

HP

SureStore E

Disk Array FC60

High Availability Disk Storage for the Data Center.

Now with More Capacity, New Optimization Services and Support.

Introducing the new HP SureStore E Disk Array FC60, the perfect addition to your computing environment in an era when technologies such as data warehousing, online transaction processing (OLTP), and enterprise resource planning (ERP) have created an expanding need for data storage that's spacious without sacrificing speed.

Designed to deliver a large volume of high-performance, high-availability disk storage at an extremely affordable price, the Disk Array FC60 combines the best of Fibre Channel speed, RAID protection, and multi-drive capacity.

With the Disk Array FC60, you gain the advantages of superior disk storage for your HP computing environment. And the Disk Array FC60 has the superior reliability and uptime for use in mission-critical high availability (HA) data storage. Plus, it has the high performance so necessary to data warehouse and OLTP applications. What's more, the Disk Array FC60 is backed by new optimization services for both UNIX and NT storage systems. All to further deliver on HP's promise to provide the industry's only Stress-Free Storage experience. Guaranteed.



The Disk Array FC60 is five times faster than previous storage solutions, holds eight times as much data - and actually costs less.

Features and Benefits

- **Ultra-fast sequential performance up to 170 MB/sec**
 - So users can get more done in less time than ever before
- **Expandable storage to 4.4 TB of data**
 - For scalability as business requirements grow
- **Supports up to eight logical partitions with LUN security**
 - Divide up storage capacity of the FC60 among up to eight Windows servers for a high-performance, high-capacity solution on an economical basis
- **Professional Services**
 - To meet the needs of specific configurations and fully utilize the capacity of the FC60 in any environment
- **User-configurable RAID**
 - Tailors the Disk Array FC60 to your availability requirements
- **10,000-rpm disk speed**
 - Provides better I/O performance
- **120-hour battery backup**
 - For the ultimate in data safety
- **Hot-swappable components**
 - Minimizes service interruption
- **HP reliability**
 - For a Stress-Free storage experience

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More Throughput, Less Overhead

The Disk Array FC60 is a Fibre Channel storage solution, offering a peak throughput of up to 85 megabytes per second on each channel, and sequential transfer rates of up to 170 MB/s for dual controller configurations. Thanks to the Disk Array FC60's high throughput, applications can pump data between disk and memory at very high rates—and that means less time for backup and better performance from the storage area network or data warehouse. This high throughput is especially valuable in OLTP and other applications where data availability and reliability are a necessity.

Supremely Scalable Storage That Evolves with Your Needs

The Disk Array FC60 is designed to be extremely flexible. Begin with a small investment in storage, and augment and enhance the storage solution as your requirements grow or change. The Disk Array FC60 features modular construction, assuring a solution well-matched to today's needs and minimal disruption when growth or reconfiguration is necessary. This is the storage solution that can match your budget *and* your database.

Big Capacity for Big Datasets

As the volume and importance of data grow exponentially, it's important that the data repository be able to handle rapidly expanding storage requirements. Disk Array FC60 configurations are expandable from four to 60 drives, allowing room for the largest dataset found anywhere in commercial computing today.

More than four terabytes of storage with the Disk Array FC60

How it adds up: The Disk Array FC60 consists of one controller enclosures and up to six disk enclosures, all of which can be mounted in standard 19" computer equipment rack kits for both HP rack systems series E cabinets and Rittal 9000 cabinets. The controller enclosure holds one or two array controllers, each with 256 megabytes of mirrored cache memory. The controller enclosure is connected to each of the disk enclosures via up to six Ultra2 SCSI cables. Each disk enclosure can hold up to 10 disk drives, which can be 9.1-, 18.2-, 36.4, or 73.4-gigabyte models. With a full complement of 73.4-gigabyte drives, a single Disk Array FC60 can provide more than 4.4 terabytes of data storage.

Full Cluster Support for High Availability Applications

The FC60 fully supports the creation of high-availability configurations with no single point of failure. In HP-UX environments, the FC60 can support up to four simultaneous hosts accessing the same data with MC/ServiceGuard or LockManager for Oracle Parallel Server. In Windows NT environments, the FC60 is certified for use with Microsoft Cluster Services (MSCS).



