

# StorageTek T10000D Tape Drive



## KEY FEATURES

- Enterprise class capacity, throughput, and reliability
- Interface options include 16 Gb/sec FC and FICON
- Encryption and WORM technology

## KEY BENEFITS

- Lower 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.
- 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 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.

## Support the Most Demanding Data Center Operations

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

- **Lower total cost of ownership (TCO).** Fewer drives, libraries, and media do the same job with StorageTek T10000D's higher capacity and throughput.
- **Best-in-class data availability.** Enterprise design and data integrity validation ensure reliable access to data.
- **Unprecedented performance.** Accelerator features of StorageTek T10000D maximize data center efficiency.
- **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 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 from Oracle by 55 percent. Backward read compatibility with Oracle's 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 and FICON, you can easily transition across these environments as network architectures change.

Compared to disk storage, tape storage minimizes power, cooling, and acquisition cost leading to significant savings in total cost of ownership. 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 Oracle's StorageTek SL8500 modular library system or StorageTek SL3000 modular library system to accelerate data consolidation efforts. As data center storage needs increase, you can manage costs effectively by combining high tape capacity with the eco-efficiencies of tape.

## Acquire Best-in-Class Availability with Exceptional Tape Drive Design

When writing large volumes of data to tape, be sure that the file transfers correctly, the first time. The Data Integrity Validation feature of StorageTek T10000D reads CRC checksum files (based on the T10 ANSI standard) to verify that data is 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 tape guiding system of the StorageTek T10000D tape drive, reduces tape damage and adds to overall system 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 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.
- 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.

## Receive Unprecedented Performance with Accelerator Features

Starts, stops, and seek time delays are unavoidable in an enterprise data center, but they can be minimized with StorageTek T10000D. Using three key features, starts and stops are nearly eliminated when writing files, and seek time is minimized when recalling multiple files from a single cartridge:

- A 2 gigabyte buffer maximizes recording efficiency across a wide range of host speeds.
- The File Sync Accelerator feature of StorageTek T10000D enables a wide range of file sizes to be written efficiently through advanced buffer management and dynamically selected tape speeds.
- The File Access Accelerator feature of StorageTek T10000D optimizes the order in which multiple files are recalled from a tape cartridge, thereby minimizing seek time between files.

## Migrate Data in Parallel with Production

A first in the industry, Oracle's StorageTek Direct Copy feature of StorageTek T10000D enables migration of tape data in parallel with production processes. You can copy data from any Fibre Channel tape device directly to StorageTek T10000D without burdening the host application and disk cache with CPU-intensive data migration activity.

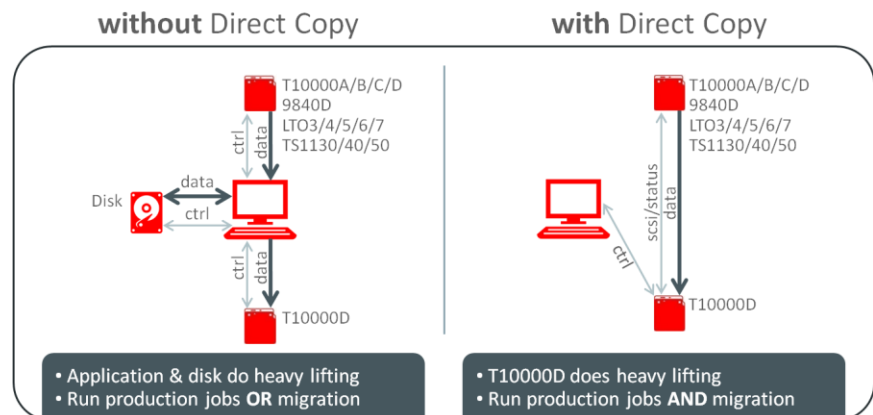


Figure 1. Tape data migration is simplified with StorageTek Direct Copy.

## Simplify Extreme Capacity with LTFS

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 are 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, Oracle's StorageTek LTO 6 and StorageTek LTO 7 tape drives, and Oracle's 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.

Oracle's secure StorageTek VolSafe tape cartridges for the StorageTek T10000D tape drive help you meet stringent electronic storage regulatory and legal requirements with WORM capability. Store data securely on non-erasable, non-rewritable 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 you 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, email [acsdirect\\_us@oracle.com](mailto:acsdirect_us@oracle.com), or visit [oracle.com/acs](http://oracle.com/acs).

### STORAGETEK T10000D TAPE DRIVE SPECIFICATIONS

Capacity	
Native capacity (uncompressed)	8 TB (1.6 TB, sport tape cartridge) Up to 8.5 TB with the Maximum Capacity feature of StorageTek T10000D
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)	$1 \times 10^{-19}$
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)

<b>Read compatibility interface</b>	StorageTek T10000A and StorageTek T10000B on StorageTek T10000 tape cartridges StorageTek T10000C and StorageTek T10000D on StorageTek T10000 T2 tape cartridges
<b>Emulation modes</b>	3592 (MVS), VSM
<b>Automation</b>	StorageTek SL8500 modular library system, StorageTek SL3000 modular library system, rack mount
<b>Network addressing</b>	IPv4, IPv6
<b>Mechanical</b>	
<b>Height x depth x width</b>	3.2 in. (8.1 cm) x 16.75 in. (42.6 cm) x 5.77 in. (14.6 cm)
<b>Environmental</b>	
<b>Temperature</b>	Operating: +60°F to +90°F (+15°C to +32°C) Non-operating (storage): +50°F to +104°F (+10°C to +40°C)
<b>Relative humidity</b>	Operating: 20% to 80% Non-operating: 10% to 95%
<b>Tape Format</b>	
Linear serpentine	
<b>Power</b>	
<b>Consumption/dissipation (drive only):</b>	
<b>Operating max continuous – not peak</b>	90 W
<b>Hibernate mode</b>	36 W

**Encryption**

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 Oracle's key management software, Oracle's Sun server, GUI/CLI that are executed on a workstation, and an 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.

\*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 the StorageTek T10000D tape drive, visit [oracle.com](http://oracle.com) or call +1.800.ORACLE1 to speak to an Oracle representative.

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