

You Have Enough to Worry About— Why Not Let HP Take Several Terabytes Off Your Mind?

Hewlett-Packard's Fibre Channel (FC) data storage solutions provide you with industry-leading high availability, performance, and the all-important peace of mind that comes from the confidence your data is protected and available when you need it. Based on HP's reliable reputation through innovative products, renowned customer support, and HP's guaranteed system uptime of 99.95% today and 99.999% by the year 2000—you have quality assurance that's unmatched by any other data storage provider.

Overview

The fast growth of expanding enterprise and mission-critical applications has forever changed how we address enterprise data storage. HP's goal—from our participation as a founding member of the Fibre Channel Standards committee—is to provide ANSI- (American National Standards Institute) standard, Fibre Channel data storage solutions that function so smoothly and reliably day after day that you don't even have to think about it.

Our leadership in the industry and close contact with our customers uniquely position us to have a hand on the pulse of our customers' needs, and to develop advanced data storage solutions that anticipate and meet these needs. With the HP FC 1010D, HP introduces its first Fibre Channel High Availability Storage System, designed to address your demand for high availability, increased performance, and uncompromised reliability. For our customers currently requiring or implementing mirrored-protected data storage, and for enterprise UNIX® and Windows NT® environments, the HP FC 1010D storage system gives you an essential building block for the fastest *and safest* data storage solution.

Key Features and Benefits

- Fast 100 MB/s Fibre Channel Arbitrated Loop (FC-AL) transfer speed
 - 10-disk capacity, 9–18 GB, provides 180 GB maximum per enclosure
 - High-performance 10,000-rpm disks
 - HP-exclusive long-distance capabilities for system configurations: Separate Fibre Channel nodes by *up to 10 kilometers (6.2 miles)* for extra data protection
 - Easy to configure—no more tangled wires, 60-pin connectors, or termination issues to struggle with in the data center
 - Hot pluggability, full redundancy, and fault tolerance provide fail-over protection
 - HP MirrorDisk/UX support secures your critical data
 - HP MC/ServiceGuard High Availability
 - Supports RAID levels 0, 1, and 0+1 for top transfer speeds
 - Superior raw performance: IOPS and MB/s
- Superior price performance: \$/IOP/s and \$/MB/s
 - 1 TB protected storage per 2-meter rack
 - SCSI Enclosure Services and HP Event Monitoring Service built in for easy remote system management
 - Remote Lights Out management software
 - HP's singular commitment to high availability and uptime

“HP is positioning itself well to compete in this changing storage market by offering a broad range of high-availability on-line and off-line Fibre Channel solutions.”

—Aberdeen Group



Stress-Free Storage Solutions from HP

Hewlett-Packard—the market leader.

Our technology certainly distinguishes HP as the industry leader in data storage solutions. But that's only part of what makes the difference. The rest of the package comes from experience—experience testing configuration after configuration to learn, adapt, and develop the most successful systems; experience in real-world situations to determine actual performance and functionality; and most of all, experience working side by side with our customers to provide the world's best and long-lasting solutions. No other industry provider can match HP's commitment and success in these areas. Here's why.

Critical applications demand the highest level of performance—and HP delivers.

The HP FC1010D is designed for market applications demanding fast and broad bandwidth, such as databases and data warehouses (Oracle® Parallel Server [OPS] and Informix Universal Server), multimedia, decision support systems (DSS), and online transaction processing (OLTP).

In these critical areas, even a small glitch in performance can impact revenue potential. For example, the fast processor capabilities of hosts are often constrained by typical parallel SCSI configurations, and by hardware disk array controllers—resulting in a significant loss of

available throughput. As data from multiple storage mechanisms competes to get through a single gateway, it bogs down and slows—a problem the swift transfer rate of the HP FC 1010D is uniquely positioned to solve.

Because the performance you gain from HP FC 1010D storage system far exceeds the speed and bandwidth capability that controller-operated disk arrays—and even fast SCSI devices—can provide, you can meet the stringent demands of your data centers handling multi-terabyte loads. For addressing the manageability issues you face, HP provides SCSI Enclosure Services, integrated with HP Event Monitoring Services, so you can remotely manage your system.

