Sun™ StorEdge™ L400 Installation and User's Guide

THE NETWORK IS THE COMPUTER™

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Regulatory Compliance Statements

Your Sun product is marked to indicate its compliance class:

- Federal Communications Commission (FCC) — USA
- Department of Communications (DOC) — Canada
- Voluntary Control Council for Interference (VCCI) — Japan

Please read the appropriate section that corresponds to the marking on your Sun product before attempting to install the product.

FCC Class A Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted-pair (UTP) cables.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

FCC Class B Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted pair (UTP) cables.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

DOC Class A Notice - Avis DOC, Classe A

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

DOC Class B Notice - Avis DOC, Classe B

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

VCCI 基準について

第一種VCCI基準について

第一種VCCIの表示があるワークステーションおよびオプション製品は、第一種情報装置です。これらの製品には、下記の項目が該当します。

この装置は、第一種情報装置(商工業地域において使用されるべき情報装置)で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会(VCCI)基準に適合しております。したがって、本製品を、住宅地域または住宅地域に隣接した地域でご使用になりますと、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

取り扱い説明書に従って正しくお取り扱いください。

第二種VCCI基準について

第二種VCCIの表示  があるワークステーションおよびオプション製品は、第二種情報装置です。これらの製品には、下記の項目が該当します。

この装置は、第二種情報装置(住宅地域または住宅地域に隣接した地域において使用されるべき情報装置)で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会(VCCI)基準に適合しております。しかし、本製品を、ラジオ、テレビジョン受信機に近接してご使用になりますと、受信障害の原因となることがあります。

取り扱い説明書に従って正しくお取り扱いください。

Safety Agency Compliance Statements

Read this section before beginning any procedure. The following text provides safety precautions to follow when installing a Sun Microsystems product.

Safety Precautions

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages may be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.

Symbols

The following symbols may appear in this book:

Caution – There is risk of personal injury and equipment damage. Follow the instructions.

Caution – Hot surface. Avoid contact. Surfaces are hot and may cause personal injury if touched.

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

On – Applies AC power to the system.

Depending on the type of power switch your device has, one of the following symbols may be used:

Off – Removes AC power from the system.

Standby – The On/Standby switch is in the *standby* position.

Modifications to Equipment

Do not make mechanical or electrical modifications to the equipment. Sun Microsystems is not responsible for regulatory compliance of a modified Sun product.

Placement of a Sun Product

Caution – Do not block or cover the openings of your Sun product. Never place a Sun product near a radiator or heat register. Failure to follow these guidelines can cause overheating and affect the reliability of your Sun product.

SELV Compliance

Safety status of I/O connections comply to SELV requirements..

Power Cord Connection

Caution – Sun products are designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electric shock, do not plug Sun products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

Caution – Not all power cords have the same current ratings. Household extension cords do not have overload protection and are not meant for use with computer systems. Do not use household extension cords with your Sun product.

Caution – Your Sun product is shipped with a grounding type (three-wire) power cord. To reduce the risk of electric shock, always plug the cord into a grounded power outlet.

The following caution applies only to devices with a **Standby** power switch:

Caution – The power switch of this product functions as a standby type device only. The power cord serves as the primary disconnect device for the system. Be sure to plug the power cord into a grounded power outlet that is nearby the system and is readily accessible. Do not connect the power cord when the power supply has been removed from the system chassis.

Lithium Battery

Caution – There is a lithium battery, Ray-O-Vac BR2335, soldered on the SMC controller card. Batteries are not customer replaceable parts. They may explode if mishandled. Do not dispose of the battery in fire. Do not disassemble it or attempt to recharge it. When the lithium battery needs to be replaced, replace the entire SMC controller card.

System Unit Cover

You must remove the cover of your Sun computer system unit in order to add cards, memory, or internal storage devices. Be sure to replace the top cover before powering up your computer system.

Caution – Do not operate Sun products without the top cover in place. Failure to take this precaution may result in personal injury and system damage.

Einhaltung sicherheitsbehördlicher Vorschriften

Auf dieser Seite werden Sicherheitsrichtlinien beschrieben, die bei der Installation von Sun-Produkten zu beachten sind.

Sicherheitsvorkehrungen

Treffen Sie zu Ihrem eigenen Schutz die folgenden Sicherheitsvorkehrungen, wenn Sie Ihr Gerät installieren:

- Beachten Sie alle auf den Geräten angebrachten Warnhinweise und Anweisungen.
- Vergewissern Sie sich, daß Spannung und Frequenz Ihrer Stromquelle mit der Spannung und Frequenz übereinstimmen, die auf dem Etikett mit den elektrischen Nennwerten des Geräts angegeben sind.
- Stecken Sie auf keinen Fall irgendwelche Gegenstände in Öffnungen in den Geräten. Leitfähige Gegenstände könnten aufgrund der möglicherweise vorliegenden gefährlichen Spannungen einen Kurzschluß verursachen, der einen Brand, Stromschlag oder Geräteschaden herbeiführen kann.

Symbole

Die Symbole in diesem Handbuch haben folgende Bedeutung:

Achtung – Gefahr von Verletzung und Geräteschaden. Befolgen Sie die Anweisungen.

Achtung – Hohe Temperatur. Nicht berühren, da Verletzungsgefahr durch heiße Oberfläche besteht.

Achtung – Gefährliche Spannungen. Anweisungen befolgen, um Stromschläge und Verletzungen zu vermeiden.

Ein – Setzt das System unter Wechselstrom.

Je nach Netzschaltertyp an Ihrem Gerät kann eines der folgenden Symbole benutzt werden:

Aus – Unterbricht die Wechselstromzufuhr zum Gerät.

Wartezustand (Stand-by-Position) - Der Ein-/Wartezustand-Schalter steht auf Wartezustand. Änderungen an Sun-Geräten.

Nehmen Sie keine mechanischen oder elektrischen Änderungen an den Geräten vor. Sun Microsystems, übernimmt bei einem Sun-Produkt, das geändert wurde, keine Verantwortung für die Einhaltung behördlicher Vorschriften

Aufstellung von Sun-Geräten

Achtung – Um den zuverlässigen Betrieb Ihres Sun-Geräts zu gewährleisten und es vor Überhitzung zu schützen, dürfen die Öffnungen im Gerät nicht blockiert oder verdeckt werden. Sun-Produkte sollten niemals in der Nähe von Heizkörpern oder Heizluftklappen aufgestellt werden.

Einhaltung der SELV-Richtlinien

Die Sicherung der I/O-Verbindungen entspricht den Anforderungen der SELV-Spezifikation.

Anschluß des Netzkabels

Achtung – Sun-Produkte sind für den Betrieb an Einphasen-Stromnetzen mit geerdetem Nulleiter vorgesehen. Um die Stromschlaggefahr zu reduzieren, schließen Sie Sun-Produkte nicht an andere Stromquellen an. Ihr Betriebsleiter oder ein qualifizierter Elektriker kann Ihnen die Daten zur Stromversorgung in Ihrem Gebäude geben.

Achtung – Nicht alle Netzkabel haben die gleichen Nennwerte. Herkömmliche, im Haushalt verwendete Verlängerungskabel besitzen keinen Überlastungsschutz und sind daher für Computersysteme nicht geeignet.

Achtung – Ihr Sun-Gerät wird mit einem dreiadrigen Netzkabel für geerdete Netzsteckdosen geliefert. Um die Gefahr eines Stromschlags zu reduzieren, schließen Sie das Kabel nur an eine fachgerecht verlegte, geerdete Steckdose an.

Die folgende Warnung gilt nur für Geräte mit Wartezustand-Netzschalter:

Achtung – Der Ein / Aus-Schalter dieses Geräts schaltet nur auf Wartezustand (Stand-By-Modus). Um die Stromzufuhr zum Gerät vollständig zu unterbrechen, müssen Sie das Netzkabel von der Steckdose abziehen. Schließen Sie den Stecker des Netzkabels an eine in der Nähe befindliche, frei zugängliche, geerdete Netzsteckdose an. Schließen Sie das Netzkabel nicht an, wenn das Netzteil aus der Systemeinheit entfernt wurde.

Lithiumbatterie

Achtung – Auf die SMC-Controller-Karte ist eine Ray-O-Vac BR2335 Lithiumbatterie aufgelötet. Batterien gehören nicht zu den vom Kunden austauschbaren Teilen. Bei unsachgemäßer Handhabung besteht Explosionsgefahr. Die Batterie nicht in offenes Feuer werfen, nicht demontieren, nicht wieder aufladen! Wenn die Lithiumbatterie ersetzt werden muß, die gesamte SMC-Controller-Karte auswechseln.

Gehäuseabdeckung

Sie müssen die obere Abdeckung Ihres Sun-Systems entfernen, um interne Komponenten wie Karten, Speicherchips oder Massenspeicher hinzuzufügen. Bringen Sie die obere Gehäuseabdeckung wieder an, bevor Sie Ihr System einschalten.

Achtung – Bei Betrieb des Systems ohne obere Abdeckung besteht die Gefahr von Stromschlag und Systemschäden.

Conformité aux normes de sécurité

Ce texte traite des mesures de sécurité qu'il convient de prendre pour l'installation d'un produit Sun Microsystems.

Mesures de sécurité

Pour votre protection, veuillez prendre les précautions suivantes pendant l'installation du matériel :

- Suivre tous les avertissements et toutes les instructions inscrites sur le matériel.
- Vérifier que la tension et la fréquence de la source d'alimentation électrique correspondent à la tension et à la fréquence indiquées sur l'étiquette de classification de l'appareil.
- Ne jamais introduire d'objets quels qu'ils soient dans une des ouvertures de l'appareil. Vous pourriez vous trouver en présence de hautes tensions dangereuses. Tout objet conducteur introduit de la sorte pourrait produire un court-circuit qui entraînerait des flammes, des risques d'électrocution ou des dégâts matériels.

Symboles

Vous trouverez ci-dessous la signification des différents symboles utilisés :

Attention : risques de blessures corporelles et de dégâts matériels. Veuillez suivre les instructions.

Attention : surface à température élevée. Evitez le contact. La température des surfaces est élevée et leur contact peut provoquer des blessures corporelles.

Attention : présence de tensions dangereuses. Pour éviter les risques d'électrocution et de danger pour la santé physique, veuillez suivre les instructions.

MARCHE – Votre système est sous tension (courant alternatif).

Un des symboles suivants sera peut-être utilisé en fonction du type d'interrupteur de votre système:

ARRET – Votre système est hors tension (courant alternatif).

VEILLEUSE – L'interrupteur Marche / Veilleuse est en position « Veilleuse ».

Modification du matériel

Ne pas apporter de modification mécanique ou électrique au matériel. Sun Microsystems n'est pas responsable de la conformité réglementaire d'un produit Sun qui a été modifié.

Positionnement d'un produit Sun

Attention : pour assurer le bon fonctionnement de votre produit Sun et pour l'empêcher de surchauffer, il convient de ne pas obstruer ni recouvrir les ouvertures prévues dans l'appareil. Un produit Sun ne doit jamais être placé à proximité d'un radiateur ou d'une source de chaleur.

Conformité SELV

Sécurité : les raccordements E/S sont conformes aux normes SELV.

Connexion du cordon d'alimentation

Attention : les produits Sun sont conçus pour fonctionner avec des alimentations monophasées munies d'un conducteur neutre mis à la terre. Pour écarter les risques d'électrocution, ne pas brancher de produit Sun dans un autre type d'alimentation secteur. En cas de doute quant au type d'alimentation électrique du local, veuillez vous adresser au directeur de l'exploitation ou à un électricien qualifié.

Attention : tous les cordons d'alimentation n'ont pas forcément la même puissance nominale en matière de courant. Les rallonges d'usage domestique n'offrent pas de protection contre les surcharges et ne sont pas prévues pour les systèmes d'ordinateurs. Ne pas utiliser de rallonge d'usage domestique avec votre produit Sun.

Attention : votre produit Sun a été livré équipé d'un cordon d'alimentation à trois fils (avec prise de terre). Pour écarter tout risque d'électrocution, branchez toujours ce cordon dans une prise mise à la terre.

L'avertissement suivant s'applique uniquement aux systèmes équipés d'un interrupteur VEILLEUSE:

Attention : le commutateur d'alimentation de ce produit fonctionne comme un dispositif de mise en veille uniquement. C'est la prise d'alimentation qui sert à mettre le produit hors tension. Veillez donc à installer le produit à proximité d'une prise murale facilement accessible. Ne connectez pas la prise d'alimentation lorsque le châssis du système n'est plus alimenté.

Batterie au lithium

Attention – Une pile au lithium, Ray-O-Vac BR2335, est soudée à la carte contrôleur SMC. Le client ne peut pas remplacer lui-même cette pile. Elle peut exploser si mal maniée. Ne pas la jeter dans les flammes. Ne pas la démonter ni essayer de la recharger. Lorsque la pile au lithium doit être remplacée, remplacer l'ensemble de la carte contrôleur SMC.

Couvercle

Pour ajouter des cartes, de la mémoire, ou des unités de stockage internes, vous devrez démonter le couvercle de l'unité système Sun. Ne pas oublier de remettre ce couvercle en place avant de mettre le système sous tension.

Attention : il est dangereux de faire fonctionner un produit Sun sans le couvercle en place. Si l'on néglige cette précaution, on encourt des risques de blessures corporelles et de dégâts matériels.

Normativas de seguridad

El siguiente texto incluye las medidas de seguridad que se deben seguir cuando se instale algún producto de Sun Microsystems.

Precauciones de seguridad

Para su protección observe las siguientes medidas de seguridad cuando manipule su equipo:

- Siga todas los avisos e instrucciones marcados en el equipo.
- Asegúrese de que el voltaje y la frecuencia de la red eléctrica concuerdan con las descritas en las etiquetas de especificaciones eléctricas del equipo.
- No introduzca nunca objetos de ningún tipo a través de los orificios del equipo. Pueden haber voltajes peligrosos. Los objetos extraños conductores de la electricidad pueden producir cortocircuitos que provoquen un incendio, descargas eléctricas o daños en el equipo.

Símbolos

En este libro aparecen los siguientes símbolos:

Precaución – Existe el riesgo de lesiones personales y daños al equipo. Siga las instrucciones.

Precaución – Superficie caliente. Evite el contacto. Las superficies están calientes y pueden causar daños personales si se tocan.

Precaución – Voltaje peligroso presente. Para reducir el riesgo de descarga y daños para la salud siga las instrucciones.

Encendido – Aplica la alimentación de CA al sistema.

Según el tipo de interruptor de encendido que su equipo tenga, es posible que se utilice uno de los siguientes símbolos:

Apagado – Elimina la alimentación de CA del sistema.

En espera – El interruptor de Encendido/En espera se ha colocado en la posición de *En espera*.

Modificaciones en el equipo

No realice modificaciones de tipo mecánico o eléctrico en el equipo. Sun Microsystems no se hace responsable del cumplimiento de las normativas de seguridad en los equipos Sun modificados.

Ubicación de un producto Sun

Precaución – Para asegurar la fiabilidad de funcionamiento de su producto Sun y para protegerlo de sobrecalentamien-tos no deben obstruirse o taparse las rejillas del equipo. Los productos Sun nunca deben situarse cerca de radiadores o de fuentes de calor.

Cumplimiento de la normativa SELV

El estado de la seguridad de las conexiones de entrada/salida cumple los requisitos de la normativa SELV.

Conexión del cable de alimentación eléctrica

Precaución – Los productos Sun están diseñados para
trabajar en una red eléctrica monofásica con toma de tierra. Para reducir el riesgo de descarga eléctrica, no conecte los productos Sun a otro tipo de sistema de alimentación eléctrica. Póngase en contacto con el responsable de mantenimiento o con un electricista cualificado si no está seguro del sistema de alimentación eléctrica del que se dispone en su edificio.

Precaución – No todos los cables de alimentación eléctrica tienen la misma capacidad. Los cables de tipo doméstico no están provistos de protecciones contra sobrecargas y por tanto no son apropiados para su uso con computadores. No utilice alargadores de tipo doméstico para conectar sus productos Sun.

Precaución – Con el producto Sun se proporciona un cable de alimentación con toma de tierra. Para reducir el riesgo de descargas eléctricas conéctelo siempre a un enchufe con toma de tierra.

La siguiente advertencia se aplica solamente a equipos con un interruptor de encendido que tenga una posición "En espera":

Precaución – El interruptor de encendido de este producto funciona exclusivamente como un dispositivo de puesta en espera. El enchufe de la fuente de alimentación está diseñado para ser el elemento primario de desconexión del equipo. El equipo debe instalarse cerca del enchufe de forma que este último pueda ser fácil y rápidamente accesible. No conecte el cable de alimentación cuando se ha retirado la fuente de alimentación del chasis del sistema.

Batería de litio

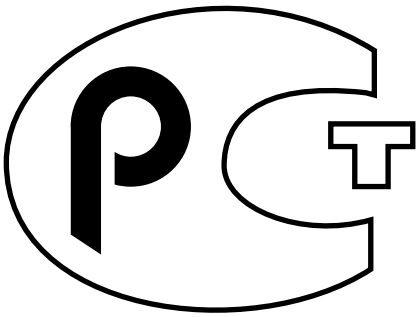
Precaución – Hay una pila de litio Ray-O-Vac BR2335, soldada en la tarjeta controladora SMC. Las pilas no son piezas que el cliente puede reemplazar. Pueden explotar si no se manejan con cuidado. No use fuego para disponer de esta pila quemándola. No la desarme o no trate de volverla a cargar. Cuando haya necesidad de reemplazar la pila de litio, reemplace toda la tarjeta controladora SMC.

Tapa de la unidad del sistema

Debe quitar la tapa del sistema cuando sea necesario añadir tarjetas, memoria o dispositivos de almacenamiento internos. Asegúrese de cerrar la tapa superior antes de volver a encender el equipo.

Precaución – Es peligroso hacer funcionar los productos Sun sin la tapa superior colocada. El hecho de no tener en cuenta esta precaución puede ocasionar daños personales o perjudicar el funcionamiento del equipo.

GOST-R Certification Mark



Z001

Nordic Lithium Battery Cautions

Norge

A D V A R S E L – Litiumbatteri — Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

Sverige

VARNING – Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

Danmark

ADVARSEL! – Litiumbatteri — Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

Suomi

VAROITUS – Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

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Preface

This manual describes how to install and use the Sun™ StorEdge™ L400 tape library tower and rackmounted versions. The manual also contains some maintenance information regarding the use, care, and cleaning of certain components. Finally, it contains procedures on how to install various components within the tape library.

Using UNIX Commands

This document may not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris 2.x Handbook for SMCC Peripherals*
- AnswerBook™ online documentation for the Solaris™ 2.x software environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1 Typographic Conventions

Typeface or Symbol	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output.	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output.	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Command-line variable; replace with a real name or value.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be `root` to do this. To delete a file, type `rm` *filename*.

Shell Prompts

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Ordering Sun Documents

SunDocs[SM] is a distribution program for Sun Microsystems technical documentation. Contact SunExpress for easy ordering and quick delivery. You can find a listing of available Sun documentation on the World Wide Web.

TABLE P-3 SunExpress Contact Information

Country	Telephone	Fax
Belgium	02-720-09-09	02-725-88-50
Canada	1-800-873-7869	1-800-944-0661
France	0800-90-61-57	0800-90-61-58
Germany	01-30-81-61-91	01-30-81-61-92
Holland	06-022-34-45	06-022-34-46
Japan	0120-33-9096	0120-33-9097
Luxembourg	32-2-720-09-09	32-2-725-88-50
Sweden	020-79-57-26	020-79-57-27
Switzerland	0800-55-19-26	0800-55-19-27
United Kingdom	0800-89-88-88	0800-89-88-87
United States	1-800-873-7869	1-800-944-0661

World Wide Web: `http://www.sun.com/sunexpress/`

Sun Welcomes Your Comments

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If a card is not available, you can email or fax your comments to us. Please include the part number of your document in the subject line of your email or fax message.

- Email: `smcc-docs@sun.com`
- Fax: SMCC Document Feedback
  1-415-786-6443

CHAPTER 1

Product Description

This manual covers the Sun™ StorEdge™ L400 tape library tower and rackmount versions.

Each tape library can contain the following main components:

- A robotic handler, referred to as the *Cartridge Handling Mechanism* (CHM)
- One or two 8 mm tape drives
- From one to twenty 8 mm tape cartridges in two removable cartridge magazines

Note – Each library is shipped with one data cartridge.

- A fixed cartridge holder for a cleaning cartridge or an additional data cartridge

Assuming an average data compression ratio of 2:1, the tape library can store up to 800 Gbytes of information. The tape library has a four-line, liquid crystal display (LCD), called a display panel, and a keypad on the front panel called the Operator Panel. By using this panel, you can set options, check operating statistics, and diagnose errors.

Listed below are the electrical ratings and physical dimensions of the tape library:

Electrical Ratings

- Consumes 60 - 110 watts (true power)
- 100 to 240 VAC at 50-60 Hz

Dimensions

TABLE 1-1 Physical Dimensions

Version	Height	Width	Length	Weight
Tower	22 in (558.8 mm)	9.45 in (240 mm)	21.4 in (543.6 mm)	82 lb (37.2 kg)
Tabletop	9.5 in (241 mm)	19.5 in (495 mm)	21.1 in (536 mm)	91.5 lb (41.5 kg)
Rackmount	8.65 in (220 mm)	19.0 in (483 mm)	21.1 in (536 mm)	89.5 lb (40.6 kg)

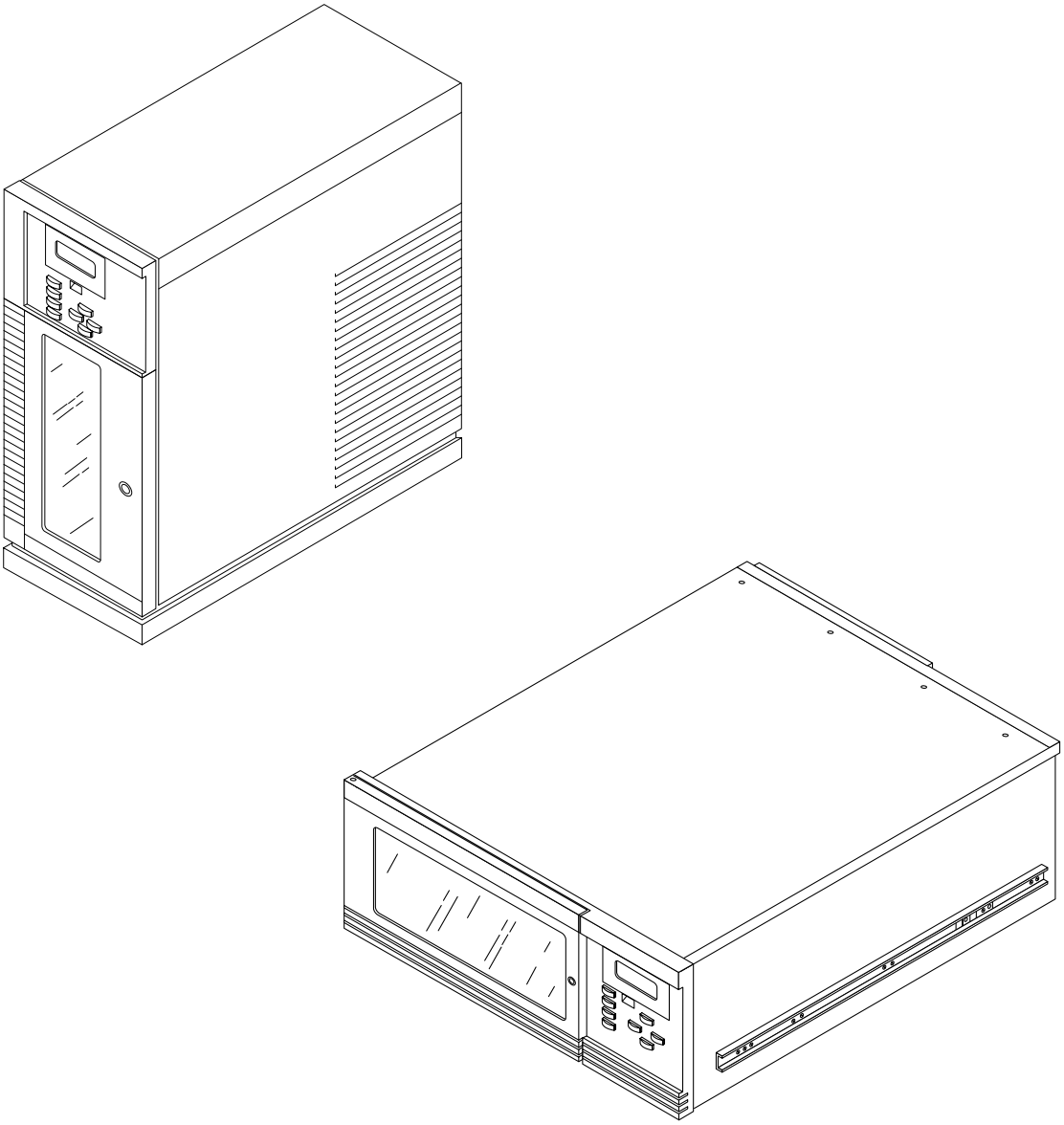


FIGURE 1-1 Sun StorEdge L400 Tower and Rackmount Versions

Note – The remaining illustrations in this chapter show the rackmount version. Internal components of all versions are identical; differences are in orientation only.

1.1 Front Panel Components

See FIGURE 1-2 for an illustration of the front panel of the tape library.

Front door	The door contains a clear, shatterproof and scratch resistant window that allows you to see the cartridges, the tape drives and the motions of the CHM.
Key lock	When the power is on, an electronically controlled lock (solenoid latch) engages automatically after the door is locked with the key. When you turn the key, the door will not unlock until the CHM finishes performing the current command and moves to the park position
Operator panel	Allows you to manually change control modes, set SCSI IDs, and perform diagnostics. A security option prevents users from making changes using this panel.

