

## IBM TS2900 Tape Autoloader

This IBM® Redbooks® Product Guide describes the IBM TS2900 Tape Autoloader, which is designed for entry-level automation in small-to-medium business environments. With a low-profile, high-density storage capacity, the TS2900 is ideally suited for backup and archival operations. The TS2900 is available with IBM Linear Tape-Open (LTO) Ultrium 7, 6, and 5 Half-High SAS tape technology for a high-capacity, entry-priced tape storage solution.

The TS2900 Tape Autoloader is shown in Figure 1.



Figure 1. TS2900 Tape Autoloader

The TS2900 is equipped with standard features that are designed to provide ease-of-use and secured data backup. Web-based remote management, a bar code reader, and a removable tape magazine help provide ease of use. The TS2900 can be used in a rack system or on a desktop that is next to a server in an office. These types of features help reduce the requirements of IT personnel staff, and also help centralize backup in the data center. The TS2900 also supports the encryption of sensitive user data in combination with LTO Ultrium 7, 6, or 5 Half-High tape technology from IBM. With 6 Gbps SAS attachment, the TS2900 is supported on IBM Power Systems™, IBM System x®, System x (Lenovo), Intel, and other open system server platforms.

### Did you know?

The TS2900 1U slim profile rack system environment is designed for automated, high-capacity tape storage and has the lowest entry price of any IBM tape automation that offers IBM Half-High tape technology. The IBM LTO Ultrium Half-High technology delivers reliable performance for small-to-medium open system environments. The single I/O station helps support continuous backup and archive library operations, and the removable magazine facilitates the offsite relocation of cartridges and archival data. The design of the remote library management through a standard web interface offers flexibility and greater administrative control of storage operations without the need to touch the unit.

## Highlights

The TS2900 has a nine-data-slot cartridge capacity for a total storage capacity of up to 135 TB with 2:5:1 compression, and a single I/O station to provide undisturbed library operation when data cartridges are extracted or inserted. The library uses one IBM LTO Ultrium Half-High tape drive (in these TS2900 models, an LTO Ultrium 7 S7H, LTO Ultrium 6 S6H, or an LTO Ultrium 5 S5H). The TS2900 is shipped as a rack mount unit, with the option of a desktop conversion kit. As standard, the TS2900 includes a bar-code reader, which supports the operations in sequential or random access mode. Remote administration and management capabilities are possible through the web interface that is also included as standard.

## LTO technology

With its use of an LTO Ultrium 7, 6, or 5 Half-High tape drive and a nine-tape cartridge capacity, the TS2900 can store up to 135 TB compressed (54 TB native). The IBM LTO Ultrium 7 tape drive supports up to 300 MBps native data-transfer. IBM LTO standards leadership continues with the LTO Ultrium 7 tape drive, which increases the storage capacity to 15.0 TB compressed (6.0 TB native) on LTO Ultrium 7 media. The LTO Ultrium 6 more than doubled the storage capacity of the LTO Ultrium 5 tape drive with 6.25 TB compressed 2:5:1 on LTO Ultrium 6 media.

The following backward compatibility (read and write) is available:

- The LTO Ultrium 7 tape drive can read and write LTO Ultrium 7 and 6 tape cartridges and read from LTO Ultrium 5 tape cartridges.
- The LTO Ultrium 6 tape drive can read and write LTO Ultrium 6 and 5 tape cartridges and read LTO Ultrium 4 tape cartridges.
- The LTO Ultrium 5 tape drive can read and write LTO Ultrium 5 and 4 tape cartridges.

All drives have speed-matching and channel calibration for improved performance. They support the leading operating systems and popular backup software.

## Security

Data is one of the most highly valued resources in a competitive business environment. Protecting that data, controlling access to it, and verifying its authenticity while maintaining its availability are priorities in our security-conscious world. Increasing regulatory requirements are also helping to direct the need for the adequate security of data. LTO Ultrium 7, 6, and 5 tape drive technology helps address security and compliance requirements with its continued Write Once Read Many (WORM) and Application Managed Encryption (AME) capability.

