Sun StorEdge™ L280 Autoloader

Just the Facts

Copyrights

Introduction

Designed for backup of workstations and workgroup servers, the Sun StorEdge™ L280 autoloader offers 280-GB native capacity in the reliable DLT™ 7000 format. Housed in either a desktop enclosure or in a rackmount version, the Sun StorEdge L280 autoloader consists of one DLT 7000 tape drive, eight slots for storing cartridges, and a robotic system to remove cartridges from the slots, load them into the drive, unload them from the drive, and return them to the cartridge slots. It can be used with Sun StorEdge Enterprise NetBackup™ or Solstice Backup™, as well as many other storage management software applications, to easily handle the unattended backup of 150-GB databases in eight hours or less.

An internal rackmount kit is available for those customers wishing to mount the deskside version in one of Sun's expansion racks. An upgrade option is available in the standalone desktop enclosure for those customers wishing to trade in an existing SPARCstorage™ DLT 4700 from Sun.

The Sun StorEdge L280 autoloader is read/write compatible with the DLT 4000, DLT 2000, and DLT 2000XT formats, enabling those customers with tape media written by a DLT 4000 or DLT 2000 drive or SPARCstorage DLT 4700 to be able to use that same media in the Sun StorEdge L280 autoloader.

Storage Management Systems

Today, autoloaders are sold to perform backup and archival tasks. With increasing numbers of autoloaders and tape technologies and a higher 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 run 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 daunting and challenging.
- **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.

- **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 solution 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 will determine the length of time data will be readable from stored files.
- **Standards:** Standard form factors and formats will ensure backward compatibility between older files and current drives.

Key Messages

- **Part of a complete tape backup solution:** Combined with Sun Enterprise™ servers and software, like Sun StorEdge Enterprise NetBackup and Solstice Backup, the Sun StorEdge L280 autoloader contributes towards a complete tape backup solution.
- **Superior quality:** Sun has an extremely rigorous qualification testing and design collaboration process.
- **One-stop shopping:** Besides hardware and software, Sun offers maintenance (via a SunSpectrum℠ contract) of the Sun StorEdge L280 autoloader (worldwide). Sun also sells the media that is used in the autoloader.
- **Investment protection:** The DLT 7000 tape drive inside the Sun StorEdge L280 autoloader is read and write compatible with previous generation DLT tape media from DLT 2000 through DLT 7000 formats.
- **Solution flexibility:** The rackmount configuration offers a compact footprint along with low cost for the density of capacity available. Two Sun StorEdge L280 autoloaders can sit side by side in a standard 19-inch rack providing 560 GB of capacity, up to double the amount some other DLT autoloaders can offer in the same space.

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. In addition to the Sun StorEdge L280 autoloader, Sun's tape offerings include the following (note that all capacities listed are native):

- Sun StorEdge SLR5 tape drive
- Sun StorEdge DDS-3 tape drive
- Sun StorEdge 7-GB, 8-mm tape drive
- Sun StorEdge 20-GB, 8-mm tape drive
- Sun StorEdge DDS-3 tape autoloader
- Sun StorEdge L400 tape library (8-mm library)
- Sun StorEdge L1000 tape library (1.0-TB DLT library)
- Sun StorEdge L1800 tape library (1.8-TB DLT library)
- Sun StorEdge L3500 tape library (3.5-TB DLT library)
- Sun StorEdge L11000 tape library (11.4-TB DLT library)

Product Availability

April 29, 1998	External desktop configuration: Worldwide General Availability (GA)/Volume Ship Date
May 13, 1998	Internal rackmount configuration: Worldwide General Availability (GA)/ Volume Ship Date

Target Markets

- **Installed base of DLT 4700 autoloaders**

  The Sun StorEdge L280 autoloader is a replacement for the SPARCstorage DLT 4700 autoloader. Sun offers an upgrade option for existing SPARCstorage DLT 4700 customers interested in trading these autoloaders in for a discount towards a Sun StorEdge L280 autoloader.
- **Cost-competitive entry point to an automated backup solution**
- **Entry-level DLT-based backup solution**

  The Sun StorEdge L280 autoloader is complemented by Sun's entire DLT-based product line that can accommodate a customer's growth requirements.

Typical Customers

- Telco customers enjoy the flexibility of a small footprint solution, which easily enables multiple distributed backup solutions in a multi-tier environment.
- Manufacturing customers like options enabling rackmounted solutions that can be integrated into existing racks.
- Government and education customers like the ability to secure the latest technology at an entry-level price.