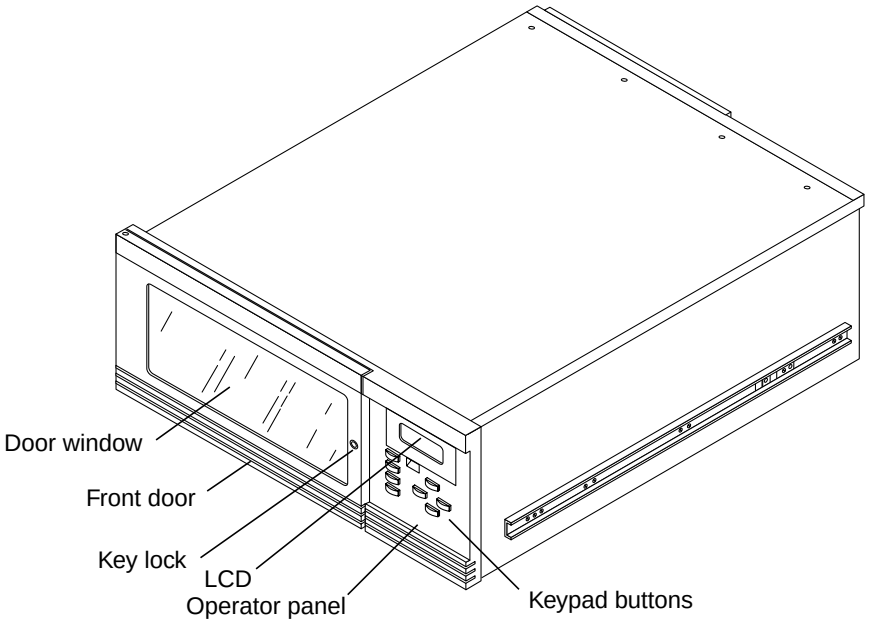


FIGURE 1-2 Front Panel

1.2 Back Panel Components

See FIGURE 1-3 for an illustration of the back panel of the tape library.

SMC card	Provides control for the CHM. The serial diagnostic ports, SCSI connectors, and the ESD shield are part of the card.
Power supply assembly	Includes a power entry module, fan, fuse, and power switch. The AC power connector, power switch, fuse, and cooling fan protrude through the back panel.
Remote hardware reset port	Allows you to perform a manual hardware reset of the tape library to clear hardware-related errors.
SCSI bus jumper block	Connects two internal portions of the SCSI bus together.

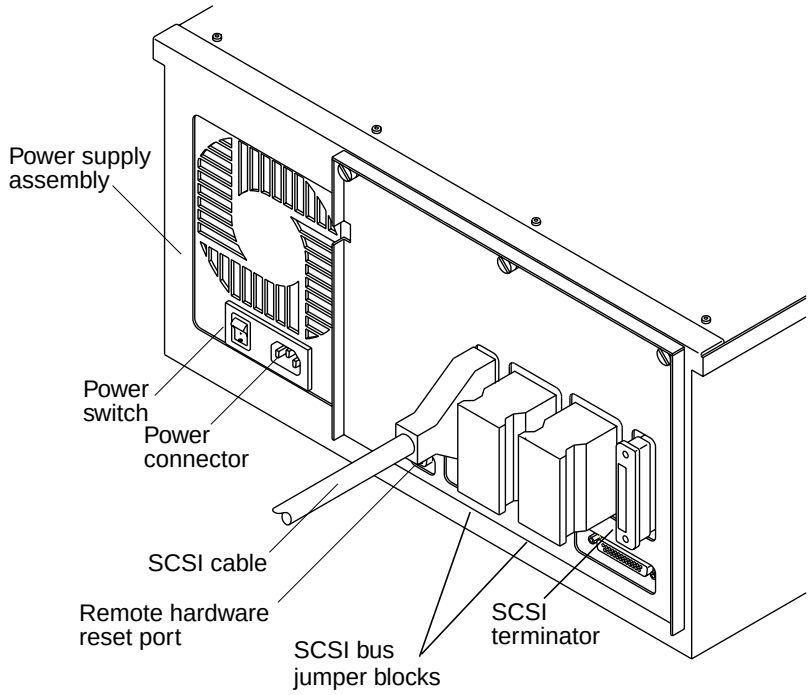


FIGURE 1-3 Back Panel

1.3 Internal Components

See FIGURE 1-4 for an illustration of the internal components of the tape library.

Removable tape cartridge holders	Each holds 8 mm tape cartridges (10 maximum). The cartridges don't need to be formatted or conditioned before use.
Fixed cartridge holder	Stores a cleaning cartridge or an additional data cartridge above the removable holder.
Cartridge handling mechanism (CHM)	This robotic assembly moves cartridges between the storage locations and the tape drives.
Tape drives in carriers	One or two tape drives are installed in the tape library.
Bar code scanner	This scanner gathers specific information from bar code labels on the cartridges within the tape library.

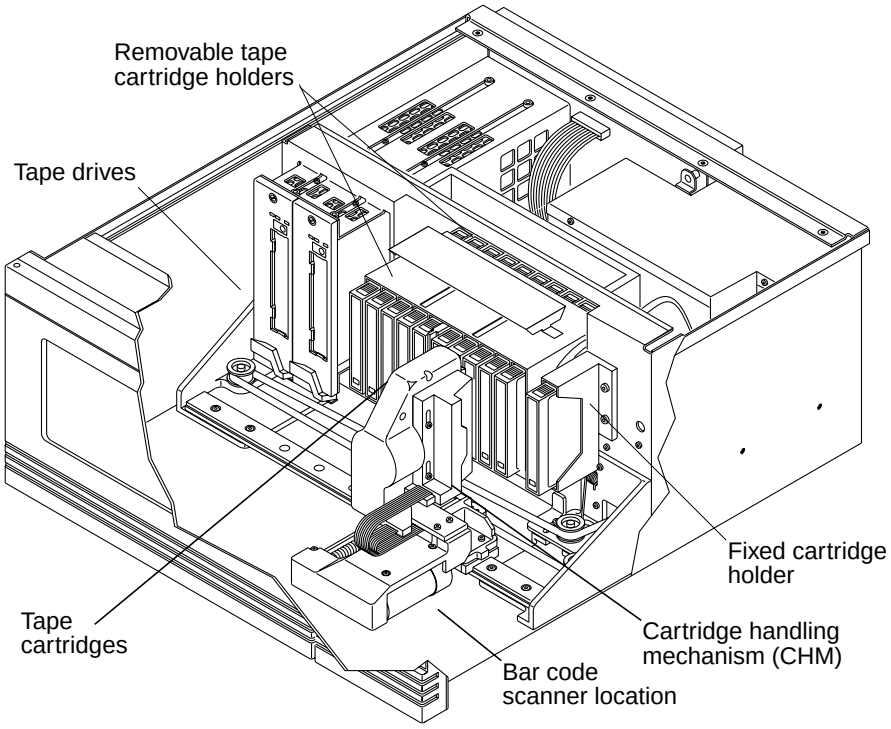


FIGURE 1-4 Internal Components

CHAPTER 2

Preparing the Tape Library for Installation

This chapter contains information on how to prepare the tape library for installation.

2.1 Unpacking the Tape Library

Caution – The tape library shipping weight is approximately 92 pounds (41.73 kg). Use two or more people to unpack and install the tape library.

Unpacked the tape library and check the contents against the packing slip to make sure you have the following items:

- A Sun StorEdge L400 tape library with one or two tape drives installed
- Two power cords
- SCSI cable (2 meters)
- Removable tape cartridge holder
  - One data tape cartridge
  - Cover for cartridge holder
- Cleaning cartridge
- Regulated SCSI terminator
- Accessory kit, containing:
  - SCSI bus jumper blocks (2 each)
  - Clean wipes
  - Door key

Note – If the tape library is *not being* installed in the United States or Canada, you may have to use a country-kit power cord. Talk to your Sun sales representative for more information.

2.2 Preparing the Tape Library

Caution – Before performing any of the following steps, be sure that the power switch is off. To avoid damaging the tape library, be sure that the work area is free of conditions that could cause electrostatic discharge (ESD).

1. **Locate the key in your accessory kit.**
2. **Insert the key vertically into the lock and turn it clockwise 90 degrees (FIGURE 2-1).**

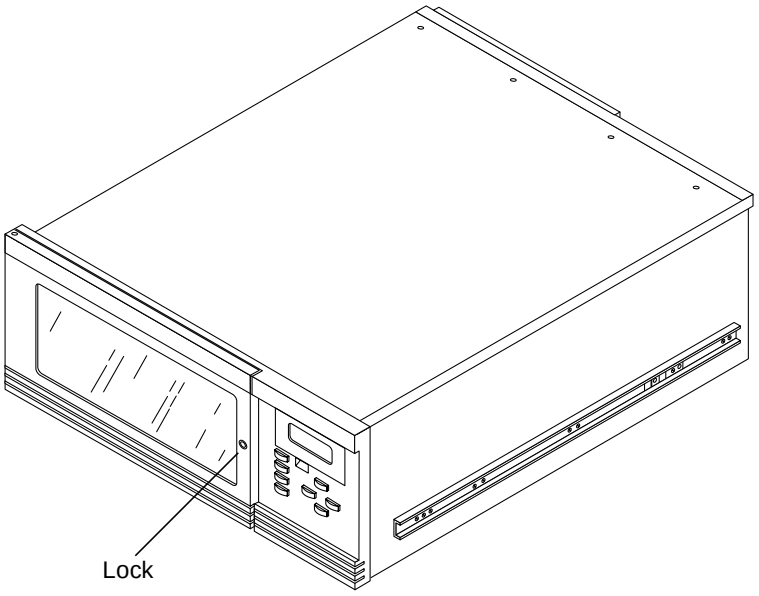


FIGURE 2-1 Lock Location

3. **Pull the front door open.**

4. **Attach wrist strap.**

5. **Reach in through the open door and remove the packing material (**FIGURE 2-2**).**

   a. **Remove the large piece of packing material**

   b. **Pull the CHM towards you and push it to the top of the tape library to free it from the second piece of packing material that is inserted in the holder.**

   c. **Remove the packing material that is in the removable cartridge holder.**

   Keep the packing material in case the tape library ever needs to be transported.

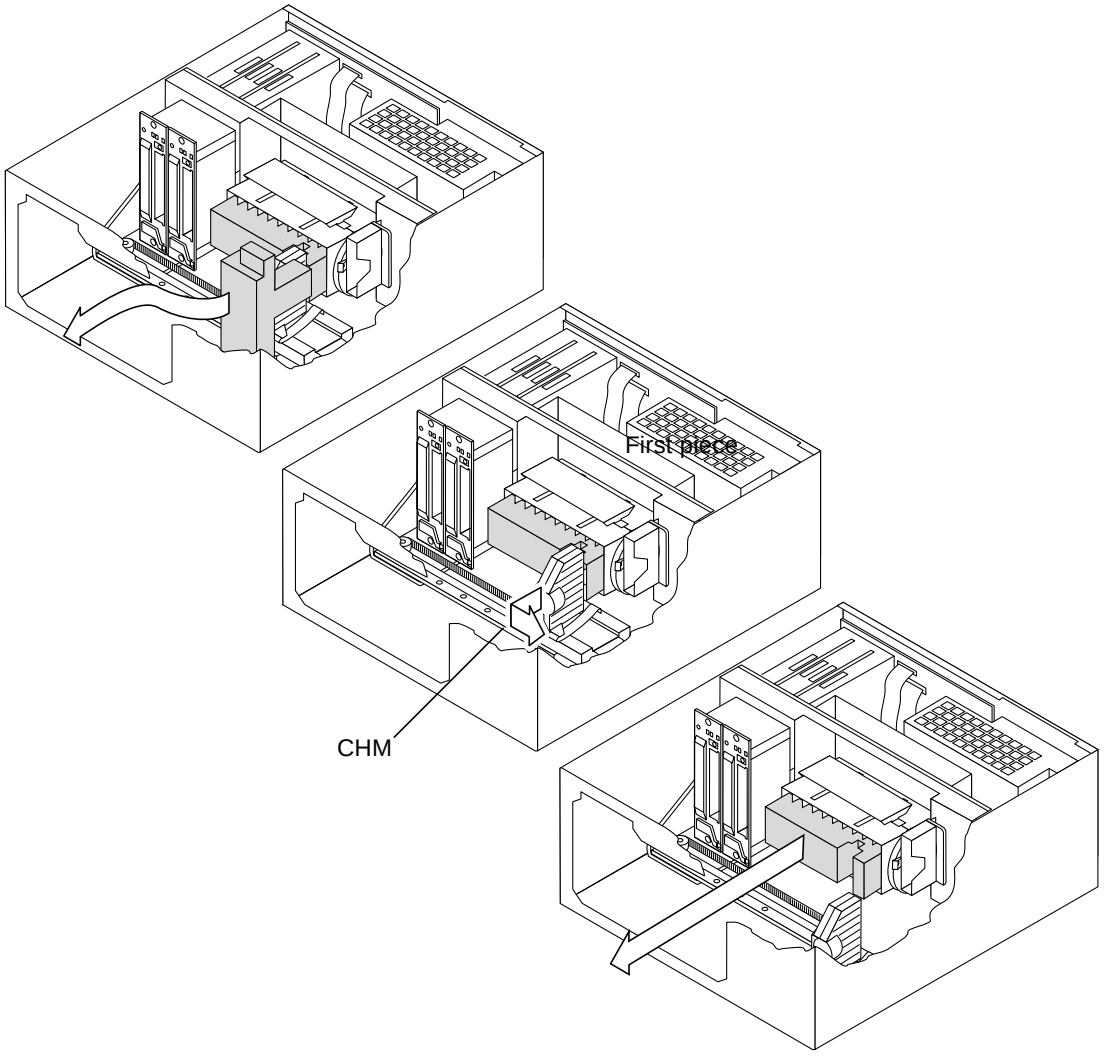


FIGURE 2-2 Removing Packing Material

6. **Remove the tape cartridge holder by reaching in through the door and pulling the right-side of the removable tape cartridge holder towards you while lifting its left-end slightly (**FIGURE 2-3**).**

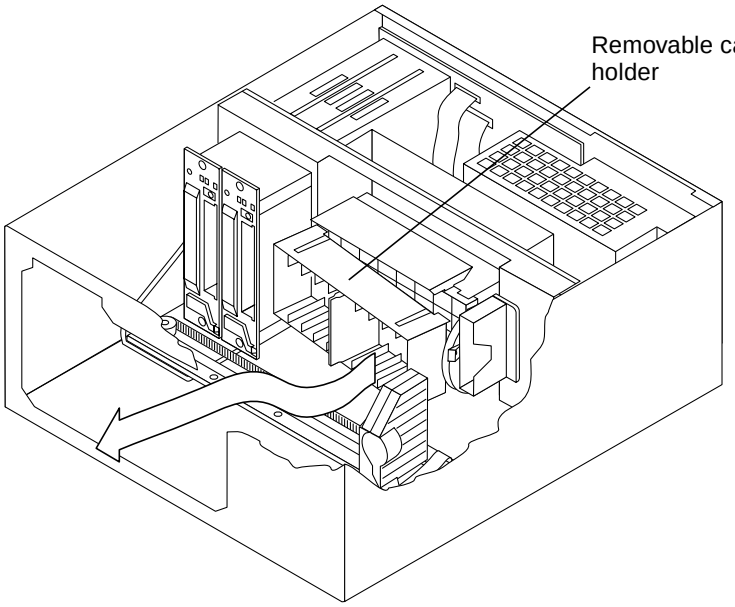


FIGURE 2-3 Removing the Cartridge Holder

7. **Rotate the spindle and remove the second removable tape cartridge holder.**

2.3 Installing the Tape Cartridges

The next procedures discusses:

1. Preparing the tape cartridges
2. Placing them in the removable and fixed cartridge holders
3. Installing the removable cartridge holders into the tape library

2.3.1 Setting the Write-Protect Switch

Each 8 mm data cartridge has a write-protect switch. This switch determines whether data can be written to the cartridge (*write enabled*) or whether data on the cartridge is protected from being erased or overwritten (*write protected*). You can use your finger or a ball-point pen to set the write-protect switch.

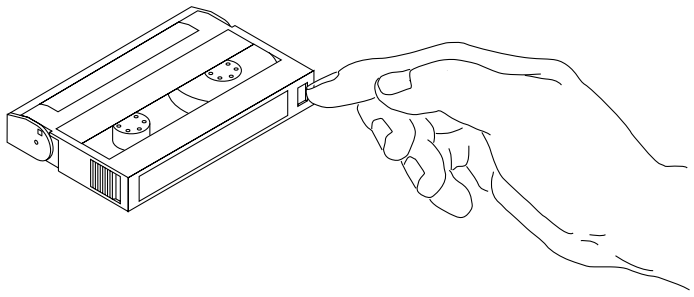


FIGURE 2-4 Setting the Write-Protect Switch

To write-protect a cartridge:

- **Move the write-protect switch away from the edge of the tape cartridge (**FIGURE 2-4**).**

  If the red tab is visible, the cartridge is write protected.

To write-enable a cartridge:

- **Move the write-protect switch toward the edge of the tape cartridge.**

  If the red tab is *not* visible, the cartridge is write enabled.

2.3.2 Adding the Bar Code Labels

- **Center the label within the area on the edge of the cartridge (**FIGURE 2-5**).**

  Bar code labels on your 8 mm cartridges are used by the bar code scanner to gather information.

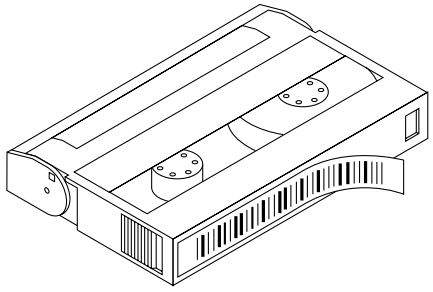


FIGURE 2-5 Placing Bar Code Labels

2.3.3 Placing the Tape Cartridge in the Removable Holder

1. **Make sure the write-protect switch is write enabled (switch is to the right) on the tape cartridges.**
2. **Using the holder's single mounting guide for orientation, insert a cartridge into the holder (**FIGURE 2-6**).**

   Very little force is needed to install a cartridge into the cartridge holder. If the cartridge does not snap into place easily, check the orientation of the cartridge.

The holder can contain up to ten cartridges.

Note – Only use a holder designed for 8 mm tape cartridges.

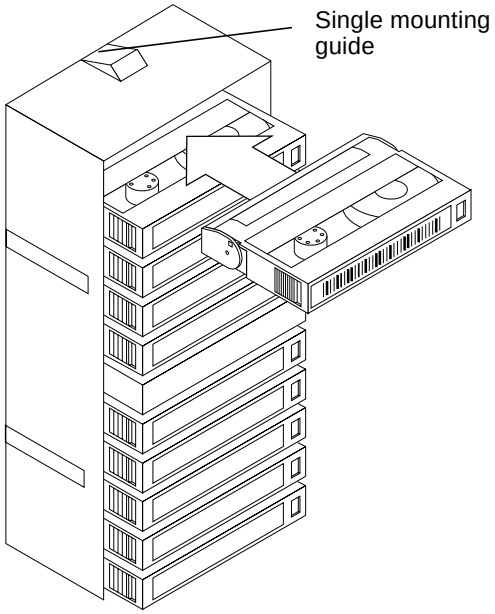


FIGURE 2-6 Inserting a Tape Cartridge

2.3.4 Installing the Removable Cartridge Holders

1. **Locate the roller on the top end of the holder's mounting plate on the interior back of the tape library (**FIGURE 2-7**).**
2. **Position the cartridge holder near the mounting plate so that the single mounting guide on the top of the holder is on the right.**
3. **Place the holder's two mounting guides on its bottom end into the matching holes in the left side of the mounting plate.**
4. **Snap the cartridge holder into place by pressing against the right side of the holder.**
5. **Rotate the spindle and perform the above steps for the second removable cartridge holder.**

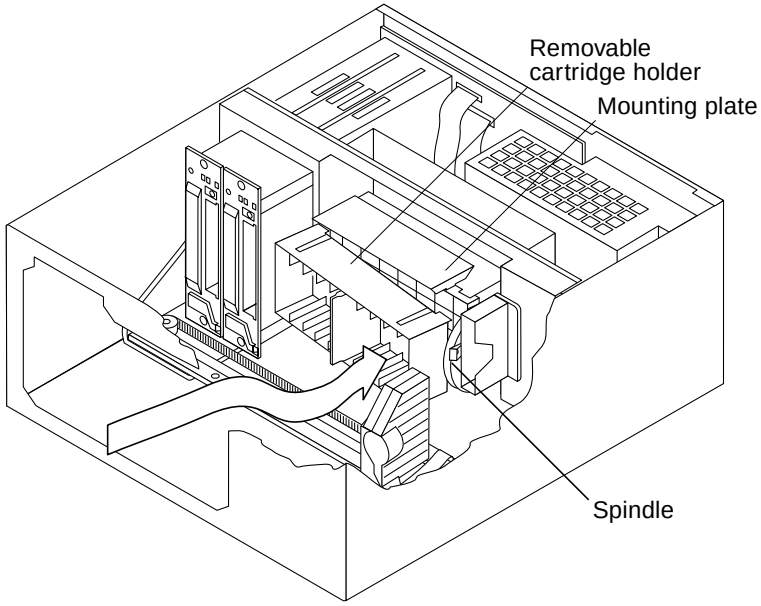


FIGURE 2-7 Installing the Removable Cartridge Holders

2.3.5 Inserting a Cartridge in the Fixed Holder

Caution – Never use video cleaning cartridges as they may damage the tape drives.

- **Insert the cartridge into the fixed cartridge holder until it snaps into place (**FIGURE 2-8**).**

  Close the door and lock it by turning the key counterclockwise 90 degrees.

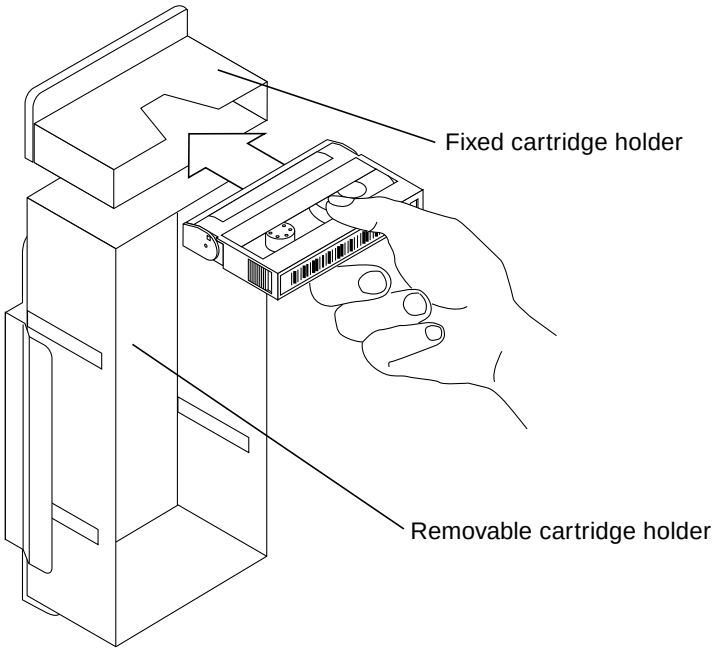


FIGURE 2-8 Inserting a Cartridge in the Fixed Holder

CHAPTER 3

Installing a Tape Library Tower Version

This chapter explains how to install a tape library tower version.

3.1 Before You Start

Before you perform any of the installation procedures:

- Read the “Safety Agency Compliance” section at the beginning of the manual.
- Protect the tape library from electrostatic discharge (ESD) by placing it on an antistatic work surface and by wearing an antistatic wrist band. If such a mat or wristband are unavailable, discharge static electricity from your body before handling the tape library or the tape drives by touching a known grounded surface, such as your workstation metal chassis.
- Determine the SCSI bus length.

  The total SCSI bus length of your system unit, the external SCSI cables, and the tape library must not exceed a maximum SCSI bus length of 20 feet (6 meters). To determine if the total SCSI bus length is 6 meters or less, see Appendix A, “SCSI Information”.
- Gather the following tools and equipment:
  - Antistatic wrist strap
  - ESD mat
  - Flatblade screwdriver
  - TORX screwdriver with T-20 and T-10 bits
  - Container to hold loose screws

3.2 Installation Task List

The following tasks must be performed to install a tape library. The procedures for these tasks are detailed in this chapter.

1. Verify the operating environment version on your system.
2. Determine available SCSI IDs.
3. Power off your system and peripherals.
4. Connect the tape library to your system.
5. Power on the tape library.
6. If necessary, set the SCSI IDs for the tape library and the tape drives using the Operator Panel.
7. Turn on the remaining peripherals and your system.
8. Reboot your system using the `boot -r` command.

3.3 Verifying the Operating System Version

Verify that you are using the Solaris 2.5 or higher level software environment on your system:

- **Type `uname -rs` and press Return.**

```
% uname -rs
SunOS 5.5
```

The SunOS level returned must be 5.5 or higher.

Caution – For SunOS 5.5 or 5.5.1 operating systems, you must perform the procedures in Appendix B, “Modifying the `st.conf` File," before proceeding.

3.4 Shutting Down the System

1. **Become superuser by typing** `su` **and pressing Return.**

```
% su
Password: superuser password
#
```

2. **Shut down the operating system.**

   Use either the `init` or `shutdown` commands. See the man pages for these commands or the Solaris AnswerBook online documentation.

