Sun StorageTek L700x/L1400x

Tape Libraries and Pass-Thru Port

Operator's Guide

Part Number: 95845
Revision: AA

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Revision AA

Sun Microsystems, Inc.
www.sun.com

Part No.95845
May 2007, Revision AA

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Summary of Changes

EC	Date	Revision	Description
53897	August 1999	First	Initial Release
111827	February 2003	Fifteenth	Refer to this and previous editions for a description of the changes.
111860	August 2003	Sixteenth	Refer to this and previous editions for a description of the changes.
111893	April 2004	Seventeenth	Refer to this and previous editions for a description of the changes.
111943	December 2004	Eighteenth	Refer to this and previous editions for a description of the changes.
111966	July 2005	W	Refer to this and previous editions for a description of the changes.
129919	March 2006	Y	Refer to this and previous editions for a description of the changes.
114173	May 2007	AA	Added DLT-S4 and LTO Gen 4 drive and media information. Library firmware must be Version 3.15.02 or later to support these drive types.

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Preface

This guide describes how to operate the L700e and L1400M Tape Libraries (referred to in this manual as "the library"). The L1400M library is an enhanced L700e. For L1400M operating differences information, refer to Appendix D, "L1400M Library Differences."

For specific drive information and for host-generated software commands and console messages, refer to your drive or software documentation.

This guide is intended primarily for data center operators. System programmers and computer system administrators might also find the information useful.

Organization

This guide has five chapters and two appendixes:

Chapter 1 "General Information"describes the tape library hardware. This chapter also describes the library's two operating modes, its Auto Clean feature, and the optional Horizon L Series Library Monitor.

Chapter 2 "Controls and Indicators" shows the locations of the power switch and operator panel and describes the functions of the buttons, indicators, and display screens.

Chapter 3 "Configuration" describes how to power on and configure the library and drives through the operator panel. A configuration record form is provided at the end of the chapter.

Chapter 4 "Library Operation" contains the procedures for operating the library in two modes: automated mode and manual mode. It explains how to load cartridges through the CAP, power off the library, and manually removing cartridges. The optional Pass-thru Port is also described.

Chapter 5 "Sun/StorageTek Maintenance Support" describes how to contact the Customer Support Center for assistance if the library has a hardware or software problem.

Appendix A "Cartridge Tape Information" describes how to prepare, inspect, store, clean, and repair cartridges. It also lists the criteria that colored cartridges must meet to be used in the tape library.

Appendix B "Library Elements and Diagrams" includes maps of all SCSI elements and panel, row, column locations for the library cells.

Appendix C "Sun/StorageTek L-Series Library Admin" lists counters and composite information.

Appendix D	"L1400M Library Differences" identifies how the L1400M library differs from the L700e.
Glossary	The Glossary defines new or special L700e tape library terms and abbreviations used in this guide.
Index	The Index assists in locating information in this guide.

Alert Messages

Alert messages call your attention to information that is especially important or that has a unique relationship to the main text or graphic.

Note: A note provides additional information that is of special interest. A note might point out exceptions to rules or procedures. A note usually, but not always, follows the information to which it pertains.

CAUTION:
A caution informs the reader of conditions that might result in damage to hardware, corruption of data, or corruption of application software. A caution always precedes the information to which it pertains.

A warning alerts the reader to conditions that might result in long-term health problems, injury or death. A warning always precedes the information to which it pertains.

Mensajes de alerta

Los mensajes de alerta llaman la atención hacia información de especial importancia o que tiene una relación específica con el texto principal o los gráficos.

Nota: Una nota expone información adicional que es de interés especial. Una nota puede señalar excepciones a las normas o procedimientos. Por lo general, aunque no siempre, las notas van después de la información a la que hacen referencia.

PRECAUCIÓN:
Una precaución informa sobre situaciones que podrían conllevar daños del hardware, de los datos o del software de aplicación. Las precauciones van siempre antes de la información a la que hacen referencia.

ADVERTENCIA:
Una advertencia llama la atención sobre condiciones que podrían conllevar problemas de salud crónicos, lesiones o muerte. Las advertencias van siempre antes de la información a la que hacen referencia.

Conventions

Typographical conventions highlight special words, phrases, and actions in this publication.

Item	Example	Description of Convention
Buttons	MENU	Text and capitalization follow label on product
Commands	Mode Select	Initial cap
Document titles	*System Assurance Guide*	Italic font
Emphasis	*not* or *must*	Italic font
File names	`fsc.txt`	Monospace font
Hypertext links	Figure 2-1 on page 2-5	Blue (prints black in hardcopy publications)
Indicators	*Open*	Text and capitalization follow label on product
Jumper names	TERMPWR	All uppercase
Keyboard keys	<Y> <Enter> or <Ctrl+Alt+Delete>	Text and capitalization follow label on product; enclosed within angle brackets
Menu names	Configuration Menu	Capitalization follows label on product
Parameters and variables	Device = *xx*	Italic font
Path names	`c:/mydirectory`	Monospace font
Port or connector names	SER1	Text and capitalization follow label on product; otherwise, all uppercase
Positions for circuit breakers, jumpers, and switches	ON	Text and capitalization follow label on product; otherwise, all uppercase
Screen text (including screen captures, screen messages, and user input)	`downloading`	Monospace font
Switch names	Power	Text and capitalization follow label on product
URLs	http://www.storagetek.com	Blue (prints black in hardcopy publications)

Referenced Publications

Library Documentation	Part Number
StorageTek Backup Resource Monitor User Guide. https://www.support.storagetek.com/GlobalNavigation/Support/CurrentProducts/Software/ShowContents.htm?ID={8B970BE5-70CF-4EC5-AF6E-5A68DC6D3E35}	

Tape Drive Documentation	Part Number
Quantum Tape Drive Manuals	CD enclosed with drives or check Quantum Web site (www.quantum.com)
T9840 Tape Drive User's Reference Guide	95739
T9940 Tape Drive Operator's Guide	95989
T10000 Tape Drive Operator's Guide	96174c

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http://www.sun.com/storagetek/

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Sun/StorageTek's CRC is a Web site that enables members to resolve technical issues by searching code fixes and technical documentation. CRC membership entitles you to other proactive services, such as HIPER subscriptions, technical tips, answers to frequently asked questions, addenda to product documentation books, and online product support contact information. Customers who have a current warranty or a current maintenance service agreement may apply for membership by clicking on the Request Password button on the CRC home page.

The URL for the CRC is http://www.support.storagetek.com

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Notices

Please read the following compliance and warning statements for this product.

CAUTION:
Potential equipment damage: **Cables that connect peripherals must be shielded and grounded; refer to cable descriptions in the instruction manuals. Operation of this equipment with cables that are not shielded and not correctly grounded might result in interference to radio and TV reception.**

Changes or modifications to this equipment that are not expressly approved in advance by Sun/StorageTek will void the warranty. In addition, changes or modifications to this equipment might cause it to create harmful interference.

United States FCC Compliance Statement

The following compliance statement pertains to Federal Communications Commission Rules 47 CFR 15.105:

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 or her own expense.

CISPR 22 and EN55022 Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Japanese Compliance Statement

The following compliance statement in Japanese pertains to VCCI EMI regulations:

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

English translation: This is a Class A product based on the Technical Requirement of the Voluntary Control Council for Interference by Information Technology (VCCI). In a domestic environment, this product may cause radio interference, in which case the user may be required to take corrective actions.

Taiwan Warning Label Statement

The following warning label statement pertains to BSMI regulations in Taiwan, R.O.C.:

警告使用者: 這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

English translation: This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.

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NOTICE

INTERNAL CODE LICENSE

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   c. "Maintenance Code" is defined as Microcode and other software, including data files, which may reside or execute in or be used by or in connection with Equipment, and which detects, records, displays, and/or analyzes malfunctions in the Equipment.

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Safety

To ensure your safety, please read the following information.

Fiber-optic Safety

WARNING:
***Eye hazard*. Never look directly into a fiber-optic cable, a fiber-optic connector, or a laser transceiver module. Hazardous conditions might exist from laser power levels that are capable of causing injury to the eye.**

Be especially careful when using optical instruments with this equipment. Such instruments might increase the likelihood of eye injury.

The laser transceivers in fiber-optic equipment can pose dangers to personal safety. Ensure that anyone who works with this Sun/StorageTek equipment understands these dangers and follows safety procedures. Ensure that the optical ports of every laser transceiver module are terminated with an optical connector, a dust plug, or a cover.

Each fiber-optic interface in this Sun/StorageTek Fibre Channel equipment contains a laser transceiver that is a Class 1 Laser Product. Each laser transceiver has an output of less than 70 µW. Sun/StorageTek's Class 1 Laser Products comply with EN60825-1(+A-11) and with sections 21 CFR 1040.10 and 1040.11 of the Food and Drug Administration (FDA) regulations.

WARNING:
The use of controls or adjustment or performance of procedures other than those specified herein might result in hazardous radiation exposure.

The following translations are for users in Finland and Sweden who wish to identify laser safety and classification:

CLASS 1 LASER
LUOKAN 1 LASERLAITE
KLASSE 1 LASER APPARAT

Laser Product Label

In accordance with safety regulations, a label on each Sun/StorageTek Fibre Channel product identifies the laser class of the product and the place and date of the manufacturer. The label appears on top of a Fibre Channel tape drive and near the Fibre Channel connectors on a Fibre Channel tape library. A copy of the label is shown here:

CLASS 1 LASER PRODUCT
LASER KLASSE 1
APPAREIL A LASER DE CLASSE 1
COMPLIES WITH 21 CFR 1040.10 AND 1040.11

Fiber-optic Cable Installation

Follow these guidelines when you install fiber-optic cables:

1. **Cable routing:**
   - **Raised floor:** You may install fiber-optic cables under a raised floor. Route them away from any obstruction, such as existing cables or other equipment.
   - **Cable tray or raceway:** Place the cables in position; do not pull them through the cable tray. Route the cables away from sharp corners, ceiling hangers, pipes, and construction activity.
   - **Vertical rise length:** Leave the cables on the shipping spool, and lower them from above; do not pull the cables up from below. Use proper cable ties to secure the cable.
   - **General:** Do not install fiber-optic cables on top of smoke detectors.
2. **Cable management:**
   - Leave at least 4.6 m (15 ft) of cable at each end for future growth.
   - Use strain reliefs to prevent the weight of the cable from damaging the connector.
   - Review all information in this manual and in any related manuals about safely handling fiber-optic cables.
3. **Connector protection:**
   - Insert connectors carefully to prevent damage to the connector or fiber.
   - Leave the connector's protective cover in place until you are ready to make connections.
   - Replace the connector's protective cover when the connector is disconnected.
   - Clean the connector before making a connection. Make sure that there are no obstructions and that keyways are aligned.

Fiber-optic Cable Handling

Observe these precautions when you handle fiber-optic cables:

- Do not coil the cable to less than 96 mm (3.75 in.) in diameter.
- Do not bend the cable to less than 12 mm (0.5 in.) in radius. Sun/StorageTek recommends that a cable's bend radius be no less than 20 times the diameter of the cable.
- Do not pull on the cables; carefully place them into position.
- Do not grasp the cables with pliers, grippers, or side cutters; do not attach pulling devices to the cables or connectors.
- Keep cables away from sharp edges or sharp protrusions that could cut or wear through the cable; make sure that cutouts in the equipment have protective edging.
- Protect the cable from extreme temperature conditions.
- Install the connector's protective cover whenever the connector is not connected.

Rack Safety and Precautions

WARNING:
Possible personal injury:

- **More than one person might be required to install equipment into the library's rack or to remove equipment from the library's rack.**
- **Personnel should take adequate precautions when they are moving a library that contains rack-installed equipment. The weight of some rack equipment might alter the height of the library's center of gravity. This condition might cause the library to tip during a move.**

Observe the following safety and handling precautions when you are installing equipment into the library's rack:

CAUTION:
Potential equipment damage: **Do not exceed the maximum allowable weight (136 kg [300 lb]) and U-height (13U) for equipment in the rack area of this library.**

- Ensure that the equipment has UL listing (listing by Underwriters' Laboratories), CSA certification (certification by the Canadian Standards Association), and CE compliance (compliance with the European Council's directives and standards).

- Understand that the library does not supply power to the rack area. So ensure that the rack-installed equipment has an adequate power source.

  Note: If you remove power from the library by using the library's power switch, the rack-installed equipment will remain powered-on.

- Follow the manufacturer's guidelines to position, to support, and to fasten the equipment in the rack.
- Locate the equipment so that it does not block or hinder any ventilation openings in the library's rack area. For example, do not block library or drive exhaust areas, the electronic module exhaust area, perforated metal, or other similar ventilation.
- Locate the equipment so that the library doors adequately clear the equipment when you close them.
- Install the equipment from the bottom of the rack to the top of the rack; Sun/StorageTek recommends that you place the heaviest items near the bottom of the rack.
- Ensure that any equipment that you install within the rack is adequately cooled. The library's internal ambient temperature should not exceed the recommended operating temperature. Base cooling considerations upon the power dissipation within the rack space as well as upon the ambient room conditions that are external to the library. You must provide cooling for moderate power dissipation within the rack space.
- Ensure that the equipment in the rack does not create an overcurrent condition, whether equipment is connected directly to the branch circuit or to a power distribution strip.
- Ensure that the equipment in the rack has reliable earth ground, whether equipment is connected directly to the branch circuit or to a power distribution strip.

CAUTION:
Potential equipment damage: **Do not exceed the maximum allowable weight (136 kg [300 lb]) and U-height (13U) for equipment in the rack area of this library.**

Observe the following safety and handling precautions when you are installing equipment into the library's rack:

- Ensure that the equipment has UL listing (listing by Underwriters' Laboratories), CSA certification (certification by the Canadian Standards Association), and CE compliance (compliance with the European Council's directives and standards).
- Understand that the library does not supply power to the rack area. So ensure that the rack-mounted equipment has an adequate power source.

  Note: If you remove power from the library by using the library's power switch, the rack-mounted equipment will remain powered on.

- Follow the manufacturer's guidelines to position, to support, and to fasten the equipment in the rack.

- Locate the equipment so that it does not block or hinder any ventilation openings in the library's rack area. For example, do not block library or drive exhaust areas, the electronic module exhaust area, perforated metal, or other similar ventilation.
- Locate the equipment so that the library's doors adequately clear the equipment when you close them.
- Install the equipment from the bottom of the rack to the top of the rack; Sun/StorageTek recommends that you place the heaviest items near the bottom of the rack.
- Ensure that any equipment that you place within the rack is adequately cooled. The library's internal ambient temperature should not exceed the recommended operating temperature. Base cooling considerations upon the power dissipation within the rack space as well as upon the ambient room conditions that are external to the library. You must provide cooling for moderate power dissipation within the rack space.
- Ensure that the equipment in the rack does not create an overcurrent condition, whether equipment is connected directly to the branch circuit or to a power distribution strip.
- Ensure that the equipment in the rack has reliable earth ground, whether equipment is connected directly to the branch circuit or to a power distribution strip

Electrostatic Discharge Damage Prevention

Before you touch any internal components in the library, including drives, you must take precautions against electrostatic discharge (ESD).