Year 2000 Compliance

The Sun StorEdge L280 autoloader is Year 2000 compliant.

Internationalization and Localization

The User's Guide provided with the Sun StorEdge L280 autoloader is localized into Spanish, German, Italian, French, Japanese, Korean, Simplified Chinese, and Traditional Chinese. The touch screen control panel is in English only.

Selling Highlights

Typical Applications

- Servers with database/on-line capacity in the 50-GB to 150-GB range. As a rule of thumb, backup solutions should have three to five times the amount of backup capacity as on-line storage. This enables not only multiple copies of regular backup cycles, but also allows room to expand as data grows. Sun will support up to two Sun StorEdge™ L280 autoloaders per host adapter (a total native capacity of 560 GB of backup capacity).
- Archival
- Hierarchical storage management (HSM)

Technical Overview

There are a number of Sun StorEdge™ L280 autoloader technical features that are worth highlighting:

- Digital linear tape technology
- Adaptive cache buffering scheme
- Tape cartridge transport
- Diagnostics

Note: *The Sun StorEdge L280 autoloader does not have a bar code reader.*

Digital Linear Tape Technology Overview

Digital linear tape technology uses multichannel linear or serpentine recording. Linear or serpentine technology uses a multichannel tape, whereby multiple channels are simultaneously recorded and read. 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™ 7000 essentially doubles data transfer rates compared to the DLT 4000 (two channels). In contrast, helical scan technology records in diagonal stripes using a rotating drum head and slow tape motor—an approach that provides high capacity but lower performance.

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, minimizing 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.

The digital linear tape is one-half inch (12 mm) wide. This allows for more data to be recorded on digital linear tape than 8 mm or 4 mm, offering higher capacity (35 GB on DLT 7000 versus 20 GB or 12 GB for 8 mm and 4 mm, respectively).

Future digital linear tape products will easily grow in capacity by increasing bit density and tape length. Performance improvements occur through the addition of new heads and channels, or by increasing the tape speed.

Digital linear tape offers several advanced features, such as full SCSI-2 command set implementation, built-in diagnostics, and a high data transfer rate of 5 MB per second. The current version of DLT 7000 tapes have a native capacity of 35 GB. The digital linear tape cost per MB is comparable to 4-mm or 8-mm technology.

As the digital linear tape 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

Digital linear tape transfer rates could surpass that of many host computers. Digital linear tape overcomes this by using an adaptive cache buffering scheme to achieve maximum throughput. Host system data rates are monitored and digital linear tape automatically adjusts its transfer rate to match that of the system. This minimizes the number of times the drives have to stop and reposition.

Tape Cartridge Transport

In a typical operation, the host commands the robotics to transport tape cartridges between storage bins inside the autoloader and the DLT 7000 tape drive. Each time a tape cartridge is transported, a gripping mechanism is moved to the tape location where it “picks” the tape cartridge, moves it to the designated location, then “places” it.

Diagnostics

The Sun StorEdge L280 autoloader includes an extensive suite of system tests, contained on the service CD. These tests are exercised over the SCSI cable and run on any Sun platform (except X86). The Sun StorEdge L280 autoloader also has self-contained, self-diagnostic routines that can run offline. These internal tests are run using the control panel of the Sun StorEdge L280 autoloader.

Specifications and Configuration

Technical Specifications

Sun StorEdge™ L280 Autoloader	
Technology	DLT™ 7000[1]
Capacity	280 GB native (with 8 digital linear, compact IV tapes)
Sustained Transfer Rate	5 MB/sec native
Digital Linear Tape Cartridge Capacity	35 GB native[2]
Robotics MSBF	200,000 swaps
Robotics MTBF	200,000 hours
Drive MTBF	200,000 power-on hours
Drive Head Life	30,000 hours
Media Life	Average 500,000 passes, 10,000 uses
Magazine Life	45,000 swaps
Average Tape Access Time	11 seconds
Average Tape Exchange Time	22 seconds
Average Access Time	60 seconds
Tape Load Time	37 seconds
Tape Unload Time	17 seconds
Repositioning Time	1.3 seconds
Tape Rewind Time	120 seconds
Firmware Level	Drive: V80 Robotics: V2.07 (V2.08 is being qualified as of 3/9/99)

[1] DLT 7000 drives have the capability to both read and write in a DLT 4000 mode. The DLT 7000 drive is read compatible back to the DLT 2000 product, which Sun does not offer.

