



IBM System Storage DS3524 Express DC and EXP3524 Express DC models are designed for telecommunications and service provider environments

Table of contents

| | |
|---|---|
| 2 Overview | 8 Publications |
| 2 Key prerequisites | 9 Technical information |
| 3 Planned availability date | 13 Terms and conditions |
| 3 Description | 17 Pricing |
| 6 Product number | 20 Order now |

At a glance

The IBM® System Storage® DS3524 Express® DC Storage System and EXP3524 Express DC Expansion Unit are dc-powered models designed specifically for service providers and applications in the telecommunications industry.

The DS3524 DC features:

- Dual-active intelligent array controller
- 6 Gb SAS host ports standard with optional 8 Gb Fibre Channel (FC) or 1 Gb iSCSI host ports
- Twenty-four 2.5-inch SAS disk drive bays, with support for 96 disk drives through the attachment of EXP3524 DC Express expansion units

The EXP3524 DC features:

- Dual-active environmental services modules
- Twenty-four 2.5-inch SAS disk drive bays

Both models include:

- Compact, 2U, 19-inch rack mount enclosure with redundant, hot-swappable hardware components
- Two hot-swappable power supplies
- Dual port, hot-swappable 6 Gb SAS high performance, high-capacity nearline, and self-encrypting disk drives
- Three year warranty with customer replaceable units (CRU) and on-site service, along with optional warranty service upgrades

The DS3524 DC and EXP3524 DC conform to applicable Network Equipment Building System (NEBS) level 3 documents and to applicable European Telecommunications Standards Institute (ETSI) documents. The DS3500 and EXP3500 ac-powered models now also conform to applicable NEBS level 3 and ETSI documents.

For ordering, contact your IBM representative, an IBM Business Partner, or IBM Americas Call Centers at 800-IBM-CALL (Reference: YE001).

Overview

The IBM System Storage DS3500 family of entry disk storage systems is expanded to include two new dc-powered models designed specifically for the telecommunications industry and service providers. These new models are designed to support the same functional capabilities as the DS3500 ac-powered models, but are powered from an industry-standard -48 V dc power source.

These dc-powered models conform to applicable Network Equipment Building System (NEBS) level 3 documents and to applicable European Telecommunications Standards Institute (ETSI) documents. The previously announced DS3500 and EXP3500 ac-powered models now also conform to applicable NEBS level 3 and ETSI documents, enabling service providers to standardize on the DS3500 as their single storage system across their business.

The IBM System Storage DS3524 Express DC Storage System features include:

- Dual-active, intelligent array controllers with mirrored cache
- 6 Gb SAS host ports with optional 8 Gb FC or 1 Gb iSCSI host ports
- Twenty-four 2.5-inch SAS disk drive bays with support for up to 96 disk drives through the attachment of EXP3524 DC expansion units
- Two hot-swappable dc power supplies
- Data protection options including:
 - Multiple RAID levels (0, 1, 3, 5, 6, and 10)
 - Storage partitions to manage volume-to-host access
 - FlashCopy® and Volume Copy to create logical or physical copies of your data
 - Remote Mirroring for data replication from one DS3500 system to another DS3500 system over FC communication links
 - Full Disk Encryption (FDE) with local key management and self-encrypting disk drives (SED)
 - Turbo Performance option to further enhance system performance
 - DS Storage Manager, a powerful yet easy-to-use graphical user interface (GUI) for administrative activities

The IBM System Storage EXP3524 Express DC Expansion Unit features include:

- Dual-active environmental services modules (ESM)
- 6 Gb SAS attachment to the DS3524 DC system or another EXP3524 DC expansion unit
- Twenty-four 2.5-inch SAS disk drive bays
- Two hot-swappable dc power supplies

Feature exchange

None

Key prerequisites

The DS3524 DC storage system is initially supported for attachment to selected:

- IBM System x®, IBM BladeCenter®, and IBM Power® System servers and blades
- Intel® and AMD processor-based servers

Refer to the IBM System Storage Interoperation Center (SSIC) for additional details

<http://www.ibm.com/systems/support/storage/config/ssic>

SSIC will also be updated with interoperability support enhancements as they become available.

Planned availability date

February 25, 2011.

Description

Introducing the IBM System Storage DS3524 DC and EXP3524 DC

The IBM System Storage DS3524 Express DC Storage System and EXP3524 Express DC Expansion Unit are the newest addition to the IBM System Storage DS3500 family of entry disk storage systems. The DS3500 series delivers affordable, entry-level configurations for small and medium businesses in compact 2U, 19-inch rack mount enclosures, with the flexibility to scale in capacity, performance, host interfaces, and advanced functions as your business grows or requirements change.

The DS3524 DC and EXP3524 DC are designed specifically for the telecommunications industry and service providers. These new models are designed to support the same functional capabilities as the DS3500 ac-powered models, but are powered from an industry-standard -48 V dc power source. They also conform to applicable NEBS level 3 documents and to applicable ETSI documents.

The previously announced DS3500 and EXP3500 ac-powered models now also conform to applicable NEBS level 3 and ETSI documents.

New technology delivers new levels of performance

The DS3524 DC combines next-generation controller technology with the latest, high-performance host interface technologies to deliver new levels of performance compared to the IBM System Storage DS3000 series.

The DS3524 DC with its dual-active controllers is designed to be equally adept at delivering throughput to bandwidth-intensive applications and I/O operations to transactional applications, such as databases and Microsoft® Exchange. This balanced performance, combined with the ability to handle concurrent workloads, makes the DS3524 DC a great fit for consolidation and virtualization environments.

The performance of the system can be further enhanced with the Turbo Performance option, which is available with the initial purchase of your system or as an upgrade to an existing system.

