

IBM TS4300 tape library models with encryption, path failover, and LTO Ultrium 8 drives deliver increased reliability, security, capacity, and performance

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At a glance

IBM[®] TS4300 Tape Library models L3A and E3A on machine type 3555 combine IBM enterprise tape automation reliability with open systems affordability. The TS4300 Tape Library is an external, 3U-high standalone or rack-mountable unit that can be expanded to up to seven modules and incorporates Linear Tape-Open[™] (LTO[™]) IBM Ultrium[™] 8 tape drives.

Organizations that are required to provide secure, long-term storage for their data can start small with the base model and then increase cartridge and drive capacity as needed. With a maximum of 3.2 PB of native storage based on the new Ultrium LTO 8 format, the full-high 8 Gb Fibre Channel, half-high 6 Gb SAS, and half-high 8 Gb Fibre Channel tape drives deliver enhanced tape performance over the previous generation of IBM LTO Ultrium 7 tape drives with a native data transfer rate of up to 360 MBps on the full-height version.

IBM TS4300 also offers enhanced availability and security by incorporating Path Failover and library-managed encryption (LME).

TS4300 tape libraries include support for:

- New IBM LTO Ultrium 8 half-high 6 Gb SAS and 8 Gb Fibre Channel, and full-high 8 Gb Fibre Channel drives (feature numbers AGKM, AGKN, and AGKP)
- LTO Generation 8 tape drive native data transfer rate up to 360 MBps on a full-height drive and up to 300 MBps on a half-height drive
- LTO Generation 8 media specification tape cartridge compressed capacity of up to 30 TB with 2.5 to 1 compression
- Support for media partitioning and self-describing tape through IBM Spectrum Archive[™]
- Adherence to LTO specifications
- Data security and regulatory compliance through support for LME and WORM media on LTO Ultrium 8, Ultrium 7, and Ultrium 6 tape drives
- Path failover to provide automatic control in the event of a loss of a host adapter or control path drive

Overview

IBM TS4300 Tape Library models L3A and E3A on machine type 3555 incorporate the new LTO Ultrium 8 full-high 8 Gb Fibre Channel, half-high 6 Gb SAS, and half-high 8 Gb Fibre Channel tape drives, enhancing tape performance over the previous

generation of IBM LTO Ultrium 7 tape drives with a native data transfer rate of up to 360 MBps on the full-height version.

Mixed LTO Ultrium generations and attachment tape drive types are supported where drive space is available. Ultrium 8 tape drives for the TS4300 Tape Library are only available as feature numbers.

LTO Ultrium 8 tape drives support the LTO Generation 8 media specification of double the compressed capacity of up to 30 TB with 2.5 to 1 compression (up to 12 TB native capacity) compared to previous LTO 7 compressed capacity of up to 15 TB with 2.5 to 1 compression (up to 6 TB native capacity) per tape cartridge. IBM Ultrium 8 tape drives can read and write LTO Ultrium 7 data cartridges.

Note: Actual degree of compression achieved is highly sensitive to the characteristics of the data being compressed.

The base module of the TS4300 tape library can accommodate either up to three Ultrium half-high tape drives with either SAS or Fibre Channel attachment, one Ultrium full-high with Fibre Channel attachment, or a combination of one Ultrium full-high plus one Ultrium half-high tape drive.

It can also hold up to 32 data cartridge slots in two removable magazines, including a standard five-cartridge I/O station.

Note: Capacity decreases to 32 data cartridges (including 4 in the I/O Station) when the base module is the bottom module or the only module due to mechanical limitations.

On its maximum configuration of one base module and six expansions, the TS4300 tape library can accommodate up to twenty-one Ultrium half-high tape drives, seven Ultrium full-high tape drives, or any combination of both based on the drive form factor (space needed for one full-height drive equals two half-height drives), and data cartridge slots.

The TS4300 Tape Library incorporates path failover and LME for enhanced availability and security. Ultrium 8 SAS and Fibre Channel tape drives are encryption capable. Other optional features available include a rack mount kit, additional attachment cables, additional drives, wrap tools, interposers, and power cords.

Management software options

IBM Spectrum Archive: TS4300 leverages IBM Spectrum Archive for direct, intuitive, and graphical access to data stored in IBM tape drives and libraries by incorporating the IBM Linear Tape File System™ (LTFS) format standard. LTFS compatibility enables tape-stored data to be accessed as if it were on disk or flash storage.