Note – If your system is a server, use the `shutdown` command to inform the mounted users that the system will be going down. Otherwise, use the `init 0` command.

   The system should now be at the `ok` prompt. If a `>` prompt is showing, type `n` to switch to the `ok` prompt.

3. **Find available SCSI device identifiers (SCSI IDs) for the tape library.**

   To check for available SCSI IDs, enter `probe-scsi-all` at the `ok` prompt. Note which SCSI IDs are returned by this command. These SCSI IDs are already assigned.

   The tape library uses three SCSI IDs. The default settings for the SCSI IDs are:

TABLE 3-1 Default SCSI IDs for the Tape Library and Internal Tape Drives

Device/Unit	SCSI ID	Description
Tape Library	2	Includes the cartridge handling mechanism (CHM), the removable cartridge holder, and the fixed cartridge slot
First internal tape drive	4	The top 8 mm tape drive
Second internal tape drive	5	The bottom 8 mm tape drive

   If a device is already set to a default tape library SCSI ID, then you can change the tape library's SCSI IDs later in this installation procedure.

4. **Turn off the power to your system and then to your peripherals.**

Caution – All power cords should remain plugged into each unit and wall outlets to prevent damage to the equipment by static electricity from your body.

Caution – Always allow 10 seconds between turning off the power and turning it back on again. This pause prevents possible damage to power supply components.

3.5 Connecting the SCSI Cables

The following procedures explain how to install a tape library in a direct connection to a system, and how to install a tape library in a daisy chain connection with other external peripherals and a system.

There are six SCSI ports on the back panel of the tape library. Use these connectors to enable multiple devices to be connected in a series for daisy chained configurations (FIGURE 3-1).

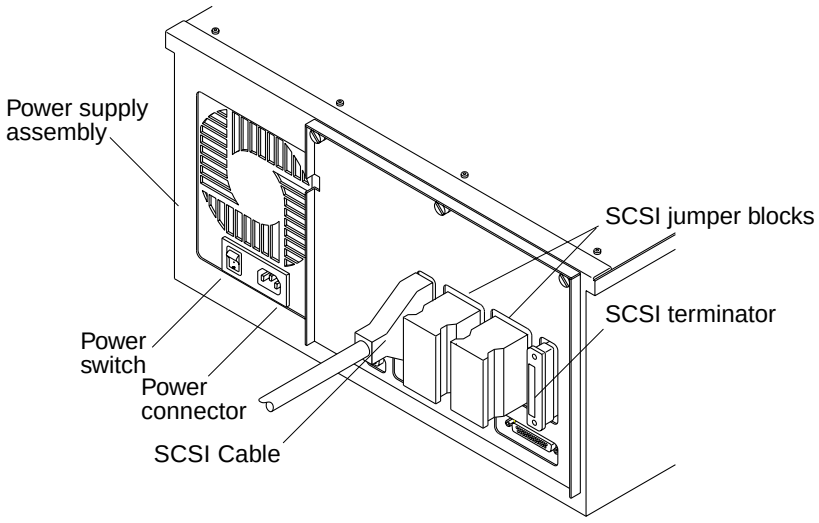


FIGURE 3-1 SCSI Connectors on the Tape Library Rear Panel

If the tape library is not the last physical device on the SCSI bus, plug a SCSI cable into an available connector. If the tape library is the last physical device on the SCSI bus, plug a SCSI cable into the left-end connector and the appropriate SCSI external terminator into the right-end connector.

If you are connecting the tape library to a single SCSI bus, you must install the SCSI bus jumper blocks into the middle four connectors. If you are installing the tape library on all three SCSI buses, the SCSI bus jumper blocks are not needed.

3.5.1 SCSI Buses

You can separate the internal SCSI bus of the tape library into one, two, or three buses. Each drive and the robotic arm are on an individual bus. You can put the entire unit on one bus by installing the provided jumper block across the middle four SCSI connectors on the tape library rear panel.

You should use the single bus for most installations. Other than some fault tolerance there is no significant advantage to the multiple bus configuration. There is no throughput advantage to having the internal drives on two buses except in the extreme case of very un-compressible data when using data compression on the drives. And, with the multiple bus configuration, control and access by the applications software can be an issue. You must verify that the your software can support separating the second drive onto a separate SCSI bus or separate host system.

If you configure your tape library for multiple SCSI buses, you must order and install one or more of the appropriate SCSI terminators and SCSI cables and SCSI bus host adapter cards if not available.

3.5.2 Installing the SCSI Cable

1. **Connect a 4-meter SCSI data cable to the tape library.**
2. **Route the SCSI data cable to the system and connect it to the appropriate host adaptor card.**

   You must have an FSB/S or a SBE/S SCSI host adaptor card in your system.
3. **Install the SCSI bus jumper blocks to the middle four SCSI ports on the back panel of the tape library.**
4. **Install the SCSI regulated terminator if the tape library is the last unit of your configuration.**

If this is not the last device in the SCSI chain, then:

a. Connect one end of another SCSI cable to the other single SCSI port on the back panel of the tape library.

b. Connect the other end of the SCSI cable to the SCSI port on the back panel of the next peripheral unit in the stack.

Repeat this step until you reach the last SCSI device.

c. Ensure that the last device on the SCSI bus is properly terminated.

3.6 Powering On the Tape Library

This section describes how to power on the tape library. The power switch and connector for the power cord are located on the back panel of the tape library (FIGURE 3-1).

Note – Power cords are supplied with the tape library for 120-volt use in the United States and Canada.

With the power switch in the off (0) position and the door closed and locked:

1. **Connect the three-hole end of the power cord to the power receptacle on the rear panel of the tape library, then connect the three-prong end of the power cord to the nearest power source outlet.**

Caution – Sun products have been designed to work with single-phase power systems having a grounded neutral conductor. To reduce the risk of electric shock, do not plug Sun products into any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure what type of power is supplied to your building.

Note – The tape library has self-ranging voltage selection, so you do not need to change the voltage setting.

---

2. **Press the power switch to the on position.**

   When you power on the tape library, the following events occur:

   - Cooling fan begins to rotate.
   - Main Screen appears on the LCD.
   - Tape drives perform their initiation tests.
   - Tape library performs a 40-second, initiation test.

   During this test, the tape library first engages the locking solenoid in the front door, then the CHM does the following tests:

   - Verifies its full range of motion by moving along the long axis
   - Verifies the presence of the cartridge holder by touching it
   - Reseats all cartridges by touching each of them
   - Moves to the park position

   If the tape library does not power on as described, check the following:

   - If the LCD is not illuminated:
     - Is the power switch in the on position?
     - Is the power cord inserted correctly?
     - Is the fuse good?
   - If the LCD is illuminated:
     - Is there an error message or error code on the LCD?
     - Is the door closed and locked?

3.7 Setting SCSI IDs

If you determined that you need to change one or more of the tape library's default SCSI ID settings (2, 4, and 5), then perform the steps in Section 7.3.1, "Set SCSI IDs," on page 7-6.

3.8 Powering On Peripherals and the System

1. **Power on your other peripherals and then your system.**

Note – If your system starts to reboot, interrupt the reboot process by pressing the Stop and A keys together.

---

2. **Reboot your system using the** `boot -r` **command.**

CHAPTER 4

Installing a Tape Library Rackmount Version

This chapter explains how to install a tape library rackmount version.

4.1 Before You Start

Before you perform any of the installation procedures:

- Read the “Safety Agency Compliance” section in the front of this manual.
- Protect the tape library from electrostatic discharge (ESD) by placing it on an antistatic work surface and by wearing an antistatic wrist band. If such a mat or wristband are unavailable, discharge static electricity from your body before handling the tape library or the tape drives by touching a known grounded surface, such as your workstation's metal chassis.
- Determine the SCSI bus length.

  The total SCSI bus length of your system unit, the external SCSI cables, and the tape library must not exceed a maximum SCSI bus length of 20 feet (6 meters). To determine if the total SCSI bus length is 6 meters or less, see Appendix A, “SCSI Information”.
- Gather the following tools and equipment:
  - Antistatic wrist strap
  - ESD mat
  - Phillips screwdriver
  - Container to hold loose screws

4.2 Installation Overview

The following tasks must be performed to install a tape library. The procedures for these tasks are detailed on the following pages.

1. Verify the operating environment version on your system.
2. Determine available SCSI IDs.
3. Power off your system and peripherals.
4. Install the tape library in the cabinet.
5. Connect the tape library to your system.
6. Power on the tape library.
7. If necessary, set the SCSI IDs for the tape library and the tape drives using the Operator Panel.
8. Turn on the remaining peripherals and your system.
9. Reboot your system using the `boot -r` command.

4.3 Verifying the Operating System Version

Verify that you are using the Solaris 2.5 or higher level software environment on your system.

- **Type** `uname -rs` **and press Return.**

```
% uname -rs
SunOS 5.5
```

The SunOS level returned must be 5.5 or higher.

Caution – For SunOS 5.5 or 5.5.1 operating systems, you must perform the procedures in Appendix B, “Modifying the `st.conf` File," before proceeding.

4.4 Shutting Down the System

Before you can install the tape library or upgrade your hardware, you must shut down the system. If a step is omitted, the system may fail to boot, or fail to correctly configure the tape drive.

1. **Become superuser by typing** `su` **and pressing Return.**

```
% su
Password: superuser password
#
```

2. **Shut down the operating system.**

   Use either the `init` or `shutdown` commands. See the man pages for these commands or the Solaris AnswerBook online documentation.

Note – If your system is acting as a server, use the `shutdown` command to inform the mounted users that the system will be going down. Otherwise, use the `init 0` command.

The system should now be at the `ok` prompt. If a `>` prompt is showing, type **`n`** to switch to the `ok` prompt.

3. **Find available SCSI device identifiers (SCSI IDs) for the tape library.**

   To check for available SCSI IDs, enter `probe-scsi-all` at the `ok` prompt. Note which SCSI IDs are returned by this command. These SCSI IDs are already assigned.

   The tape library uses three SCSI IDs. The default settings for the SCSI IDs are:

TABLE 4-1 Default SCSI IDs for the Tape Library and Internal Tape Drives

Device/Unit	SCSI ID	Description
Tape Library	2	Includes the cartridge handling mechanism (CHM), the removable cartridge holder, and the fixed cartridge slot
First internal tape drive	4	The top 8 mm tape drive
Second internal tape drive	5	The bottom 8 mm tape drive

   If a device is already set to a default tape library SCSI ID, then you can change the tape library's SCSI IDs later in this installation procedure.

4. **Turn off the power to your system, your peripherals, and then your cabinet.**

Caution – All power cords should remain plugged into each unit and wall outlets to prevent damage to the equipment by static electricity from your body.

Caution – Always allow 10 seconds between turning off the power and turning it back on again. This pause prevents possible damage to power supply components.

4.5 Installing the Tape Library

Follow these instructions to install a tape library in a system or expansion cabinet

4.5.1 Preparing the System

Follow the instructions in the "Preparing for Service" section of your system or enclosure documentation. Be sure to:

- Extend the anti-tilt bar
- Remove or open the front panel
- Remove the vented rear panel

4.5.2 Installing the Slide Rail Runners on the Tape Library

1. **Separate runners from slide rails.**

   a. **Locate the slide rails that were shipped with the tape library.**

   b. **Fully extend one slide rail until it locks.**

   c. **Press the rail release button in the center of the rail (**FIGURE 4-1**).**
   This action releases the two-part portion.

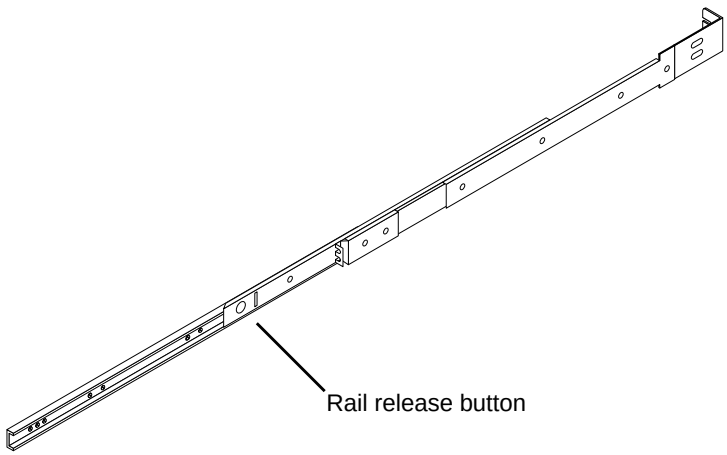


FIGURE 4-1 Rail Release Button on the Slide Rail

   d. **Continue extending the slide rail until it separates from the runner.**

   e. **Repeat for the other slide rail.**

2. **Install runners on the tape library (**FIGURE 4-2**).**

   a. **Locate the slide rail runners that you separated from the slide rails.**

   b. **Position the runners on the sides of the tape library, just behind the front panel by aligning each runner with the three predrilled holes on each side of the tape library.**

   c. **Attach the runners with the 8-32 Phillips screws provided.**

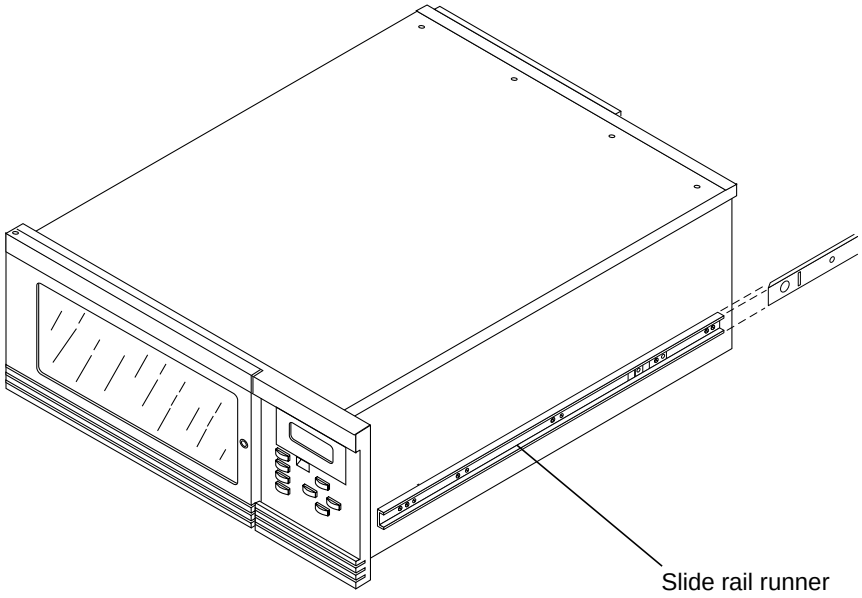


FIGURE 4-2 Installing Slide Rail Runners

4.5.3 Installing Locking Brackets on the Tape Library

1. **Locate the two locking brackets shipped with the tape library.**
2. **Attach a locking bracket on each side of the tape library using the 10-32 Phillips screws provided.**

- If you are installing the Sun StorEdge L400 tape library behind a bezel, mount the locking brackets with the short side facing back.

  Use the set of slotted holes farthest from the short side. Install the bracket so that the screws are in the middle of the slotted holes.

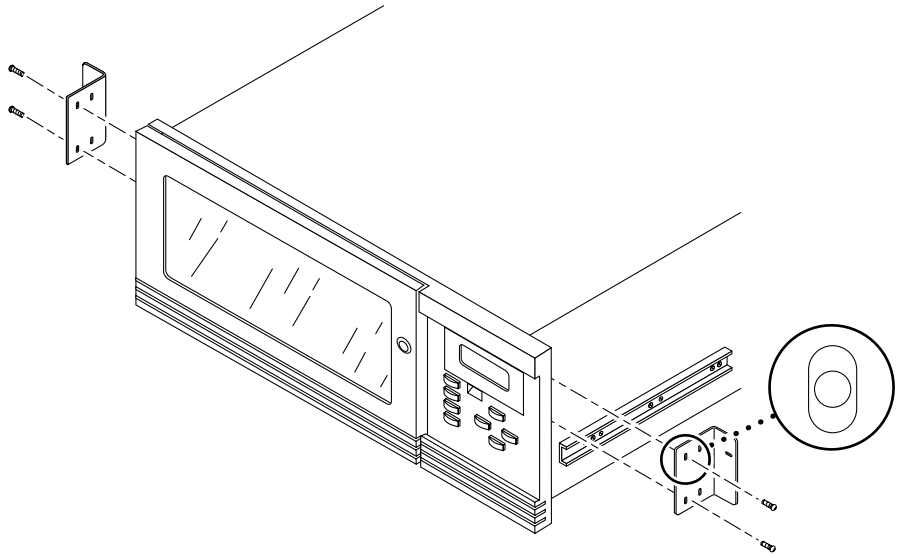


FIGURE 4-3 Positioning the Locking Brackets Behind a Door

- If you are installing the Sun StorEdge L400 tape library behind a door, mount the locking brackets with the short side facing front.

  Use the set of slotted holes closest to the short side. Install the bracket so that the screws are in the middle of the slotted holes.

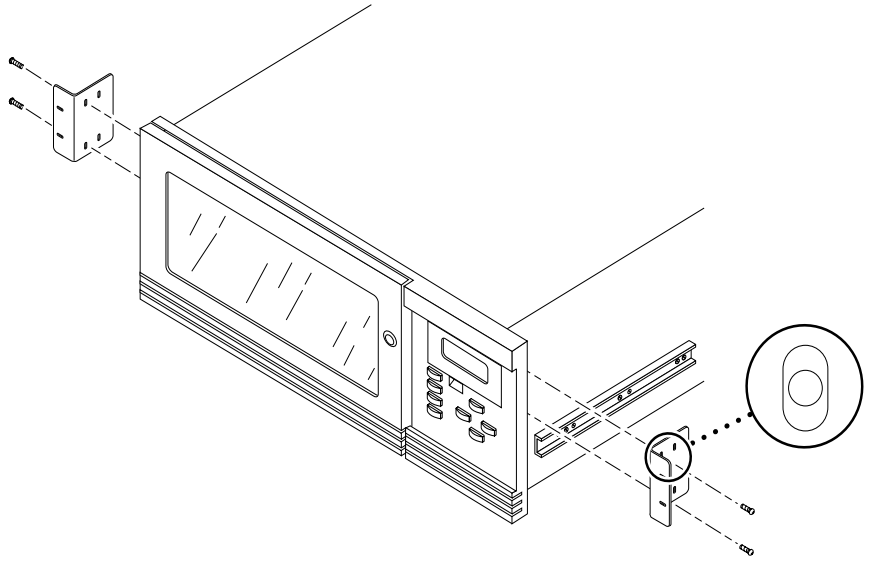


FIGURE 4-4 Positioning the Locking Brackets Behind a Bezel

4.5.4 Installing Slide Rails in the Cabinet

1. **Place both slide rails inside the cabinet, with the bent brackets towards the rear of the cabinet and facing inside the cabinet (**FIGURE 4-5**).**

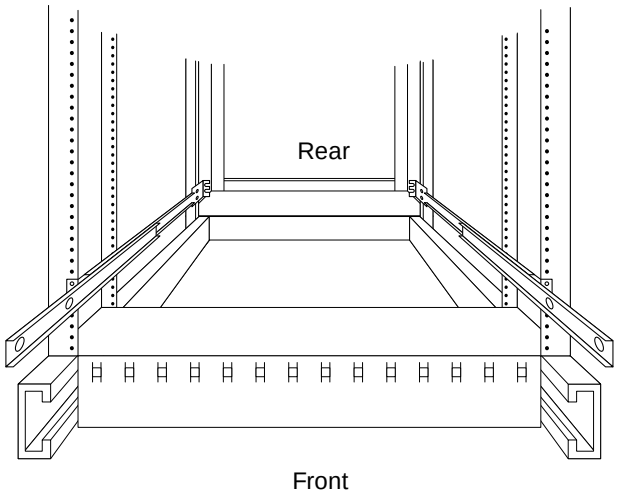


FIGURE 4-5 Placing the Slide Rails Inside the Cabinet

2. **Select the correct mounting holes in the cabinet to use for the tape library. For mounting hole information refer to** `http://docs.sun.com`**. Select** `Storage & Peripherals` → `Rackmount Placement Matrix`**.**

3. **Standing at the front of the cabinet, position the front part of the slide rail over the proper hole positions (FIGURE 4-6).**

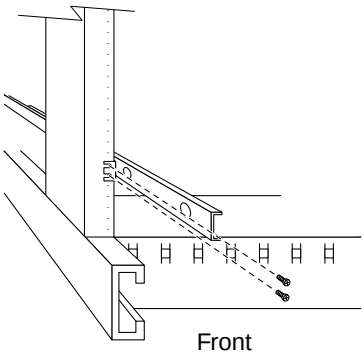


FIGURE 4-6 Securing the Front Part of the Slide Rail to the Cabinet

4. **Use a Phillips screwdriver and two 10-32 screws to loosely secure the front part of the slide rail to the cabinet (FIGURE 4-6).**

5. **Repeat Step 3 and Step 4 for the other slide rail.**

6. **Standing at the rear of the cabinet, position the bracket of one slide rail over the proper hole positions (FIGURE 4-7).**

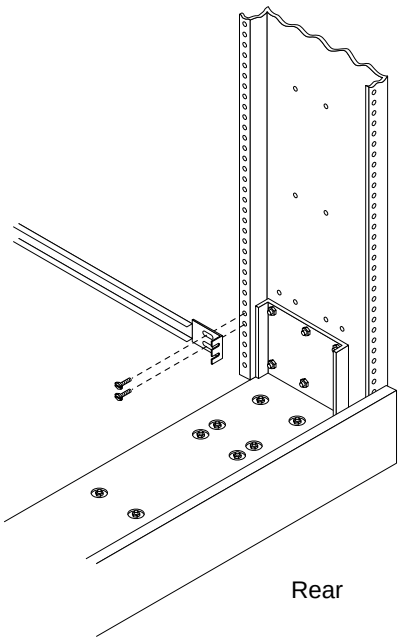


FIGURE 4-7 Securing the Bent Bracket to the Cabinet

7. **Loosely secure the bent bracket to the cabinet using a Phillips screwdriver and two 10-32 screws (FIGURE 4-7).**

8. **Repeat Step 6 and Step 7 for the other slide rail.**

9. **With the slide rails correctly positioned, tighten all the screws at the cabinet front and the rear.**

4.5.5 Installing the Tape Library in the Cabinet

Caution – The tape library shipping weight is approximately 92 pounds (41.73 kg). Use two or more people to install the tape library in the cabinet.

1. **Mount the tape library on the slide rails.**
   a. **Completely push both slide rails into the cabinet.**
   b. **Position the tape library on the rails and slide it towards the cabinet until you hear a click (FIGURE 4-8).**

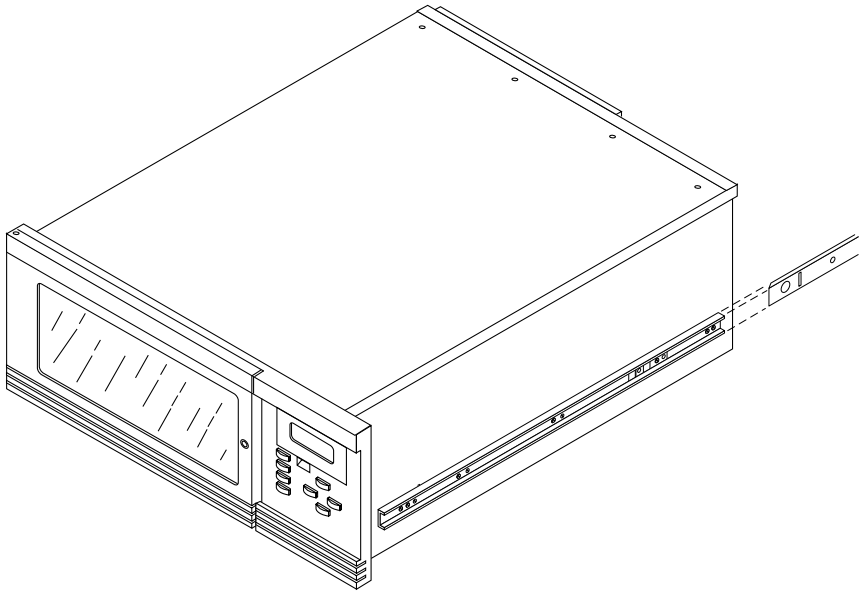


FIGURE 4-8 Positioning the Tape Library on the Slide Rails

2. **Press the buttons in the center of the slide rails and completely push the tape library into the cabinet.**

3. Attach the locking bracket to the cabinet rails.

If you are installing the Sun StorEdge L400 tape library behind a bezel:

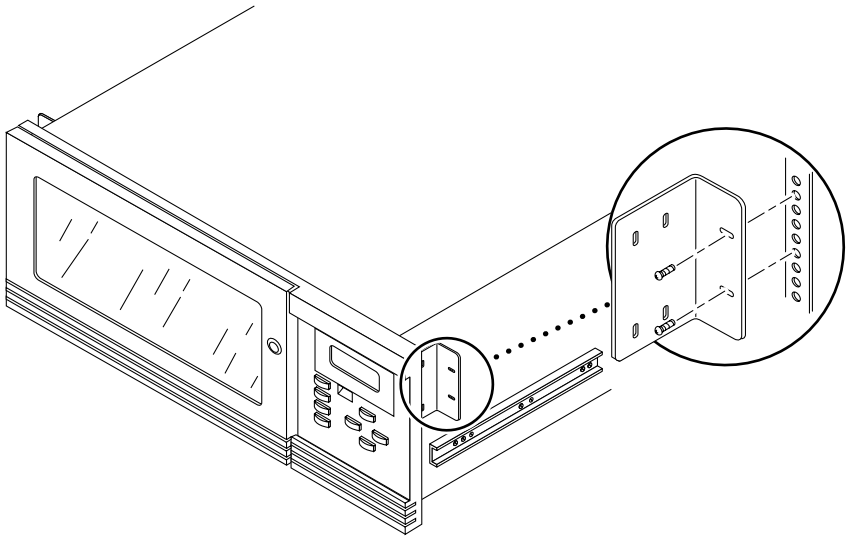


FIGURE 4-9 Mounting a Tape Library Behind a Bezel

a. Loosely install two 10-32 screws in each locking bracket using a Phillips screwdriver.

b. Tighten the screws to secure the locking brackets to the cabinet rail faces.

