

Sun StorEdge™ L180 Tape Library

Just the Facts



Copyrights

©2002 Sun Microsystems, Inc. All Rights Reserved.

Sun, Sun Microsystems, the Sun logo, Sun StorEdge, Sun Enterprise, Sun Fire, Solstice, Solstice Backup, SunSpectrum, Java, Solaris, Sun Fire, Ultra, AnswerBook, SunSpectrum Platinum, SunSpectrum Gold, SunSpectrum Silver, SunSpectrum Bronze, and SunSolve are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries.

UNIX is a registered trademark in the United States and other countries, exclusively licensed through X/Open Company, Ltd.

All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. in the United States and other countries. Products bearing SPARC trademarks are based upon an architecture developed by Sun Microsystems, Inc.

Last Update: 1/25/2002



Table of Contents

Positioning.....	5
Introduction.....	5
New Features.....	6
Storage Management Systems.....	6
Choosing a Storage Solution.....	7
Key Messages.....	7
Availability.....	8
Target Users.....	8
Target Markets.....	8
Product Family Placement.....	8
Internationalization and Localization.....	9
FC-Tape Phase I Configurations Support Matrix	9
Selling Highlights.....	10
Market Value Proposition.....	10
Applications.....	10
Software Support.....	11
Features and Benefits.....	11
Enabling Technology.....	12
Technology Overview.....	12
Highly Reliable Robotic Technology.....	12
LTO Technology Overview.....	12
Digital Linear Tape Technology Overview.....	13
9840 Tape Technology Overview.....	14
Vision System.....	14
Bar Code Label Support.....	15
Cartridge Access Port (CAP).....	15
Removable Magazines.....	15
Gripper Mechanism.....	15
Operator Panel.....	15
Internal 19-Inch Rack.....	15
System Architecture.....	16
Overview.....	16
Reliability, Availability, and Serviceability (RAS).....	19
Reliability.....	19
Availability.....	19
Specifications.....	21
General Specifications.....	21
Hardware Dimensions.....	22
Environmental Specifications.....	22
Requirements and Configuration.....	24
Operating Environment Support.....	24
Hardware Support.....	24
System Configuration.....	26
System Management.....	27
System Administration.....	27
Software Support.....	27
Ordering Information.....	29
Part Numbers.....	29



Ordering Notes.....30
Free Installation.....30
Service and Support.....31
 Warranty.....31
 Professional Services.....32
Glossary.....33
Materials Abstract.....36

Positioning



Figure 1. Sun StorEdge™ L180 tape library

Introduction

The Sun StorEdge™ L180 library is a 180-cartridge automated library offering a mid-sized solution to Sun's enterprise-class customers in need of storage capacities ranging between 3.48 and 17.4 TB. Coupled with reliable robotics, drive, and power supply redundancy, along with high availability and strong performance, the Sun StorEdge L180 library is an ideal tape storage solution for protecting customer data.

The Sun StorEdge L180 tape library is an automated tape library for departmental and enterprise data storage. This library has a capacity of six drives and 174 cartridges with 9840 drives, or 10 drives and 174 cartridges with DLT and/or LTO drives. It is offered in a base configuration of 80 cartridges, without drives. Drives, as well as a 100-cartridge expansion kit, are options. There are six dedicated cleaning/diagnostic cartridges that do not figure into the overall capacity, but are figured into cartridge count.

The Sun StorEdge L180 library is offered with 9840, LTO, or DLT 8000 drives, or a combination of these for a multimedia library. The 9840 configuration is a 3.48-TB library, supporting six drives with a throughput of 60 MB/sec. native. The DLT 8000 configuration is a 6.96-TB library, supporting ten drives with a throughput of 60 MB/sec. native. The LTO configuration is a 17.4-TB library, supporting ten drives with a throughput of 150 MB/sec. native.



The Sun StorEdge L180 tape library with 9840 and LTO drives is not meant to be a competitive product to the Sun StorEdge L180 tape library with DLT 8000 drives. In fact, they are complementary products, as the 9840 provides fast access to date, and the LTO offers high capacity and transfer rate.

The Sun StorEdge L180 library features the same robotics and high availability as the Sun StorEdge L700 library. They share common FRUs and use the same drive options and library controller. As is the case for the Sun StorEdge L700 library, the Sun StorEdge L180 library requires that the Scopetool be completed before a unit can be shipped or installed.

A summary of the technologies in the Sun StorEdge L180 tape library is delineated in the following table.

Feature	Sun StorEdge L180 Tape Library Configured with 9840	Sun StorEdge L180 Tape Library Configured with DLT 8000	Sun StorEdge L180 Tape Library Configured with LTO
Maximum Number of Drives	6	10	10
Maximum Native Throughput	60 MB/sec. ¹	60 MB/sec.	150 MB/sec.
Maximum Number of Data Cartridge Slots	174	174	174
Number of Diagnostic and Cleaning Cartridge Slots	6	6	6
Maximum Native Capacity	3.48 TB	6.96 TB	17.4 TB
1. Theoretically, the 9840 tape drive has a maximum native throughput of 10 MB/sec. Sun is typically experiencing 9 MB/sec. to 9.5 MB/sec. transfer rates.			

Note: This table assumes that the entire library is populated with DLT 8000, 9840, or LTO technology (drives and cartridges), not a mixture of these technologies within the same enclosure.

New Features

The Sun StorEdge L180 tape library is offered in a base unit, and the customer can choose the number and type of drives. The Sun StorEdge L180 tape library uses the same library controller and drive modules as the Sun StorEdge L700 tape library. The Sun StorEdge L180 tape library ships with monitoring software included. However, to activate the software, customers must purchase the monitor kit (part number SG-XMONLIBSW1).

Storage Management Systems

Today, mission-critical libraries are sold to perform backup and archival tasks. With increasing numbers of tape technologies and a high demand for backup and archival solutions in all environments, automated tape backup solutions have a number of requirements:

- **Reliability:** Accurate storage and retrieval of data that has been backed up and archived.
- **System availability:** Many organizations runs 24 hours a day, 7 days a week. In these environments, it is imperative for data that has been backed up to be available on demand.
- **Management of large amounts of data:** Users are generating more data than ever before. Organizations need a method for organizing data (through activity) such that data reliability is maintained.



- **Simplified administration:** Monitoring tapes can be time consuming.
- **Integration:** Hardware and software must fit seamlessly into existing customer server and client environments.

Choosing a Storage Solution

There are many factors to consider in choosing a storage solution, beginning with an evaluation of the computing environment. Here are some factors to consider:

- **Performance:** Performance is the speed of transfer of data to the backup system and how fast data backups can be completed. System and media performance must be compatible.
- **Capacity:** Capacity is the amount of data that can be stored. Compression algorithms, which increase media capacity and data transfer rate, are available for several technologies.
- **Economics:** The economics of a storage solutions are measured in the cost per unit of storage in gigabytes, the cost and time it takes to transfer data (cost per hour per GB or TB), and the capital cost for equipment or hardware.
- **Availability of robotic mechanisms:** Robotic mechanisms that can handle multiple cartridges increase storage capacity and offer unattended operations.
- **Media stability:** Storage media stability determines the length of time data is readable from stored files.
- **Standards:** Standard form factors and formats help ensure backward compatibility between older files and current drives.

Key Messages

- **Part of a complete tape backup solution:** Combined with Sun Enterprise™ or Sun Fire™ servers and software, such as VERITAS NetBackup and Solstice Backup™ software, the Sun StorEdge L180 library contributes towards a complete tape backup solution.
- **Outstanding quality:** Sun has an extremely rigorous qualification testing and design collaboration process.
- **One-stop shopping:** Besides hardware and software, Sun offers maintenance (via a SunSpectrumSM program contract) for the Sun StorEdge L180 library (check with Sun Enterprise Services; some locations offer limited support). Sun also sells the media that is used in the library.
- **Investment protection:** The DLT 8000 tape drive inside the Sun StorEdge L180 tape library is read/write compatible with DLT 4000 and DLT 7000 technologies. The Sun StorEdge L180 tape library can be upgraded to future drive technologies, when available.
- **Solution flexibility:** The library configuration offers a compact footprint along with low cost for the density of capacity available.
- **Manageability:** The Sun StorEdge L180 tape library can be managed locally using the LCD screen on the front panel or monitored from anywhere on the network with library monitoring software via the additional Ethernet port provided for out-of-band monitoring.
- **Mixed media:** The Sun StorEdge L180 tape library supports different drive technologies (DLT 8000, 9840, and LTO) operating within the unit at the same time.



