

IBM System Storage TS3500 Tape Library



The IBM System Storage TS3500 Tape Library (TS3500 tape library) is designed to provide a highly scalable, automated tape library for mainframe and open systems backup and archive in midrange to enterprise environments.

The TS3500 tape library supports System z via the IBM 3953 Tape System (3953 tape system). The 3953 tape system enables System z hosts to access the TS3500 tape library cartridge inventory and allows connection to TS1120 and 3592 J1A tape drives. The TS3500 tape library can support up to four 3953 tape systems, allowing for up to eight IBM Virtualization Engine TS7700 sub-systems per physical library.

High availability and Capacity on Demand
The TS3500 tape library can also be ordered with a dual accessor model option to help increase the mount performance and overall system reliability and availability. The TS3500 Model HA1 allows two robotic accessors to operate simultaneously in two to 16 frame configurations.

Highlights

- ***Designed for IBM System z™, IBM Virtualization Engine™ TS7700 and open systems environments***
- ***Utilizes the IBM System Storage™ TS1120 Tape Drive and IBM TotalStorage® 3592 Tape Drive Model J1A for System z, TS7700 Virtualization Engine and open systems environments***
- ***Utilizes the IBM System Storage TS1040 Tape Drive, using LTO™ Ultrium® 4 technology for increased capacity, throughput, fast access performance and WORM (Write Once Read Many) data cartridges in open systems environments***
- ***Optional dual library accessor, with the IBM System Storage TS3500 Model HA1, designed to increase library performance, availability and reliability***
- ***Supports TS1120 and TS1040 tape drive encryption for data protection***

The TS3500 tape library's entry base frame provides a more flexible upgrade path for users who want to expand their tape storage at time of need. Capacity on Demand configurations for the TS3500 tape library L-frame models include the "entry" level configuration, an "intermediate" configuration and a "full" capacity configuration.

Advanced features

The L23 and D23 frames support the TS1120 or 3592 J1A tape drives. The L53 and D53 frames support TS1040 tape drives. TS3500 tape library models continue to lead the industry in tape drive integration with features such as persistent World Wide Name, multipath architecture, drive/media exception reporting, remote drive/media management, and host-based path failover. Both L-Frame models support improved cartridge handling, hot-swap drive packaging, and a second optional 16-slot Input/Output (I/O) station. The TS3500 Model D23 and D53 frames can be attached to existing model L22 or D52 frames. Mixed media is supported by combining LTO Ultrium Tape Drives and the TS1120 or 3592 J1A

tape drives within the TS3500 library frame by frame. The TS1040 tape drive is a native switched fabric 4 Gbps Fibre Channel tape drive. It is installed in the TS3500 models L53 and D53 and supports and offers investment protection with LTO Ultrium technology.

The TS3500 tape library is designed to provide the flexibility required to help address the system capacity and performance requirements of the most demanding applications by accommodating up to 192 drives in up to sixteen TS3500 tape library frames. The TS3500 tape library is designed with a variety of advanced features. The TS3500 tape library architecture is designed to allow simultaneous attachment of servers and applications to logical library partitions. Remote management using a Web browser provides library control and configuration. Simple Network Management Protocol (SNMP) query and trap functionality is also included. Redundant control paths, gripper, power supplies, and AC feeds offer enhanced availability. Control path and data path automatic failover capabilities further enhance the autonomic capabilities of the TS3500 tape library.

The Advanced Library Management System (ALMS) is available as a feature. ALMS supports dynamic storage management, allowing the user to dynamically create and change logical libraries and configure any drive into any logical library. ALMS is required when attaching to mainframe environments. Based on capacity requirements, ALMS can be implemented as an "entry," "intermediate" or "full" Capacity on Demand level in the TS3500 tape library.

The TS1120 and 3592J1A tape drives used in the L23 and D23 frames are designed for automation and use a tape cartridge with a form factor similar to the IBM 3590 tape cartridge. The TS1120 tape drive has a dual-ported 4 Gbps Fibre Channel interface and has a native data rate of 104 Mbps. With the use of IBM 3592 extended capacity cartridges, the TS1120 tape drive has a native cartridge capacity of up to 700GB (2.1TB with 3:1 compression). The 3592 J1A has a dual-ported 2 Gbps fibre channel interface and has a native data rate of up to 40 Mbps and 300GB native cartridge physical capacity.

