The TS3500 Tape Library combines IBM® tape and automation reliability at open systems prices. The new models expand capacity and function and are designed to provide support for:

- New Models S54 and S24 integrated with installed TS3500 or 3584 libraries, which incorporate IBM's patented high-density (HD) slot technology, allowing multiple cartridges to be stored in a tiered architecture
- Additional capacity for Models S54 and S24 with the HD Capacity on Demand feature that provides a license key to non-disruptively increase capacity in the library
- New LED lighting in Models S24 and S54 frames
- New enhanced gripper assemblies

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

New models of the IBM System Storage™ TS3500 Tape Library, Models S54 and S24 (machine type 3584) are designed to provide substantially higher capacity and higher density, while helping to protect the investment of existing IBM System Storage TS3500 Tape Library installations. The TS3500 Tape Library is designed to be a highly scalable, automated tape library combining IBM automation technology for midrange to enterprise open systems environments.

The TS3500 Tape Library Models S54 and S24 are driveless, storage-only expansion frames, with Model S54 designed to contain up to 1,320 Ultrium (LTO) tape cartridges and Model S24 designed to contain up to 1,000 3592 tape cartridges. Model S54 offers a 3:1 increase in slot capacity over the Model D53 and Model S24 a 2.5:1 increase in slot capacity over the Model D23.

The TS3500 Model S54 can be attached to installed Model D32, D52, D53, L32, L52, and L53 with IBM TS1040 or LTO Ultrium Tape Drives. The TS3500 Model S24 can be attached to Model D22, D23, L22, and L23 with Enterprise or 3592 Tape Drives.

The TS3500 Models S24 and S54 incorporate IBM's patented high-density (HD) slot technology, which allows multiple cartridges to be stored in a tiered architecture. The depth of a cartridge location in a high-density slot is known as a tier. (Previous model frames support only one cartridge per storage slot.) High-density slots are designed to contain multiple cartridges in Tiers 1 through 4 (Model S24) or Tiers 1 through 5 (Model S54).

The new TS3500 Tape Library frames support high-density Capacity on Demand (CoD) features (#1645 or #1646) that provide a license key to non-disruptively increase licensed capacity in the library. These advancements reduce automation floor space requirements, enhance library management, and provide flexibility, growth, and a foundation for automation across an enterprise or business installation.

Product preview

IBM intends to support greater than 6,887 cartridge slots in IBM TS3500 Tape Libraries which include the new Models S54 and S24.

Previews provide insight into IBM plans and direction. Specific availability dates, ordering information, and terms and conditions will be provided when the product functionality is announced.

Feature exchange

Not applicable

Key prerequisites

Appropriate levels of host software are required to attach the TS3500 Tape Library with the LTO Ultrium and Enterprise Tape Drives to selected IBM System i™, IBM System p™, IBM System z™, IBM System x™, and other servers running HP-UX, Linux®, Sun Solaris SPARC, and Microsoft® Windows® operating systems. Refer to the Software requirements section for details.

Planned availability dates

- November 7, 2008: All features except 2304 and 2305
- December 5, 2008: Features numbers 2304 and 2305
- February 20, 2009: Model conversions from:
  - 3584 Model S24 to 3584 Model S54
  - 3584 Model S54 to 3584 Model S24
Description

The TS3500 Tape Library (machine type 3584) is part of the family of tape library storage solutions designed for the large, unattended storage requirements in today's midrange to high-end systems. Each aspect of the subsystem is designed to optimize access to data and reliability. The TS3500 Tape Library supports the IBM System Storage LTO Ultrium and Enterprise Tape Drives.

The TS3500 Tape Library now includes support for the new high-density (HD) expansion frames, Models S54 and S24, which are compatible with current TS3500 library frames. Models S54 and S24, are driveless, storage-only expansion frames, with Model S54 designed to contain up to 1,320 Ultrium (LTO) tape cartridges and Model S24 designed to contain up to 1,000 3592 tape cartridges. Model S54 offers a 3:1 increase in slot capacity over the Model D53 and Model S24 a 2.5:1 increase in slot capacity over the Model D23.

The TS3500 Tape Library Model S54 can be attached to installed Model D32, D52, D53, L32, L52, and L53 with IBM TS1040 or LTO Ultrium Tape Drives. Model S24 can be attached to Model D22, D23, L22, and L23 with TS1130 or 3592 Tape Drives.

The TS3500 Models S24 and S54 also incorporate IBM's patented HD slot technology, which allow multiple cartridges to be stored in a tiered architecture. The depth of a cartridge location in a high-density slot is known as a tier. (Previous model frames support only one cartridge per storage slot.) High-density slots are designed to contain multiple cartridges in Tiers 1 through 4 (Model S24) or Tiers 1 through 5 (Model S54).