Latest host interface technologies with intermix flexibility

The DS3524 DC supports the latest host interface technologies, 6 Gb per second SAS and 8 Gb per second Fibre Channel. Along with 1 Gb per second iSCSI support and the capability to intermix host interface technologies, the DS3524 DC addresses shared storage requirements within a single system.

- Second-generation, 6 Gb SAS builds upon the solid foundation of 3 Gb SAS with performance improvements and reliability enhancements. With direct attachment support and the capability to be shared by multiple host servers, the DS3524 DC with SAS provides ease-of-use and simplicity at an affordable price.
- Fibre Channel, a mature and proven technology now available at 8 Gb, is the host interface of choice for high-performance environments. The DS3524 DC with Fibre Channel allows you to exploit the benefits offered by a SAN environment.
- iSCSI allows you to capitalize your existing IT skills and infrastructure by delivering block-based storage across the IP network. The DS3524 DC with iSCSI provides an alternative to direct attach SAS or the investment in a storage-only, Fibre Channel infrastructure.

SAS host interface ports are standard on the DS3524 DC. Optional additional SAS ports, FC ports, or iSCSI ports can be added. The following configurations are available:

| 6 Gb SAS Ports | 8 Gb FC Ports | 1 Gb iSCSI Ports |
|----------------------|---------------------|------------------------|
| 4 | -- | -- |
| 8 | -- | -- |
| 4 | 8 | -- |
| 4 | -- | 8 |

Tiered storage options with high performance and nearline SAS disk drives

With support for mixed disk drives within a single system, the DS3524 DC is designed to support a complete range of data storage requirements, from highly utilized applications to high-capacity, low usage applications.

The DS3524 DC and EXP3524 DC support the following dual-port, hot-swappable 2.5-inch 6 Gb SAS disk drives:

- High-performance, enterprise class drives
 - 146 GB 15,000 rpm
 - 300 GB and 600 GB 10,000 rpm
- High-capacity, archival-class nearline drives
 - 500 GB 7,200 rpm
- Self-encrypting drives (SED) for data security
 - 300 GB 10,000 rpm

Up to 96 disk drives are supported by a single DS3524 DC storage system with attachment of EXP3524 DC expansion units. Additional disk drives and expansion units are designed to be dynamically added with virtually no downtime, helping you to quickly and seamlessly respond to your ever-growing capacity demands.

Energy saving implementations for cost savings today and tomorrow

DS3524 DC was developed with the following energy savings features to reduce power consumption and provide a lower overall total cost of ownership:

- High-efficiency power supplies to meet power efficiency standards for reduced power consumption
- Small form factor (2.5-inch) disk drives which deliver comparable I/O performance when compared to 3.5-inch disk drives, but require less space and consume less power

And the DS3524 DC controller technology creates performance value by getting the most performance out of the fewest disk drives. This reduces the number of disk drives needed to meet performance and capacity demands, resulting in lower acquisition and operational expenditures.

High availability with new data protection and security options

DS3524 DC supports high system and data availability with:

- Dual-active, intelligent array controllers with mirrored cache
- Dual port disk drives with automatic disk drive failure detection and rebuild with global hot spares
- Redundant hardware, including dc power supplies and fans
- Hot-swappable and customer replaceable components
- Automated path failover support for the data path between the server and the disk drives

DS3524 DC supports data protection with:

- **RAID** levels 0, 1, 3, 5, 6, and 10 provide the flexibility to choose the level of protection required.
- **Storage Partitions** that logically divide a single DS3500 into multiple systems to manage volume-to-host access.
- **FlashCopy and Volume Copy** to create logical or physical copies of data for file restoration and backup
- **Remote Mirroring** to provide storage system-based data replication from one system to another system using either synchronous or asynchronous data transfers over Fibre Channel communication links.
- **Full Disk Encryption (FDE)** provides local key management and disk drive-level encryption for comprehensive data security and protection. DS3524 DC locally manages and protects the self-encrypting drives (SED) by utilizing a single authorization scheme (or lock key) that can be set and applied to all SED drives within a system. DS Storage Manager maintains and controls the key linkage and communications with the SED drives, secures user-selected logical drive groups, and can even initiate an instant secure erase feature when servicing, decommissioning, or repurposing drives. The DS3524 DC FDE engine performs encryption without a performance penalty, which allows you to achieve new levels of data security without sacrificing performance. With these encryption services, FDE key management is transparent to day-to-day storage administration, making SED drives as easy to manage as traditional drives.

Intuitive storage management with the IBM DS Storage Manager

DS Storage Manager provides a powerful, yet easy-to-use and intuitive graphical user interface (GUI) for DS3524 DC administrative activities, including configuration, reconfiguration, expansion, and routine maintenance, as well as performance tuning and management of advanced functions, such as data replication and Full Disk Encryption (FDE) keys. DS Storage Manager extends the robustness and functionality of storage management previously only available on the DS4000™ and DS5000 products to the DS3500 family, while maintaining the ease-of-use and intuitive nature of the DS3000 Storage Manager. It provides a complete physical view of your system, but with expertise built into the interface and automated policy decisions, you no longer have to contend with low-level activities.

Rich set of data replication functions for business continuity

FlashCopy creates a capacity-efficient, point-in-time copy of a physical volume for data protection uses, such as file restoration and backup. A FlashCopy volume is the logical equivalent of the physical volume, but is created more quickly than a physical copy and with minimal disruption to applications and production processes. Using copy-on-write technology, FlashCopy volumes preserve data in its original form even as data in the physical (source) volume is changed. FlashCopy volumes appear and function as standard storage volumes, and restoration of a FlashCopy volume is quick and easy.

