IBM LTO Ultrium 5 Half High Tape Drive

Increased performance and capacity for reduced total cost of ownership and improved data protection

Highlights

- Offers increased capacity and speed
- Optimizes data security
- Enhances investment protection and helps reduce operating costs
- Improves reliability and serviceability
- Offers flexible attachment options
- Supports partitioning and IBM Linear Tape File System™

Overview

The digital universe has grown by an order of magnitude since 2007. Organizations today have more data to manage, protect and preserve for longer periods of time. Failure to properly manage and safeguard data can lead to business disruption, lost productivity and goodwill, as well as penalties from regulatory violations. The IBM Linear Tape-Open (LTO) Ultrium 5 Half High Tape Drive is designed to help organizations manage the challenges associated with explosive data growth and help achieve rapid, reliable data access in order to improve competitive advantage and ensure business continuity.

Offers increased capacity and speed

Rapid data growth fuels the need for increased storage capacity and speed. The fifth generation of LTO Ultrium tape drives provides up to 3.0 TB capacity and data transfer rates of up to 280 MBps.[1] As such, it offers nearly twice the capacity and higher throughput compared to the preceding LTO Ultrium 4 generation of drives, and provides an excellent alternative to slower and smaller-capacity 1/4-inch, 4 mm, 8 mm, Digital Linear Tape/Super Digital Linear Tape (DLT/SDLT), and older LTO generation tape drives. Its substantially higher, sustained data transfer rate offers faster backup and recovery of large data sets and thus reduces the disruption due to a major data loss or outage.

To further increase capacity, Digital Speed Matching (DSM) adjusts the drive's native data rate to better match the data rate of the server. DSM adjusts among 14 speeds in LTO 5 and, combined with a 256 MB buffer, improves data throughput and reduces tape repositions and wear whenever the host data rate is less than optimal.

The LTO Ultrium 5 Half High Tape Drive uses an IBM-patented compression algorithm to optimize compression speed. The compression algorithm synchronously swaps the data compression scheme dynamically between adaptive lossless data compression (ALDC) and a pass-thru mode. While data compression is being performed, a separate circuit performs simultaneous decompression to improve data integrity.

Optimizes data security

To comply with regulatory requirements and preserve stakeholder trust, organizations must ensure data privacy and protect data from unauthorized access and unintentional loss. The LTO Ultrium 5 Half High Tape Drive utilizes Advanced Encryption Standard (AES) 256 encryption in the drive to help prevent unauthorized access to sensitive data without impacting drive performance. This capability reduces the risk of data loss or corruption due to virus or sabotage, and it protects data privacy during transport of the media. It also features a light-emitting diode (LED) Encryption Indicator, which visually confirms when data is being encrypted or when an encrypted cartridge is mounted.

The LTO Ultrium 5 Half High Tape Drive supports write-once, read-many (WORM) media cartridges that prevent accidental overwriting of stored data and can reduce the risk of data loss due to human error. It also features Data Safe Mode, which provides read/write protection at the drive level. Like WORM, it prevents accidental overwriting of data; unlike WORM, it can be enabled or disabled.

Enhances investment protection and reduces operating costs

LTO tape technology is built to open standards with media available from multiple suppliers. The LTO Ultrium 5 Half High Tape Drive is read- and write-compatible with Ultrium 4 media and read-compatible with Ultrium 3 media. Users are

therefore able to introduce LTO Ultrium 5 drives into existing tape storage environments while protecting investments in tape automation hardware and prior generation media. Users can subsequently utilize Ultrium 5 media with its higher capacity and performance characteristics to reduce the number of tapes required and shorten the data backup window.

By virtue of lower energy costs and lower acquisition cost per gigabyte, tape remains the most economical and environmentally friendly storage technology available. The LTO Ultrium 5 Half High Tape Drive consumes 48% less power than previous generations of IBM LTO drives. The substantially higher capacity offered by Ultrium 5 media nearly halves the number of cartridges needed, which reduces media storage space requirements.

Offers flexible attachment.

The LTO Ultrium 5 Half High Tape Drive offers more attachment options and higher attachment speeds than any previous IBM LTO drive. With its 6 Gbps SAS, 8 Gbps Fiber Channel, Ethernet and RS-422 interfaces, the LTO Ultrium 5 Half High Tape Drive can be configured to operate in numerous environments. The drive can be natively attached to the server or integrated into storage area networks (SANs) and libraries through its RS-422 connector or through a new Ethernet connector. The Library/Drive interface and Analog/Digital interface (LDI/ADI) Auto Detect feature automatically detects library interface protocol for further ease of use.

Improves reliability and serviceability

The LTO Ultrium 5 Half High Tape Drive uses an advanced independent tape loader and threader motors which, combined with positive pin retention improvements, can increase tape handling reliability while loading and recovering tapes and when extracting tapes after a sudden power down. The Partial Response Maximum Likelihood (PRML) channel enables the drive to compensate for variations in the media, recording function and read/write head to optimize interchangeability between LTO drives from other vendors. Skip Sync enables writing to tape with reduced backhitch, which helps increase cartridge reliability as well as read/write speed.

For enhanced serviceability, the LTO Ultrium 5 Half High Tape Drive captures error information and stores it in the drive's flash memory so that it can be recalled when needed to minimize troubleshooting time.