Availability

All configurations of the Sun StorEdge L180 tape library are currently available.

Note that there is limited availability of the Sun StorEdge L180 tape library in certain areas of the world. For more information, contact a Sun services representative.

Target Users

- **High-availability applications, 24x7 operations**
- **Data centers:** The small footprint coupled with a scalable configuration and a choice of DLT 8000, 9840, or LTO drives, or a combination of these, makes the Sun StorEdge L180 library an ideal solution for customers who have limited resources and need to accommodate growth in the near future.
- **Telco:** Flexibility of a small footprint solution; easily enables multiple distributed backup solutions in a multi-tier environment.
- **Manufacturing:** Offers an enterprise-class database backup solution for Oracle, Sybase, Baan, and so on, at a departmental price, with quick restore times and outstanding availability.
- **Government and education:** Ability to secure the latest enterprise-class technology at a departmental price.

Target Markets

Industry/Customer	Key Features to Highlight
ISPs	Small footprint library
Banking, Medical, Finance, and Insurance	Cost competitive entry point to mission-critical back-up solutions
Retail and Distribution	Large database back-up capabilities
Oil and Gas	Remote site backups
Government and Military	Remote site backups, as well as departmental price into an enterprise class product for mission-critical applications

Product Family Placement

Because the optimal choice of a secondary storage system depends on customer requirements and sensitivities, Sun offers a family of solutions to help customers make the best choice for their specific requirements and sensitivities. Sun's tape offerings include the following (note that all capacities listed are native):

- Sun StorEdge L9 tape autoloader (360-GB DLT1 or DLT 8000, 900-GB LTO library)
- Sun StorEdge L20/40/60 tape library (800-GB to 2.4-TB DLT 8000, 2-TB to 6-TB LTO library)
- Sun StorEdge L1000 tape library (1.2-TB DLT 8000 library)
- Sun StorEdge L180 tape library (3.48-TB 9840, 6.96-TB DLT 8000, 17.4-TB LTO, or multimedia library)
- Sun StorEdge L700 tape library (13.8-TB 9840, 27.6-TB DLT, 67.8-TB LTO, or multimedia library)



Internationalization and Localization

The documentation provided with the Sun StorEdge L180 tape library is scheduled to be localized into the following five languages in Q3FY00: French, Japanese, Korean, Simplified Chinese, and Traditional Chinese. The operator panel is in English only.

FC-Tape Phase I Configurations Support Matrix

Feature	Specifications
Backup Software	<ul style="list-style-type: none"> Solstice Backup 6.1 VERITAS NetBackup 3.4 with patch 110539-05
Driver Stack	Sun StorEdge Network Foundation Software, Phase IVg+ <ul style="list-style-type: none"> 111095-03 111096-03 111097-03 111412-03
Host Bus Adapters	<ul style="list-style-type: none"> PCI single-port Fibre Channel HBA (X6799A) PCI dual-port Fibre Channel HBA (X6727A) cPCI dual-port Fibre Channel HBA (X6748A) SBus dual-port Fibre Channel HBA (X6757A)
Operating Systems	Solaris 8 Operating Environment, Update 4 FCS (4/2001)
Platforms	<ul style="list-style-type: none"> Sun Fire 280R, V880, 3800, 4800, 4810, 6800, and 15000 servers Sun Enterprise 220R, 250, 420R, 450, 3500-6500, and 10000 servers Ultra™ 2, 5, 10, 60, and 80 workstations Sun Blade™ 100 and 1000 workstations
Switches	SANBox 16-port, Firmware 3.03.51
Tape Drives (native FC-AL)	STK 9840FC (see Note)
Tape Libraries (native FC-AL)	STK L180/L700 (see Note)
Note: Refer to the DPE Firmware Levels matrix at http://rmqual.ebay/Qual_Docs/Data_Protection_Prod_Supp_Matrix_3.0.pdf	



Selling Highlights

Market Value Proposition

The Sun StorEdge™ L180 tape library provides customers with a mission-critical, mid-range solution. Its price offers enterprise class reliability at a departmental price. Because the Sun StorEdge L180 library is offered with 9840, LTO, and DLT 8000 drives, the customer has a choice between the high performance of the 9840, the higher capacity of LTO, and the value of DLT 8000.

Reliability, Quick Restore, and Availability

The Sun StorEdge L180 tape library automated storage robotics are designed and built for extreme durability. The Sun StorEdge L180 tape library utilizes a Digital Vision System instead of a common laser scanner. The Digital Vision System is an optical-based system used to read barcode labels and perform targeting and calibration. Using this system, the Sun StorEdge L180 tape library reads barcodes very rapidly and accurately, yielding very fast cartridge exchanges and library inventory. This also allows the system to do continuous calibration. There are 1,000,000 mean swaps between failure (MSBF) and 70,000 hours mean time between failure (MTBF).

Note: *Due to the sophistication of the Digital Vision System, it is recommended that all media labels be purchased from StorageTek. Details follow under "Bar Code Label Support" in the Enabling Technologies section.*

Ease of Management

The Sun StorEdge L180 tape library offers an LCD management from a panel located on the front of the library. From this panel, a customer gets library and drive status, as well as media information. Also included in the Sun StorEdge L180 library is library monitoring software. (*Note: To activate the software, customers must purchase the monitor kit, part number SG-XMONLIBSW1.*) This monitoring software utilizes the Ethernet network port and web server built into the Sun StorEdge L180 tape library. The monitoring software is out-of-band, in that it is fully independent of the library SCSI control path, the data SCSI path, and the server(s) to which the library is connected.

Serviceability

The design of the Sun StorEdge L180 tape library facilitates easy service. All serviceable units can be accessed from the front or rear of the library. In addition, the tape drives in the Sun StorEdge L180 library are hot swappable given the usual limitations of SCSI bus integrity.

Applications

- Servers with database/on-line capacity in the 1- to 3-TB range. As a rule of thumb, backup solutions should have three to five times the amount of backup capacity as on-line storage. This helps enable not only multiple copies of regular backup cycles (daily, weekly, monthly), but also allows room to expand as data grows.
- Archival



- Hierarchical storage management (HSM)
- SAN architecture

Software Support

The Sun StorEdge L180 library is supported by VERITAS NetBackup, Solstice Backup™ software, and many other storage management software applications. Solstice Backup software does not support multimedia.

Features and Benefits

Features

- **Reliability**

- Extensive compatibility testing for servers
- 1 million mean swaps between failures (MSBF)

- **Manageability**

- Front panel menu and library monitoring software

- **Scalability**

- Offered in a base configuration with flexible drive count and flexible cartridge count

- **Upgradeability**

- Field-upgradeable to new drive technology or from HVDS to Fibre Channel, when available

- **Serviceability**

- Error alert messages
- Field-replaceable components
- Same drive module as Sun StorEdge L700 library

Benefits

- Ease of installation
- Investment protection

- Clear, intuitive
- Out-of-band management

- Fits the customers needs
- Investment protection
- Pay as you grow

- Investment protection

- Clear and proactive
- Drives and robotics
- Reduction in service
- FRUs same as Sun StorEdge L700 library

Enabling Technology

Technology Overview

The Sun StorEdge™ L180 library includes a number of features that make it especially well-suited to backup of mid-range networks and servers. They include:

- Hot-plug drives and power supplies for outstanding RAS features
- 6U of 19-inch rack space
- 9840 tape technology helps decrease access times and increase data transfer rates
- DLT tape technology is excellent for legacy systems and is Sun's lowest priced drive for this product.
- LTO tape technology has the best speed and capacity for this product.
- Java™ technology-based web server for monitoring and diagnosis allows the library to remain competitive in the long run, thus protecting customers' investments
- A highly accessible cartridge access port, via software or front panel
- Tapes drives (and their data cartridges) can be shared by multiple hosts in FC environments

Highly Reliable Robotic Technology

The Sun StorEdge L180 tape library uses advanced rotational robotics, which uses a rotational mechanism for horizontal positioning. The unit needs no adjustments or lubrication, and is designed for a cycle life of over 1 million cycles.

