

# L700 Tape Library

General Information Manual

## ■ Reader Feedback

Information contained in this publication is subject to change. In the event of changes, this publication will be revised. Please forward any comments concerning the contents of this publication to the following address:

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# List of Pages

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Total number of pages in this document is 54, consisting of the following:

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# Summary of Changes

<i>Date</i>	<i>Reissue Level</i>	<i>Change</i>
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# About This Manual

This General Information Manual (GIM) provides high-level information about StorageTek's L700 Tape Library. The GIM does not provide extensive technical information about the L700.

See [“Related Publications”](#) for publications that contain more detailed information about the L700.

## ■ Intended Audience

This manual presents information for data processing and application-development personnel, such as MIS managers, storage administrators, system analysts, and performance specialists.

## ■ Organization

This manual contains:

- [Chapter 1](#) provides an introduction to the L700 Tape Library.
- [Chapter 2](#) lists highlights, including features and benefits.
- [Chapter 3](#) describes typical customers the system was designed for.
- [Chapter 4](#) describes the system's configurations and options.
- [Chapter 5](#) describes the system's components.
- [Chapter 6](#) lists service offerings.
- [Appendix A](#) provides product specifications.

## ■ Related Publications

You can find additional information in the *L700 Tape Library Operator's Guide*, PN 95845. You can order the book from your StorageTek marketing representative.

## ■ Trademarks

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# Overview

# 1

Storage Technology Corporation secures its position as the premier provider of storage solutions with the L700 Tape Library. StorageTek's L700 features Aegis architecture—Fibre-Channel ready, integration with system management frameworks, lightweight magnesium-alloy robotics, the proprietary StorageTek vision system, and flexible high availability.

The L700 performs 450 exchanges per hour. An onboard JAVA-based Web server for monitoring and diagnosis enables the library to remain competitive for the long term, which protects your investment.

## ■ Performance

StorageTek's L700 features a wide-based gripper mechanism enhancing cartridge stability and enabling faster moves. The advanced cartridge-cell design provides pinpoint cartridge location resulting in simpler mechanics. That means that the gripper mechanism need not reposition the cartridge, enabling a simpler gripper with faster, more accurate, and reliable movements.

The library also features fast audit times. An audit of the library's cartridges and drives takes two, three, and five minutes for the 216, 384, and 678 cartridge configurations respectively.

## **Drive Count, Cartridge Capacity, and Expandability**

Select the cartridge capacity you need—216, 384, or 678. The space-efficient rotational robotics use less raised-floor space per number of cartridges than competing products. In addition, StorageTek's L700 can be outfitted with up to 20 DLT7000 or DLT8000 drives or up to 12 StorageTek 9840 Tape Drives. With the highest drive capacity in its class, it excels at handling demanding high-volume applications.

### **■ Mixed Media Support**

Unique to its class, StorageTek's L700 supports mixed media types. The L700 supports DLT7000 and DLT8000 and StorageTek's 9840. The L700 will support new drive and media types when they are available.

This media flexibility protects customers' investment in other technologies. For example, a StorageTek L700 could initially be purchased with DLT7000 drives. As performance requirements increase, the customer can add StorageTek 9840 drives. This flexibility also enables smooth data migration from one type of media to another—all within the same library.

### **■ Cartridge Access Port**

Two cartridge access ports (CAPs) hold up to 20 cartridges and load through four removable five-cartridge magazines. The removable magazines boast a patented easy-loading feature that enables them to swing out for loading and unloading—or lift out for remote storage or vaulting.

## ■ Connectivity

Complementing its own software products, StorageTek has teamed with leading software developers in the areas of backup and archive, hierarchical storage management (HSM), media management, and disaster recover. This relationship with software developers ensures easy connectivity with leading solutions, such as:

- Computer Associates
  - ◆ ARCserv (NT)
  - ◆ NetArchive (UNIX)
- Legato NetWorker
- Sterling Alexandria
- Tivoli ADSM
- Veritas
  - ◆ Backup EXEC (NT)
  - ◆ NetBackup (UNIX)
  - ◆ HP Omniback

## ■ LibConnect, an Optional Onboard Web Server

StorageTek's L700 features an optional onboard Web server, LibConnect. Unlike host-based interfaces available in other products, the library's onboard server eliminates the need for *any* external server and it can be directly attached to a 10base-T Ethernet link and any TCP/IP network.

Using Java Script and either Netscape™ or Internet Explorer™, you can directly access library information. Cell- and drive-based activity statistics,

drive configurations, library configurations, and error reporting are all available over the World Wide Web.

LibConnect provides a direct, device-level interface, which requires no third-party software or additional layers of complexity. If you choose LibConnect and have a Web browser, you can benefit from the library's full remote capabilities.

The operator graphical interface displays the library configuration as a standard part of the Web interface. Its graphics include a cell map, drive map, plus CAP and option configurations. The graphical interface also displays context-sensitive configuration and statistical data for any cell location, CAP, or drive.

## ■ Remote Management

Remote attachment through optional LibConnect enables a world of remote administration possibilities. StorageTek L700 firmware provides full support for remote management, including drive configuration, library configuration, code downloads, and remote resets.