If you are installing the Sun StorEdge L400 tape library behind a door:

a. Select the correct cabinet rail mounting holes to use for the locking brackets. For mounting hole information refer to `http://docs.sun.com`**. Select** `Storage & Peripherals → Rackmount Placement Matrix`**.**

b. Use a Phillips screwdriver and thread two 10-32 screws through the back of the rail for each of the mounting brackets (FIGURE 4-10**)**

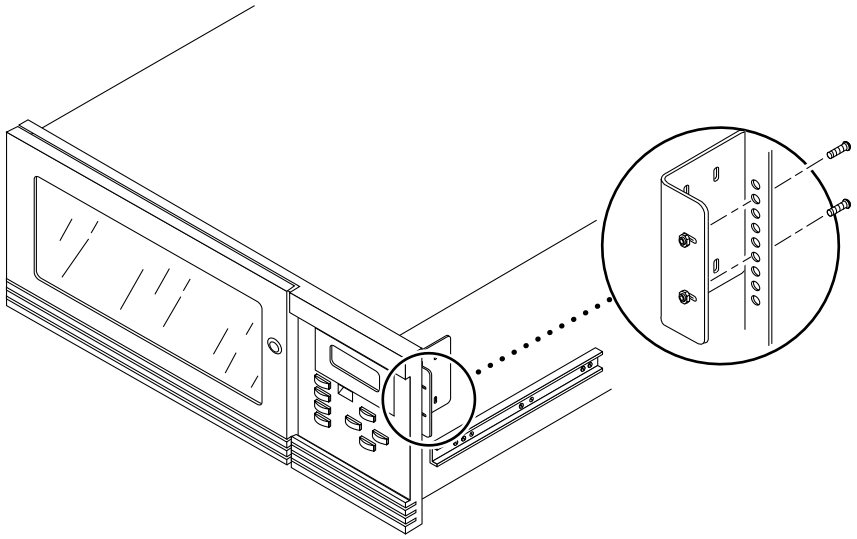


FIGURE 4-10 Mounting a Tape Library Behind a Door

c. Loosely put the mounting brackets over the screws.

d. Use an 3/8-inch open ended box wrench to install 10-32 nuts over the screws.

Tighten the screws.

4.6 Installing the Power Cable

Note – The tape library has autoranging voltage selection, so you do not need to change the voltage setting.

To plug the power cord into the tape library:

1. **Locate the power cord for the tape library.**

   There are two power cords in the shipping kit – one for 230V and one for 240V. Choose the correct cord for your system. Match the connector on the cord to the connector type on the power sequencer.

2. **Plug the female end of the power cord into the power receptacle at the rear of the tape library (FIGURE 4-11).**

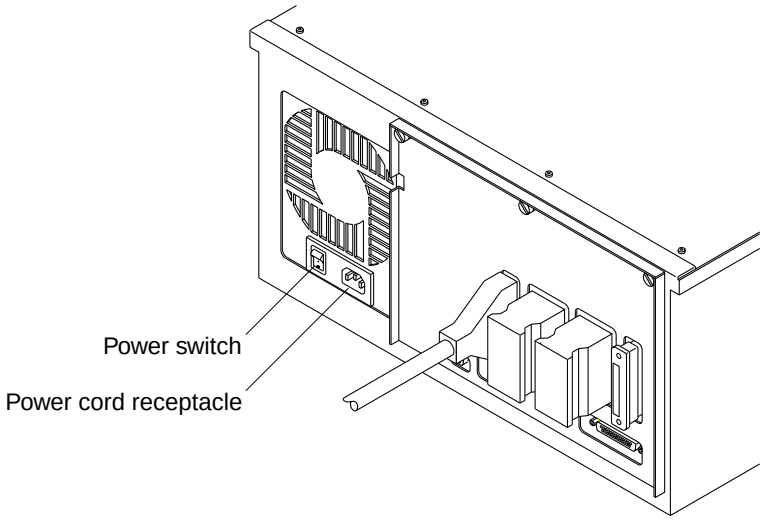


FIGURE 4-11 Location of the Power Receptacle on the Tape Library

3. **Route the power cord down the right side and along the bottom of the cabinet.**
4. **Route the power cord up through the cut-out to the power distribution unit at the side of the cabinet.**
5. **Plug the power cord for the tape library into the power distribution unit (**FIGURE 4-12**).**

Caution – The power distribution unit serves as the primary disconnect device for the tape library. Do not plug the tape library into a power source other than the power distribution unit. Personal injury may result if you work on a tape library that is plugged into another power source, since that power source may still be active when you work on the tape library.

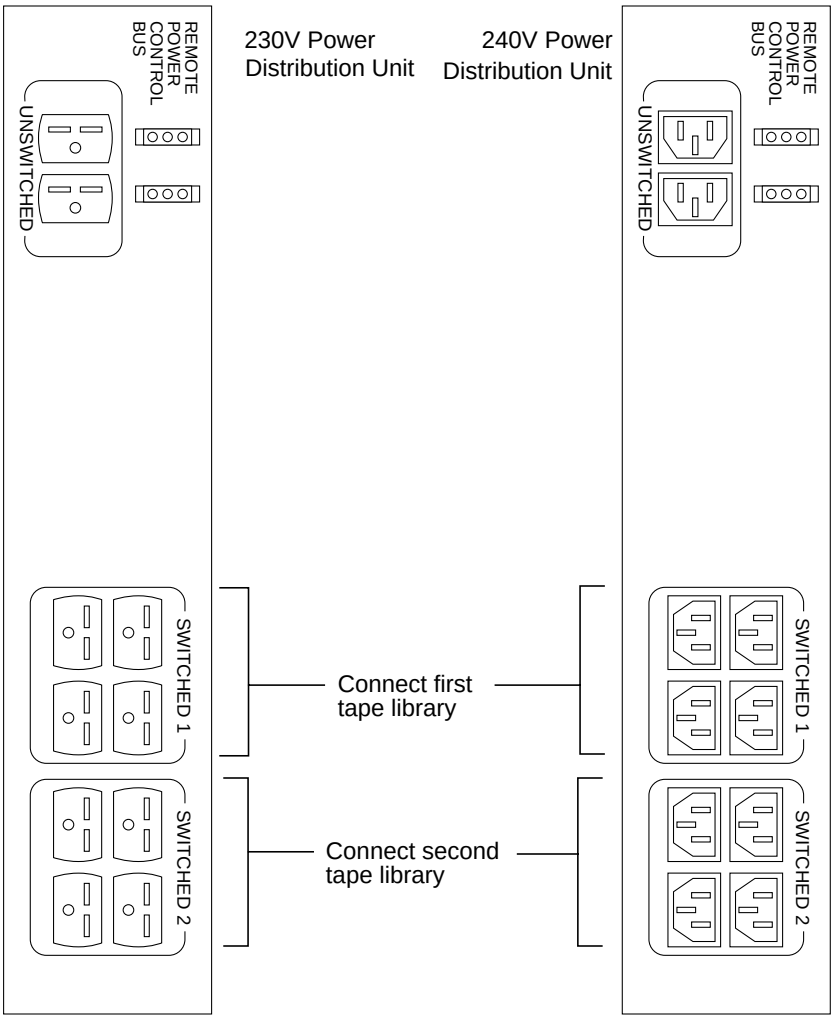


FIGURE 4-12 Power Distribution Unit

4.7 Connecting the SCSI Cables

The following procedures explain how to install a tape library in a direct connection to a system, and how to install a tape library in a daisy chain connection with other external peripherals and a system.

There are six SCSI ports on the back panel of the tape library. Use these connectors to enable multiple devices to be connected in a series for daisy chained configurations (FIGURE 4-13).

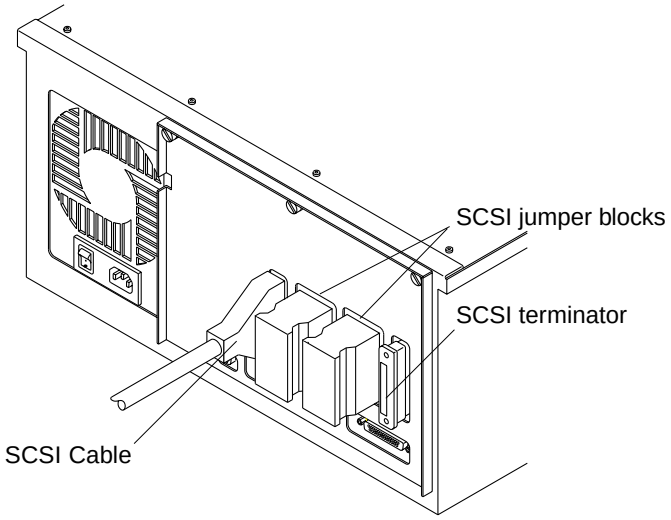


FIGURE 4-13 SCSI Connectors on the Tape Library Rear Panel

If the tape library is not the last physical device on the SCSI bus, plug a SCSI cable into an available connector. If the tape library is the last physical device on the SCSI bus, plug a SCSI cable into the left-end connector and the appropriate SCSI external terminator into the right-end connector.

If you are connecting the tape library to a single SCSI bus, you must install the SCSI bus jumper blocks into the middle four connectors (FIGURE 4-13). If you are installing the tape library on all three SCSI buses, the SCSI bus jumper blocks are not needed.

4.7.1 SCSI Buses

You can separate the internal SCSI bus of the tape library into one, two, or three buses. Each drive and the robotic arm are on an individual bus. You can put the entire unit on one bus by installing the provided jumper block across the middle four SCSI connectors on the tape library rear panel.

You should use the single bus for most installations. Other than some fault tolerance there is no significant advantage to the multiple bus configuration. There is no throughput advantage to having the internal drives on two buses except in the extreme case of very un-compressible data when using data compression on the drives. And, with the multiple bus configuration, control and access by the applications software can be an issue. You must verify that the your software can support separating the second drive onto a separate SCSI bus or separate host system.

If you configure your tape library for multiple SCSI buses, you must order and install one or more of the appropriate SCSI terminators and SCSI cables and SCSI bus host adapter cards if not available.

4.7.2 Installing the SCSI Cable

1. **Connect a 4-meter SCSI data cable to the tape library.**

Note – If you are installing the tape library into an expansion cabinet, go to Step 2. If you are install the library into a system cabinet, you do not need to route the cable outside of the rack, go to Step 4.

---

2. **Route the SCSI data cable down the left side and along the bottom of the cabinet.**
3. **Route the SCSI data cable over the edge of the bottom panel of the expansion cabinet (FIGURE 4-14).**

   The cable will be routed between the bottom panel and the kick panel when you replace the kick panel.

Note – You may want to use tie wraps as cable restraints for the data cables connected to the tape library. Pass a tie wrap through the slit in the base of the cabinet and secure the cable(s) in the wrap.

---

4. **Route the SCSI data cable over to the system cabinet and connect it to the appropriate host adaptor card.**

   You must have an FSB/S or a SBE/S SCSI host adaptor card in your system.

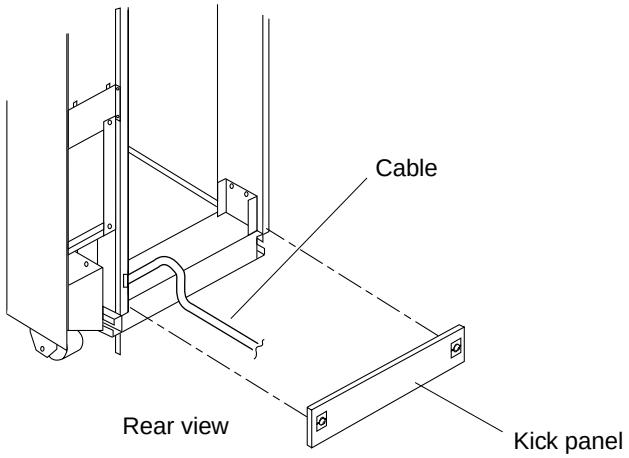


FIGURE 4-14 Routing the Cable Out of the Expansion Cabinet

5. **Install the SCSI bus jumper blocks to the middle four SCSI ports on the back panel of the tape library.**

6. **Install the SCSI regulated terminator if the tape library is the last unit of your configuration.**

   If this is not the last device in the SCSI chain, then:

   a. **Connect one end of another SCSI cable to the other single SCSI port on the back panel of the tape library.**

   b. **Connect the other end of the SCSI cable to the SCSI port on the back panel of the next peripheral unit in the stack.**

      Repeat this step until you reach the last SCSI device.

   c. **Ensure that the last device on the SCSI bus is properly terminated.**

4.8 Powering On the Tape Library

This section describes how to power on the tape library. The power switch and connector for the power cord are located on the back panel of the tape library (FIGURE 4-11).

1. **Turn on the power to the cabinet.**
2. **Press the tape library's power switch to the on position (**FIGURE 4-11**).**

   When you power on the tape library, the following events occur:

   - The cooling fan begins to rotate.
   - The Main Screen appears on the LCD.
   - The tape drives perform their initiation tests.
   - The tape library performs a 40-second, initialization test.

   During this test, the tape library first engages the locking solenoid in the front door, then the CHM does the following tests:

   - Verifies its full range of motion by moving along the long axis.
   - Verifies the presence of the cartridge holder by touching it.
   - Reseats all cartridges by touching each of them.
   - Moves to the park position.

   If the tape library does not power on as described, check the following:

   - If the LCD is not illuminated:
     - Is the power switch in the on position?
     - Is the power cord inserted correctly?
     - Is the fuse good?
   - If the LCD is illuminated:
     - Is there an error message or error code on the LCD?
     - Is the door closed and locked?

4.9 Setting SCSI IDs

If you determined that you need to change one or more of the tape library's default SCSI ID settings (2, 4, and 5), then perform the steps in Section 7.3.1, "Set SCSI IDs," on page 7-6.

4.10 Powering on the System

1. **Power on your other peripherals and then your system.**

Note – If your system starts to reboot, interrupt the reboot process by pressing the Stop and A keys together.

---

2. **Reboot your system using the** `boot -r` **command.**

CHAPTER 5

Installing the Optional Second Tape Drive Upgrade

This chapter describes how to install the optional second tape drive upgrade in a Sun StorEdge L400 tape library equipped with one tape drive.

5.1 Tape Drive in the Drive Carrier or Drive Blank

In this section, *drive carrier* refers to a tape drive installed in a drive carrier.

Caution – If you operate the tape library with only one tape drive, you must have a *drive blank* installed in the outside drive carrier slot (the left slot in the table top and rack-mounted units or the bottom slot in the tower unit).

Failure to install a drive blank will interrupt the SCSI bus, and failure to install the drive blank in the outer slot will disrupt air flow within the library.

Before you begin any procedure in this section, obtain a long medium size flatblade screwdriver.

5.1.1 Removing the Drive Carrier or Drive Blank

1. **Make sure the power is on.**
2. **Make sure data cartridges are not in the tape drives. The top/right and bottom/left LEDs on the tape drives must be off.**

If the top/right and bottom/left LEDs are steadily flashing:

a. Open the front door.

b. Push the Unload square button on the tape drive (FIGURE 5-1**).**

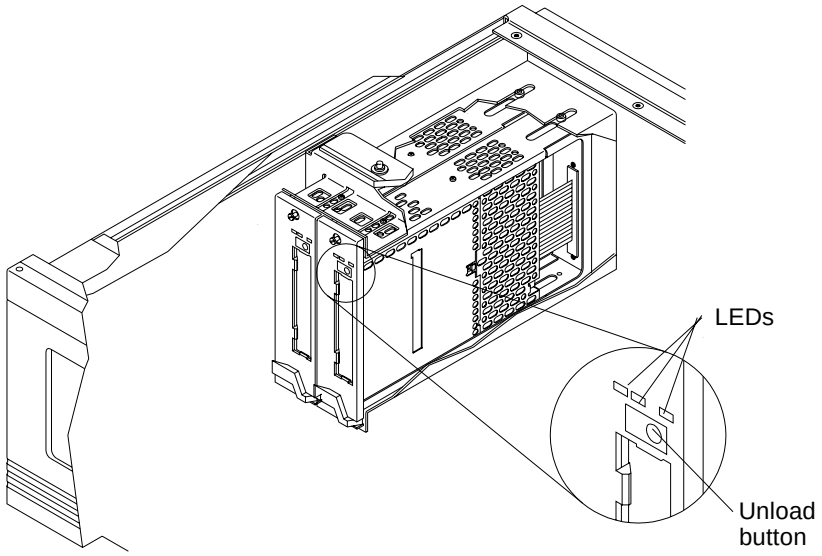


FIGURE 5-1 Location of the Unload Button

c. Wait 10 to 90 seconds.

d. Remove all data cartridges.

3. **Turn off the power but leave the power cord connected to the wall outlet.**
4. **Attach a wrist strap to your wrist and to the metal chassis.**

5. **Loosen the two captive screws on the drive carrier faceplate (**FIGURE 5-2**).**

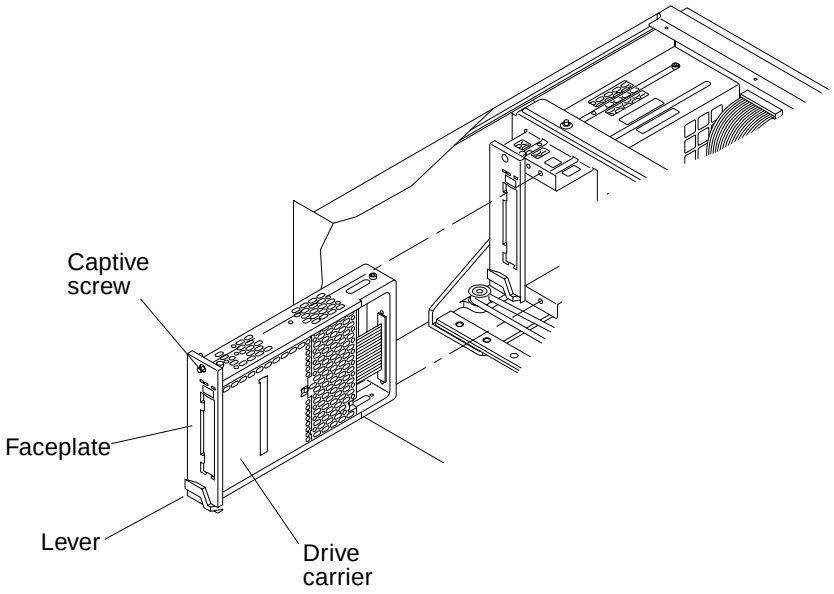


FIGURE 5-2 Screws on the Drive Carrier Faceplate

6. **Pull out the lever on the faceplate using your finger.**

   Do not try to pull out the lever without first loosening the screws.

7. **Pull the drive carrier out of the slot.**

5.1.2 Installing the Drive Carrier or Drive Blank

If you are installing two drive carriers, it does not matter which one you insert first.

1. **Insert the drive carrier into the slot with the lever toward the bottom for rackmounted units or on the right for tower units (**FIGURE 5-3**).**

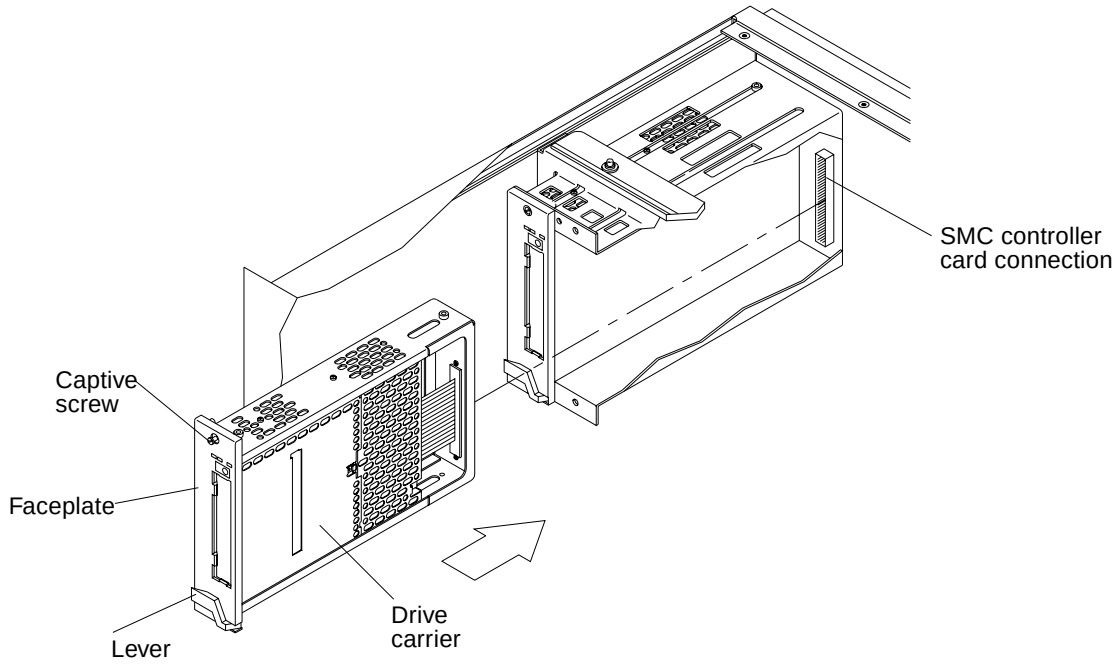


FIGURE 5-3 Inserting the Drive Carrier

2. **Push the drive carrier into the slot until the rear surface of the bezel is flush with the frame. When the tape drive reaches the SMC controller card connection, you will feel some resistance. Push firmly until it is seated.**

   Make sure the lever closes all the way when the connection is made.

3. **Tighten the two captive screws on each end of the drive carrier faceplate.**

4. **Remove the wrist strap.**

CHAPTER 6

Operating the Tape Library

This chapter describes how to use the tape library. The basic operations of the tape library include:

- Understanding the operator panel
- Using the control modes
- Stopping/restarting the tape library's operation
- Resetting the tape library
- Security options for the tape library
- Testing the drives and the tape library
- Media movement control methods
  - Sequential
  - Random access mode
  - Manual modes
- How to set up Solstice™ backup

6.1 Understanding the Operator Panel

The tape library's Operator Panel includes a four-line liquid crystal display (LCD) screen and a keypad. You can tilt the LCD screen for better visibility (rackmounted version only).

The Main Screen

By default, when you turn on the power, the tape library's Main Screen displays:

- First line - name of the product (programmable)
- Second line - firmware version and current time
- Third and fourth lines - status of tape library's operation

If you want to change the default display, use the MODE SELECT command and modify the LCD Display Mode page. For more information on changing the default display, see Chapter 7.

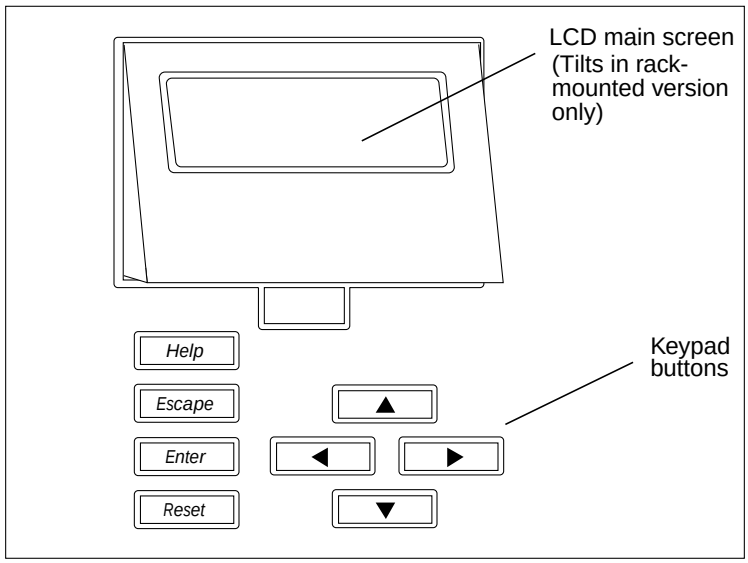


FIGURE 6-1 Operator Panel

Keypad Buttons on the Operator Panel

↑	Scrolls up
↓	Scrolls down
→	Scrolls right
←	Scrolls left
Help	Goes to the Help screen
Escape	No action
Enter	Selects the item next to the arrow
Reset	Goes to the reset screen

6.1.1 Using the Operator Panel

The Operator Panel enables you to do the following:

- Monitor CHM functions, including cartridge movement and placement while the tape library is operating in SCSI mode
- Access a menu of operations for performing such tasks as setting the CHM control mode and performing setup operations
- Enable or disable LCD password security
- Set SCSI IDs for the tape library and the two tape drives
- View error messages for the tape library
- Reset the tape library

Monitoring CHM Functions

The two bottom lines on the Main Screen of the LCD show an operational status of the tape library. These status messages describe the CHM's movements and placement procedures.

Accessing Menu Options

The Main Menu of the LCD includes 12 menu options.

To access the Main Menu:

- **Press** `Escape` **repeatedly from any other menu until this screen appears.**

To see the other menu options:

- **Scroll down by pressing ↓ and scroll up by pressing ↑.**

To select an option:

- **Press Enter.**

Enabling and Disabling LCD Password Security

Using the LCD password security feature, you can prevent a user from inadvertently changing settings or interrupting library operations. When security is enabled, you cannot:

- Change the control mode
- Change SCSI IDs
- Change the SCSI parity checking
- Perform LCD diagnostics
- Use the LCD options for cleaning the CTSs
- Open the front door

If a user attempts to perform any of these operations while security is enabled, the LCD displays a message stating that security is active.