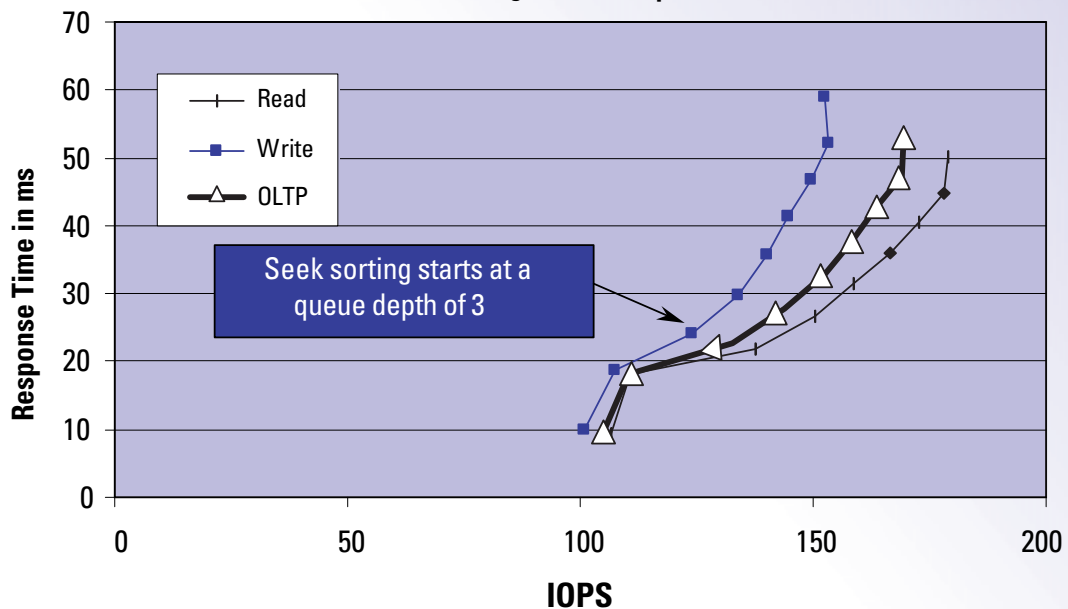
Comparative speed

FC	SCSI	SSA
100 MB/s	20/40/80 MB/s	80 MB/s

Further good news is that you can incorporate these enclosures into a Fibre Channel Arbitrated Loop (FC-AL) and, via HP's FC multiplexer, can connect your legacy SCSI storage devices for overall improved network performance and protection of your current investment as you grow.

10,000-rpm Single Disk Performance

2K random, single disk 10K-rpm, FC-AL



Stress-Free Storage Solutions from HP

Need to scale up as you grow? No problem. No hassle.

In addition to delivering speedy I/O operations, each HP FC 1010D enclosure provides ample data storage volume—up to 10 FC-AL disk drives, both 9.1 GB and 18.2 GB capacity. HP's 2-meter rack provides *four times* the amount of storage capacity as a competitor's 1.6-meter rack—inside the same footprint—so your storage gain doesn't come at the expense of valuable floor space.

The scalable HP FC 1010D, together with HP's family of Fibre Channel products, eradicates the restrictions that come with SCSI and SSA devices. Once all available slots are filled, you can continue to expand your storage network with additional FC hubs and HP FC 1010D enclosures to fit your unique and changing requirements. In high availability environments, HP supports connectivity allowances up to 100 data storage devices per Fibre Channel Arbitrated Loop (an example of which is shown in Figure 1).

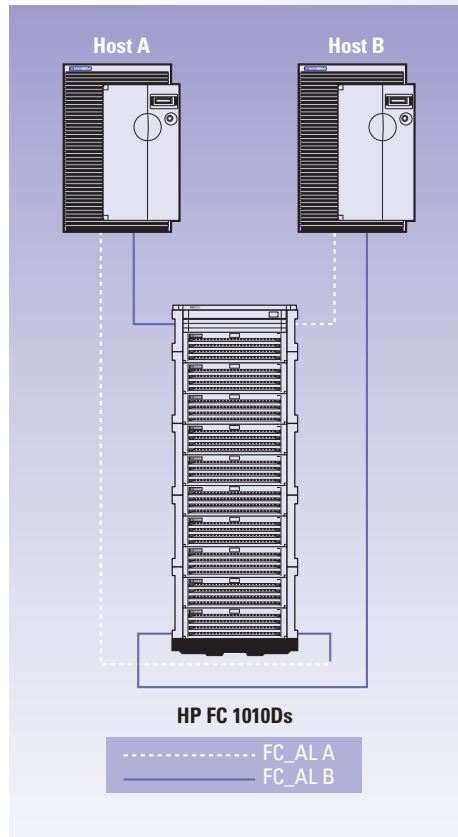


Figure 1.

Flexible, safe configurations and easy connectivity.

Gone are the days of trying to shoehorn all your equipment into one small data center. Fibre Channel connectivity lets you physically separate Fibre Channel nodes by a *full 10 kilometers (6.2 miles)*! Figure 2 below portrays a sample configuration. This advantage allows you to place MC/ServiceGuard HP-UX¹ cluster nodes and storage devices in different locations when building campus and metropolitan networks, and simultaneously to optimize floor space in the data center.

¹Equivalent support for NT environments is forthcoming.