Advanced encryption through Library Managed Encryption (LME) and System Managed Encryption (SME) are available as optional Transparent LTO Encryption feature 5900. For key management for encryption, IBM Security Key Lifecycle Manager V2 is required. Whether encryption is application- or hardware-based, vital data can securely be stored to help ensure compliancy with data security, information disclosure, and privacy regulations for data at rest. For LTO Ultrium 7, 6 and 5, IBM Security Key Lifecycle Manager is required for enabling LME and SME.

## IBM Linear Tape File System

IBM Linear Tape File System™ (LTFS) is the first file system that works in with LTO generations 7, 6, and 5 tape technology to set a new standard for ease-of-use and portability for open systems tape storage. The LTO Ultrium 5 tape drive was the first generation to introduce media partitioning, which allows LTO Ultrium media to be divided into segments and improves accessibility by providing the ability to quickly locate data to retrieve or update.

With LTFS, accessing data that is stored on an IBM tape cartridge became as easy and intuitive as using a USB flash drive. With LTFS and the operating system's file manager, reading data on a tape cartridge is as easy as dragging and dropping. Users can run any application that is designed for disk files against tape data without being concerned that the data is physically stored on tape. Originally built on the LTO Ultrium 5 format standard, IBM Spectrum Archive™ Library Edition (LE) provides a direct, intuitive, graphical access to data that is stored in IBM tape drives and libraries that use LTO Ultrium 7, 6, or 5 tape cartridges.

A member of the IBM Spectrum Storage™ family, IBM Spectrum Archive enables direct, intuitive, and graphical access to data that is stored in IBM tape drives and libraries by incorporating the LTFS format standard for reading, writing, and exchanging descriptive metadata on formatted tape cartridges. Spectrum Archive eliminates the need for more tape management and software to access data. Spectrum Archive offers three software solutions for managing your digital files with the LTFS format: Single Drive Edition, Library Edition, and Enterprise Edition. IBM Spectrum Archive Library Edition supports the TS2900 models S7H, S6H, and S5H.

Spectrum Archive Library Edition features the following benefits:

- The GUI helps reduce complexity by enabling an icon-based view of an LTO Ultrium 7, 6, or 5 library, including tape cartridges and files that use the operating system's file manager.
- LE helps reduce costs because it does not require any other tape management software or utilities.
- The file system API of the operating system is used to provide a basic read/write interface to the tape library for applications without any other operating system enhancements, such as plug-ins or service packs.
- “Mount-less” cartridge inquiry for fast access is achieved after the tape library is inventoried. Tape cartridges do not have to be remounted to retrieve content index data and basic cartridge information, such as volume name and serial number.
- Spectrum Archive LE software can be ordered concurrently with hardware, or as software only for installed supported tape libraries. Spectrum Archive LE can be ordered as product identifier (PID) software base order number 5639-LT1. The feature number is 5806.

## Part number information

Table 1 lists part numbers and feature codes for the TS2900.

Table 1. TS2900 Tape Autoloader ordering information

Description		MTM
TS2900 Tape Autoloader with Ultrium 7 Half-High SAS tape drive		3572-S7H
TS2900 Tape Autoloader with Ultrium 6 Half-High SAS tape drive		3572-S6H
TS2900 Tape Autoloader with Ultrium 5 Half-High SAS tape drive		3572-S5H
Optional feature codes		Feature code
Transparent LTO Encryption		5900 (5901 for LTO-7 and LTO-6)
Rack mount kit		7006
Deskside covers		7010
Additional Magazine		8111
Ultrium Tape Cartridges WORM media*	Ultrium 7 media 5-pack	8706
	Ultrium 6 media 5-pack	8605
	Ultrium 5 media 5-pack	8505
Ultrium Cleaning Cartridge		8002
Attachments		
2.0 m SAS/Mini-SAS 1x Cable		5402
2.0 m Mini-SAS/Mini-SAS 1x Cable		5502

\* Ultrium 7, 6, and 5 WORM media and tape cartridge options can be ordered at this website:  
<http://www.ibm.com/systems/storage/media>

The IBM Ultrium WORM cartridges (Machine Type 3589) were designed for applications, such as archiving and data retention, and for applications that require an audit trail. IBM Ultrium 7, 6, and 5 tape drive WORM support allows vital data to be stored in a non-erasable, non-rewritable format that are provided for these types of applications. The IBM Ultrium WORM cartridges work with the IBM LTO Ultrium tape drives to help prevent the alteration or deletion of user data. In addition, IBM took the following steps to reduce the possibility of tampering with the information:

- The bottom of the cartridge is molded in a different color than rewritable cartridges.
- The special cartridge memory helps protect the WORM nature of the media.
- A unique format is factory written on each WORM cartridge.

