Quantum

SCALAR TAPE LIBRARIES

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

DATASHEET

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 Libraries 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.

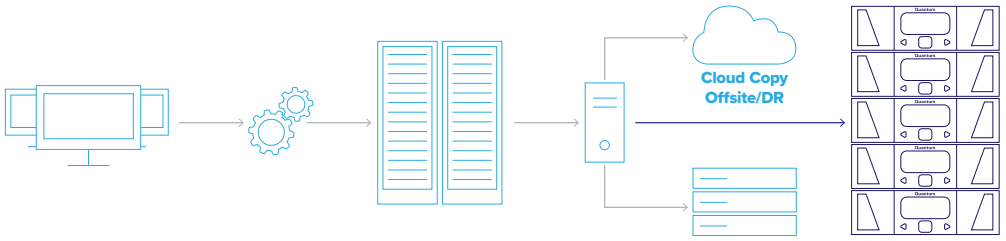
Ensure Data Integrity and Security
Quantum Scalar Tape Libraries are the most secure tape libraries on the market, with over 25 unique features and capabilities that form a comprehensive security framework which controls system access, provides system monitoring and event detection, data security and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

Maximize Availability, Durability, and Performance with Quantum RAIL Architecture
Scalar Tape Libraries can be deployed in a Redundant Array of Independent Libraries, or "RAIL" architecture when used with software that can write files and objects across multiple tape systems. This gives maximum performance, availability, and durability when building a large tape archive.

Organizations are generating more data than ever, and most of this data must be kept for years and decades. Environmental, Sustainability, and Governance (ESG) goals are becoming important, particularly for enterprises. And strengthening cybersecurity is a top priority for IT departments worldwide. Quantum Scalar® Tape Libraries address all of these needs with a compact, efficient design and unique software features that make Scalar Tape easy to manage and more secure than any other tape system.

Scalar Tape Offers Low-Cost, Sustainable, Secure Data Storage

Quantum Scalar Tape Libraries offer efficient, intelligent, and secure LTO tape storage for data archiving and long-term retention. Scalar Tape Libraries 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.



LEARN MORE:
www.quantum.com/scalar

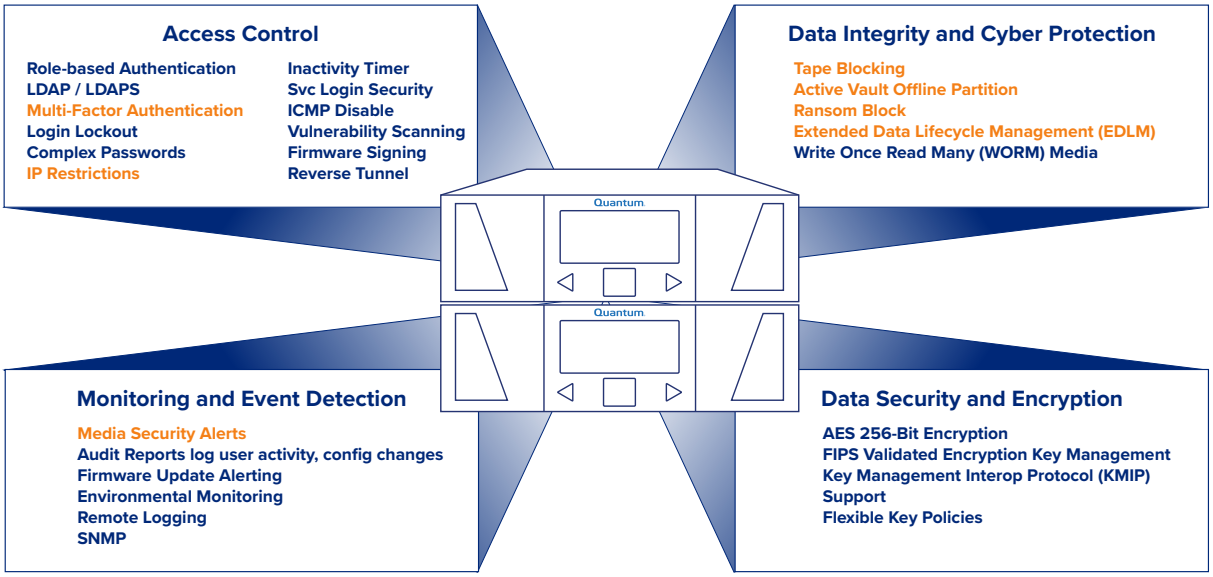
ULTRIUM LTO 7 ULTRIUM LTO 8 ULTRIUM LTO 9