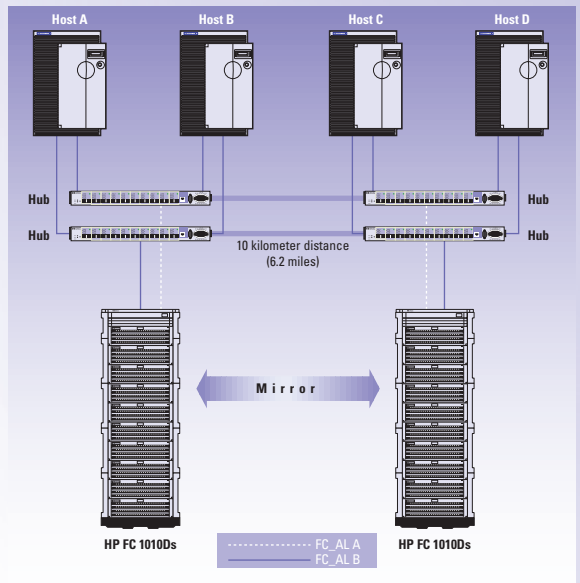


Figure 2.

Additional good news is that this flexible topography does not create manageability complications. Through SCSI Enclosure Services (SES) and HP's Event Monitoring Service (EMS), network manageability functions better than ever, and from a remote central location—a critical benefit.

Stress-Free Storage Solutions from HP

This flexible, manageable topography provides multiple advantages—protection against data loss from localized disasters such as fire, smoke, or water damage; the reassurance of improved disaster recovery; centralized manageability; and the allowance to build your configuration in a way that best serves your environment instead of being restricted by space and cable limitations. And speaking of cables—you no longer have to deal with the cumbersome problem of multiple SCSI cables, 60-pin connectors, or terminating the last device in line (or finding this end-cable later when rearranging your setup). Cable connections are kept to a minimum, easing your assembly operations and keeping your storage center uncluttered and efficient.

High availability systems from HP.

With HP, you move closer and closer to the ideal of zero downtime. When you demand uncompromised, uninterrupted access to your information, you want the full assurance that your information is protected against network and hardware failure. HP's FC 1010D allows you to build configurations with features such as campus clustering and dual-loop access to data storage devices, improving availability and access time.

And the countdown to HP's 99.999% uptime continues . . .

HP understands the critical nature of data protection, underscored by HP's company guarantee of 99.95% annual uptime for its systems solutions, equating to *only 4.5 hours of downtime per year*. HP continues to drive this commitment to the next level with its goal of 99.999% by the year 2000—*only 5 minutes of down time per year*. HP's FC 1010D storage systems are designed to support this future initiative.

MirrorDisk/UX and the security of fault tolerance.

HP's focus is on helping you build a high-availability data storage environment where you never have to worry about losing valuable data and time. HP's FC 1010D enclosure's fully redundant fault-tolerant design delivers robust protection against data loss and system downtime. How? Through support for MirrorDisk/UX and RAID levels 0, 1, and 0+1, this intelligent storage system gives you the increased protection of mirrored and striped redundancy, so you can achieve the highest no-compromise performance—and safety—possible from your configuration. Please see Figure 3 below for a sample mirrored configuration.

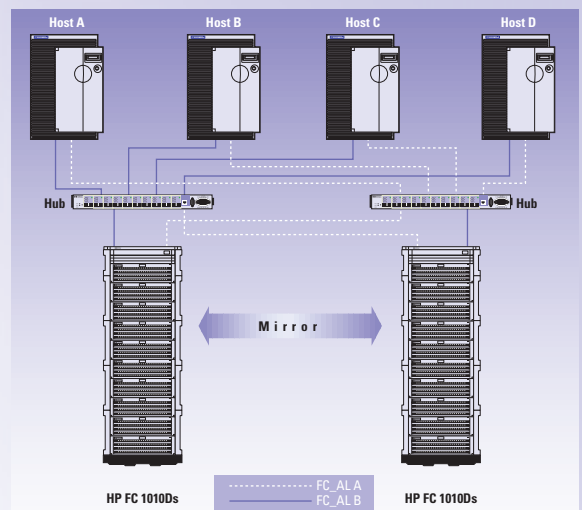


Figure 3.

With HP, you move closer and closer to the ideal of zero downtime.

Stress-Free Storage Solutions from HP

Built-in operations support you can count on.

SCSI Enclosure Services (SES) is built into the HP FC 1010D firmware and is integrated with HP's Event Monitoring System (EMS) to simplify remote device monitoring and management for manual operators. "No news is good news" is the basis of HP's secure system, designed to notify you *automatically* if there is a failure in the storage system of *any kind, in any component*—disk, fan, power supply, or link controller card—so you don't have to be constantly on the lookout for failure lights.