The TS3500 Tape Library is designed to provide an excellent network data backup/archive solution. With the granularity and scalability to follow your requirements from a few servers to hundreds of clients, from gigabytes to petabytes, this powerful pairing can grow with you, helping to protect your investment.

Model S24

The TS3500 Tape Library Model S24 is a high-density, storage-only expansion frame that can contain up to 1,000 3592 tape cartridges, compared to 400 3592 cartridges in the Model D23. The base capacity for a Model S24 frame consists of up to 600 storage slots available in Tiers 0, 1, and 2. In order to use the additional high-density capacity of up to 400 storage slots in Tiers 3 and 4, the Capacity on Demand (CoD) feature #1645 for Model S24 is required. Advanced Library Management System (ALMS) and an enhanced gripper assembly are required for any library with a Model S24 frame.

Model S54

The TS3500 Tape Library Model S54 is a high-density, storage-only expansion frame that can contain up to 1,320 LTO Ultrium cartridges, compared to 440 LTO cartridges in the Model D53. The base capacity for a Model S54 frame consists of up to 660 storage slots available in Tiers 0, 1, and 2. In order to use the additional high-density capacity of up to 660 storage slots in Tiers 3, 4, and 5, the CoD feature #1646 for Model S54. ALMS and an enhanced gripper assembly are required for any library with a Model S54 frame.

TS3500 Tape Library means high performance

The IBM TS1040 LTO Ultrium Tape Drives and TS1130 Tape Drives are designed for high performance in a streaming mode of operation. Automatic data caching, using an expanded cache memory and read/write buffering, helps enhance performance even further. The TS3500 Tape Library is designed for high data transfer performance.

Cartridge move time within the TS3500 Tape Library can be as short as 3.0 seconds or less in a single-frame library. The dual-gripper accessor is designed to retrieve the next cartridge to be mounted, unload the current cartridge, and load the next cartridge, helping provide the following potential benefits as compared to a single gripper:

• Save complete move operations
• Improve overall library performance
Increase redundancy and reliability

**TS3500 Tape Library defines high reliability**

Leading-edge technology designed to position the TS1130 Tape Drives and TS1040 LTO Ultrium Tape Drives among the tape technology. Highly accurate recording is supported by an exclusive thin-film write module designed by IBM with read-after-write data verification. Data read is managed by IBM’s Magneto Resistive (MR) heads, designed for accuracy, high reliability, and durability. The TS3500 drives and library robotics are TapeAlert-compatible, and are designed to provide tape drive and library error and diagnostic reporting. Drive cleaning is an automatic function that can be performed by the library when required by the drive, without requiring operator intervention.

**Advanced Library Management System (ALMS)**

ALMS is the next generation of patented IBM Multi-Path Architecture. ALMS provides a license key to enable dynamic management of cartridges, cartridge storage slots, tape drives, and logical libraries. Tape drives can be assigned to any logical library using a Web user interface. It is designed to allow logical libraries to be added, deleted, or easily changed non-disruptively. In addition, storage capacity can be added while avoiding impact to host applications in many instances.

ALMS is designed to avoid outages when adding capacity on demand (COD) storage, adding or removing logical libraries, or when changing logical library storage allocation. The use of ALMS may also help reduce outages when adding expansion frames, adding or removing tape drives, or changing logical drive allocation.

**TS1130 Tape Drive, Model E06**

The new TS1130 Tape Drive, Model E06 (machine type 3592) is designed for automation and uses a tape cartridge with a form factor similar to the 3590 tape cartridges, which allows it to be used in the TS3500 Tape Library. The TS1130 Tape Drive is designed to provide higher levels of performance, reliability, and cartridge capacity than the TS1120 Model E05 Tape Drive. The TS1130 has a high-technology Giant Magneto Resistive (GMR) head design and provides a native data rate performance of up to 160 MB/sec versus the 100 MB/sec data rate of the TS1120 Tape Drive Model E05. The TS1130 E06 Tape Drive has a dual-port 4-Gbps Fibre Channel interface for Fibre Channel attachment to host systems or a switched fabric environment.

With the use of the IBM 3592 Extended Data cartridge (JB), the TS1130 Model E06 can format a cartridge uncompressed up to 1 TB (3 TB with 3:1 compression).

The TS1130 Model E06 is designed to support capacity scaling of an individual tape cartridge to 20% of maximum capacity (128 GB for standard tape cartridges or 200 GB for extended tape cartridges). Capacity scaling lets the utilized length of tape to be logically shortened, allowing improved data access times in trade off for reduced capacity. The tapes can subsequently be scaled back to full capacity as needed. For details on the TS1130 (3592) Tape Drive, refer to Hardware Announcement 108-493, dated July 15, 2008.