Volume Copy creates a physical copy of a volume. Volume Copy is used with FlashCopy to create a physical copy of your data with minimal disruption to applications and production processes. Upon completion of the Volume Copy process, the new volume can be mapped to any host and functions as a standard volume. Volume Copy can also be used to redistribute data within the system, moving volumes to a different disk drive technology or RAID level.

Both FlashCopy and Volume Copy are performed by DS3524 DC storage system, so no host server resources are used.

Remote Mirroring provides storage system-based data replication from one DS33534 DC system to another DS3500 system over Fibre Channel communications links. Remote Mirroring supports synchronous or asynchronous data transfers, enabling you to choose the replication method that best meets your protection, distance, or performance requirements:

- Synchronous mirroring is designed to provide continuous mirroring between primary and remote volumes to help ensure absolute synchronization.
- Asynchronous mirroring queues remote writes to reduce the latency, thus enabling long distance replication while increasing local system performance. Asynchronous mirroring includes a write consistency option designed to ensure that writes to the remote system complete in the same order as the local system.

Remote Mirroring also includes features such as dynamic mode switching, suspend and resume with delta resynchronization, read-only and FlashCopy / Volume Copy access to secondary volumes, and cross-mirroring.

Product number

| Description | Mach type | Model | Feature | SEO number |
|---|-----------|---------|---------|------------|
| IBM System Storage DS3524 DC (Dual controller, four 6 Gb SAS ports, 2 GB cache, DC power supplies) | 1746 | C4T | 2813 | 1746T4D |
| IBM System Storage EXP3524 DC (Expansion unit, dual ESM, DC power supplies) | 1746 | E4T | 2823 | 1746T4E |
| 2.5-inch Disk Drives: | | | | |
| 146GB 15K 2.5-inch HDD | 1746 | C4T,E4T | 5205 | 49Y1841 * |
| 300GB 10K 2.5-inch HDD | 1746 | C4T,E4T | 5210 | 49Y1836 * |
| 600GB 10K 2.5-inch HDD | 1746 | C4T,E4T | 5220 | 49Y2048 * |
| 300GB 10K 2.5-inch SED HDD | 1746 | C4T,E4T | 5250 | 49Y1952 * |
| 500GB 7.2K 2.5-inch NL HDD | 1746 | C4T,E4T | 5265 | 49Y1851 * |
| Host Interface Cards: | | | | |
| 6Gb SAS 2 Port Card | 1746 | C4T | 3610 | 68Y8431 * |
| 8Gb FC 4 Port Card | 1746 | C4T | 3611 | 68Y8432 * |
| 1Gb iSCSI 4 Port Card | 1746 | C4T | 3612 | 68Y8433 * |
| Hardware Options: | | | | |
| 8Gb FC SFP SW Transceivers | 1746 | C4T | 3620 | 69Y2876 * |
| 2GB Cache Upgrade | 1746 | C4T | 3630 | 68Y8434 * |
| Licensed Functions: | | | | |
| 4 to 8 Partition Upgrade | 1746 | C4T | 4300 | 68Y8436 * |
| 4 to 16 Partition Upgrade | 1746 | C4T | 4301 | 68Y8437 * |
| 4 to 32 Partition Upgrade | 1746 | C4T | 4302 | 68Y8438 * |
| 4 to 64 Partition Upgrade | 1746 | C4T | 4304 | 68Y8439 * |
| 8 to 16 Partition Upgrade | 1746 | C4T | 4310 | 68Y8441 * |
| 8 to 32 Partition Upgrade | 1746 | C4T | 4311 | 68Y8442 * |
| 8 to 64 Partition Upgrade | 1746 | C4T | 4312 | 68Y8443 * |
| 16 to 32 Partition Upgrade | 1746 | C4T | 4320 | 68Y8445 * |
| 16 to 64 Partition Upgrade | 1746 | C4T | 4321 | 68Y8446 * |
| 32 to 64 Partition Upgrade | 1746 | C4T | 4330 | 68Y8448 * |
| Turbo Performance | 1746 | C4T | 4400 | 69Y2871 * |
| Full Disk Encryption (FDE) | 1746 | C4T | 4410 | 68Y8490 * |
| FlashCopy: Base | 1746 | C4T | 4420 | 68Y8451 * |
| FlashCopy: 8/64 Upgrade | 1746 | C4T | 4421 | 68Y8452 * |
| Volume Copy: Base | 1746 | C4T | 4430 | 68Y8453 * |
| FlashCopy / Volume Copy | 1746 | C4T | 4440 | 68Y8454 * |
| Remote Mirroring: Base | 1746 | C4T | 4450 | 68Y8455 * |
| Host Kits: | | | | |
| AIX/VIOS Host Kit | 1746 | C4T | 4700 | 68Y8458 * |
| Host and Expansion Unit Attachment Cables: | | | | |
| 3m SAS Cable | 1746 | C4T,E4T | 3707 | 39R6531 * |
| 1m SAS Cable | 1746 | C4T,E4T | 3708 | 39R6529 * |
| 1m Fiber Cable (LC-LC) | 1746 | C4T | 5601 | 39M5696 * |
| 5m Fiber Cable (LC-LC) | 1746 | C4T | 5605 | 39M5697 * |
| 25m Fiber Cable (LC-LC) | 1746 | C4T | 5625 | 39M5698 * |

* The SEO number was previously announced and is being shown here only for completeness of the product structure.

