

DATASHEET

SCALAR TAPE LIBRARIES

Low-Cost, Secure Storage for Long-Term Data Archiving and Cyber Protection



MANAGE MASSIVE DATA GROWTH WITH QUANTUM TAPE LIBRARIES

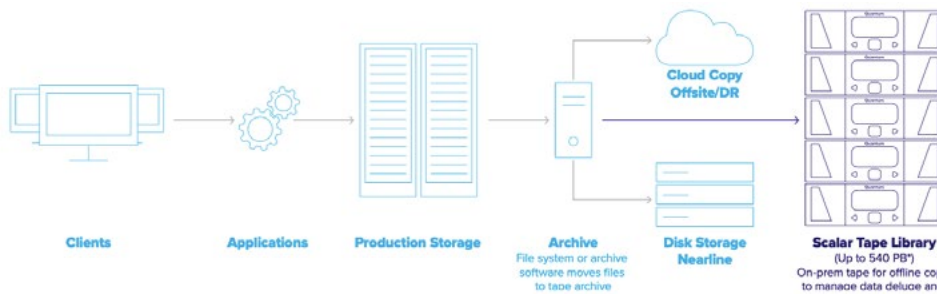
Organizations are generating and storing petabytes and exabytes of unstructured data—video, high-res images, IoT data, research data, and much of this data needs to be kept for years and decades. The total installed enterprise storage systems are expected to grow 30.9% CAGR between 2020-2025 totaling 5.5 zettabytes (AB)—that’s over 5 million petabytes. The data deluge (growth) will expand within the enterprise and tape is the most cost-effective, secure storage option, requiring very little power to store data for long periods, and is a key component in the fight against cyber threats.



Source: IDC InfoBrief, sponsored by Quantum, "Data Deluge: Why Every Enterprise Needs a Cold Storage Strategy", Doc. #US48119821, August 2021.

BUILDING A DIGITAL TAPE ARCHIVE WITH OFFLINE PROTECTION

Quantum Scalar® Tape Libraries offer efficient, intelligent, and secure LTO tape storage for data archiving and long-term retention. Scalar tape systems combine high-density and highly reliable hardware designs with intelligent software that proactively monitors each tape system. As a result, administrators spend less time managing tape. Scalar Tape Libraries are the most secure tape systems on the market with a host of unique features that protect data stored on tape.



FEATURES & BENEFITS

Lowest-Cost, Long-Term Storage

LTO tape continues to provide the lowest-cost, long-term storage solution, and for PB-scale data sets, is a fraction of the cost of public cloud and other cold storage solutions. Quantum Scalar tape systems further reduce total cost with space efficient designs, iLayer Proactive diagnostics and analytics, automated monitoring and reporting, and integration with cloud-based AIOps software to reduce administrative time.

Easily Manage Data Growth

Quantum Scalar Tape Libraries have a modular design that simplifies adding storage slots for capacity growth and drives for greater performance. Capacity-on-Demand (CoD) slot licensing provides a level of storage granularity to help you better manage your storage costs in a pay-as-you-grow approach with capacity scaling from 1,125 TB up to 540 PB based on LTO-9 compressed capacity.

