Compaq
Smart Array
Controllers and
Universal Hard
Disk Drives
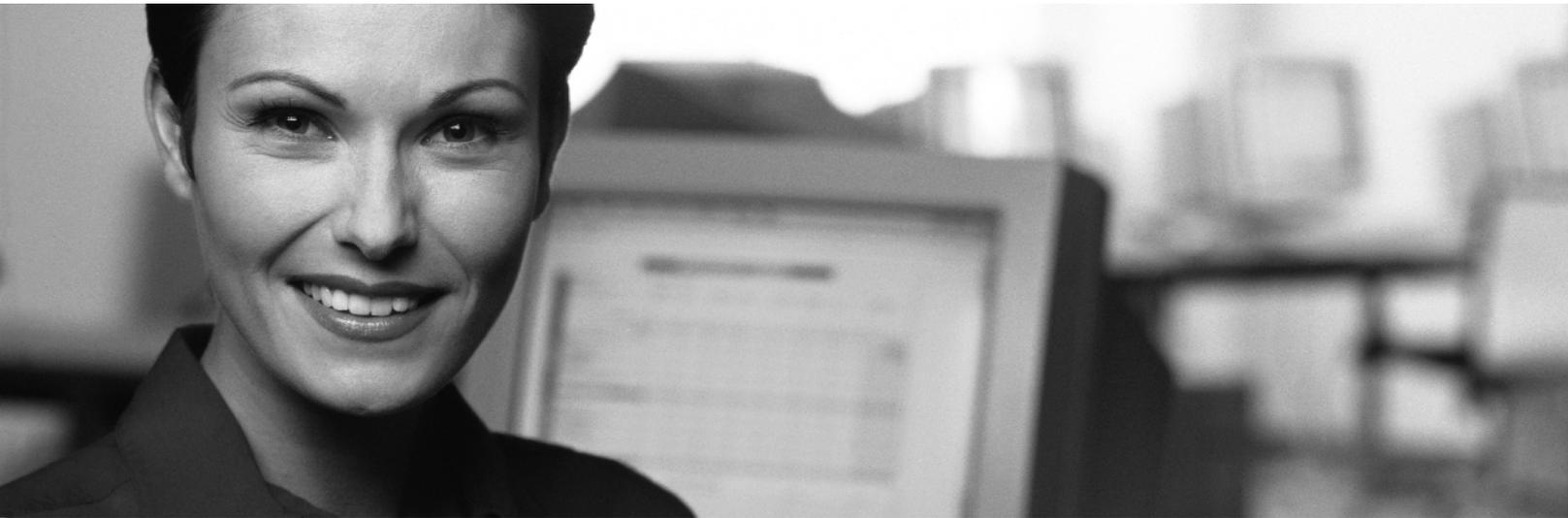
Intelligent Protection

COMPAQ
Inspiration Technology

Enhancing

Compaq gives you the ultimate in data protection while lowering your overall cost of ownership.

Choosing a primary storage solution can be a complex task. With new data-intensive applications and the rising consumption of disk storage, protecting your data is more vital than ever to the day-to-day operations of your business. That's why smart companies choose Compaq, the world's largest provider of storage. Quite simply, our solutions do more.

Engineered for value

Every Compaq controller is designed exclusively by Compaq engineers, not by third-party vendors. That means our Smart Array Controller line is fully compatible, resulting in value and lower overall cost of ownership that are second to none. Only Compaq Smart Array Controllers and Universal Hard Disk Drives are designed for, integrated and tested with Compaq servers – to ensure you get the highest performance throughout your enterprise – no matter which storage solutions you choose.

Industry-recognized features

Compaq controllers are recognized industry-wide as leaders in TPC benchmarking. With our unique Pre-Failure Warranty, Compaq will actually replace faulty drives before they fail to further protect your data. And our patented Advanced Data Guarding (ADG) gives you the highest level of RAID protection without sacrificing capacity. Just imagine what this leading technology can do for you.

performance

The Smart Array Controller line.
Smart. Scalable. Something for every enterprise.