Patented Technology and Industry-Exclusive Features Provide the Most Secure Data Protection

Tape has emerged as a critical part of building cyber-resilient infrastructures, particularly for long-term archives, cold storage, and backup data. Tape is inherently more secure than flash (SSD) or disk-based (HDD) storage because of the nature of tape, but even tape systems can be made more secure. That is why Quantum developed the Scalar® Security Framework, which is a comprehensive security framework that controls system access, provides system monitoring and event detection, data security and encryption, and unique features for cyber protection and data integrity.

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, Tape Blocking, and Ransom Block.

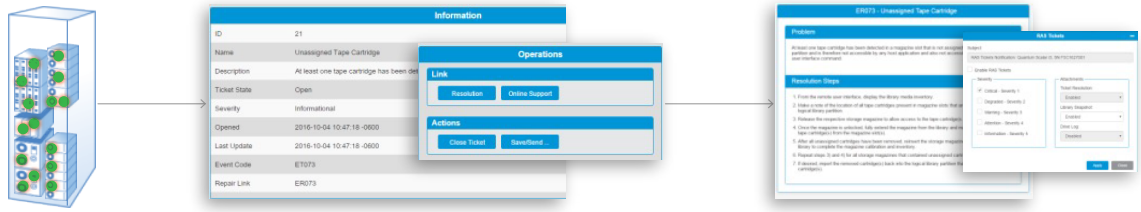
Orange text indicates features that are patented or unique to Quantum Scalar Tape Libraries.



Simplified Management with Advanced Monitoring and Proactive Diagnostics

Scalar iLayer™ tape library software is the most advanced, feature-rich tape management software in the industry. It simplifies management through the use of wizard-like processes and saves administrative time through extensive use of policies.

iLayer continually monitors the tape library environment including temperature, humidity, and voltage to provide plain English proactive diagnostics for the robot, tape drives, media, and all other library components. Degraded conditions, including media and drive conditions, can be detected and alerted proactively to make tape easier to manage and to minimize downtime. The Advanced Reporting option provides industry-unique reports and alerts that maximize the value and efficiency of the tape library.



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 CAPACITY AND PERFORMANCE

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

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).
[4]See compatibility guide for Quantum compatible media: www.quantum.com/swcompguide.aspx

Scalar Tape Libraries

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Scalar i3 control module.

Scalar i6 control module.

Scalar i6 full rack.

Scalar i7 RAPTOR.

Scalar i6000 features ultra-high density and a 19-inch rack form factor, and scales from 100 to 14,100 cartridges.