**TS1040 Tape Drive, Model F4A**

The IBM System Storage TS1040 Tape Drive, Model F4A (machine type 3588) provides integration of IBM LTO Ultrium 4 Tape Drives in the TS3500 Tape Library and offers enhancements in performance, capacity, and reliability over today's IBM Ultrium 3 Tape Drives. The tape cartridge capacity of the IBM LTO Ultrium 4 800 GB Data Cartridge has doubled over the IBM LTO Ultrium 3 400 GB Data Cartridge to 800 GB native physical capacity (1,600 GB with 2:1 compression). Ultrium 4 Tape Drives can read and write LTO Ultrium 3 Data Cartridges and read LTO Ultrium 2 Data Cartridges.

The TS1040 Tape Drives and LTO Ultrium 4 data cartridges are supported in TS3500 Models L32, L52, L53, D32, D52, and D53 frames. In addition, the Ultrium 4 Tape Drive is designed to provide:

- Ability to configure Ultrium 2, Ultrium 3, and Ultrium 4 tape drives in the same frame and/or the same logical library
• Ability to distinguish between Ultrium 2, Ultrium 3, and Ultrium 4 Tape Drives on all user interfaces (using inquiry data), on the front of the drive, and at the rear of the drive canister
• Ability to maintain the Ultrium 4 drive serial number during a FRU replacement in the same manner that the TS1130 or 3592 drive serial number is maintained
• A larger 256 MB internal drive buffer

For details on the TS1040 Tape Drive, Model F4A, machine type 3588, refer to Hardware Announcement 107-203, dated April 24, 2007.

WORM media support

The IBM 3589 Ultrium 4 800 GB WORM Tape Cartridges are designed for applications such as archiving and data retention, as well as those applications requiring an audit trail. These cartridges work with the LTO Ultrium 4 Tape Drive to help prevent the alteration or deletion of user data. IBM Ultrium 4 800 GB WORM Data Cartridges can be ordered as unique 3589 models with the following features:

• Pre-labeling, with the ability to specify a starting volume serial and color-coding
• Packaging in individual jewel cases or in bulk
• Cartridge memory, built into every cartridge helps to enhance functionality and media reliability by storing access history and media performance information for use by the tape drive every time the cartridge is accessed
• Half-inch particle tape with a 800 GB WORM native capacity in a single cartridge

Encryption

The IBM System Storage TS1130 (3592) Tape Drive and the IBM System Storage TS1040 (3588 F4A) Tape Drive support encryption of data on a tape cartridge. Three encryption management methods are supported: Application, System, or Library Managed. Encryption capability is supported when the TS1040 or TS1130 Tape Drive is integrated or attaches to IBM supported tape libraries, subsystems, or controllers. All 3592 and Ultrium 4 media, including WORM cartridges, can be encrypted.

Additional TS3500 Tape Library enhancements

Along with integration of Models S54 and S24, the TS3500 Tape Library also supports the following enhancements. (These enhancements were announced in U.S. Hardware Announcement 108-494, dated July 15, 2008, or the announcement letter specific to your geography.)

• IPv6, designed to allow the Internet to grow steadily in the number of hosts connected and the amount of data transmitted. The TS3500 supports addresses in IPv4 and IPv6 formats.
• Secure Socket Layer (SSL) functionality, a communication protocol for transmitting documents through the Internet and supported on the TS3500.
• Embedded Storage Management Initiative-Specification (SMI-S), which allows a SAN environment management software, such as IBM TotalStorage® Productivity Center (TPC), to communicate directly with the TS3500. This simplifies the management infrastructure by removing the need for a separate SMI-S Agent for Tape software.
• IBM Tape System Reporter (TSR), a Windows-based GUI software application that collects information from multiple TS3500 tape libraries (ALMS must be enabled) and aggregates the data in a centralized database. TSR provides the ability to generate SQL queries or custom reports on the usage and performance of the tape drives and cartridges of the tape library.


Accessibility by people with disabilities

A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be requested at

Section 508 of the U.S. Rehabilitation Act

The IBM System Storage TS3500 Tape Library is capable, when used in accordance with IBM's associated documentation, of satisfying the applicable requirements of Section 508 of the Rehabilitation Act, provided that any assistive technology used with the product properly interoperates with it. A U.S. Section 508 Voluntary Product Accessibility Template (VPAT) can be requested at


Product positioning

As you compare competitive tape solutions, consider:

- Library scalability: 1 to 16 frames, 1 to 192 tape drives, 58 to 6,887 cartridge slots
- Capacity, performance, and library management requirements
- Data integrity, reliability, and availability
- Storage usage and application requirements
- Affordability
- Loyalty to legacy or existing tape formats, including LTO and 3592 drive technology
- Server attachment and operating system support

The TS3500 Tape Library and related software applications excel in addressing these requirements and can constitute a functionally rich tape storage solution incorporating LTO Ultrium and 3592 tape technology. You also gain flexibility of automated tape library management and unattended save and restore operations.

