

Scalable, high-performance storage for on demand computing environments



IBM System Storage DS4700 Express Model



Highlights

- **End-to-end 4 Gbps capable Fibre Channel interface technology to help optimize performance**
- **Up to 1550 MBps bandwidth for high throughput applications**
- **Support for Fibre Channel hard disk drives**
- **Includes IBM System Storage™ DS4000™ Storage Manager to help centrally manage the DS4000 series**
- **Eight total host channels with dual controllers for increased connectivity**
- **Support for up to 112 disk drive modules with the attachment of six DS4000 EXP810 Expansion Units**
- **NEBS-3 compliant designed to be powered from a -48 V dc Telco industry-standard power source**

The challenge: Managing data to achieve a low cost of ownership and high data availability

Effective data management is essential to the success of your enterprise if business goals are to be met. You need a storage solution that has a low cost of ownership while providing high data availability, strong storage management capabilities, and powerful performance features. You need to be able to easily and cost effectively scale storage capacity and take advantage of emerging technologies as information demands change. Powerful, dynamic backup and recovery capabilities can help you protect data and prevent failure—not just respond and recover.

The solution: IBM System Storage DS4700 Express

In a continuing effort to provide storage solutions that are designed to provide low total cost of ownership, high performance, robust functionality, and unparalleled ease of use, IBM offers the IBM System Storage DS4700 Express.

As part of the DS4000 series, the DS4700 Express offers high-performance 4 Gbps capable Fibre Channel connections, up to 84 TB of physical storage capacity with 112 750 GB SATA disk drives, and powerful system management, data management and data protection features. The DS4700 Express is designed to expand from workgroup to enterprise-wide capability with the attachment of six DS4000 EXP810 disk enclosures. The DS4700 Express DC Models are NEBS-3 compliant storage systems designed to be powered from a -48 Volt DC Telco industry-standard power source. The DS4700 Express is available in a 3U high enclosure and mounts in a 19-inch rack-mount package.

Helping to achieve a low Total Cost of Ownership (TCO)

The IBM System Storage DS4700 Express Model supports a high-performance 4 Gbps capable Fibre Channel interface designed for data-intensive applications that demand increased connectivity. The DS4700 Express supports eight 4 Gbps capable host channels that may be directly attached to host servers or connected to a Fibre Channel storage area

network (SAN). Four Gbps capable drives and IT infrastructure are required to achieve 4 Gbps capable throughput speeds.

There are two ways to measure the performance of an SAN device: Megabytes per second (MBps) and input/output per second (IOPS).

The DS4700 Express 4 Gbps SAN solution is designed to provide up to 1550 MBps throughput (assuming a 4 Gbps capable system) with up to 121,500 IOPS. A 2 Gbps storage array can require up to twice as many host ports as a 4 Gbps array to deliver the throughput of four 4 Gbps ports. The DS4700 Express can help you free up or eliminate the need for additional host ports in the SAN for each array.

On the host side, if a server requires more than two 2 Gbps host bus adapters (HBAs) to attain the required performance (a server should have at least two HBAs for availability), that number can be halved with a 4 Gbps HBA. Fewer HBAs can help you lower the number of switch ports used and, therefore, help reduce overall cost.

Helping to provide high data availability

The IBM System Storage DS4700 Express Model offers the latest innovation from IBM in storage infrastructure performance and management. It is designed to help you develop storage environments that can deliver high data availability.

With a choice of multiple RAID levels and redundant, hot-swappable components, the DS4700 Express is designed to help you maintain data availability and security, enabling enterprise inspired levels of reliability, availability, security and serviceability.

The DS4700 Express offers disaster recovery and resiliency capabilities that are designed to help you protect data and prevent failure—not just respond and recover. These include point-in-time copying with IBM FlashCopy®, copying a volume with VolumeCopy, and remote mirroring with Enhanced Remote Mirroring.

One of the key advantages of the DS4700 Express 4 Gbps technology is that it is backward compatible with 2 Gbps and even 1 Gbps technologies.

That means you can avoid replacing your entire SAN with 4 Gbps technology; you can add new technology incrementally. 4 Gbps products will slow down to the 2 Gbps or 1 Gbps speed if they are connected, but zoning allows you to implement a rolling upgrade strategy with minimal disruption.

Helping to achieve Information Lifecycle Management

Information is the lifeblood of an on demand business, and how that information is managed can become a key strategy of the IT organization. Because of the 4 Gbps capable technology incorporated into the DS4700 Express, the IBM DS4000 series can allow flexible access and a broader range of scale and performance options, providing structure and context to your enterprise information. As a result, you have the freedom to build data management strategies that align with your evolving information demands.