Table 2 lists the specifications for the TS2900.

Table 2. TS2900 specifications

<b>Specifications</b>	
Tape drive type	1 Ultrium 7 Half-High or 1 Ultrium 6 Half-High or 1 Ultrium 5 Half-High
Number of tape cartridges	9
Number of I/O slots	1
Tape media physical capacity	<ul style="list-style-type: none"> <li>Up to 15.0 TB per cartridge compressed 2:5:1; 6.0 TB native with LTO-7 media</li> <li>Up to 6.25 TB per cartridge compressed 2:5:1; 2.5 TB native with LTO-6 media</li> <li>Up to 3.0 TB per cartridge compressed 2:1; 1.5 TB native with LTO-5 media</li> </ul>
Data transfer rate (per drive)	<ul style="list-style-type: none"> <li>Up to 300 Mbps native with LTO-7 tape drive</li> <li>Up to 160 Mbps native with LTO-6 tape drive</li> <li>Up to 140 MBps native with LTO-5 tape drive</li> </ul>
Tape Autoloader Capacity	<ul style="list-style-type: none"> <li>Up to 135 TB with 2.5:1 compression; 54 TB native with LTO-7 media</li> <li>Up to 56.25 TB with 2.5:1 compression; 22.5 TB native with LTO-6 media</li> <li>Up to 27 TB per tape library compressed; 13.5 TB native with LTO-5 media</li> </ul>
Attachment support	6 Gbps SAS
Warranty	One-year, Customer Replaceable Unit (CRU) service in most countries
<b>Operating environment</b>	
Dimensions (W x H x D)	17.6 in (445 mm) x 1.7 in (43.6 mm) x 33.3 in (847 mm)
Weight	<ul style="list-style-type: none"> <li>28.66 lb (13 kg) with no drive and no cartridge</li> <li>39.7 lb (18 kg) with drive and cartridge</li> </ul>
Temperature	50 to 100 degrees F (10 to 38 degrees C)
Relative humidity	20% RH to 80% RH
Electrical power	1.3 amps at 100 V ac; 0.7 amps at 240 V ac 0.1 KVA
Noise level	6.6 dBA (idle); 6.8 dBA

## What is in the TS2900 shipping box?

The group box contains the following items:

- Tape autoloader with Ultrium 7 Half-High (Model S7H), Ultrium 6 Half-High tape drive (Model S6H), or Ultrium 5 Half-High tape drive (Model S5H)
- Rack mount kit with device to PDU line cord or Deskside Cover (one must be selected)
- SAS wrap tool
- Drive that includes two Mini-SAS (SFF-8088) connectors
- One removable nine-cartridge magazine
- Power cord (must be selected)
- One IBM Ultrium Cleaning Cartridge (universal)
- *IBM System Storage TS2900 Tape Autoloader Setup, Operator, and Service Guide, GC27-2212-02*
- *IBM System Storage TS2900 Tape Autoloader Installation Quick Reference Guide, GA76-0423-00*

- Quality hotline card
- Device Driver readme sheet
- IBM System Storage Translated Safety Notices
- Multi-language Statement of Limited Warranty
- Statement of Limited Warranty Pointer Sheet
- Misc documents CD

## Supported hardware platforms

The TS2900 is supported on the following platforms:

- IBM BladeCenter®
- IBM Power Systems® (p6 and newer)
- IBM System i®
- IBM System p® (p5 and older)
- IBM System x®
- System x (Lenovo)
- Advanced Micro Devices (AMD)
- Intel (x86 and x86\_64)
- Oracle Solaris

## Supported operating systems

The TS2900 is supported on the following operating systems:

- IBM AIX® 6.1 or later
- IBM i 7.1 or later
- IBM VIOS 2.2.0 or later with client IBM i
- Microsoft Windows Server 2012 or 2012 R2 or later
- Novell SUSE Linux Enterprise 11 SP2 or later
- Oracle Solaris 10 and 11.2
- Red Hat Linux Enterprise 6.7 or 7.1

For more information about the latest support levels and configurations for LTO tape drives, platforms, operating systems, and attachments, see the IBM Systems Storage Interoperation Center (SSIC) at this website:

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

## Supported software products

The TS2900 is supported on the following software products:

- IBM Spectrum Archive Library Edition
- IBM Spectrum Protect
- IBM Security Key Lifecycle Manager
- Atempo Time Navigator
- Barracuda Yosemite Server Backup
- CA ARCserve Backup
- CommVault Systems Galaxy/Simpana
- Dell NetVault
- EMC NetWorker
- Microsoft System Center Data Protection Manager
- Thales e-Security keyAuthority
- Veritas Backup Exec
- Veritas NetBackup

For more information about current IBM software products and independent software vendor products that support TS2900, see the Independent Software Vendor (ISV) matrix for 3592 and LTO tape drives at this website:

[http://www.ibm.com/systems/resources/lto\\_isv\\_matrix.pdf](http://www.ibm.com/systems/resources/lto_isv_matrix.pdf)

Also check the ISV website for product-specific version support, any limitations, and more usage information.

## Warranties and Maintenance

Every TS2900 is covered by a one-year system warranty.

Optional IBM features that are initially installed in an IBM system carry the same warranty and warranty service support category as the system. If installed after the initial system installation, they carry the balance of the system warranty or the optional feature warranty, whichever is greater.

### Customer replaceable unit service

IBM provides replacement customer-replaceable units (CRUs) for you to install. CRU information and replacement instructions are included with your machine and are available from IBM upon your request.

**Note:** Each ServicePac is country-specific and is valid only when purchased and registered in the country in which IBM service will be provided. For a complete list of ServicePac part numbers that are specific to your country, see the following IBM ServicePac Worldwide Product Matrix:

<https://www-304.ibm.com/sales/gss/download/spst/servicepac/extProductSelectorWWW.do>



## Related publications

For more information, see the following resources:

- *IBM System Storage interactive product guide*.  
<http://public.dhe.ibm.com/common/ssi/ecm/ts/en/tso00364usen/TSO00364USEN.PDF>
- *IBM System Storage TS2900 Tape Autoloader Setup, Operator, and Service Guide*, GC27-2212:  
<http://www.ibm.com/support/docview.wss?uid=ssg1S7005220>
- *IBM System Storage TS2900 Tape Autoloader Installation Quick Reference Guide*, GA76-0423:  
<http://www.ibm.com/support/docview.wss?uid=ssg1S7005223>
- IBM Linear Tape-Open: LTO Ultrium tape drives, libraries, and autoloaders:  
<http://www.ibm.com/systems/storage/tape/index.html>
- *IBM Tape Library Guide for Open Systems*, SG24-5946:  
<http://www.redbooks.ibm.com/abstracts/sg245946.html>
- *IBM Linear Tape File System Installation and Configuration*, SG24-8090:  
<http://www.redbooks.ibm.com/abstracts/sg248090.html>
- *IBM System Storage TS2900 Tape Autoloader*:  
<http://www.ibm.com/systems/storage/tape/ts2900>
- *IBM LTO Ultrium 7 Data Cartridge*.  
[http://www.ibm.com/systems/storage/media/lto\\_7](http://www.ibm.com/systems/storage/media/lto_7)
- *IBM LTO Ultrium 6 Data Cartridge*.  
[http://www.ibm.com/systems/storage/media/lto\\_6](http://www.ibm.com/systems/storage/media/lto_6)
- *IBM LTO Ultrium 5 TB Data Cartridge*.  
[http://www.ibm.com/systems/storage/media/lto\\_5](http://www.ibm.com/systems/storage/media/lto_5)
- *IBM Spectrum Archive: Linear Tape File System*.  
<http://www.ibm.com/systems/storage/tape/ltfs>
- *IBM Security Key Lifecycle Manager*:  
<http://www.ibm.com/software/products/en/key-lifecycle-manager>

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