Ensure Data Integrity and Security

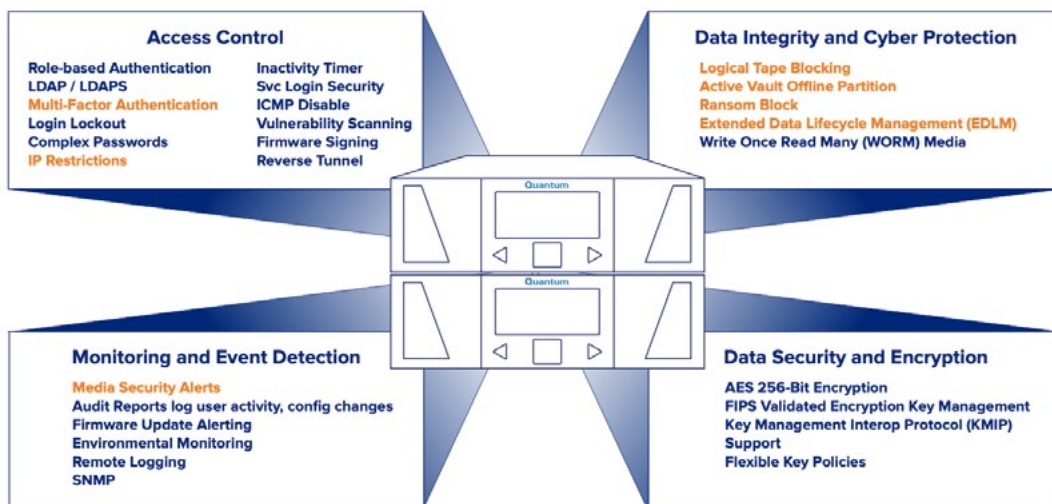
Quantum Scalar Tape Libraries are the most secure tape libraries on the market, with over 25 unique features and capabilities that form a comprehensive security framework which controls system access, provides system monitoring and event detection, data security and encryption, and unique features for cyber protection and data integrity.

Minimize Downtime

Scalar Tape Libraries have a comprehensive set of high-availability features to ensure the system remains operational and accessible. Redundant power supplies and path failover (for both robotic control and data path) provide the fault tolerance needed in an enterprise system. Additionally, intelligence built into the iLayer software provides a higher level of availability as advanced features like environmental and power monitoring, proactive diagnostics, and media and tape drive reporting identify trends and notify users of potential issues before faults occur—enabling proactive control of the library system to ensure maximum uptime.

QUANTUM SCALAR TAPE LIBRARIES ARE THE MOST SECURE TAPE SYSTEMS AND A KEY COMPONENT OF A CYBER-RESILIENT INFRASTRUCTURE

Quantum Scalar Tape Libraries offer a cyber-resilient solution that can be as small as a few tapes, scale within a rack, or can start at a full rack to grow according to your storage needs. Our automated security features enable you to efficiently store and manage your offline copies and keep them out of the reach of ransomware or other malware. You can learn more about Scalar's Security Framework at www.quantum.com/security-framework, which includes exclusive features with increasing levels of security such as Active Vault, Logical Tape Blocking, and Ransom Block.

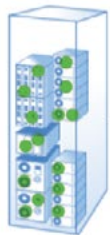


Orange indicates a feature that is unique to Quantum Scalar® Tape Systems.

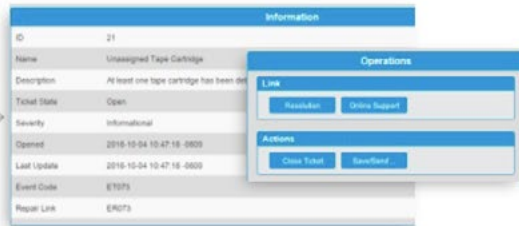
QUANTUM SCALAR TAPE LIBRARIES MAKE TAPE EASY WITH ADVANCED MONITORING AND PROACTIVE DIAGNOSTICS

Quantum Scalar Tape Libraries start as small as three rack units and 25 slots and can scale as large as over 20 racks in size. Every module offers Capacity-on-Demand (CoD) licensing, with configurable designs to accommodate data growth.

Scalar iLayer™ proactive diagnostics software is constantly monitoring the tape library environment, including media, tape drives, and the tape library itself. Degraded conditions, including media and drive conditions, can be detected and alerted proactively to make tape easier to manage and minimize downtime.



Proactive System Monitoring



Advanced Diagnostics in Plain English



Auto-Notification and Guided Repair

INVESTMENT PROTECTION WITH SUPPORT FOR MULTIPLE LTO GENERATIONS

Quantum Scalar Tape Libraries support many generations of LTO media. Different generations of LTO tape drives and tape media can be mixed within a single library, offering investment protection and giving customers the benefits of decreasing tape costs over time.

Drive Type	Media Type	Cartridge Capacity Native/Compressed ¹ (TB)	Drive Throughput Native/Compressed ¹ (MB/sec)
LTO-9 ²	LTO-9 (L9) ²	18/45	400/1,000
LTO-8	LTO-8 (L8)	12/30	360/900
LTO-8	LTO-7 (M8) ³	9/22.5	300/750
LTO-7	LTO-7 (L7)	6.0/15.0	300/750
LTO-6	LTO-6 (L6)	2.5/6.25	160/400

Please see www.quantum.com for more drive specifications.