No matter what size your enterprise is today, or where it's headed tomorrow, Compaq has the right controller solution to meet your needs. All Smart Array Controllers use a standard set of management and utility software that reduces training time, installation and maintenance. And, data compatibility between generations of Smart Array Controllers simplifies upgrades, without the need to back up and restore.

The modular, feature-rich Smart Array 5300 family

The Smart Array 5300 family of Ultra3 array controllers raises the bar for performance standards. Available in 5304/128, 5302/64, 5302/32 and 5302/FC models, the 5300 series is loaded with innovative features to bring flexibility and data protection to a new level. These modular, highly scalable controllers are upgradable to 4 SCSI channels, supporting up to 4TB of data. But, one of the most powerful advantages of the 5300 series lies in the exclusive Compaq Advanced Data Guarding technology and optional SAN Access Module.

Advanced Data Guarding

Advanced Data Guarding (ADG) technology provides the highest level of data protection among RAID levels, while still delivering a high level of disk drive capacity utilization. Using this patented Compaq technology, you can safely deploy large-capacity disk drives and create large storage volumes. ADG also offers lower implementation costs and greater usable capacity per U than RAID 1. This innovative feature comes standard on the 5304/128 and is an optional upgrade on the 5302/64, as well as the 5302/32 and 5302/FC with additional memory upgrade.

SAN Access Module

The SAN Access Module is the industry's first true integrated bridge from existing SCSI Direct Attach Storage (DAS) to the Fiber Channel Storage Area Network (SAN). This module enables you to continue to use and deploy Direct Attach Storage while reaping the benefits of the SAN, such as consolidated backup. It's driven by Smart Array 5302 Controllers, the highest performance PCI RAID controllers in the industry.

Simply put, SAN Access makes backup operations easier, enabling you to connect with an Enterprise Backup Solution for effortless deployment and superior data protection management.

Delivering

Flexible Compaq RAID Controllers are designed with your needs in mind.

How much storage capacity do you require? How much performance do you need? Compaq has a solution that's right for you.

The Smart Array 532 – entry-level value

The Smart Array 532 Controller delivers exceptional value for entry-level and workgroup servers, without sacrificing performance. This controller features two Ultra3 SCSI channels, allowing for the configuration of up to 28 hard drives to store up to 2TB of storage per server PCI slot.

Mix-and-match LVD SCSI compatibility enables you to mix Ultra2 and Ultra3 devices on the same SCSI bus. Other advantages of the Smart Array 532 include:

> *Increased bandwidth through Ultra3 SCSI technology and memory architecture*

> *Smart Array advantage lowers entry-level and workgroup server ownership cost*

> *Increased performance over Smart Array 431*

> *Consistent configuration and management tools with other Smart Array Controllers*

Smart Array 431 Controller

This single-channel, wide Ultra3 controller features 64-bit architecture and supports up to 14 wide Ultra3 SCSI hard drives.

> *Affordable, hardware-based RAID for small and medium-size business servers*

> *Excellent combination of RAID protection and long-term reliability*

> *Data compatible with other Smart Array Controllers, all Ultra3 and Ultra2 drives and servers for unparalleled investment protection*

Smart Array 5i Controller

This Ultra3 embedded controller provides hardware RAID-based fault tolerance protection for OS, application and log files.

> *Embedded design frees up valuable PCI slots*

> *Software consistency with other Smart Array Controllers*

> *Standard on ProLiant DL380 G2 and optional on the ProLiant ML370 G2*

value

Integrated Smart Array Controller

This intelligent array controller delivers entry-level, hardware-based fault tolerance with support for all internal hard drives, offering a cost-effective RAID solution.

> *Provides ProLiant server users with basic OS and small data set protection*

> *Embedded design frees up valuable PCI slots*

> *Standard on many ProLiant DL servers*

RAID LC2 Controller

This low-cost, single-channel SCSI controller is designed for entry-level and workgroup servers.