IT managers will appreciate the embedded SNMP agent, an interface through which a network management framework, such as OpenView™ and Unicenter TNG™ supports the StorageTek L700. This feature enables total library management—from monitoring to exception notification—from a system management console or from a remote site such as another building or campus. If a framework is unavailable, you can monitor the system using a Web browser alone.

For security purposes, there are two levels of access: standard and administrator. Standard level enables users to receive numerous status reports. Administrator level enables remote administration including firmware downloads, reset, and library configuration over the Web.

The library collects performance statistics for:

- Gets/puts
- Jobs completed
- Cycles left on cleaning tapes
- Errors

You can receive most of the statistics for the library as a whole or for individual drives or cells. You can select and view the displayed statistics using the context-sensitive pop-up menus from the embedded Web page. You can use the statistics for predictive analysis, optimizing library and network performance, or scheduling replacement of cleaning tapes.

## ■ High Availability

The StorageTek L700 meets or exceeds the needs of the market segment that demands the library's ultra-high availability features. The library features optional redundant power supplies, and the firmware contains failure-monitoring capabilities. The hot-swappable power supplies share the load so, if one fails, the other will continue operating without interrupting service.

The StorageTek L700 features a fault-tolerant cooling system and can continue to function while service personnel replace a cooling fan. The fans feature highly reliable ball-bearing construction specified for a mean time between failures of 80,000 hours. If one fan fails, operation continues uninterrupted. The firmware uses rotation sensing to monitor and adjust fan speed to maintain optimum temperature. If a fan begins to fail, it will trigger a failure event notification.

The notification includes e-mailing and paging multiple targets. This messaging system can notify service personnel of the type and location of a failure, getting help on the way at any time.

StorageTek's L700 supports TapeAlert™, which defines a standard notification format for possible system failures. The firmware monitors drive and library performance statistics to warn of possible drive or library component failure. The automated notification system sends a warning when drive or library performance parameters fall below specified limits.

For SCSI tape drives, the drive trays enable hot-swapping drives. Any drive can be removed or installed from the drive columns without interrupting service. The drive trays promote easy installation and require no special tools.

## ■ Room to Grow

A StorageTek L700 feature unique to the library industry is 13U of 19-inch rack space that you can use for custom integration. The space could be used for integrating RAID, a Fibre-Channel hub, or a server, enabling you to maintain all your resources and accessories in a single, secure enclosure.

## Compact PCI™ Expansion Interface

For future enhancements or if you have unique requirements, you can add a two-slot Compact *PCI*™ expansion bus to the library to increase expansion possibilities. This standard, ruggedized industrial computing platform provides a non proprietary hardware interface to the library.

## Native Fibre-Channel Ready

Enterprise-class applications demand cutting-edge interface technologies. StorageTek's L700 offers an optional Fibre-Channel interface card in a rugged Compact *PCI*™ form factor. The interface conforms to ANSI X3.230-1994 (FC-PH) standards for target mode operation. For additional flexibility, you can choose either copper or optical physical interfaces.

StorageTek's L700 Fibre-Channel attachment can be upgraded in the field. The integration rack provides room for a Fibre-Channel hub, such as the StorageNet *Access Hub*. This enables the library to be easily integrated into existing systems. As native Fibre-Channel tape drives become available, the L700 can be upgraded.

## Low-Voltage Differential (LVD) SCSI

You can order an LVD SCSI interface through a Compact *PCI™* expansion card. You may need LVD to support emerging drive standards, which the L700 can be field-upgraded to support.

## Onboard SCSI Controller

StorageTek's L700 includes an onboard SCSI controller supporting both single-ended and differential UltraSCSI. No additional interface cards are required for supporting synchronous transfer rates up to 40 MB/s.

## Vision System

The StorageTek L700 uses a patented vision system for cartridge management, adaptive targeting, and self-calibration. Self-calibration enables the library to adapt to any mechanical parameters that might change over time. It makes a more robust, reliable library that will perform dependably over the long term.

Most automated libraries use a common laser bar-code scanner for reading labels on cartridges. Common scanners—virtually identical to those used in grocery stores—do not provide the advantages of StorageTek's L700 vision system. For example, empty-cell detection on the fly reduces audit time, an exclusive StorageTek feature.

StorageTek's proprietary vision system not only reads regular bar-code labels, but also can read marginal bar-code labels that scanning systems have difficulty reading.

## **Operator Panel**

StorageTek's L700 graphical panel is easy to use. The display features a large area for improved viewing. The crisp graphics display features, and an easy-to-use menu system presents all necessary configuration and status functions.

## **Reliability and Serviceability**

The StorageTek L700 library was designed with reliability and serviceability in mind. All serviceable components are easily accessible. The tape drives reside in hot-swappable, customer-serviceable trays, which can be quickly replaced without special tools. The drive trays use blind-mate drawer connectors, making drive replacement easy.

StorageTek's L700 features a locking mechanism that holds the robotics stationary during shipping. To set up the library, just remove the locking pin, connect power, connect the host, and turn it on. It's ready to go.