Note: *If the controller fails, the library is considered non-functional. Since the robotics controller communicates with the robot and all functional controls and calibration values are held on that board, the library is "dead" to the outside world (even in a manual mode) if a failure occurs.*

There is no command-line interface available for manipulating the robotic arm.

LTO Technology Overview

LTO technology was created through the joint efforts of Seagate, IBM, and HP to address specific customer requirements in the high-capacity, high-performance segment of the tape marketplace. Based on 0.5-inch linear recording technology, the Ultrium format offers users a clear choice in high-capacity, high-performance tape solutions by delivering on the promises of a credible four-generation roadmap, an open format approach to the market, and solutions designed to meet data protection requirements both today and into the foreseeable future.

The Ultrium format has enjoyed broad early adoption for a number of reasons including:

1. Being the only open format in midrange tape market; multiple manufacturers produce technologically independent products that are tested rigorously to help ensure data interchange between the mechanisms
2. Broad support from automation and system OEM manufacturers
3. A proven ability to meet the growing demands placed on backup technology from both a capacity and performance standpoint



Some of the primary advantages of the Ultrium format include:

- Compared to other formats, the Ultrium format is the fastest available, with a format potential data rate of up to 40 GB compressed and an actual product data rate of 30 to 32 MB per second.
- Compared to DLT, SDLT, AIT, and Mammoth, the Ultrium format is the only format that is a true open format, bringing all the associated benefits to the reseller and user.
- Compared to SDLT, the Ultrium format provides a much lower logical adoption risk as the enabling technologies of the Ultrium format are evolutionary (or field proven) in nature while SDLT technology are revolutionary (new and unproven).
- The Ultrium format is backed and supported by Seagate, IBM, and HP as well as the major media manufacturers. No other format offers such broad support.

For more detailed technical information on the Ultrium format of LTO technology, visit the LTO Program web site at <http://www.lto-technology.com>.

Digital Linear Tape Technology Overview

Digital Linear Tape (DLT) technology uses multichannel linear or serpentine recording. Linear or serpentine technology uses a multichannel tape. The tape carries data in parallel channels that run past a single stationary head. Each of the channels passes over its own write element within the head. The use of four channels with the DLT 8000 essentially doubles data transfer rates compared to the DLT 4000 (two channels).

Media and read/write head durability further distinguishes Digital Linear Tape technology from other offerings. Digital Linear Tape implements a simple tape path and operates at a low constant tension, with the tape head being stationary, helping to minimize wear and tear on both tape and heads. In contrast, helical scan technology utilizes a read/write head positioned on a rotating drum. The drum lays data down diagonally across a slow-moving tape. Because the tape is wrapped around the rotating drum, tape and head life are usually lower.

Future DLT products should easily grow in capacity by increasing bit density. Performance improvements occur through the addition of new heads and channels, or by increasing the tape speed. Note, however, that future DLT drives and media should have the same form factor. Thus, they should be compatible with today's Sun StorEdge L180 tape library.

Digital Linear Tape offers several advanced features, such as full SCSI-2 command set implementation, built-in diagnostics, and a high (native) data transfer rate of 6 MB/second. The current version of DLT 8000 tapes have a native capacity of 40 GB per cartridge. The DLT cost per MB is comparable to 8-mm technology. As the DLT technology is evolving to even higher capacity tapes and higher transfer rates, it is a suitable option for enterprise environments where storage needs are increasing rapidly.

Adaptive Cache Buffering Scheme

The DLT transfer rate could surpass that of many host computers. DLT tape overcomes this potential issue by using an adaptive cache buffering scheme. Host data rates are monitored and the drive automatically adjusts its transfer rate to match that of the system. This helps minimize the number of times the drive has to stop and reposition.



9840 Tape Technology Overview

The 9840 tape drive is a high-performance tape drive designed for the enterprise and multi-platform environments. Performance characteristics of the drive are shown in the table below.

Tape load and initialize to ready	5 sec.
Search time	8 sec. (first search) and 11 sec. (average)
Maximum rewind time	16 sec.
Data buffer size	8 MB/drive
Maximum block size	256 KB

The 9840 tape cartridge is a 0.5-inch cartridge and includes both the supply and takeup reels. This design allows for 5 second load and 11 seconds average access time. When inserted in the drive, the cartridge and tape are pressed against the read/write path in the drive, and the drive servo mechanisms engage the supply and takeup reels in the cartridge. Each cartridge weighs 262 grams or 9.17 ounces. The media itself is based on advanced media particle technology with polyethylene naphthalate (PEN) substrate. Native capacity of each cartridge is 20 GB and archival life is estimated at 15 to 30 years.

The 9840 was designed to work in automated environments and specifically targets environments needing fast cartridge loads (that is, fast cartridge hand-offs from the library gripper to the drive). This allows for fast access to the first byte and frees the library to service other mount/dismount requests. With a load time of five seconds, the 9840 significantly outperforms any other tape drive. The following table lists the rates for several characteristics of the 9840 drive.

Data transfer rate (uncompressed)	10 MB/sec.
Load time	5 sec.
Unload time (includes rewind)	4 sec.
Average search time (excluding load)	8 sec.
Average rewind time	8 sec.
Time to backup 100 MB	21 sec.
Time to locate (load and search)	12 sec.

Vision System

The Sun StorEdge L180 tape library uses a vision system for cartridge management, adaptive targeting, and self-calibration. Due to this advanced capability, there is no scheduled manual calibration or other maintenance of the Sun StorEdge L180 tape library. In addition, this system not only reads regular bar code labels, but also marginal bar code labels that scanning systems have difficulty reading. Another function of the vision system is the ability to read multiple types of bar codes including the traditional StorageTek Tri-Optic bar code labels, CompacTape IV, and 9840 Tri-Optic labels.



Bar Code Label Support

Customers can purchase cartridge labels through StorageTek by calling 1-800-905-8502 (US).

Note: *With multimedia, it is highly recommended that all tape labels be purchased directly from StorageTek. Standard DLT labels may lower library performance.*

Cartridge Access Port (CAP)

The cartridge access port (CAP) contains up to ten cartridges in two removable magazines; each magazine holds five cartridges.

The cartridge access port can be controlled via either software or the front panel. If using backup software, it is recommended that the software be used to transfer cartridges from the bins to the cartridge access ports (and vice versa), as this keeps the inventory correct within both the software and the hardware. In the offline mode, the cartridge access port(s) can be accessed via the front panel without problems.

Removable Magazines

The removable magazines boast an easy-loading feature that enables them to swing out for loading and unloading, or lift out for remote storage or vaulting.

Gripper Mechanism

The Sun StorEdge L180 tape library's wide-based gripper mechanism enhances cartridge stability and enables faster moves. The gripper and cartridge slot design allow efficient handling of DLT 8000, LTO, and 9840 cartridges. In addition, the advanced cartridge-cell design provides pinpoint cartridge location resulting in simpler mechanics. That means that the gripper mechanism need not reposition the cartridge, thus allowing faster, more accurate, and reliable movements.

The library also features fast audit times. An audit of the library's cartridges and drives takes at most five minutes with a fully loaded library.

Operator Panel

The panel shows cartridge access port information, tape library and drive status, tape library and drive configuration, test sequences, and error and event information. The panel is also capable of showing the current firmware for the robotics and the drives.