Feature	Benefit
Best-in-Class Storage Density	Scalar i3 and i6 Libraries offer the best density within a standard 19" rack form factor. The Scalar i7 RAPTOR provides the highest density of any tape library of any kind.
Capacity-on-Demand Growth (CoD)	Simplifies growth by scaling quickly and easily, without disruption.
Active Vault	Active Vault provides an automated way to create a more secure air gap within your Scalar Tape Library by moving tapes to a secure, offline partition with no network access.
Tape Blocking	Tape Blocking is a policy-based block that's placed on a tape or a magazine. Tape Blocking adds to the protection provided by Active Vault, and can be used along with Active Vault and Ransom Block.
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. Ransom Block builds upon Active Vault protection and can be used with Tape Blocking.
Multi-Factor Authentication (MFA)	Multi-factor authentication option for remote library login using standard MFA applications to protect library admin/user accounts with an additional layer of security via a time-based one-time password (TOTP).
Extended Data Life Management (EDLM)**	Ensures stored data remains readable with automated, policy-based media health checks. Automated notifications of suspect or bad results can be sent via e-mail. Works with media in host/data partitions or Active Vault partitions.
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 saves administrative 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. Multiple key use policies are available to tune protection and administrative time.
Third-Party Key Management Support	Supports the use of qualified third-party encryption key managers using the KMIP protocol.
Active/Active Dual Robots***	Adds a redundant, 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.
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 API	Saves administrative time by easily automating repetitive tasks. The API can be used to conduct any configuration, operation, monitoring, and reporting task that is available in iLayer.
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 so that systems can be shared between multiple applications.

**Ransom Block not available on Scalar i6000.*
***EDLM not available on Scalar i3.*
****Active/Active Dual Robots available only on Scalar i6000.*
*****Data Path Failover available on Scalar i6, Scalar i6000, and Scalar i7 RAPTOR models only.*

	Scalar i3	Scalar i6	Scalar i6000	Scalar i7 RAPTOR
Number of Slots	25 to 800	50 to 800	100 to 14,100**	100 to 2,016
System Capacity Range (TB)				
LTO-9 (native / compressed)	450 to 14,400 / 1,125 to 36,000[1]	900 to 14,400[1] / 2,250 to 36,000[1]	1,800 to 253,800[1] / 4,500 to 634,500[1]	1,800 to 36,288 / 4,500 to 90,720
LTO-8 (native / compressed)	300 to 9,600 / 750 to 24,000[1]	600 to 9,600[1] / 1,500 to 24,000[1]	1,200 to 169,200[1] / 3,000 to 423,000[1]	1,200 to 24,192 / 3,000 to 60,480
LTO-7 (native / compressed)	150 to 4,800 / 375 to 12,000[1]	300 to 4,800[1] / 750 to 12,000[1]	600 to 84,600[1] / 1,500 to 211,500[1]	600 to 12,096 / 1,500 to 30,240
Number of Drives	1 – 24		1 – 192	1 - 20
Drive Types Supported	Half-Height (HH) LTO Drives	Full-Height (FH) LTO Drives	Full-Height (FH) LTO Drives	Full Height (FH) LTO Drives
How System Scales	Scales vertically in rack up to 48U in 3U increments and 25-slot CoD licensing	Scales vertically in rack up to 48U in 6U increments and 25-slot CoD licensing	Scales linearly up to 20 racks 100-slot CoD licensing	Scales by adding magazines 100-slot CoD licensing
Module Form Factor	Rackmount 3U	Rackmount 6U	Full Rack	Full Rack
Minimum Size	One Module (3U)	One Module (6U)	One Module (One Full Rack)	One Module (One Full Rack)
Maximum Size	Sixteen Modules (48U)	Eight Modules (48U)	Twenty Modules	One Module (One Full Rack)
Deployment	Rack-mounted		Free-standing	Free-standing
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	TBD