Security remains in effect even after you reset the tape library, or power the tape library off and back on. You can disable security by entering your password in the Security submenu.

Viewing Errors

If an error occurs, the tape library displays an error message on the bottom two lines of the LCD. The upper line includes the error number, and the lower line gives a brief description. Refer to Appendix C for error code descriptions.

6.2 Using the Control Modes

The tape library's CHM can operate in the control modes listed below. To switch between these modes, use the Operator Panel.

- SCSI Interface mode
- Sequential 1 mode and Sequential 2 mode
- Dual Sequential mode
- LCD Interface mode
- 25-Pin or 9-Pin Serial Port mode (not supported)

6.2.0.1 SCSI Interface Mode

With the SCSI Interface mode, CHM motion is controlled by a SCSI driver that allows the CHM to retrieve and replace cartridges as specified by the host through the SCSI-2 command set.

Note – When you switch the tape library from SCSI Interface mode to another mode, CHM operations are temporarily halted. However, tape drive operations can still continue.

6.2.0.2 Sequential 1 Mode and Sequential 2 Mode

When the tape library is operating in the Sequential 1 mode, the CHM picks cartridges from the removable cartridge holder sequentially and places them in Drive 1 for processing. When the tape library is operating in the Sequential 2 mode, the CHM places cartridges in Drive 2 for processing.

6.2.0.3 Dual Sequential Mode

For tape libraries with two tape drives, dual sequential allows you to use ten tape cartridges (Magazine 0) in the removable cartridge holder in Drive 1 and ten tape cartridges (Magazine 1) in Drive 2.

6.2.0.4 LCD Interface Mode

When the tape library is operating in LCD Interface mode, the user can instruct it to perform CHM motion commands, such as picking and placing cartridges, and performing diagnostics, from the Operator Panel without communicating across a SCSI bus.

You do not have to operate the tape library in LCD Interface mode to use most of the features available through the LCD. For example, you can use the LCD to check system statistics when it is operating in any of the control modes.

Note – LCD Interface mode is required only when you want to control the motions of the CHM through the Operator Panel.

6.2.1 Changing the Control Mode

1. **If you have not already done so, power on the tape library.**
2. **Press** Escape **on the Operator Panel to display the Main Menu.**
3. **Select the Interface Menu.**
4. **From the Interface Menu, press Enter to select the Control Mode Menu.**

   An asterisk next to a selection indicates the current active mode.
5. **Using ↓ and ↑ on the Operator Panel, scroll through the choices until the arrow is next to the mode you want.**

   Scroll down to view the other options.
6. **Press Enter to select the mode.**
7. **When the system status message at the bottom of the display indicates that the change is complete, press** Escape **to return to the Control Mode Menu.**

6.3 Interrupting the Tape Library's Operation

You can temporarily stop the tape library's operation without turning off power and without disturbing the cartridge processing order to:

- Remove and replace individual cartridges
- Remove and replace cartridge holder(s)

To stop the tape library's operation:

1. **Turn the key in the door lock to unlock it.**

   When the CHM finishes the current operation and moves to the park position, the door's interlock mechanism will release the door.
2. **Open the front door.**

   When you stop the tape library's operation:
   - The CHM moves to the park position and stops.
   - Current to all of the motors is turned off.
   - A Not Ready status is returned to the host.
3. **Remove or replace a cartridge or removable cartridge holder.**

   See Chapter 2, "Preparing the Tape Library for Installation.".

6.4 Resuming the Tape Library's Operation

1. **Close the tape library's door.**
2. **Turn the key counterclock wise in the door lock to lock it.**

   After the door is closed, Unit Attention status is returned to the host. The tape library then performs its initiation procedure.

Note – You will get a Status: error 91 operator abort message.

6.5 Resetting the Tape Library

Reset the tape library after you have finished correcting a hardware error. Hardware errors can include problems in picking and placing a cartridge, or difficulties in moving the CHM. When a hardware error occurs, a message appears on the LCD describing the error.

Caution – Never press Reset while a tape cartridge is in a tape drive. If this should happen, manually eject the cartridge.

To reset the tape library:

- **Press Reset, then Enter on the Operator Panel.**

  A reset causes the tape library and the drives to perform their initiation tests. After the tape library is reset, the Main Screen appears on the LCD.

  To continue a reset:

- **Press Enter.**

  To cancel a reset:

- **Press** `Escape`**.**

6.6 Security Options for the Tape Library

The tape library features a security option that prevents users from inadvertently changing important settings and operations. When security is enabled, access to the following LCD activities is prevented:

- Changing the control mode
- Changing the SCSI IDs
- Changing the library serial number
- Changing SCSI parity checking
- Using the Diagnostics Menu and the Demo Menu
- Using the Clean Drives Menu
- Opening the front door (LCD security only)
- Communicating with a tape drive across a serial port

If a user attempts to perform any of the above operations when security is enabled, the Main Screen displays a message that states security is active. The message also states whether security was enabled through the LCD or SCSI.

Note – Security remains in effect even after you reset the tape library.

6.6.1 Enabling or Disabling Security

1. **Select the** `Configuration Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select** `Set Security On/Off` **(depending whether security is already on or off) by pressing ↓ or ↑, then** `Enter`**.**
3. **Select a three digit password.**

   To disable security, enter the same password used to turn security on.

   a. **Move from column to column by pressing ← or →.**

   b. **Change the password (default password is** `000`**) by pressing ↑ or ↓.**

   c. **Press** `Enter` **to make the password active.**

Note – If you forgot the password, try entering the default password - `000`.

6.7 Tape Drive LEDs

The two tape drives in the tape library use three LEDs to indicate diagnostic and operating states (see TABLE 6-1).

TABLE 6-1 Tape Drive LED States

	Top LED (Error/Clean)	Middle LED (Tape Ready)	Bottom LED (Tape Motion)
POST or reset	on	on	on
Error or failed POST	flash	off	off
Ready (no tape loaded)	n/a	off	off
Ready (tape loaded)	n/a	on	off
Normal tape motion	n/a	on	flash
High-speed motion	n/a	on	fast flash
Time to clean	on	n/a	n/a
Clean in progress	on	on	flash

POST= power on self-test

6.8 Testing

The following tests check the operation of the overall tape library, the disk drives, and the cartridge handling mechanism. For more information on running the tape library diagnostics from the Operator Panel, see Chapter 7.

6.8.1 Testing the Installation

If the tape library has been stored for six months or more, you need to perform some “warm-up exercises” on the tape drives and the tape library. The exercises involve inserting tapes into the tape drives and using your application software to write and read data.

6.8.2 Testing the Tape Library

1. **Load tapes into the magazine and close the door.**
2. **Use the front panel controls to select one of the sequential modes**
3. **Use the front panel controls to select Restart On.**

Caution – Do not run more than 200 passes or tape damage due to overuse may occur.

4. **Run Sundiag or SunVTS (whichever came with your operating system). Choose the “Library” option.**

6.8.3 Testing the Internal Tape Drives

1. **Press the eject button on the drive carrier faceplate, if you need to manually eject a cartridge from the drive 1.**
2. **Insert a non-vital tape cartridge into the drive 1.**

   Make sure the cartridge is not write-protected.

3. **Close and lock the door.**

   The tape drive loads the tape and positions it at the logical beginning of tape (LBOT) in about 35 seconds. All three LEDs will be off for the first eight seconds, then the bottom LED will flash. When the bottom LED stays lit, the drive is ready. If the top amber LED remains on or flashing, an error has occurred.

Caution – Do not run more than 200 passes or tape damage due to overuse may occur.

4. **Run Sundiag or SunVTS (whichever came with your operating system). Choose the “Tape” option.**

6.8.4 Testing the Cartridge Handling Mechanism

To test the robotic CHM, run the Slot Demo function from the tape library Operator Panel. No host interaction is required for this test. Make sure there is at least one tape cartridge in the tape library.

1. **Disable security, if enabled.**
2. **Select the** `Maintenance Menu` **by pressing** ↓ **or** ↑**, then** `Enter`**.**
3. **Insert a tape magazine with at least one empty slot into the tape library.**
4. **Select** `Demo Menu` **by pressing** ↓ **or** ↑**, then** `Enter`**.**
5. **Select** `Slot Demo` **by pressing** ↓ **or** ↑**, then** `Enter`**.**

   The system begins the demo and displays this screen:

```
SLOT DEMO:
 Total Cycles: N
 Status: Move NN - NN
Moving to Slot N
```

Where:

N	Indicates the number of cycles that have run so far.
NN- NN	Indicates the source and destination element indexes of the current move.

To stop the demo, press Escape and Enter.

6.9 Media Movement Control Methods

The library offers four methods to move media inside the unit.

Sequential mode offers the functionality of moving from one tape cartridge to the next cartridge in a serial fashion. Sequential mode is supported with the standard utilities offered in the Solaris environment.

Random access mode allows you to select any of the tapes in the magazine in any order. Random access mode requires the use of a specialized applications package such as the Solstice Backup product.

There are two manual methods as well.

6.9.1 Sequential Mode

Sequential mode allows the tape cartridges to be accessed serially. This is the most advanced mode supported by the Sun operating system without use of Networker/ Solstice Backup or similar application. When a tape is ejected from the drive the next tape in the magazine is placed in the drive. In a two drive library, one half of the tapes in the magazine are used in one drive and one half in the other drive. This effectively creates a unit that appears like one very long tape. This is useful for simple backup and restore operations such as ufsdump.

1. **To automatically load the first tape into the drive, use the Operator Panel to select the Restart option.**

   Restart 1 loads the tape into the first drive. Restart 2 loads into the second drive.

2. **To enable the unit to move to the next tape after ejecting a tape, use the Operator Panel to select one of the sequential modes.**

   - Sequential 1 for the first drive.
   - Sequential 2 for second drive.
   - Dual Sequential for use of two drives simultaneously.

3. **To enable the unit to eject a tape from the drive, use:**

   - `mt -f /dev/rmt/x offline` [replace 'x' with the drive number] or
   - use the `l` flag with `ufsdump`.

   Access to the on-line man(ual) page is via `man ufsdump`.

4. **To load the first tape after ejecting the last, use the front panel controls to select the Loop option.**

   There is both a loop 1 for the first drive and a loop 2 for the second drive.

6.9.2 Random Access Mode

The random access method allows access to any tape in the library. Sun does not provide a driver in the standard OS to provide this functionality. A random access driver and a full backup application utility is offered in the Solstice Backup program. This is a version of the Legato Networker utility. This multi-function utility provides various capabilities, including backup operations while the system is running. It does not require the system to be shut down like some other utilities.

6.9.3 Manual Modes

The third method is to place the tapes manually into an internal drive using commands from the front panel.

1. **Select the LCD interface mode.**
2. **Select Maintenance Menu, press enter.**
3. **Scroll to Diagnostics, press enter.**
4. **Scroll to Position to Element, press enter.**
5. **Select a number, press enter.**

   Cartridge slot numbers are 1 through 20.
6. **Scroll to Move Cartridge.**

   Drive numbers are 82 and 83.

   The fourth method is the manual mode. The manual method involves opening the front door of the unit and placing tapes directly into the internal drives by hand. This is recommended in the event of a failure of the robotic unit.

6.10 How to Set Up Solstice Backup

The options of Solstice Backup (formerly Networker) are fairly complicated. To run this library effectively you need the Turbo version of Solstice and a jukebox module and enabler. Consult your sales representative for the complete list of the options.

The tape library offered by Sun is based on the Exabyte EXB-220 product. Select the “EXB-210” device in the Solstice Backup device menu.

The software allows use of either a software or hardware data compression scheme. You should never use the two compression methods at the same time. If you use the Networker software command you must specify non-data compression format to the drive (`/dev/rmt/0l` or `0m`). Alternately, you can not use the Networker data compression and specify the drive’s data compression mode (`/dev/rmt/0h`). One disadvantage of this approach is the data format on the tape is not readable by the earlier 8500 or 8200 drives because they do not incorporate data compression.

CHAPTER 7

Tape Library Menu Functions

7.1 Primary Menu

The tape library has a primary menu on the display panel from which you can access several menus. The menus you can choose are displayed by the LCD as follows:

```
Main Screen
Interface Menu
Configuration Menu
Maintenance Menu
Library Info Menu
```

To access the Primary Menu:

- **Press Escape until the Primary Menu is displayed (FIGURE 7-1).**

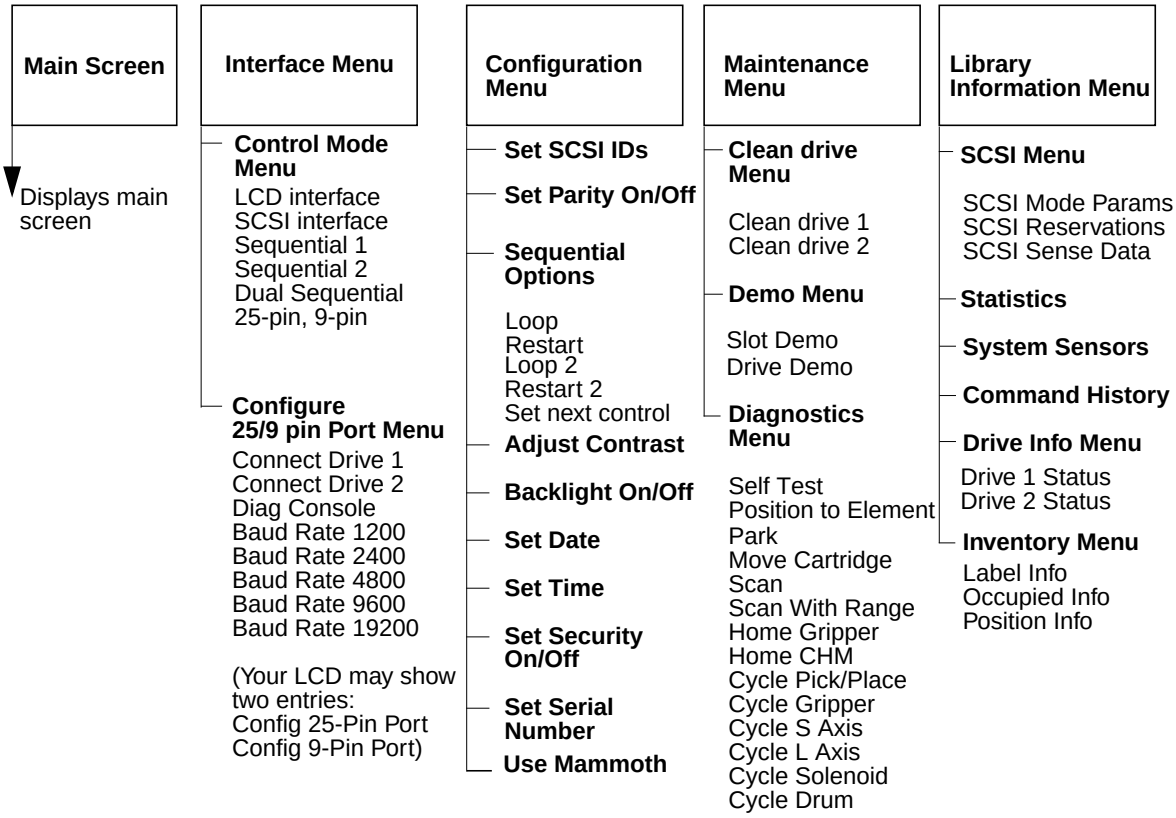


FIGURE 7-1 Primary Menu

When the Primary Menu is displayed, use the keys on the keypad to perform the following functions.

↑	Scrolls up, often increases a value.
↓	Scrolls down, often decreases a value.
→	Scrolls right.
←	Scrolls left.
Help	Goes to the Help screen.
Escape	Goes forward/backward through menus.
Enter	Selects the item next to the arrow.
Reset	Goes to the reset screen.

7.2 Interface Menu

The Interface Menu allows you to put the tape library into various modes from which you can control the tape library.

The `Interface Menu` consists of the following submenus:

- Control mode
- Configure 25-Pin Port (not supported)
- Configure 9-Pin Port (not supported)
- Configure 4-Pin Port (not supported)

7.2.1 Control Mode

The `Control Mode Menu` determines what controls the motions of the CHM. The tape library must be in one of the three sequential modes in order to use the SunDiag™ or SunVTS™ system exerciser. The tape library has the following control modes:

- LCD Interface
- SCSI Interface
- Sequential 1
- Sequential 2
- Dual Sequential
- 25-Pin Serial Port (not supported)
- 9-Pin Serial Port (not supported)

Use ↑ to scroll up through the control mode functions and ↓ to scroll down.

7.2.1.1 LCD Interface

LCD Interface Mode is required when you want to control the motions of the CHM though the display panel. For example, diagnostics can be performed that test individual motions, such as picking and placing cartridges from specific locations.

Note – You must be in LCD interface mode to run certain tests in the Maintenance Menu.

---

1. **Disable security.**
2. **Select the Interface Menu by pressing ↓ or ↑, then Enter.**

3. **Select the Control Mode Menu by pressing ↓ or ↑, then Enter.**
4. **Select LCD Interface mode by pressing ↓ or ↑, then Enter.**

   You can now execute commands in the Maintenance Menu.

7.2.1.2 SCSI Interface Mode

In the `SCSI Interface` mode, the host computer system issues SCSI commands to the tape library to specify how cartridges are loaded and unloaded from the removable cartridge holder and to access the tape drives.

To get the tape library to SCSI Interface mode:

1. **Disable security.**
2. **Select the Interface Menu by pressing ↓ or ↑, then Enter.**
3. **Select the Control Mode Menu by pressing ↓ or ↑, then Enter.**
4. **Select SCSI Interface by pressing ↓ or ↑, then Enter.**

7.2.1.3 Sequential 1, Sequential 2, or Dual Sequential Modes

Set the tape library to `Sequential 1`, `Sequential 2`, or `Dual Sequential` mode in order to run the SunDiag system exerciser. If only one tape drive is installed, only `Sequential 1` mode is displayed.

1. **Check to see if there are any tapes in the tape drives by checking LED states (refer to LED descriptions in Section 6.7, "Tape Drive LEDs").**

   If there are tapes in the tape drives, you must remove them.

   If a tape is installed in a tape drive:

   a. **Open the door.**

   b. **Push the square-shaped Eject button to the right of the LEDs on the tape drive.**

      The tape unloads from the tape drive. The tape library ignores the fixed slot in all sequential modes.

   c. **Close the door.**

The following chart explains what each sequential mode does.

TABLE 7-1 Sequential Mode Definitions

Sequential 1	CHM picks cartridges from the holder sequentially and processes them in Drive 1 (the right drive)
Sequential 2	CHM picks cartridges from the holder sequentially and processes them in Drive 2 (the left drive)
Dual Sequential	CHM picks ten cartridges from magazine 0 for Drive 1 and 10 cartridges from magazine 1 for Drive 2.

2. **Press Escape until the Primary Menu is displayed.**
3. **Select the Interface Menu by pressing ↓ or ↑, then Enter.**
4. **Select the Control Mode Menu by pressing ↓ or ↑, then Enter.**
5. **Select** `Sequential 1`**,** `Sequential 2`**, or** `Dual Sequential` **mode by pressing ↓ or ↑, then Enter.**

   The tape library performs the following actions when processing a cartridge:

   1. Picks the first cartridge from the cartridge holder.

   If the CHM encounters an empty cartridge slot, it moves to the next cartridge in the holder and picks it.

   2. Places the cartridge in CTS 1 or CTS 2 (depending on the mode) and waits until the CTS ejects the cartridge.
   3. Retrieves the cartridge from the CTS and returns it to its original slot in the holder.
   4. Repeats the process with the next cartridge.

7.2.1.4 Running the SunDiag or SunVTS System Exerciser

See the *SunDiag User's Guide* for instructions on how to use SunDiag.

1. **Select the Interface Menu by pressing ↓ or ↑, then Enter.**
2. **Select the Control Mode Menu by pressing ↓ or ↑, then Enter.**
3. **Select** `Sequential CTS1`**,** `Sequential CTS2`**, or** `Dual Sequential` **(for two drive models) mode by pressing ↓ or ↑, then Enter.**

   a. Set the Restart option to ON by pressing ← or →.

b. Set the Loop option to ON by pressing ← or →.

4. **Open and close the tape library.**

   This action causes the tape library to inventory cartridge locations and place a tape cartridge in each tape drive.

5. **Press Escape until you get to the Primary Menu.**

6. **Select the Main Screen by pressing** `Enter`**.**

   Leave the tape library in Main Screen mode for normal operation.

7. **Start the SunDiag system exerciser.**

7.2.2 25-pin, 9-pin, and 4-pin Serial Port Modes

The 25-pin, 9-pin and 4-pin serial port modes are not supported on Sun systems.

7.3 Configuration Menu

The `Configuration Menu` consists of the following submenus:

- Set SCSI IDs
- Set SCSI parity checking
- Sequential options
- Adjust contrast
- Backlight
- Set date
- Set time
- Set security
- Set serial number
- Use Mammoth

7.3.1 Set SCSI IDs

The tape library is configured with default SCSI IDs for the CHM and for each tape drive. This section describes how to view the default settings and change them, if necessary. SCSI IDs can be viewed and changed from the Operator Panel (FIGURE 6-1).

Note – Use `probe-scsi-all` at the `ok` prompt to determine the SCSI IDs that are currently set.

You can use the Configuration Menu to change the SCSI IDs of the tape library (LIB) and the cartridge tape subsystems (CTSs). Each device (the library and the two CTSs) must have separate SCSI IDs. If the tape library contains only one drive, the SCSI ID for the blank drive displays a “B” for blank.

TABLE 7-2 shows the default SCSI IDs for the tape library and the tape drives.

TABLE 7-2 Default SCSI IDs for the Tape Library and Internal Tape Drives

Device/Unit	SCSI ID	Description
Tape Library	2	Includes the cartridge handling mechanism (CHM), the removable cartridge holder, and the fixed cartridge slot
Tape drive (first)	4	The top 8 mm tape drive
Tape drive (second)	5	The bottom 8 mm tape drive

You can set the SCSI IDs of the tape drives and of the tape library to any available SCSI ID from 0 to 6. SCSI IDs 4 and 5 are most commonly used for tape drives. SCSI ID 7 is reserved for the host or the SCSI host adaptor card.

Caution – Each device on a SCSI loop must have an unique SCSI ID.

To view or change the SCSI IDs:

1. **Locate the LCD and keypad on the front panel (FIGURE 6-1).**
2. **Press Escape until the Primary Menu is displayed (”).**
3. **Select the Configuration Menu by pressing ↑ or ↓, then pressing Enter.**
4. **Select Set SCSI IDs by pressing ↑ or ↓, then pressing Enter.**
5. **Set the SCSI IDs for Drive 1 (the top tape drive), Drive 2 (the bottom tape drive), and the tape library (LIB).**
   - Press either ↑ or ↓ to increase or decrease the SCSI ID value.
   - Press ← or → to select a drive or the tape library.

   Press Enter to make the selection active, or Escape to not change anything.

7.3.2 Set SCSI Parity Checking

Use the SCSI parity option to turn parity checking on the SCSI bus *on* or *off*. When parity is on (default), the tape library checks all data coming across the SCSI bus for parity. When you change SCSI parity, it changes both the current and the saved Mode Select parity parameters to the new value.

1. **Select the** `Configuration Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select** `SCSI Parity` **by pressing ↓ or ↑.**
3. **Turn parity checking on or off by pressing → to turn parity checking ON or ← to turn parity checking OFF.**

7.3.3 Sequential Options

With the `Sequential Options`, you can perform the following actions to control how the cartridges are processed.

Restart option	Determines whether the tape library restarts at the first cartridge or restarts where it left off after a power-on or reset.
On	Starts at the first cartridge
Off	Restarts operation where it left off.
Loop option	Determines if the tape library should stop after processing all of the cartridges in the holder or loop back to the first cartridge and continue processing.
On	Loops back to the first cartridge.
Off	Stops processing cartridges after processing the last cartridge.

Note – The loop and restart options are application specific.

7.3.3.1 Restart Option

1. **Select the** `Configuration Menu` **by pressing ↓ or ↑, then** `Enter`**.**

2. **Select** `Sequential Options` **by pressing ↓ or ↑, then** `Enter`**.**

   The following screen is displayed.

```
→ Loop:                  OFF →
   Restart:               ON
   Loop2:                 OFF
   Restart2:              ON
```

3. **Select** `Restart` **for tape drive 1 or** `Restart2` **for tape drive 2 by pressing ↑ or ↓.**
4. **Set** `Restart` **on or off by pressing ← or →.**

7.3.3.2 Loop Option

1. **Select the** `Configuration Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select** `Sequential Options` **by pressing ↓ or ↑, then** `Enter`**.**

   The following screen is displayed.

```
→ Loop:                  OFF →
   Restart:               ON
   Loop2:                 OFF
   Restart2:              ON
```

3. **Select** `Loop` **for Drive 1 or** `Loop2` **for Drive 2 by pressing ↑ or ↓.**
4. **Set the Loop option on or off by pressing ← or →.**

7.3.4 Adjust Contrast

1. **Select the** `Configuration Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select** `Adjust Contrast` **by pressing ↓ or ↑, then** `Enter`**.**
3. **Raise the contrast by pressing → or lower the contrast by pressing ←.**

7.3.5 Back Light

The `Back Light` feature turns the light in back of the display panel on or off.

