IBM LTO generation 5 full-high tape drives, T3000P for OEM

Fifth-generation LTO tape drive provides outstanding capacity and performance

Highlights

- Supports the latest generation and highest capacity LTO® media cartridges with a capacity of up to 3.0 TB to help control massive storage growth and demanding costs associated with backup and archiving.
- Provides data transfer rates of up to 280 MBps[1], and supports slower speeds through Digital Speed Matching (DSM) to help reduce read/write times.
- Utilizes AES 256 data encryption[3] in the drive with no impact to drive performance to help prevent unauthorized access to sensitive data at no additional cost.
- Adaptive data compression, DSM and 512 MB buffer improves drive performance and storage capacity.

Today's enormous growth in data is being fueled by business continuity requirements, regulatory compliance, and information lifecycle management initiatives. Whether your business uses a high-performance network server or individual workstations, archiving and retrieving data in a fast, dependable, and consistent manner is mission critical to your business. The IBM System Storage® T3000P Tape Drive is the fifth-generation and highest capacity LTO Ultrium tape drive introduced to address the storage challenges faced by today's IT organizations.

Greater capacity and speed

IBM's fifth generation of LTO tape drives offer almost twice the capacity and significantly faster throughput than the preceding Ultrium LTO 4 generation of drives. The T3000P Tape Drive is designed for integration into servers, desktop enclosures, autoloaders, and scalable automated tape libraries.

To further increase capacity, Digital Speed Matching (DSM) will adjust the drive's native data rate to better match the data rate of the server. Speed matching has been increased from 7 speeds in LTO4 to 14 speeds in LTO5. This feature, along with a larger 512 MB buffer, will improve data throughput and reduce tape repositions and wear for times when the host data rate is less than optimal.

In addition, the T3000P Tape Drive uses an IBM-patented compression algorithm to optimize compression speed. The compression algorithm synchronously swaps the data compression scheme

dynamically between ALDC (adaptive lossless data compression) and a pass-thru mode. While data compression is being performed, a separate circuit—that performs simultaneous decompression—helps provide data integrity.

Securing your data

Businesses are proactively focusing on securing sensitive customer and business data. With increasing regulatory and compliance requirements, the need to secure data for audit and compliance purposes has become critical. The T3000P Tape Drive utilizes AES256 encryption and supports write once, read many (WORM) cartridges to help protect your data.

Compatibility with prior-generation Ultrium media

Compatibility with Ultrium LTO4 and LTO3 tape drives (excluding encryption) and media eases the introduction of these high-performance tape drives into your environment and protects your prior investments in media and tape automation systems. The T3000P Tape Drive is backward read and write compatible with Ultrium 4 media and read compatible with Ultrium 3 media. However by using Ultrium 5 media, which provides almost double the capacity of Ultrium 4 media, you will shorten read/write times, reduce the number of tapes required, and improve the backup window.

The IBM System Storage T3000P Tape Drive is an excellent tape storage solution for businesses requiring backup or low-cost real-time archival of their data within a small window of time. With 2:1 compression, the new T3000P has a storage capacity of up to 3.0 TB. Along with higher capacity, the performance of the T3000P Tape Drive is faster than previous generations of half-high LTO drives achieving a native data transfer rate of up to 140 MB per second, which is 133 percent faster than LTO3 Half High drives. The T3000P Tape Drive provides an excellent alternative to slower and smaller capacity 1/4-inch, 4 mm and 8 mm and DLT/SDLT tape drives as well as older LTO Generation tape drives.

Flexible host attachment

The IBM LTO Ultrium 5 tape drive offers the greatest level of attachment flexibility and the highest attachment speeds of any IBM LTO drive introduced to date. With its 6 Gbps SAS, 8 Gbps Fibre Channel, Ethernet, and RS-422 interfaces, the drives are engineered to perform in numerous environments. This means that when natively attached, the drives' speed and capabilities can be exploited by the server. It also means that the IBM T3000P can be integrated into SANs and libraries (LDI or ADI) through its RS-422 connector or a new Ethernet connector—which allows the drive to respond quickly to library commands and helps avoid contention on the attachment bus.

SAN and library integration

The T3000P tape drive with Fibre Channel is designed to auto-configure to establish its operational mode (FC-AL or point-to-point) and attachment speed. The T3000P tape drive features advanced library support (LDI or ADI) through an RS-422 or a new Ethernet connector.

Greater data protection with reliability and serviceability

With a focus on overall reliability, the T3000P Tape Drive utilizes advanced independent tape loader and threader motors. This, combined with positive pin retention improvements, increases tape handling reliability while loading tapes, recovering tapes, and extracting tapes after a sudden power down. In addition, the Partial Response Maximum Likelihood (PRML) channel includes an adaptive channel calibration feature. This feature 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.

For enhanced serviceability, the T3000P Tape Drive captures its error information. These errors are stored in the drive's flash memory so that it can be recalled when needed to minimize troubleshooting time for IT staff and system manufacturers.

Despite the increases in performance, the T3000P tape drive consumes less energy than previous generations of IBM LTO tape drives. Highly integrated electronics use IBM copper-based technology to help reduce energy consumption. These lower energy requirements are particularly important for systems in which heat dissipation must be limited.

"Green" storage with lower total cost of ownership

Even with the increased speed and capacity of the T3000P Tape Drive, it consumes 48 percent less power than previous generations of IBM LTO tape drives—which is ideal for "green" storage environments and reduced operating costs.

Tape drives are inherently environmentally and economically more friendly than any other storage source. With lower power requirements, lower cooling requirements, and lower costs per gigabyte.