All subassemblies were streamlined; for example, cabling was simplified to reduce the number of connectors. Also, the cartridge-gripper mechanism uses a quiet, simple design resulting in high performance. This minimalist approach enables the StorageTek L700 to yield both high value and reliability.

The StorageTek L700 requires no periodic maintenance—no lubrication or belt-retensioning. It was designed with highly integrated electronics. All the main library functions reside on a single controller card, resulting in a more reliable, cost-effective solution than a motherboard with plug-in modules.

## Proven Quality

The StorageTek L700 features ball-bearing construction throughout—rather than less-expensive, but noisier, bushings—for all motors, rollers, and fans, resulting in whisper-quiet and reliable performance.

Light, strong, materials in the Z-theta-reach robotics enable high performance while maintaining rugged design. StorageTek's L700 robotics operate the DLT drive's cartridge-load handle directly rather than using stepper motors. This direct operation results in high performance, increased reliability, and simplicity.

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# Highlights

# 2

StorageTek's L700 Tape Library performs 450 exchanges per hour. LibConnect, an optional onboard JAVA-based Web server for monitoring and diagnosis, enables the library to remain competitive for the long term, which protects your investment.

**Table 2-1. Features and Benefits**

<i>Features</i>	<i>Benefits</i>
450 exchanges per hour	High performance
From 216 to 678 cartridge cells	High capacity/excellent investment protection
Onboard Web server enables remote configuration firmware download, performance monitoring, and maintenance	Quick and easy upgrades Control your library directly through Netscape™ and Internet Explorer™
SNMP agent supports remote administration using OpenView™, UniCenter TNG™ and other third-party software.	Seamless integration into enterprise-level systems-management frameworks
13 U of 19-inch rack space	Unlimited flexibility/expandability
Up to 20 DLT or 12 9840 drives	High availability/high throughput

**Table 2-1. Features and Benefits (Continued)**

Up to 40 cells in two cartridge access ports (CAPs)	Quick and easy loading for batch jobs
Native Fibre-Channel ready (copper/optical)	Fibre-Channel ready/high throughput and long distance
Compact PCI™ expansion card	Expandability/standards compliant
Mix media types (DLT and StorageTek 9840)	Flexibility and investment protection
Redundant power supplies and fans, cooling-system monitoring, and SCSI TapeAlert notification	Flexible high availability
Operator-serviceable drive trays are hot-swappable SCSI and require no special tools	Fast and easy drive replacement Continuous library operation
High-resolution graphical interface	Intuitive operation, easy to use

# Typical Customers

3

Enterprises of all sizes will benefit greatly from the StorageTek L700 Tape Library's high performance, high availability, and flexible capacity. The library's Aegis architecture provides agility to accommodate future technological changes in the marketplace.

## ■ UNIX Networks

Organizations with large UNIX networks will gain a competitive advantage from fast load speeds and parallel data paths, which speed throughput. Typical applications include:

- Database servers
  - ◆ Data warehouse, datamart
- Application servers
- File servers

## ■ Small and Midsize Environments

High performance also benefits small and midsize environments. Typical applications include:

- Multi servers to single library
- Network-attached library for centralized monitoring and diagnosis

## ■ Mixed-Media Environments

Mixing media has never been easier. Choose the type and number of drives you require, then select the cartridge-cell capacity. As your information needs change, so can the library configuration. Choose cartridge capacities of 216, 384, or 678. Combine DLT7000, DLT8000 and StorageTek 9840 drives. Benefits include:

- Low cost, high capacity for backup and large streaming jobs
- High performance, moderate capability for fast restore, HSM, and interactive jobs

# Configurations

## 4

The StorageTek L700 Tape Library's flexibility provides unparalleled investment protection. You can configure the library to meet your present needs, then add more cell arrays, and tape drives, within the same footprint. You also can customize the library by adding a server or other components to the internal 19-inch rack. Native Fibre-Channel capability provides flexible topology and increases the distance over which the library can operate.