1. **Select the** `Configuration Menu` **by pressing ↓ or ↑, then** `Enter`**.**

2. **Select** `Back Light` **by pressing** ↓ **or** ↑**, then** `Enter`**.**

3. **Turn** `Back Light` **on by pressing** → **or turn** `Back Light` **off by pressing** ←**.**

7.3.6 Set Date

Use the `Set Date` screen to set the date shown on the diagnostic listings and the command history screen

1. **Select the** `Configuration Menu` **by pressing** ↓ **or** ↑**, then** `Enter`**.**

2. **Select** `Set Date` **by pressing** ↓ **or** ↑**, then** `Enter`**.**

3. **Set the date using these keys.**

↑	Increases the day, month, or year.
↓	Decreases the day, month, or year.
→	Moves to the column on the right.
←	Moves to the column on the left.

7.3.7 Set Time

Use the `Set Time` screen to set the time shown on the `Main Screen` and the command history screen.

1. **Select the** `Configuration Menu` **from the Primary Menu by pressing** ↓ **or** ↑**, then** `Enter`**.**

2. **Select** `Set Time` **by pressing** ↓ **or** ↑**, then** `Enter`**.**

3. **Set the time using these keys.**

↑	Increases the hours, minutes, or seconds.
↓	Decreases the hours, minutes, or seconds.
→	Moves to the column on the right.
←	Moves to the column on the left.

7.3.8 Set Security

The security option allows you to prevent a user from inadvertently changing important settings and operations.

Note – Security remains in effect after resetting the tape library.

When security is enabled, a user cannot access the following activities:

- Changing the control mode
- Changing the SCSI IDs
- Changing the library serial number
- Changing SCSI parity checking
- Using the Diagnostics Menu and the Demo Menu
- Using the Clean Drives Menu
- Opening the front door (LCD security only)

If a user attempts to perform any of the these operations when security is enabled, the tape library displays a message stating security is active.

To enable or disable security:

1. **Select the** `Configuration Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select** `Set Security On/Off` **by pressing ↓ or ↑, then** `Enter`**.**
3. **Select a three digit password.**

   To disable security, enter the same password used to turn security on.

   a. **Move from column to column by pressing ← or →.**

   b. **Change the password (default password is** `000`**) by pressing ↑ or ↓.**

   c. **Press** `Enter` **to make the password active.**

Note – If you forgot the password, enter the default password, `000`.

7.3.9 Set Serial Number

A label on the back of the unit displays the serial number. To enter the serial number in the tape library firmware, use the `Set Serial Number` option.

1. **Select the** `Configuration Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select** `Set Serial Number` **by pressing ↓ or ↑, then** `Enter`**.**

3. **Change each digit by pressing ↑ or ↓. Move from column to column by pressing ← or →.**

   The following screen displays:

```
The serial number is
NNNNNN.  Press
ENTER to accept or
ESC to cancel.
```

4. **Press** `Enter` **to save the changes or** `Escape` **to cancel the changes.**

7.3.10 Use Mammoth

Allows you to check whether an Exabyte Mammoth drive is installed. This option is factory set.

1. **Select the** `Configuration Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select** `Use Mammoth` **by pressing ↓ or ↑, then** `Enter`**.**
3. **Select mammoth by pressing ↑ or ↓.**
4. **Press** `Enter` **to save the changes or** `Escape` **to cancel the changes.**

7.4 Maintenance Menu

The `Maintenance Menu` consists of the following submenus:

- Clean drive menu
- Demo menu
- Diagnostics menu

7.4.1 Clean Drive Menu

To clean the tape drives, see Section 8.2, “Cleaning Tape Drives.”

7.4.2 Demo Menu

The `Demo Menu` includes:

Drive Demo	Causes the CHM to move randomly between slots in removable cartridge holder, the fixed cartridge slot, and the tape drives.
Slot Demo	Causes the CHM to move cartridges randomly between slots of removable cartridge holder, and the fixed cartridge holder.

To run the Drive Demo:

1. **Open the door and make sure there is a tape cartridge and one empty slot in the tape library.**
2. **Disable security, if enabled.**
3. **Select the** `Maintenance Menu` **by pressing ↓ or ↑, then** `Enter`**.**
4. **Select** `Demo Menu` **by pressing ↓ or ↑, then** `Enter`**.**
5. **Select** `Drive Demo` **by pressing ↓ or ↑, then** `Enter`**.**

   The screen displays:

```
Should cartridges
be loaded into
the drives?                    NO→
```

6. **Select YES if you want to include the tape drive in the demo. Select NO if you do not want to include the tape drive in the demo.**

   Use → or ←.

   - If you select YES, the CHM pushes the cartridge all the way into the drive.
   - If you select NO, the CHM inserts the cartridge into the drive slot, but does not push the cartridge all the way into the drive.

   The tape will not automatically eject the cartridge.

7. **The system begins the demo and displays this screen:**

```
DRIVE DEMO:
 Total Cycles: N
Status: Move NN - NN
```

Where:

N	Indicates the number of cycles that have run so far.
NN- NN	Indicates the source and destination element indexes of the current move.

To stop the demo, press `Escape` and Enter.

Note – If you cannot press the `Escape` or `Reset` keys, power cycle the tape library.

To run the Slot Demo:

1. **Disable security, if enabled.**
2. **Select the** `Maintenance Menu` **by pressing ↓ or ↑, then** `Enter`**.**
3. **Insert a tape cartridge into the tape library.**
4. **Select** `Demo Menu` **by pressing ↓ or ↑, then** `Enter`**.**
5. **Select** `Slot Demo` **by pressing ↓ or ↑, then** `Enter`**.**

   The system begins the demo and displays this screen:

```
SLOT DEMO:
 Total Cycles: N
 Status: Move NN - NN
Moving to Slot N
```

Where:

N	Indicates the number of cycles that have run so far.
NN- NN	Indicates the source and destination element indexes of the current move.

To stop the demo, press `Escape` and Enter.

7.4.3 Diagnostics Menu

The `Diagnostics Menu` enables you to perform a variety of diagnostic functions. Use ↑ to scroll up or ↓ to scroll down.

Before you perform diagnostics, make certain you know the element indexes for the components you will exercise. See TABLE 7-3.

TABLE 7-3 Element Indexes for the Tape Library Parts

Library Part	Element Index
Fixed cartridge slot	0
Cartridge slots	1 to 20*
Tape drive 1	82
Tape drive 2	83
CHM	86

***Starting sequentially from right of magazine 0, and then right of magazine 1

The following chart describes the diagnostics available and a brief description of each diagnostic.

TABLE 7-4 Diagnostic Menu Descriptions

Self Test	Performs the following tests: - Moves the gripper to the home position (bottom or left side of the tape library) - Moves the CHM along the short axis once - Moves the CHM along the long axis once - Moves the CHM to the home position
Position to Elem	Moves the CHM to the tape drive or to one of the cartridge slots. You must specify an element address for the destination.
Park	Moves the CHM to the park position (at the right of the tape library).
Move Cartridge	Moves a cartridge from one location to another. You must specify an element address for the source and destination. See TABLE 7-3.
Scan	Scans all elements.
Scan with Range	Scans a range of elements.
Home Gripper	Moves the gripper to the park position (open).

TABLE 7-4 Diagnostic Menu Descriptions *(Continued)*

Home CHM	Moves the CHM to the park position, then to the opposite end of the long axis.
Cycle Pick/Place	Causes the CHM to take a cartridge from a specified slot or CTS and replace it in the same slot. You must specify the source slot (see TABLE 7-3) and the number of pick/place cycles that the CHM should perform in increments of 10 (up to 250).
Cycle Gripper	Causes the gripper to open and close. You must specify the number of cycles in increments of 10 (up to 250).
Cycle S Axis	Causes the CHM to move end to end along the short axis (the axis where the CHM moves in and out). You must specify the number of cycles the CHM must perform in increments of 10 (up to 250).
Cycle L Axis	Causes the CHM to move end to end along the long axis. You must specify the number of cycles the CHM must perform in increments of 10 (up to 250).
Cycle Solenoid	Cycles the door solenoid, used to lock the front door. You must specify the number of cycles the CHM must perform in increments of 10 (up to 250).
Cycle Drum	Rotates the drum assembly 180 degrees.

7.4.3.1 Self Test

The following actions occur during the `Self Test` diagnostic:

- The gripper fingers of the CHM move to the home position.
- The CHM cycles the long and short axes once, then moves to the home position at the bottom of the long axis.
- The spindle assembly is returned to home position.

1. **Select the** `Maintenance Menu` **by pressing** ↓ **or** ↑**,then** `Enter`**.**
2. **Select the** `Diagnostics Menu` **by pressing** ↓ **or** ↑**, then** `Enter`**.**
3. **Select** `Self Test` **by pressing** ↓ **or** ↑**, then** `Enter`**.**

To abort the `Self Test` diagnostic, press `Escape` and `Enter`.

7.4.3.2 Position to Element Test

This diagnostic positions the CHM in front of a tape drive, cleaning cartridge slot, or a particular slot in the cartridge holder.

1. **Select the** Maintenance Menu **by pressing ↓ or ↑, then** Enter**.**
2. **Select the** Diagnostics Menu **by pressing ↓ or ↑, then** Enter**.**
3. **Select** Position to Element **by pressing ↓ or ↑, then** Enter**.**

   The following screen is displayed:

```
Set Destination            0
  ↑ Increase
  ↓ Decrease
                       ↓
```

4. **Select the element address where you want to position the CHM by pressing ↑ or ↓, then** Enter**.**

   The CHM moves in front of the element index you indicate. The system displays a message similar to the following when the move is complete.

```
POSITION TO 3:

Status:  Complete
                       ↓
```

5. **To run the test again with a different element index, press** Escape **to return to the** Diagnostics Menu**, then repeat steps 4 and 5.**

   To abort the Position to Element diagnostic, press Escape and Enter.

7.4.3.3 Park Test

The Park test moves the CHM to the end of the long axis, called the park position.

1. **Select the** Maintenance Menu **by pressing ↓ or ↑, then** Enter**.**
2. **Select the** Diagnostics Menu **by pressing ↓ or ↑, then** Enter**.**
3. **Select** Park **by pressing ↓ or ↑, then** Enter**.**

   To abort this diagnostic, press Escape and Enter.

7.4.3.4 Move Cartridge Test

The Move Cartridge test picks a cartridge from one element index and moves it to another.

Note – If you insert a tape cartridge into a drive, the drive does not automatically eject the cartridge. The system displays an error message if there is no cartridge in the source element slot or if the destination element slot is full.

1. **Select the** `Maintenance Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select the** `Diagnostics Menu` **by pressing ↓ or ↑, then** `Enter`**.**
3. **Select** `Move Cartridge` **by pressing ↓ or ↑, then** `Enter`**.**

   The system displays the following screen:

```
Set Source                    0
  ↑ Increase
  ↓ Decrease
```

4. **Select the element index of the cartridge slot from which you want the CHM to pick the cartridge by pressing ↑ or ↓, then** `Enter`**.**

   The system displays the following screen:

```
Set Destination
  ↑ Increase
  ↓ Decrease
```

5. **Select the element index of the cartridge slot from which you want the CHM to place the cartridge by pressing ↑ or ↓, then** `Enter`**.**

   The CHM moves the cartridge from the source to the destination.

7.4.3.5 Scan Test

The `Scan` test scans all the elements. The information is stored in the cartridge inventory. Scan errors and the contents of labels are displayed on the Label Information screen.

1. **Select the** `Maintenance Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select the** `Diagnostics Menu` **by pressing ↓ or ↑, then** `Enter`**.**
3. **Select** `Scan` **by pressing ↓ or ↑, then** `Enter`**.**

   The bar code scanner scans all the elements.

   To abort this diagnostic, press `Escape` and `Enter`.

7.4.3.6 Scan With Range Test

The Scan With Range test scans a range of elements and stores the information in the cartridge inventory. Scan errors and the contents of labels are displayed on the Label Information screen.

1. **Select the** Maintenance Menu **by pressing** ↓ **or** ↑**, then** Enter**.**
2. **Select the** Diagnostics Menu **by pressing** ↓ **or** ↑**, then** Enter**.**
3. **Select** Scan With Range **by pressing** ↓ **or** ↑**, then** Enter**.**

   The system displays the following screen:

```
Set Scan Start                0
  ↑ Increase
  ↓ Decrease
```

4. **Select the element index where you want the bar code scanner to begin scanning by pressing** ↑ **or** ↓**, then** Enter**.**

   The system displays the following screen:

```
Set Scan Stop                 0
  ↑ Increase
  ↓ Decrease
```

5. **Select the element index (shown in the upper right corner) where you want the bar code scanner to end scanning by pressing** ↑ **or** ↓**, then** Enter**.**

   The test scans a range of bar code labels and stores the information in the cartridge inventory.

   To abort this diagnostic, press Escape and Enter.

7.4.3.7 Home Gripper Test

The Home Gripper test closes and opens the gripper on the CHM.

1. **Select the** Maintenance Menu **by pressing** ↓ **or** ↑**, then** Enter**.**
2. **Select the** Diagnostics Menu **by pressing** ↓ **or** ↑**, then** Enter**.**
3. **Select** Home Gripper **by pressing** ↓ **or** ↑**, then** Enter**.**

   The gripper on the CHM closes and opens.

   To abort this diagnostic, press Escape and Enter.

7.4.3.8 Home CHM Test

The following actions occur during the Home CHM test:

- CHM moves in and out on the short axis
- CHM moves on the long axis
- Gripper of the CHM closes and opens

1. **Select the** Maintenance Menu **by pressing** ↓ **or** ↑, **then** Enter**.**
2. **Select the** Diagnostics Menu **by pressing** ↓ **or** ↑**, then** Enter**.**
3. **Select** Home CHM **by pressing** ↓ **or** ↑**, then** Enter**.**

   To abort this diagnostic, press Escape and Enter.

7.4.3.9 Cycle Pick / Place Test

The Cycle Pick/Place test picks a cartridge from the element you specify and places it back in the same element. You can specify the number of times you want this test repeated.

1. **Select the** Maintenance Menu **by pressing** ↓ **or** ↑**, then** Enter**.**
2. **Select the** Diagnostics Menu **by pressing** ↓ **or** ↑**, then** Enter**.**
3. **Select** Cycle Pick/Place **by pressing** ↓ **or** ↑**, then** Enter**.**

   The system displays the following screen:

```
Set Source                0
  ↑ Increase
  ↓ Decrease
```

4. **Select the element index of the cartridge slot from which you want the CHM to pick and place the cartridge by pressing** ↑ **or** ↓**, then** Enter**.**

   The system displays this screen:

```
Set Cycles                10
  ↑ Increase
  ↓ Decrease
```

5. **Select the number of cycles (in increments of ten) you want the** Cycle Pick/Place **to run by pressing** ↑ **or** ↓**, then** Enter**.**

   The test picks a cartridge from the element you specify and places it back in the same element.

To abort this diagnostic, press Escape and Enter.

7.4.3.10 Cycle Gripper Test

The Cycle Gripper test opens and closes the gripper the number of times you specify.

1. **Select the** Maintenance Menu **by pressing** ↓ **or** ↑**, then** Enter**.**
2. **Select the** Diagnostics Menu **by pressing** Escape**.**
3. **Select** Cycle Gripper **by pressing** ↓ **or** ↑**, then** Enter**.**

   The system displays the following screen:

```
Set Cycles                10
  ↑ Increase
  ↓ Decrease
```

4. **Select the number of cycles (in increments of ten) you want the** Cycle Gripper **test to run by pressing** ↑ **or** ↓**, then** Enter**.**

   The test closes and opens the gripper the number of times you specify.

   To abort this diagnostic, press Escape and Enter.

7.4.3.11 Cycle SAxis Test

The Cycle S Axis test positions the CHM in front of the fixed cartridge slot and moves the CHM back and forth on the short axis the number of times you specify.

1. **Select the** Maintenance Menu **by pressing** ↓ **or** ↑**, then** Enter**.**
2. **Select the** Diagnostics Menu **by pressing** ↓ **or** ↑**, then** Enter**.**
3. **Select** Cycle S Axis **by pressing** ↓ **or** ↑**, then** Enter**.**

   The system displays this screen:

```
Set Cycles                10
  ↑ Increase
  ↓ Decrease
```

4. **Select the number of cycles (in increments of ten) you want the** `Cycle S Axis` **test to run by pressing ↑ or ↓, then** `Enter`**.**

   The test positions the CHM in front of the fixed cartridge slot and moves the CHM back and forth on the short axis the number of times you specify.

   To abort this diagnostic, press `Escape` and `Enter`.

7.4.3.12 Cycle L Axis Test

The `Cycle L Axis` test moves the CHM back and forth on the long axis the number of times you specify.

1. **Select the** `Maintenance Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select the** `Diagnostics Menu` **by pressing ↓ or ↑, then** `Enter`**.**
3. **Select** `Cycle L Axis` **by pressing ↓ or ↑, then** `Enter`**.**

   The system displays this screen:

```
Set Cycles                10
  ↑ Increase
  ↓ Decrease
```

4. **Select the number of cycles (in increments of ten) you want the** `Cycle L Axis` **test to run. Press ↑ or ↓, then** `Enter`**.**

   The test positions the CHM in front of the fixed cartridge slot and moves the CHM back and forth on the long axis the number of times you specify.

   To abort this diagnostic, press `Escape` and `Enter`.

7.4.3.13 Cycle Solenoid Test

The `Cycle Solenoid` test exercises the solenoid that controls the locking mechanism on the front door.

1. **Select the** `Maintenance Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select the** `Diagnostics Menu` **by pressing ↓ or ↑, then** `Enter`**.**

3. **Select** `Cycle Solenoid` **by pressing ↓ or ↑, then** `Enter`**.**

   The system displays the following screen:

```
Set Cycles                  10
  ↑ Increase
  ↓ Decrease
```

4. **Select the number of cycles, in increments of ten, (up to 250) you want the** `Cycle Solenoid` **test to run by pressing ↑ or ↓, then** `Enter`**.**

   You will hear a clicking sound.

   To abort this diagnostic, press `Escape` and `Enter`.

7.5 Library Information Menu

The `Library Information Menu` consists of the following submenus:

SCSI Menu	Contains SCSI mode parameters, reservations, and sense data.
Statistics	Contains data about CHM operations and elements.
System Sensors	Contains information about the mechanical sensors.
Command History	Displays the contents of the history buffer.
Inventory Menu	Contains information about bar code labels and elements.
Drive Info Menu	Displays the drive status.

7.5.1 SCSI Menu

The `SCSI Menu` consists of the following submenus:

SCSI Mode Parameters	Displays data the library reports in response to a mode sense command.
SCSI Reservations	SCSI reservations is not supported on Sun systems.
SCSI Sense Data	SCSI sense data is not supported on Sun systems.

To check or set the SCSI Mode Parameters:

1. **Select the** `Library Info Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select the** `SCSI Menu` **by pressing ↓ or ↑, then** `Enter`**.**
3. **Check the settings of the various operating mode parameters. Scroll up by pressing ↑ or scroll down by pressing ↓.**

   The SCSI mode parameters screen provides the current (Cur), default (Def), and saved (Sav) values for the following parameters.

Current (Cur)	The value currently active (either the power-on default or a temporary value set by the latest MODE SELECT command.
Default (Def)	The original value set at the factory.
Saved (Sav)	The value specified as the power-on default by a MODE SELECT command. After specifying a value with the MODE SELECT command, this value takes effect each time you power on the tape library.

The mode parameters for this menu are:

CHM Addr	The element address of the cartridge handling mechanism.
Stor Addr	The element address of the fixed slot. The remaining cartridge slots are numbered consecutively—starting from the right cartridge.
CTS Addr	The element address of the first cartridge tape subsystem (CTS). The remaining CTS is numbered sequentially.
CTS Num	The number of CTSs installed.
Parity	Parity checking on the SCSI bus. When the parity option is on (the default), the tape library checks all data coming across the SCSI bus for parity.
Pty Retry	The number of retries when a parity error is detected.
Security	Indicates whether the SCSI security feature is on or off.
Write Line 1 - 4	Indicates whether the text displayed on each of the four lines on the main menu is defined for the LCD Mode page.

FIGURE 7-2 shows the default element addresses for the tape library.

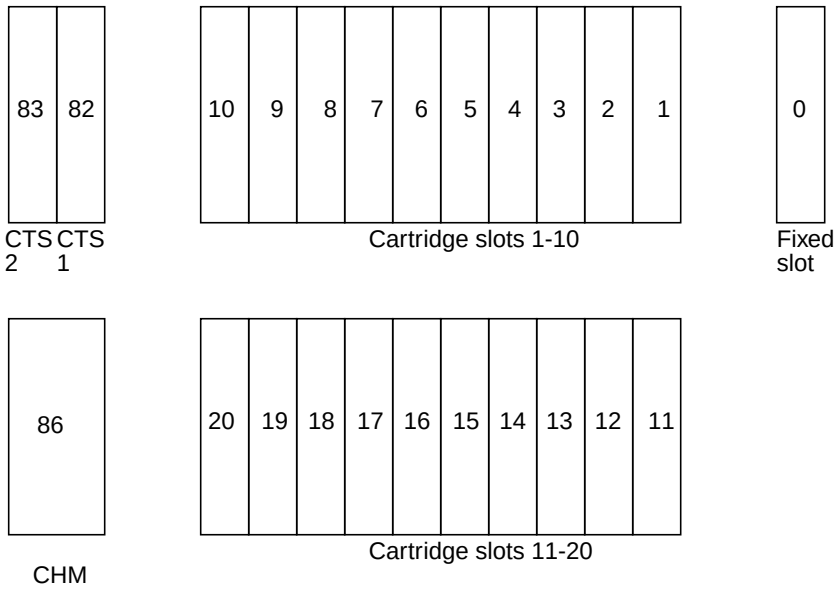


FIGURE 7-2 Default Element Addresses for the Tape Library

SCSI Reservations

The `SCSI Reservations` command is not supported on Sun systems.

SCSI Sense Data

The `SCSI Sense Data` command is not supported on Sun systems. However, SCSI Sense Data is displayed in the console window on the Sun system.

7.5.2 Statistics

The statistics menus enables you to review the statistics for the tape library and for each element.

1. **Select the** `Library Info Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select** `Statistics` **by pressing ↓ or ↑, then** `Enter`**.**

   The system displays the System Stat screen followed by the Element Stat screen.

3. Press: ↓ or ↑ to scroll though the screens.

```
SYSTEM STAT TOTALS:
Moves          7107
Pick Retry        0
Put Retry         0 ↓
```

```
ELEM STATS, INX=0   ↑
Total Puts          0
Retries: Pick       0
Put    0   Scan     0
```

The system statistics displayed are:

Moves	Number of times the CHM has picked a cartridge and placed it in a slot or tape drive.
Pick Retry	Number of times the CHM retried picking a cartridge.
Put Retry	Number of times the CHM retried placing a cartridge.
Scans	Number of times the tape library scanned a bar code label.
Scan Retry	Number of times the tape library retried scanning a bar code label.
Scan Fail	Number of times the tape library failed to scan a bar code (tries six times before logging a failure).

The element statistics displayed are:

Total Puts	Number of times a cartridge was placed in that element since the library was turned on.
Retries: Pick	Number of times the library retried picking from that element.
Retries: Put	Number of times the library retried placing a cartridge in that element.
Retries: Scan	Number of times the library retried scanning that element.

7.5.3 System Sensors

The `System Sensors` display lets you check the current status of the internal mechanical sensors.

1. **Select the** `Library Info Menu` **by pressing ↓ or ↑, then** `Enter`**.**
2. **Select** `System Sensors` **by pressing ↓ or ↑, then** `Enter`**.**

   The system displays the Digital Sensors screen followed by the Analog Sensors screen. Use ↓ and ↑ to scroll though the screens:

```
DIGITAL SENSORS
 Door Closed                1
 Key Lock                   1
 Gripper Home               0 ↓
```

```
ANALOG SENSORS              ↑
  Temperature:  23C
  +12V:     11816 mV
  -12V:     12233 mV
```

Digital System Sensors

Table 4-2 lists the digital system sensor descriptions.

TABLE 7-5 Digital System Sensor Descriptions

Sensor	Sensor Position 1	Sensor Position 0
Door Closed	Door is closed.	Door is open.
Key lock	Door locked.	Door is unlocked.
Gripper Home	Gripper is located in the home position.	Gripper is not located in the home position.
Cart seated	Cartridge is correctly seated.	Cartridge is not correctly seated.
Drum Axis Home	Home position.	Other than home position.

Analog System Sensors

Table 4-3 lists the analog system sensor descriptions.

TABLE 7-6 Analog System Sensor Descriptions

Sensor	Description
Temperature	Indicates the temperature of the tape library in degrees C.
+12V	Indicates the output of the 12-volt power supply in milliVolts.
-12V	Indicates the output of the negative 12-volt power supply in milliVolts.
+24V	Indicates the output of the 24-volt power supply in milliVolts.

7.5.4 Command History

Use the `Command History` command to display the 300 most recent history events (000 - 299).

1. **Select the** `Library Info Menu` **by pressing ↓ or ↑, then Enter.**
2. **Select** `Command History` **by pressing ↓ or ↑, then Enter.**

   The system displays a screen similar to the following:

```
000      MOVE    19:37:45
   Move from 8 to 82
complete
1861    9-29-94 04441
```

3. **Press ↑ and ↓ to scroll through the entries.**

   The most recent event in the history buffer is displayed first.

4. **To exit** `Command History`**, press** `Escape`**.**

See TABLE 7-7 to understand what the `Command History` information means.

TABLE 7-7 Field Descriptions of Command History

Shown in sample	Field Name	Description
000	IDX (Index)	Line number of this event within the history buffer (000 - 299). 000 - most recent event
MOVE	From	Process name that caused this event.
19:37:45	Time	Time, according to the internal clock, the event took place.
Move from 8 to 82 complete	Description	Event description.
1861	Line	Line number of the source code that caused this event.
9-29-94	Date	The date, according to the internal calendar, the event took place.
04441	Seq	Sequence number of this event across all system buffers.