Additional information

IBM System Storage DS3524 DC

IBM System Storage DS3524 DC base model (Model C4T with feature 2813 (Part number/SEO 1746T4D)) consists of the following components:

- 2U, 19-inch rack mount enclosure
- Two intelligent array controllers with 2 GB cache (1 GB per controller)
- Four 6 Gb SAS host interface ports (two per controller)
- Two 6 Gb SAS ports for attachment of an EXP3524 DC expansion unit (one per controller)
- Four Ethernet ports for system management (two per controller)
- Twenty-four bays for 2.5-inch SAS disk drives
- Two DC power supplies and cooling units
- Two DC power cords

DS3524 DC includes the following functions at no additional charge:

- RAID levels 0, 1, 3, 5, 6, and 10
- Storage partitions (four partitions per system)
- FlashCopy (two active FlashCopy images per system)
- Host attachment support for Microsoft Windows®, Linux® on Intel, and VMware
- DS Storage Manager
- Support for 96 disk drives through attachment of EXP3524 DC expansion units

The following optional features are available on the DS3524 DC. Refer to the [Product number](#) section for feature numbers and part numbers:

- 6 Gb SAS 2 port daughter card
- 8 Gb FC 4 port daughter card (with two SFP transceivers)
- 1 Gb iSCSI 4 port daughter card
- 2.5-inch 6 Gb SAS disk drives:
 - High performance, enterprise class drives - 146 GB 15,000 rpm - 300 GB and 600 GB 10,000 rpm
 - High-capacity, archival-class nearline drives - 500 GB 7,200 rpm
 - Self-encrypting drives (SED) for data security - 300 GB 10,000 rpm
- 1 GB to 2 GB cache upgrade (per controller)
- Turbo Performance
- Full Disk Encryption (FDE)
- 8, 16, 32, or 64 partitions per system
- 4 or 8 active FlashCopy images per volume (64 per system)
- Volume Copy
- Remote Mirroring
- Host kit for AIX/VIOS
- FC SFP transceivers
- SAS and fiber optic host attachment cables

IBM System Storage EXP3524 DC

IBM System Storage EXP3524 DC base model (Model E4T with feature 2823 (Part number/SEO 1746T4E)) consists of the following components:

- 2U, 19-inch rack mount enclosure
- Two environmental services modules (ESM)
- Two 6 Gb SAS "out" ports for attachment to a DS3524 DC storage system or another EXP3524 DC expansion unit (one port per ESM)
- Four 6 Gb SAS "in" ports for attachment of another EXP3524 DC expansion unit (one port per ESM)
- Twenty-four bays for 2.5-inch SAS disk drives
- Two DC power supplies and cooling units.
- Two DC power cords

The following optional features are available on the EXP3524 DC. Refer to the [Product number](#) section for feature numbers and part numbers:

- 2.5-inch 6 Gb SAS disk drives:
 - High performance, enterprise class drives - 146 GB 15,000 rpm - 300 GB and 600 GB 10,000 rpm
 - High-capacity, archival-class nearline drives - 500 GB 7,200 rpm.
 - Self-encrypting drives (SED) for data security - 300 GB 10,000 rpm
- SAS expansion unit attachment cables

Publications

The following publications are available:

- IBM Systems Storage DS3500 and EXP3500 Rack Installation and Quick Start Guide
- IBM Systems Storage DS3500 and EXP3500 Installation, User's, and Maintenance Guide
- IBM System Storage DS® Storage Manager Version 10 Installation and Host Support Guide
- IBM System Storage DS Storage Manager Version 10 Copy Services User's Guide
- IBM System Storage DS3000, DS4000, and DS5000 Command Line Interface and Script Commands Programming Guide
- IBM System Storage DS3000, DS4000, and DS5000 Hard Disk Drive and Storage Expansion Enclosure Installation and Migration Guide
- IBM Remote Support Manager 1818-RS3 Quick Reference
- IBM Remote Support Manager Version 2.6 Planning, Installation, and User's Guide

Publications and product documentation are available at the IBM System Storage Support site

<http://www.ibm.com/systems/support/storage/>

Services

Global Technology Services

IBM services include business consulting, outsourcing, hosting services, applications, and other technology management.

These services help you learn about, plan, install, manage, or optimize your IT infrastructure to be an On Demand Business. They can help you integrate your high-

speed networks, storage systems, application servers, wireless protocols, and an array of platforms, middleware, and communications software for IBM and many non-IBM offerings. IBM is your one-stop shop for IT support needs.

For details on available services, contact your IBM representative or visit

<http://www.ibm.com/services/>

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or visit

<http://www.ibm.com/services/continuity>

For details on education offerings related to specific products, visit

<http://www.ibm.com/services/learning/index.html>

Select your country, and then select the product as the category.

Technical information

Specified operating environment

Physical specifications

DS3524 and EXP3524 DC Power Models

- Height: 8.8 cm (3.5 in)
- Width: 44.9 cm (17.7 in)
- Depth: 48.7 cm (19.2 in)
- DS3524 approximate weight:
 - Empty: 21.7 kg (47.84 lb)
 - Fully configured: 25.9 kg (57.2 lb)
- EXP3524 approximate weight:
 - Empty: 20.8 kg (45.86 lb)
 - Fully configured: 25.3 kg (55.8 lb)

To assure installability and serviceability in non-IBM industry-standard racks, review the IBM Systems Storage DS3500 and EXP3500 Rack Installation and Quick Start Guide (part number 49Y8727) for any product-specific installation requirements.

Operating environment

DS3524 and EXP3524 DC Power Models

Temperature:

- Operating: 5 to 40 degrees C (41 to 104 degrees F) at 30.5 to 3,000 m (100 to 9,840 ft)
- Short-term operating (see note below): -5 to 50 degrees C (23 to 122 degrees F)
- Non-operating: -10 to 50 degrees C (-14 to 120 degrees F)

Relative humidity (no condensation):

- Operating: 5% to 85%
- Short-term operating (see note below): 5% to 90% (not to exceed 0.024 kg water/kg of dry air)
- Non-operating: 10% to 90%

Note: Short-term operating refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in one year. (This refers to a total of 360 hours in any given year, but no more than 15 occurrences during that one-year period.)