CAUTION:
Components are sensitive to static electricity: **Even a small electrostatic discharge can damage an electrical component that is inside the library. A damaged component might not fail immediately, but over time, it will become worse and might eventually cause an "intermittent" problem. Be sure that you touch an *unpainted* metal surface of the library before you reach inside the library or touch the drives or optional interface equipment.**

Before you touch any internal components:

1. With your finger, touch an *unpainted* metal surface of the library. In some libraries, you can touch the library's frame. In other libraries, you might have to touch a bolt on the wall or on the door frame.
2. Keep your body movement to a minimum as you touch the drives or the library components.

Antistatic wrist straps that have clip-on ends are commercially available.

Seguridad

Por su propia seguridad rogamos leer detenidamente la siguiente información.

Seguridad de fibras ópticas

ADVERTENCIA:
***Riesgo para la vista*. Nunca mire directamente el interior de un cable de fibra óptica, un conector de fibra óptica o un módulo transceptor de láser. Los niveles de potencia del láser pueden conllevar situaciones de riesgo, susceptibles de lesionar la vista.**

Tenga especial cuidado al utilizar instrumentos ópticos con estos equipos. Dichos instrumentos pueden incrementar las probabilidades de lesiones oculares.

Los transceptores de láser de los equipos de fibra óptica pueden suponer un peligro para la seguridad física. Asegúrese de que toda persona que trabaje con estos equipos de StorageTek entienda los peligros y siga los procedimientos de seguridad. Asegúrese de que todos los puertos ópticos de los módulos transceptores de láser estén terminados con un conector óptico, una cubierta o un tapón de protección contra el polvo.

Todas las interfaces de fibra óptica de estos equipos de canal de fibra de StorageTek contienen un transceptor de láser, categorizado como Producto láser de Clase 1. Cada transceptor de láser tiene una salida inferior a 70 μW. Los productos de láser de clase 1 de StorageTek cumplen las normas EN60825-1(+A-11) y las secciones 21 CFR 1040.10 y 1040.11 de las normas de la Administración para la Calidad de Alimentos y Medicamentos (FDA).

ADVERTENCIA:
El uso de mandos, ajustes o procedimientos distintos de los aquí especificados puede conllevar un riesgo de exposición a radiaciones.

Las siguientes traducciones están dirigidas a usuarios de Finlandia y Suecia que deseen identificar la categoría y clasificación de seguridad de los dispositivos láser:

LÁSER DE CLASE 1
LUOKAN 1 LASERLAITE
KLASSE 1 LASER APPARAT

Etiqueta del producto láser

De conformidad con las normas de seguridad, cada producto de canal de fibra de StorageTek lleva una etiqueta que identifica la clase de láser del producto, y el lugar y fecha de fabricación. Esta etiqueta aparece sobre la unidad de cinta de canal de fibra, así como en las proximidades de los conectores de las bibliotecas de cintas de canal de fibra. A continuación puede verse una copia de dicha etiqueta:

CLASS 1 LASER PRODUCT
LASER KLASSE 1
APPAREIL A LASER DE CLASSE 1
CUMPLE LAS NORMAS 21 CFR 1040.10 Y 1040.11

Instalación de cables de fibra óptica

Para instalar cables de fibra óptica, efectúe este procedimiento:

1. **Tendido del cable:**
   - **Tarima:** Los cables de fibra óptica pueden instalarse debajo de tarimas. Al tenderlos, manténgalos apartados de cualquier obstrucción, como por ejemplo otros cables o equipos.
   - **Escalerilla portacables o canaleta de cables:** Sitúe los cables en su posición. No tire de ellos a través de la escalerilla portacables. Al tender los cables, manténgalos apartados de esquinas afiladas, colgadores de techo, conductos, tuberías y actividades de construcción.
   - **Longitud de elevación vertical:** Deje los cables en la bobina original y bájelos desde arriba. No tire de ellos desde abajo. Utilice los fijadores adecuados para inmovilizarlos.
   - **General:** No instale cables de fibra óptica encima de detectores de humo:
2. **Instalación de los cables:**
   - Deje como mínimo 4,6 m (15 pies) de cable en cada extremo, en previsión de futuras extensiones.
   - Utilice protectores contra tirones para evitar que el peso del cable dañe el conector.
   - Repase en el presente manual, así como de manuales afines, toda la información relativa a la manipulación segura de cables de fibra óptica.
3. **Protección de los conectores:**
   - Inserte los conectores con todo cuidado para evitar dañar éstos o la fibra.
   - No quite la cubierta de protección del conector hasta que esté preparado para realizar las conexiones.

- Al desconectar el conector, vuelva a colocar la cubierta de protección.
- Antes de realizar una conexión, limpie el conector. Asegúrese de que no haya obstrucciones y de que las ranuras de chavetas estén alineadas.

Manipulación de cables de fibra óptica

Al manipular cables de fibra óptica, tenga en cuenta las siguientes precauciones:

- No enrolle el cable a menos de 96 mm (3,75") de diámetro.
- No curve el cable a menos de 12 mm (0,5") de radio. StorageTek recomienda que el radio de curvatura de un cable no sea inferior a 20 veces el diámetro del cable.
- No tire de los cables: colóquelos con cuidado en su posición.
- No aferre los cables con alicates, pinzas ni fresas. No una los cables ni los conectores a dispositivos de tracción.
- Mantenga los cables apartados de bordes y salientes afilados que pudieran cortarlos o desgastarlos. Asegúrese de que los orificios del equipo dispongan de bordes protectores.
- Proteja los cables contra temperaturas extremas.
- En toda ocasión en que el conector no esté conectado, colóquele su cubierta de protección.

Seguridad y precauciones del bastidor

ADVERTENCIA:
Posibilidad de lesiones físicas:

- **Es necesaria más de una persona para instalar o desinstalar equipos en y del bastidor de la biblioteca.**
- **Al mover una biblioteca que contenga equipos instalados en bastidor, deberán adoptarse las precauciones adecuadas. El peso de algunos equipos del bastidor pueden modificar la altura del centro de gravedad de la biblioteca. Esta situación puede provocar que la biblioteca se vuelque durante un traslado.**

Al instalar la biblioteca en el bastidor, adopte las siguientes precauciones de seguridad y de manipulación:

PRECAUCIÓN:
Daños potenciales al equipo: **Evite superar el peso (136 kg [300 lb]) y altura (13U) máximos admisibles para equipos del área de bastidor de la biblioteca.**

- Asegúrese de que el equipo disponga de homologaciones UL (Underwriters' Laboratories), CSA (certificado de la Canadian Standards Association) y CE (compatibilidad con las directivas y normas de la Unión Europea).
- Debe entenderse que la biblioteca no proporciona alimentación eléctrica al área del bastidor. Por ello, asegúrese de que el equipo instalado en el bastidor disponga de una fuente de alimentación adecuada.

  Nota: Si desconecta la alimentación eléctrica de la biblioteca accionando el interruptor de encendido de ésta, el equipo instalado en el bastidor seguirá conectado a la alimentación eléctrica.
- Siga las directrices del fabricante para colocar, sostener y fijar el equipo en el mismo.
- Sitúe el equipo de tal modo que no bloquee ni obstaculice ningún orificio de ventilación del área del bastidor de la biblioteca. Por ejemplo, no bloquee las áreas de escape de la biblioteca o de la unidad, el área de escape del módulo electrónico, orificios perforados en el metal ni medios de ventilación similares.
- Sitúe el equipo de tal manera que las puertas de la biblioteca no lo toquen al cerrarlas.
- Instale el equipo en el bastidor desde abajo hacia arriba. StorageTek recomienda instalar los componentes más pesados en la parte inferior del bastidor.
- Asegúrese de que cualquier equipo instalado dentro del bastidor disponga de la ventilación adecuada. La temperatura ambiente en el interior del bastidor no debe ser superior a la temperatura de servicio recomendada. Para la refrigeración de la base deben tomarse en consideración tanto la disipación eléctrica dentro del espacio del bastidor como las condiciones ambientales externas de la biblioteca. Dentro del espacio del bastidor debe ajustarse la refrigeración para una disipación eléctrica moderada.
- Asegúrese de que el equipo del bastidor no crea una situación de sobrecorriente, tanto si el equipo está conectado directamente al circuito derivado como si lo está a una regleta de distribución de alimentación.
- Asegúrese de que el equipo del bastidor disponga de una puesta a tierra fiable, tanto si el equipo está conectado directamente al circuito derivado como a una regleta de distribución de alimentación.

PRECAUCIÓN:
Daños potenciales al equipo: **Evite superar el peso (136 kg [300 lb]) y altura (13U) máximos admisibles para equipos del área de bastidor de la biblioteca.**

Al instalar la biblioteca en el bastidor, adopte las siguientes precauciones de seguridad y de manipulación:

- Asegúrese de que el equipo disponga de homologaciones UL (Underwriters' Laboratories), CSA (certificado de la Canadian Standards Association) y CE (compatibilidad con las directivas y normas de la Unión Europea).
- Debe entenderse que la biblioteca no proporciona alimentación eléctrica al área del bastidor. Por ello, asegúrese de que el equipo montado en el bastidor disponga de una fuente de alimentación adecuada.

  Nota: Si desconecta la alimentación eléctrica de la biblioteca accionando el interruptor de encendido de ésta, el equipo montado en el bastidor seguirá conectado a la alimentación eléctrica.
- Siga las directrices del fabricante para colocar, sostener y fijar el equipo en el mismo.
- Sitúe el equipo de tal modo que no bloquee ni obstaculice ningún orificio de ventilación del área del bastidor de la biblioteca. Por ejemplo, no bloquee las áreas de escape de la biblioteca o de la unidad, el área de escape del módulo electrónico, orificios perforados en el metal ni medios de ventilación similares.
- Sitúe el equipo de tal manera que las puertas de la biblioteca no lo toquen al cerrarlas.
- Instale el equipo en el bastidor desde abajo hacia arriba. StorageTek recomienda instalar los componentes más pesados en la parte inferior del bastidor.
- Asegúrese de que cualquier equipo instalado dentro del bastidor disponga de la ventilación adecuada. La temperatura ambiente en el interior del bastidor no debe ser superior a la temperatura de servicio recomendada. Para la refrigeración de la base deben tomarse en consideración tanto la disipación eléctrica dentro del espacio del bastidor como las condiciones ambientales externas de la biblioteca. Dentro del espacio del bastidor debe ajustarse la refrigeración para una disipación eléctrica moderada.
- Asegúrese de que el equipo del bastidor no crea una situación de sobrecorriente, tanto si el equipo está conectado directamente al circuito derivado como si lo está a una regleta de distribución de alimentación.
- Asegúrese de que el equipo del bastidor disponga de una puesta a tierra fiable, tanto si el equipo está conectado directamente al circuito derivado como a una regleta de distribución de alimentación.

Prevención de daños por descarga electrostática

Antes de tocar cualquier componente interno de la biblioteca, incluidas las unidades de cinta, debe tomar las precauciones adecuadas frente a descargas electrostáticas (DES).

PRECAUCIÓN:
Los componentes son sensibles a la electricidad estática: **incluso una pequeña descarga electrostática puede dañar un componente eléctrico del interior de la biblioteca. Un componente dañado puede no fallar inmediatamente pero, con el tiempo, se deteriora y puede causar un problema "intermitente". Asegúrese de tocar una superficie metálica *sin pintar* de la biblioteca antes de tocar el interior de la misma, las unidades de cinta o los equipo de interfaz opcionales.**

Antes de tocar un componente interno:

1. Toque con el dedo una superficie metálica *sin pintar* de la biblioteca. En algunas bibliotecas se puede tocar el marco. En otras, puede tocar un tornillo de la pared o el marco de la puerta.
2. No mueva demasiado el cuerpo mientras toca las unidades de cinta o los componentes de la biblioteca.

Puede adquirir muñequeras antiestáticas con extremos de mordazas.

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General Information

1

This chapter describes the hardware components of the library, the cell locations for cartridge tapes, and the two library operating modes (automatic and manual). For software information and drive information, refer to the publications that pertain to these specific topics.

The library is a robotic system that mounts cartridges into a storage cell or into a drive for read/write operations. It also moves cartridges from the cartridge access port (CAP) to storage cell or from cell to cell. Figure 1-1 on page 1-3 through Figure 1-4 on page 1-8 show the major components of the library, described in the following pages.

Refer to Appendix D for L1400M Tape Library differences information.

Tape Library Components

The tape library has seven major components:

- A robot, which mounts and dismounts cartridges
- Storage cells for 156 to 678 cartridges in a standalone configuration; 300 to 1,344 cells when two libraries are joined with a Pass-thru Port (PTP)
- A CAP that holds up to 20 cartridges in four magazines, with an optional second CAP that holds the same number of cartridges
- Drives, which perform read/write operations
- Operator panel that provides controls and indicators for the library and a 10-character display for messages
- Electronic module that controls the robot operations and interfaces to the host operating systems (not shown, located behind the rear door)
- Power systems that include both AC and DC power supplies (not shown, located behind the rear door)

Robot

The robot moves cartridges between storage cells, between cells and tape drives, and between the CAP and cells. The robot consists of the Z column assembly (vertical motion), the theta mechanism (lateral motion), and the hand-camera assembly. Figure 1-1 on page 1-3 shows these robot components.

The Z column assembly contains a Z column and Z carriage. The Z column attaches to the floor and ceiling of the tape library. The Z column can rotate almost 360 degrees to enable access to all the cells in the tape library.

The hand-camera assembly, which is attached to the Z carriage, grasps and releases cartridges. The Z carriage moves the hand up and down the Z column to storage cells, drives, or the CAP.

The camera, which is on the hand, is active only during a library audit. An audit occurs when you:

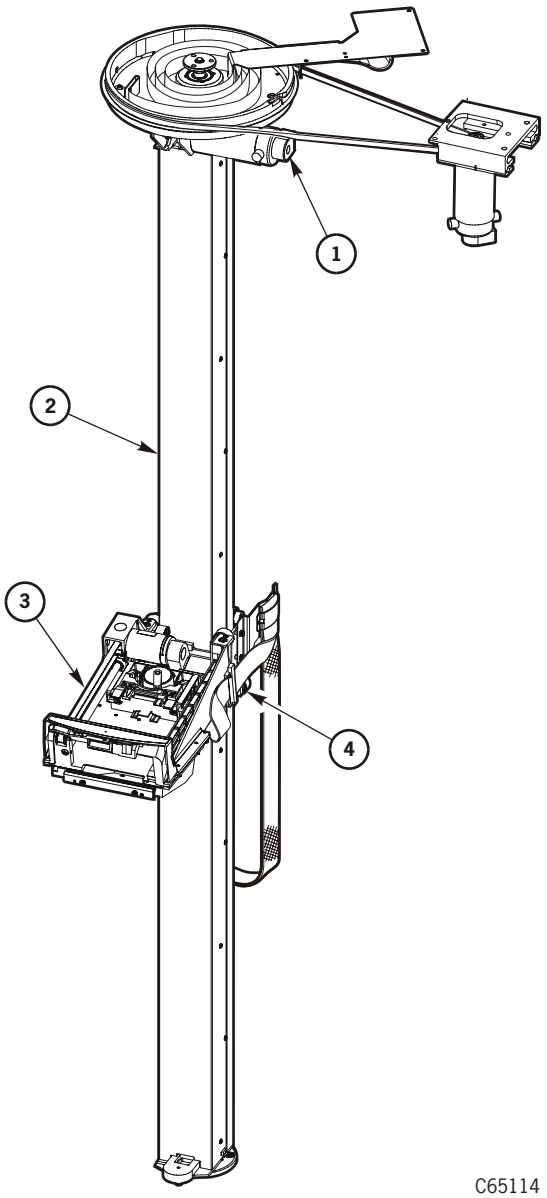
- Power-on the tape library.
- Open and close the left access library door.
- Make a request at the customer server console to audit the tape library.