IBM Spectrum Archive enables users of LTO Ultrium 8 tape library systems to inventory cartridges and read, write, and search data on any cartridge, enabling writing of metadata and tagging of individual files for easy and fast access to files stored on cartridges.

IBM Spectrum Protect™: Spectrum Protect enables users to create, manage, and optimize archives, and provides management of concurrent copies of content, plus active, inactive, and off-site content.

IBM Security Key Lifecycle Manager (SKLM): IBM SKLM enhances data security while dramatically reducing the number of encryption keys to be managed. It simplifies encryption key management with an intuitive user interface for configuration and management, and helps minimize the risk of loss or breach of sensitive information.

Key prerequisites

Appropriate levels of host software are required to attach and support the TS4300 Tape Library with IBM LTO Ultrium 8 tape drives to select IBM Power Systems™, IBM

System z^(R), Linux^(R), and WindowsTM servers. See the [Technical information](#) section for details.

Prerequisites for using encryption

Certain hardware and software prerequisites must be met before using encryption with the TS4300 tape library.

With the TS4300 tape library, encryption is managed at the logical library level. All drives that are assigned to a logical library use the same method of encryption. The rules for setting up encryption differ whether you use LME or application-managed encryption (AME).

The following prerequisites apply:

- Tape drives must be enabled for encryption from the TS4300 management GUI
- Feature code 5900, LTO Library Managed Encryption, is required if using LME
- IBM Security Key Lifecycle is required when using LME

Planned availability date

- October 10, 2017: All models and features

Description

IBM TS4300 Tape Library is the next-generation storage solution designed for the heavy demands of backup tape storage to help mid-size enterprises respond to future challenges. Requirements for secure, long-term data retention, especially in the financial services, healthcare, and life sciences industries, are common and increasingly stringent, with data volumes growing massively as a result. Tape storage offers a less costly long-term storage option than disk drives or flash, and data stored on tape kept offline or on write-once media is almost impossible to hack.

IBM TS4300 tape libraries can be used as standalone, L3A model only, or rack mountable when expansions (E3A model) are added to the base. The modular design enables users to increase cartridge and drive capacity as needed, scaling vertically with up to seven modules (including the base library), with expansion for Ultrium LTO 8, Ultrium LTO 7, and Ultrium LTO 6 cartridges, drives, and redundant power supplies, and a single robot which manages all modules in the stack.

IBM TS4300 Tape Library capacity is 272 tape cartridges, providing a media physical capacity up to 1.7 PB with 2.5 to 1 compression (up to 680 TB native capacity) data storage with Ultrium LTO 6, or up to 4 PB with 2.5 to 1 compression (up to 1.6 PB native capacity) data storage with Ultrium LTO 7 per unit, and up to 8 PB with 2.5 to 1 compression (up to 3.2 PB native capacity) data storage with Ultrium LTO 8 per unit.

Each TS4300 tape library module (either the base or expansion) supports LTO 8, 7, or 6 hot-swappable drives, and up to three half-height or one full-height drive plus one half-height drive with SAS or Fibre Channel attachment.

Model L3A (base module)

Model L3A can be installed and operate on its own, providing capacity for 32 LTO cartridges.

The TS4300 Tape Library Model L3A has the following characteristics:

- **Cartridge capacity:** The TS4300 base module is configured to hold two removable magazines, one on the left side and one on the right side, holding 20 slots each for a total of 40 data cartridges. This enables quick population of

the tape library, as well as ease of storage for media. You may order additional magazines as optional features to ease import/export tape cartridges on a regular basis.

Note: Capacity decreases to 32 data cartridges when the base module is the bottom module or the only module due to mechanical limitations.

- **I/O station:** The front cartridge box of five slots in the right magazine will be considered as the I/O station box. The full group of five slots will be configurable as either import/export elements or as storage elements. This enables continuous library operation during import or export of data cartridges.

Note: Capacity decreases to 4 data cartridges when the base module is the bottom module or the only module due to mechanical limitations.

- **Media options:** Labeled or generic Ultrium media can be ordered at the time of purchase through the following feature codes, through the 3589 LTO Ultrium media machine type, or at the [IBM Storage Media](#) website.

- 8706 Ultrium 7 Data Cartridge (5-pack)

Data cartridges are sold separately and subject to availability.