[2] Sun customers typically experience a 1.4:1 compression ratio.

Physical Characteristics

Size: Rackmount Unit • Requires 5 EIA units in a rack; 1 EIA = 1.75 inches	Height: 6.97 inches (177 mm) Width: 8.65 inches (220 mm) Depth: 22 inches (559 mm) Footprint: 1.32 ft^2 (0.12 m^2) Net Weight: 27.5 lb. (12.5 kg) Gross Weight: 38.9 lb. (17.7 kg)
Size: Deskside Unit	Height: 7.35 inches (187 mm) Width: 8.9 inches (226 mm) Depth: 22 inches (559 mm) Footprint: 1.36 ft^2 (0.13 m^2) Net Weight: 31.5 lb. (14.3 kg) Gross Weight: 42.5 lb. (19.3 kg)
Operating Interface	SCSI-2 high density wide differential
Control Panel	16-character, 2-line, backlit LCD status display Select switches to scroll menu items LED indicator light (operational/fault status/diagnostic)

Environmental Specifications

Power	
• AC Power Voltage	100-127V or 200-240V auto ranging
• Current Rating	100-127V, 1.8A, 220-240V, 0.9A (50/60 Hz, auto ranging)
• Power Maximum	120 Watts
• Stand-By or Idle	14.8 Watts
• Maximum Watts	100-127V (60 Hz), 1.8A
• Maximum Watts	200-240V (50 Hz), 0.9A
Operating Environment	
• Humidity	20 to 80 percent, noncondensing
• Temperature	10 to 40 degrees C (50 to 104 degrees F)
• Altitude	Sea level to 10,000 ft. (3,000 m)
Non-Operating Environment	
• Humidity	10 to 95 percent, noncondensing
• Temperature	-40 to 66 degrees C (-40 to 151 degrees F)
• Altitude	Sea level to 10,000 ft. (3,000 m)
Safety	UL1950 listed CSA C22.2-No. 950 TUV-EN60950
Emission	FCC Part 15B Class B CE Mark, VCCI Class 2 C-Tick GOST Taiwan BCIQ

Configuration Information

The desktop and rackmount configurations come shipped with the following:

	Desktop	Rackmount
Number of Drives	1	1
Slots[1]	8	8
Mailbox Slots (Cartridge Holder)	1	1
Blank Digital Linear Tape, Compact IV Cartridge	1	1
Cleaning Cartridge	1	1
68-pin to 68 pin, differential SCSI cables[2]	1 (2 meter)	1 (4 meter)
SCSI jumper cable	1	1
SCSI terminators (differential)	1	1
US power cable[3]	1	1
Documentation for installation and use (CD)	yes	yes
Bar Code Reader	no	no
[1]Six cartridge removable magazine and two fixed slots.		
[2] The maximum supported length of the differential SCSI bus is 25 meters. If you need longer cables than those provided, you will need to order them separately.		
[3] GEO-specified based on where unit is ordered.		

Drives, Host Adapters, and SCSI Configuration Information

- Two Sun StorEdge L280 autoloaders maximum per host adapter (Note: You can theoretically connect more than two Sun StorEdge L280 autoloaders to the same bus, but it is not recommended due to decreased performance. The drives need at least 3.5 MB/sec to sustain in streaming mode.)
- The Sun StorEdge L280 autoloader is ***not*** compatible with a fast, single-ended SCSI, as it has a SCSI differential controller and requires a differential SCSI card in the host it is connected to.

System Compatibility

Operating Environment Support

- Solaris™ 2.5.1 and 2.6 operating environment
- Solaris 7 Update 3/99 (with SBU 5.1.1)
- Modification to `st.conf` file required

Hardware Compatibility

Sun Hardware

System	Host Adapter Required
SPARCstation™ 5, 10, 20 systems	X1062A
Sun Enterprise™ 1 and 2 systems	X1062A
Sun Ultra™ 5, 10, 30, and 60 workstations	X6541A
Sun Enterprise 250 server	X6541A
Sun Enterprise 450 server	X6541A
Sun Enterprise 3000 - 6000, 3500 - 6500 servers	X1062A
Sun Enterprise 10000 server	X1062A

Non-Sun Hardware

Support on non-Sun platforms is expected in the near future. The first supported platform will be Microsoft Windows NT. This is expected in the third quarter of calendar year 1999. The Sun StorEdge L280 autoloader has been tested, but is not supported, on the following platforms: HP9000 s800 K420, AIX-10, NT-Intel, and NT-Alpha.