Internal 19-Inch Rack

This rack allows users to customize the library by adding a server or other components. Total maximum weight of equipment installed in this location cannot exceed 170 lb. or 77.1 kg. Power must be supplied to these components. Power cable space is provided in the cutout area of the left rear door. Equipment must be installed from the bottom to the top, with the heaviest item(s) on the bottom. The components must be UL/CSA approved and properly grounded.

Note: *Sun does not support or take responsibility (from a compliance or safety standpoint) for any components used in this space, unless those components are covered by their own Sun warranty or SunSpectrumSM service contract.*



System Architecture

Overview

The following figures depict the architectural design of the Sun StorEdge™ L180 tape library.

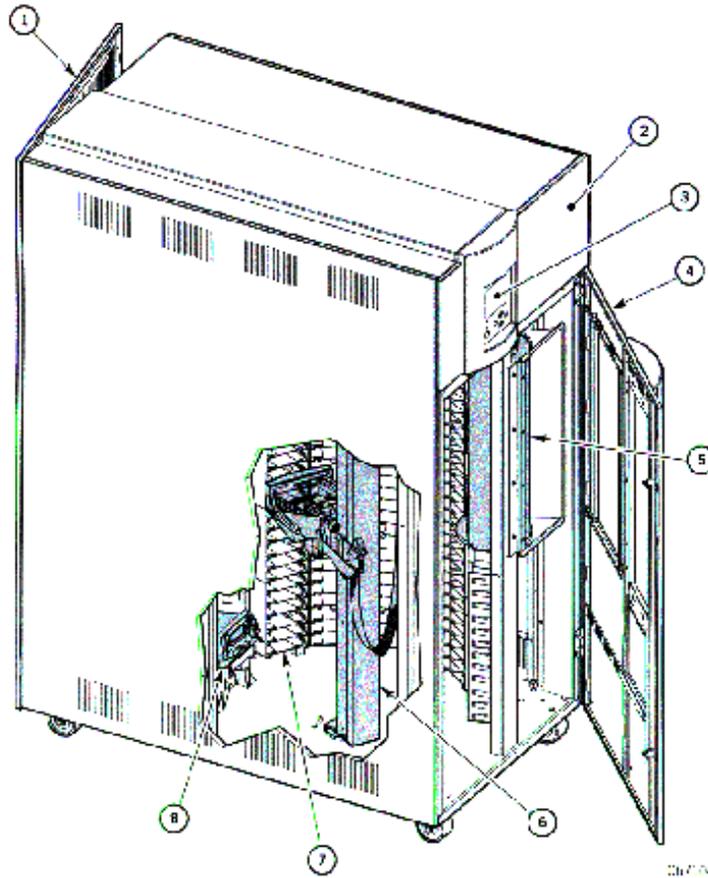


Figure 2. Major external components

Major external components of the Sun StorEdge L180 tape library are shown in the figure above. These features are:

1. Rear door
2. Rack door
3. Operator panel
4. Front door
5. Cartridge access port (CAP)
6. Robotics
7. Arrays
8. Drives

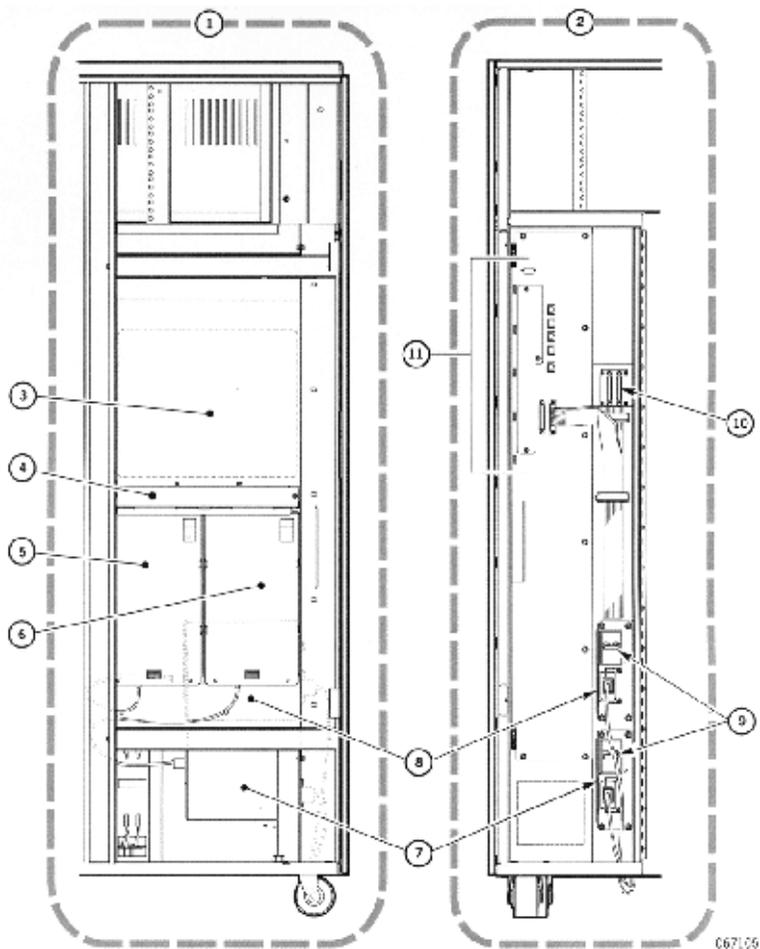


Figure 3. Major electronic components

The major electronic compartment components of the library are shown in the figure above. These components are located behind the right front door of the library.

1. View from library side
2. View from library rear
3. MPC card
4. Fan tray assembly
5. Standard DC power supply
6. DC power supply
7. Standard AC power distribution unit (PDU)
8. AC PDU
9. Power switches (circuit breakers)
10. Library-to-client SCSI I/O connectors
11. Electronics module bulkhead