- **Robotics:** The base library will include scaling robotics with a barcode reader for identifying, locating, and moving LTO cartridges between storage locations and drives.
- **Operator panel:** The base library will include a power button, six navigation buttons (left, right, up, down, enter, back), and a standard, monochrome graphic display. The size of the display will be approximately 93 mm x 52 mm.
- **Standard interfaces:** The base library will include a USB host port on the front of the library and a 10/100/1000 Ethernet port on the rear.
- **Power supplies:** Power supplies are rated 80 Plus Silver. Each module can run with a single power supply for nonredundant operation. An optional power supply will provide redundant operation. Power supplies will be hot swappable when two are installed in a single module.
- **Customer replaceable units (CRUs):** Drive sleds (drive + sled), power supply, base module controller, left and right magazines, robotic assembly, elevator cable assembly (spooling mechanism), and the base library chassis are all CRUs.

Model E3A (expansion module)

The capacity of a base library can be increased by adding one or more 3U expansion modules. Each expansion will add 40 slots of LTO cartridge capacity and can include an additional three half-height LTO drives or an additional one full-height drive plus one half-height LTO drive.

The location of the base module within a library stack is limited due to the length of the spooling cable. A stacked library will support up to three expansion modules above and up to three expansion modules below the base library. A unit-to-unit locking mechanism ensures a proper alignment between units in a library stack.

TS4300 Tape Library Model E3A has the following characteristics:

- **Cartridge capacity:** The TS4300 expansion module is configured to hold two removable magazines, one on the left side and one on the right side, holding 20 slots each for a total of 40 data cartridges. You may order additional magazines as optional features to ease import/export tape cartridges on a regular basis.

Note: Capacity decreases to 32 data cartridges when the expansion module is the bottom module due to mechanical limitations.

- **I/O station:** The front cartridge box of five slots in the right magazine will be considered as the I/O station box. The full group of five slots will be configurable as either import/export elements or as storage elements. This enables continuous library operation during import or export of data cartridges.

Note: Capacity decreases to 32 data cartridges when the expansion module is the bottom module due to mechanical limitations.

- **Media options:** Labeled or generic Ultrium media can be ordered at the time of purchase through the following feature codes, through the 3589 LTO Ultrium media machine type, or at the [IBM Storage Media](#) website.
 - 8706 Ultrium 7 Data Cartridge (5-pack)
 - Data cartridges are sold separately and subject to availability.
- **Power supplies:** Power supplies are rated 80 Plus Silver. Each module can run with a single power supply for nonredundant operation. An optional power supply will provide redundant operation. Power supplies will be hot swappable when two are installed in a single module. When an expansion module is installed without drives, it will operate with no power supply installed.
- **CRUs:** Drive sleds (drive + sled), power supply, expansion module controller, unit-to-unit cable, left and right magazines, and the expansion module chassis are all CRUs.

TS4300 Tape Library supports Ultrium LTO 8

The IBM LTO Ultrium 8 tape drive is the eighth-generation LTO Ultrium tape drive in the IBM LTO Ultrium family of products. The Ultrium 8 tape drive in the TS4300 offers the following significant features over the Ultrium 7 tape drive:

- **Increased performance:** LTO Generation 8 specification native data transfer rate is up to 360 MBps and data tracks are written 32 at a time on full-height form factors. IBM Ultrium 8 tape drives can read and write LTO Ultrium 7 data cartridges.

Note: Although the Ultrium LTO 8 tape drive provides the capability for excellent tape performance, other components of the system may limit the actual performance achieved. Also, the compression technology used in the tape drive can typically double the amount of data that can be stored on the media, but the actual degree of compression achieved is highly sensitive to the characteristics of the data being compressed.
- **Increased tape cartridge capacity:** LTO Generation 8 media specification tape cartridge physical capacity is up to 30 TB compressed physical capacity, double that of the Ultrium 7 data cartridges. This is achieved by increasing the linear density, and track density. The tape itself is a Barium Ferrite tape developed to help provide durability and increased capacity.