Connectivity	**Drive Interfaces:** 8 Gb Fibre Channel and 6/12 Gb SAS **Management Interface:** Dual 1 GbE **Library Interface:** Bridged through drive for data; 1 GbE with remote GUI and RESTful Web Services for library mgmt	**Drive Interfaces:** 8 Gb Fibre Channel; 12 Gb SAS (LTO-9 only) **Library Interface:** Bridged through drive for data; 1 GbE with remote GUI and RESTful Web Services for library mgmt		
Import/Export Options				
I/E Stations	One I/E Station, configurable in 5-slot increments		CM includes 24-slot I/E Station Additional 24-slot and 72-slot I/E Stations available	Configurable, 0-56 slots
Max I/E Station Slots	240 slots		240 slots per partition	56 slots
Bulk Load/Unload Options	by magazine		Using HDEM	by magazine
Extended I/E	Not Supported		Supported	
Auto-import	Not Supported		Supported	
Export Redirect	Not Supported		Supported	
Dimensions (H x W x D)				
Control Module	5.2 in x 17.4 in x 36.4 in (13.2 cm x 44.1 cm x 92.45 cm)	10.4 in x 17.4 in x 36.4 in (26.4 cm x 44.1 cm x 92.45 cm)	77.4 in × 24.3 in × 38.3 in (196.6 cm × 61.7 cm × 97.4 cm)	90.2 in x 23.9 in x 54.3 in (229 cm x 606 cm x 138 cm)
Expansion Module	5.2 in x 17.4 in x 36.4 in (13.2 cm x 44.1 cm x 92.45 cm)	10.4 in x 17.4 in x 36.4 in (26.4 cm x 44.1 cm x 92.45 cm)	77.4 in × 23.6 in × 38.3 in (196.6 cm × 59.9 cm × 97.4 cm)	N/A
Parking Module	N/A		77.4 in × 23.6 in × 38.3 in (196.6 cm × 59.9 cm × 97.4 cm)	N/A
Reliability and Availability				
MSBF	Greater than 2 million		Greater than 3 million	Greater than 3 million
MTTR	30 minutes		20 mins, 10 mins for Dual Robot replacement	5 minutes or less
Electrical	100 VAC to 240 VAC, 50 Hz to 60 Hz		0-240 VAC, 2-24 kVA; -48 VDC, <1 kVA per module	200-240 VAC or 240/380 VDC
Power	Optional 2N power / 80 PLUS® Gold certified power supplies		**Control and Expansion Modules:** Optional 2N power / 80 PLUS® Gold certified power supplies; **HD Expansion Modules:** Optional 2N power / 80 PLUS® certified power supplies	2N power included, 80 PLUS Titanium certified power supplies
Dual Robotics	No		Yes	No
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)		N/A	N/A
Module Upgrades	Any module may be added in <30 minutes; all components are customer installable		Requires Quantum Installation	N/A
Compliance and Certification				
Safety Standards	IEC 60950-1 and IEC 62368-1 with worldwide deviations, EN62368-1, UL 62368-1, IS3525(Part 1), CNS 15598-1			
Emissions Standards	FCC Part 15 Class A, EN 55032 Class A, KN 32, VCCI, EN 300 386, CNS 15936-1 Class A, ICES-003 Class A			
Immunity Standards	EN 55035, KS C 9832 and KS C 9835			
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)	CE (Europe) FCC/NRTL (USA) ICES/CSA (Canada) KCC (South Korea) RCM (Australia/New Zealand) UKCA (United Kingdom) VCCI (Japan)

Please see www.quantum.com for more drive specifications.
*[1]Assumes 2.5:1 compression. *Up to 240 import/export elements supported per logical partition. **Larger configurations are available with qualification; contact your Quantum representative.*
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.

Operational/Storage Environmental Requirements

Environmental Factor	Recommended[1]	Allowable[2]	Shipping[3]
Dry-Bulb Temperature	**LTO-7, LTO-8:** 16 to 25 °C (61 to 77 °F) **LTO-9:** 15 to 25 °C (59 to 77 °F)	**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-7, LTO-8:** Wet Bulb Temperature <= 26 °C (79 °F) **LTO-9:** Max Dew Point 22 °C (72 °F)	**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.

Quantum

Quantum delivers end-to-end data management solutions designed for the AI era. With over four decades of experience, our data platform has allowed customers to extract the maximum value from their unique, unstructured data. From high-performance ingest that powers AI applications and demanding data-intensive workloads, to massive, durable data lakes to fuel AI models, Quantum delivers the most comprehensive and cost-efficient solutions. Leading organizations in life sciences, government, media and entertainment, research, and industrial technology trust Quantum with their most valuable asset – their data. Quantum is listed on Nasdaq (QMCO). For more information visit www.quantum.com.

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