7.5.5 Inventory Menu

The library maintains a cartridge inventory in NVRAM containing information about these element locations:

- CHM (medium transportation element)
- Tape cartridge elements (storage elements)
- CTSs (tape drives or data transfer elements)

Use the `Inventory Menu` to display:

Bar code label information	Includes data about whether the bar code scanner could accurately scan the label.
Element occupied information	Includes data about whether the element contains a cartridge and whether the holder or tape drive is installed.
Element position information	Includes data about the exact position of each element.

7.5.5.1 Bar Code Label Information

The `Label Info` command displays bar code label information.

1. **Select the** `Library Info Menu` **by pressing ↓ or ↑, then Enter.**
2. **Select** `Inventory Menu` **by pressing ↓ or ↑, then Enter.**
3. **Select** `Label Information` **by pressing ↓ or ↑, then Enter.**
4. **Display information for each element index by pressing ↑ or ↓.**

The system displays this screen:

```
ELEM LABEL, INX= 0:
 Label:
 Valid/Error: 0/0
 Send Vol Match: 0 ↓
```

The following chart explains the information on the `Label Information` screen.

INX	Element index for which information is being displayed.
Label	If the element location contains a bar code that has been scanned, the Label field contains the cartridge label.
Label Valid 1 0	Indicates whether the field is accurate: Label field is accurate. Label field is not accurate.

The Label Error field indicates whether the bar code was unable to read the cartridge label.

TABLE 7-8 Label Error Field Error Messages

Error Code	Description
0	Bar code scan was successful, a reset condition occurred, or the door was open.
60	The bar code scanner could not read the bar code label because there was no label on the cartridge.
61	The bar code scanner could not read the bar code label because the label was unreadable.

TABLE 7-8 Label Error Field Error Messages *(Continued)*

Error Code	Description
62	The bar code scanner could not read the bar code label because the cartridge holder or tape drive was not installed.
65	The bar code scanner could not read the bar code label because a Direct Memory Access (DMA) overrun occurred.
69	The bar code scanner could not read the bar code label because the label was upside down or misplaced.

The Send Volume Match flag indicates whether the cartridge label matched the template sent with the last SEND VOLUME MATCH (B8h) command:

0 Label did not match the template.

1 Label matched the template.

7.5.5.2 Element Occupied Information

The `Occupied Info` command displays information for each element index. To display element occupied information:

1. **Select the** `Library Info Menu` **by pressing ↓ or ↑, then Enter.**
2. **Select the** `Inventory Menu` **by pressing ↓ or ↑, then Enter.**
3. **Select** `Occupied Info` **by pressing ↓ or ↑, then Enter.**

   This screen is displayed:

```
ELEM OCCUP, INX = 0:
 Addr/Src:      0/255
 O/V/P/A:  o/1/1/1
 CTS/Warning: 0/0    ↓
```

4. **Display information for each element index by pressing ↑ or ↓.**

The following chart explains the element index information.

INX	Displays the element index.
Addr (Address)	Shows the SCSI address of this element.
Src (Source Element Index)	Shows the index of the last storage element from which the cartridge was moved.
O (Occupied)	Indicates whether the tape library considers the specified element location to contain a tape cartridge, as follows:
0 1	Element location does not contain a tape cartridge. Element location contains a tape cartridge.
V (Occupied Valid)	Indicates whether the Occupied flag is accurate.
0 1	Occupied flag is questionable (may not be accurate). Occupied flag is accurate.
P (Cartridge Holder or Tape Drive Present)	Indicates if a cartridge holder or tape drive is installed. If the element index references a storage element, this flag indicates whether the holder is installed. If the element index references a tape drive, this flag indicates whether that particular drive is installed. The values for this flag are:
0 1	Not installed Installed
A (Tape Drive Accessible)	Indicates whether a drive is empty, a cartridge is loaded in the drive, or the cartridge is ejected:
0 1	Cartridge may be loaded in the drive. Drive is empty or the cartridge is ejected and ready to be picked.

7.5.5.3 Element Position Information

The `Position Info` command displays information about each element position. To display element position information:

1. **Select the** `Library Info Menu` **by pressing ↓ or ↑, then Enter.**
2. **Select the** `Inventory Menu` **by pressing ↓ or ↑, then Enter.**

3. **Select** `Position Info` **by pressing by pressing ↓ or ↑, then Enter.**

   The following screen is displayed:

```
ELEM POS,    INX= 0:
 Long Axis:    104
 Depth           0
                  ↓
```

4. **Display the following information for each element index by pressing ↓ or ↑.**

   The following chart displays the information for each index:

INX	Displays the element index.
Long Axis	Indicates the distance the CHM has to move along the long axis from its home position to the specified element location.
Depth	For storage elements the Depth field indicates the distance the CHM has to move along the short axis from its home position to touch the holder or a tape cartridge in the holder (not used for the tape drives or the CHM).

7.5.6 Drive Info Menu

Tape drive information available from the `Drive Info Menu` includes:

- Tape drive type
- Tape cartridge present or not
- Cleaning status (if it needs cleaning or not)

To display information from the Drive Info Menu:

1. **Select the** `Library Info Menu` **by pressing ↓ or ↑, then Enter.**
2. **Select the** `Drive Info Menu` **by pressing ↓ or ↑, then Enter.**

   The system displays this screen:

```
Drive 1 Status          ↑
Drive 2 Status          ↓
```

3. **Display information about the selected tape drive by pressing ↑ or ↓.**

   For each tape drive present, the system displays this screen:

```
CTS 1 STATUS
 Type            Mammoth
 Present         1
 Accessible      1              ↓
```

The following chart describes the tape drive information displayed on the previous screen:

CTS 1	Tape drive closest to the magazine (Drive 1).
CTS 2	Tape drive farthest from the magazine (Drive 2).
Type Mammoth	Model (Mammoth) of the tape drive Displays 8mm if a drive is not present.
Present	Indicates if a tape drive is installed.
1 0	Tape drive present. Tape drive not present.
Accessible	Indicates if the tape drive is accessible to the CHM.
1 0	A cartridge is protruding from the tape drive or the drive is empty. A cartridge is loaded in the tape drive or the drive status is unknown.
Clean	Cleaning status.
1 0	Drive needs to be cleaned or the cleaning tape is used up. Drive is clean.
Warning	Not currently used.
Occupied	Indicates if a cartridge is installed.
1 0	Cartridge loaded in the tape drive. No cartridge loaded in the tape drive.
Occupied Valid	Indicates if the occupied status is reliable or not.
1 0	The occupied information is reliable. The door has been opened or another interruption has occurred so the occupied information may not be reliable.

7.5.6.1 Tape Drive LEDs

- **See Section 6.7, "Tape Drive LEDs."**

7.5.6.2 Cleaning Tape Drives

Tape drives need to be cleaned once every 72 motion hours.

Note – When cleaning the tape drive, use a Sun approved 8 mm cleaning cartridge.

Each drive keeps track of tape motion hours internally. When tape motion hours have reached the limit, the following activities occur:

- The tape drive informs the library that it needs cleaning. The library displays “CTS needs cleaning” on the LCD main screen.
- Indicators or flags in the tape drive are set. The application program can look at the indicators and determine if cleaning is required.

You can clean a tape drive two ways:

- By installing a cleaning cartridge in the fixed cartridge slot and using the `Clean Drive 1` or `Clean Drive 2` options.
- By opening the front door and manually inserting a cleaning cartridge into the tape drive.

To clean the tape drive through the display panel:

1. **Make sure a cleaning cartridge is in the fixed cartridge slot.**
2. **Disable the security option.**
3. **Select the** `Maintenance Menu` **by pressing ↓ or ↑, then Enter.**
4. **Select** `Clean Drive Menu` **and press Enter.**

   a. **Select** `Clean Drive 1` **to clean Drive 1.**

   OR

   b. **Select** `Clean Drive 2` **to clean Drive 2.**

   The following activities occur:

   - The CHM picks the cleaning cartridge from the fixed cartridge slot and inserts it into the specified tape drive.
   - The tape drive automatically performs the cleaning process. The cleaning cartridge is ejected when the cleaning process is complete.
   - After ejecting the cleaning cartridge, the CHM automatically picks the cartridge from the tape drive and replaces it in the fixed cartridge slot.

5. **Confirm that cleaning was completed. Look at the LEDs at the left front of the tape drive. All LEDs should be off.**

   If LEDs still indicate that cleaning is required, replace cleaning cartridge and clean again.

   If the LEDs still indicate cleaning is required after the second cleaning, there is a problem with the tape drive.

To manually clean a tape drive:

1. **Open the front door.**
2. **Eject a tape from the drive, if necessary, by pressing the** `Unload` **button.**
3. **Manually insert a cleaning cartridge into the appropriate tape drive.**

   The tape drive automatically ejects the cleaning cartridge when cleaning is complete.

CHAPTER 8

Maintaining the Tape Library

This chapter describes how to clean and service various components of the tape library. To help the tape library perform at a optimum level, you should perform the preventive maintenance procedures described in this chapter.

Be sure to read through this chapter and the “Safety Agency Compliance” section at the beginning of this manual before starting any of the procedures.

8.1 Cleaning the Front Door

Caution – To avoid scratching or marring the window, do not use abrasive cleaners, abrasive cleaning implements, or harsh chemicals or solvents (for example, alcohol, kerosene, or petroleum spirits) to clean the door.

- **Use the wet-wipe and dry-wipe cleaning packets provided with the tape library.**

8.2 Cleaning Tape Drives

Clean the tape drive heads and tape paths after every 72 tape-motion hours with an approved 8 mm cleaning cartridge. Depending on the operating environment, you may need to clean the tape drive (CTS) more often.

1. **Make sure a cleaning cartridge is installed in the fixed cartridge slot.**

   If not, install one.

2. **Select Clean Drive 1 from the Utilities Menu if you plan to clean the left drive, or Select Clean Drive 2 if you plan to clean right drive.**
   - The CHM picks the cleaning cartridge from the fixed slot and places it in the tape drive.
   - The CTS automatically performs the cleaning cycle and ejects the cartridge when it is finished.
   - The CHM picks the cartridge from the tape drive and places it back in the fixed slot.

   You can clean a tape drive inside the tape library in one of several ways:
   - As described above, by installing a cleaning cartridge in the fixed cartridge slot and using the Clean Drive 1 or Clean Drive 2 options from the Maintenance Menu on the LCD.
   - By installing a cleaning cartridge in the removable cartridge holder (preferably the fixed slot) and using SCSI commands to automate the cleaning process.
   - By opening the front door and manually inserting a cleaning cartridge into the tape drive. The CTS automatically ejects the cleaning cartridge when finished.

Note – It may take up to two minutes for a cleaning cartridge to complete its function.

8.3 Caring for Tape Cartridges

When handling and storing tape cartridges:

- Keep them away from anything magnetic.
- Store them in a clean, dust-free environment.
- Store them by putting them on their edge.
- Keep them out of direct sunlight and away from sources of extreme heat, cold, or humidity.
- Make sure the cartridge is at the same temperature as the drive before using it.
- Never open the tape access door on the cartridge and touch the surface of the tape

APPENDIX **A**

SCSI Information

This appendix describes the Small Computer Systems Interface (SCSI). Topics covered in this appendix include:

- SCSI ports and connections
- SCSI bus length
- SCSI bus termination information

A.1 SCSI Ports and Connections

If fast SCSI devices and old-style connectors must be used in the same system, the old-style connectors should be connected to a separate SCSI port that does not contain fast SCSI devices. Do not connect fast SCSI devices and old-style connectors in the same daisy-chain.

Old-style connectors can be identified by:

- 3-row 50-pin D connector
- 50-pin ribbon style connector
- 50-pin “Centronics style” of a connector (1/2-inch Front Load Tape (FCT) drive)

There are four microminiature SCSI ports on the back panel of a tape library. The SCSI connectors have 50 pins divided into two rows. You can connect the tape library to your system in two ways—*direct connection* or a *daisy-chain*.

A.1.1 Direct Connection

A direct connection is when you install the first SCSI device in the SCSI bus to the desktop system by connecting one end of the SCSI cable to one of the SCSI ports of the tape library, and the other end of the SCSI cable to the SCSI port of the desktop system. You must connect a regulated SCSI terminator to the other SCSI port of the tape library.

Note – If you install a SBus card with an additional SCSI port in the desktop system, you can connect the tape library to the SCSI port of the SCSI card.

A.1.2 Daisy-Chain Connection

A daisy-chain connection is a means of connecting a maximum of seven SCSI peripherals to a host system. It enables a single port on the desktop system to connect to more than one SCSI peripheral. If you want more than one SCSI peripheral on a bus, you need to daisy-chain.

Note – For best performance, connect no more than four tape drives to the same SCSI bus. If another drive is already connected to it, add no more than two tape drives.

If you connect SCSI devices to your system in this manner, connect a regulated terminator to the unused SCSI port on the back panel of the last device in the daisy-chain.

Note – Devices with the old-style connectors (3-row 50-pin D connectors or 50-pin ribbon connectors) should not be used on the same bus (daisy chained) with fast SCSI devices.

A.2 SCSI Bus Length

A bus is a signal route to which several parts of a computer system can be connected so that signals can pass between them. The total length of a SCSI bus includes:

- The length of the external SCSI cable *plus*
- The length of the internal SCSI buses for the device and the system

Your desktop system performance is reliable with a maximum SCSI bus length of 20 feet (6 meters), shown in Figure B-1. The internal signal path of your system unit and the external SCSI cables must not exceed this maximum length. If this length is exceeded, the system will not run in a reliable manner.

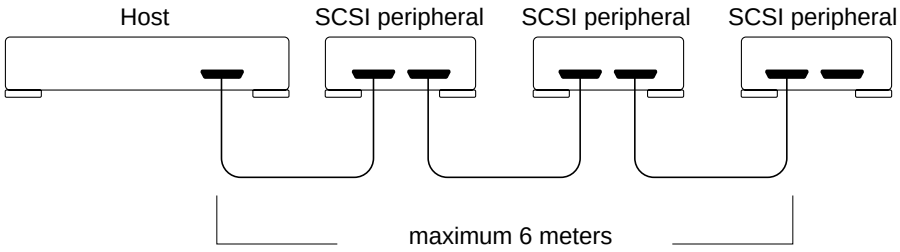


FIGURE A-1 Maximum SCSI Bus Length

A.2.1 Computing SCSI Bus Lengths

When connecting the tape library to your system, find the total SCSI bus length for your configuration. To do this, add the length of the internal bus lengths of each device of the system to the length of the external SCSI cable, which can measure either 0.8, 2, or 4 meters in length. The total length must be less than 20 feet (6 meters).

For example, if you were to connect a tape library to a SPARCstation 10 system, this configuration would have a total SCSI bus length of 3.4 meters as follows:

- tape library (internal signal path) 0.50 meters
- SPARCstation 10 System (internal signal path) 0.90 meters
- SCSI Cable between them 2.0 meters

Since the total SCSI bus length is well below the maximum of 6 meters, this configuration is acceptable.

Table B-1 lists the internal and external cable lengths for the tape library and some of the supported systems and enclosures. For systems or enclosures that are not listed in the table, see the documentation that came with your system or enclosure.

TABLE A-1 SCSI Internal Cable (Bus) Lengths

	SCSI Cable Lengths	
Devices and Cables	**Meters**	**Inches**
Sun StorEdge L400	0.5	19.7
Desktop Storage Module (disk unit)	0.3	11.9
Desktop Storage Module (tape unit)	0.4	15.7
SBus cards (SBE/S, FSBE/S, SBus SCSI Host Adaptor)	0.1	3.9
SPARCserver™ 1000[1]	1.8	70.2
SPARCcenter™ 2000[2]	0.1	3.9

1. Only for first system board. For any other system board, add 0.9 m.
2. Does not contain an on-board SCSI interface

A.2.2 Additional SCSI Buses

If the SCSI bus length exceeds 6 meters or you have to install more than six SCSI devices, you can install some of the devices on additional SCSI buses by installing an SBus SCSI Host Adapter card (SSHA) or a FSBE/S with desktop systems or an SBE/S SBus card with deskside systems. The SBus SCSI Host Adapter card provides an additional SCSI port (SCSI bus) for your system. The SBE/S or FSBE/S SBus card provides an additional SCSI port and an Ethernet port.

When you insert an SBus SCSI Host Adapter card into your system, the SCSI bus length total does not include the internal cable length of the system, listed in Table B-2. Additional SCSI buses, SCSI bus 1, 2, 3, and 4 are named based on the order they are found by the OpenBoot™ PROM when probing SBus slots. SBus slots are probed in this order: on-board, slot 0, slot 1, slot 2, slot 3.

For example, if the first FSBE/S SBus card is in slot 2, when the system probes the SBus slots, it begins probing the on-board SCSI bus, then SBus slot 1, then SBus slot 2, and so on. Because slot 2 contains the first FSBE/S SBus card, this is SCSI bus 1.

A.3 Terminating SCSI Devices

You must attach a regulated SCSI terminator to the SCSI port at the end of the SCSI bus. A terminator holds the bus at a predetermined signal level when the bus is not active and maintains impedance matching.

All SCSI daisy-chains must be terminated at the last unit attached to the SCSI bus. Also, a terminator is built in to all SBus SCSI cards and to all host systems to terminate that end of the bus. The regulated terminators must be used for all 50-pin SCSI busses having fast SCSI drives on a fast SCSI host.

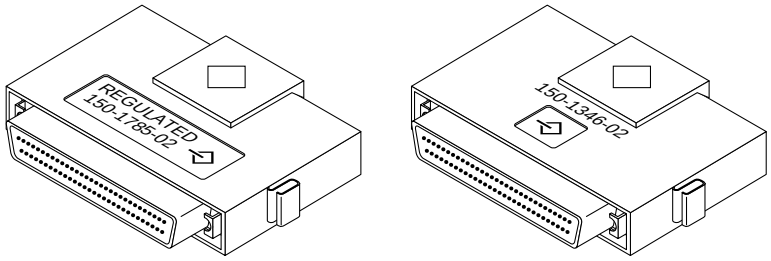


FIGURE A-2 Regulated and Unregulated Terminators

SCSI termination guidelines are as follows:

- The SCSI device at the end of a daisy-chain must be electrically terminated.
- Only the last device in a SCSI daisy-chain is terminated.
- Any fast SCSI device or a daisy-chain of fast SCSI devices must be terminated with a regulated terminator.
- Any configuration of the tape library with an External Expansion Module (EEM) or an External Storage Module (ESM) must have a tape library as the last device to provide regulated term power.

A.3.1 50-pin Ribbon Connectors

Devices with the 3-row 50-pin D connector or the 50-pin ribbon connector (old-style connectors) should not be used on the same bus with fast SCSI devices.

Note – The mixing of fast SCSI devices and old-style connectors in the same daisy-chain is not recommended since errors can be created and performance may be degraded.

If fast SCSI devices and old-style connectors must be used in the same system, the old-style connectors should be connected to a separate SCSI port that does not contain fast SCSI devices.

APPENDIX **B**

Modifying the `st.conf` File

The Solaris software environment recognizes all tape devices that were supported by Sun when your operating system was released. If your system uses SunOS releases 5.5 or 5.5.1, which were released before the Sun StorEdge L400 tape library, you need to modify the `/kernel/drv/st.conf` file so that your Solaris software will recognize the tape drives inside of the tape library.

If you are familiar with this procedure, go to Section B.2, "Modifying the `st.conf` File.". For more information on this procedure, go to Section B.1, "Understanding the `st.conf` File."

B.1 Understanding the `st.conf` File

The beginning of the `st.conf` file contains possible values that you might use to configure third-party or other unsupported tape drives. These values are divided into three sections:

- `tape-config-list`
- Tape device identifiers
- Configuration values

B.1.1 `tape-config-list`

The line:

```
#tape-config-list=
```

indicates the start of values that the operating system will use to configure previously unsupported tape devices.

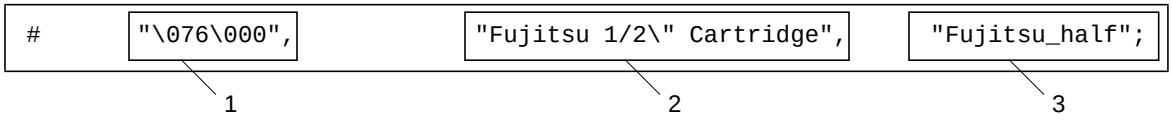
Note – There can only be one active (uncommented) `tape-config-list=` line in the `st.conf` file.

B.1.2 Tape Device Identifiers

The next section, which includes lines like:

```
#       "ARCHIVE Python 28454","Archive Python 4mm Helical Scan","ARCH_Python",
#       "ARCHIVE Python 29279", "Archive Python 4mm DAT Stacker","ARCH_Python",
```

and ends with a line like:



contains:

1. The information about the tape device that the operating system sees when it 'looks at' a tape device.
2. The information the operating system outputs when queried about the tape device (by programs such as SunVTS diagnostic software).
3. A string which acts as a pointer to values that will be used to configure the tape device.

Note – The first two lines of the example end in commas. The last line in the example ends with a semi-colon. You must follow this format when adding multiple tape devices to the `st.conf` file.

B.1.3 Configuration Values

The third section contains the values that will be used to configure the tape devices. It has lines like:

```
#ARCH_Python    =       1,0x2c,0,0xde39,4,0x00,0x8c,0x8c,0x8c,3;
```

The part of the line before the equal sign (=) is the string that is linked to the values that will be used to configure a tape device. The second part of the line contains the configuration values. These values are well defined in the `st` man page.

If you look at the first two examples in the Tape Device Identifiers section, you will see that both the `ARCHIVE Python 28454` and the `ARCHIVE Python 29279` lines end with the string `ARCH_Python`. This means that the operating system will configure both tape devices according to the parameters set in the `ARCH_Python` line.

Note – Each line in the configuration section must start with a unique string. Also, each line in this section ends in a semi-colon(;).

B.2 Modifying the `st.conf` File

Read this entire procedure before editing the `st.conf` file.

Note – The syntax is critical. Verify the placement of commas, semicolons, and beginning and ending quotation marks.

---

1. **Become superuser.**

```
% su
Password:
#
```

2. **Make a copy of the original `st.conf` file as a backup (`st.conf.old`).**

```
#cp /kernel/drv/st.conf /kernel/drv/st.conf.old
```

3. **Edit the** `st.conf` **file.**

   Using an editor, scroll through the `st.conf` file to the following line:

```
#tape-config-list=
```

   a. **Delete the # character that begins the line, if it hasn't already been removed.**

   b. **Using the editor, continue to scroll until you come to the end of the "Tape Device Identifiers" section.**

      The line will look something like:

```
# "EXABYTE EXB8500C", "Exabyte 8500C Helical Scan", "EXB-850X",
```

   c. **On the next line, add the following entry exactly as shown:**

```
"EXABYTE EXB-8900","Exabyte Mammoth","mam-data";
```

Note – If multiple devices are enabled (lines uncommented) only the last uncommented line with this format must end with a semicolon. All previous lines with this format must end with a comma.

---

   d. **Using the editor, continue to scroll until you come to the end of the "Configuration Values" section.**

      The line will look something like:

```
# "EXB-850X = 1,0x29,0,0xce39,4,0x14,0x15,0x8c,0x8c,1;
```

   e. **On the next line, add the following entry exactly as shown:**

```
mam-data=1,0x29,0,0x1de39,1,0x7f,0;
```

Note – All lines in this section end with semicolons.

---

   f. **Save and exit the file.**

4. **Continue the installation procedure.**

APPENDIX **C**

8 mm Tape Drive Information

C.1 Tape Drives

The tape drive used in the Sun StorEdge L400 tape library is model 8900. This 8 mm device incorporates internal data compression and uses AME data grade tapes only.

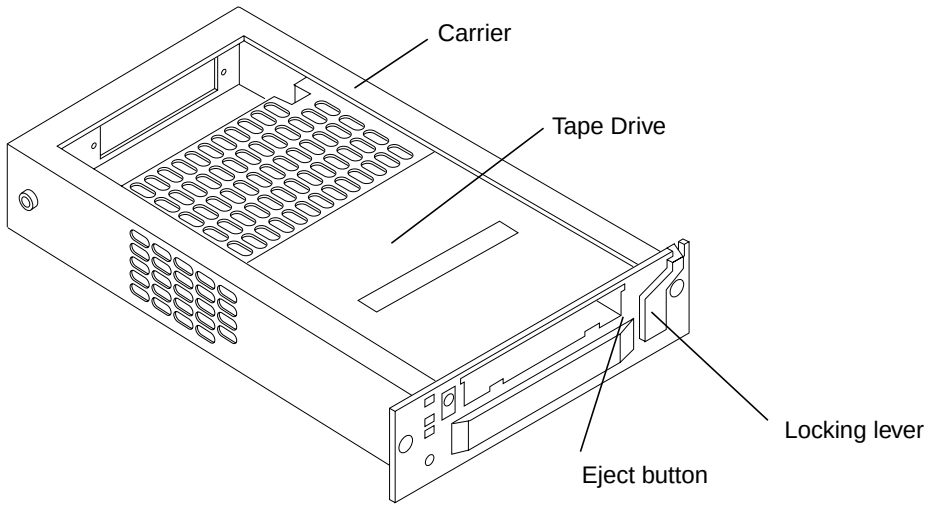


FIGURE C-1 Tape Drive and Carrier

C.2 Tape Formats and Capacities

The tape drive in the tape library can read and write data in an AME format only. AME media is the only recommended tape format for use with the Sun StorEdge L400 tape library. The 8900 tape drive treats the following formats as read-only:

- 8200
- 8500
- 8500c (compressed)

Note – After reading any tape format other than AME, the 8900 tape drive must be cleaned prior to any further use.