Note: Actual degree of compression achieved is highly sensitive to the characteristics of the data being compressed
- **Ultrium 7 cartridge compatibility:** The Ultrium 8 tape drive can read and write Ultrium 7 cartridges.
- **Encryption supported on Ultrium 8, 7, 6, 5, and 4 Fibre Channel and SAS tape drives:** TS4300 tape libraries support data encryption on the base drive with LTO-8, 7, 6, 5, and 4 media meeting LTO Generation 8 and 7 media specifications and AME. LME is supported with the LTO LME feature number 5900. IBM Security Key Lifecycle Manager (SKLM) V1 is required with this feature.
- **Attachment options:** TS4300 tape libraries come with dual-port 6 Gbps SAS, 8 Gbps Fibre Channel (on the Full Height form factor), or a single port 8 Gbps Fibre Channel (on the Half Height form factor) LTO-8 tape drive attachment for connection to a wide spectrum of open system servers. They are supported on IBM Power Systems, System p, System z, Microsoft™ Windows, Linux, and other open systems.
- **WORM media support:** With LTO Generation 8 media specification of up to 30 TB with 2.5 to 1 compression, IBM 3589 LTO-8 WORM tape cartridges are designed for archiving and data retention applications, as well as those applications requiring an audit trail. These cartridges work with the IBM LTO Ultrium 8 tape drive to help prevent the alteration or deletion of user data. IBM LTO-8 WORM tape cartridges can be ordered as unique 3589 models with the following features:
 - Color coding and prelabeling with the ability to specify a starting volume serial
 - Packaging in individual jewel cases or in bulk

- Cartridge memory is built into every cartridge 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 Barium Ferrite tape with up to 30 TB WORM compressed capacity in a single cartridge
- **Internal data buffer:** There is a 1 GB internal data buffer in the Ultrium 8 full-high and half-high tape drive.
- **Digital speed matching:** Speed matching on Ultrium 8 ranges from 112 to up to 360 MBps versus 100 to up to 300 MBps on Ultrium 7.
- **Tunnel magnetoresistive (TMR) head design:** LTO 8 has a TMR head technology used for first time in LTO drives. Use of flat lap head technology in TMR heads from the enterprise tape drives for Ultrium 8 helps minimize contact, edge damage, debris accumulation, and wear on the tape as it moves over the read/write heads.
- **Dual-stage 32-channel head skew actuator:** The actuator is designed to provide precision head alignment to help support higher track density and improved data integrity. The track following skew actuator supports flangeless tape guide rollers and dynamic skew to enable the head to follow skew tape motion and improve linear actuation.
- **Power management:** The Ultrium 8 tape drive power management function is designed to control the drive electronics to be either completely turned off or in a low-power mode when the circuit functions are not needed for drive operation.

Proven IBM LTO Ultrium features in the IBM LTO Ultrium 8 tape drive include:

- **Servo and track layout technology:** There are 6,656 data tracks in Ultrium 8 versus 3,584 data tracks in Ultrium 7. The high-bandwidth servo system features a low-mass servo to help more effectively track servo bands and improve data throughput with damaged media in less-than-optimal shock and vibration environments.
- **Surface Control Guiding Mechanism:** The patented Surface Control Guiding Mechanism from IBM is designed to guide the tape along the tape path in the Ultrium 8, 7, and 6 tape drive. This method is designed to use the surface of the tape, rather than the edges, to control tape motion to reduce tape damage (especially to the edges of the tape) and tape debris, which comes from the damaged edges and accumulation in the head area.
- **Robust drive components optimized for automation environments:** With the most robust components available, steel ball bearings in loader, robust leader block design, and single circuit card, the drives offer enhanced reliability and prolonged life.
- **Separate writing of multiple filemarks:** This is designed to cause any write command of two or more filemarks to cause a separate data set to be written containing all filemarks after the first. This feature helps improve performance if a subsequent append overwrites somewhere after the first filemark.
- **LTO Data Compression (LTO-DC):** The Ultrium 8 uses LTO-DC, which is an implementation of a Lempel-Ziv class 1 (LZ-1) data compression algorithm. LTO-DC is an extension of Adaptive Lossless Data Compression (ALDC) and an improvement over previous IBM lossless compression algorithms. Patented "Scheme-Swapping" compression from IBM is designed to look ahead at incoming data and determine the most efficient storage method (either ALDC or pass-through mode) to help optimize data compression and increase data throughput. The compressed ratio is up to 2.5 to 1 for LTO Ultrium 8.
- **LTO Cartridge Memory (LTO-CM):** Contained within the LTO Ultrium data cartridge is the LTO-CM, which is a passive, contactless silicon storage device that is physically a part of the cartridge. The LTO-CM is designed to hold information about that specific cartridge, the media in the cartridge, and the data on the media. The storage capacity of the Generation 8 LTO-CM is 16,320 bytes. Communication between the drive and the LTO-CM is through a low-level RF field transmitted by the drive to the cartridge.
- **Statistical Analysis and Reporting System (SARS):** The Ultrium 8 tape drive uses SARS to help isolate failures between media and hardware. SARS uses the cartridge performance history saved in the Cartridge Memory module and the drive performance history kept in the drive flash to help determine the likely

cause of failure. SARS is designed to cause the drive to request a cleaner tape, to mark the media as degraded, and to indicate that the hardware has degraded.

