

STORAGETEK T10000D TAPE DRIVE

THE ULTIMATE ARCHIVE

KEY FEATURES

- Highest capacity and fastest throughput in the industry
- Interface options include 16 Gb/sec FC, FICON, or 10 Gb/sec FC over Ethernet (FCoE)
- Encryption and WORM technology

KEY BENEFITS

- **Lowest total cost of ownership.** Fewer drives, libraries, and media do the same job.
- **Best-in-class data availability.** Enterprise design and data integrity validation ensure reliable access to data.
- **Unprecedented performance.** Accelerator features maximize data center efficiency.
- **Extreme capacity simplified.** Compatibility with LTFS software ensures drag-and-drop simplicity just as if the files were stored on disk or flash.
- **Protection for your data and your business.** Meet evolving requirements for data security and compliance.

Oracle's StorageTek T10000D enterprise tape drive blends the highest capacity, performance, reliability, and data security to support demanding, 24/7 data center operations. The eco-efficient StorageTek T10000D tape drive also ensures the lowest total cost of ownership, and proven reliability with ongoing compatibility with StorageTek enterprise libraries as well as third-party hardware and software.



Figure 1. The StorageTek T10000D tape drive delivers breakthrough economics.

Support the Most Demanding Data Center Operations

The StorageTek T10000D tape drive delivers superior value and performance for any data storage and retrieval:

- Lowest total cost of ownership. Fewer drives, libraries, and media do the same job with the StorageTek T10000D's highest capacity and fastest throughput in the industry.
- Best-in-class data availability. Enterprise design and data integrity validation ensure reliable access to data.
- Unprecedented performance. Accelerator features of the StorageTek T10000D maximize data center efficiency.
- Extreme capacity simplified. Compatibility with LTFS software ensures drag-and-drop simplicity just as if the files were stored on disk or flash.
- Protection for your data and your business. Choose encryption and write once, read many (WORM) technology—to meet evolving requirements for data security and compliance.

Lower Your TCO with the StorageTek T10000D

The StorageTek T10000D tape drive delivers a potent combination: Native capacity of up to 8.5 terabytes and a maximum compressed data rate of up to 800 MB/sec (up to 252 megabytes per second with 1:1 compression). This means fewer tape drives and cartridges do the same amount of work as midrange tape drives at a lower total cost. Library footprint is reduced and media management is simplified, because you manage fewer drives and tapes. Writing 8.5 terabytes of data without a media exchange improves operational efficiency. Sport cartridges enable even faster access to data; add them to the mix to achieve a hybrid access/capacity solution.

Archive management features include the capability to increase the capacity of existing StorageTek T10000 T2 tape cartridges by 55 percent, and backward read compatibility with StorageTek T10000A, StorageTek T10000B, and StorageTek T10000C tape drives preserves existing media investments. Because the StorageTek T10000D tape drive offers 16 Gb/sec Fibre Channel, FICON, and 10 Gb/sec Fibre Channel over Ethernet (FCoE) connectivity, you can easily transition across these environments as network architectures change.

Tape-based storage also minimizes power, cooling, and acquisition cost. Compared to disk storage, tape is 105 times more energy efficient and 26 times less expensive¹. As a key component of eco-efficient data centers, tape excels in applications as diverse as production, data management, backup/restore, disaster recovery, and archive.

Pair the StorageTek T10000D tape drive with the StorageTek SL8500 or StorageTek SL3000 modular library systems to accelerate data consolidation efforts. As data center storage needs increase, manage costs effectively by combining the highest tape capacity on the market with the eco-efficiencies of tape.

Best-in-Class Data Availability with Exceptional Tape Drive Design

When writing large volumes of data to tape, be sure that the file transferred correctly, the first time. The Data Integrity Validation feature of the StorageTek T10000D reads CRC checksum files (based on the T10 ANSI standard) to verify that data was not corrupted en route to the tape drive.

The StorageTek T10000D tape drive is engineered to support demanding 24/7 high-duty cycle operations. The SafeGuide System tape path feature, which is the tape guiding system of the StorageTek T10000D tape drive, provides long-term data and drive reliability:

- The tape guides contact only the backside of the media, not the recording surface, minimizing lateral tape motion and protecting data integrity.
- The long tape path guides the media more accurately and reduces tape tension, which also reduces stress on the drive and media.
- The buckler mechanism securely attaches the cartridge leader to the drive leader.
- The unique hub-locking mechanism protects your data during cartridge transport.

The 32-channel, dual-head design of the StorageTek T10000D tape drive minimizes media and drive wear and ensures long term data availability:

- Writing with 32 channels enables operation at lower tape speed, which reduces stress on the drive and media without impacting performance. Midrange tape drives write with 16 channels.
- Dual heads work in tandem while recording data: while one head writes, the other reads the written data, verifying that every recorded bit meets strict standards for recording quality. Competing tape drives utilize a single recording head.

Unprecedented Performance with Accelerator Features

Starts and stops are unavoidable in an enterprise data center, but they can be minimized with the StorageTek T10000D. Starts, stops, and backhitching are nearly eliminated with three key features:

- A 2 gigabyte buffer maximizes recording efficiency across a wide range of host speeds.
- The File Sync Accelerator feature enables a wide range of file sizes to be written efficiently through advanced buffer management and dynamically selected tape speeds.

¹ The Clipper Group, "Revisiting the Search for Long-Term Storage — A TCO Analysis of Tape and Disk," May 13, 2013

- The Tape Application Accelerator feature further enhances performance by streaming data to tape despite tape marks and sync marks received from the host application that cause other tape drives to stop and start.