Electrical power:

- Voltage range: -42 to -60 V dc
- Voltage nominal: -48 V dc
- Current: 21.7A to 15.3A
- Power:
 - DS3524: 575 watts
 - EXP3524: 465 watts

Heat dissipation (BTU per hour):

- DS3524: 1,968
- EXP3524: 1,591

Maximum noise level (normal operation):

- DS3524 and EXP3524: 6.4 bels

Hardware requirements

The DS3524 DC requires:

- Controller firmware level 7.75, or later
- DS Storage Manager version 10.75, or later

Refer to the product documentation and the IBM Systems Support site for additional information on firmware levels and other requirements

<http://www.ibm.com/systems/support/storage/>

Software requirements

None

Compatibility

Refer to the IBM System Storage Interoperation Center SSIC) for a comprehensive list of environments, devices, and configurations supported by the DS3524 DC

<http://www.ibm.com/systems/support/storage/config/ssic>

Limitations

Controller firmware level 7.75 is only supported on the DS3524 dc-powered model:

- 1746 Model C4T
- Part number/SEO 1746T4D

Controller firmware level 7.75 is not supported on the DS3512 and DS3524 ac-powered models:

- 1746 Model C2A and C4A
- Part numbers/SEOs 1746A2S, 1746A4S, 1746A2D, and 1746A4D

At initial availability, the DS3524 DC interoperability support is not equivalent to the interoperability support available on the DS3500 ac-powered models. The IBM System Storage Interoperation Center (SSIC) will be updated as interoperability support enhancements become available.

Planning information

Customer responsibilities

Physical configuration and installation planning, along with machine set up and configuration, are customer responsibilities. Refer to the *IBM Systems Storage DS3500 and EXP3500 Installation, User's, and Maintenance Guide* for additional information.

The DS3524 DC and EXP3524 DC models require an electrically rated 30A circuit-breaker for the -48 V dc input. In addition, the wiring between the dc power source and the DS3524/EXP3524 dc power supply connectors must be with 10AWG copper wires. Refer to the IBM Systems Storage DS3500 and EXP3500 Installation, User's, and Maintenance Guide for additional information.

As of February 15, 2011, the DS3500 and EXP3500 ac-powered and dc-powered models conform to applicable Network Equipment Building System (NEBS) level 3 documents and to applicable European Telecommunications Standards Institute (ETSI) documents. It is a customer responsibility to review the test result documents to determine the testing performed on the DS3500 and EXP3500 models and options meet their requirements. Contact your IBM sales representative or business partner to obtain a copy of the test result documents.

You are responsible for downloading or obtaining from IBM, and installing designated Machine Code (microcode, basic input/output system code (called BIOS), utility programs, device drivers, and diagnostics delivered with an IBM machine) and other software updates in a timely manner from an IBM Internet website or from other electronic media, and following the instructions that IBM provides. You may request IBM to install Machine Code changes; however, you may be charged for that service.

Cable orders

Host Attachment

Host attachment cables are required to connect DS3524 DC host ports to server or fabric ports. As a convenience, a limited selection of cables can be ordered with your DS3524 DC. Refer to the [Product number](#) section for feature numbers and part numbers.

In many situations, the required lengths and installation of host attachment cables will be unique to each customer's configuration and facility specifications. IBM Network Integration and Deployment Services, offered by IBM Global Services, can provide assistance for these unique cabling and installation requirements.

SAS: The DS3524 DC requires a mini SAS 4x cable terminated with an SFF-8088 connector. The following SAS cables can be ordered with your DS3524 DC:

- 1 m SAS Cable
- 3 m SAS Cable

Fibre Channel: The DS3524 DC requires 50.0/125 micrometer fiber optic cable terminated with an LC Duplex connector. The following fiber optic cables can be ordered with your DS3524 DC:

- 1 m Fiber Cable (LC-LC)
- 5 m Fiber Cable (LC-LC)
- 25 m Fiber Cable (LC-LC)

iSCSI: The DS3524 DC requires a Category 5 or Category 5E Ethernet cable terminated with a 8P8C modular connector (RJ45 compatible connector). This cable must be customer-supplied and is not available for ordering with your DS3524 DC.

Expansion Unit Attachment

Expansion unit cables are required to connect a EXP3524DC expansion unit to the DS3524 DC storage system or another EXP3524 DC expansion unit. As a convenience, a limited selection of cables can be ordered with your EXP3524 DC. Refer to the [Product number](#) section for feature numbers and part numbers.

The EXP3500 requires a mini SAS 4x cable terminated with an SFF-8088 connector. The following SAS cables can be ordered with your EXP3524 DC:

- 1 m SAS Cable
- 3 m SAS Cable

System Management

Cables are required if the DS3524 DC configuration will be managed "out of band" using the 1 Gb Ethernet management ports. The DS3524 DC requires a Category 5 or Category 5E Ethernet cable terminated with a 8P8C modular connector (RJ45 compatible connector). This cable must be supplied by the customer and is not available for ordering with your DS3524 DC.

Direct customer support

Direct customer support for DS3000 Disk Systems is provided by IBM Operational Support Services--Support Line. This fee service provides voice and electronic access into the IBM support organization. IBM Operational Support Services--Support Line helps answer questions pertaining to product and feature usage (how to), configuration, and product compatibility for eligible products. For a list of the products supported via Support Line, visit

<http://www.ibm.com/services/sl/products/>

For more information on services, call 800-IBM-4YOU (426-4968).

Security, auditability, and control

This product uses the security and auditability features of host hardware.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communications facilities.

IBM Electronic Services

IBM has transformed its delivery of hardware and software support services to help you achieve higher system availability. Electronic Services is a Web-enabled solution that offers an exclusive, no-additional-charge enhancement to the service and support available for IBM servers. These services are designed to provide the opportunity for greater system availability with faster problem resolution and preemptive monitoring. Electronic Services comprises two separate, but complementary, elements: Electronic Services news page and Electronic Services Agent.