During an audit, the camera reads the location and volume serial number (VOLSER) of each cartridge in the storage cells and reserved cells. Since this information is stored in the library's memory, the library does not rely on the camera to read cartridge locations or VOLSERs during mount and dismount operations.

The storage of audit data within the library has two implications for operation:

- Each time an audit occurs, you must use the system console to request a host update. This procedure adds the library audit information to the host memory.
- If you manually exchange a cartridge from a drive for one in storage, the host memory will continue to apply the VOLSER and location information from the first cartridge to the second cartridge. This might cause an error.

Figure 1-1. Robot Components (C65114)



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

Hand-Camera Assembly

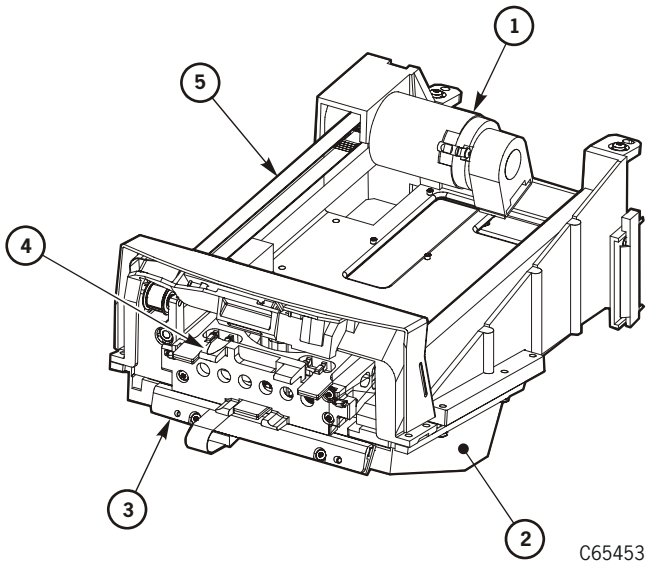
Figure 1-2 shows the hand-camera assembly which consists of a gripper, a motor-driven drive belt for gripper extension, and a bar code scanner card and camera (enclosed in a case under the hand components).

The camera reads the volume serial numbers (VOLSERs) from the cartridge labels during an audit and as you enter cartridges through the CAP. During an audit, the library matches each VOLSER with a specific cell location. These locations are stored in memory on the MPC/MPCL card. Because the library always stores a cartridge in the same location, it does not use the camera during normal robotic operations.

During the library's initialization, the hand checks its extension in the space below the calibration label (at the bottom of the drive column).

Note: Cartridges left in drives will not be audited. However, volume information is retained for a cartridge that a library mounted to a drive.

Figure 1-2. Hand-Camera Assembly (C67038)



1. Motor
2. Camera housing
3. LED card
4. Gripper
5. Drive belt

Storage Cells

Host software locates cartridges by panel, column, row, and cell. The library contains storage cells for 156 to 678 cartridges, excluding the CAP cells. The number of cells is determined by how many drives are installed and whether the tape library has the standard rear window panel or the expansion frame. The expansion frame provides additional storage cells for 294 cartridges.

Cell Locations

Cartridges are stored in cell arrays that hold six cartridges. Cell arrays are stacked in columns and these columns are arranged in a circle around the robot assembly. Columns can hold up to 42 cartridges.

- Table 1-1 on page 1-6 lists tape library storage capacities.
- Figure 1-3 on page 1-7 through Figure 1-4 on page 1-8 show cell locations for the L700e tape library in its various configurations.

Note: The following statements apply to cell locations:

1. The library uses array targets for robotic calibration during an Initial Program Load (IPL).
2. Never put data cartridges in the reserved cells. If you do not want to store diagnostic and/or cleaning tapes in these cells, you must leave them empty.
3. The library does *not* use the drive and CAP locations to store cartridges.
4. The robot uses the swap cell (the top-most cell in the reserved area) for in-transit cartridges, to perform a swap operation, or to place a cartridge that is left in the hand-camera assembly when a power failure occurs. See "Reserved Cells" on page 1-9 for a more complete description.

Library Capacity

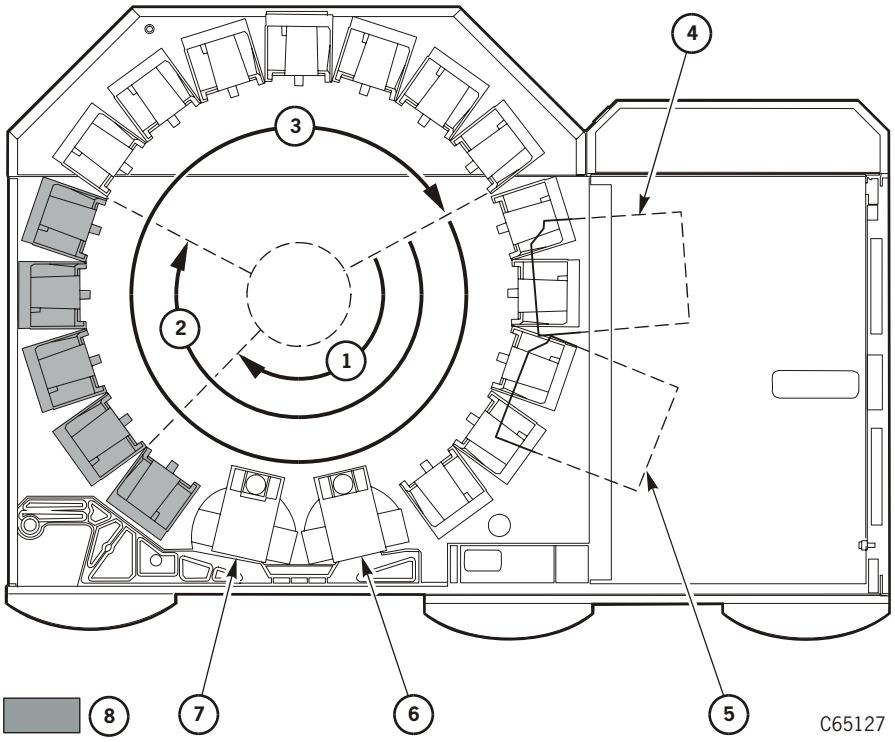
Table 1-1 lists the library storage capacities. Although library capacity is automatically configured when you bring the library online, check the operator panel to be sure that the capacity information is accurate.

Table 1-1. Tape Library Capacity

Expansion Frame	Second Drive Column	Drives Installed (Maximum)	Panel 2 Access	Total Data Cartridge Cells[1.]	Reserved Cells[2.]
Yes (Full)	No	10 DLT/Ultrium, or 6 T9x40/T10000 + 1 DLT, or 1 Ultrium	Entire	678	12
	Yes	20 DLT/Ultrium, or 12 T9x40/T10000 + 2 DLT, or 2 Ultrium	Entire	618	12
No (2/3)	No	10 DLT/Ultrium, or 6 T9x40/T10000 + 1 DLT, or 1 Ultrium	Entire	384	12
	Yes	20 DLT/Ultrium, or 12 T9x40/T10000 + 2 DLT, or 2 Ultrium	Entire	324	12
No (1/3)	No	10 DLT/Ultrium, or 6 T9x40/T10000 + 1 DLT, or 1 Ultrium	Partial	216	12
	Yes	20 DLT/Ultrium, or 12 T9x40/T10000 + 2 DLT, or 2 Ultrium	Partial	l56	12

1. These numbers do not include cells in the CAP or the reserved area. These numbers must be doubled (minus 12 cells) for libraries joined with a PTP.
2. The reserved cells are composed of one swap cell and 11 cleaning and/or diagnostic cartridge slots. They are shown in Figure 1-5 on page 1-10.

Figure 1-3. Locating Cartridges—Top View (C65127)



1. 1/3 capacity (partial access to Panel 2)

   Note: For 1/3 capacity with a PTP, columns 1 and 2 on Panel 2 cannot be used.
2. 2/3 capacity (entire access to Panel 2)
3. Full capacity (with optional expansion frame)
4. Drive column 0
5. Drive column 1 (optional)
6. CAP B (optional)
7. CAP A
8. Panel 2

Figure 1-4. Locating Cartridges—Panels, Columns, Rows (C65412)

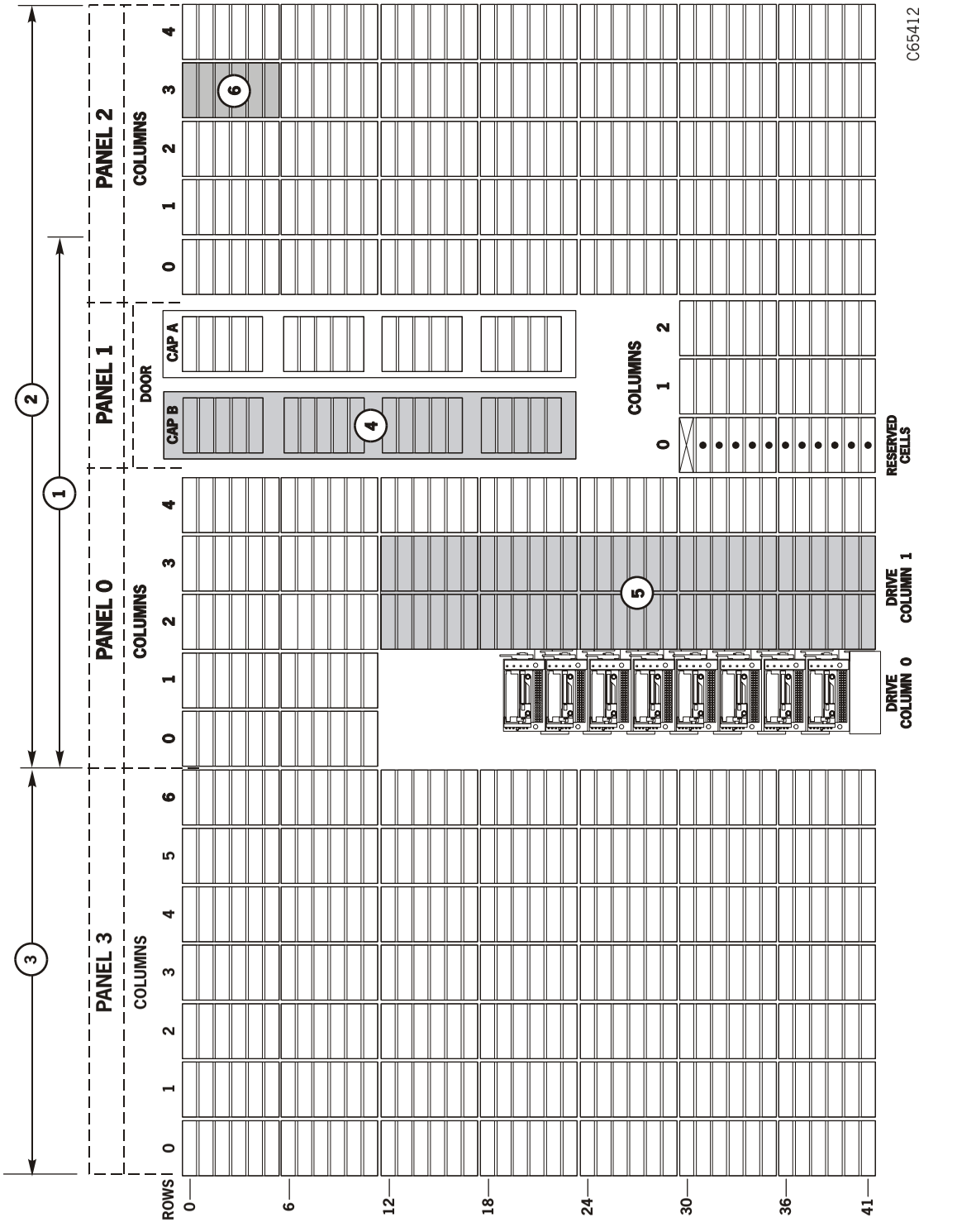


Figure 1-4. Locating Cartridges—Panels, Columns, Rows (Continued) (C65412)

1. 216-cartridge-cell configuration
2. 384-cartridge-cell configuration
3. Expansion frame (See note)

   Note: 678-cartridge-cell configuration equals 384-cartridge-cell configuration plus Expansion frame.
4. Optional second CAP (See note)
5. Optional second drive column

   Note: The optional second CAP replaces the front window. The optional second drive column replaces the 60 shaded cells.
6. If a PTP is installed, six storage cells are replaced with two PTP cells in this location.

Reserved Cells

The reserved cells, located within the library's left access door, are composed of two types: a single, in-transit cell and diagnostic/cleaning cells. These are described below.

In-transit Cell

In Figure 1-5 on page 1-10, the top cell is reserved for in-transit cartridges and used as a drop-off cell. Do *not* place a cartridge into this cell.

Under the following conditions, it may also be used as a drop-off cell if the robot has a cartridge in the hand/camera assembly and the library loses power:.

- the cartridge cannot be returned to its source cell
- the cartridge cannot be placed into its destination cell
- during such a power-off condition, the cartridge will *never* be placed into a drive

  When power is restored, the robot automatically places this cartridge into the drop-off cell as part of the robotic initialization sequence.