Professional Services to Maximize Your Investment

Scaling up the volume of storage accessible over a SAN is no problem, thanks to HP Professional Services for Disk Array FC60 customers. Designed to meet your specific environment and application needs, these services are designed to help you fully utilize and expand the FC60 accordingly as you grow. Services include:

- LUN Configuration Service
Provides consulting for managing FC60 storage volumes to fine-tune access for specific host and application needs.
- MS Cluster Service
Provides customers with a mission critical storage environment by setting up MC Service Guard or LockManager for Oracle Parallel Server for HP-UX and Microsoft Cluster Services for NT connects.
- Performance Consulting Service (August, '00)
Provide analysis, design and implementation to achieve overall optimal performance in any customer environment.
- Disaster Recovery Planning Service (August, '00)
HP consulting on implementing contingencies for ensuring 24/7 business continuity, including high availability solutions for SAN- and WAN-based storage systems.
- Data Migration Service
Provides end-to-end management of data migration from existing storage devices to new HP storage systems.
- Backup Integration Service (May, '00)
Provides end-to-end management to integrate new storage solution into an existing or new backup environment.
- SAN Assessment Service
Assists in evaluating storage needs, provide high-level assessment of best storage solution for any customer environment.
- SAN Architecture Service
Provides overall storage solution via planning, design, integration and testing to maximize information sharing across entire enterprise.

A Speedy Storage Bargain

With all its other features, the Disk Array FC60 actually supplies faster storage at a lower cost than ever before. In fact, when price and speed are taken into account (cost-per-megabyte-per-second), the Disk Array FC60 transfers data at less than one-fifth the cost of the previous solution. This means you can easily afford to store and readily access the important data that is so critical to staying competitive in the Information Age.

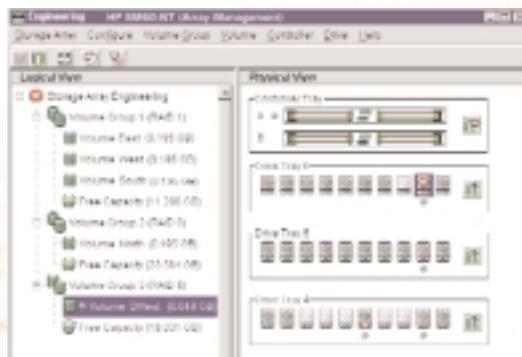
HP SureStore E Disk Array FC60



RAID to Order For Your Environment

The FC60 management software lets you choose all the important RAID parameters specifically to suit the environment - and it lets you choose your management style, too. You can set the partition size and RAID levels to order, using either the convenient graphical interface for easy selection or the scriptable command line interface that automates management of large numbers of disk arrays. Because you have full control over RAID behavior, it's easy to tailor the Disk Array FC60 to your availability requirements and performance criteria:

- You can configure the system for maximum availability and continued peak performance in the event of a disk failure. This yields a disk subsystem with a high degree of performance and predictability, regardless of activity elsewhere in the system.
- Or you can configure for maximum storage capacity with minimum expense.



The convenient graphical interface makes disk array configuration easy.

Ideal for I/O-Intensive Applications

The high-speed disks in the Disk Array FC60 rotate at 10,000 rpm, enhancing I/O performance, especially in computing applications that involve large numbers of small data transfers. This makes the Disk Array FC60 ideal for use in the I/O-intensive data access so necessary for data warehousing, OLTP, ERP, and file serving.

Safeguards Data up to Five Days without Power

As with any HA installation, an uninterruptible power supply is recommended for use with the Disk Array FC60. However, internal batteries in the disk array itself actually maintain information in the controller cache for up to 120 hours in the event of a power loss. This assures no data loss even in the event of a complete loss of electrical power over a long weekend, and it is further proof of HP's commitment to data integrity and high availability.

Zero-Downtime Maintenance, for Data When You Need It

All data in the Disk Array FC60 can be configured with RAID protection (except when configured in RAID 0), so if any drive fails, no data is lost and system operation continues with no interruption. Power supplies and fans are redundant, so the system continues to operate even if one fails. Moreover, array controllers, disk drives, power supplies, fans, and batteries are all hot-swappable, ensuring that repairs won't affect the system's high availability.

Shipped with the Hewlett-Packard Stress-Free Storage Guarantee

As a SureStore E storage solution from HP, the Disk Array FC60 has an impressive pedigree. Like all HP SureStore E products, the Disk Array FC60 is designed from the ground up for reliability and ease of management. And it's backed by HP's world-renowned service and support. In fact, Hewlett-Packard is so confident of this product that we ship it with a pledge of "Stress-Free Storage - Guaranteed."