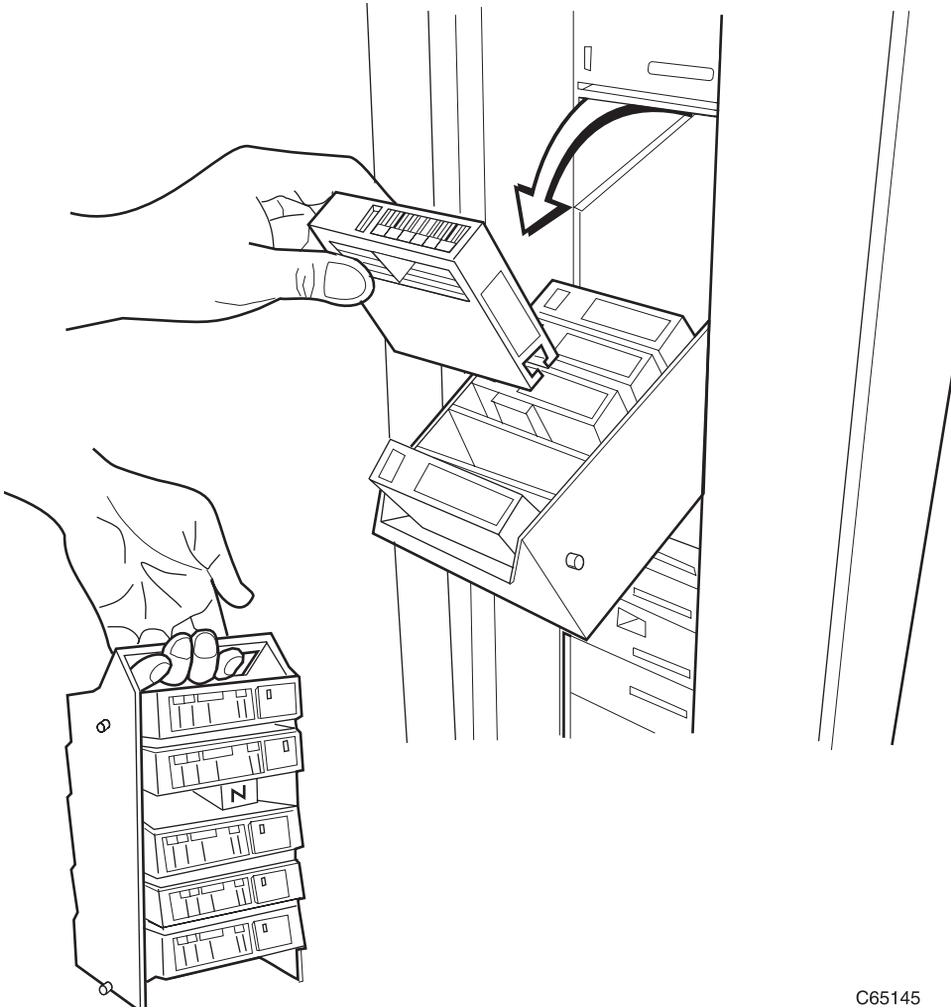
### ■ Cartridge Capacity

StorageTek's L700 comes with cartridge capacities of 216, 384, and 678. See [Figure 4-3 on page 4-6](#). Depending on configuration, the capacity ranges from 6 to 24.5 TB.

### ■ Cartridge Access Port

Two cartridge access ports (CAPs) holds up to 20 cartridges in four handy five-cartridge magazines.

**Figure 4-1. Five-cartridge Magazine for Cartridge Access Port (CAP)**



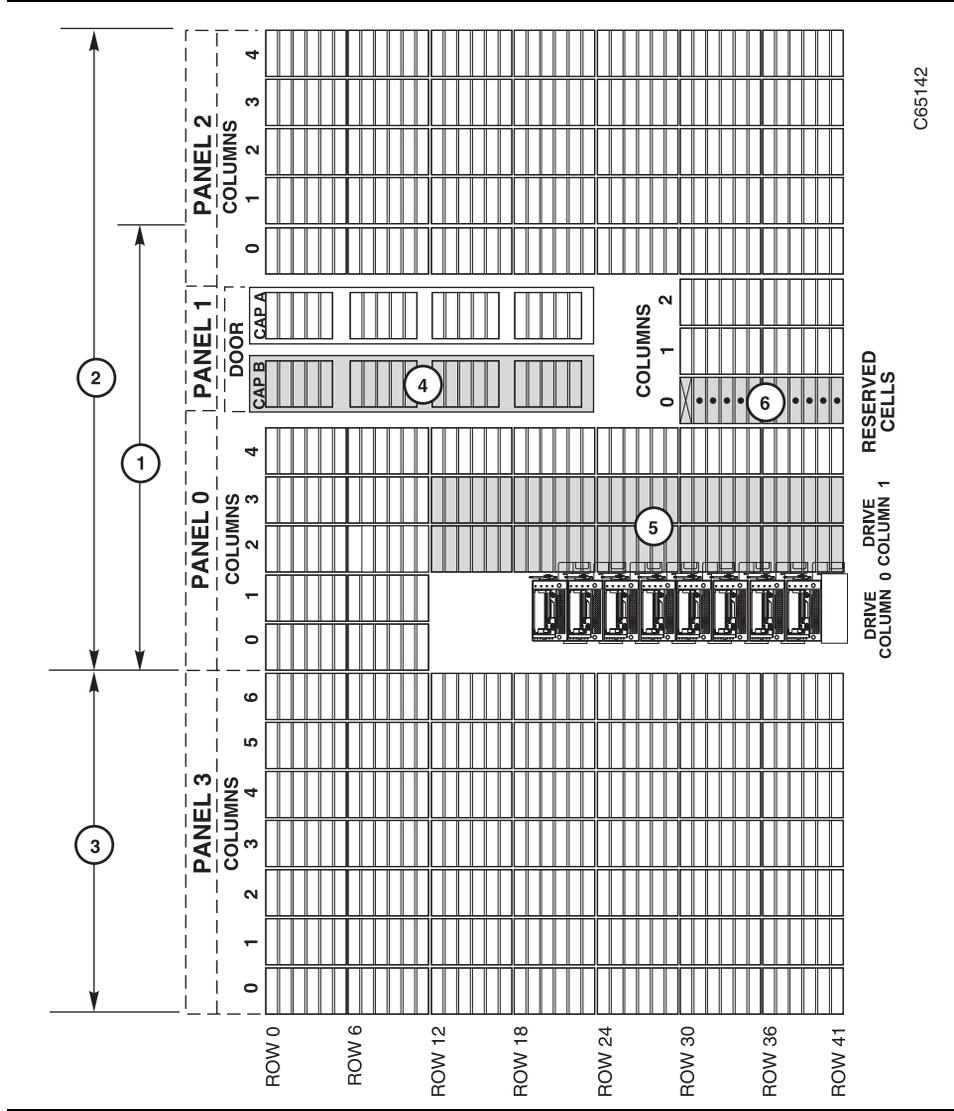
C65145

Convenient five-cartridge magazines can be removed from CAP (C65145)