The Electronic Services news page is a single Internet entry point that replaces the multiple entry points traditionally used to access IBM Internet services and support. The news page enables you to gain easier access to IBM resources for assistance in resolving technical problems.

The Electronic Service Agent™ is no-additional-charge software that resides on your server. It monitors events and transmits system inventory information to IBM on a periodic, client-defined timetable. The Electronic Service Agent automatically reports hardware problems to IBM. Early knowledge about potential problems enables IBM to deliver proactive service that may result in higher system availability

and performance. In addition, information collected through the Service Agent is made available to IBM service support representatives when they help answer your questions or diagnose problems. Installation and use of IBM Electronic Service Agent for problem reporting enables IBM to provide better support and service for your IBM server.

To learn how Electronic Services can work for you, visit

<http://www.ibm.com/support/electronic>

Terms and conditions

Volume orders: Contact your IBM representative.

IBM Global Financing

Yes

Warranty period and warranty service

Warranty period

- System (including the cache backup battery module): Three years
- Optional features: Three years, unless specified otherwise

An IBM part or feature installed during the initial installation of an IBM machine is subject to a full warranty effective on the date of installation of the machine. An IBM part or feature which replaces a previously installed part or feature assumes the remainder of the warranty period for the replaced part or feature. An IBM part or feature added to a machine without replacing a previously installed part or feature is subject to a full warranty effective on its date of installation. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature is the same as the machine it is installed.

Warranty service

Customer Replaceable Unit (CRU) and On-Site Service

If required, IBM provides repair or exchange service depending on the types of warranty service specified for the machine. IBM will attempt to resolve your problem over the telephone, or electronically via an IBM website. Certain Machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. If applicable to your product, parts considered Customer Replaceable Units (CRUs) will be provided as part of the machine's standard warranty service.

Service levels are response-time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country and location-specific information.

CRU Service

IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request. CRUs are designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU.

Tier 1 (mandatory) CRU

Installation of Tier 1 CRUs, as specified in this announcement, is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

Tier 2 (optional) CRU

You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge.

Based upon availability, CRUs will be shipped for next-business day (NBD) delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, return instructions and a container are shipped with the replacement CRU. You may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

The following parts have been designated as Tier 1 CRUs:

Bezel
Cache
Cache backup battery module
Controller
Disk drive
Filler panel
I/O adapter
I/O cable
I/O transceiver
Power supply unit
Rack kit
Services module

CRU and On-site Service

At IBM's discretion, you will receive specified CRU service, or IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

Service level is:

- 9 hours per day, Monday through Friday, excluding holidays, next business day response. Calls must be received by 5 p.m. local time in order to qualify for next business day response.

International Warranty Service

International Warranty Service (IWS) is available in selected countries or regions.

The warranty service type and the service level provided in the servicing country may be different from that provided in the country in which the machine was purchased.

Under IWS, warranty service will be provided with the prevailing warranty service type and service level available for the IWS-eligible machine type in the servicing country, and the warranty period observed will be that of the country in which the machine was purchased.

To determine the eligibility of your machine and to view a list of countries where service is available, visit

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/brandind=5000008>

For more information on IWS, refer to Services Announcement [601-034](#), dated September 25, 2001.

Warranty service upgrades

During the warranty period, warranty service upgrades provide an enhanced level of On-site Service for an additional charge. Service levels are response-time objectives and are not guaranteed. See the Warranty services section for additional details.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM website. Certain Machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts.

On-site Service

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose. The following on-site response-time objectives are available as warranty service upgrades for your machine. Available offerings are:

- 9 hours per day, Monday through Friday, excluding holidays, 4 hour average, same business day response
- 24 hours per day, 7 days a week, 4 hour average response
- 24 hours per day, 7 days a week, 2 hour average response

Customer Replaceable Units (CRUs) may be provided as part of the machine's standard warranty CRU Service except that you may install a CRU yourself or request IBM installation, at no additional charge, under one of the On-site Service levels specified above. For additional information on the CRU Service, see the warranty information.

Maintenance services

If required, IBM provides repair or exchange service depending on the types of maintenance service specified for the machine. IBM will attempt to resolve your problem over the telephone or electronically, via an IBM website. Certain Machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. You must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, scheduling of service will depend upon the time of your call, machine technology and redundancy, and availability of parts. Service levels are response-time objectives and are not guaranteed. The specified level of maintenance service may not be available in all worldwide locations. Additional charges may apply outside IBM's normal service area. Contact your local IBM representative or your reseller for country and location-specific information. The following service selections are available as maintenance options for your machine type.

On-site Service

IBM will repair the failing machine at your location and verify its operation. You must provide a suitable working area to allow disassembly and reassembly of the IBM machine. The area must be clean, well lit, and suitable for the purpose.

Service levels are:

- 9 hours per day, Monday through Friday, excluding holidays, next business day response
- 9 hours per day, Monday through Friday, excluding holidays, 4 hour average response
- 24 hours per day, 7 days a week, 4 hour average response

- 24 hours per day, 7 days a week, 2 hour average response

Customer Replaceable Unit (CRU) Service

If your problem can be resolved with a CRU (for example, keyboard, mouse, speaker, memory, or hard disk drive), and depending upon the maintenance service offerings in your geography, IBM will ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM upon your request.

Based upon availability, CRUs will be shipped for next business day delivery. IBM specifies, in the materials shipped with a replacement CRU, whether a defective CRU must be returned to IBM. When return is required, 1) return instructions and a container are shipped with the replacement CRU, and 2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

CRUs may be provided as part of the machine's standard maintenance service except that you may install a CRU yourself or request IBM installation, at no additional charge, under any of the On-site Service levels specified above.