HP SureStore E Disk Array FC60

Table 1. Disk Array FC60 Technical Specifications

Product Number	A5277A - FC60 Controller Enclosure, Field Racked A527AZ - FC60 Controller Enclosure, Factory Racked A5294A - Disk System SC10 for the FC60, Field Racked A5294AZ - Disk System SC10 for the FC60, Factory Racked
Performance/Throughput	
Host Interface Type	One or two Fibre Channel interfaces, each 100 MB/s peak performance
Drive Bus	Six Ultra2 SCSI interfaces, each 40 MB/s
Array Chassis Capacity	Each SC10 contains up to 10 drives per enclosure. Using ten active data drives
Single enclosure	Each SC10 can have up to the following maximum capacities: Up to 743 GB (usable capacity) using 73.4-GB drives Up to 364 GB (usable capacity) using 36.4-GB drives Up to 182 GB (usable capacity) using 18.2-GB drives Up to 91 GB (usable capacity) using 9.1-GB drives
Maximum Capacity per array	Each FC60 can support up to six disk enclosures. Using six disk enclosures, each with 10 data drives, the FC60 can support the following maximum capacities: Up to 4,404 GB using 73.4-GB drives Up to 2,184 GB using 73.4-GB drives Up to 1,092 GB using 73.4-GB drives Up to 546 GB using 73.4-GB drives
Storage Controller	One or two high-performance controllers per FC60 256-MB cache memory per controller Either controller interfaces with all of back-end buses
Disk Drive Capacity	9.1-, 18.2-, 36.4-GB, and 73.4-GB per drive
Revolution Velocity	10,000 rpm
Transfer Rate	100 MB/s per Fibre Channel interface, one interface per controller; two controllers per FC60 Controller Enclosure
Average Seek Time	Average seek time for 73.4-GB drive: 6.6 ms for write 5.95 ms for read Average seek time for 36.4-GB drive: 6.6 ms for write 5.95 ms for read Average seek time for 18.2-GB drive: 6.6 ms for write 5.8 ms for read Average seek time for 9.1-GB drive: 6 ms for write 5.2 ms for read
Average Latency	2.99 ms
Power	100/120/127 Vac or 200/230/240 Vac (autorange)
VA Rating	180 VA maximum
Min. Power Cord Gauge	18 AWG
Min. Number of Power Supplies	1 supply (The base FC60 will run with 1 supply and is always delivered with 2 supplies)
Max. Number of Power Supplies	2 supplies



HP SureStore E Disk Array FC60

Table 1. Disk Array FC60 Technical Specifications (continued)

Environmental Characteristics	
Heat Dissipation	615 BTU/hr maximum
Inrush Current	21.7 A max. @ 120 Vac; or 42.9 A max. @ 230 Vac
Frequency	50/60 Hz, single phase
Input Current	1.5 A @ 120 Vac; 0.8 A 230 Vac
Operating Temperature	41 to 104 degrees Fahrenheit (5 to 40 degrees Celsius)
Relative Humidity	Operating: 10-80% RH @ 28 degrees Celsius (wet bulb) Non-operating: 10-90% RH @ 28 degrees Celsius (wet bulb)
Vibration	Operating random: 0.21 G (rms), 5-500 Hz Non-operating swept sine: 0.5 G (0 to peak), 5-500 Hz Non-operating random: 2.09 G (rms), 5-500 Hz
Shock	4 G, 11 ms (1/2 sine)
Altitude	Operating 0-10,000 ft (0-3,048 m) Non-operating: 0-15,000 ft (0-4,572 m)
Temperature Gradient	20 degrees Celsius/hr
FC60 Physical Characteristics	
Net weight	76 lb (34.5 kg); includes, dual power supplies, batteries, and dual controllers
Shipping weight	107lb (48.5 kg)
Height	6.75 in (17.1 cm) or 4 EIA units
Width	17.5 in (44.5 mm)
Depth	24 in (61 mm)
SC10 Physical Characteristics	
Net weight	110 lb (50 kg) includes 10 drives, dual power supplies, fans, control cards, etc.
Height	5.91 in (15 cm) or 3.5 EIA units
Width	18.9 in (48 cm)
Depth	27.2 in (69 cm)
Safety and EMC	See Disk Array FC60 User's guide for complete description of Safety and EMC certifications
Operating System Support	HP-UX 11.0 and HP-UX 10.20 Windows NT 4.0 server and enterprise editions, Windows 2000 support available mid-2000



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