- **Highly integrated electronics using IBM-engineered copper technology:** This technology is designed to reduce the total number of components in the drive, help lower chip temperatures, and reduce power requirements, resulting in a more reliable drive. The eighth-generation drive electronics are designed to provide error correction of soft errors in the memory arrays in data and control paths.

Ultrium 30 TB compressed data cartridge

The LTO Generation 8 media specification tape cartridge physical compressed capacity of up to 30 TB (with 2.5 to 1 compression) doubles the IBM Ultrium 7 data cartridge compressed capacity of up to 15 TB with 2.5 to 1 compression. IBM LTO Ultrium 8 tape drives can read and write Ultrium 7 data cartridges. LTO 8 data cartridges should be ordered using machine type 3589 or as a feature number for restricted resellers at the time of purchase.

Note: Actual degree of compression achieved is highly sensitive to the characteristics of the data being compressed.

These cartridges have been designed to provide several enhancements over previous tape technologies. They are designed to work with tape drives that have increased tape speeds and high-density data recording. The case is specially designed for use in automated libraries and is designed for repeated, unattended handling. The tape itself is a Barium Ferrite tape developed for durability and capacity.

Data cartridges are sold separately and subject to availability.

Path failover option

The TS4300 Tape Library will support Control Path Failover and Data Path Failover for all generations of IBM LTO Ultrium half-high tape drives, including IBM LTO Ultrium 8.

Multi-Path support

The Multi-Path feature of the libraries supports sharing of the library robotics. The library can be partitioned into one or more logical libraries, and can provide each logical library its own separate and distinct drives, storage slots, and control paths. You can partition the library into as many logical libraries as there are drives in the library. Each logical library must contain at least one drive.

Note: This type of partitioning is designed to allow heterogeneous applications to share the library robotics independent of each other. Cartridges under library control are not shared between logical libraries, nor allowed to be moved between logical libraries. An example of heterogeneous sharing is a Microsoft Windows application using the drive and storage slots of one logical library while a UNIX[®] application uses the drive and slots of another logical library.

Management software options

IBM Spectrum Archive: TS4300 leverages IBM Spectrum Archive for direct, intuitive, and graphical access to data stored in IBM tape drives and libraries by incorporating the IBM LTFS format standard. LTFS compatibility enables tape-stored data to be accessed as if it were on disk or flash storage.

IBM Spectrum Archive allows users of LTO Ultrium 8 tape library systems to inventory cartridges and read, write, and search data on any cartridge, enabling writing of metadata and tagging of individual files for easy and fast access to files stored on cartridges.

IBM Spectrum Protect: Spectrum Protect enables users to create, manage, and optimize archives, and provides management of concurrent copies of content, plus active, inactive, and off-site content.

IBM SKLM: IBM SKLM enhances data security while dramatically reducing the number of encryption keys to be managed. It simplifies encryption key management with an intuitive user interface for configuration and management, and helps minimize the risk of loss or breach of sensitive information.

Accessibility by people with disabilities

A US Section 508 Voluntary Product Accessibility Template (VPAT) containing details on accessibility compliance can be found on the [IBM Accessibility](#) website.

Reference information

For information about IBM TS4300 models L3A and E3A, refer to Hardware Announcement [117-043](#), dated July 25, 2017.

Product number

Description	Machine type	Model	Feature number
LTO 8 HH Fibre Channel Drive	3555	L3A, E3A	AGKM
LTO 8 HH SAS Drive	3555	L3A, E3A	AGKN
LTO 8 FH Fibre Channel Drive	3555	L3A, E3A	AGKP
Path Failover	3555	L3A	1682
LTO Lib Managed Encryption	3555	L3A	5900

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^(R) ID and password are required (use IBMid).