Helping to increase performance

The DS4700 Express is designed to manage some of your most compute-intensive workloads. Excelling at IOPS and MBps, the

DS4700 Express works well for both transaction-oriented and bandwidth-intensive applications. Additionally, the DS4700 Express is a good choice for environments with intense replication requirements, because its extra “horsepower” is designed to efficiently handle the additional performance demands of FlashCopy, Volume Copy and Enhanced Remote Mirroring.

The DS4700 Express Model 72 has eight independent 4 Gbps Fibre Channel host ports for direct attachment to host (FC-AL) or for fabric attachment to storage area networks (FC-SW). As one of the industry’s first enterprise-class storage systems using 4 Gbps Fibre Channel technologies, the DS4700 Express is designed to enable you to prepare for the future while fully utilizing your present infrastructure. Using its ability to auto-negotiate FC connection speeds allows you to integrate it into an existing 1 Gbps or 2 Gbps infrastructure. You can also help protect your storage infrastructure investment as the DS4700 Express has the capability to function with SANs when they are able to support 4 Gbps speeds.

The DS4700 Express storage system’s four 4 Gbps drive connections are designed to support up to 112 disk drives with the attachment of six DS4000 EXP810 disk enclosures. This makes the DS4700 Express a good choice for performance-oriented or capacity-oriented storage requirements. Models 70 and 72 are designed to support over 33.6 TB of Fibre Channel physical storage capacity.

The DS4700 Express expands the DS4000’s history of flexibility with another configuration option—cache size. The DS4700 Express is available in two models: Model 70 is designed to support up to 2 GB of physical cache memory (1 GB per controller) and the Model 72 can support up to 4 GB of physical cache memory (2 GB per controller).

The DS4700 Express is integrated into DS4000 series environments, running the same robust, yet intuitive, storage management software as the other DS4000 series models. It is designed to support high utilization of storage capacity and control over your rapidly growing storage environment.

Serving a wide range of storage consolidation and clustering applications

The IBM System Storage DS4700 Express is designed to be an affordable, scalable storage server for storage consolidation and clustering applications. Its modular architecture, which includes Dynamic Capacity Addition and Dynamic Volume Expansion, can support on demand business environments by helping to enable storage to grow as demands increase. Autonomic features such as online firmware upgrades and DS4000 Remote Support Manager also are designed to help enhance the system's usability.

The DS4700 Express features support the consolidation of direct-attached storage into a centrally managed, shared or storage area network (SAN) environment. With built-in support for eight Fibre Channel-attached servers, the need for additional switches is reduced or eliminated, helping to make server clustering more cost-effective.

The 4 Gbps capable IBM System Storage EXP810 Storage Expansion Unit offers a new 16-bay disk enclosure for attachment to selected DS4000 Mid-range Disk

Systems, with up to 4.8 TB physical capacity per expansion unit using sixteen Fibre Channel 300 GB disk drives, or up to 12 TB physical capacity per expansion unit using sixteen SATA 750 GB disk drives. The EXP810 Storage Expansion Unit is designed to accommodate the new optional 2 Gbps Fibre Channel Enhanced Disk Drive Modules (E-DDM). The EXP810 contains redundant (AC or DC) power and cooling modules, and Environmental Service Module (ESM) interfaces. The EXP810 DC Models are NEBS-3 compliant disk expansion units designed to be powered from a -48 Volt DC Telco industry-standard power source. The DS4000 EXP810 is available in 3U high enclosure and mounts in a 19-inch rack-mount package.

Each ESM Customer Replacement Unit (CRU) supports 2 Gbps/4 Gbps Fibre Channel host connections. The DS4000 EXP810 ESM designs support a 4 Gbps Fibre Channel loop. Both 2 Gbps and 4 Gbps Fibre Channel disk drives are supported. A switch on the front of the DS4000 EXP810 enclosure selects the speed of the entire enclosure—either 2 Gbps or 4 Gbps, but not both at the same time.

Intermix Capabilities

The DS4700 Express helps support intermix of Fibre Channel and SATA disk drives within the controller. DS4700 Express also helps support attachment of EXP810, EXP710 and EXP100 to further enhance storage utilization.

Leveraging DS4000 Series capabilities

The DS4700 Express is part of the DS4000 series, which uses common storage management software and expansion enclosures. The DS4700 Express can also be used with the DS4000 EXP810 Storage Expansion Unit to take advantage of using Fibre Channel technology.