Encryption support

To keep information confidential if backup tapes are lost or stolen, the TS3500 tape library supports TS1120 and TS1040 tape drive encryption. The TS1120 and TS1040 tape drives include data encryption capabilities within the drives, helping to avoid the need for host-based encryption of data—and the concurrent drain on host performance—or the use of specialized encryption appliances. This capability is intended to provide customers with greater ability to protect information if tape cartridges are lost or stolen by supporting the storage of the data in an encrypted form.

The IBM Encryption Key Manager component for the Java™ platform can help generate and manage encryption keys for TS1120 and TS1040 tape drives

across the enterprise. This feature uses standard key repositories and supports three different encryption key management methods: application managed, system managed, or library managed.

WORM cartridge support for TS1120, 3592 and LTO Generation 4 drives

The TS1120 and 3592 J1A tape drives also include support for the IBM 3592 JW/JR WORM (Write Once Read Many) cartridges. The TS1120 tape drive supports IBM 3592 JX Extended WORM cartridges that feature 700GB native capacity.

The IBM LTO Ultrium 4 800GB cartridges (standard and Write Once Read Many (WORM)) and native 4 Gbps Fibre Channel TS1040 tape drive designed to provide up to double the tape cartridge capacity and a 50% improvement in tape drive performance over the third

generation LTO Ultrium drives. The fourth generation LTO Ultrium is designed to support up to 120 Mbps native data-transfer rates. The TS1040 tape drive can read and write IBM LTO Ultrium 3 cartridges and read LTO Ultrium 2 cartridges at original capacities with improved performance. The TS1040 tape drive and cartridges (standard or WORM) can be resident in the same TS3500 tape library frame with LTO Ultrium 3 and 2 tape drives and cartridges.

Software support

You can increase the power of the TS3500 tape library by integrating it with industry-leading storage management solutions such as IBM Tivoli® Storage Manager and a wide array of other storage software.

TS3500 Tape Library at a glance

Characteristics

Frame definition	L23 - base frame for TS1120 or 3592, D23 - expansion frame for TS1120 or 3592 L53 - base frame for LTO, D53 - expansion frame for LTO HA1 - High Availability service bay frame for use with the dual accessor feature
Tape drive types	TS1120 or 3592 tape drives or IBM LTO Ultrium 4, 3, or 2 Tape Drives
Number of frames	One base frame, and up to 15 expansion frames The TS3500 Model HA1 installation, provides two additional Dxx frames, required as service bays
Number of drives	Up to 12 per frame (up to 192 per library)
Number of tape cartridges	L23 "Entry" - 58; L23 "Intermediate" - 117; L23 "Full" - 199 to 260; D23 - 360 to 400; Total: Up to 6,260 L53 "Entry" - 64; L53 "Intermediate" - 129; L53 "Full" - 219 to 287; D53 - 396 to 440; Total: Up to 6,887
Number of Input/Output slots	Up to 224 (16 I/O slots standard)
Number of logical libraries	Maximum of 192 (up to number of drives installed)
Number of 3953 Systems	Maximum of four per TS3500 subsystem
Number of TS7700 Virtualization Engine	Maximum of eight per TS3500 subsystem
Capacity ¹	IBM Ultrium 4 Cartridges: 52TB to 5.5PB (102TB to 11PB with 2:1 compression) 3592 cartridges: 29TB to 3.13PB (87TB to 9.39PB with 3:1 compression) 3592 extended capacity cartridges: 40.6TB to 4.38PB (121.8TB to 13.14PB with 3:1 compression)
Media type	L23/D23: IBM 3592 JA/JJ/JB and JW/JR/JX Write Once Read Many (WORM) cartridges L53/D53: IBM LTO Ultrium 4, 3, 2 Cartridges
Dimensions (all frames)	70.9"H x 30.8"W x 47.7"D (1800 mm x 782 mm x 1212 mm)
Max. weight	L23 - 1079 lb (490 kg); D23 - 994 lb (451 kg) L53 - 1061 lb (481kg); D53 - 970 lb (440 kg)
Warranty	One Year; IBM On-site Repair (IOR)

Operating environment

Temperature	16° to 32° C (61° to 90° F)
Relative humidity	20% to 80% (non-condensing)
Wet bulb maximum	23.0° C (73.4° F)
Electrical power	8.0 amps at 200-240 VAC; 1.6 kVA

Attachment and systems support

The TS3500 tape library can attach to IBM System p™, System i™, and System x™ servers and non-IBM servers, workstations

Operating systems support

Device driver support is available for IBM AIX®; IBM OS/400®; IBM i5/OS®; Windows® 2000; Windows Server™ 2003; Linux®; Sun Solaris; and HP-UX.