Diagnostic/Cleaning Cells

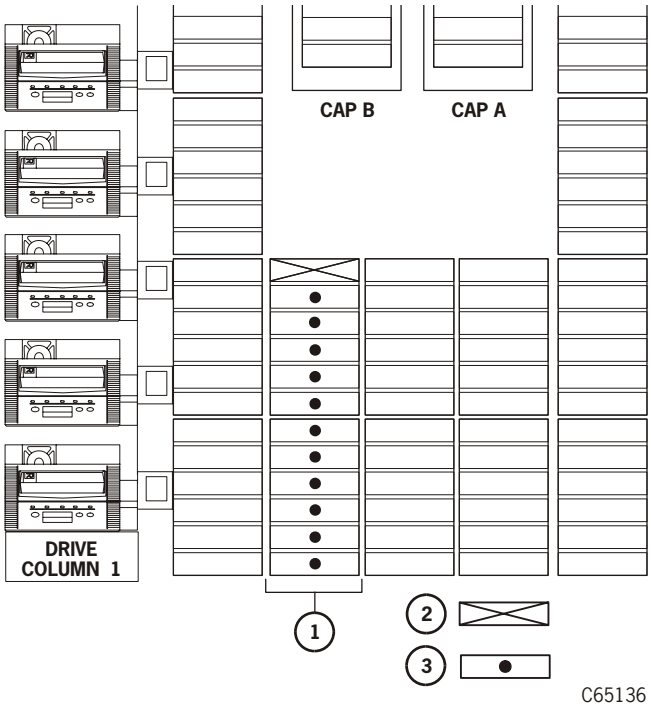
You may place any type of cleaning or diagnostic cartridge into the other 11 cells. Alternately, these 11 cells may be left empty.

Manually loading cleaning cartridges into any of the 11 cells enables Auto Clean. Alternately, entering cleaning cartridges through the CAP also enables Auto Clean. Cleaning cartridges must match the types of drives installed in the library.
See "Auto Clean" on page 3-19 for more information regarding cleaning cartridges and the Auto Clean feature.

Note: Diagnostic cartridges must be manually placed into the reserved cells.

CAUTION:
System degradation: **Do not insert data cartridges into these reserved cells. The host software will not find these cartridges.**

Figure 1-5. Reserved Cell Locations (C65136)



1. Location of reserved cells
2. Swap cell (leave empty)
3. Diagnostic and cleaning cartridges

Cartridge Access Port

A cartridge access port (CAP) is the location where you add cartridges to or remove cartridges from a library without interrupting normal cartridge mounts and dismounts by the robot. The library may have an optional, second CAP. Both CAPs are located on the right front door.

The CAP magazine is designed for easy loading. You can access the magazine by simply pulling down on the magazine handle and adding cartridges. Or, you can remove the magazine by lifting it out, load the cells, and place the magazine back into the CAP. Snap-on cartridge retention covers allow you to keep cartridges in place when transporting magazines.

For detailed procedures, refer to "Importing Data Cartridges through the CAP".

Tape Drives

The library supports the following types of drives:

- T9840A – HVD SCSI or Fibre Channel
- T9840B – HVD SCSI, Fibre Channel, Enterprise Systems Connection (ESCON), or fibre connection (FICON).

  To use the T9840B drive with ESCON operation:
  - library firmware must be version 3.01 or later,
  - Client Server Component (CSC) software must be version 4.1 or later.
  - Automated Cartridge System Library Software (ACSLS) (Unix-based server) software must be version 6.1.1 or later.

  To use the T9840B drive with FICON operation:
  - library firmware must be version 3.07 or later,
  - CSC software must be version 5.0 or later,
  - ACSLS (Unix-based server) software must be version 6.1.1 or later.
- T9840C – Fibre Channel, ESCON, or FICON.

  To use the T9840C with ESCON operation:
  - library firmware must be version 3.07 or later,
  - CSC software must be version 5.0 or later,
  - ACSLS (Unix-based server) software must be version 6.1.1 or later.

  To use the T9840C with FICON operation:
  - library firmware must be version 3.07 or later,
  - CSC software must be version 6.0 or later,
  - ACSLS (Unix-based server) software must be version 7.0 or later.
- T9940A – HVD SCSI or Fibre Channel
- T9940B – Fibre Channel only
- T10000 – Fibre Channel
  - The T10000 requires library firmware version 3.11.02 and SN3300 router/ L1400M Interface Control Module firmware version 5.64F or later.
- DLT 7000 or DLT 8000 – HVD SCSI only
- The SDLT 320 model—Backward Read Compatibility (BRC – ability to read previously written tapes on DLTIV media)
- SDLT 600—LVD and Fibre Channel. Reads/writes DLTtape II. Read-only from DLTtape I. This drive requires Firmware Version 3.08.01 or later
- DLT-S4—LVD and Fibre Channel. Reads/writes DLTtape S4 cartridges. Read only from SDLT 320 and 600 cartridges. Library firmware must be Version 3.15.02 or later.

- IBM drives
  - Ultrium 1 – Native LVD, Fibre Channel or, with a converter card, HVD
  - Ultrium 2 Fibre Channel drives. This drive requires Firmware Version 3.04 or later.
  - Ultrium 3 Fibre Channel drives. This drive requires Firmware Version 3.08.01 or later.
  - Ultrium 4* LVD or Fibre Channel drives. Backward read/write compatible with Ultrium 3 media, read only with Ultrium 2 media. Library firmware must be Version 3.15.02 or later.
- Hewlett Packard drives:
  - Ultrium 1—Native LVD or, with a converter card, HVD
  - Ultrium 2—Native LVD only. This drive requires Firmware Version 3.03 or later.
  - Ultrium 2—Fibre Channel. This drive requires Firmware Version 3.05 or later.
  - Ultrium 3—LVD and Fibre Channel. Reads/writes Ultrium 2 cartridges. Read only from Ultrium 1 cartridges. This drive requires Firmware Version 3.08.01 or later
  - Ultrium 4* LVD or Fibre Channel drives. Backward read/write compatible with Ultrium 3 media, read only with Ultrium 2 media. Library firmware must be Version 3.15.02 or later.
- Certance Ultrium – LVD or HVD (determined by model number)

CAUTION:
***Possible data loss:* Sun/StorageTek does not advise mixing DLT 7000 and DLT 8000 drives in the same library. If a DLT 7000 cartridge is inserted into a DLT 8000 drive, the tape can be read and written in 7000 mode.**

If a DLT 8000 cartridge is inserted into a DLT 7000 drive, the drive will indicate "Medium Error/Calibration Error (03/8000)" if a read command is issued and, as with most tape drives, will write over any data present on the tape if a write command is issued at load point.

The maximum number of DLT or Ultrium drives is 20. The maximum number of T9x40/T10000 drives is 12.

As an operator, you might have to:

- Configure a drive in a library; refer to "Network Entries" on page 3-13.
- Check drive status information; refer to "Drive Status" on page 4-5.
- Manually mount a cartridge to a drive or dismount a cartridge from a drive; refer to "Loading/Unloading Cartridges Manually" on page 4-30.

  Note: During typical operation (or automated mode), the library's robotic hand-camera assembly automatically places a cartridge into the drive or removes a cartridge from the drive when a command is sent from the host software.

For specific drive information, refer to your drive publications.

*** Note:** Check availability for Ultrium 4 drives and media.

Optional Interfaces

Several optional interfaces are available for the library. These are described in the next three sections.

Sun/StorageTek L-Series Library Admin

This product provides tape library monitoring for L-Series libraries using an embedded web server and any web browser on the network connected to the L180/700e/1400.

Ordering the L-Series Library Admin is optional, but highly recommended for every L180 or L700e customer. Its configuration and operation are outlined in Chapter 3, "Configuration" and Appendix C, "Sun/StorageTek L-Series Library Admin."

Note: The L-Series Library Admin is included with all L1400 base library orders.

The optional Web interface to the L700e library is Feature code LS4X.

The Sun/StorageTek L-Series Library Admin lets a library's user configure, operate, and monitor the library through a workstation or PC that is running a Netscape or Microsoft browser. The monitor must first be enabled and configured on the library. Installation and configuration instructions appear in the documentation that ships with the Sun/StorageTek L-Series Library Admin components.

Table 1-2 lists the model and feature number. l

Table 1-2. Sun/StorageTek L-Series Library Admin Model/Feature Code

Description	Model	Required Feature	Quantity
Legacy StorageTek L-Series Library Admin for L700/700e	HRZNLSA	CDRM	N/A
Legacy Sun	SG-XMONLIBSWL700		
		LS4X (1 per tape library)	

Sun/StorageTek Framework Library Monitor

Sun/StorageTek Framework Library Monitor provides monitoring of several SCSI-attached libraries from within a system management framework on standard UNIX and Windows NT systems. It monitors the tape library associated with all data backup, recovery, hierarchal storage management, or vertical application jobs across a SCSI bus.

Its model number is HRZN001, Feature code FS3X. Installation and configuration instructions appear in the documentation that ships with the product.

See Table 1-3 on page 1-14. for the model and feature number.

Table 1-3. Sun/StorageTek Framework Library Monitor Model/Feature Codes

Description	Model	Required Feature	Quantity
Sun/StorageTek Framework Library Monitor	HRZN001	CDRM	N/A
		FS4X (1 per tape library)	
At least one of the following framework features (corresponding to the framework the customer has installed) must be ordered also:			
		FW01 (CA Unicenter)	
		FW02 (HP OpenView)	
		FW03 (Tivoli NetView)	
		FW04 (Other)*	

Note: The feature FW04 (Other) is for those customers who have their own SNMP application and wish to perform their own SNMP integration with the library's SNMP agent.

Sun/StorageTek Library Manager

Sun/StorageTek Library Manager (Product HRZN003) provides sharing and common robotics control for SCSI-attached libraries. It is also required for PTP operation. See Table 1-4.

Table 1-4. Sun/StorageTek Library Manager Model/Feature Codes

Product	Model	Feature	Quantity
Sun/StorageTek Library Manager	HRZN003	CDRM	N/A
		FS4X (1 per tape library)	
The features below correspond to the customer's platform.			
		WN2K (Windows 2000)	
		NT100 (Windows NT)	
		SLRS (Solaris)	
		LBAT (Library Attach)	
Note: Library Attach is required for PTP operation and for Windows NT/2000 platforms. ISVs use this product as the NT/2000 Client Software Component to interface with ACSLS, Library Manager, and Library Station.			

Table 1-5. Sun/StorageTek Optional Interfaces—Comparisons

Description	Framework Monitor	L-Series Library Admin	Library Manager
SNMP monitoring from management framework	X		
Launch L-Series Admin from framework	X		
Detailed monitoring and status of individual libraries		X	
Event handling	X	X	X
Library sharing among applications			X
Browser-based GUI		X	
Tape operations: import, export, mount, dismount, and query		X	X
Library management: reporting, state and status, configuration, startup, and shutdown.			X
PTP operation			X*
Note: Version 2.0 or higher required.			

Tape Library Safety Features

Safety features are incorporated into the tape library. If the left access door is opened, an electrical interlock removes power from the robot assembly.

The door access interlock of one library in a Pass-thru Port (PTP) configuration removes power to that library's robot and immediately suspends any PTP operation. This prevents any transfer of cartridges when you may be inside the library.

Behind the right front door, covers are placed over the logic card, the AC power supply, and the DC power supply to prevent you from coming into contact with hazardous voltages and sensitive electronics.

Controlling Software

Controlling software, within the client/server, requests tape read and write operations to the drives and robotic move operations for the tape library robotic components. Software determines where the cartridge is located by tracking the VOLSER and cell location during audits, then allocates which drive receives the cartridge. For specific information, refer to your software publications.

When the control path is a direct attachment, the software resides within the client central processing unit (CPU). When the control path is an indirect attachment, the software is divided between the server and the client CPUs. For specific information, refer to your software publications.

Library Operating Modes

An operating mode is the manner in which a tape library and the controlling software (also referred to as the customer's server software) interact. A library can operate in either automated mode or manual mode.

Automated Mode

Automated mode is the normal operating mode of the tape library. The controlling software instructs the robot to move the cartridge among the storage cells, drives, and CAP without operator intervention. Your tasks may include:

- Monitoring the tape library operator display for messages
- Importing a cartridge through the CAP
- Exporting a cartridge through the CAP
- Replacing a cleaning cartridge

Refer to Chapter 4, "Library Operation," for the procedures.

Manual Mode

Manual mode occurs when the tape library is offline. Your tasks may include:

- Opening the tape library doors
- Moving the robot
- Locating a cartridge
- Removing a cartridge from the hand
- Mounting a cartridge into a drive
- Dismounting a cartridge from a drive
- Returning the tape library to online status

Refer to Chapter 4, "Library Operation," for the procedures.

Auto Clean Feature

Drives occasionally need to be cleaned to prevent read/write errors.

The Auto Clean feature is enabled when your tape library is initializing and detects cleaning cartridges in the reserved cells. When a drive requires cleaning while Auto Clean is enabled, the robot will receive a software message telling it to retrieve a cleaning cartridge and place it into the drive.

If Auto Clean is not enabled, you must manually import a cleaning cartridge for the drive that requires cleaning. The "Clean Drive" request appears on the operator panel's display.

Refer to "Auto Clean" on page 3-19 for more information and procedures.

13U Rack Area

You may use the internal 13U (0.57 m [22.75 in.] x 0.48 m [19 in.]) rack area, located behind the right front door, for additional equipment. Refer to "Rack Safety and Precautions" on page xxvii for precautions you must follow before installing equipment in this area.

Power cable space is provided in the cutout area of the rear door.

CAUTION:
Heat within rack area: **Cooling considerations should be made based upon the power dissipation within the rack space, as well as the external library room ambient conditions. Cooling must be provided for moderate power dissipation within the rack space. Additional cooling is available from Sun/StorageTek.**

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Controls and Indicators

2

This chapter describes the functions of the library operator panel, the library power switch, and provides samples of displays you could see on the operator panel. It also lists tasks you can perform through the use of the operator panel. Refer to drive publications for information about operating the drives.

Operator Panel

The operator panel, recessed into the library's rack door, contains buttons, indicators, and a graphic display. Figure 2-1 on page 2-2 shows the panel and describes each item.