Not only are disk drives monitorable, but all other components are as well. Before now, the tradeoff of high availability was the search-and-hunt routine required to find failures. The benefit of having duplicate components isn't much help unless you know when the first component has failed so you can fix it and regain redundancy immediately. Fortunately, now, until you are alerted otherwise, you don't have to take the time and expense to send operations personnel into the data center to check the status of your data storage system. Instead, you can relax knowing your storage system is up and running with no problems.

And even when you are notified of a problem, SES allows you to immediately identify the point of failure and repair it—without taking the storage system down. All repairs and upgrades across the FC-AL are hot-swappable and occur in the background without interruption of data I/O operations. This also lets you work on your system during regular business hours—no middle-of-the-night inconveniences or reduced productivity from having to bump personnel off the system during repairs and upgrades.

SES capabilities.

- HP OpenView provides remote monitoring and notification of component status
- Temperature monitoring of enclosure
- Rotation failure detection for monitoring fan speed
- Tracking of voltage tolerance and current load margin of power supplies
- Field replaceable unit (FRU) status sensing, port bypass circuit management, host/controller status reporting and diagnostic command support
- Indicator/alert management (LEDs, buzzer)
- Self test

Q *How do I know my data is available and protected with HP's FC 1010D storage system?*

A *The HP FC 1010D fully supports HP's upcoming 5nines:5minutes initiative, and operates in a MirrorDisk/UX-protected environment, so you always have a backup of your data available.*

Q *What sets HP's FC storage products apart from the competition?*

A *For all your storage needs—high availability, performance, capacity, and security—HP delivers a portfolio of solutions that no other vendor can match.*

Stress-Free Storage Solutions from HP

Upgradability protects your investment.

HP is in the business of making your life easier and worry-free. And that means being able to leverage your current equipment investments as you grow. Because the data storage industry has changed so dramatically in recent years, it's difficult to predict exactly what your requirements will be in the future. HP's FC 1010D storage system is the safe choice because its flexible, cost-effective design allows you to utilize current equipment by installing your existing drives into the enclosure now, and expanding with new data storage devices whenever you need them down the road. And the HP FC 1010D's hot-pluggable support lets you add storage devices online.

Combining the HP FC 1010D with HP's other FC products—including hubs, switches, and multiplexers—gives you the entire framework to upgrade your existing network to be even faster and more reliable. Whatever your high-speed application, you can build a network that gives you enterprise-scale access to your data at Fibre Channel performance rates.

You can also add additional HP FC 1010D enclosures to your system easily to build an FC-AL storage area network (SAN), which allows you to expand your data storage capacity without adding additional servers—and without disrupting your existing storage system.

Why HP is the smart choice in information storage.

With its knowledge and foresight, HP shapes all its data storage products to be the best building blocks of an entire protected data storage system that will serve you for years into the future. The HP FC 1010D not only gives you an essential protected storage solution now but, backed by HP's ongoing commitment to high availability and system uptime, ensures that your longterm storage solution from HP is the one you can entrust with the future of your business.

Q *If I buy HP's FC 1010D now, will I be able to upgrade to higher speeds and capacity in the future?*

A *Yes. HP's FC 1010D is fully upgradable to future technology.*

HP's FC 1010D storage system is an essential building block for protected, stress-free data storage.

Stress-Free Storage Solutions from HP

Specifications

Fibre Channel High Availability Storage System 1010D

Product Number	A5236A—Field-rackable version A5236AZ—Factory-racked version
Performance/Throughput	
Host interface type	Full-speed Fibre Channel Arbitrated Loop
Enclosure capacity	100 MB/s (1 GB/s)
High availability features	10 disk drives; 180 GB total per enclosure Dual-loop access Hot-pluggable fans, power supplies, link control cards SES (SCSI Enclosure Services)
Dimensions	
Rackmount enclosure	Height: 150 mm (3 1/2 EIA units) Width: 448 mm Depth: 728 mm Weight: 100 lb (45.35 kg)
Drive	
Capacity	9.1 GB and 18.2 GB formatted
Rotational velocity	10,000 rpm
Transfer rate	Up to 10 MB/s
Average seek time	8.0–10.0 ms
AC Power	
Input requirements	100–240 Vac, single-phase input, 50–60 Hz
Input watts	650 W
Power factor	PFC-compliant to EN61000-3-2
Inrush current	10 A max per supply @ 240 Vac
AC inlet	C 22 appliance coupler
AC protection	Internally fused, 8 A
Operating Environment	
Temperature	50–100.4° F (10–38°C)
Temperature gradient	10° C/hr
Relative humidity	20–80% (noncondensing)
Elevation	8,000 ft (2,438.4 m)
Shock	3 G at 11 ms 1/2 sin pulse
Vibration	.25 G at 5–500 Hz
Safety and emissions	FCC Class A, VDE Class A, U.L. 1950, CSA C22.2-950, ENG950
Quality	Manufactured under an ISO 9000-certified facility
Standard accessories	Rack rail kits for HP standard rack and HP Rack System/E

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