> *Provides RAID 0, 1, 0+1 and 5 functionality*

> *Seamlessly upgrades to all Compaq Smart Array Controllers*

> *Fully qualified on Compaq ProLiant DL 320, ML330 and ML350*

StorageWorks Enclosure 4300 family

The StorageWorks 4300 combines Ultra3 SCSI transfer rates with the highest spindle count per U of rack space to deliver higher performance and the greatest I/O per second. In addition:

> *3U form factor ensures the maximum storage capacity per square*

> *Existing Ultra2 components from your StorageWorks Enclosure 4200 can be easily upgraded, and mixed or matched with Ultra3 for simple, cost-effective technology transitions*

> *Universal drives and drive carriers can be used in both servers and external storage, reducing spares inventory*

You can even protect your valuable time with the Compaq Array Configuration Utility.

Compaq makes it easy to configure and expand your disk drive arrays with the Compaq Array Configuration Utility – intuitive, graphical software that uses Configuration Wizards to have you up and running in no time.

A standard feature with all Smart Array Controllers, this tool can be used to configure your array controller, add disk drives to an existing configuration or completely reconfigure your disk drive array. Simply.

Imagine how much time you could save with these features:

> *Express and custom initial configuration options*

> *Capacity expansion, logical drive extension, RAID-level migration and strip size migration tools*

> *Variable cache read/write ratio and strip size for tuning the controller's performance*

> *Drive rebuild and capacity priority settings*

> *Online (hot) spare configuration*

Compaq Array Configuration Utility supports RAID 0, 1, 0+1, 5 and ADG on SA-5300 fault tolerance levels. Most important, it can make your life easier.

Simplifying

Everything works together – and works for you.

Compaq Universal Hard Disk Drives have built-in compatibility for superior investment protection. This enterprise-wide compatibility enables you to freely deploy and re-deploy these drives anywhere you need storage capacity, reliably supporting the full range of Compaq platforms.

15K Ultra3 Universal Hot-Plug Hard Disk Drive

This 15,000-rpm hard disk drive is the highest performance device in today's enterprise storage market, giving you the power you need for quick access to mission-critical data.

> *Operates with the same power consumption and cooling requirements as most 10K drives*

> *Easily integrates with existing platforms and applications*

> *Offers backward compatibility and can mix with Ultra2 drives for added investment protection*

10K Ultra3 Universal Hot-Plug Hard Disk Drive

This 10,000-rpm hard disk drive offers the ideal mix of price and performance, designed for the mainstream segment of servers and storage enclosures.
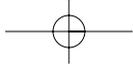
> *Satisfies capacity points from 9 GB up to 72 GB*

> *Easily integrated into existing platforms and applications*

> *Offers backward compatibility and can be mixed with Ultra2 drives for increased investment protection*