The TS3500 Tape Library models are a smart choice for tape automation for IBM System p, IBM System i, IBM System z, IBM System x, and other open system servers. The TS3500 Tape Library utilizes the patented Multi-Path Architecture, designed to allow homogeneous or heterogeneous open systems applications to share the library robotics, with Advanced Library Management System (ALMS) for storage slot pooling and flexible drive assignment.

The TS3500 Tape Library Base Frame Model L53 offers 64 to 287 slots for LTO Ultrium tape cartridge media and up to 12 IBM LTO Ultrium Fibre Channel Tape Drives. It is designed to provide excellent price and performance in the open systems environments where the tape automation requirements are satisfied by 1 to 12 drives or a library native capacity of up to 229 TB.

The TS3500 Tape Library Base Frame Model L23 offers 58 to 260 slots for 3592 tape cartridge media and up to 12 IBM TS1130 or TS1120 Tape Drives, with a library native capacity of up to 260 TB. The TS1130 and TS1120 Tape Drives are designed to provide high capacity, performance, and reliability in open systems environments with tape drive flexibility to accommodate capacity, as well as fast access where these requirements are needed.

Up to 15 TS3500 Tape Library Expansion Frame Models D22, D23, S24, D32, D52, D53 or S54 can be added as active frames to either Model L22, L23, L32, L52, or L53. The Model D23 provides up to 400 cartridge slots for 3592 media and can contain up to 12 TS1130 or TS1120 Tape Drives. The Model D53 provides up to 440 slots for LTO media, and can contain up to 12 Ultrium Fibre Channel Tape Drives.

The Model S24 high-density frame provides storage for up to 1,000 3592 cartridges, while the Model S54 high-density frame provides storage for up to 1,320 LTO cartridges. This can provide a total TS3500 library capacity of up to 192 IBM LTO Ultrium, TS1130 or TS1120 Tape Drives, and support for up to 6,887 Ultrium cartridge slots holding up to 5.5 PB of native physical capacity, or support for up to 6,260 3592 cartridge slots holding up to 6.2 PB of native physical capacity.

The TS3500, part of a family of IBM System Storage tape products, can be the answer to growing storage requirements and shrinking backup windows. If you require high-performance automated tape backup, the TS3500 Tape Library constitutes an excellent tape storage solution.
<table>
<thead>
<tr>
<th>Description</th>
<th>Machine type</th>
<th>Model</th>
<th>Feature number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS3500 HD Frames for Enterprise Drives</td>
<td>3584</td>
<td>S24</td>
<td></td>
</tr>
<tr>
<td>TS3500 HD Frames for LTO Drives</td>
<td>3584</td>
<td>S54</td>
<td></td>
</tr>
<tr>
<td>Service Bay B Config w/Accessors</td>
<td>3584</td>
<td>S24,S54</td>
<td>1440&lt;sup&gt;1&lt;/sup&gt;</td>
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<tr>
<td>Add D22/D52/D23/D53/S24/S54 to X32</td>
<td>3584</td>
<td>S24,S54</td>
<td>1610&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Add D32 to X22/X52/X23/X53/S24/S54</td>
<td>3584</td>
<td>D32</td>
<td>1620&lt;sup&gt;3&lt;/sup&gt;</td>
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<tr>
<td>HD COD for S24</td>
<td>3584</td>
<td>S24</td>
<td>1645</td>
</tr>
<tr>
<td>HD COD for S54</td>
<td>3584</td>
<td>S54</td>
<td>1646</td>
</tr>
<tr>
<td>LTO Test Hardware for HD</td>
<td>3584</td>
<td>HA1</td>
<td>1695</td>
</tr>
<tr>
<td>3592 Test Hardware for HD</td>
<td>3584</td>
<td>HA1</td>
<td>1696</td>
</tr>
<tr>
<td>Enhanced Node Cards</td>
<td>3584</td>
<td>L22,L32</td>
<td>1700</td>
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<tr>
<td>Enhanced Node Card</td>
<td>3584</td>
<td>D22,D32</td>
<td>1701</td>
</tr>
<tr>
<td>Enhanced Grippers/Pivot</td>
<td>3584</td>
<td>L22,L23</td>
<td>2205</td>
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<td>Enh. Grippers/Pivot for HA</td>
<td>3584</td>
<td>D22,D52</td>
<td>2206</td>
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<tr>
<td>Enhanced Accessor</td>
<td>3584</td>
<td>L22,L23</td>
<td>2304</td>
</tr>
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<td>Enhanced Accessor for HA</td>
<td>3584</td>
<td>D22,D52</td>
<td>2305</td>
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<tr>
<td>High Density Library</td>
<td>3584</td>
<td>L22,L23</td>
<td>9050</td>
</tr>
<tr>
<td>Enhanced Grippers/Pivot</td>
<td>3584</td>
<td>L23,L53</td>
<td>9205</td>
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<td>Enh. Grippers/Pivot for HA</td>
<td>3584</td>
<td>D23,D53</td>
<td>9206</td>
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</tbody>
</table>

<sup>1</sup>This feature has been previously announced on other models.