[BP Attachment for Announcement Letter 117-084](#)

Publications

The following publications are available:

Title	Order number
<i>IBM TS4300 Tape Library Getting Started Guide</i>	SC27-4630-01
<i>IBM TS4300 Tape Library User's Guide</i>	SC27-4629-01
<i>IBM TS4300 Product information CD</i>	00GH794

Publications listed above are available at the [IBM Publications Center](#).

Additional planning information is available at [Fix Central](#) or [TS4300 Knowledge Center](#).

IBM Knowledge Center provides you with a single point of reference 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 by going to [IBM Knowledge Center](#) for all your product information needs.

To access the IBM Publications Center Portal, go to the [IBM Publications Center](#) website.

The Publications Center is a worldwide central repository for IBM product publications and marketing material with a catalog of 70,000 items. Extensive search facilities are provided. A large number of publications are available online in various file formats, which can currently be downloaded.

Services

IBM Systems Lab Services

IBM Systems Lab Services offers a wide array of services available for your enterprise. It brings expertise on the latest technologies from the IBM development community and can help with your most difficult technical challenges.

IBM Systems Lab Services exists to help you successfully implement emerging technologies so as to accelerate your return on investment and improve your satisfaction with your IBM systems and solutions. Services examples include initial implementation, integration, migration, and skills transfer on IBM systems solution capabilities and recommended practices. IBM Systems Lab Services is one of the service organizations of IBM's world-renowned IBM Systems Group development labs.

For details on available services, contact your IBM representative or go to the [Lab Services](#) website.

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 go to the [IBM Global Technology Services^{\(R\)}](#) website.

For details on available IBM Business Continuity and Recovery Services, contact your IBM representative or go to the [Resiliency Services](#) website.

Details on education offerings related to specific products can be found on the [IBM authorized training](#) website.

Technical information

Specified operating environment

Hardware requirements

TS4300 tape library models L3A and E3A

TS4300 models L3A and E3A support Ultrium 6, Ultrium 7, and the new Ultrium 8 half-high SAS and Fibre Channel and full-high Fibre Channel tape drives, and can be attached to IBM Power Systems, AIX^(R), Linux, and Windows servers, and non-IBM servers, workstations, and personal computers that support those interface specifications.

For the latest supported hardware interoperability configurations, go to the [IBM System Storage^{\(R\)} Interoperation Center](#) website.

Select the Midrange category, then click on "Learn More" under TS4300 model, then click on the **Details** tab, then click on "See a complete list of software requirements".

One base module L3A and up to six expansion modules E3A are designed to provide up to 272 cartridge slots for LTO media.

TS4300 L3A comes with one power supply and an additional power supply can be added with feature number 1900, Additional Power Supply. If ordered as an option, the additional power supply will require a power cord. If the Additional Power Supply feature is ordered, then two power cords will be required. A power cord feature number should also be specified.

TS4300 E3A comes without a power supply and the first power supply can be added with feature number 1899, First Power Supply. If ordered, the power cord feature is required. If FC 1900 Additional Power Supply is ordered, then two power cords will be required. A power cord feature number should also be specified.

TS4300 tape library models L3A and E3A can contain a maximum of three half-height or one full-height and one half-height LTO Ultrium Fibre Channel tape drives per module for a total of up to 21 half-height or seven full-height per library stack.

Labeled or bulk quantities of LTO cartridges can be ordered using machine type 3589 or purchased through distributors.

Note: The TS4300 tape library requires that cartridges have appropriate bar code labels.

Cables

Cables are required to attach tape drives in the TS4300 tape library to each server connection (up to the number of tape drives installed).

An interposer may also be required for attachment to various server adapters. One or more of the following Fibre Channel or SAS cables should be specified on the TS4300.

Fibre Channel cables: A Fibre Channel cable is required to attach a TS4300 Tape Library with Fibre Channel Ultrium tape drives to host Fibre Channel adapters, Fibre Channel switches, or other Fibre Channel components. At least one Fibre Channel cable should be specified on the initial Fibre Channel drive plant order. The IBM Ultrium 6, 7, or 8 (8 Gbps) Fibre drive comes with an LC duplex connector.