Use this panel to:

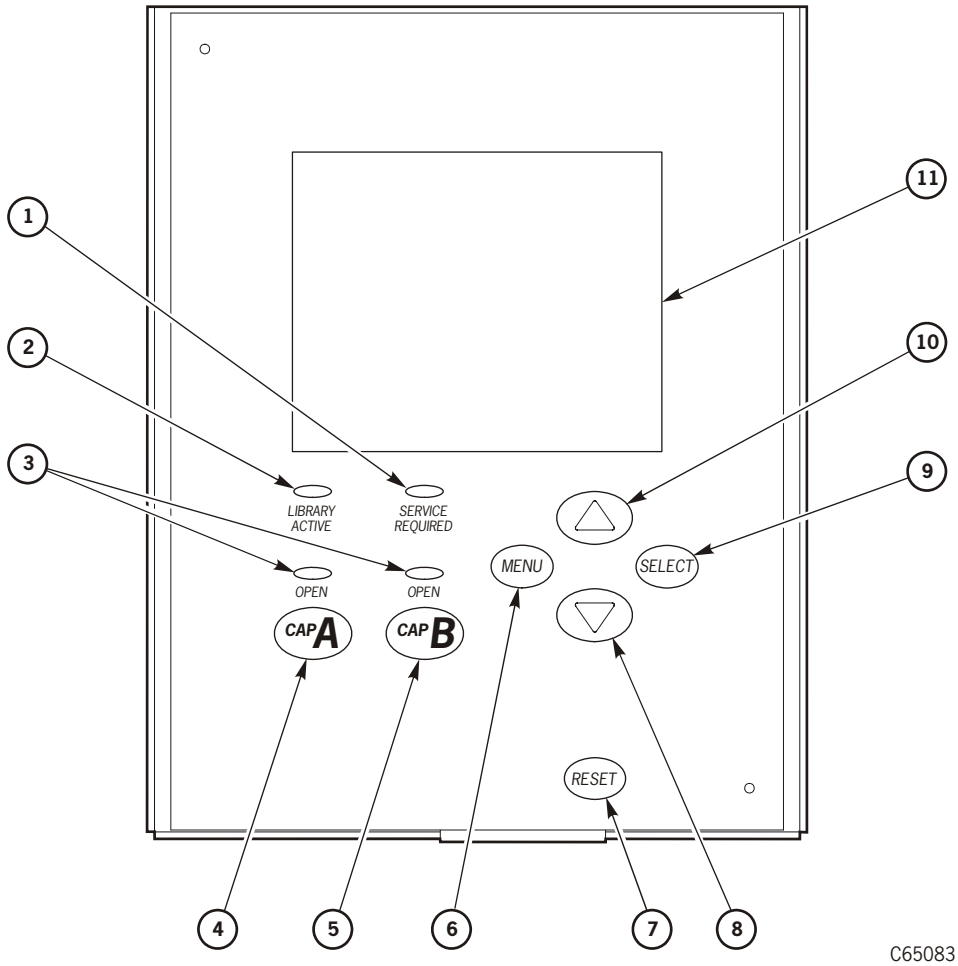
- Monitor current information about the CAPs, configuration, drives, doors, drive cleaning, hardware and software versions, personality, and library status
- Help resolve library problems

  If an error occurs, the display shows a fault symptom code (FSC), which you can give to a service representative to help resolve problems. Write down the FSC as soon as it is displayed.
- Set library, network, and drive configurations
- Rotate the CAPs
- Replace drive cleaning cartridges and set cleaning cartridge warning count
- Run library and drive tests
- Reset (start an initial program load [IPL] on) the library

For specific task instructions, refer to Chapter 3, "Configuration" and Chapter 4, "Library Operation."

Note: With 3.00.xx firmware and later, an asterisk (*) may appear on the operator panel display; for example, `STK L700 (Code 3.00.13)*`. This denotes that a cleaning cartridge's life has expired. To determine which cartridge has expired and to eject the expired cartridge, see "Cleaning Cartridge Usage Count" on page 3-24 and "Exporting Cleaning Cartridges through the CAP" on page 3-25.

Figure 2-1. Operator Panel Display, Controls, and Indicators (C65083)



1. *Service Required* indicator is steadily red when human intervention is required; blinks if a fan is defective.
2. *Library Active* indicator flashes green when the library is operational.
3. *Open* indicator is steadily amber when the CAP is open for you to import or remove cartridges.
4. CAP A open button rotates CAP A for you to access the magazines.
5. CAP B open button rotates CAP B for you to access the magazines.
6. MENU button initially places you into the Main Menu screen; subsequently, it returns you to a previously selected screen.
7. RESET button starts an IPL.
8. Arrow down button moves the cursor down the display screen or decrements an underscored value.
9. SELECT button selects an item on a menu; it also saves the currently underscored value and moves the cursor to the next field.
10. Arrow up button moves the cursor up the display screen; it also increments a value underscored on the screen.
11. Graphic display screen shows current information, FSCs, and allows input from menus.

Indicators

Three indicators provide basic status information: *Library Active, Service Required,* and *Open*. Refer to Figure 2-1 on page 2-2 for details about these indicators.

Note: When the *Service Required* indicator is on, Sun/StorageTek recommends that you contact your service provider.

Buttons

Six buttons are provided on the operator panel: CAP, RESET, MENU, SELECT, and the up and down arrows. The CAP and RESET buttons let you directly manipulate the library; the remaining four buttons let you manipulate the menus and underscored values on the graphic display. Refer to Figure 2-1 on page 2-2 for the location and a description of each button.

Note: The up arrow, down arrow, MENU and SELECT buttons manipulate only values that are under operator control. As you scroll down or up a list of selections, the cursor underscores these values. (You cannot manipulate values that do not permit underscoring.)

Display Screens

Screens on the graphic display show current information and allow your input. Information includes:

- Drive status
- CAP and CAP magazine status
- Library status
- Library capacity
- Library personality
- Library features
- Hardware and software versions
- SCSI type (single-ended or differential)
- Cleaning cartridge and Auto Clean status
- Ethernet ID
- Error and FSC information

Note: If your library contains a pass-thru port (PTP), the panel will display `L700e`; if you do not have a PTP, the panel will display `L700`.

Except for CAP status and error or FSC information, these values are set through an automatic configuration process that occurs during an IPL.

Values requiring your input are:

- Cleaning cartridge warning count
- SCSI drive configuration:
  - SCSI ID
  - Bus status (on or off bus)
- Network configuration:
  - Library name
  - IP address
  - Subnet mask
  - Library gateway
- Library configuration information:
  - SCSI ID
  - Fast Load enable/disable
  - Date/time
- Display screen brightness and contrast

You can also use the menus to run diagnostic tests.

The following pages describe the library's primary menus. For instructions on working with specific configuration values, see "Operator Panel Entry" on page 3-3

Library Status

The "Library Status" screen is an information-only screen. It is the first screen to appear on the operator panel after an IPL.

STK L700e (Code Version x.xx.xx)	Library type and firmware version
CAP Closed	CAP status
Library Ready / PTP Ready	Library / PTP status
No Remote Users or Web Enabled	Number of users logged onto the library through a remote interface or whether the Web interface is enabled.
Column 0	The status of each drive in the drive column

Figure 2-2 shows an example Library Status screen. (For a list of drive status messages, see "Drive Status" on page 4-5.)

Figure 2-2. Library Initial Status Screen

```
STK L700e (CODE VER 3.05.xx)*
CAP CLOSED

LIBRARY READY / PTP READY
WEB ENABLED
     COLUMN 0
00 BUSY
01 BUSY
02 LOADING
03 LOADING
04 EMPTY
05 EMPTY
06 EMPTY
07 ---
08 ---
09 ---
```

Note: An asterisk (*) may appear on the operator panel after the firmware version. This indicates that an expired cleaning cartridge is inside the library. See "Cleaning Cartridge Usage Count" on page 3-24 and "Exporting Cleaning Cartridges through the CAP" on page 3-25 to remove the expired tape.

By pressing the MENU button from the Library Status screen, you can display the main menu (see Figure 2-3).

Figure 2-3. Main Menu Screen

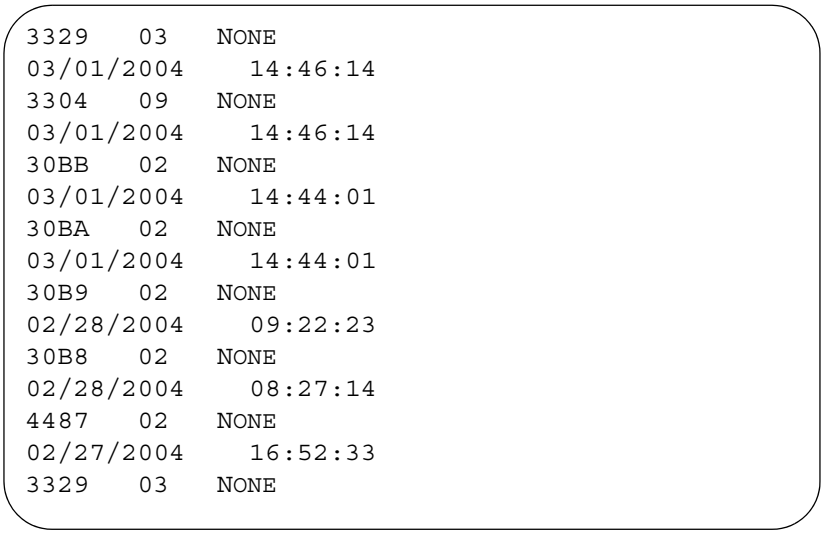
```
MAIN MENU:

FSC LOGS
CAP CONTENTS
DRIVE INFO
CLEANING INFO
DIAGNOSTICS
VERSION INFO
CONFIGURATION
```

FSC (Fault Symptom Code) Logs

The FSC Logs screen (Figure 2-4) displays the last 20 fault symptom codes (FSCs), the number of occurrences, and the date and time of the last occurrence. The screen may be scrolled (if required) to view all FSCs. For more information,
see "Reviewing FSC Logs" on page 4-18.

Note: Events listed in the log might not be failures. All events are recorded. FSCs are generated for both library and drive errors.

Figure 2-4. FSC Log Screen

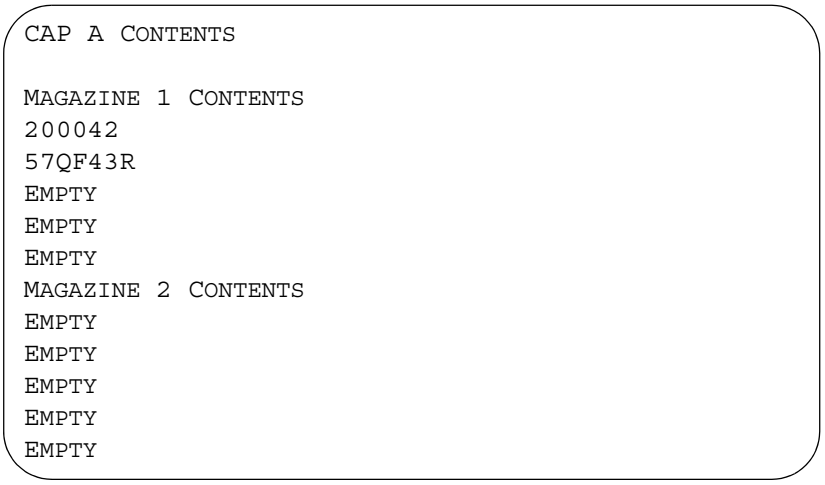


CAP Contents

The CAP Contents screen (Figure 2-5) is an information-only screen. It displays either the VOLSER of a cartridge or status message for each slot in a CAP magazine.

Note: You must scroll down to view the contents of both CAPs.

Figure 2-5. CAP Contents Screen



Drive Information

The Drive Information Menu (Figure 2-6 and Figure 2-7) is an information-only screen that lists manufacturing and status information about the selected drive:

Vendor	The manufacturer of the drive
Type	The drive model
Status	The drive's local number and status (see "Drive Status" on page 4-5 for a list of status messages)
Serial Number	The serial number assigned by the drive's manufacturer
Interface Type	The type of client-to-drive interface (this example shows a SCSI interface, but a drive with Fibre Channel capability would display `FIBRE I/F`)
Code Version	The firmware version of the drive

See "Drive Information" in Chapter 4, "Library Operation" for instructions on how to access a drive.

Figure 2-6. Drive Information Menu (1 of 2)

```
DRIVE INFORMATION MENU:
00   HP LTO
```

Upon pressing SELECT when the cursor is lined up with the drive, you will see further information as shown below.

Figure 2-7. Drive Information Menu (2 of 2)

```
DRIVE INFORMATION MENU:

VENDOR: HP
TYPE: HP LTO
STATUS: 00 EMPTY

SERIAL NUMBER:
 XXXXXXXXXX

INTERFACE TYPE:
 SCSI I/F

CODE VERSION
 13
```

Cleaning Information Menu

The Cleaning Information menu (Figure 2-8) provides information about and control of the library's cleaning cartridges. It enables you to change the warning count for each type of cleaning cartridge.

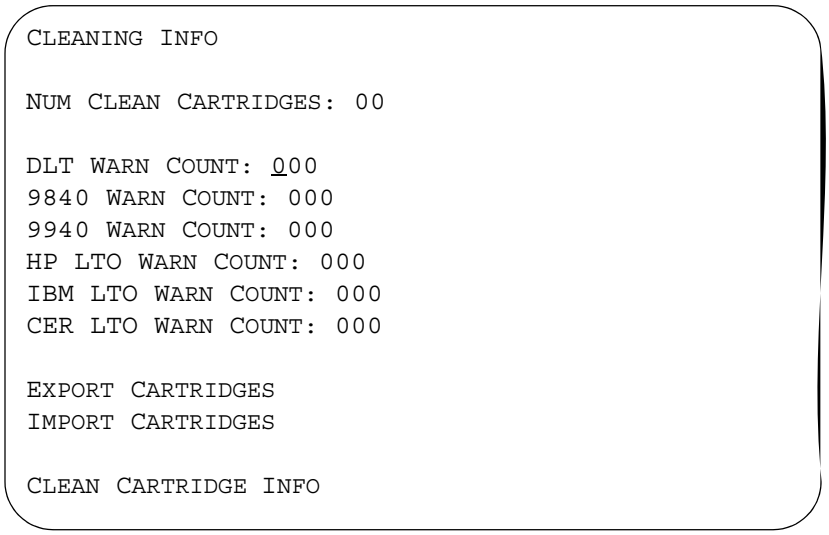
Warning Count

The warning count should be set lower than the cartridge's recommended usage (or "maximum warning count" displayed on the operator panel); this will allow time for you to obtain a replacement cleaning cartridge. For example, if the maximum warning count equals 20 uses, you may want to set the warning count to 17 (or other, lower number).

Always replace a used cleaning cartridge with a new, unused cleaning cartridge.

Note: You should periodically check the status of the cleaning cartridges. See "Cleaning Cartridge Usage Count" on page 3-24 for directions.

Figure 2-8. Cleaning Information Menu



Cleaning Cartridge Expiration

If the usage count for a cleaning cartridge has reached its life limit, the `CLEAN CARTRIDGE INFO` screen will display `EXPIRED`. You *must* remove this cartridge from the library. See "Cleaning Cartridge Expiration" on page 3-24 for more details.

The table below shows an example of the Cleaning Info menu:

Num Clean Cartridges	The total number of cleaning cartridges located in the reserved cells within the library
DLT Warn Count	The number times you want the DLT cleaning cartridge to be used before a warning appears.
T9840 Warn Count	The number times you want the T9840 cleaning cartridge to be used before a warning appears.
T9940 Warn Count	The number times you want the T9940 cleaning cartridge to be used before a warning appears.
T10000 Warn Count	The number times you want the T10000 cleaning cartridge to be used before a warning appears.
HP LTO Warn Count **IBM LTO Warn Count** **CER LTO Warn Count** **Universal LTO Warn Count**	The number of times you want the specified Ultrium cleaning cartridge to be used before a warning appears.
Export Clean Cartridges	A procedure for moving cleaning cartridges from the reserved cells to the CAP
Import Cleaning Cartridges	A procedure for moving cleaning cartridges from the CAP to the reserved cells
Clean Cartridge Info	A path to an information screen that lists all cleaning cartridges in the library

For more information, see "Auto Clean" on page 3-19, which includes the following sections:

- "Manually Installing Cleaning Cartridges" on page 3-21
- "Importing Cleaning Cartridges through the CAP" on page 3-21
- "Cleaning Cartridge Warning Count" on page 3-23
- "Cleaning Cartridge Usage Count" on page 3-24
- "Cleaning Cartridge Expiration" on page 3-24
- "Exporting Cleaning Cartridges through the CAP" on page 3-25

Diagnostic Tests

Note: All Diagnostic tests except for Clean Drive require the tape library and associated drive to be offline.