<sup>2</sup>This feature has been previously announced on other models, but the description has changed.

<sup>3</sup>This feature was previously announced on the designated model, but the description has changed.
Model conversions

<table>
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<th>To Model</th>
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<tbody>
<tr>
<td>3584-S24</td>
<td>3584-S54</td>
</tr>
<tr>
<td>3584-S54</td>
<td>3584-S24</td>
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Feature conversions

<table>
<thead>
<tr>
<th>From Type</th>
<th>Feature</th>
<th>To Feature</th>
<th>Conversion Requirements</th>
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<tbody>
<tr>
<td>3584</td>
<td>1645</td>
<td>1646</td>
<td>Model conversion of S24 to S54</td>
</tr>
<tr>
<td>3584</td>
<td>1646</td>
<td>1645</td>
<td>Model conversion of S54 to S24</td>
</tr>
</tbody>
</table>

Business Partner information

If you are a Direct Reseller - System Reseller acquiring products from IBM, you may link directly to Business Partner information for this announcement. A PartnerWorld® ID and password are required (use IBM ID).


Publications

The following publications are shipped with the product. Additional copies are available. To order, contact your IBM representative.

<table>
<thead>
<tr>
<th>Title</th>
<th>Part number</th>
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<tr>
<td>IBM System Storage TS3500 Maintenance Information: IBM 3584 Tape Library</td>
<td>45E2871</td>
</tr>
<tr>
<td>IBM System Storage TS3500 3584 Product Information CD</td>
<td>45E2872</td>
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</table>

The following publications will be available at

http://www-03.ibm.com/systems/storage

<table>
<thead>
<tr>
<th>Title</th>
<th>Order number</th>
</tr>
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<tbody>
<tr>
<td>IBM System Storage TS3500 Tape Library with ALMS: Introduction and Planning Guide</td>
<td>GA32-0593</td>
</tr>
<tr>
<td>IBM System Storage TS3500 Tape Library with ALMS: Operator's Guide</td>
<td>GA32-0594</td>
</tr>
</tbody>
</table>

The following device driver publication is also available at

The IBM Systems Information Center provides you with a single information center where you can access product documentation for IBM systems hardware, operating systems, and server software. Through a consistent framework, you can efficiently find information and personalize your access. The IBM Systems Information Center is at


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For details on education offerings related to specific products, visit


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

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http://www.ibm.com/servers/eserver/xseries/services.html

### Technical information

#### Specified operating environment

**Physical specifications**

- Width: 782 mm (30.8 in)
- Depth: 1212 mm (47.7 in)
- Height: 1800 mm (70.9 in)

Approximate weights are as follows:

- **Model S24:**
  - Minimum weight: 285.7 kg (630 lb) (with 0 cartridges)
  - Maximum weight: 526.2 kg (1,160 lb) (with 1,000 cartridges)

- **Model S54:**
  - Minimum weight: 290.3 kg (640 lbs) (with 0 cartridges)
  - Maximum weight: 562.5 kg (1,240 lbs) (with 1,320 cartridges)

**Operating environment**

- Temperature: 15° to 32° C (59° to 90° F)
- Maximum Dew Point: 17° C (63° F) operating
- Wet bulb (temperature): 26° C (79° F) operating
- Relative humidity: 20% to 80%
- Caloric value: 0 kBTU/hour maximum
- Electrical power: 0 amps at 200 V ac
- Capacity of exhaust: 0 cubic meter/min

**Hardware requirements**

The TS3500 Tape Library can be attached to selected IBM Power Systems, IBM System i, IBM System p, IBM System x, and other servers running AIX®, HP-UX, Linux, Sun Solaris SPARC, and Microsoft Windows servers that support Fibre Channel interfaces.

The TS3500 Tape Library family includes enhanced power architecture models that take less floor space than Model D32 or L32. The models include raven black covers, and have a look and feel consistent with other IBM System Storage products.

Up to 15 TS3500 Tape Library Expansion Frame Models D22, D23, S24, D32, D52, D53, or S54 can be added as active frames to either Model L22, L23, L32, L52, or L53. Model S24 is designed to provide up to 1,000 cartridge slots for 3592 media, while Model D23 provides up to 400 cartridge slots for 3592 media. Model S54 is designed to provide up to 1,320 cartridge slots for LTO media, while Model D53 provides up to 440 cartridge slots LTO media.