## ■ Tape Drives

Combine drive types to suit your requirements. [Figure 4-3 on page 4-6](#) shows a mix of tape drives in the drive column.

Figure 4-2. Cartridge-Cell Arrays, CAPs, and Drive Columns

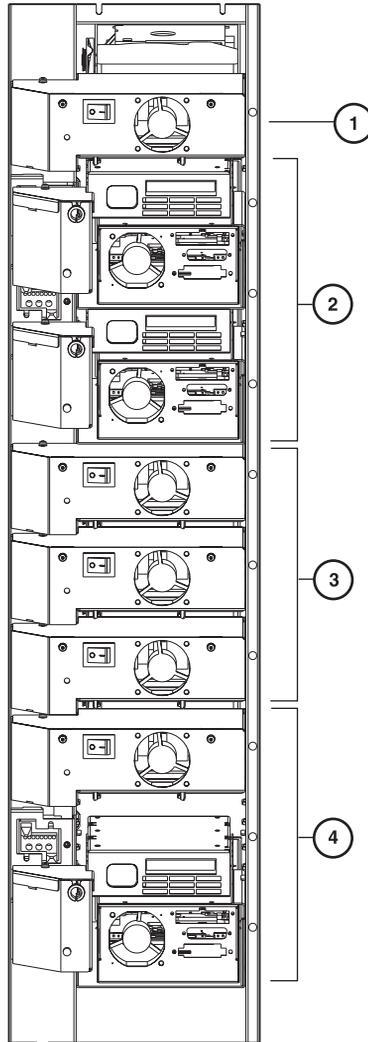


**Figure 4-2. Cartridge-Cell Arrays, CAPs, and Drive Columns (Continued)**

Cartridge cell arrays, CAPs, and drive columns (C65142)

1. Nominal 216-cartridge-cell configuration
  2. Nominal 384-cartridge-cell configuration  
**Note:** Nominal 678-cartridge-cell configuration equals call-outs 2 plus 3.
  3. Expansion frame
  4. Optional second CAP
  5. Optional second drive column
  6. Reserved cells contain cleaning cartridges; top cell for cartridge exchanges
-

Figure 4-3. Drive Column with Tape Drives



C65099

**Figure 4-3. Drive Column with Tape Drives**

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Drive Column with Tape Drives (C65099)

1. DLT (only)
  2. Two StorageTek 9840 drives (shown) or three DLT drives or mixed
  3. Three DLT drives (shown) or two 9840 drives or mixed
  4. Mixed 9840 and DLT drives (shown) or three DLTs or two 9840s
-

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# Components

# 5

StorageTek's L700 features Aegis architecture, including:

- Advanced rotational robotics
- Advanced hand design for mixed media
- Operator panel
- Internal 19-inch rack
- Cartridge cells and cartridge access ports (CAPs)
- Media—DLT and StorageTek 9840 tapes
- Tape drives—DLT and StorageTek 9840 tape drives

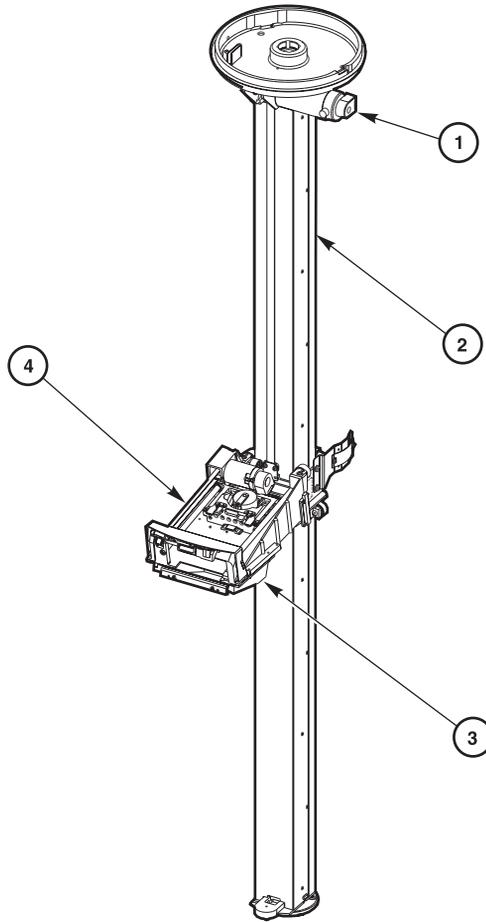
## ■ Advanced Rotational Robotics

The cartridge handling system consists of:

- A rotational mechanism for horizontal positioning
- A vertical positioning mechanism
- A hand-camera assembly that accommodates different media types

**Figure 5-1. Advanced Rotational Robotics**

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C65140

**Figure 5-1. Advanced Rotational Robotics**

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Robotics components (C65140)

1. Z motor
  2. Z column
  3. Z carriage
  4. Hand-camera assembly
- 

**■ Advanced Hand Design for Mixed Media**

Because of its innovative design, the hand accommodates different media types.

