec)</b>	6.7	6.7
<b>Average seek time (ms)</b>	8.5	9
<b>Drive rotational speed (RPM)</b>	5400	7200
<b>Average latency (ms)</b>	5.54	4.17
<b>MTBF (hours)</b>	800,000	1,000,000

## RAIDPro — Bullet-Proof Design

Dual Redundant,  
Hot-Swappable  
Cooling Fans

Cable Lock  
Guard



Triple Redundant,  
Hot-Swappable  
Power Supplies

- Hot-Swappable Drives
- On-the-fly Capacity Expansion
- On-the-fly RAID Level Migration
- Multiple Hot Spare Disk Drives

For more information, visit us on the World Wide Web at <http://www.storagedimensions.com>.

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