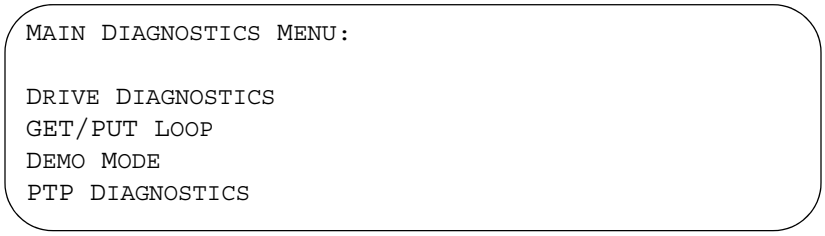
The Main Diagnostics Menu (see Figure 2-9) lets you perform the following tests:

- **Drive-related tests:**
  - **Clean Drive**. Enables you to clean tape drives.
  - **Mount**. Loads test tapes to a drive.
  - **Dismount**. Unloads test tapes from a drive.
  - **Mount-Dismount Loop**. Loads and unloads test tapes from a drive. You may designate the number of times the tape library goes through the loop.
  - **Run Drive Check.** Determines that the drive is in working order.

  Note: Sun/StorageTek does not recommend looping tests excessively.
- **Get-Put Loop**. Gets a diagnostic tape and returns it to the same location. You may designate the number of times the tape library goes through the loop.
- **Demo Mode**. Simulates tape library operation.

For more information, see "Running Diagnostic Tests" on page 4-19.

Figure 2-9. Main Diagnostics Menu



Version Information

The Version Info Menu is an information-only screen (see example in Figure 2-10). It displays the version level of the library's functional code, the date the code was completed, and the serial number of the logic card (also referred to as "the MPC card").

Figure 2-10. Version Information Menu

```
VERSION INFO MENU:

STK L700E

CODE VERSION:
   3.05.xx

CODE BUILT ON:
   MAY 29 2003  16:38:19

HARDWARE VERSION
   MPC 00000798
```

Main Configuration Menu

The Main Configuration Menu (see Figure 2-11) allows you access to the configuration menus (library, drive, network) and to the panel display controls. You can access screens that let you view the library personality, perform a feature upgrade, and input a password for a Web interface product.

Figure 2-11. Main Configuration Menu

```
MAIN CONFIGURATION MENU

LIBRARY CONFIG
DRIVE CONFIG
NETWORK CONFIG
PERSONALITY MODULE
WEB PASSWORD
DISPLAY INFO
```

Library Configuration

The Lib Config Menu displays library capacity information and lets you modify the library's configuration.

The screen displays:

Lib SCSI I/F ID (OR Lib Fibre I/F ID)	Library interface identifier
Fast Load	Fast Load feature status (on or off)
Media Check	Whether LTO, DLT, and SDLT cartridges are checked for proper orientation during audit (3.08 firmware or higher)
Date	Current date
Time	Current time
Auto Clean	Is Auto Clean is enabled
Caps	Number of CAPs installed
User Cells	Number of data storage cells in the library
Drive Column	Number of drive columns installed
Expansion Frame	Is an expansion frame installed

Figure 2-12 shows an example library configuration screen. From this menu, you may access editing menus for these library settings. See "Library Entries" on page 3-4 for procedures and additional information.

Figure 2-12. Library SCSI Interface Configuration Menu (1 of 2)

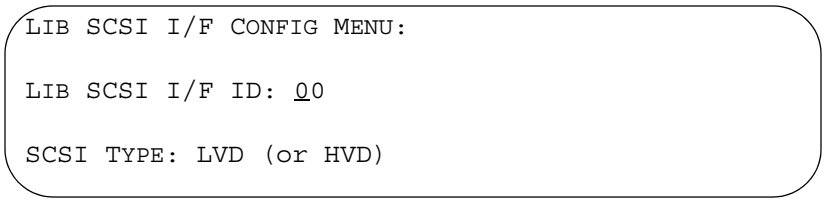
```
LIB CONFIG MENU:

LIB SCSI I/F
FAST LOAD: OFF
MEDIA CHECK: ON
DATE: 03/01/2002
TIME: 23:59

AUTO CLEAN: OFF
USER CELLS: 336

CAPS: 2
DRIVE COLUMN: 2
EXPANSION FRAME: NO
EXPANSION FRAME: NO
```

Library SCSI Interface Configuration

The Lib SCSI I/F Config Menu lets you view the library's SCSI type (differential or single-ended) and access an edit menu for the library's SCSI ID. Figure 2-13 shows an example of this menu.

When you place the cursor at the `LIB SCSI I/F` line, the following will display, allowing you to set the library's SCSI ID.

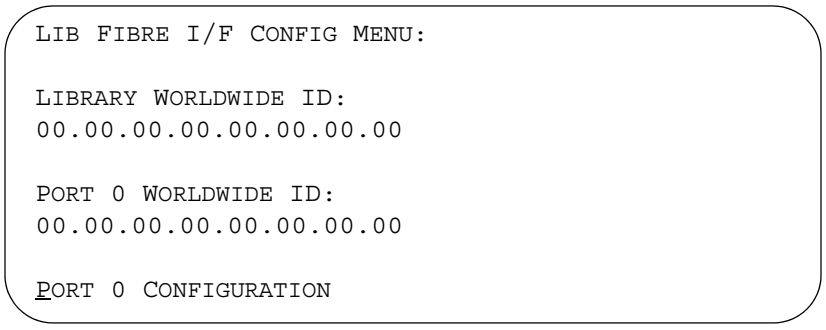
Figure 2-13. Library SCSI Interface Configuration Menu (2 of 2)



Library Fibre Channel Interface Configuration

The Lib Fibre I/F Config Menu lets you view the library's worldwide ID and Port 0 worldwide ID. It also lets you access an edit menu for the library's Port 0 address. Figure 2-14 shows an example of this menu.

Figure 2-14. Library Fibre Channel Interface Configuration Menu



Drive Configuration

The drive configuration menu lets you modify each drive's configuration. Figure 2-15 on page 2-15 shows an example screen. For each drive, the menu displays:

- Drive position
- Drive type
- If the drive path is SCSI, the drive's SCSI ID and its SCSI bus relationship with the library.
- If the drive path is Fibre Channel, the menu displays FIBRE I/F after the drive type.

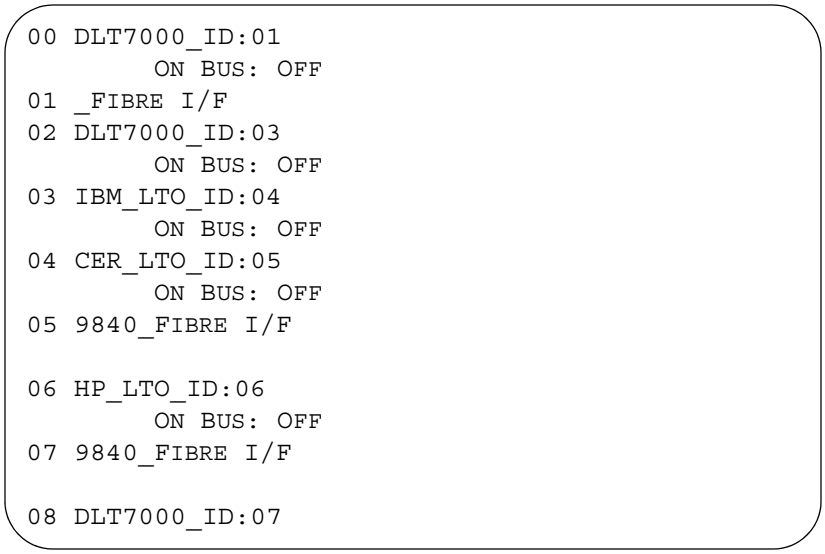
Sub-menus let you change the SCSI ID and configure whether the drive is on the same SCSI bus as the library.

For more information, see "Network Entries" on page 3-13."

Notes: These statements apply to this menu:

1. The cursor position is saved on all screens that list the library's drives.
2. The panel displays 16 lines of data per menu. If your library contains more than eight drives, you must use the down arrow button to scroll to drives 08 and above.

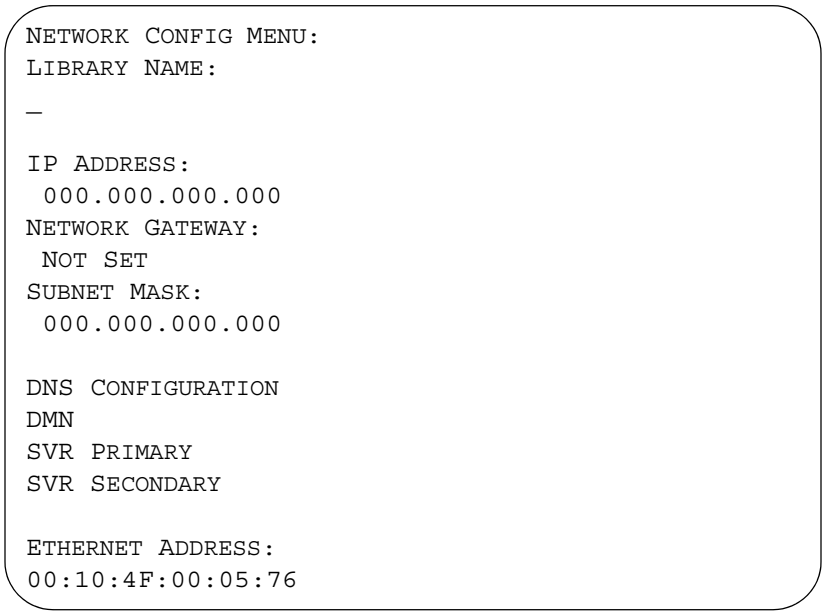
Figure 2-15. Drive Configuration Menu



Network Configuration

The Network Config Menu (see Figure 2-16) lets you modify the library's network configuration and view the library's Ethernet (web interface) address. For procedures, see "Network Entries" on page 3-13.

Figure 2-16. Network Configuration Menu



Personality Module

The Personality Module Menu (Figure 2-17) lets you view the library's personality (vendor) setting. This feature must be installed by the service representative.

Figure 2-17. Personality Module Information (1 of 2)

```
PERSONALITY MODULE INFO:

STATUS:
  PRESENT
TYPE:
  NORMAL
VERSION:
  0
LIBRARY VENDOR ID:
  0
LIBRARY VENDOR NAME:
  STK

LIBRARY PRODUCT NAME:
  L700e
```

When you use the down arrow, the following information will appear:

Figure 2-18. Personality Module Information (2 of 2)

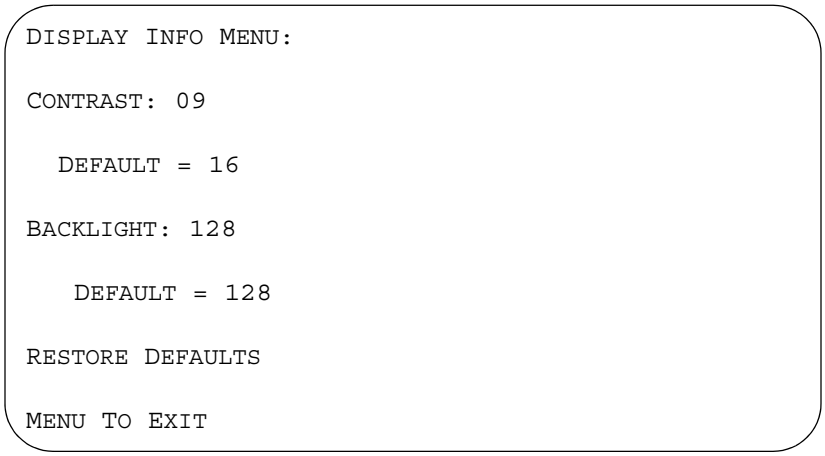
```
PERSONALITY MODULE INFO:

WEB PASSWORD:
  horizon

Use arrows to change each letter
Select to move right
Select on space to save the password
Menu to move left or exit.
```

Note: The initial Web (default) password displays `horizon`, but the name for the product has been changed to Sun/StorageTek L-Series Library Admin.

Display Information

The Display Info Menu (Figure 2-19) leads to menus that let you adjust the contrast and backlight on the graphic display screen. For more information, see "Screen Characteristics" on page 3-18.

Figure 2-19. Display Information Menu



Operations Overview

Table 2-1 lists the tasks that you can perform through the operator panel menus. The right column refers you to another page in this manual for more information. The tasks appear in the order you would find them on the operator panel main menu:

- FSC Logs
- CAP Status
- Cleaning Info.
- Diagnostics
- Version Info.
- Configuration

Table 2-1. Operations Guide

Task	Page for Operator Panel Instructions
Understand CAP status messages	page 4-3
Understand library status messages	page 4-4
Understand drive status messages	page 4-5
Review FSC logs	page 4-18
Check CAP magazine	page 4-6
Manage cleaning cartridges	See list for individual tasks.
• Import cleaning cartridges through CAP	page 4-11
• Export cleaning cartridges to CAP	page 4-10
• Check usage count	page 4-7
• Check/set warning count	page 3-23
• Manually clean a drive	page 4-17
• Import data cartridges through CAP	page 4-12
• Export data cartridges through CAP	page 4-16
Run diagnostic tests	page 4-19
• Run get/put loop	page 4-21
• Operate in demo mode	page 4-22
• Run drive mount diagnostics	page 4-20
Check firmware version	page 2-12
Check library personality information	page 4-8

Table 2-1. Operations Guide (Continued)

Task	Page for Operator Panel Instructions
Set configuration	page 3-3
• Set library SCSI ID	page 3-4
• Set library Fibre Channel Port 0 address	page 3-5
• Enable/disable Fast Load	page 3-7
• Set media check	page 3-8
• Set date and time	page 3-8
• Set drive configuration	page 3-10 and page 3-12
• Set network configuration	page 3-13
• Set screen characteristics	page 3-18

Library Power Switch

The library power switch is a circuit breaker or breakers behind the right front door of the library. Figure 2-20 on page 2-21 shows the power switch location. This switch, attached to the AC power distribution unit (PDU), controls the AC power to the library and drive column.

The power switch has two configurations:

- A single breaker on the AC power distribution unit controls the library and a single drive column.
- An optional second breaker, located on the second power distribution unit, powers the second drive column and an optional second library power supply.