The limit of 15 total active expansion frames is reduced as follows:

<table>
<thead>
<tr>
<th>Active S24 frames</th>
<th>Active S54 frames</th>
<th>Limit of total active expansion frames</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>13 (reduce by 2)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>12 (reduce by 3)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>10 (reduce by 5)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>11 (reduce by 4)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>9 (reduce by 6)</td>
</tr>
</tbody>
</table>
Model D53 and L53 can contain up to 12 IBM TS1040 or LTO Ultrium Fibre Channel Tape Drives per frame. Model D23 and L23 can contain up to 12 of the TS1130 or 3592 Tape Drives per frame. The TS1130 Model E06 Tape Drives have a 4-Gbps dual-ported Fibre Channel interface.

The cartridge storage capacity of the TS3500 can be expanded with the high-density Capacity on Demand (CoD) features #1645 for Model S24 or #1646 for Model S54 for licensing additional library capacity or by attaching an optional expansion frame Models D22, D23, D32, D52, D53, S24, or S54.

**TS3500 Tape Library Models S24 and S54**

When a Model S24 or S54 is installed in a TS3500 Tape Library, the following features are required:

- One of the following features:
  - #1690 - Advanced Library Management System
  - #1692 - Entry ALMS
- #9002 - First Expansion Frame Attachment or #9003 - Additional Expansion Frame Attachment must be added to Model L23 or L53 for each Model D22, D23, D32, D52, D53, S24, or S54 frame that is attached. This ensures that proper cables are shipped and configuration records are correct.
- #9050 - High Density Library
- One of the following features:
  - #2205 - Enhanced Grippers/Pivot for Models L22, L23, L32, L52, or L53
  - #2304 - Enhanced Accessor for Models L22, L23, L52, or L53
  - #9205 - Enhanced Grippers/Pivot for Models L23 or L53

When a Model S24 or S54 is installed in a High Availability (HA) TS3500 Tape Library (feature #9040 on the base library), the following features are required:

- One of the following features on the expansion frame that includes feature #1440:
  - #2206 - Enhanced Grippers/Pivot for HA for Models D22, D52, D23, or D53
  - #2305 - Enhanced Accessor for HA for Models D22, D52, D23, D53, S24, or S54
  - #9206 - Enhanced Grippers/Pivot for HA for Models D23, D53, S24, or S54
- One of the following features on the attached Model HA1:
  - #1695 - LTO Test Hardware for HD
  - #1696 - 3592 Test Hardware for HD

Labeled or bulk quantities of LTO cartridges can be ordered using machine type 3589 or purchased through distributors. Refer to the Supplies section for additional information.

**Note:** The TS3500 Tape Library requires that cartridges have appropriate barcode labels.

**Software requirements**

**LTO Ultrium or Enterprise Tape Drives in the TS3500 Tape Library**

Support for LTO Ultrium and Enterprise Tape Drives in the TS3500 Tape Library is provided in the following operating systems, at the minimum levels indicated:

- i5/OS® V5R3, or later
- AIX V5.2, V5.3, V6.1
• Sun Solaris 8, 9, or 10 (SPARC-based)
• Microsoft Windows 2003 (build 3790, or later) and Windows 2008 (Build 6001)
• 64-bit HP-UX 11i v1, 11i v2, 11i v3
• Linux distributions: Red Hat Enterprise Linux Version 4 and Version 5, Novell SUSE Linux Enterprise Server 9 (SLES 9), Novell SUSE Linux Enterprise Server 10 (SLES 10)

For a current list of host software versions and release levels that support LTO and Enterprise Tape Drives in the TS3500 or 3584, refer to the following Web site:

Compatibility
The TS1130 Tape Drives (machine type 3592) cannot read cartridges written by the 3590 or 3490. Cartridges written by the TS1130 Tape Drive cannot be read by the 3590 or 3490. Even though the cartridges are similar in size, they contain different media, and thus are not interchangeable.

The IBM LTO Ultrium 4 Tape Drives can read and write IBM LTO Ultrium 4 and 3 Data Cartridges. The LTO Ultrium 800 GB Data Cartridges can only be used on LTO Ultrium 4 Tape Drives.

Limitations
• Mixed media with high-density frames is not supported in HA tape libraries.
• A high-density frame (Model S24 or Model S54) model cannot be added to a 3584 library string with a Model D42 unless the D42 is first removed or converted to a Model D32.
• Manual cartridge assignment using Insert Notification is not supported on a high-density library. For any partitioned library, it is recommended that Cartridge Assignment Policy be configured to provide automated assignment of all inserted cartridges.
• Although the compression technology can increase the amount of data stored on the media, the actual degree of compression achieved is highly sensitive to the characteristics of the data being compressed.
• Fibre Channel cable lengths are limited to 500 meters (1,650 ft).
• Although multiple systems may be attached to a tape drive, the systems cannot use the drive simultaneously.
• LTO Ultrium data cartridges cannot reside in the same library frame with 3592 data cartridges.