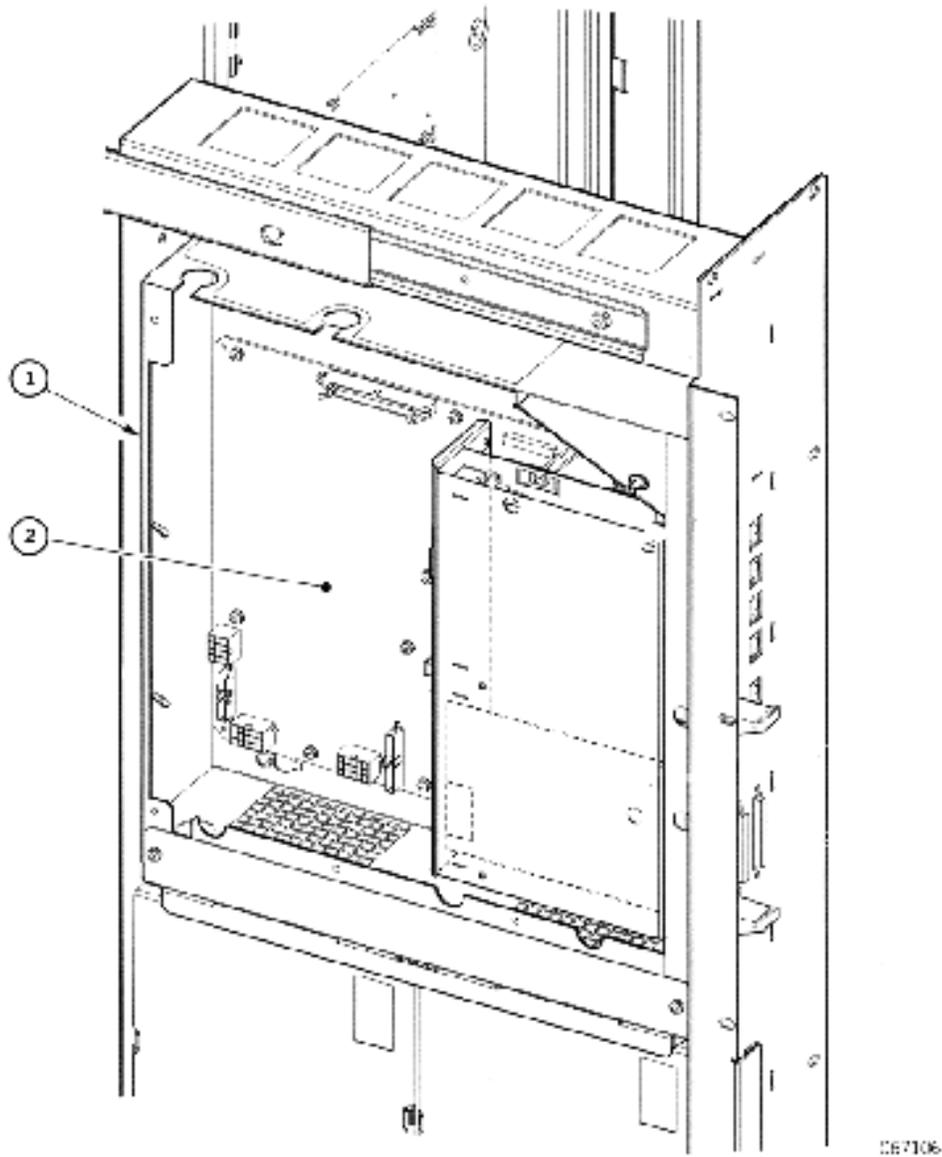


Figure 4. Major electronic module components

The major electronic module components of the library are shown in the figure above. These components are located behind the right front door of the library.

1. Electronics module
2. MPC card

Reliability, Availability, and Serviceability (RAS)

Reliability

The Sun StorEdge™ L180 library robotics are designed, built and tested for extreme durability.

- Mean swaps between failure (MSBF): 1,000,000
- Mean time between failure (MTBF): 70,000 hours

Availability

The Sun StorEdge L180 library offers high reliability through several functional characteristics:

- **Tape drives and trays**

The tape drives and power supplies reside in hot-pluggable trays, which can be quickly replaced without special tools. The drive trays use blind-mate drawer connectors, making drive replacement easy.

- **Optional redundant power supplies**

The Sun StorEdge L180 tape library offers an option for redundant power supplies (for the robot only). The hot-swappable power supplies share the load so if one fails, the other continues without interrupting service.

The second power option allows running the unit from two power circuits. The power to the robot is completely redundant. With a 9840 library, drives 1 through 3 are on one circuit and drives 4 through 6 are on a second circuit. With the DLT 8000 or LTO library, drives 1 through 5 are on one circuit and drives 6 through 10 are the the second circuit. (Note: all drives plug into a PDU) So, if one circuit fails, all the drives on that circuit go down. The application has to steer towards the operational drives, which is not simple failover.

- **Cooling system**

The Sun StorEdge L180 tape library's cooling system 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 (MTBF) of 70,000 hours. If one fan fails, operation continues uninterrupted. The firmware uses rotation sensing to monitor fan speed. If a fan begins to fail, it triggers a failure event notification.

- **Messaging system**

The Sun StorEdge L180 tape library's messaging system can notify personnel of types and locations of failures via e-mail and pages. A network port permits monitoring and configuration while the library is in use without disturbing data movement operations.

This library 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 a drive or library performance parameters fall below specified limits.

- **Streamlined subassemblies**

All subassemblies have been 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 minimalistic approach enables the Sun StorEdge L180 tape library to yield both high value and reliability.

- **Maintenance**

The Sun StorEdge L180 tape library does not require any 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.

- **Vision system**

Self-calibration of the Sun StorEdge L180 tape library's vision system enables it to adapt to any mechanical parameters that might change over time. It makes a more robust, reliable library that performs dependably over the long run.

- **9840 media**

The 9840 media does not require retensioning, which means that the cartridge does not periodically have to be loaded into a drive and the media retensioned. The benefit is that the data and all drives are continuously available. No drives need to be dedicated to maintenance functions. In addition, the 9840 media can be stored flat or on edge without media distortion or loss of data.

- **Service access requirements**

There are no side clearance requirements for the Sun StorEdge L180 library, so multiple units may be placed side by side, saving floor space. Access is required for front and back to access the LCD panel (front) and drives, controllers and connections (rear).



Specifications

General Specifications

Feature	Specifications
Technology	DLT 8000, LTO, or 9840 drive technology
Capacity (native) <ul style="list-style-type: none"> • DLT 8000 • 9840 Tape • LTO Tape 	<ul style="list-style-type: none"> • 6.96 TB • 3.48 TB • 17.4 TB
Sustained Transfer Rate <ul style="list-style-type: none"> • DLT 8000 • 9840 Tape • LTO Tape 	<ul style="list-style-type: none"> • 60 MB/sec. native • 60 MB/sec. native • 150 MB/sec. native
Cartridge Capacity <ul style="list-style-type: none"> • DLT 8000 • 9840 Tape • LTO Tape 	<ul style="list-style-type: none"> • 40 GB native² • 20 GB native • 100 GB native
Average Cartridge Swap Time	7 seconds
Robotics MSBF	1,000,000 swaps
Robotics MTBF	70,000 hours
Drive MTBF	110,000 power-on hours
Drive Head Life	30,000 hours minimum
Media Life <ul style="list-style-type: none"> • DLT 8000 • 9840 Tape • LTO Tape 	<ul style="list-style-type: none"> • Average 1,000,000 passes, 15,000 uses • 80,000 passes • 1,000,000 passes
Magazine Life	45,000 swaps
Average Tape Access Time <ul style="list-style-type: none"> • DLT 8000 • 9840 Tape • LTO Tape 	<ul style="list-style-type: none"> • 60 seconds • 11 seconds • 60 seconds
Tape Load Time (to BOT) <ul style="list-style-type: none"> • DLT 8000 • 9840 Tape • LTO Tape 	<ul style="list-style-type: none"> • 48 seconds • 4 seconds • 48 seconds
Tape Unload Time (from BOT) <ul style="list-style-type: none"> • DLT 8000 • 9840 Tape • LTO Tape 	<ul style="list-style-type: none"> • 17 seconds • 4 seconds • 17 second
Tape Rewind Time (max.) <ul style="list-style-type: none"> • DLT 8000 • 9840 Tape • LTO Tape 	<ul style="list-style-type: none"> • 120 seconds • 16 seconds • 120 seconds



Feature	Specifications
Firmware Level	9840 drive: V1.28.117 or greater parallel SCSI 9840 FC drive: V1.28.122 or greater DLT 8000 drive: V4.3 or greater LTO drive: V1400 Robotics: V2.3.0 or later
Operating Interface	SCSI II or FC interface
Control Panel	Backlit LCD status display Select buttons to cross menu items LED indicator light (operation/fault status/diagnostic)
<p>1. DLT 8000 drives are read and write compatible back to the DLT 4000 and DLT 7000 formats.</p> <p>2. Sun customers typically experience a 1.4:1 compression ratio</p>	

Hardware Dimensions

Dimension	U.S.	Metric
Height	65.1 in.	165.4 cm
Width	28.3 in.	71.9 cm
Depth	49.3 in.	124.5 cm
Weight (six 9840)	598 lb.	271.3 kg
Weight (ten DLT 8000)	645 lb.	292.6 kg
Weight (ten LTO)	645 lb.	292.6 kg
Shipping Weight (w/o drives and cartridges)	528 lb.	239.5 kg

Environmental Specifications

Feature	Specification
Power Requirements - Library Enclosure <ul style="list-style-type: none"> • Power cable (US/Canada) • Power cable (international) • Input voltage range • Nominal voltage (per power supply) • Power configuration (US/Canada) • Power configuration (international) • Power consumption • Maximum heat output 	<p>100 VAC UL/CSA</p> <p>200 to 240 VAC HAR</p> <p>90 to 254 VAC</p> <p>220 or 240 VAC</p> <p>Single phase 100 VAC, 47 to 63 Hz, 20 A service, 3 wire</p> <p>Single phase 200 to 240 VAC, 47 to 63 Hz, 10 A service, 3 wire</p> <p>120 W</p> <p>410 BTUH</p>