Features for specifying Fibre Channel cables and their respective lengths are as follows:

- 10 m OM3 fiber Cable (LC) (feature #AGK1)
- 25 m OM3 fiber Cable (LC) (feature #AGK2)

SAS cables: A SAS cable is required to attach a TS4300 to the server host bus SAS adapter. Mini-SAS HD/Mini-SAS cables provide attachment from HBA with SFF-8644 to drives with SFF-8088. Mini-SAS/Mini-SAS cables provide attachment from HBA SFF-8088 to drives with SFF-8088. At least one SAS cable should be specified on the initial plant order.

The following cable options are available for SAS attachment:

- 2 m Mini- SAS/Mini- SAS 1x Cable (from HBA with SFF-8088 to drive with SFF-8088) (feature #5502)
- 4 m Mini- SAS HD/ Mini-SAS 1x Cable (from HBA with SFF-8644 to drive with SFF-8088) (feature #5507)
- 3 m Mini- SAS HD/ Mini-SAS 2x Cable (from HBA with SFF-8644 to two drives with SFF-8088) (feature #5509)

SAS Interposers

A 1x4 interposer with Mini-SAS/Mini-SAS connectors is available for connecting up to four Mini- SAS/Mini-SAS 1x cables and their respective SAS drives to a single host bus adapter port. Mini- SAS/Mini-SAS 1x cable (feature number 5502) connects the interposer to the drive, and needs to be ordered separately.

The following interposer is available:

- Mini-SAS/Mini-SAS 4x Interposer (from HBA with SFF-8088 to maximum four cables with SFF-8088) (feature #5500)

See the **Specify or Special features** section of the Sales Manual for a detailed description of the above features.

Software requirements

Application software

For a current list of host software versions and release levels that support the TS4300 tape library, see the [Independent Software Vendor \(ISV\) matrix](#) for LTO for the product.

Spectrum Protect and other compatible software offerings can provide storage and tape management software for the TS4300. Supporting software and applications must be obtained separately from IBM, IBM Business Partners, or ISVs.

IBM continues to work with ISVs to support the TS4300 tape library. For specific information and availability dates, contact the application vendor.

The installation of a TS4300 tape library may require code updates for supported open systems device drivers or storage management software.

Note: All new IBM tape device drivers will only be posted to the web through the Fix Central download portal and not through the ftpsite. IBM maintains the latest levels of System Storage tape drive and library device drivers and documentation on the Internet. Utilize the [Fix Central](#) download portal.

There are several menus to navigate to the correct download as follows:

1. Click on **Select Product** Tab
2. On the first menu item Click **Select Product > Product Group > System Storage**
3. Expand **Select from System Storage > Tape Systems**
4. Expand **Select from Tape systems > Tape drivers and software**
5. Expand **Select from Tape drivers and software > user product**
6. Expand **Platform > user operating system**
7. Click **Continue** to view what drivers are available

The *IBM Tape Device Drivers Installation and User's Guide* can be found at the [IBM Support](#) website.

LTO Ultrium 8 Encryption

Encryption for the TS4300 Tape Library with SAS and Fibre Channel versions of the IBM LTO Ultrium 8, 7, and 6 tape drives is provided in AIX, Linux, and Microsoft™ Windows operating system environments.

The installation of an Ultrium 8 tape drive with encryption may require code updates for System p and supported open systems device drivers or storage management software. An update of the open systems device drivers can be obtained through an anonymous FTP from

- ftp.software.ibm.com

Look under the directory **storage/devdvr**.

For details about supported software versions and release levels for the LTO Ultrium 8 tape drive, as well as hardware support information, see the [Storage Tape](#) website.

Three modes of encryption management are supported:

- System managed (available for AIX, Linux, Windows)
- Library managed (available for OS/400[®], i5/OS, AIX, Linux, and Windows)
- Application managed (IBM Spectrum Protect)

Compatibility

IBM LTO Ultrium 8 tape drives can read and write IBM LTO Ultrium 8 or 7 data cartridges.

LTO Ultrium 8 tape drives support the LTO Generation 8 media specification.

Limitations

TS4300 tape libraries support a mixture of LTO drive types in a logical library. For situations where the ISV support does not exist or does not meet your requirements, the TS4300 tape library provides another option to protect your investment by partitioning the tape drives into separate logical libraries. You can customize the logical libraries to any number of slots by using menus.