Notes: If your library has two circuit breakers:

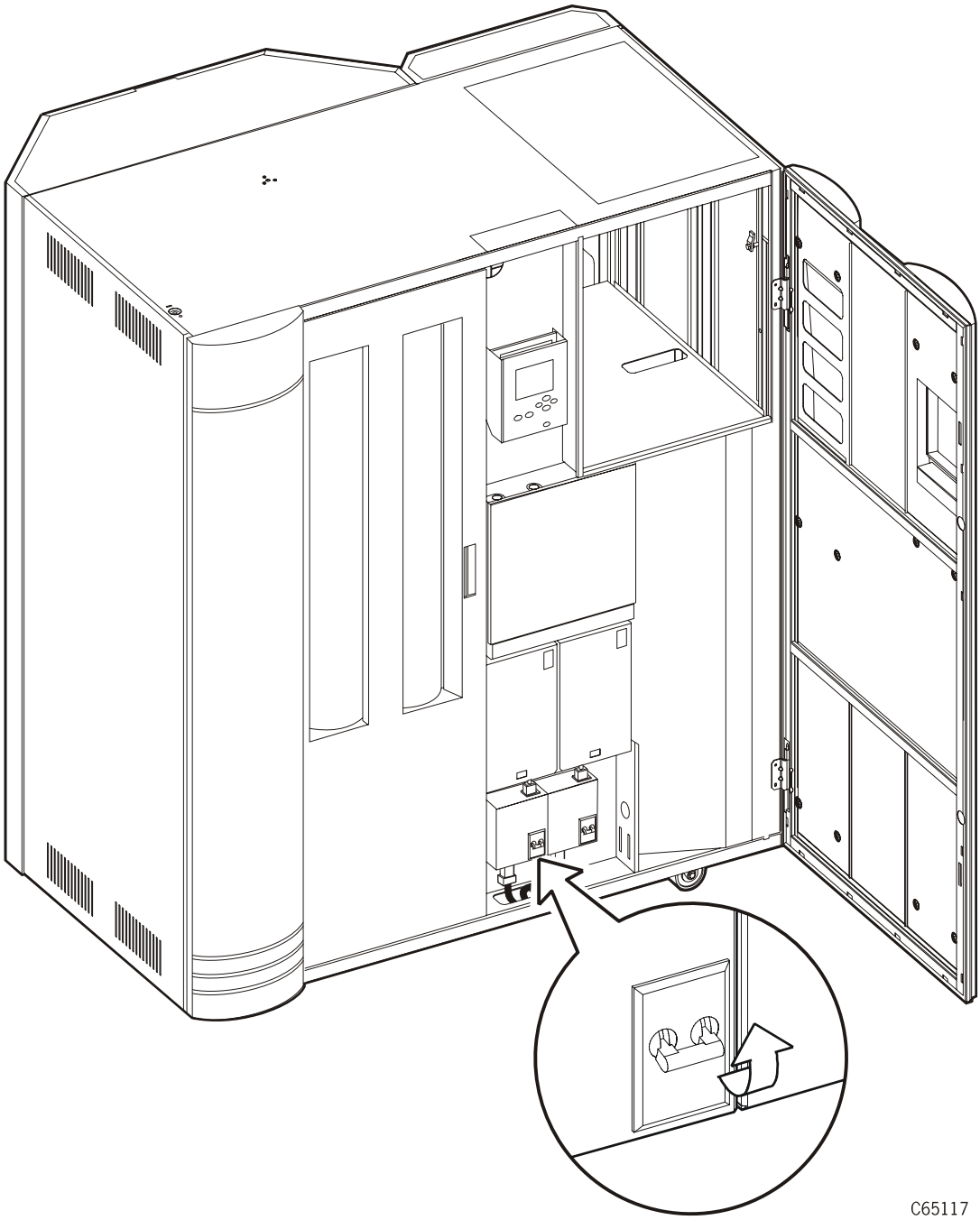
1. The optional PDU must be connected to a separate electrical circuit.
2. If only one breaker is powered off, the second breaker will still be powered on.

To apply power to the library and drive column, lift the switch or switches.

To remove power from the library and drive column:

- Make sure all jobs are complete.
- Push down on the library power switch or switches.

Figure 2-20. Library Power Switch Location (C65117)



Redundant AC Power Option

The APC uninterruptible power supply (UPS) is an optional feature designed to prevent blackouts, brownouts, sags and surges in AC power. This UPS also filters out small fluctuations and disturbances in AC line voltage.

The UPS comes with a power strip that allows you to connect up to eight additional components to the UPS. If power fails, the UPS will supply power to the equipment connected to the power strip until the batteries are exhausted.

While running on battery power, periodic beeps will sound:

- Press the TEST/ALARM DISABLE button to turn off this alarm.
- A continuous beep will sound *two* minutes before the UPS will shutdown.

Notes:

- The UPS is maintained and serviced by APC representatives. Refer to the APC documentation for specific information about the UPS.
- The UPS requires additional cooling if installed in the library. This cooling fan is also an optional feature for the library.

Tape Drive Power Switches

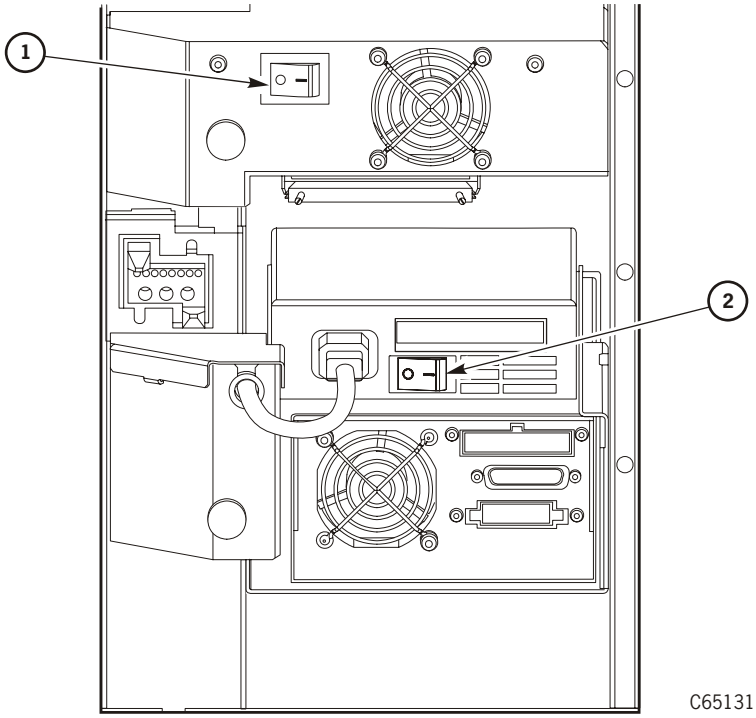
The tape drives are behind the drive access door, inside the right side door of the library. Each drive has a power switch that controls the power to only that drive.

Note: The library's main power switch controls the AC power to the library *and* the drive column.

To remove power from a drive, push the drive switch to the "O" position.

To supply power to a drive, push the drive switch to the "|" position

Figure 2-21. Drive Power Switch Locations (C65131)



1. DLT or Ultrium drive power switch
2. T9x40/T10000 drive power switch

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Configuration

3

This chapter describes how to configure the L700e and library and drives for operation. The L1400M is an enhanced L700e; therefore, much of the configuration information is common to both libraries. For L1400M Tape Library configuration differences, refer to Appendix D.

Configuration requires you to:

1. Power on or reset the library
2. Enter library and drive configuration information
3. Enable Auto Clean (if desired) by installing cleaning cartridges
4. Place the library online (if necessary)
5. Send a client command to load library audit information into client memory

After power-on, the library automatically verifies and loads some configuration values, such as drive locations, Auto Clean status, capacity, and drive types. Before the library is fully operational, however, someone must enter the remaining configuration values.

Typically, your service representative will configure your library during installation, during firmware upgrade, or after drives are added. If you must change the library's configuration, you may enter the values through the operator panel.

Note: You may need to consult with your systems administrator for some information.

Powering on the Library

Powering on the library supplies power to the library electronics and to the drive column. If you have a second drive column, you must power on both supplies. Powering on also initiates an IPL of the library.

To power on the library, lift the switch (circuit breaker) or switches behind the right front door of the library. If you are not familiar with the location of the switches, refer to Figure 2-20 on page 2-21.

Note: If the tape library does not power on, contact your service provider. If you have a Sun/StorageTek maintenance agreement, you may contact Sun/StorageTek's Customer Support Services and report the problem.

Failed Media Checking Message

If an upside-down LTO, DLT or SDLT cartridge is found during audit, and the Media Check option on the Library Configuration menu is set to ON, the following message appears on the Operator Panel (3.08 firmware or higher.):

```
**************************);
>>> Failed Media Checking <<< );
UPSIDE-DOWN TAPE DETECTED!  );
Location: (see below)
Panel NN, Column NN, Row NN,
Press <SELECT> to DISABLE the
Media Checking option.
```

Locations that may appear are:

- `Storage Cell`
- `CAP (A or B)`
- `Drive`
- `Playground`
- `Pass-thru-Port`
- `In-transit`
- `Unknown Location`

NN is the panel, column, and row number of the upside-down cartridge.

If this message appears, open the rear door and reorient the cartridge(s), then close the rear door. to reinitialize the library.

This process repeats until all upside-down cartridges are reoriented.

Initializing and IPLing the Library

Powering on the library causes it to initialize components and perform an IPL (initial program load). During initialization, the library prepares the robot for operation and audits any cartridges in the storage and reserved cells. During an IPL, the library loads the operating code and automatically verifies some configuration values, such as drive locations and drive types.

You will have to re-IPL (reset) the library when you:

- Are directed to do so by your system administrator or a Sun/StorageTek Central Support Services engineer
- Must change the library configuration (for example, when you have to change the library's SCSI ID)

Re-initializing the Library

You will have to re-initialize the library in the rare instance when a robotic component malfunctions. Before re-initializing the library, perform any necessary manual operation tasks (see "Operating in Manual Mode" on page 4-23).

To re-initialize the library, make sure that all drives are powered on and perform one of these actions:

- Power off and power on the library (also causes an IPL)
- Open and close the front door

Re-IPLing the Library

You will have to re-IPL (reset) the library when:

- You are directed to do so by your system administrator or a service representative
- You have to change the library configuration (for example, when you have to change the library's SCSI ID)

To re-IPL the library after it is already powered on, make sure that all the drives are powered on and press the RESET button on the operator panel.

If the Failed Media Checking message appears, see
"Failed Media Checking Message" on page 3-2.

Entering Configuration Data

After the IPL is complete, the status screen will appear on the operator panel. At this point, you must make choices about your library, drives, and network and enter those choices into the library's memory.

Note: You may need to consult with your systems administrator for some information.

You may enter all configuration data through the operator panel.
See "Operator Panel Entry" (in the following section) for specific instructions. If you have installed the Sun/StorageTek L-Series Library Admin, you also can enter some configuration data through a workstation or a PC that is running a Netscape or Microsoft browser. For more information, access the online help files for the Sun/StorageTek L-Series Library Admin.

Operator Panel Entry

Entering configuration data through the operator panel prepares the library for operation. For a detailed description of the operator panel, see
"Operator Panel" on page 2-1.

Library Entries

Four entries are required for a library—other entries will vary with your options:

- Library SCSI ID or Fibre Channel Port 0 address
- Drive Fast Load enable/disable
- Date
- Time

Note: The procedures below assume that you will make all entries during one, operator panel entry session. Each item is saved as it is changed, *except* for the library's SCSI ID or Fibre Channel Port 0 address: to save a revised library SCSI ID, you must reset the library by pressing the RESET button.

Setting the Library's SCSI ID

If the control path for the library is SCSI, you must enter the library's SCSI ID at the operator panel. Set the library SCSI ID from the Lib SCSI I/F Config Menu.

Note: The information below explains special circumstances for selecting a SCSI ID (address) for the library:

1. When configuring the library to a Unix-based workstation, Sun/StorageTek recommends that you use a dedicated SCSI client host bus adapter (HBA):
   - For wide SCSI adapters, you may assign any address from 0 to 14 for the library.
   - For narrow SCSI adapters, the range of addresses is 0 to 6.
2. If you choose to use the embedded system bus on the SPARC station, select address 6, 5, 2, or 0 for the library; the remaining targets are reserved for Sun peripherals.
3. For IBM RISC System/6000 machines, available addresses on the embedded system bus are 6, 5, 3, and 2.
4. If you use Automated Cartridge System Library Software (ACSLS), its level must be Version 5.3.2 or higher
5. If your libraries contain a Pass-thru Port (PTP), you must use ACSLS Version 6.0.1 or higher, with the Special Program Enhancement (SPE) for PTP operation

To set the library's SCSI ID:

1. From the online status screen, press the MENU button.

   The Main Menu will display.

2. Press the down arrow button until the cursor underscores `CONFIGURATION`.

3. Press the SELECT button.

   The Main Configuration Menu will appear and the cursor will line up with `LIBRARY CONFIG`.

4. Press the SELECT button .

   The Lib Config Menu will appear and the cursor will line up with `LIB SCSI I/F`.

5. Press the SELECT button.

   The Lib SCSI I/F Config Menu will appear. (This menu also displays the type of SCSI interface: differential or single-ended.)

6. Press the arrow buttons until the cursor underscores `SCSI ID`.

7. Press the SELECT button.

   The Set Lib SCSI ID Menu will appear.

8. Press the up and down arrow buttons to select the correct ID.

9. Press the SELECT button to save the changes. (You may press the MENU button to abort.)

10. If the library SCSI ID is the only configuration value you wish to set at this time, press the RESET button. If you wish to set other configuration values before you reset the library, continue with the next section.

Setting the Library Fibre Channel Port 0 Address

If the control path for the library is Fibre Channel, you must set the Library's Fibre Channel Port 0 address. The library Fibre Channel Port 0 address locates the library's Port 0 on the Fibre Channel loop. Set the library Fibre Channel Port 0 address from the Lib Fibre I/F Config Menu.

Note: Before you enter a Port 0 address, you must first set the library's Fibre Channel hard address option to *enabled*.

If you configure the library for soft addressing, you are allowing the network's software to configure the Port 0 address. For this addressing approach, you must set the Fibre Channel hard address option to *disabled*.

The default for the hard address option is *disabled*.

Consult with the system administrator before selecting the library's Port 0 addressing option.

Set the library Fibre Channel Port 0 address from the Lib Fibre I/F Config Menu.

To set the library Fibre Channel Port 0 address:

1. From the online status screen, press the MENU button.

   The Main Menu will display.

2. Press the down arrow button until the cursor underscores `CONFIGURATION`.

3. Press the SELECT button.

   The Main Configuration Menu will appear and the cursor will line up with `LIBRARY CONFIG`.

4. Press the SELECT button.

   The Lib Config Menu will appear and the cursor will line up with `LIB FIBRE I/F CONFIG`.

5. Press the SELECT button.

   The Lib Fibre I/F Config Menu will appear and the cursor will line up with `PORT 0 CONFIGURATION`. This menu also displays the library's worldwide ID (the node ID) and the Port 0 worldwide ID (the port ID). These two IDs are set at the factory and cannot be changed. Each ID is 64 bits and uses the IEEE registered format.

6. Press the SELECT button.

   The Fibre Port 0 Configuration menu will appear.