Planning information

Customer responsibilities
Physical planning is a customer responsibility. Detailed planning information is in the IBM System Storage TS3500 Tape Library with ALMS: Introduction and Planning Guide, GA32-0593. Current levels of the open systems device drivers should be obtained to ensure that the TS1040 Model F4B or TS1130 Tape Drive are supported.

Customers are responsible for obtaining the appropriate adapters, cables, and interposers (if required) for system attachment. Customers are also responsible for ordering media.

To utilize the remote support facility, phone lines need to be installed close to the TS3500 Tape Library.

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 Web site 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
Cables are required to attach tape drives in the TS3500 Tape Library to each server connection (up to the number of tape drive attachments installed). If no host attachment cables are required
to be shipped with 3584 frame from the plant, then the No Host Cables From Plant feature (9700) should be specified on the frame.

**Installability**

Installation time for each field-installed tape drive in the TS3500 Tape Library is approximately 0.4 hours.

**Packaging**

<table>
<thead>
<tr>
<th>Product</th>
<th>Shipment group</th>
<th>Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS3500</td>
<td>TS3500 frame with attachment hardware and cables</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Service tools</td>
<td></td>
</tr>
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<td></td>
<td>IBM System Storage TS3500 3584</td>
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<td>Maintenance Information:</td>
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<td>IBM 3584 Tape Library</td>
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<td>IBM System Storage TS3500 3584</td>
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<tr>
<td></td>
<td>Product Information CD</td>
<td></td>
</tr>
</tbody>
</table>

**Supplies**

**For end users**

IBM LTO data media supplies including labeled, initialized, bulk data media, or cleaning cartridges can be purchased from IBM using machine type 3589. Refer to the 3589 Sales Manual.

Labeled, initialized, or bulk data media for the TS1130 Model E06 Tape Drive can be ordered directly through AAS using machine type 3599. Refer to the 3599 Sales Manual.

**Note:** The 3592 data cartridge has servo tracks written on it. These tracks are designed to enable the tape drive to accurately position the read/write head with respect to the media while the tape is in motion. If these servo tracks are damaged or removed (such as by Degaussing), the cartridge is no longer usable. For information about IBM branded media, such as additional IBM LTO Ultrium data or cleaning cartridges, or 3592 data or cleaning cartridges, call 888-IBM-MEDIA (426-6334) in the U.S. or Canada or refer to the following Web site:

http://www.ibm.com/servers/storage/media

**Security, auditability, and control**

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

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

**Terms and conditions**

**Volume orders:** Contact your IBM representative.

**IBM Global Financing**

Yes

**Warranty period**

The TS3500 Tape Library: One year

IBM LTO Ultrium and 3592 media: Warranted separately
Warranty 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 Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. 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. This product is covered by the following types of service.

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.

- 24 hours per day, 7 days a week, same-day response, IBM On-site Repair

If your problem can be resolved with a Customer Replaceable Unit (CRU) (for example, keyboard, mouse, speaker, memory, or hard disk drive), IBM may ship the CRU to you for you to install. CRU information and replacement instructions are shipped with your machine and are available from IBM at any time on 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 30 days of your receipt of the replacement.

Non-IBM parts support

Warranty Service

IBM is now shipping machines with selected non-IBM parts that contain an IBM field replaceable unit (FRU) part number label. These parts are to be serviced during the IBM machine warranty period. IBM is covering the service on these selected non-IBM parts as an accommodation to their customers, and normal warranty service procedures for the IBM machine apply.

Warranty Service Upgrades

During the warranty period, warranty service upgrades provide an enhanced level of On-site Service for an additional charge. A warranty service upgrade must be purchased during the warranty period and is for a fixed term (duration). It is not refundable or transferable and may not be prorated. If required, IBM will provide the warranty service upgrade enhanced level of on-site service acquired by the customer. Service levels are response-time objectives and are not guaranteed.

IBM will attempt to resolve your problem over the telephone or electronically by access to an IBM Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability.

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 service selections are available as warranty upgrades for your machine type.

- 24 hours per day, 7 days a week, 2-hour average response
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 the on-site service level specified above. For additional information on the CRU service, refer to 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 Web site. You must follow the problem determination and resolution procedures that IBM specifies. Scheduling of service will depend upon the time of your call and is subject to parts availability. 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.

- 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

CRUs

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 is shipped with the replacement CRU and (2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 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.

Non-IBM parts support

Under certain conditions, IBM repairs selected non-IBM parts at no additional charge for machines that are covered under warranty service upgrades or maintenance services.

IBM Service provides hardware problem determination on non-IBM parts (for example, adapter cards, PCMCIA cards, disk drives, memory) installed within IBM machines covered under warranty service upgrades or maintenance services and provides the labor to replace the failing parts at no additional charge.

If IBM has a Technical Service Agreement with the manufacturer of the failing part, or if the failing part is an accommodations part (a part with an IBM FRU label), IBM may also source and replace the failing part at no additional charge. For all other non-IBM parts, customers are responsible for sourcing the parts. Installation labor is provided at no additional charge, if the machine is covered under a warranty service upgrade or a maintenance service.