Feature	Specification
Power Requirements - Drive Consumption (Note: Drives get power from library tower) <ul style="list-style-type: none"> • Power cable (US/Canada) • Power cable (international) • Input voltage range • Nominal voltage (per power supply) • Power configuration (US/Canada) • Power configuration (international) • Power consumption • Maximum heat output (10 drives) 	120 VAC UL/CSA 200 to 240 VAC HAR 90 to 254 VAC 120 or 240 VAC Single phase 120 VAC, 47 to 63 Hz, 6A service Single phase 200 to 240 VAC, 47 to 63 Hz, 3A service 972 W 3,314 BTUH
Operating Environment <ul style="list-style-type: none"> • Relative humidity • Temperature • Altitude 	20 to 80 percent noncondensing 15 to 32 degrees C (59 to 90 degrees F) 0 to 3.05 KM (0 to 10,000 feet)
Non-operating Environment <ul style="list-style-type: none"> • Humidity • Temperature • Altitude 	5 to 95 percent, non-condensing -20 to 60 degrees C (-40 to 140 degrees F) Sea level to 50,000 ft. (15,240 m) - shipping Sea level to 10,000 ft. (3,050 m) - storage
Operating Acoustic Noise	<6.5 bels
Safety	UL 1950 cUL CSA C22.2-No 950-M95 TUV EN950
RFI/EMI	FCC Class .15B. Class A CE Mark VCCI class A



Requirements and Configuration

Operating Environment Support

- Solaris™ 2.6, 7, and 8 Operating Environment
(Solaris 2.6 requires patch 105847-04 or later; Solaris 7 requires patch 107460-04 or later)

Hardware Support

The Sun StorEdge™ L180 tape library supports the following Sun hardware:

- Sun Enterprise™ 220R, 250, 420R, 450, 3500–6500, and 10000 servers
- Sun Fire™ 280R, V880, 3800, 4800, 4810, 6800, and 15000 servers
- Sun Blade™ 100 and 1000 workstations
- Ultra™ 2, 5, 10, 60, and 80 workstations

Other Sun hardware is not recommended due to Sun StorEdge L180 tape library performance demands. Refer to the section "Maximum Connect for Drive Technologies by Platform," below, for additional system support information.

Drives, Host Adapters, and SCSI Configurations

- Two drives maximum per X1065A host adapter. Customers can theoretically connect more than two drives to the same bus, but it is not recommended due to performance loss.
- Sharing of tapes/drives by multiple hosts is possible with Solstice Backup™ software or VERITAS NetBackup software.
- Recommended that no other devices (disks, etc.) are on any SCSI bus with the tape drives.
- Robotics have their own SCSI ID and are attached via a separate SCSI cable. Low-bandwidth robotics may coexist with tape drives on a SCSI channel bus.
- Uneven and even numbers of drives are supported.
- The longest supported length of the SCSI bus is 25 meters. Note that this is NOT merely the SCSI cable length, but the total length the SCSI signal has to travel. Sun includes a 6-meter SCSI cable with each drive. This cable is part of the total SCSI signal length. There is an additional 1.5 feet of SCSI cable length within the library for each tape drive.
- The following table depicts the maximum number of Sun StorEdge L180 tape libraries as well as tape drives that can be hooked up to each server. For additional supportable configurations, see the product support matrix at:

http://rmqual.ebay/Qual_Docs/Data_Protection_Prod_Supp_Matrix_3.0.pdf



Maximum Connect for Drive Technologies by Platform

The table below lists the maximum connect for drive technologies by platform. Note that these figures assume the maximum speed processors for each system listed.

Platform	HvD SCSI HBA Support	FC HBA Support	Max. DLT 8000 SCSI	Max. 9840A SCSI	Max. 9840A FC SCSI	Max. LTO SCSI
Sun Fire 15000	X6541A	X6727A, X6799A	270	176	294	164
Sun Enterprise 10000	X1065A	X6727A, X6799A	96	60	72	36
Sun Fire 6800	X6541A, X6749A	X6727A, X6799A, X6748A	120	76	96	72
Sun Fire 4800/4810	X6541A, X6749A	X6727A, X6799A, X6748A	60	36	48	36
Sun Fire 3800	X6749A	X6748A	60	36	48	36
Sun Enterprise 6500	X1065A	X6727A, X6799A	64	42	48	40
Sun Enterprise 4500/5500	X1065A	X6727A, X6799A	32	20	30	18
Sun Enterprise 3500	X1065A	X6727A, X6799A	16	12	16	10
Sun Enterprise 450	X6541A	X6727A, X6799A	24	16	16	16
Sun Enterprise 250	X6541A	X6727A, X6799A	12	8	8	8
Sun Fire V880	X6541A	X6727A, X6799A	48	30	36	20
Sun Enterprise 420R	X6541A	X6727A, X6799A	12	6	6	6
Sun Fire 280R	X6541A	X6727A, X6799A	12	8	12	8
Sun Enterprise 220R	X6541A	X6727A, X6799A	12	6	6	6
Sun Blade 1000	X6541A	X6727A, X6799A	12	8	12	8
Ultra 80	X6541A	X6727A, X6799A	12	6	6	6
Ultra 60	X6541A	X6727A, X6799A	12	6	6	6
Sun Blade 100	X6541A	X6727A, X6799A	2	Not advised	Not advised	2
Ultra 10	X6541A	X6727A, X6799A	2	Not advised	Not advised	1
Ultra 5	X6541A	X6727A, X6799A	2	Not advised	Not advised	1
Ultra 2	X1065A	X6727A, X6799A	4	Not advised	Not advised	2



System Configuration

Media Compatibility

DLT 8000 drives are read and write compatible back to the DLT 4000 and DLT 7000 formats.

Tape Drive Cleaning

Two dedicated cleaning cartridge locations are provided. These locations are in addition to the data cartridge cells.

Diagnostics Cartridges

Dedicated slots for diagnostic tapes are part of the basic configuration. These tapes do not contain any diagnostic software, but are used to determine if the library robot is functioning properly. These locations are in addition to the data cartridge cells.



System Management

System Administration

LCD Control Panel

The Sun StorEdge™ L180 library control panel contains the necessary routine to enable the library configurations using the control panel and can run some diagnostic routines.

Diagnostics

The Sun StorEdge L180 tape library includes extensive built-in diagnostics that can be used to conduct system tests. Diagnostics are stored in flash memory and are divided into three levels:

- Startup
- Run-time
- Remote

At power-up, or reset, the Sun StorEdge L180 tape library runs through a self-check initialization sequence that verifies all major systems are functional and operating within normal ranges. The system configuration, vision and targeting, servo ranges and operations, tape drive interfaces, operator panel, and tape inventory are all checked, before the library goes ready. Errors that would prohibit normal use of the library cause the startup sequence to terminate, and the fault to be displayed on the front operator panel.

Run-time diagnostics can be run locally from the front operator panel of the Sun StorEdge L180 tape library or remotely via a serial port. With the run-time diagnostics, the library robotics and tape drives can be exercised and tested. The following diagnostic functions can be run:

- Get and put a tape cartridge to and from a cell, with full range of robotic motion and reach tested
- Mount and dismount cartridge to a selected tape drive
- Run "demo mode" to exercise random puts and gets of tape cartridges throughout the library
- Initiate tape drive cleaning
- View the fault symptom code event log
- View library and drive firmware levels

Software Support

VERITAS NetBackup and Solstice Backup™ Software

The Sun StorEdge L180 tape library is supported by VERITAS NetBackup software, Solstice Backup™ software, and many other storage management software applications. If VERITAS NetBackup software is used, a robotics license is needed for every drive that is used in the library. With Solstice Backup software: for the 84-cartridge configuration, a 1-128 TSM (autochanger license) is required; for the 180-cartridge configuration, a 1-256 TSM (autochanger license is required).