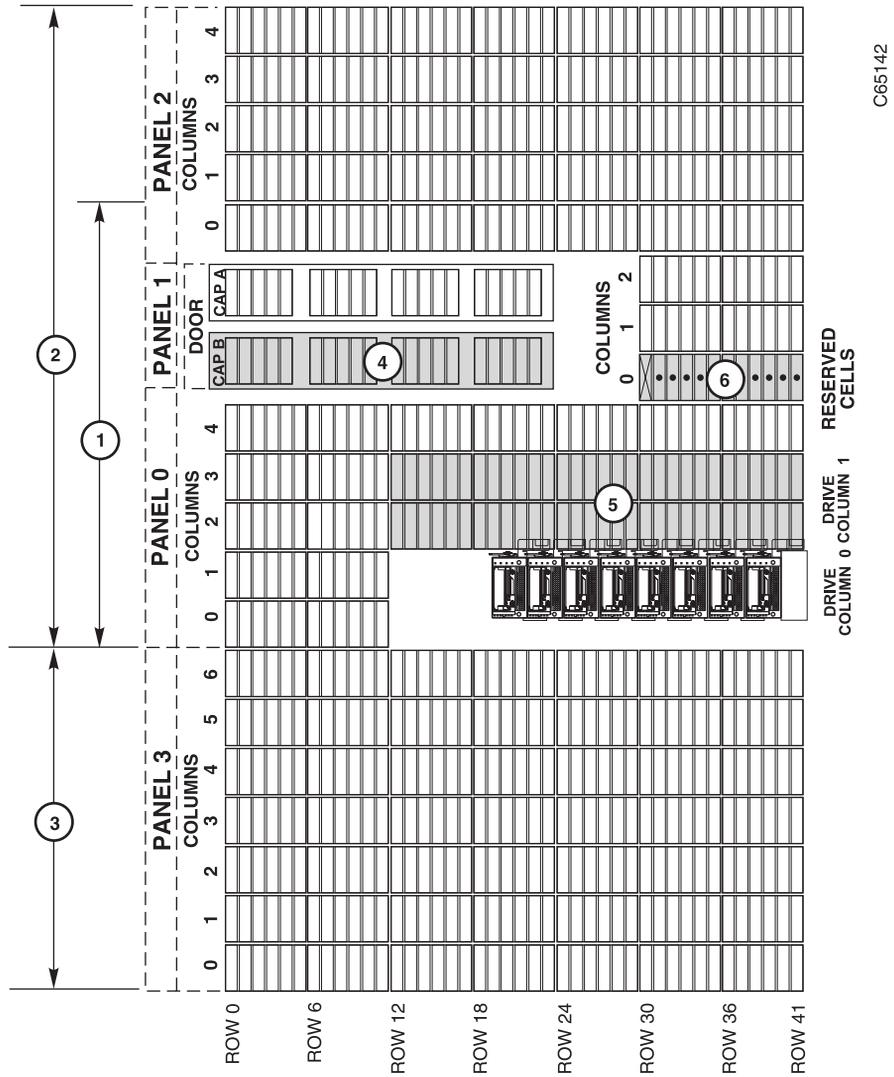
**■ Operator Panel**

The operator panel contains buttons, indicators, and a large graphic display. The panel shows CAP information, tape library and drive status, tape library and drive configuration, test sequences, plus error and event information.

**■ Internal 19-inch Rack**

The standard rack enables users to customize the library by adding a server or other components. Because the rack is internal, all accessories, cables, and connectors remain secure inside the cabinet.

**Figure 5-2. Cartridge-Cell Arrays, CAPs, and Drive Columns**



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**Figure 5-2. Cartridge-Cell Arrays, CAPs, and Drive Columns**

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Explanation of cell arrays, CAPs, and drive columns (C65142)

1. Nominal 216-cartridge-cell configuration
  2. Nominal 384-cartridge-cell configuration  
**Note:** Nominal 678-cartridge-cell configuration equals call-outs 2 plus 3.
  3. Expansion frame
  4. Optional second CAP
  5. Optional second drive column
  6. Reserved cells contain cleaning cartridges; top cell for cartridge exchanges
- 

## ■ Cartridge Access Port

The cartridge access port (CAP) contains up to 10 cartridges in two handy five-cartridge magazines.