Warranty service upgrades

IBM hourly service rate classification

Three

Field-installable features

Yes

Model conversions

No

Machine installation

Customer setup. Customers are responsible for installation according to the instructions IBM provides with the machine.

Graduated program license charges apply

No

Licensed machine code

IBM Machine Code is licensed for use by a customer on the IBM machine for which it was provided by IBM under the terms and conditions of the IBM License Agreement for Machine Code, to enable the machine to function in accordance with its specifications, and only for the capacity authorized by IBM and acquired by the customer. You can obtain the agreement at

http://www.ibm.com/servers/eserver/support/machine_warranties/machine_code.html

IBM may release changes to the Machine Code. IBM plans to make the Machine Code changes available for download from the IBM System Storage technical support website

<http://www.ibm.com/systems/support/storage/>

You may also obtain updated code by contacting your IBM representative.

If the machine does not function as warranted and your problem can be resolved through your application of downloadable Machine Code, you are responsible for downloading and installing these designated Machine Code changes as IBM specifies.

If you would prefer, you may request IBM to install downloadable Machine Code changes; however, you may be charged for that service.

Educational allowance

None

Pricing

Product charges

| SEOs | Description |
|---------|-------------------------------|
| 1746T4D | IBM System Storage DS3524 DC |
| 1746T4E | IBM System Storage EXP3524 DC |

| TMFS | Description |
|------|-------------------------------|
| 2813 | IBM System Storage DS3524 DC |
| 2823 | IBM System Storage EXP3524 DC |

| Description | Machine type | Model number | Feature number | SEO number | Install Type * |
|-------------------------------|--------------|--------------|----------------|------------|----------------|
| IBM System Storage DS3524 DC | 1746 | C4T | 2813 | 1746T4D | Plant |
| IBM System Storage EXP3524 DC | 1746 | E4T | 2823 | 1746T4E | Plant |

The following feature numbers and SEO numbers were previously announced and are shown here only for completeness of the product structure.

2.5-inch Disk Drives:

| | | | | | |
|----------------------------|------|---------|------|---------|------|
| 146GB 15K 2.5-inch HDD | 1746 | C4T,E4T | 5205 | 49Y1841 | Both |
| 300GB 10K 2.5-inch HDD | 1746 | C4T,E4T | 5210 | 49Y1836 | Both |
| 600GB 10K 2.5-inch HDD | 1746 | C4T,E4T | 5220 | 49Y2048 | Both |
| 300GB 10K 2.5-inch SED HDD | 1746 | C4T,E4T | 5250 | 49Y1952 | Both |
| 500GB 7.2K 2.5-inch NL HDD | 1746 | C4T,E4T | 5265 | 49Y1851 | Both |

Host Interface Cards:

| | | | | | |
|-----------------------|------|-----|------|---------|------|
| 6Gb SAS 2 Port Card | 1746 | C4T | 3610 | 68Y8431 | Both |
| 8Gb FC 4 Port Card | 1746 | C4T | 3611 | 68Y8432 | Both |
| 1Gb iSCSI 4 Port Card | 1746 | C4T | 3612 | 68Y8433 | Both |

Hardware Options:

| | | | | | |
|----------------------------|------|-----|------|---------|------|
| 8Gb FC SFP SW Transceivers | 1746 | C4T | 3620 | 69Y2876 | Both |
| 2GB Cache Upgrade | 1746 | C4T | 3630 | 68Y8434 | Both |

Licensed Functions:

| | | | | | |
|----------------------------|------|-----|------|---------|-------|
| 4 to 8 Partition Upgrade | 1746 | C4T | 4300 | 68Y8436 | Both |
| 4 to 16 Partition Upgrade | 1746 | C4T | 4301 | 68Y8437 | Both |
| 4 to 32 Partition Upgrade | 1746 | C4T | 4302 | 68Y8438 | Both |
| 4 to 64 Partition Upgrade | 1746 | C4T | 4304 | 68Y8439 | Both |
| 8 to 16 Partition Upgrade | 1746 | C4T | 4310 | 68Y8441 | Field |
| 8 to 32 Partition Upgrade | 1746 | C4T | 4311 | 68Y8442 | Field |
| 8 to 64 Partition Upgrade | 1746 | C4T | 4312 | 68Y8443 | Field |
| 16 to 32 Partition Upgrade | 1746 | C4T | 4320 | 68Y8445 | Field |
| 16 to 64 Partition Upgrade | 1746 | C4T | 4321 | 68Y8446 | Field |
| 32 to 64 Partition Upgrade | 1746 | C4T | 4330 | 68Y8448 | Field |
| Turbo Performance | 1746 | C4T | 4400 | 69Y2871 | Both |
| Full Disk Encryption (FDE) | 1746 | C4T | 4410 | 68Y8490 | Both |
| FlashCopy: Base | 1746 | C4T | 4420 | 68Y8451 | Both |
| FlashCopy: 8/64 Upgrade | 1746 | C4T | 4421 | 68Y8452 | Both |
| Volume Copy: Base | 1746 | C4T | 4430 | 68Y8453 | Both |
| FlashCopy / Volume Copy | 1746 | C4T | 4440 | 68Y8454 | Both |
| Remote Mirroring: Base | 1746 | C4T | 4450 | 68Y8455 | Both |

Host Kits:

| | | | | | |
|-------------------|------|-----|------|---------|------|
| AIX/VIOS Host Kit | 1746 | C4T | 4700 | 68Y8458 | Both |
|-------------------|------|-----|------|---------|------|

Host and Expansion Unit Attachment Cables:

| | | | | | |
|-------------------------|------|---------|------|---------|------|
| 3m SAS Cable | 1746 | C4T,E4T | 3707 | 39R6531 | Both |
| 1m SAS Cable | 1746 | C4T,E4T | 3708 | 39R6529 | Both |
| 1m Fiber Cable (LC-LC) | 1746 | C4T | 5601 | 39M5696 | Both |
| 5m Fiber Cable (LC-LC) | 1746 | C4T | 5605 | 39M5697 | Both |
| 25m Fiber Cable (LC-LC) | 1746 | C4T | 5625 | 39M5698 | Both |

*** Install type:**

- "Plant" denotes plant installation only.
- "Field" denotes field installation only.
- "Both" denotes both plant and field installation.