¹ Assumes 2.5:1 compression and full-height (FH) drives.

² LTO-9 does not support read/write of LTO-8 Type M (M8) media.

³ New, unused LTO generation 7 cartridges can be initialized as LTO-8 Type M media (M8).



Scalar i3 control module.



Scalar i6 control module.



Scalar i6000 features ultra-high density and a 19-inch rack form factor, and scales from 100 to 12,006 cartridges.

FEATURES AND BENEFITS

Features	Benefits
Best-in-Class Storage Density	All Scalar Tape systems offer the best density within a standard 19" rack form factor.
Capacity-on-Demand Growth (CoD)	Simplifies growth by scaling quickly and easily, without disruption.
Quantum Ransom Block*	Provides the highest level of security by creating a physical barrier between tapes and the tape robot. Data stored on tapes that have been 'blocked' cannot be accessed even in the unlikely event that a tape library is hacked.
Active Vault	Secure, isolated in-library vault partition not visible to applications or network. Protects data against ransomware and other cyber threats. Archive tapes inside the library, minimizing costs and cartridge handling while improving security and access to vaulted content.
Logical Tape Blocking	Logical Tape Blocking is a logical policy-based block that's placed on a tape magazine, while it waits for the magazine to be filled. Before tapes are ejected, administrators can prevent tapes from being loaded into a drive using software commands, reducing the risk window until Ransom Block is initiated. Works in conjunction with Scalar Ransom Block.
Multi-Factor Authentication (MFA)	Multifactor authentication option for library UI login using standard MFA applications to protect library admin/user accounts with an additional layer of security via a time-based one-time password.
Extended Data Life Management (EDLM)**	Ensures stored data remains readable with automated integrity checks.
iLayer Proactive Monitoring and Diagnostics	Ensures the entire system stays running smoothly; provides guided steps to resolve issues, often before failures occur.
Advanced Reporting	Media, drive, and media security reports help manage system resources, improve security, and improve budget and planning. Automated report scheduling and distribution save time.
Scalar Key Manager (Encryption)	The Scalar Key Manager FIPS-validated solution makes it easy to manage keys, mitigating risk of lost data. AES 256-bit encryption standard provides the highest levels of security.
Scalar Key Manager Support	FIPS-validated solution makes it easy to manage keys, mitigating risk of lost data.
Active/Active Dual Robots**	Adds a second robot to the library for high availability and faster performance. Operations continue in the event of a robot failure. Robot service is non-disruptive to the application.
High-Density Expansion Module***	Can store up to 23.4 PB* in a single 19-inch rack without compromising cartridge access performance. Provides non-disruptive bulk loading and fast independent cartridge scan/inventory.
Cloud-Based Analytics	Gain insight into your system with Real-Time Monitoring and Predictive Issue Resolution analytical tools.
Path Failover**	Control path and data path failover features ensure library system stays operational and accessible, even with a SAN fabric failure.
RESTful Web Services	Saves administrative time by easily automating repetitive tasks.
Automatic Firmware Update Checks	Customers can choose to have automatic checks for firmware updates to ensure use of the latest library and drive code levels.
Auto-Discovery and Auto-Calibration	Auto-discovery and auto-calibration for installed/added components (modules, tapes, drives, magazines, etc.)
Partitioning	Every Scalar Library supports logical partitioning, up to 24 partitions per system, so that systems can be shared between multiple applications.

*Ransom Block not available on Scalar i6000.