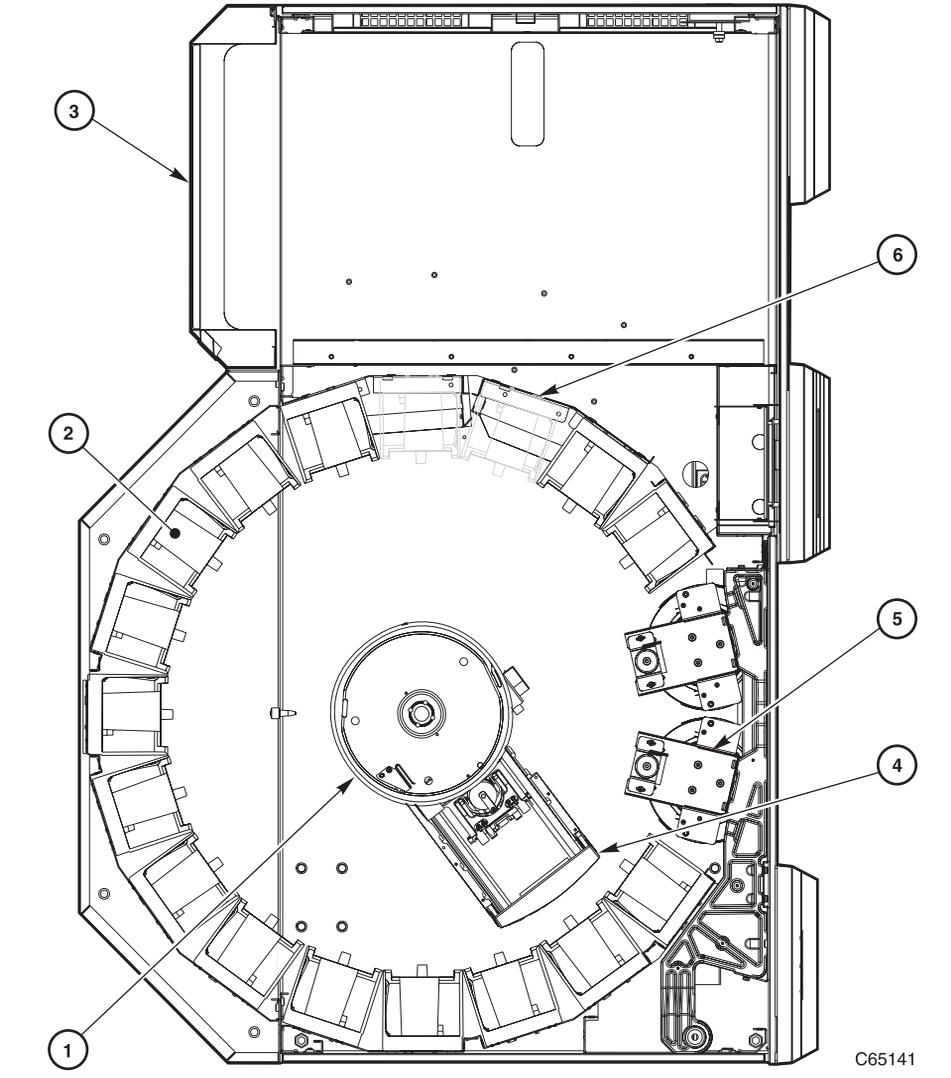
## ■ Media—DLT and StorageTek 9840 tapes

The library handles industry-standard DLT cartridge tapes and StorageTek's 9840 high-performance cartridge tapes.

## ■ Tape Drives—DLT and StorageTek 9840 Tape Drives

You can combine up to 20 DLT7000 and DLT8000 tape drives, and up to 12 9840 tape drives in the library. The drives share a common small computer system interface and are hot swappable, which minimizes downtime.

**Figure 5-3. Top View Showing Library Components**



**Figure 5-3. Top View Showing Library Components**

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Top View Showing Library Components (C65141)

1. Rotating robot
  2. A cartridge cell
  3. Rear door
  4. Hand-camera
  5. A Tape drive
  6. Cartridge-cell array wall
-

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# Service Offerings

# 6

StorageTek tiered service offerings provide a range of options designed to meet customer requirements for all elements of storage solutions, including hardware, software, and selected hardware products.

StorageTek provides support services in different levels, including:

**Interactive** provides economical, remote support to customers that can maintain networks and applications and are looking for StorageTek to perform in a backup role. Customers will have online access to product-specific technical information on StorageTek's Customer Resource Center and telephone access to StorageTek's Remote Support Center to assist in problem determination 24 hours a day, 7 days a week. Customers will have access to an Engineering Change Notification (ECN) database, and have the option of implementing ECNs themselves or having StorageTek implement them for a fee. When necessary to correct a failure, the customer may return the unit to StorageTek for repair or exchange. The Interactive service offering includes a 30-day repair and return policy. Under this option, StorageTek will ship a replacement part after the customer's part is declared defective.

**Next Day** provides on-site service for customers that look to StorageTek for technical expertise and complete problem resolution. Next Day customers run critical operations with a high level of redundancy that tends to reduce

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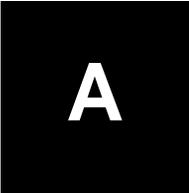
the need for a same-day response. They usually are not sufficiently staffed to handle in-depth problem resolution and require StorageTek to provide spare parts. Customers purchasing Next Day receive next business day on-site support. Customers purchasing Next Day receive on-site support 9 a.m. to 5 p.m., Monday through Friday, excluding nationally recognized holidays. Next Day includes complete spares support if hardware problems occur. With notice of an ECN, the customer can have StorageTek implement the change from 8 a.m. to 5 p.m. Monday through Friday, nationally recognized holidays excluded. Next Day customers receive preventive and concurrent maintenance during usual business hours.