The Sun StorEdge L280 autoloader can be plugged into DEC/Compaq, EMC, HP, Siemens, and any system that you can hang a differential SCSI library on. This does not mean, however, that it has been subjected to Sun's rigorous qualification testing. It also does not mean that Enterprise Services or any SunSpectrum contract covers this type of system setup.

Software Compatibility

The Sun StorEdge L280 autoloader is supported by Sun StorEdge Enterprise NetBackup™, Solstice Backup™, and many other storage management software applications. (If using NetBackup, customer should purchase Robotics Tier No. 1.)

The `st.conf` file needs to be modified for the system to recognize the digital linear tape drives in the library. Instructions on how to modify the file come with the Sun StorEdge L280 autoloader.

The Sun StorEdge L280 autoloader is supported on leading database applications as follows:

Database	Solstice Backup	Sun StorEdge Enterprise NetBackup
Oracle	X	X
Informix	X	X
SAP	X	
MS Exchange	X	X
MS SQL Server	X	X
Oracle on Microsoft Windows NT	X	
Lotus Notes on Microsoft Windows NT	X	
Lotus Notes on SPARC™	X	
Sybase		X

Host Adapters

- Differential fast/wide intelligent SCSI (DWIS) host adapter (X1062A)
- Dual-channel differential UltraSCSI host adapter (X6541A—PCI-to-SCSI)

The X1065A host adapters are NOT compatible with Sun's tape products.

X6541A host adapters can support four DLT™ drives. The speed of the SCSI host adapter is not the performance factor; it is the speed of the tape drive on a bus. Both the X1062A and X6541A are faster than the tape drive. Since the X6541A can handle 40 MB per second, it can support four drives streaming at 5 MB per second. The X6541A is a dual port, ultra fast wide host adapter. "Dual port" means that the host adapter can independently communicate to many SCSI devices.

The Sun StorEdge L280 autoloader is not supported on any on-board host adapter. A minimum of one differential host adapter is required.

Media Compatibility

The Sun StorEdge L280 autoloader is read/write compatible with previous generation DLT tape media from the DLT 2000 format (DLT tape III) through the DLT 7000 format (DLT compact IV tape).

Application Software

The Sun StorEdge™ L280 autoloader does not ship with a robotics driver. Cartridge loading must be performed manually. A storage management software application, such as Solstice Backup™ or Sun StorEdge Enterprise NetBackup™, is recommended for maximum utilization of the Sun StorEdge L280 autoloader.

Sun StorEdge LibMON™

Sun StorEdge LibMON™ software enables local and remote Web-based monitoring of the Sun StorEdge L280 autoloader. It is available at a minimal charge. This software enables remote administration via an Internet browser. Other features include:

- Event logging
- Event notification via e-mail, pager, and SNMP alerts
- Remote library configuration
- Remote library diagnostics
- Visual status monitoring of library inventory, cartridges, and drives

Software Commands

Sun StorEdge Enterprise NetBackup and Solstice Backup storage management applications have their own documentation, which will help you get set up and running with tape automation products like the Sun StorEdge L280 autoloader.

The Sun StorEdge L280 autoloader is supported in sequential mode by standard UNIX® commands like `tar` and `ufsdump` without modification to the kernel in the Solaris™ operating environment.

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

The Sun StorEdge L280 autoloader has three modes of operation:

- Autodetect: Defaults to stacker mode until the autoloader receives a changer command, which changes it to random mode until it is power cycled.
- Stacker: Loads each tape sequentially after each drive unload request. Only one SCSI ID may be configured. The Sun StorEdge L280 autoloader port does not need to be connected to any SCSI ID in this mode, since moving of the tapes is controlled by the Sun StorEdge L280 autoloader sequential control system internally.
- Random: Allows random access to tapes per command to the Sun StorEdge L280 autoloader.