**EDLM & Path Failover not available on Scalar i3.

*** Active/Active Dual Robots and HD Expansion module available only on Scalar i6000.

TECHNICAL SPECIFICATIONS

	Scalar i3 (Small to Mid-Market)	Scalar i6 (Medium Enterprise)	Scalar i6000 (Large Enterprise)
Number of Slots	25 to 400	50 to 800	100 to 12,006
System Capacity Range (TB)			
LTO-9 (raw / compressed)	Coming Soon	900 to 14,400 ¹ / 4,500 to 36,000 ¹	1,800 to 216,108 ¹ / 4,500 to 540,270 ¹
LTO-8 (raw / compressed)	300 to 4,800 ¹ / 750 to 12,000 ¹	600 to 9,600 ¹ / 1,500 to 24,000 ¹	1,200 to 144,072 ¹ / 3,000 to 360,180 ¹
LTO-7 (raw / compressed)	150 to 2,400 ¹ / 375 to 6,000 ¹	300 to 4,800 ¹ / 750 to 12,000 ¹	600 to 72,036 ¹ / 1,500 to 180,090 ¹
Number of Drives	1 - 24		1 - 192
Drive Types Supported	Half-Height (HH) LTO Drives	Full-Height (FH) LTO Drives	Full-Height (FH) LTO Drives
Control Module Form Factor	3U	6U	Full Rack
Minimum Size	3U	6U	One full 19" rack
Maximum Size	24U	48U	Twenty Racks
Deployment	Rack-mounted		Free-standing, scales linearly
How System Scales	Scales vertically in rack up to 24U in 3U increments and 25-slot CoD licensing	Scales vertically in rack up to 48U in 6U increments and 50-slot CoD licensing	Scales up to 20 systems CoD: 100, 200, 400, 700, 1,500, 3,000, 5,000, 7,000, 9,000, 11,000
Operation			
Inventory Speed	Ranges from approx. 1 minute to 6 minutes, depending on the configuration		For most modules, 1 minute 12 seconds; four modules <5 minutes
Connectivity	Drive Interfaces: 8 Gb Fibre Channel and 6 Gb SAS Management Interface: 1 GbE	Drive Interfaces: 8 Gb Fibre Channel; 12 Gb SAS (LTO-9 only) Management Interface: 1 GbE	Drive Interface: 8 Gb FC Library Interface: 8Gb FC bridged through drive for data; 1 GbE with remote GUI and RESTful Web Services for library mgmt
i3 and i6 Import/Export Options	Configurable, 0 to 50 slots in 5-slot increments Up to 240 import/export elements supported per logical partition		See options for i6000 below*
i6000 Import/Export Options*			
Control Module	One I/E station with 24 slots		
Expansion Modules	Option for 0, 24, or 72 slot I/E stations per expansion module		
Maximum I/E Station Slots	1,104 slots		
Extended Import/Export	Allows licensed storage slots to be used as I/E elements		
Bulk Load/Unload	Up to 540 slots per High-Density Expansion Module (HDEM) without interruption		
Auto-Import	Automatically redirects cartridge exports to bulk unload areas or to an Active Vault based on user policies		
Export Redirect	Library automatically imports cartridges to multiple partitions based on user policies without needing cartridges placed in specific I/E slots		
Dimensions			
Control Module	10.4inx17.4inx36.4in (26.5 cm x 44.1 cm x 92.45 cm)		7.4 in x 24.3 in x 38.3 in (196.6 cm x 61.7 cm x 97.4 cm)
Expansion Module	10.4inx17.4inx36.4in (26.5 cm x 44.1 cm x 92.45 cm)		77.4 in x 23.6 in x 38.3 in (196.6 cm x 59.9 cm x 97.4 cm)
Parking Module	N/A		77.4 in x 23.6 in x 38.3 in (196.6 cm x 59.9 cm x 97.4 cm)