Supports partitioning and Linear Tape File System

The LTO Ultrium 5 Half High Tape Drive with LTO Ultrium 5 Media offers partitioning support. In conjunction with exclusive IBM Linear Tape File System technology, this provides file-level access to data stored on tape and enables users to quickly locate and update information by viewing a directory tree. This capability offers some of the following benefits:

- Greater flexibility and access with a self-contained tape data cartridge
- Process improvement through data sharing between different platforms
- Reduced media, file management and archive costs by eliminating the middleware layer
- Introduction of tape storage in entertainment, medical and manufacturing applications

Media

You can order media for all your IBM LTO Ultrium tape products from your IBM representative, or visit:
ibm.com/systems/storage/media

IBM LTO 5 Half High Tape Drive at a glance	
Characteristics	
Tape drive type	IBM LTO Ultrium 5
Capacity per cartridge*	1.5 TB native; 3.0 TB with 2:1 data compression
Sustained data transfer rate*	140 MBps native; 280 MBps with 2:1 data compression
Media type	LTO Ultrium 5, 4 and 3
Data cartridge	LTO Ultrium 5 (rewritable), LTO Ultrium 5 (WORM)
Cleaning cartridge	Universal cleaning cartridge
Backward compatibility	Read/write-compatible with Ultrium LTO 4 media Read-compatible with Ultrium LTO 3 media
Interface	Fibre Channel-8 or 6 Gbps SAS
Library interface	LDI, ADI over RS422 or Ethernet
Data compression	Streaming Lossless Data Compression (SLDC) (LTO data compression per ECMA-321)†
Encryption	AES256
Buffer	256 MB
Rewind speed	Up to 6.33 meters/sec
Operating speed	Up to 6.33 meters/sec
Data rate matching	DSM 40 – 140 MBps
Physical Characteristics	
Dimensions (internal drive)	146 mm W × 41 mm H × 205 mm D
Weight (internal drive)	1.6 kg (3.5 lb)
Reliability	
Mean time between failures (MTBF)	250,000 power-on hours at 100% duty cycle
Error rate (calculated)	1 x 10 17 bytes per permanent read error
Error rate (validated)	1 x 10 13 bytes per permanent write error
Operating environment	
Operating temperature	10° to 45° C (50° to 100° F)
Relative humidity	10% to 80% (non-condensing)
Electrical power	T3000V (SAS): 5 V at 3.6 A, 12 V at 0.65 A (steady state)
Power dissipation	T3000V (SAS): 6.5 W (idle, with cartridge), 24.0 W (read/write)
Open systems support	Microsoft Windows 2000; Microsoft Windows Server 2003; Sun Solaris 10; HP-UX 11.0, 11i; Linux (Red Hat Enterprise Server 4, SUSE Linux Enterprise Server 9; IBM AIX® Version 5.1, 5.2, 5.3; and Novell NetWare)
Warranty	Three-year mail-in exchange‡

Feature	Benefits
Up to 280 Mbps data transfer rate*	• Helps reduce the time required for backup
Up to 3.0 TB cartridge physical capacity*	• Can store greater amounts of data as your business grows
Adaptive Data Compression and 256 MB buffer	• Helps achieve optimal performance and storage capacity • Can improve data throughput and tape repositions • Enables data integrity through synchronous, dynamic swapping of data compression scheme
Skip Sync	• Reduces backhitching when writing to tape • Helps increase the speed when reading and writing to tape and improves the reliability of tape cartridges
LDI/ADI Auto Detect	• Tape drive automatically detects the library's interface protocol • Makes installing the tape drive in a tape library much easier
LED Encryption Indicator	• LED indicates when data is being encrypted or when an encrypted tape cartridge is mounted • Provides the operator a visual confirmation of additional security
Data Safe Mode	• Provides read/write protection by preventing the accidental overwrite of data already on the cartridge • This technology is similar to WORM; however, it is managed at the drive and has the capability to be enabled/disabled‡‡
Constant Capacity	• Ensures that the data on the media is limited to a maximum of 3.0 TB* • Makes it easier to copy tape to tape and create dual backups
Partitioning and IBM Linear Tape File System	• Reduces the management effort and costs required to store data on tape by eliminating middleware requirements • Eases the understanding of what data is stored on the tape by displaying the content as a file tree • Opens new opportunities for customers to leverage LTO technology in entertainment, manufacturing and medical environments

For more information

To learn more about IBM LTO Ultrium tape drives, please contact your IBM OEM representative, or visit:
ibm.com/systems/storage/tape/oem

[1] Assuming 2:1 data compression

* Based on 2:1 data compression.

† Prior to the release of ECMA-321, SLDC (streaming lossless data compression) was known as "LTO-DC." SLDC uses ALDC as its primary data compression scheme, but also has a pass-thru scheme to avoid the expansion of incompressible data—a problem ALDC and most other compression algorithms encounter.

‡ All performance and reliability values are provided "AS IS" and no warranties or guarantees are expressed or implied by IBM. Actual values may vary and depend upon many factors including system hardware configuration and software design and configuration.

‡‡ May not meet regulatory requirements in some industries, states or countries.

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