Ordering Information

Sun StorEdge™ L280 Autoloader Options

SG-XLIBDLT1-280G	Sun StorEdge™ L280 autoloader (deskside version)[1]
SG-XLIBDLT 2-280G	Sun StorEdge L280 autoloader (rackmount version)
X9643A	Sun StorEdge L280 autoloader rackmount kit (X-option)[2]
UG-DLT 4700-TO-L280	Upgrade from SPARCstorage™ DLT™ 4700 to Sun StorEdge L280 autoloader
LMN9S-200-E999	Sun StorEdge LibMON™ 2.0 (media, documentation, and license)
LMN9S-200-E99C	Sun StorEdge LibMON 2.0 Japanese (media, documentation, and license)
X6541A	Dual-channel differential UltraSCSI host adapter (PCI)
X1062A	SBus differential fast/wide intelligent SCSI-2 host adapter
SG-XMEDDLTCIV-10	Digital Linear Tape compact IV tape (package of 10)
SG-XMEDDLTCL-10	Digital Linear Tape cleaning cartridges (Package of 10)

[1] Please note that there is a separately available rackmount kit for those customers who purchase a deskside version and then, at a later date, want to rackmount the Sun StorEdge L280 autoloader.

[2] Includes sheet metal hardware needed to mount two autoloaders into a standard 19"-wide rack.

Converting from Rackmount to Desktop (and Vice Versa)

- Rackmount to desktop:
  - Purchase the FRU (skin and feet—Sun Part Number F-370-3425-01—please check with your Enterprise Services representative)
  - Take the Sun StorEdge L280 autoloader out of the rack, put on the skin and feet, and place on the desktop.
- Desktop to rackmount:
  - Purchase the rackmount kit (one kit for two Sun StorEdge L280 autoloaders)
  - Remove the skins and feet from the desktop unit, place in rack, and secure as necessary.

System Support Program

The SunSpectrum℠ 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. SunSpectrum programs provide a simple pricing structure in which a single fee covers support for an entire system, including related hardware and peripherals, the Solaris™ operating environment, and telephone support for Sun™ software packages. The majority of Sun's customers today take advantage of the SunSpectrum program, underscoring the value it represents. Customers should check with their local Sun Enterprise™ Services representative for program and feature variance and availability in their area.

FEATURE	SUNSPECTRUM PLATINUM℠ Mission-critical Support	SUNSPECTRUM GOLD℠ Business-critical Support	SUNSPECTRUM SILVER℠ Systems Support	SUNSPECTRUM BRONZE℠ Self Support
Systems Features				
Systems approach coverage	Yes	Yes	Yes	Yes
System availability guarantee	Customized	No	No	No
Account Support Features				
Service account management team	Yes	No	No	No
Personal technical account support	Yes	Yes	No	No
Account support plan	Yes	Yes	No	No
Software release planning	Yes	No	No	No
On-site account reviews	Monthly	Semi-annual	No	No
Site activity log	Yes	Yes	No	No
Coverage / Response Time				
Standard telephone coverage hours	7 day/24 hour	7 day/24 hour	8 a.m.–8 p.m., Monday–Friday	8 a.m.–5 p.m., Monday–Friday
Standard on-site coverage hours	7 day/24 hour	8 a.m.–8 p.m., Monday–Friday	8 a.m.–5 p.m., Monday–Friday	N/A
7 day/24 hour telephone coverage	Yes	Yes	Option	No
7 day/24 hour on-site coverage	Yes	Option	Option	N/A
Customer-defined priority setting	Yes	Yes	Yes	No
– Urgent (phone/on-site)	Live transfer/ 2 hour	Live transfer/ 4 hour	Live transfer/ 4 hour	4 hour / N/A
– Serious (phone/on-site)	Live transfer/ 4 hour	2 hour/next day	2 hour/next day	4 hour / N/A
– Not critical (phone/on-site)	Live transfer/ customer convenience	4 hour/ customer convenience	4 hour/ customer convenience	4 hour / N/A
Additional contacts	Option	Option	Option	Option