Ultra3 Non-Pluggable Hard Disk Drive

This business-class, non-pluggable hard disk drive provides an economical primary storage solution for businesses that want guaranteed compatibility, but may not need some high-end features.
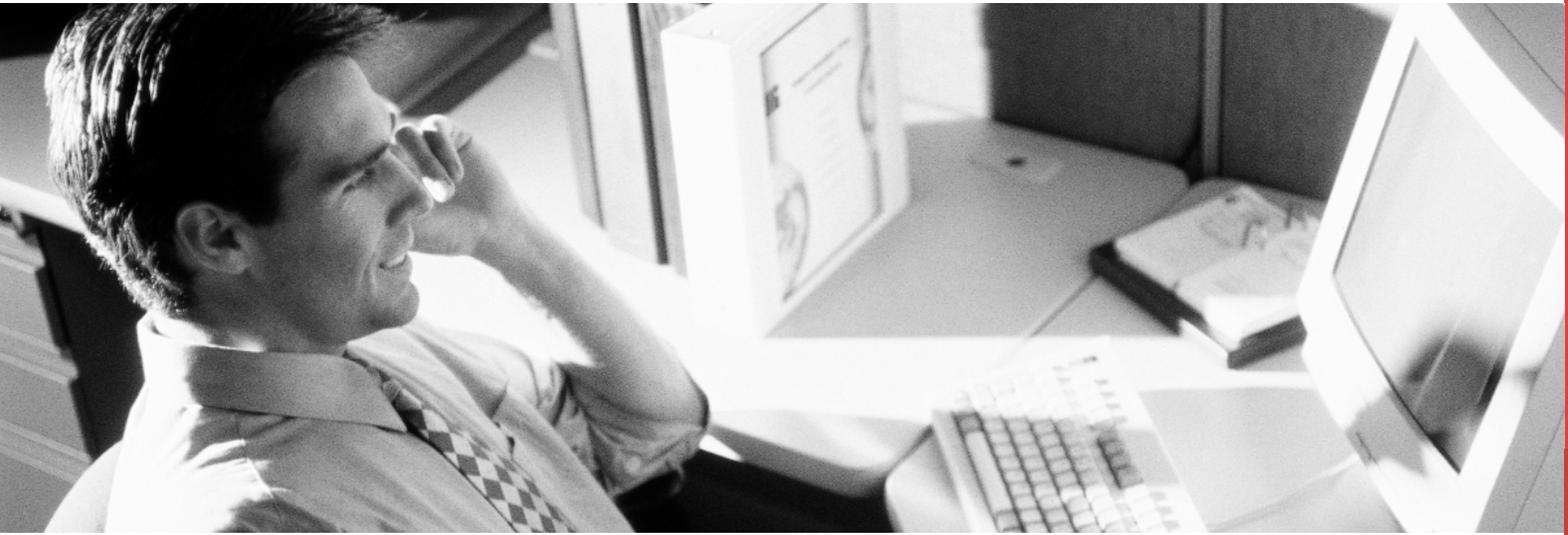
> *Available in 9 GB, 18 GB and 36 GB capacities*

> *10K-rpm speed*

> *Compact design for maximum storage density*

protection

Protection. Performance. Built-in value.

There's really only one brand to choose. The largest provider of multi-user storage across all markets. One that offers new, advanced RAID levels, redundant cache batteries and modular, flexible solutions. One that innovates, designs and even patents each controller in-house. One company. One industry-recognized leader. One complete source for your storage needs.

Compaq delivers it all – with compatibility across every line.

A lot of companies may protect your data, but Compaq protects your time and your investment. Consistent data compatibility between generations of controllers makes upgrading easy and trouble-free. Consistent configuration and management tools reduce training costs and human error. Our Universal Hard Disk Drives migrate between servers and external storage without backup and restore. And seamless upgrades help boost your capacity and performance – and do it without downtime.

Choosing a primary storage solution can be a complex task. With Compaq, it doesn't have to be. Let us show you how. For more information on Compaq Smart Array Controllers and Universal Hard Disk Drives, call **1-800-AT-COMPAQ** (800-282-6672), press 5 and reference code NBE, visit our Web site at **www.compaq.com/smartarray** or fill out the attached reply card. We've even made it simple to find out more.

COMPAQ
Inspiration Technology

Compaq makes it easy to get the ultimate in data storage and protection:

> *A full range of flexible, modular RAID controllers and universal hard disk drives*

> *Built-in compatibility to consistently lower your overall cost of ownership*

> *Just complete and return the attached reply card to find out more*

YES! I want to find out more about protecting my data and my company's investment.

When choosing a controller, which is the most important factor in your decision? *(check all that apply)*

(89Y) ❑ Features/Technology
(89Z) ❑ Brand name
(5A2) ❑ Price
(94G) ❑ Compatibility

(8A2) ❑ Company
(8A3) ❑ Service
(8A4) ❑ Industry recommendations
(5A3) ❑ Performance

_____
Name

_____
Title

_____
Company

_____
Dept/MS

_____
St./P.O. Box

_____
City   State   ZIP

_____
Telephone   Fax

_____
Email Address

I'd like to receive periodic targeted email from Compaq with special offers in my selected areas of interest. Please send me:

(785) ❑ Text with graphics (HTML)
(786) ❑ Text only
(452) ❑ No thanks
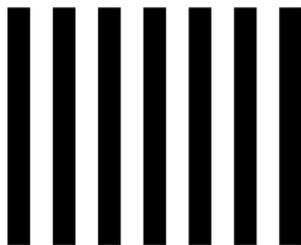
COMPAQ
Inspiration Technology

NBD

Find out more

> *Just send in the attached reply card*
> *For more information call 1-800-AT-COMPAQ*
> *(800-282-6672), press 5 and*
> *reference code **NBE***
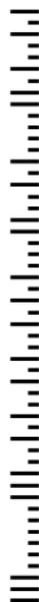> *Visit the Compaq Web site at*
> *www.compaq.com/smartarray*

Compatibility

Whatever your storage needs, Compaq has a compatible, reliable solution that's ready to work for your enterprise. Here are two at-a-glance charts to make your decision easier.

Server – RAID Controller Compatibility

		SA-5304	SA-5302	SA-532	SA-431	RAID LC2	Integrated Smart Array	SA-5i
DL Series	DL320			●	●	●		
	DL360	●	●		●		●	
	DL380	●	●		●		●	●
	DL580	●	●		●		●	
	DL750	●	●		●		●	
	DL760	●	●		●		●	
	ProLiant 8500	●	●					
ML Series	ML330/330e			●²	●	●	●	
	ML350	●*	●*	●	●	●	●	
	ML370	●	●		●		●¹	●
	ML530	●	●		●			
	ML570	●	●		●		●¹	
	ML750	●	●		●			
	ProLiant 8000	●	●		●			
CL Series	CL380				●		●	

*Supported in ML350 servers with 1GHz or greater processor
¹Configurable option
²Not supported in ML350 servers with 1GHz processor

Compaq RAID Controller Comparison

	SA-5304	SA-5302	SA-532	SA-431	RAID LC2	Integrated Smart Array	SA-5i
SCSI Protocols Supported	Ultra3, Ultra2 Wide-Ultra	Ultra3, Ultra2 Wide-Ultra	Ultra3 Ultra2	Ultra3, Ultra2 Wide-Ultra	Ultra2	Ultra2 Wide-Ultra	Ultra3 Ultra2
Channels	4	2*	2	1	1	1	2
SCSI Ports (external/internal)	4/2	2/2 or 4/2	1/1	1/1	0/1	0/1	1/1
RAID Levels Supported	0,1,0+1,5, ADG	0,1,0+1,5, ADG†	0,1,0+1,5	0,1,0+1,5	0,1,0+1,5	0,1,0+1,5	0,1,0+1,5
Recovery ROM	Yes	Yes	Yes	No	No	No	Yes
Cache-Read/Write	128MB	64MB or 32MB	32MB	16MB	8MB††	16MB††	32MB††
Battery-Backed Cache	Yes	Yes	No	No	No	No	No
PCI Bus	64-Bit, 66 MHz	64-Bit, 66 MHz	64-Bit, 66 MHz	64-Bit, 66 MHz	32-Bit, 33 MHz	32-Bit, 33 MHz	32-Bit, 33 MHz
SCSI Peak Data Transfer Rate	640 MB/s total, 160MB/s per channel	640 MB/s total, 160MB/s per channel	320 MB/s total, 160MB/s per channel	160 MB/s	80 MB/s	80 MB/s	160 MB/s
Drives Supported (maximum)	56***	28*** or 56*	28***	14***	5	Dependent on Server	Dependent on Server
Array Configuration Utility	Yes	Yes	Yes	Yes	No	Yes	Yes
Array Diagnostic Utility	Yes	Yes	Yes	Yes	No	Yes	Yes

* Upgradeable to 4 channels with the Ultra3 Channel Expansion Module
** Upgradeable to 4 external ports with the Ultra3 Channel Expansion Module
*** Based on use of Compaq StorageWorks 4200 or 4300 family (14 hard disk drive enclosure)

†Requires ADG upgrade option and minimum of 64MB of cache
†† Used for code, transfer buffers and non-battery-backed read cache