Usage plan machine

No
**IBM hourly service rate classification**

Two

When a type of service involves the exchange of a machine part, the replacement may not be new, but will be in good working order.

**Field-installable features**

Yes

**Model conversions**

Yes

**Machine installation**

Installation is performed by IBM. IBM will install the TS3500 in accordance with the IBM installation procedures for the machine.

In the United States, contact IBM at 800-IBM-SERV (426-7378), in other countries contact the local IBM office.

Some features are designated as customer setup, and customers are responsible for installation according to the instructions IBM provides with the machine.

Customer requests for installation of items not covered in the installation guide may be performed at IBM's hourly service rate designated for the machine.

**Graduated program license charges apply**

No

**Licensed internal code and licensed machine code**

This product does not contain Licensed Internal Code or Licensed Machine Code.

**Educational allowance**

A reduced charge is available to qualified education customers. The educational allowance may not be added to any other discount or allowance.

**Pricing**

Please see your IBM Sales Representative for pricing.

For current prices visit http://www-03.ibm.com/systems/p/

or contact us at 1-888-Shop-IBM.

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

**Product charges**

<table>
<thead>
<tr>
<th>Description</th>
<th>Machine Type</th>
<th>Model</th>
<th>Feature number</th>
<th>Field Install</th>
<th>Plant Install</th>
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<tbody>
<tr>
<td>TS3500 HD Frames for Enterprise Drives</td>
<td>3584</td>
<td>S24</td>
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<tr>
<td>Feature</td>
<td>MES number</td>
<td>Description</td>
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<td></td>
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<tr>
<td>TS3500 HD Frames for LTO Drives</td>
<td>1440</td>
<td>S24,S54</td>
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<td>Service Bay B Config w/Accessor</td>
<td>1610</td>
<td>S24,S54</td>
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<tr>
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<td>D32</td>
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<tr>
<td>HD COD for S24</td>
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<tr>
<td>HD COD for S54</td>
<td>1646</td>
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<td>LTO Test Hardware for HD</td>
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<td>3592 Test Hardware for HD</td>
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<td>Enhanced Node Cards</td>
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<td>Enhanced Node Card</td>
<td>1701</td>
<td>Y</td>
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<td>Enhanced Grippers/Pivot</td>
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<td>Y</td>
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<td>Enhanced Accessor for HA</td>
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<td>Enhanced Accessor for HA</td>
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<td>High Density Library</td>
<td>9050</td>
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<td>Enhanced Grippers/Pivot</td>
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<td>Feature number removal</td>
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<td>2305</td>
<td>N</td>
<td></td>
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</tr>
</tbody>
</table>

** If field installed on a purchased machine, parts removed or replaced become the property of IBM and must be returned.
1 This feature has been previously announced on other models.

2 This feature has been previously announced on the designated models, now including Models S24 and S54, and the description has changed.

3 This feature was previously announced on the designated model, but the description has changed.

**Model conversion purchase price**

<table>
<thead>
<tr>
<th>Model</th>
<th>From</th>
<th>To</th>
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<tbody>
<tr>
<td>3584-S24</td>
<td>3584-S54</td>
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</tr>
<tr>
<td>3584-S54</td>
<td>3584-S24</td>
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</tr>
</tbody>
</table>

**Feature conversion purchase price**

<table>
<thead>
<tr>
<th>Model</th>
<th>Feature</th>
<th>Returned parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>3584-S24</td>
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<td>1646</td>
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<tr>
<td>3584-S54</td>
<td>1646</td>
<td>1645</td>
</tr>
</tbody>
</table>

* Parts removed or replaced become the property of IBM and must be returned.

**Specify feature codes**

The following charges apply to features ordered for field installation:

<table>
<thead>
<tr>
<th>Description</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add D32 to X22/X52/X23/X53/S24/S54</td>
<td>1620</td>
</tr>
<tr>
<td>Enhanced Node Cards</td>
<td>1700</td>
</tr>
<tr>
<td>Enhanced Node Card</td>
<td>1701</td>
</tr>
<tr>
<td>Enhanced Grippers/Pivot</td>
<td>2205</td>
</tr>
<tr>
<td>Enh. Grippers/Pivot for HA</td>
<td>2206</td>
</tr>
<tr>
<td>Enhanced Accessor</td>
<td>2304</td>
</tr>
<tr>
<td>Enhanced Accessor for HA</td>
<td>2305</td>
</tr>
</tbody>
</table>

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Internet: callserv@ca.ibm.com
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       ibm.com® Sales Execution Center, Americas North
       3500 Steeles Ave. East, Tower 3/4
       Markham, Ontario
       Canada
       L3R 2Z1

Reference: YE001

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Note: Shipments will begin after the planned availability date.

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