Note: *Solstice Backup software does not currently support multimedia. Also note that some versions of VERITAS NetBackup and Solstice Backup software may require patches.*

Third-Party Software Support

For information on the third-party application software supported by the Sun StorEdge L180 library, consult the following web site:

<http://webhome.ebay.com/networkstorage/products/software-compatibility.html>

Database Applications Support

The Sun StorEdge L180 library is supported on leading database applications as shown in the table below.

Database	Solstice Backup	VERITAS NetBackup
Oracle on UNIX [®] /Solaris [™] Operating Environment	X	X
Oracle on Microsoft Windows NT	X	X
SAP R/3 on UNIX/Solaris Operating Environment	X	X
SAP R/3 on Microsoft Windows NT	X	X
Microsoft Exchange on UNIX/Solaris Operating Environment	—	—
Microsoft SQL Server on Windows NT	X	X
Informix on UNIX/Solaris Operating Environment	X	X
Informix on Microsoft Windows NT	X	—
Lotus Notes on Microsoft Windows NT	X	Starts with 3.4
Lotus Notes on UNIX/Solaris Operating Environment	X	Starts with 3.4
Sybase on UNIX/Solaris Operating Environment	X	X
Sybase on Microsoft Windows NT	—	—

Operating System Commands

For information about software commands, refer to the *Solaris Handbook for SMCC Peripherals* or the AnswerBook[™] software documentation for the operating system. The *Solaris Handbook for SMCC Peripherals* also describes how to determine which SCSI target IDs are available and how to configure the system after installation.



Ordering Information

Part Numbers

The part numbers for the Sun StorEdge™ L180 tape library are listed below.

Order Number	Title and Description
SG-XLIBL180-BASE2	Sun StorEdge L180 library - 80-slot base configuration <ul style="list-style-type: none">• Two each, US and international power cords• Operators Manual• Operators CD• Installation Guide Note: Data, cleaning, and diagnostic cartridges must be ordered separately.
SG-XCTXP100A-L180	100-cartridge expansion; includes 100 cartridge cells (cartridges sold separately)
SG-XCTXP100A-L180	Redundant power supply and distribution unit
SG-XLIB9840-DRV	Sun StorEdge L180 library 9840 drive option (six drive maximum)
SG-XLIB9840FC-DRV	Sun StorEdge L700 tape library 9840 Fibre Channel tape drive
SG-XLIBFCCARD	Sun StorEdge L700 tape library robotics card
SG-XMED9840-STRKIT	9840 media starter kit with 100 cartridges, 5 cleaning cartridges, and 100 barcode labels (000-000 to 000-200)
SG-XMED9840-20	9840 cartridges (package of 20)
SG-XMED9840CL-5	9840 cleaning cartridges (package of 5)
SG-XMEDCART-1MAG	Tape library media magazine; holds 5 cartridges (9840)
SG-XTAPDLT8-DRV	Sun StorEdge L180 library DLT 8000 drive option (10 drive maximum)
SG-XTAPLTO-DRV	Sun StorEdge L180 library LTO drive option (10 drive maximum)
SG-XMEDDLTCIV-10	Digital Linear Tape CompacTape IV tape (package of 10)
SG-XMEDLTO100GB-10	LTO data cartridges (package of 10)
SG-XMEDDLTCL-10	Digital Linear Tape cleaning cartridges (package of 10)
SG-XMEDLTOSEACL-10	LTO cleaning cartridges (package of 10)
SG-XMONLIBSW1	Library monitoring software; one monitor kit: enabling key and CD-ROM manual
X6541A	Dual-channel differential UltraSCSI host adapter (PCI)
X1065A	SBus differential ultra/wide intelligent SCSI-2 host adapter
X3832A	2-meter 68-pin to VHDC UltraSCSI cable



Order Number	Title and Description
X3831A	10-meter 68-pin to VHDC UltraSCSI cable (must be used with X6541A)
X902A	2-meter SCSI cable for Sun StorEdge L180 library
X979A	12-meter SCSI cable for Sun StorEdge L180 library

Ordering Notes

- With multimedia, it is highly recommended that all tape labels be purchased directly from StorageTek. Call 1-800-905-8502. Standard DLT labels can lower library performance.
- A 100-cartridge expansion kit (SG-XCRTX100A-L180) is available to take the unit to 180 cartridges. The expansion kit is field-upgradeable, but the upgrade must be performed by Sun Enterprise Services.
- The Sun StorEdge L180 tape library ships with monitoring software included. However, to activate the software, customers must purchase the monitor kit (SG-XMONLIBSW1).

Free Installation

Installation is free with the purchase of the Sun StorEdge L180 tape library. However, a site survey and several checklists need to be completed, reviewed, and approved a **MINIMUM** of 15 business days prior to delivery of the unit to the customer's site. For information on this process (the Service Notification Process) refer to <http://scope.central> or contact a Sun service representative.



Service and Support

The SunSpectrumSM program is an innovative and flexible service offering that allows customers to choose the level of service best suited to their needs, ranging from mission-critical support for maximum solution availability to backup assistance for self-support customers. The SunSpectrum program provides a simple pricing structure in which a single fee covers support for an entire system, including related hardware and peripherals, the SolarisTM Operating Environment software, and telephone support for SunTM software packages. The majority of Sun's customers today take advantage of the SunSpectrum program, underscoring the value that it represents. Customers should check with their local Sun Enterprise Services representatives for program and feature availability in their areas.

Support Contracts

SunSpectrum program support contracts are available both during and after the warranty program. Customers may choose to uplift the service and support agreement to meet their business needs by purchasing a SunSpectrum contract. For more information on the SunSpectrum program offerings refer to the following URL:

http://service.central/TS/ESP/SunSpectrum/Feature_Matrix/index.html.

The four levels of SunSpectrum support contracts are outlined below.

SunSpectrum Program Support

Program	Description
Mission-Critical SunSpectrum PlatinumSM Support	Designed to support client-server, mission critical solutions by focusing on failure prevention, rapid recovery and year round technical services planning. Support is provided 24x7.
Business-Critical SunSpectrum GoldSM Support	Includes a complete package of proactive and responsive services for customers who require maximum uptime for their strategic business-critical systems. Support is provided 24x7.
System Coverage SunSpectrum SilverSM Support	Combines the service expertise, responsive on-site support and technical support by telephone and SunSolve TM CD/on-line services. Support is provided 8 a.m. to 8 p.m. Mon. through Fri.
Self-Directed SunSpectrum BronzeSM Support	Provided for customers who rely primarily upon their own in-house service capabilities. Enables customers to deliver high quality service by giving them access to UNIX [®] expertise, Sun certified replacement parts, software releases and technical tools. Support is provided 8 a.m. to 5 p.m. Mon. through Fri.

Warranty

The Sun StorEdgeTM L180 tape library comes with a one-year warranty with 15-day parts exchange.



Professional Services

Sun Professional Services offers a comprehensive set of services that can assist the customer with the integration and optimal utilization of the Sun StorEdge L180 tape library.

Tape Library Implementation Service

This basic service provides for the integration of the Sun StorEdge L180 tape library and backup software (VERITAS NetBackup or Solstice Backup™ software). The resulting hardware/software platform serves as the foundation for further development of production backup and recovery policies by the customer. SunPS consultants perform the following activities:

- Configure the network backup software with the backup server and Sun StorEdge L180 tape library
- Provide functional testing of the backup server with an existing client system using single files of UFS for backup and restore operations
- Provide complete documentation of the configuration

Backup and Restore Implementation Service

This more comprehensive service includes the basic hardware and software integration service described above and extends services to include analysis of the current environment and continues through the development of policies and practices, testing and documentation. This service addresses the following areas:

- Analysis of current environment
- Customized design
- Restore strategy
- Off-line media management
- Implementation of hardware and software
- Integration of databases and key applications
- Testing
- Policies and practices
- Documentation

More information about these services can be found on the Sun Professional Services web site. There is a sales tool section on the site with an electronic service brief and sales guide. The service brief is a piece of collateral which may be printed and given to the customer. Go to the URL:

<http://sunps.central/Services/Storage/>

A Statement of Work must be completed and approved by the customer and included with the sales quote. The Statement of Work details what activities are performed by each party (Sun Professional Services and the customer), and well as terms and conditions of the service engagement. Contact a local Sun Enterprise Support Service Sales Representative as early as possible in the sales cycle to ensure that any potential engagement meets customer needs.