3953 Tape System at a glance

Characteristics

Frame	3953 Model F05 + feature code 5505—base frame for the 3953 tape system, consisting of the mechanical frame, power and cabling infrastructure to support the library manager(s) and a single TS1120 tape controller Up to 5 additional F05s can be configured as expansion frames, each capable of supporting up to 3 TS1120 tape controllers
Library Manager	3953 Model L05 – single library manager. Maximum of 2 (redundancy only) per 3953 tape system
Number of frames	Six total: One base frame, and up to 5 expansion frames
TSSC	One per 3953 tape system
TS7700 Virtualization Engine support	Maximum of two TS7700s per 3953 tape system, maximum of eight per TS3500 tape library
TS1120 Tape Controller support	Maximum of 14 with two TS7700s, up to 16 with 0 TS7700s
TSSC capability	Yes, required
Dimensions (all frames)	71"H x 43.4"W x 25.4"D (1804 mm x 1102 mm x 644 mm)
Weight	3953 Model F05 – 620.4 lb (282 kg)
Warranty	One Year; IBM On-site Repair (IOR)

Operating environment

Temperature	16° to 32° C (61° to 90° F)
Relative humidity	20% to 80% (non-condensing)
Wet bulb maximum	23.0° C (73.4° F)
Electrical power	8.0 amps at 200-240 VAC; 1.5 kVA

Attachment and systems support

The 3953 tape system enables the TS1120 and 3592 J1A tape drives within the TS3500 tape library to attach to System z hosts or the TS7700 Virtualization Engine

Operating systems support

IBM z/OS®

For more information

Contact your IBM representative or
IBM Business Partner or visit

ibm.com/storage/tape



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.

THE INFORMATION IN THIS DOCUMENT IS PROVIDED "AS-IS" WITHOUT ANY WARRANTY, EITHER EXPRESSED OR IMPLIED. IBM EXPRESSLY DISCLAIMS ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NONINFRINGEMENT. IBM products are warranted according to the terms and conditions of the agreements (e.g., IBM Customer Agreement, Statement of Limited Warranty, International Program License Agreement, etc.) under which they are provided.

References in this document to IBM products, programs or services does not imply that IBM intends to make such products, programs or services available in all countries in which IBM operates or does business. Any reference to an IBM program or product in this document is not intended to state or imply that only that program may be used. Any functionally equivalent program or product that does not infringe IBM's intellectual property rights may be used instead. It is the user's responsibility to evaluate and verify the operation of any non-IBM product, program or service.

IBM's customer is responsible for ensuring its own compliance with legal requirements. It is the customer's sole responsibility to obtain advice of competent legal counsel as to the identification and interpretation of any relevant laws and regulatory requirements that may affect the customer's business and any actions the customer may need to take to comply with such laws. IBM does not provide legal advice or represent or warrant that its services or products will ensure that the customer is in compliance with any law.

¹ Capacity depends on drives installed, number and type of cartridges used, and compression ratio achieved. Listed capacity is physical. Usable capacity may be less.

© International Business Machines Corporation 2007

IBM Systems and Technology Group
Route 100
Somers, New York 10589

Produced in the United States
April 2007
All Rights Reserved

IBM, AIX, i5/OS, OS/400, System i, System p, System Storage, System z, System x, TotalStorage, Tivoli, Virtualization Engine and z/OS are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries or both.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc., in the United States, other countries or both.

Linear Tape-Open, LTO, the LTO logo, Ultrium, and the Ultrium logo are U.S. trademarks of HP and IBM.

Linux is a registered trademark of Linus Torvalds in the United States, other countries or both.

Microsoft, Windows, Windows Server, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries or both.

Other company, product and service names may be trademarks or service marks of others.

This document could include technical inaccuracies or typographical errors. IBM may make changes, improvements or alterations to the products, programs and services described in this document, including termination of such products, programs and services, at any time and without notice. Any statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only. The information contained in this document is current as of the initial date of publication only and is subject to change without notice. IBM shall have no responsibility to update such information.

IBM is not responsible for the performance or interoperability of any non-IBM products discussed herein. Performance data for IBM and non-IBM products and services contained in this document was derived under specific operating and environmental conditions. The actual results obtained by any party implementing such products or services will depend on a large number of factors specific to such party's operating environment and may vary significantly. IBM makes no representation that these results can be expected or obtained in any implementation of any such products or services.