Extreme Capacity Simplified with LTFS

The StorageTek T10000D is compatible with linear tape file system (LTFS) software, which enables writing files to tape in a self-describing format, much the same way files are written to disk and flash storage devices. This facilitates file retrieval directly from tape without the need for a backup/archive application or the need to stage the data on another tier of storage. Files that are stored in an LTFS format on tape can be accessed just as if the files were stored on disk or flash.

Protect Your Data, Protect Your Business

Choose one or both—encryption and WORM technology—to meet evolving requirements for data security and compliance.

The StorageTek T10000D tape drive has built-in encryption that works in conjunction with Oracle Key Manager, an appliance that provides a simple, centralized, scalable solution for managing the keys used to encrypt and decrypt data written by the StorageTek T10000D tape drive. The encryption capability is the same proven technology that is used in the previous-generation StorageTek T10000A, StorageTek T10000B, and StorageTek T10000C tape drives, StorageTek LTO-5 and StorageTek LTO-6 tape drives, and the StorageTek T9840D tape drive. Use encryption to ensure that only the right people have access to the data, and avoid potential legal and financial problems caused by loss or theft of unencrypted data.

StorageTek VolSafe secure tape cartridges for Oracle's StorageTek T10000D tape drive help you meet stringent electronic storage regulatory and legal requirements with WORM capability. Store data securely on nonerasable, nonrewritable tape and recall data quickly when you need it.

Simplify Media Services

When you want to organize and optimize media to reduce downtime, risk and maintenance, turn to Oracle for expert assistance. Media conversion services help you move data in optical, tape, and disk formats to new or different technology that offers higher capacity, lower cost, and lower risk. For example, it may be time to convert WORM optical to WORM StorageTek VolSafe tape cartridges. And when you're optimizing data center facilities, tape relocation services expedite data center relocation and rack relocation activities.

Engage the Storage Experts

Oracle offers tailored, mission-critical services and support for your storage environment. The Oracle Advanced Customer Support Services team helps you address storage challenges by delivering installation, configuration, optimization, and ongoing monitoring, and tailored support. Oracle service professionals help you achieve the highest levels of system performance and availability with diagnostic and monitoring tools that help anticipate, identify, and remediate any potential issues. From tape library installation services, to the design and implementation of key management encryption systems, Oracle service experts help you realize more value from your storage infrastructure—with less disruption to your business. For more information contact your Oracle representative, e-mail acsdirect_us@oracle.com, or visit oracle.com/acs.

StorageTek T10000DTape Drive Specifications	
Capacity	
Native capacity (uncompressed)	8 TB (1.6 TB, sport tape cartridge) Up to 8.5 TB with the Maximum Capacity feature
Performance	
Native sustained data rate (uncompressed)	252 MB/sec
Maximum native sustained data rate (compressed)	800 MB/sec
Access time* (see note)	Tape load and thread: 13 sec Average file access (excludes load/thread): 50 sec (14 sec for sport tape cartridge) Maximum rewind: 97.0 sec (26 sec for sport tape cartridge) Unload time: 23 sec
Buffer	2 GB
Availability	
Archive life	30+ years
Uncorrectable bit error rate (UBER)	1×10^{-19}
Drive loads/unloads	>150,000
Compatibility	
Interface	16 Gb Native Fibre Channel (compatible with 16 Gb, 8 Gb, and 4 Gb environments) Native FICON (compatible with 8 Gb and 4 Gb environments) 10 Gb native FCoE
Read compatibility interface	StorageTek T10000A and StorageTek T10000B on StorageTek T10000 tape cartridges StorageTek T10000C and StorageTek T10000D on StorageTek T10000 T2 tape cartridges
Emulation modes	3592 (MVS), VSM
Automation	StorageTek SL8500, StorageTek SL3000 modular tape libraries, rackmount
Mechanical	
Height	3.2 in. (8.1 cm)
Depth	16.75 in. (42.6 cm)
Width	5.77 in. (14.6 cm)
Environmental	
Temperature	Operating: +60°F to +90°F (+15°C to +32°C) Nonoperating (storage): +50°F to +104°F (+10°C to +40°C)
Relative humidity	Operating: 20% to 80% Nonoperating: 10% to 95%

Tape Format	
Linear Serpentine	
Power	
Consumption/dissipation (drive only):	
Operating max continuous – not peak	90 w
Hibernate mode	36 w
Encryption	
<p>The StorageTek T10000D tape drive works in conjunction with Oracle Key Manager. Oracle Key Manager delivers a simple, secure, centralized solution for managing the keys used to encrypt and decrypt data written by the StorageTek T10000D tape drive. Developed as a hardened solution, Oracle Key Manager consists of our key management software, Sun server, GUI/CLI that are executed on a workstation, and SCA 6000 cryptographic card (optional). Oracle Key Manager runs without regard to application, operating platform, or primary storage device. It complies with Federal Information Processing Standard (FIPS) 140-2 certification. Requirements and specifications may change, so check with your Oracle representative.</p>	

*The actions of the tape drive can be divided into four distinct phases:

Phase 1. Load time—the amount of time required to insert a cartridge in the drive, load the tape, and prepare to read, write, or search.

Phase 2. Average file access time—the amount of time required to search from the beginning of the tape to the midpoint; does not include load time.

Phase 3. Maximum rewind time—the amount of time required to rewind the tape from the end to the beginning of the tape. The average rewind time is the time to rewind a tape from the midpoint to the beginning, that is, one-half of the maximum rewind time.

Phase 4. Unload time—the amount of time required to eject the cartridge from the drive.

Contact Us

For more information about Oracle's StorageTek T10000D tape drive, visit oracle.com or call +1.800.ORACLE1 to speak to an Oracle representative.



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