- 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.
- Although multiple systems may be attached to a tape drive, the systems cannot use the drive simultaneously.
- SAS cable lengths are limited to a maximum of 6 meters (20 feet).
- With a data rate of 8 Gbps, Fibre Channel cable lengths are limited to 150 meters (492 feet) using an OM3 cable.
- IBM Ultrium 7 tape cartridges can be used with the IBM Ultrium 8 tape drives.
- For LTO Ultrium 8, 7, 6, and 5, IBM SKLM V1.0 or V2.0 is required for enabling LME.
- Path failover is not supported on AIX attachment to SAS device.

Planning information

Customer responsibilities

Physical installation and service planning is a customer responsibility. Detailed planning information is in the *IBM TS4300 Tape Library User's Guide* (SC27-4629-XX). The TS4300 Tape Library is designated as a customer setup unit (CSU). It is the customer's responsibility to install and service the unit, if required. Customers are responsible for obtaining the appropriate adapters, cables, and interposers (if required) for system attachment. Customers are also responsible for ordering media. For optimum performance, the customer must obtain the latest level of firmware prior to installing the unit and must update the unit as new firmware release become available.

Customers can download the latest level of drive and library firmware for the product, or the [IBM Tape Storage](#) and [IBM tape drives](#) websites.

Note: All new IBM tape device drivers will only be posted to the web through the Fix Central download portal and not through the ftpsite. IBM maintains the latest levels of System Storage tape drive and library device drivers and documentation on the Internet. Utilize the [Fix Central](#) download portal.

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

Cables are required to attach tape drives in the TS4300 tape library to each server connection, up to the number of tape drive attachments installed.

A Fibre Channel cable is required to attach a TS4300 Tape Library with Fibre Channel Ultrium tape drives to host Fibre Channel adapters, Fibre Channel switches, or other Fibre Channel components. At least one Fibre Channel cable should be specified on the initial Fibre Channel drive plant order. The IBM Ultrium 8 (8 Gbps) Fibre drive comes with an LC duplex connector.

A SAS cable for IBM Ultrium SAS tape drives is required to attach the TS4300 to the server. At least one cable should be specified on the initial plant order with the SAS drive feature. An interposer or interposers may be required for attachment to various server adapters. Customers are responsible for selecting and ordering the correct cables and interposers to match the IBM LTO Ultrium tape drive interface and the server interface.

See the **Cables** section at the end of the [Hardware requirements](#) section for a list of available cables and interposers.

See the **Specify or Special Features** section of the TS4300 Sales Manual for a detailed description of the cables and interposers available.

If no host attachment cables are required to be shipped with the library from the plant, then the No Host/SAN Cable from Plant feature (number 9700) should be specified on the module

Security, auditability, and control

This product uses the security and auditability features of host hardware, host software, or application software to which it is attached.

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

IBM Systems Lab Services

For details on available services, contact your IBM representative or go to the [Lab Services](#) website.

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, go to the [IBM Electronic Support](#) website.

Terms and conditions

MES discount applicable

Equal to the volume commitment discount

Field installable feature

Yes

Warranty period

Three year

To obtain copies of the IBM Statement of Limited Warranty, contact your reseller or IBM.

An IBM part or feature installed during the initial installation of an IBM machine is subject to the full warranty period specified by IBM. An IBM part or feature that 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. Unless specified otherwise, the warranty period, type of warranty service, and service level of a part or feature are the same as those for the machine in which it is installed.

Customer setup

Yes

Machine code

Same license terms and conditions as base machine

Prices

Description	Machine type	Model	Feature number
LTO 8 HH FIBRE CHANNEL DRIVE	3555	L3A, E3A	AGKM
LTO 8 HH SAS DRIVE	3555	L3A, E3A	AGKN
LTO 8 FH FIBRE CHANNEL DRIVE	3555	L3A, E3A	AGKP
Path Failover	3555	L3A	1682
LTO Lib Managed Encryption	3555	L3A	5900

Machine type	Model	Feature number	Install type*	MES removal	Cables required	CSU
3555	L3A, E3A	AGKM	Both	Y	Y	Y
3555	L3A, E3A	AGKN	Both	Y	Y	Y

Machine type	Model	Feature number	Install type*	MES removal	Cables required	CSU
3555	L3A, E3A	AGKP	Both	Y	Y	Y
3555	L3A	1682	Both	N	N	Y
3555	L3A	5900	Both	N	N	Y

*Install type

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

CSU = Customer setup

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Corrections

(Corrected on November 6, 2017)

The Media options bullets were updated and a statement about data cartridge availability was added to the Description section.