**Select** supports customers that look to StorageTek for technical expertise on the total solution. Select customers run mission-critical applications and cannot tolerate extended outages. Select customers will likely not have a staff of trained personnel to support StorageTek equipment and look to StorageTek for a high degree of on-site assistance. Select incorporates all aspects of Next Day and supplements it with four-hour, on-site response time. The four-hour, on-site time objective applies to customer sites within 25 miles (40 kilometers) driving distance from the nearest StorageTek service location. Customers purchasing Select receive on-site support 9 a.m. to 5 p.m., Monday through Friday, excluding nationally recognized holidays.

**Elite** customers cannot tolerate any outages. Elite incorporates all the aspects of Select and supplements it with two-hour, on-site response time. The two-hour time objective applies to customer sites within 25 miles (40 kilometers) driving distance from the nearest StorageTek service location. With notice of an ECN, the customer decides when StorageTek implements the change.

For details on the preceding StorageTek service offerings, visit Tiered Services Detailed Descriptions—Hardware on the Knowledge Map on the StorageTek Web site at [wwfokm.stortek.com/](http://wwfokm.stortek.com/).

# Specifications

A

The following tables provide detailed information about StorageTek's L700 Tape Library.

**Table A-1. Weights and Dimensions**

Library, Drive, and Cartridge Tape	
Height	183 cm (72 in.)
Width with covers	156 cm (61.3 in.)
Depth	95 cm (37.5 in.)
Depth with expansion frame	110 cm (43.5 in.)
Weight without drives or cartridges	427 kg (941 lbs)
DLT drive and tray weight	5.3 kg (11.7 lbs)
9840 drive and tray weight	6.4 kg (14.0 lbs)
DLT cartridge tape weight	255 g (9.0 oz)
9840 cartridge tape weight	260 g (9.2 oz)

**Table A-2. Power Specifications**

<b>Power cable</b>	
U.S./Canada	100 VAC UL/CSA power cable
International	200 to 240 VAC HAR power cable
Input voltage range	90 to 254 VAC
Nominal voltage (per power supply)	120 or 240 VAC
Power configuration (library without drives)	<b>U.S./Canada:</b> Single phase 100 VAC, 47 to 63 Hz, 20 A service, 3 wire <b>International:</b> Single phase 200 to 240 VAC, 47 to 63 Hz, 10 A service, 3 wire
Power consumption	210 W
Maximum heat output	716 Btu/hr

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**Table A-3. Single Drive Column**

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<b>Power cable</b>	
U.S./Canada	120 VAC UL/CSA power cable
International	200 to 240 VAC HAR power cable
Input voltage range	90 to 254 VAC
Nominal voltage	120 or 240 VAC
<b>Power configuration</b>	
U.S./Canada	Single phase 120 VAC, 47 to 63 Hz, 6 A service, 3 wire
International	Single phase 200 to 240 VAC, 47 to 63 Hz, 3 A service, 3 wire
Power consumption	6 x 9840 tape drives = 972 W 10 x DLT tape drives = 1,104 W
Maximum heat output	6 x 9840 tape drives = 3,314 Btu/hr 10 x DLT tape drives = 3,764 Btu/hr

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**Table A-4. Optional Second Drive Column**

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<b>Power cable</b>	
U.S./Canada	120 VAC UL/CSA power cable
International	200 to 240 VAC HAR power cable
Input voltage range	90 to 254 VAC
Nominal voltage	120 or 240 VAC
<b>Power configuration</b>	
U.S./Canada	Single phase 120 VAC, 47 to 63 Hz, 6 A service, 3 wire
International	Single phase 200 to 240 VAC, 47 to 63 Hz, 3 A service, 3 wire
Power consumption	6 x 9840 tape drives = 972 W 10 x DLT tape drives = 1,104 W
Maximum heat output	6 x 9840 tape drives = 3,314 Btu/hr 10 x DLT tape drives = 3,764 Btu/hr

---

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**Table A-5. Environmental Specifications**

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<b>Temperature</b>	
Operating	15° to 32°C (59° to 90°F)
Storage	10° to 40°C (50° to 104°F)
Shipping	-40° to 60°C (-40° to 140°F)

---

<b>Relative Humidity</b>	
Operating	20% to 80% (noncondensing)
Storage	10% to 95% (noncondensing)
Shipping	10% to 95% (noncondensing)

---

<b>Wet Bulb Maximum</b>	
Operating	29°C (84°F)
Storage	35°C (95°F)
Shipping	35°C (95°F)

---

<b>Altitude</b>	
Operating	0 to 3.05 km (0 to 10,000 ft.)
Storage	0 to 3.05 km (0 to 10,000 ft.)
Shipping	0 to 15.24 km (0 to 50,000 ft.)

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