Important Note: *Hardware installation and support are handled separately by Sun Support Services and are not covered under these Sun Professional Services engagements. The hardware must be installed in order to complete these engagements.*



Glossary

Actuators	Robotic components that move inside the library to manipulate cartridges. These include the gripper, extension axis, and vertical and horizontal axes.
Archive	The process of moving data from one medium to another where it is stored for later use.
Autoloader	<p>A peripheral device that contains</p> <ul style="list-style-type: none">• A mechanism for moving cartridges sequentially or under program control• Several storage locations for storage media• One drive capable of reading or writing the media• Interface circuitry <p>When commanded by a host system, autochangers can transport media back and forth between storage locations and the drive residing in the autoloader.</p>
Automatic tape library	A robotic storage and retrieval system for Digital Linear Tape cartridges.
Backup	The process of copying data to a secondary medium for protection in the event that the original copy is lost and needs to be recovered.
Bar code label	The identification label on Digital Linear Tape cartridges.
Bin	A storage receptacle for a tape cartridge.
Cartridge access port (CAP)	The operator-accessible component of the library that allows cartridges to be import/export loaded and unloaded into/from the library.
Compression	A procedure in which data is transformed by the removal of redundant information in order to reduce the number of bits required to represent the data.
Control panel	The panel on the front of the library that contains the Status Display Area, as well as the indicators and control button.
cPCI	The "c" in cPCI stands for compact. PCI connectors on board-level devices can use compact PCI (cPCI) connectors.
Differential	<i>See</i> Single-ended.
DLT	Digital Linear Tape. Linear tape recording technology (contrasted with helical scan). Digital Linear Tape technology segments tape media into parallel, horizontal tracks, and records data by running the tape past a stationary head. Digital Linear Tape provides higher performance than helical scan technology.
Fast/wide SCSI	Data transfer rate of 20 MB per second. Wide devices can be connected to a narrow SCSI interface, but the extra data lines must be terminated.



Helical scan	A means of recording data in narrow tracks that run diagonally across the tape. Formats include 4-mm, 8-mm, and 19-mm, and half-inch tape.
Host	The host computer system acting as controller for the drive.
Host adapter	A device that connects a peripheral device I/O protocol and medium to the computer system's I/O bus.
Host computer	The computer that issues SCSI commands to control the library robotics.
HSM	Hierarchical storage management. A method for keeping infrequently used data in secondary storage, then restoring it automatically when a user calls for the data. The underlying premise behind HSM is that if the most frequently used data is kept in the fastest (primary) storage, most of the time users perceive the overall system performance as if all the data were in fast storage. HSM software transparently "migrates" least frequently used data to more economical media, then restores it automatically as needed. HSM systems can provide users with performance and economy without sacrificing application portability or storage system transparency.
IOPS	Input/output operations per second, a measure of I/O performance usually used to quote random I/O performance.
LCD	Liquid crystal display.
Load	The process in which a drive takes in an inserted cartridge and goes online.
Load port	The operator-accessible component of the library that allows cartridges to be import/export loaded and unloaded into/from the library.
Magazine	A holder for tape cartridges used in robotic handling of media.
MCBF	Mean cycles between failure, an activity-dependent measure of reliability for a robotic cartridge handling system.
MSBF	Mean swaps between failure. A measure of reliability for the robotic cartridge handling system, this is the average expected number of full cartridge exchanges (that is, the cartridge is unloaded from the Digital Linear Tape drive and placed back into its storage slot, and a new cartridge is removed from its storage slot and loaded into the tape drive) between failures of equipment.
MTBF	Mean time between failure. This is the average expected time between failures of equipment, usually measured in operating hours.
MTTR	Mean time to repair.
Offline	A drive is offline if a tape is currently unloaded or not in the drive. The host has limited access, and cannot perform any commands that would cause tape motion. The host can, however, load a tape if one is inserted and can execute any diagnostic tests that do not require tape motion.
Online	A drive is online when a tape is loaded. The host has access to all command operations, including those that access the tape, set configurations and run diagnostic tests.



PCI	Peripheral component interconnect. PCI is an industry-standard bus used in servers, workstations, and PCs.
Pick	Preparation for placing it in another location.
Rear panel	The rear cosmetic panel of the library that contains the AC power switch, AC power receptacle and connectors for attaching external cabling to the library.
Robotics	The library robotics consist of the following components: gripper mechanism, vertical actuator, horizontal actuator, and extension actuator.
SBus	An I/O (input/output) bus used with host systems or boards designed according to SPARC™ processor architecture.
SCSI	Small computer system interface. A standard command specification and command set that enables computers and peripherals to communicate with each other. Sun's current family of tape drives adhere to the SCSI-2 specification.
SCSI address	The octal representation of the unique address (0–7) assigned to a narrow device, or hexadecimal representation of the unique address (0–15) assigned to a wide SCSI device.
Sequential access	Sequential access devices store data sequentially in the order received. Tape devices are the most common sequential access devices. By contrast, disk drives are direct access devices, where data is stored in blocks, not necessarily sequentially.
Single-ended	SCSI devices can be single ended or differential. Single-ended devices transmit signals by setting a line in the cable to a pattern of high and low voltages in relation to a ground line. Differential devices send signals by swapping over high and low states between two lines. This is more expensive to implement, but reduces interference and allows longer cable lengths. Single-ended and differential devices must not be mixed on one SCSI bus.
SWIS/S	Single-ended, wide, intelligent SCSI/SBus host adapter.
Termination	A SCSI bus (or cable) can have many devices plugged into it, but the end of the cable furthest from the host computer must always be terminated to avoid signals being reflected back and interfering with other signals. The terminator both absorbs signals and provides power to the lines in the cable. For this reason, it must itself be provided with power. Terminators can be of two types, active and passive.
Tape library	Type of tape autochanger that allows media to be accessed randomly.
Throughput	A measure of sequential I/O performance, quoted in MB per second. <i>See</i> IOPS.
Transfer rate	The rate at which data is transferred from one device to another, for example from the host computer to the tape drive during backup.



Materials Abstract

All materials are available on SunWIN except where noted otherwise.

Collateral	Description	Purpose	Distribution	Token # or COMAC Order #
Powerpack				
– <i>Sun StorEdge™ L180 Tape Library, Just the Facts</i>	Reference Guide (this document)	Training Sales Tool	SunWIN, Reseller Web	122321
– <i>Sun StorEdge L180 Tape Library Customer Presentation</i>	Presentation with Slide Notes	Training Sales Tool	SunWIN, Reseller Web	122325
References				
– <i>Sun StorEdge L180 Tape Library Data Sheet</i>	Data Sheet	Training Sales Tool	SunWIN, Reseller Web	117185
– <i>Sun StorEdge Product Family Overview Quick Reference Card</i>	Quick Reference Card	Sales Tool	SunWIN, Reseller Web, First Resort	73691
– <i>Planning Your Backup Architecture</i>	White Paper	Sales Tool	SunWIN	101273
External Web Site				
– <i>Sun StorEdge L180 Tape Library, General Information</i>	http://www.sun.com/storage/L180			
Internal Web Sites				
– <i>Sun StorEdge Products Internal Site</i>	http://webhome.ebay/networkstorage/products/L180			
– <i>Service Notification Process Web Site</i>	http://scope.central			
– <i>Field (SEs/Sales) information</i>	http://onestop			
– <i>Tape engineering information</i>	http://rmqual.ebay			
– <i>Software Support</i>	http://webhome.ebay/networkstorage/products/software-compatibility.html			