Reliability and Availability		
MSBF	Greater than 2 million	Greater than 3 million
MTTR	30 minutes	20 mins, 10 mins for Dual Robot replacement
Electrical	100VACto240VAC,50Hzto60Hz	0-240 VAC, 2-24 kVA; -48 VDC, <1 kVA per module
Power	Optional 2N power / 80 PLUS® certified power supplies	
Dual Robotics	No	Yes
Rack Installation Requirements	Library must be installed in a standard 19-inch four-post rack enclosure; rack must support product depth of 36.4 in (92.5 cm)	
Module Upgrades	Any module may be added in <30 minutes; all components are customer installable	Requires Quantum Installation
Compliance and Certification		
Safety Standards	IEC 60950-1 and IEC 62368-1 with worldwide deviations, EN62368-1, UL 62368-1, IS3525(Part 1), CNS14336-1	
Emissions Standards	IEC 60950-1 and IEC 62368-1 with worldwide deviations, EN62368-1, UL 62368-1, IS3525(Part 1), CNS14336-1	
Immunity Standards	EN 55024, KN 35; KN24	
International Certifications	cTUVus (US and Canada), FCC (US), ICES (Canada) CE (Europe), UKCA (United Kingdom), GS Mark (Germany), CMIM(Morocco), VCCI (Japan), KC (Korea), BSMI (Taiwan), BIS (India), RCM (AUSTRALIA/NEW ZEALAND), EAC (Eurasian Customs Union)	cTUVus (US and Canada), FCC (US), ICES (Canada) CE (Europe), UKCA (United Kingdom), GS Mark (Germany), CMIM (Morocco), VCCI (Japan), KC (Korea), BSMI (Taiwan), RCM (AUSTRALIA/NEW ZEALAND), EAC (Eurasian Customs Union)

Please see www.quantum.com for more drive specifications. 1Assumes 2.5:1 compression. *Up to 240 import/export elements supported per logical partition.
Software and Platform Compatibility: For a complete list of software and platforms compatible with Scalar series, consult the most recent Software Compatibility Guide on www.quantum.com/swcompguide.aspx.

TECHNICAL SPECIFICATIONS

Environmental Factor	Recommended ¹	Allowable ²	Shipping ³
Dry-Bulb Temperature	LTO-6, LTO-7, LTO-8: 16 to 25 °C (61 to 77 °F) LTO-9: 15 to 25 °C (59 to 77 °F)	LTO-6, LTO-7, LTO-8: 16 to 35 °C (61 to 95 °F) LTO-9: 15 to 35 °C (59 to 95 °F)	-23 to 49 °C (-9 to 120 °F)
Relative Humidity	20 to 50% (non-condensing)	20 to 80% (non-condensing)	5 to 80% (non-condensing)
Maximum Temperature Change	5 °C / hour	5 °C / hour	n/a
Maximum Humidity Change	5% / hour	5% / hour	n/a
Temperature Limitation for Humidity Conditions	LTO-6, LTO-7, LTO-8: Wet Bulb Temperature <= 26 °C (79 °F) LTO-9: Max Dew Point 22 °C (72 °F)	LTO-6, LTO-7, LTO-8: Wet Bulb Temperature <= 26 °C (79 °F) LTO-9: Max Dew Point 22 °C (72 °F)	Wet Bulb Temperature <= 26 °C (79 °F)
Maximum Altitude	3,048 m (10,000 ft)	3,048 m (10,000 ft)	12,192 m (40,000 ft)

¹ Recommended: The recommended operational/storage environmental envelope provides guidance on the environmental range for optimal performance and high reliability. This environmental range protects for 30-year archival storage. (Derate the maximum recommended dry-bulb temperature by 1 °C/300 m above 1,800 m (1.8 °F/1,000 feet above 6,000 feet)).

² Allowable: The allowable operational/storage environmental envelope defines the test limits to verify that the equipment will function within the environmental envelope. This environmental range is defined for operational storage of less than 6 months. (Derate the maximum dry-bulb temperature by 1 °C/300 m above 900 m (1.8 °F/1,000 feet above 3,000 feet)).

³ Shipping: When shipping media over extended environmental ranges, shipping times should be limited to minimize the duration of media being exposed to varying environmental conditions at lower and upper ranges. LTO tape media specifications provided by the LTO program at www.lto.org or specifications provided by the media manufacturer.

Note: The prolonged exposure to conditions outside the recommended range, especially approaching the extremes of the allowable operating environment, can result in decreased equipment reliability and longevity. An occasional short-term excursion into the allowable envelope is generally acceptable but may result in performance and reliability implications and higher power consumption. For additional information regarding tape cartridge storage, shipping and operational requirements, including acclimation requirements, please visit www.quantum.com/lto-media, or refer to specific LTO tape media specifications provided by the LTO consortium at www.lto.org or specifications provided by the media manufacturer.