The high performance of the T3000P Tape Drive combined with the high capacity of the Ultrium 5 tape cartridge can reduce the number of tape cartridges, tape drives, and tape libraries required in a storage or archive environment. Together, these all serve to reduce your overall total cost of ownership.

Features of fifth-generation drives

Building upon the highly successful line of IBM LTO tape drives, the T3000P Tape Drive introduces new features that increase throughput, capacity, and reliability over previous generations of LTO drives, while also providing capabilities to secure critical data.

Advanced features

Partitioning and Long Term File System - The IBM LTO Ultrium Generation 5 Half-High Tape Drives with LTO Ultrium 5 Tape Media provides partitioning support, which, in conjunction with IBM's unique Long Term File System technology, provides customers the ability to have file-level access to tape data. This unique support helps quickly locate and update information on the tape media.

In addition it provides some of the following benefits:

- Helps provide greater flexibility and access with a self-contained tape data cartridge
- Enables process improvement with sharing of data between different platforms
- Reduces tape, file management, and archive costs by eliminating the middleware layer
- Opens new use cases and business opportunities with entertainment, medical, and manufacturing industries
- Knowledge of what is stored on a tape media cartridge by viewing a directory tree

Skip sync - Allows writing to tape with reduced backhitch. This helps increase read/write speed and reliability of tape cartridges.

LDI/ADI auto detect - Automatically detects library interface protocol for ease of use.

LED encryption indicator - Indicates when data is being encrypted or an encrypted tape cartridge is mounted. It provides visual confirmation for additional security.

Data safe mode - Provides R/W protection and prevents accidental overwrite of data. It is similar to WORM and managed at the drive. Has the capability to be enabled/disabled.

Constant capacity - Drive media is limited to a maximum of 1.5TB and enables easier tape to tape copy or dual backups.

Superior technology

Features and benefits designed to keep your backup/restore and tape operations trouble free:

- ***A 16-channel head design*** is designed to help provide double data throughput. The 16-channel head, coupled with a 12 percent increase in linear density, helps increase drive performance.
- ***IBM-patented, timing-based servo positioning*** is designed to help data be written to tape with greater precision. The tracks are narrower on the 16-channel head, which helps to increase cartridge capacity. Compared to the LTO4 drives, the track density of the T3000P is increased by 43 percent to 1280 tracks.

Giant Magneto-restive (GMR) heads give drives longer life and increased margin for wear

- ***Advanced tape loader and threader mechanism*** helps improve error recovery when loading, threading, and unloading a cartridge. Independent loader and threader motors, coupled with positive pin retention, help retain the pin during a mis-pick. This independent control can help improve load and thread reliability.

A graceful, dynamic braking feature helps enable the reel motors to gradually decelerate instead of stopping abruptly in the event of a power failure. It helps prevent tape stretching and loose tape wraps and reduce tape damage and breakage.

- ***"On-the-fly" adaptive channel calibration*** is designed to allow the drive to adjust to variations in the media and head. Calibrating the channel can help improve higher data throughput rates and data integrity.
- ***Superior power management*** helps improve heat dissipation and provide greater operational efficiency than that of previous generation IBM LTO drives. The drive operates in two modes: write mode and idle mode (for when the drive is not in use).
- ***Digital Speed Matching (DSM)*** is supported on Ultrium 5 media in increments of 40 MBps (up to 140 MBps). This feature, along with a larger buffer, is designed to help improve throughput in environments where the host data rate is less than optimal.
- ***A large 512 MB buffer*** is designed to work in combination with DSM to mask the impact of data rate fluctuations, helping allow the tape drive to perform at its optimal speed.

IBM LTO Full High Ultrium Tape Drives, T3000P at a glance

Tape drive type	
Physical Capacity per cartridge	LTO Ultrium 5
Data transfer rate	3.0 TB compressed[1]; 1.5 TB native
Number of tracks	Up to 280 MBps compressed[1]; 140 MBps native
Media	1280
Data cartridge	LTO Ultrium 5 (rewritable) LTO Ultrium 5 (WORM)
Cleaning cartridge	LTO Universal Cleaning Cartridge (UCC)
Backward compatibility	Read/write compatible with Ultrium LTO4 media Read compatible with Ultrium LTO3 media
Interface	FC-4 at 2 Gbps or 4 Gbps or 8 Gbps SAS 6 Gbps
Library interface	LDI, ADI
Data compression	SLDC (LTO data compression per ECMA-321)[2]
Encryption	AES256
Buffer	512 MB
Rewind speed	Up to 10 meters/sec
Operating speed	Up to 6.33 meters/sec
Data rate matching	Digital Speed Matching 40 – 140 MBps
Physical characteristics	
Dimensions (internal drive)	250,000 hours at 100 percent duty cycle
Weight	1 x 1017 bytes per permanent read error
Reliability	
Mean time between failures (MTBF)	250,000 hours at 100 percent duty cycle
Error rate (calculated)	1 x 1017 bytes per permanent read error
Error rate (validated)	1 x 1014 bytes per permanent read error 1 x 1013 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	T3000P (SAS): 5 V at 3.4 A, 12 V at 1.1 A (steady state) T3000P (FC): 5V at 2.4 A, 12 V at 1.1 A (steady state)
Power dissipation	T3000P (SAS): 7.5 W (idle, with cartridge), 26.5 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; AIX® Version 5.1, 5.2, 5.3; and Novell NetWare)
Warranty	Three-year mail-in exchange

Media

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

For more information

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

[1] Assuming 2:1 compressible data.

[2] 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.

[3] Encrypted files cannot be written to prior-generation media.

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