Pricing terms

Prices in the following PDF prices link are suggested list prices on day of announcement for the U.S. only. They are provided for your information only. Dealer prices may vary, and prices may also vary by country. IBM list price does not include tax or shipping and is subject to change without notice.

[ENUS-111-013-List_prices_2011_02_15.PDF](#)

ServicePac Offerings

DS3524 Warranty service upgrades

| Machine type-Model (SEO number) | ServicePac® SEO | ServicePac PN | Description |
|------------------------------------|--------------------|------------------|---|
| 1746-C4T (1746T4D) | 88Y8198 | 67567DS | 3 year On-Site Service 9 x 5, 4 hour response |
| 1746-C4T (1746T4D) | 88Y8199 | 67567DT | 3 year On-Site Service 24 x 7, 4 hour response |
| 1746-C4T (1746T4D) | 88Y8200 | 67567DU | 3 year On-Site Service 24 x 7, 2 hour response |
| 1746-C4T (1746T4D) | 88Y8201 | 67567DV | 5 year On-Site Service 24 x 7, 4 hour response |
| 1746-C4T (1746T4D) | 88Y8202 | 67567DW | 5 year On-Site Service 24 x 7, 2 hour response |

EXP3524 Warranty service upgrades

| Machine type-Model (SEO number) | ServicePac SEO | ServicePac PN | Description |
|------------------------------------|-------------------|------------------|---|
| 1746-E4T (1746T4E) | 88Y8224 | 67567F2 | 3 year On-Site Service 9 x 5, 4 hour response |
| 1746-E4T (1746T4E) | 88Y8225 | 67567F3 | 3 year On-Site Service 24 x 7, 4 hour response |
| 1746-E4T (1746T4E) | 88Y8226 | 67567F4 | 3 year On-Site Service 24 x 7, 2 hour response |
| 1746-E4T (1746T4E) | 88Y8227 | 67567F5 | 5 year On-Site Service 24 x 7, 4 hour response |
| 1746-E4T (1746T4E) | 88Y8228 | 67567F6 | 5 year On-Site Service 24 x 7, 2 hour response |

DS3524 Maintenance agreements

| Machine type-Model (SEO number) | ServicePac SEO | ServicePac PN | Description |
|------------------------------------|-------------------|------------------|------------------------|
| 1746-C4T | 88Y8203 | 6756MDR | 1 year On-Site Service |

| | | | |
|-----------------------|---------|---------|---|
| (1746T4D) | | | 9 x 5, NBD response |
| 1746-C4T (1746T4D) | 88Y8204 | 6756MDS | 1 year On-Site Service 9 x 5, 4 hour response |
| 1746-C4T (1746T4D) | 88Y8205 | 6756MDT | 1 year On-Site Service 24 x 7, 4 hour response |
| 1746-C4T (1746T4D) | 88Y8206 | 6756MDU | 1 year On-Site Service 24 x 7, 2 hour response |
| 1746-C4T (1746T4D) | 88Y8207 | 6756MDV | 2 year On-Site Service 9 x 5, NBD response |
| 1746-C4T (1746T4D) | 88Y8208 | 6756MDW | 2 year On-Site Service 9 x 5, 4 hour response |
| 1746-C4T (1746T4D) | 88Y8209 | 6756MDX | 2 year On-Site Service 24 x 7, 4 hour response |
| 1746-C4T (1746T4D) | 88Y8210 | 6756MDY | 2 year On-Site Service 24 x 7, 2 hour response |

EXP3524 Maintenance agreements

| Machine type-Model (SEO number) | ServicePac SEO | ServicePac PN | Description |
|------------------------------------|-------------------|------------------|---|
| 1746-E4T (1746T4E) | 88Y8229 | 6756MF7 | 1 year On-Site Service 9 x 5, NBD response |
| 1746-E4T (1746T4E) | 88Y8230 | 6756MF8 | 1 year On-Site Service 9 x 5, 4 hour response |
| 1746-E4T (1746T4E) | 88Y8231 | 6756MF9 | 1 year On-Site Service 24 x 7, 4 hour response |
| 1746-E4T (1746T4E) | 88Y8232 | 6756MFA | 1 year On-Site Service 24 x 7, 2 hour response |
| 1746-E4T (1746T4E) | 88Y8233 | 6756MFB | 2 year On-Site Service 9 x 5, NBD response |
| 1746-E4T (1746T4E) | 88Y8234 | 6756MFC | 2 year On-Site Service 9 x 5, 4 hour response |
| 1746-E4T (1746T4E) | 88Y8235 | 6756MFD | 2 year On-Site Service 24 x 7, 4 hour response |
| 1746-E4T (1746T4E) | 88Y8236 | 6756MFF | 2 year On-Site Service 24 x 7, 2 hour response |

These ServicePac offerings are valid for models announced in the United States. To determine the applicable US Services for a specific product (including the most recent product announcements), refer to the ServicePac Product Selector Tool at

http://www-935.ibm.com/services/us/its/html/servicepac_americas.html

ServicePac prices

For ServiceElect (ESA) maintenance service charges, contact IBM Global Services at 888-IBM-4343 (426-4343).

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