C.3 Choosing a Cleaning Cartridge

Use only Sun approved cleaning cartridges in the tape library. Cleaners designed for video use are very abrasive and can damage the tape head and mechanism. Cleaners that require a cleaning fluid are not recommended.

C.4 Data Capacity With Data Compression

The data capacity of drives with data compression is dependent on the redundancy of the stored data. Sun specifies capacity figures that assume a compression ratio of two to one (2:1). The compressibility of data can vary. Text and binary files tend to compress at about a three to one (3:1) ratio. Image files are typically not redundant and do not compress well.

C.4.1 Hardware Data Compression

Data compression can be done by the drive's internal hardware-based data compression. This is specified by the format / device identifier as shown in TABLE C-1. One disadvantage of this approach is that this data format is not readable by the earlier drives other than the 8900 because they do not incorporate hardware data compression.

Note – Never use two compression methods on the same data. The use of a second compression method rarely compresses the data further; double compressed data can actually expand in size.

C.4.2 Software Data Compression

Data compression can be done via software. The compress and restore commands are used for writing and reading, respectively. The Solstice Backup package incorporates the capability to do software-based data compression. Software data compression results in a better compression ratio than the drive's internal data compression but takes significantly longer.

Note – Never use two compression methods on the same data. The use of a second compression method rarely compresses the data further; double compressed data can actually expand in size.

C.5 Choosing a Blocking Factor or a Block Size

You must use the proper block size in the data transfers to the tape drive. The block size determines the amount of data sent to the drive in one command and, more importantly, determines the amount of data on each logical block on the drive.

You get the best performance and throughput when you use the largest block size (blocking factor) supported. Typically, this is 63k bytes which is specified as a blocking factor of 126. The b parameter and a numerical parameter are specified in the command to the drive. A block size must be specified on both the write and the read operation. If one is not selected, a default is used that may not be the largest or best choice. Be aware that the read operation must always specify an equal or larger block size than the write operation. There is no penalty for choosing a larger block size on read. Thus, you should always choose the largest block size for any read operation.

C.6 Tape Utilities

Note – Loss of data can occur if the commands described in the following paragraphs are used inappropriately. This information is provided as a guide for experienced system administrators.
Refer to the *System Administrators Handbook* for more detailed information about using these commands.

C.6.1 mt

A very useful set of capabilities is incorporated in the `mt` command. The basic format of this command is to type `mt -f /dev/rmt/0` subcommand. The most relevant subcommands supported are: status, rewind, and offline. To access the on-line man page, type `man mt`.

The `mt status` command tells you if a drive is installed at a particular device number (`/dev/rmt/0 through /dev/rmt/7`). TABLE C-1 lists the possible responses and their meaning.

TABLE C-1 `mt` Responses

Response	Meaning
No such file or directory	No drive or drive powered off, or the system was not booted with the `-r` after drive installation
No tape loaded or drive offline	Drive available but no media installed or media load in process.
sense key(0x6)= Unit Attention	Tape was just loaded into drive
sense key(0x0)= No Additional Sense	Drive is ready. No pending errors.
sense key(0x0)= [anything else]	Recent drive error.

Typically, rewinds are issued as part of the basic write or read commands to the drive. The device identifier specifies rewind unless the no rewind case is documented. For example, when you use the `/dev/rmt/0n` identifier, you are specifying to not rewind the tape after the operation. If the `n` is not present, a rewind is implied and will be done after the operation.

The `mt rewind` command is used to issue rewind commands.

The `mt offline` command ejects media from the tape drive. This is used for sequential mode operation as detailed above. If the robotic mechanism is in sequential mode, it will automatically load the next tape.

C.6.2 tar

The `tar` command is a basic utility for writing to and reading from the tape drives. Single files, multiple files, or entire directories can be specified. To access the on-line man page, type `man tar`.

For writing, type `tar cvbf 126 /dev/rmt0?` {file or directory name}. Replace the ? with the desired density.

For reading, type `tar xvbf 126 /dev/rmt/0` {or a file or directory name}.

To read the list of files stored on the tape, `type tar tvbf 126 /dev/rm/0`.

C.6.3 ufsdump

The `ufsdump` command provides a number of capabilities including incremental backup and restore operations. Foremost for the tape library, the l parameter fills each tape and then loads the next tape using of the library sequential mode. To access the on-line man page, type `man ufsdump`.

The `ufsdump` command replaced the dump command. The `dump` command does not offer the l parameter and so it is not very useful for the tape library. With the `dump` command, you must provide a complex set of parameters that specify how much capacity is to be stored on each tape. This is very difficult to use with the data compression capable drives because the compressibility, and thus the data capacity, can not be determined with any degree of certainty. Use the `ufsdump` command instead of the `dump` command.

APPENDIX **D**

Error Codes

This appendix contains the error codes that may appear on the main screen. The tables in this appendix contain the following information:

ASC	Additional Sense Code. Corresponds to byte 12 of the sense data returned in response to the REQUEST SENSE command.
ASCQ	Additional Sense Code Qualifier. Corresponds to byte 13 of the sense data returned in response to the REQUEST SENSE command.
LCD Number	For hardware error conditions (see TABLE D-4) this is the numerical code that appears in the console window of the Sun system when the error occurs.
Description	Provides an explanation of the error.

D.1 Hardware Errors

TABLE D-1 presents the hardware error conditions in numerical order. The error code number appears on the display panel during either normal operation or diagnostic operation.

TABLE D-1 Hardware Errors by Error Code

Error Number	Description	Corrective Action
10	DROPPED A CARTRIDGE. The CHM dropped a cartridge.	If the cartridge label was removed, make sure that there is no label adhesive remaining on the cartridge. If the label was not removed, contact your service provider. CAUTION: Do not try to put the cartridge back in the gripper.
11	SOURCE EMPTY. There is no cartridge in the source location.	Install a cartridge in the source location or redirect the CHM to another location.
12	DESTINATION FULL. A cartridge already exists in the destination location.	Remove the cartridge from the destination or redirect the CHM to another location.
13	PUT MECH. FAILURE. The CHM could not successfully place a cartridge because of mechanical problems.	Make sure there is nothing blocking the CHM or the tape drives. If the error persists, contact your service provider.
14	PICK MECH. FAILURE. The CHM could not successfully pick a cartridge due to mechanical problems.	Make sure there is nothing blocking the CHM or the tape drives. If the error persists, contact your service provider.
15/16	NO SRC ELEMENT; NO DEST ELEMENT. No data cartridge magazine was installed at the selected location.	Install a data cartridge magazine or redirect the CHM.
17	CHM FULL BEFORE MOVE. A cartridge was in the gripper in one of these circumstances: - at power-on - when reset - before a move operation	Remove the cartridge. Put the cartridge back in the cartridge magazine if you know where to place it. Make sure the tape library and the tape drives are not being used by any host computer, then press Reset on the operator panel. If the error purists, contact your service provider.
18	SRC CART INSIDE DRIVE. The CHM could not successfully pick a cartridge because it was still loaded in the drive.	Press the tape drive eject button and wait for the cartridge to be unloaded, or redirect the CHM to another location.

TABLE D-1 Hardware Errors by Error Code *(Continued)*

Error Number	Description	Corrective Action
19	PICK MECH. FAILURE. The CHM could not successfully pick from a full cartridge slot.	Open the door and look for anything that might be obstructing the gripper. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
21	GRIP HOME ERROR. A gripper error occurred.	Open the door and look for anything that might be obstructing the gripper. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
22	GRIP MOTION TIMEOUT. A gripper motion took longer than the maximum allocated time. When motion functions do not complete in the allocated time, the current to the servo motors is shut off.	Open the door and look for anything that might be obstructing the gripper. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
25	PICK STALL. The CHM stalled while trying to pick a cartridge from the tape drive.	Open the door and look for anything that might be obstructing the gripper. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
26	CANNOT OPEN GRIPPER. The gripper could not open.	Open the door and look for anything that might be obstructing the CHM gripper. Make sure the tape library and the tape drives are not being used by the host computer, then press reset on the operator panel. If this error still occurs, contact your service provider.
30	S AXIS DOES NOT MOVE. The CHM could not move along the short axis.	Open the door and look for anything that might be obstructing the CHM gripper. Make sure the tape library and the tape drives are not being used by the host computer, then press reset on the operator panel. If this error still occurs, contact your service provider.

TABLE D-1 Hardware Errors by Error Code *(Continued)*

Error Number	Description	Corrective Action
31	S AXIS FAILED HOME. The CHM could not return to the home position along the short axis.	Open the door and look for anything that might be obstructing the CHM gripper. Make sure the tape library and the tape drives are not being used by the host computer, then press reset on the operator panel. If this error still occurs, contact your service provider.
36	S LM629 Failure. The tape library could not reset the servo chip for the short axis.	Make sure the tape library and the tape drives are not being used by the host computer, then press Reset on the operator panel. If this error still occurs, contact your service provider.
38	CANNOT LOAD DRIVE. The CHM could not load the cartridge into the tape drive. (IT could not move in far enough on the short axis).	Open the door and look for anything that might be obstructing the CHM along its short axis. Make sure that a cartridge is not already loaded in the tape drive. Make sure that the flap on the cartridge is closed. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
40	L AXIS DOES NOT MOVE. The CHM could not move along the long axis.	Open the door. Look for anything that might be obstructing the CHM gripper. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
41	L AXIS FAILED HOME. The CHM could not return to the home position on the long axis.	
46	L LM629 RESET FAIL. The tape library could not reset the servo chip for the long axis.	Make sure the tape library and the tape drives are not being used by the host computer, then press Reset on the operator panel. If the problem persists, contact your service provider.
50	D AXIS DOES NOT MOVE. The drum could not move on its axis.	Open the door and look for any obstructions around the drum. If there are no obstructions, contact your service provider.
51	D AXIS FAILED HOME. The library could not determine the home position for the drum.	Contact your service provider.

TABLE D-1 Hardware Errors by Error Code *(Continued)*

Error Number	Description	Corrective Action
60	NO LABEL. The bar code scanner could not read the bar code label because there was no label on the cartridge.	If present, this error appears on the Label Info screen. If the cartridge does not have a bar code label, place a label on the cartridge. If there is a bar code label, reposition or replace it. If the error persists, contact your service provider.
61	READ ERROR. The bar code scanner could not read the bar code label because the label was unreadable.	
62	NOT PRESENT. The bar code scanner could not read the bar code labels because there was no data cartridge magazine present.	If present, this error appears on the Label Info screen. If necessary, install a data cartridge magazine.
65	DMA OVERRUN. The bar code scanner could not read the bar code label because a Direct Memory Access (DMA) overrun occurred.	If present, this error appears on the Label Info screen. Make sure the tape library and the tape drives are not being used by the host computer, then press Reset on the operator panel. If this error still occurs, contact your service provider.
67	DMA CH.2 TIMEOUT. Controller board error.	
69	LABEL UPSIDE DOWN. The bar code scanner could not read the bar code label because the label is upside down.	If present, this error appears on the Label Info screen. Remove the label and reposition it on the cartridge. If the label is affixed correctly, contact your service provider.
70	L SERVO TIMEOUT. The CHM could not reach its destination along the long axis.	Open the door. Look for anything that might be obstructing the CHM along its long axis. Make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
71	PARAMETER > LIMIT. Firmware error.	Make sure the tape library and the tape drives are not being used by the host computer, then press Reset on the operator panel. If the error still occurs, contact your service provider. You may be asked to supply a diagnostic listing, and you may need new firmware.

TABLE D-1 Hardware Errors by Error Code *(Continued)*

Error Number	Description	Corrective Action
72	FRONT DOOR OPEN. The front door is open or the door solenoid is malfunctioning.	Close and lock the door. If the error still appears, make sure the library and tape drives are not being used by any host, then press Reset on the operator panel. If the error persists, contact your service provider.
73	S SERVO TIMEOUT. The CHM could not reach its destination along the short axis.	Open the door. Look for anything that might be obstructing the CHM along its short axis. Make sure the tape library and the tape drives are not being used by the host computer, then press Reset on the operator panel. If the error still occurs, contact your service provider.
75	INTERNAL S/W ERROR. Firmware error.	Make sure the tape library and the tape drives are not being used by the host computer, then press Reset on the operator panel. If the error still occurs, contact your service provider. You may be asked to supply a diagnostic listing, and you may need new firmware.
76	POS ERROR TIMEOUT. The CHM could not reach its destination along the long axis.	Open the door. Look for anything that might be obstructing the CHM along its long axis. Make sure the tape library and the tape drives are not being used by the host computer, then press Reset on the operator panel. If the error still occurs, contact your service provider.
77	INTERFACE DISABLED. The tape library was not in correct control mode when a command was sent.	Make certain you have set the correct control mode. If the control mode is correct, contract your service provider.
90	INVALID BLANK CONFIG. The drive blank configuration is invalid.	If you operate the tape library with only one drive, you must have a drive blank installed in the outermost slot.
91	OPERATOR ABORTED. A diagnostic, in progress, was aborted.	No corrective action required.
97	DRIVE NOT INSTALLED. The tape drive could not be cleaned because no tape drive is installed in this location.	This error only appears on the Clean Drives Menu. If no tape drive is installed in the location, redirect the CHM. If a tape drive is installed, make sure that the drive carrier is correctly seated. If the error persists, contact your service provider.

TABLE D-1 Hardware Errors by Error Code *(Continued)*

Error Number	Description	Corrective Action
98	NO MAGAZINE. There is no magazine installed in this location.	If no magazine is installed in that location, redirect the CHM. If a magazine is installed, make sure that it is correctly seated on the mounting plate. If the error persists, contact your service provider.
101	DRUM MOVE, SAXIS EXT. THe CHM could not move along the short axis.	Open the door and look for anything that might be obstructing the CHM along its short axis. Make sure the tape library and the tape drives are not being used by the host computer, then press Reset on the operator panel. If the error still occurs, contact your service provider.
104	DRIVE did not eject. The CHM timed out waiting for a tape drive to eject the cartridge.	There may be a problem with the tape drive. Contact your service provider.
108	INCOMPATIBLE BOOT ROM. The installed boot ROM is not compatible with the flash EEPROM code.	You do not have the correct boot ROM for the firmware you are trying to run in the library. Contact your service provider.
109	CHECK CLEANER. The cleaning cartridge was ejected immediately after being loaded into the tape drive.	Replace the cleaning cartridge. If the error persists, contact your service provider. Note: This error displays only if the cleaning was requested from the operator panel.
130-137	FAS216 ERROR; SCSI UNEXPECTED INT; SCSI INT STUCK ERROR. There is a SCSI chip failure.	Make sure the tape library and the tape drives are not being used by the host computer, then press Reset on the operator panel. If the error persists, contact your service provider. You may be asked to supply a diagnostic listing, and you may need new firmware or a new controller card.

D.2 SCSI Sense Key Errors

The SCSI sense key error messages, listed in TABLE D-2, appear in the console window on the computer system. Further descriptions of each SCSI Sense Key Error are presented on the following pages.

TABLE D-2 SCSI Sense Key Error Messages

SCSI Sense Error Messages	Description	Action
0h - No sense	There is no specific sense key information to report.	N / A
2h - Not Ready	The tape library cannot accept any tape motion commands.	Perform one or more of the following actions: - Insert a data cartridge in the tape drive. - Close the door. - Put the tape library under SCSI control. To do so, select SCSI Interface under the Control Mode Menu.
4h - Hardware Error	The tape library detected a nonrecoverable hardware failure during a selftest or while performing a command.	Try the command again. If the error message persists, replace the tape drive.
5h - Illegal Request	The unit detected an illegal operation request. For example, an illegal parameter was sent with a command or the tape library was in the wrong mode to execute the command.	Retry the operation.
6h - Unit Attention	Something happened that may have changed the state of the unit. For example, the unit was powered on, a tape was loaded into the tape drive, or the SCSI bus was reset.	N / A
Bh - Aborted Command	The tape library aborted a command (typically operator aborted).	Retry the operation.

D.2.1 Not Ready—Sense Key 2h

During a Not Ready condition, the tape library returns a Check Condition status in response to each motion command until the Not Ready condition is removed. During this time, the sense key is set to Not Ready and the ASC and ASCQ are set to codes specifying that the tape library is not ready. All commands except tape motion commands, perform normally.

TABLE D-3 lists Not Ready sense key (2h) error conditions.

TABLE D-3 Not Ready Sense Key (2h) ASC and ASCQ Values

ASC Byte 12	ASCQ Byte 13	Description
	01h	The tape library is performing an initialization after a reset or the door was closed.
	83h	The front door is open.
04h	84h	The tape library is executing ROM boot code and cannot execute the command
	89h	The tape library is in 25-pin, 9-pin, or 4-pin serial port mode.
	8Dh	The tape library is in LCD Interface mode.
	8Eh	The tape library is in Sequential CTS1, Sequential CTS2, or Dual Sequential modes.

D.2.2 Hardware Error—Sense Key 4h

The tape library returns a sense key of Hardware Error (4h) when a hardware-related error occurs. After Hardware Error occurs, the tape library will not accept motion commands. For each additional motion command, the tape library returns the same Hardware Error. The tape library executes all other commands normally.

TABLE D-4 lists Hardware Error (4h) conditions. To determine the corrective actions for the display panel numbers, see TABLE D-1.

TABLE D-4 Hardware Error Sense Key (4h) ASC and ASCQ Values

ASC Byte 12	ASCQ Byte 13	Display Panel Number	Description
15h	80h	10	The CHM dropped a cartridge.
15h	81h	14	The CHM could not successfully pick a cartridge.
15h	83h	13	The CHM could not successfully place a cartridge.
15h	84h	25	The CHM stalled while trying to pick a cartridge from the tape drive.
15h	85h	26	The gripper could not open.
3Bh	81h	71	Firmware error.
3Fh	80h	N / A	The tape library is unable to erase the flash EEPROM 1.
3Fh	81h	N / A	The tape library is unable to erase the flash EEPROM 2.
3Fh	82h	N / A	The tape library is unable to write zeros to the flash EEPROM 1.
3Fh	83h	N / A	The tape library is unable to write zeros to the flash EEPROM 2.
3Fh	84h	N / A	The tape library is unable to program the flash EEPROM 1.
3Fh	85h	N / A	The tape library is unable to program the flash EEPROM 2.
3Fh	86h	N / A	The flash EEPROM checksum was bad.
40h	80h	01	Internal clock failure.
40h	81h	02	Internal RAM failure.
40h	82h	03	Internal ROM failure.
40h	83h	04	+24-volt power supply failure.
40h	85h	06	+12-volt power supply failure.
40h	86h	07	-12-volt power supply failure.
40h	87h	08	Digital / analog converter failure.
40h	88h	72	The front door is open or the door solenoid is malfunctioning.

TABLE D-4 Hardware Error Sense Key (4h) ASC and ASCQ Values *(Continued)*

ASC Byte 12	ASCQ Byte 13	Display Panel Number	Description
40h	89h	77	The tape library was not in the correct control mode when the command was executed. To invoke commands from the Maintenance Menu, the tape library must be in LCD Interface mode. To run the SunDiag system exerciser, the tape library must be in one of the Sequential modes (Sequential CTS1, Sequential CTS2, or Dual Sequential). Under normal operation, the tape library must be set to SCSI Interface mode.
40h	90h	20	The gripper home sensor did not clear.
40h	91h	21	A gripper error occurred.
40h	92h	22	A gripper motion took longer than the maximum time allocated for it. When motion functions do not complete in the allocated time, current to the servo motors is cut off.
40h	A0h	30	The CHM could not move along the short axis.
40h	A2h	32	The motor on the short axis failed.
40h	A3h	36	The tape library could not reset the servo chip for the short axis.
40h	A4h	37	The servo busy bit on the short axis failed.
40h	A5h	73	The CHM could not reach its destination on the short axis.
40h	B0h	40	The CHM could not move on the long axis.
40h	B1h	41	The CHM could not return to home position on the long axis.
40h	B2h	42	The motor on the long axis failed.
40h	B3h	46	The tape library could not reset the servo chip for the long axis.
40h	B4h	47	The servo busy bit on the long axis failed.
40h	B5h	70	The CHM could not reach its destination on the long axis.
40h	E4h	99	One of the motors is stalled. The tape library must wait for it to cool down before operations can resume.
40h	E5h	76	The CHM could not reach its destination on the long axis.
40h	01h	17	There was a cartridge in the grab base during power up, before a cartridge move, or before a diagnostic test.
840h	00h	75	Firmware error.

D.2.3 Illegal Request—Sense Key 5h

TABLE D-5 lists the Illegal Request (5h) error conditions.

Note – In TABLE D-5, the Command Descriptor Block (CDB) is the structure used to communicate commands from an initiator to a target.

TABLE D-5 Illegal Request Sense Key (5h) ASC and ASCQ Values

ASC Byte 12	ASCQ Byte 13	Description
1Ah	00h	The parameter list length was not valid.
20h	00h	The operation code (OP code) for the Command Descriptor Block (CDB) was invalid.
21h	01h	An invalid element address was specified for the CDB.
24h	00h	There were invalid fields in the CDB.
25h	00h	The logical unit number specified in the Identify message or in the CDB is not zero.
26h	02h	There was an invalid field in the parameter list.
3Bh	0Dh	The destination element was occupied for a MOVE MEDIUM command.
3Bh	0Eh	The source element was empty for a MOVE MEDIUM command.
3Bh	85h	The destination for the MOVE MEDIUM command cannot be the CHM.
3Bh	86h	The source for the MOVE MEDIUM command cannot be the CHM.
3Bh	87h	A cartridge is stuck in the tape drive.
3Bh	90h	The source cartridge is loaded inside the tape drive and is not accessible.
3Dh	00h	There were invalid bits in the identify message. Either one of the reserved bits was nonzero or the LUNTAR field was nonzero.
3Fh	87h	The tape library cannot execute a read or write firmware command. The write firmware operation is in progress.
3Fh	88h	The tape library cannot execute a read or write firmware command. The read firmware operation is in progress.
53h	02h	A media load or unload operation was prevented with a PREVENT/ ALLOW MEDIUM REMOVAL command.
80h	01h	There was a cartridge in the grab base during power up, before a cartridge move, or before a diagnostic test.

TABLE D-5 Illegal Request Sense Key (5h) ASC and ASCQ Values *(Continued)*

ASC Byte 12	ASCQ Byte 13	Description
80h	03h	The source cartridge magazine is not installed.
80h	04h	The destination cartridge magazine is not installed.
80h	05h	The source tape drive is not installed.
80h	06h	The destination tape drive is not installed.
85h	01h	The bar code scanner is not installed.

D.2.4 Unit Attention—Sense Key 6h

The tape library does not stack Unit Attention conditions. The tape library reports only the last Unit Attention condition when there are two or more Unit Attention conditions. A Unit Attention condition remains in effect for a particular initiator until that initiator clears it.

TABLE D-6 lists combinations of ASC and ASCQ values for the Unit Attention sense key (6h).

TABLE D-6 Unit Attention Sense Key (6h) ASC and ASCQ Values

ASC Byte 12	ASCQ Byte 13	Description
28h	00h	The door was opened then closed.
28h	89h	The tape library was placed in SCSI Interface mode after operating in one of the serial port modes.
28h	8Dh	The tape library was placed in SCSI Interface mode after operating in LCD mode.
28h	8Eh	The tape library was placed in SCSI Interface mode after operating in one of the sequential modes (Sequential CTS1, Sequential CTS2, or Dual Sequential).
29h	00h	A power-on, SCSI bus reset, or device reset message occurred.
2Ah	01h	Mode parameters have been changed. Issue a MODE SENSE (1Ah) command to determine what the new mode parameters are.
3Fh	01h	New microcode was loaded.

D.2.5 Aborted Command—Sense Key Bh

TABLE D-7 lists the combinations of ASC and ASCQ values for the Aborted Command sense key (Bh).

TABLE D-7 Aborted Command Sense Key (Bh) ASC and ASCQ Values

ASC Byte 12	ASCQ Byte 13	Description
43h	00h	The tape library received a message at an invalid time.
45h	00h	A reselect failure occurred. The host system rejected the Identify message sent by the tape library after the tape library reselected the host.
57h	00h	One of the following conditions occurred: The message system was disabled and the tape library discovered a parity error on the SCSI bus. The message system was enabled and the initiator rejected a Restore Data Pointers message that the tape library sent to recover from a parity error. All parity error retries were exhausted.
48h	00h	One of the following conditions occurred: The tape library received an Initiator Detected Error message at an inappropriate time. The initiator rejected a Restore Data Pointers message that the tape library sent in response to the Initiator Detected Error message.

Glossary

bus The SCSI cable that serves as a link for passing signals between the computer system and the tape library.

CDB Command descriptor block. The structure used to communicate commands from an initiator to a target.

CHM Cartridge handling mechanism. The robotic assembly that retrieves and replaces cartridges.

CTS Cartridge Tape Subsystem.

element An element can be either the CHM, a slot in the removable cartridge holder, the fixed cartridge slot, or a tape drive. Each element has a unique address so the initiator can identify it.

element address Enables the tape library to identify the elements and move cartridges between them.

host The computer system that acts as the initiator of an operation.

initiator A host computer system that requests an operation to be performed by the target.

power-on selftest (POST) The process that occurs when the tape library performs its initial power-on diagnostics.

removable cartridge holder Holds up to ten tape cartridges.

small computer systems interface (SCSI) An industry standard bus used to connect disk and tape devices to a workstation.

SCSI address See SCSI ID.

SCSI bus See bus.

SCSI ID A unique identifier assigned to each device or subsystem on the SCSI bus. Also referred to as SCSI *address*.

target A bus device (usually a controller) that performs an operation requested by an initiator. The tape library is a target.

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