Telco Options

The IBM System Storage DS4000 series of high-performance, high availability, business-critical storage solutions includes dc powered models that are especially suited for Telco industry environments. The IBM System Storage DS4700 Express Models 70S/T and 72S/T are NEBS-3 compliant midrange disk systems and the IBM System Storage DS4000 EXP810 models 81S and 81T storage expansion units are designed to be powered from a -48 V dc Telco industry-standard power

source. These models are designed to operate at up to 4 Gbps Fibre Channel speeds for connectivity to 4 Gbps attached host systems and optionally attached 4 Gbps DS4000 storage expansion units.

Scalability throughout the DS4000 series

Because the DS4700 Express is designed to be highly scalable—up to 112 Fibre Channel or SATA disk drives—it can be upgraded from a workgroup SAN to an enterprise network storage system, thereby helping provide flexibility to grow with your business. In addition, by using IBM System Storage DS4000 Storage Manager software, multiple DS4700 Expresses can be combined to help address additional performance and capacity requirements—further enhancing your scalability options.

Another scalability feature of the DS4700 Express is Dynamic Capacity Expansion (DCE), which is designed to provide the ability to add DS4000 EXP810 enclosures to an existing DS4700 Express while avoiding the need to stop operations. Adding these enclosures can help you bring unused storage online for a new host group or an existing volume to provide additional capacity on demand.

The DS4700 Express is designed to allow upgrades to higher performing DS4000 series systems while keeping data intact, helping to avoid disruptions during upgrades. The DS4700 Express also supports online controller firmware upgrades to help provide better performance and functionality. Events such as upgrades to support the latest version of DS4000 Storage Manager or to add optional services such as DS4000 Service Alert or the new DS4000 Remote Support Manager can often be executed without stopping operations.

Centralizing administration through DS4000 Storage Manager

The System Storage DS4000 Storage Manager software included with the DS4700 Express is designed to support centralized management of local and networked DS4000 series systems. The DS4000 Storage Manager is designed to allow administrators to quickly configure and monitor storage from a Java™ technology-based Web browser interface. It is also designed to allow them to customize and change settings as well as configure new volumes, define mappings, handle routine maintenance, and dynamically add new enclosures and capacity to existing volumes—without interrupting user access to data. Failover drivers,

performance tuning routines and cluster support are also standard features of the DS4000 Storage Manager.

By providing these features and an intuitive user interface, the DS4000 Storage Manager is designed to help reduce the complexity of storage management and the amount of time spent managing storage.

Enhancing storage management capabilities

The IBM System Storage DS4700 Express has several features designed to improve data management and storage system performance. Using the DS4000 Storage Manager software, administrators can partition the DS4700 Express into as many as 64 virtual servers. This capability is designed to help your IT organization strategically allocate storage capacity to achieve high utilization of storage space and low hardware and storage management costs. Instead of purchasing multiple RAID controllers with their own dedicated disks and management, you can attach multiple servers to one central system—the DS4700 Express. The DS4700 Express is designed to provide hardware failover with dual controllers and common management.

Other DS4700 Express features that can help enhance data management and protection include FlashCopy, Dynamic Volume Expansion, VolumeCopy and Enhanced Remote Mirroring.

The FlashCopy feature is designed to take point-in-time copies of logical volumes, which may be used for file restoration, backups, application testing or data mining.

Dynamic Volume Expansion is designed to allow administrators to resize logical volumes while avoiding disruption to users. This feature can work well for applications with rapidly growing data requirements, such as Lotus Notes® and Microsoft® Exchange.

The VolumeCopy feature is designed to provide full replication of one logical volume (source) to another (target) within the DS4700 Express. VolumeCopy features support read-only access to the source volume during the copy process and suspend writes to support point-in-time integrity.

Enhanced Remote Mirror consists of Global Mirror with Asynchronous Write-order Consistency. This is critical for mirroring multi-LUN applications, Global Copy with Asynchronous, and Metro Mirror with Synchronous.

The DS4700 Express is designed to use a common pool of hot-spare disk drives as a cost-effective way to help improve availability. IT administrators can determine the number of drives to allocate as spares.

Additional tools to help manage storage

The DS4700 Express is supported by a variety of IBM Tivoli® software products, including IBM Tivoli Storage Manager, as well as other third-party hardware and software products. These applications can add to the capabilities of the DS4700 Express by enabling backup and storage reporting.