FEATURE	SUNSPECTRUM PLATINUM℠ Mission-critical Support	SUNSPECTRUM GOLD℠ Business-critical Support	SUNSPECTRUM SILVER℠ Systems Support	SUNSPECTRUM BRONZE℠ Self Support
Enhanced Support Features				
Mission-critical support team	Yes	Yes	No	No
Sun Vendor Integration Program (SunVIP℠)	Yes	Yes	No	No
Software patch management assistance	Yes	No	No	No
Field change order (FCO) management assistance	Yes	No	No	No
Remote Systems Diagnostics				
Remote dial-in analysis	Yes	Yes	Yes	Yes
Remote systems monitoring	Yes	Yes	No	No
Remote predictive failure reporting	Yes	Yes	No	No
Software Enhancements and Maintenance Releases				
Solaris™ enhancement releases	Yes	Yes	Yes	Yes
Patches and maintenance releases	Yes	Yes	Yes	Yes
Sun unbundled software enhancements	Option	Option	Option	Option
Internet and CD-ROM Support Tools				
SunSolve™ license	Yes	Yes	Yes	Yes
SunSolve EarlyNotifier℠ service	Yes	Yes	Yes	Yes

Glossary

Archive	The process of moving data from one medium to another where it will be stored for later use.
Autoloader	A peripheral device that contains 1. A mechanism for moving cartridges sequentially or under program control 2. Several storage locations for storage media 3. One drive capable of reading or writing the media, 4. Interface circuitry When commanded by a host system, autochangers can transport media back and forth between storage locations and the drive residing in the autoloader.
Average access time	Time to data, assuming the tape is already loaded in the drive and positioned at the beginning of the tape.
Average tape access time	Time required to reach any cartridge in the autoloader's slots, grab it, and load it into the drive.
Average tape exchange time	Time required to take a tape out of the drive, put it back in its slot, and then grab another tape and insert it in the drive.
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.
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. Text data is typically much more compressible than video/image data.
Control panel	The panel on the front of the autoloader that contains indicators and buttons.
Differential	*See* 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.
DWIS/S	Differential, wide, intelligent SCSI/SBus host adapter.
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.
GB	Gigabyte. A GB is 1 billion (1,000,000,000) bytes.

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 (same as video cassette players).
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 will 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.
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 (i.e., 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. 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.

Pick	Preparation for placing it in another location.
Repositioning time	Time for drive heads to be properly positioned once the tape is loaded.
Random mode	Cartridges are used in order dictated by the host or the user, rather than sequentially, as in Sequential Mode. For each cartridge to be used, the host must issue a SCSI “move medium” command to instruct the autoloader to move the cartridge from the magazine to the drive. When the cartridge is full or when no further use is to be made of it, the host must again use the “move medium” command to load another cartridge. Random mode is sometimes referred to as Changer Mode.
SBus	Sun Microsystems I/O mezzanine bus for connecting Sun and I/O cards to expand system functionality.
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 adheres 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 and retrieve data sequentially in the order originally sent to the device. Tape devices are the most common sequential access devices. By contrast, disk drives are direct access devices, where data is stored and retrieved 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 reduces interference and allows longer cable lengths. Single-ended and differential devices must not be mixed on one SCSI bus without a level converter (not offered by Sun).
Stacker mode	Cartridges are used sequentially from the autoloader magazine. The cartridge selected by the user (by using the front panel “load” command) is used first. When it is full, the changer mechanism automatically moves it back to the magazine and then moves the cartridge in the next highest numbered slot to the drive. This continues until all the cartridges have been used. To load cartridges under host control, the device must be in random Mode. Stacker Mode is sometimes referred to as Sequential Mode.
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 three types: active, passive, and forced-perfect. For the Sun StorEdge L280 autoloader, only differential, passive terminators can be used.

TB

Terabyte. A disk or tape TB is 1 trillion (1,000,000,000,000) bytes, or 1,000 GB.

Throughput

A measure of sequential I/O performance, quoted in MB per second. See 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 #
References				
– *Sun Product Intro—Sun StorEdge™ L280 Autoloader*	Introduction E-mail	Sales Tool	SunWIN, Reseller web, E-mail	82104
– *Sun StorEdge L280 Autoloader Datasheet*	Data Sheet	Sales Tool	SunWIN	81170
– *Sun Product Intro: Sun StorEdge LibMON™ 2.0*	Introduction E-mail	Sales Tool	SunWIN, Reseller web, E-mail	92394
– *Sun StorEdge LibMON 2.0 Datasheet*	Data Sheet	Sales Tool	SunWIN	92837
– *Sun StorEdge LibMON 2.0 Just The Facts*	Just The Facts	Sales Tool	SunWIN	92987
– *Sun Product Intro—Mass Storage: Media for Removable Tape Products*	Introduction E-mail	Sales Tool	SunWIN, Reseller web, E-mail	96803