The IBM System Storage Proven™ program is designed to identify and test many of these products for interoperability with the DS4700 Express and other IBM disk products. Products in this program have been tested to help avoid time-consuming installation and support issues. For more information, please visit ibm.com/storage/proven.

Service and support

The DS4700 Express has a three-year hardware warranty with a 9x5 next business day response time that is upgradeable to a 24x7 4-hour response time. Additional services for hardware

installation, DS4000 Storage Manager configuration, and advanced storage management are available from IBM Global Services. IBM Support Line services can assist with using DS4000 Storage Manager, helping you to self-maintain your DS4000 system.

The optional DS4000 Service Alert and the DS4000 Remote Support Manager services are designed to enable the DS4700 Express to quickly notify the IBM Support Center when the system detects a problem, helping to avoid the need for you to place a service call. This feature is capable of forwarding error alert messages (via e-mail) from the DS4000 Storage Manager to IBM to help expedite diagnosis and repair of failed hardware and software problems.

Competitive financing options from IBM Global Financing

Financing is available through IBM Global Services for a wide range of IBM products and services, including the DS4700 Express, for the duration of the financing term. This financing offers competitive rates, flexible terms, predictable costs and a fast approval process for DS4700 Express and associated software and services. For more information, please visit ibm.com/financing.

IBM System Storage DS4700 Express at a glance

Characteristics

Model	1814-70A/H/S/T, 1814-72A/H/S/T 1814-70S/T, 1814-72S/T (DC power supplies)
RAID controller	Dual active
Cache	Model 70A/70S: 2 GB Model 72A/72S: 4 GB Battery-backed
Host interface	8 host ports model 72, 4 host ports model 70—Fibre Channel (FC) Switched and FC Arbitrated Loop (FC-AL) standard, Auto-sensing 1 Gbps/2 Gbps/4 Gbps
Drive interface	4 drive ports—Fibre Channel (FC) Switched and FC Arbitrated Loop (FC-AL) standard, Auto-sensing 1Gbps/2 Gbps/4 Gbps
Supported drives	Supports 2 Gbps FC: 10K – 73.4 GB, 146.8 GB, 300 GB E-DDM, 15K – 36.4 GB, 73.4 GB, 146.8 GB E-DDM Supports 4 Gbps FC: 15k – 300 GB, 146.8 GB, 73.4 GB, 36.4 GB E-DDM Supports 4 Gbps SATA: 7.2K 750 GB E-DDM
RAID levels	0, 1, 3, 5, 10
Storage partitions	4, 8, 16 or 64 storage partitions
Maximum drives supported	Model 72A/H/S/T: 112 FC or 112 SATA drives (using 6 DS4000 EXP810 Expansion Units) Model 70A/H/S/T: 112 FC or 112 SATA drives (using 6 DS4000 EXP810 Expansion Units)
Fans and power supplies	Dual redundant, hot-swappable
Rack support	19-inch, industry-standard rack
Management software	IBM System Storage DS4000 Storage Manager version 9.21
SAN support	Supported IBM FC switches and directors (product numbers 2005, 2006, 2109, 3534, 2031, 2032, 2034, 2042, 2061 and 2062, and BladeCenter)
Warranty	Three year parts and labor warranty, 9x5 next business day, upgradeable to 24x7 with four hour response

Physical characteristics

Dimensions	H - 130.3 mm (5.13 in) W - 447.0 mm (17.6 in) D - 563.8 mm (22.2 in)
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Supported systems¹

For a list of currently supported servers, operating systems, host bus adapters, clustering applications and SAN switches and directors, refer to the DS4700 Express Interoperability Matrix available at ibm.com/storage/disk/ds4000/DS4700. For availability dates, configuration options, and attachment capabilities, refer to: ibm.com/storage/disk. The DS4700 Express is supported only in rack installations. With optional features, up to six DS4000 EXP810 Expansion Units can be attached to the DS4700 Express up to a maximum of 112 drives.

For more information

Contact your IBM representative,
IBM Business Partner or visit:

- ibm.com/storage/disk/ds4000/ds4700
- ibm.com/servers/eserver/express/storage



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MB, GB and TB equal 1,000,000, 1,000,000,000 and 1,000,000,000,000 bytes, respectively, where referring to storage capacity. Actual storage capacity will vary based upon many factors and may be less than stated. Some numbers given for storage capacities give capacity in native mode followed by capacity using data compression technology.

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¹ For specific details and configuration availability, please visit ibm.com/storage/disk.