If you want to allow the network's software set the library Port 0 address, set the hard address option to `DISABLED` by:

a. Pressing the arrow buttons until the cursor underscores `AUTO ADDRESS`.

b. Pressing the SELECT button. The Port Hard Address Edit Menu.

c. Pressing the up and down arrow buttons to select `DISABLED`.

d. Pressing the SELECT button to save the selected option.

Note: The default for the hard address option is `DISABLED`.

If you want to set the library Port 0 address, you must set the `HARD ADDRESS` option to `ENABLED`, enter a port address by:

a. Selecting `ADDRESS` from the Fibre Port 0 Configuration menu. The Port Address menu will display.

b. Pressing the up and down arrow buttons to select a digit for each field in the three-field address. Permissible addresses are 001 through 125.

c. Pressing the SELECT button to save the address.

7. If the library Fibre Channel Port 0 address is the only configuration value you wish to set at this time, press the RESET button. If you wish to set other configuration values before you reset the library, continue with the next section.

Reviewing Port 0 Worldwide ID

When a library has a Fibre Channel interface, the Port 0 worldwide ID identifies the library's Port 0 (that is, the lower MPU card) on the Fibre Channel system.

The ID is automatically displayed when you access the Fibre Channel Interface Configuration Menu. It cannot be changed.

Reviewing Library Worldwide ID

When a library has a Fibre Channel interface, the library's worldwide ID identifies the library as a node on the Fibre Channel system. The ID is automatically displayed when you access the Fibre Channel Interface Configuration Menu. It cannot be changed.

Enabling/Disabling Fast Load

These two terms are defined as follows:

Fast load on: The robot will mount a tape to a drive and then immediately report the move completed.

Fast load off: The robot will mount a tape to a drive and wait at the drive location until the tape is completely loaded before reporting the move completed.

Note: Some host software does not support the fast load enabled option.

Enable or disable the Fast Load feature from the Lib Config Menu. To set either feature:

1. At the Lib Config Menu screen, press the arrow button until the cursor underscores `FAST LOAD`.
2. Press the SELECT button.

   An editing screen appears.
3. Press the up and down arrow buttons to select either `ON` or `OFF`.
4. Press the SELECT button to save the changes. (You may press the MENU button to abort.)
5. If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you want to set other configuration values, continue with the next section.

   If you have not changed the library's SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

Setting Media Check

The library can check LTO, DLT, and SDLT cartridges for proper orientation in the storage cells and CAP during audit.

To set this value:

1. At the Lib Config Menu, press an arrow button to underscore:

   `Media Check`

2. Press the SELECT button. An editing screen appears.
3. On the editing screen, use the UP and DOWN arrows to select ON or OFF.
4. When the screen displays the desired setting: Press the SELECT button to save the changes. Press the MENU button to abort.

Setting the Date

Set the date and time from the Lib Config Menu:

1. At the Lib Config Menu screen, press the arrow button until the cursor underscores `DATE`.
2. Press the SELECT button.

   An editing screen appears.

3. On the editing screen:

   a. Press the up and down arrow buttons to select a value for each portion (field) of the date.

   b. Press the SELECT button to move right to the next field.

   c. Press the MENU button to move left to the previous field.

4. When the screen displays your desired setting, press the SELECT button from the right-most field to save the changes. You may press the MENU button from the left-most field to abort.
5. If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you wish to set other configuration values, continue with the next section.
6. If you have not changed the library's SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

Setting the Time

Set the time from the Lib Config Menu. FSC log entries correspond to this time setting:

1. At the Lib Config Menu screen, press the arrow button until the cursor underscores `TIME`.
2. Press the SELECT button.

   An editing screen appears.
3. On the editing screen:
   a. Press the up and down arrows to select a value for each portion (field) of the time.
   b. Press the SELECT button to move right to the next field.
   c. Press the MENU button to move left to the previous field.
4. When the screen displays your desired setting, press the SELECT button from the right-most field to save the changes. (You may press the MENU button from the left-most field to abort.)
5. If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you wish to set other configuration values, continue with the next section.
6. If you have not changed the library's SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

Configuring a Personality Module

If you are planning to use the Sun/StorageTek L-Series Library Admin, you must install its personality module and other components according to the documentation included in the Sun/StorageTek L-Series Library Admin shipping package. You should consult this documentation for instructions on setting required configuration data.

Setting the Web Password

If your library uses the Sun/StorageTek L-Series Library Admin, you must set a Web password at the operator panel. For instructions on setting this value, see the documentation that shipped with the Sun/StorageTek L-Series Library Admin.

Note: If your libraries contain a Pass-thru Port (PTP), Microsoft Windows-based servers, must use Sun/StorageTek Library Manager, version 2.0.

For Unix-based servers, you must use Automated Cartridge System Library Software (ACSLS) version 6.0.1 or higher, with the Special Program Enhancement (SPE) for PTP operation

Drive Entries

SCSI Drives

Notes: To configure a T9x40 drive:

1. The drive must have firmware version 1.24 or higher. Check the drive's firmware version, by selecting `DRIVE INFO` from the Main Menu.
2. Configuring a T9x40 drive might involve more than setting the drive's SCSI ID and bus status. For information about T9x40 drive configuration options and instructions, refer to the *T9x40 Tape Drive Service Reference Manual*, part 95740.

Two entries complete the configuration options for each SCSI drive:

- SCSI ID
- Bus status (on or off bus)

Note: On Bus means that the drive is on the same SCSI bus as the library. Off Bus means that the drive is *not* on the same SCSI bus as the library.

Set the drive SCSI IDs and bus status from the drive configuration menu. You can enter both values for each drive at the same time:

1. At the Main Configuration Menu, press an arrow button until the cursor underscores `DRIVE CONFIG`.
2. Press the SELECT button.

   The screen will list all installed drives, and the cursor will align with the first drive on the list.

   An example of the format is:

   ```
   00 DLT7000 ID:__
              ON BUS: ON
   ```

   The first two digits are the drive's logical number (the number that the library has assigned the drive). The tape library sets this number during its automatic configuration sequence (at power-on or reset). It is an internal number *only* and is shown for information *only*.

   Note: The uppermost drive within the column is designated as "0," the next is "1," and so forth.

   Next to the logical number is the drive type (DLT 7000 in this example). To the right of the drive type is the ID or SCSI address. On the next line is the drive's bus status.

   Ultrium drives will display as:

   - IBM LTO for IBM Ultrium drives
   - CER LTO for Certance Ultrium drives
   - HP LTO for Hewlett Packard Ultrium drives

Drive information might also appear on the menu as `INVALID` if the drive's SCSI ID is an invalid address

3. Press the arrow buttons to scroll to the drive you wish to change and press the SELECT button.

   The Set Drive SCSI ID Menu will appear.

   Note: The operator panel displays only 16 lines per menu. If the library contains more than eight drives, you must use the down arrow button to scroll to drives 09 and above.

4. Press the up and down arrow buttons to change the ID.

5. Press SELECT to save your changes.

   A message screen will appear to indicate that the library is saving the new ID. Then the drive configuration menu will reappear.

Notes: The new SCSI ID for a T9x40 drive might not appear right away.

6. Press the arrow down button to get to the drive's second line of information (the drive's bus status field).

7. Press the SELECT button.

   The Set Drive SCSI Bus Menu will appear.

8. Press the up and down arrow buttons to change the bus status to `ON` or `OFF`.

9. Press the SELECT button to save the changes. (You may press the MENU button to abort.)

   The drive configuration screen will reappear.

10. Continue these steps until all drives are configured.

11. If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you wish to set other configuration values, continue with the next section.

    If you have not changed the library's SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

T9x40 Drives

To configure a T9x40 drive:

1. The drive must have firmware version 1.24 or higher. Check the drive's firmware version, by selecting `DRIVE INFO` from the Main Menu.

2. Configuring a T9x40 drive might involve more than setting the drive's SCSI ID and bus status. For information about T9x40 drive configuration options and instructions, refer to the *T9x40 Tape Drive Service Reference Manual*, part 95740

T10000 Drives

To configure a T10000 drive:

1. The drive must have firmware version 1.28.101 or higher. Check the drive's firmware version, by selecting `DRIVE INFO` from the Main Menu.

Ultrium Fibre Channel Drives

You may either set a hard Fibre Channel address of 0 for LTO drives or allow the address to be set automatically, as arbitrated through the Fibre Channel loop. You set up the drive's Fibre Channel address from the Drive Config Menu.

Note: Before you enter an LTOs Fibre Channel address to 0, you must first set the drive's Fibre Channel hard address option to *enabled*.

If you configure the drive for soft addressing, you are allowing the network's software to configure the Port 0 address. For this addressing approach, you must set the Fibre Channel hard address option to *disabled*.

The default for the hard address option is *disabled*.

To set up the Fibre Channel address:

1. At the Main Configuration Menu, press an arrow button until the cursor underscores `DRIVE CONFIG`.
2. Press the SELECT button.

   The screen will list all installed drives, and the cursor will align with the first drive on the list.

   FIBRE I/F displays if the drive is a Fibre Channel drive.
3. Press the arrow buttons to scroll to the drive you wish to configure and press the SELECT button.

   The screen will allow you to select hard addressing to `enabled` or `disabled`.
4. Press the up and down arrow buttons to line up with your choice. Press SELECT and:

   - if you select `enabled`, the hard address will be set to 0
   - if you select `disabled`, the address will be arbitrated through the channel.
5. Press the SELECT button to save the changes. (You may press the MENU button to abort.)
6. If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you wish to set other configuration values, continue with the next section.

If you have not changed the library's SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

Network Entries

Use the Network Config Menu to configure the library for your network. Entries set the library's network configuration are:

- Library name
- IP address
- Network gateway
- Subnet mask
- DNS Configuration[1]

Note: You may need to consult with the systems administrator for some information.

You also may view the library's Ethernet address.

Viewing the Ethernet Address

This is a six-byte address, unique to each library. The address is written into the MPC card at the factory and cannot be changed. An example of an Ethernet address is 00:10:4f:00:05:01.

To view the Ethernet address:

1. At the Main Configuration Menu, press the arrow down button to line up the cursor with `NETWORK CONFIG`.
2. Press the SELECT button.

   The Network Config Menu will appear and the library's Ethernet address appears at the bottom of the screen.
3. If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you wish to set other configuration values, continue with the next section.

   If you have not changed the library's SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

Setting the Library Name

The system administrator might assign the library a name. The name is mapped to the IP address but does not affect operation. To set the library name:

1. At the Network Config Menu, press an arrow button until the cursor underscores `LIBRARY NAME`.
2. Press the SELECT button. An editing screen appears.

1.You must enter data for the DNS Configuration if your SNMP agent is set to trap named recipients instead of numbered recipients.

3. On the editing screen:

   a. Use the up and down arrow buttons to select a value for each character (field) in the name.

   b. Use the SELECT button to move right to the next field.

   c. Use the MENU button to move left to the previous field.

Note: Do not enter a library name longer than 30 characters.

4. When the screen displays your desired setting, press the SELECT button twice to save the changes. You may press the MENU button from the left-most field to abort.

5. If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you wish to set other configuration values, continue with the next section.

   If you have not changed the library's SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

Setting the IP Address

The system administrator might assign the library an IP address, which makes the library accessible through a network. This is a four-byte address that must be set with information obtained from the system administrator. The value set identifies the library and makes it accessible through a network.

An example of an IP address entry is 192.0.0.1

Note: To use the Sun/StorageTek L-Series Library Admin, you must set the library's IP address at the operator panel.

To set the IP address:

1. At the Network Config Menu, press an arrow button until the cursor underscores `LIBRARY NAME`.

2. Press the SELECT button. An editing screen appears.

3. On the editing screen:

   a. Use the up and down arrow buttons to select a value for each three-digit field in the address.

   Note: Do *not* leave the first field equal to zero (`000`)

   b. Use the SELECT button to move right to the next field.

   c. Use the MENU button to move left to the previous field.

4. When the screen displays your desired setting, press the SELECT button from the right-most field to save the changes. You may press the MENU button from the left-most field to abort.

5. If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you wish to set other configuration values, continue with the next section.

   If you have not changed the library's SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

Setting the Network Gateway Address

A network gateway in a large network allows devices on one subnet to interface with devices on another subnet (see "Setting the Subnet Mask Address" on page 3-16). This four-byte address must be specified by the system administrator.

Note: Entering this address is optional. It sets up the gateway connection between subnets, but it is applicable only when such a connection exists and is necessary for library operation. Consult with your systems administrator for additional information.

To set the network gateway address:

1. At the Network Config Menu, press an arrow button until the cursor underscores `NETWORK GATEWAY.`
2. Press the SELECT button.

   An editing screen appears.
3. On the editing screen:

   a. Press the up and down arrow buttons to select a value for each three-digit field in the address.

   b. Press the SELECT button to move right to the next field.

   c. Press the MENU button to move left to the previous field.
4. Press the SELECT button from the right-most field to when the screen displays your desired setting to save the changes. (You may press the MENU button from the left-most field to abort.)
5. If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you wish to set other configuration values, continue with the next section.

   If you have not changed the library's SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

Setting the Subnet Mask Address

This is a four-byte notation (specified by the system administrator) to resolve routing within your intranet. This address makes the library accessible through a subnet on a large network. An example of a subnet mask entry is 255.255.254.0.

To set the subnet mask address:

1. At the Network Config Menu, press an arrow button until the cursor underscores `SUBNET MASK.`
2. Press the SELECT button. An editing screen appears.
3. On the editing screen:
   a. Press the up and down arrow buttons to select a value for each three-digit field in the address.
   b. Press the SELECT button to move right to the next field.
   c. Press the MENU button to move left to the previous field.
4. Press the SELECT button from the right-most field when the screen displays your desired setting to save the changes. (You may press the MENU button from the left-most field to abort.)
5. If you have already changed the library's SCSI ID or Port 0 address and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you wish to set other configuration values, continue with the next section.

   If you have not changed the library's SCSI ID or Port 0 address and are not setting other configuration values, press the MENU button until you exit all menus.

DNS Configuration

Note: You must enter the Domain Name Service (DNS) configuration *only* if your Simplified Network Management Protocol (SNMP) agent is set to trap *named* recipients; if SNMP is set for *numbered* recipients, no entries are required.

The first entry you must make for the DNS Configuration is the Domain Name (DMN) field.

1. Press the arrow button until the cursor underscores `DMN`.
2. Press the SELECT button. An editing screen appears.
3. On the editing screen:
   a. Press the up and down arrow buttons to select a value for each letter in the domain server's name.
   b. Press the SELECT button to move right to the next field.
   c. Press the MENU button to move left to the previous field.

4. Enter the main server's name, being sure to append the suffix *.com* at the end.
5. Press the SELECT button from the right-most field when the screen displays your desired setting to save the changes. (You may press the MENU button from the left-most field to abort.)

The second entry you must make is the primary DNS server's IP address.

1. Press the arrow button until the cursor underscores `SVR Primary`.
2. On the editing screen:
    a. Press the up and down arrow buttons to select a value for each number in the primary domain server's IP address.
    b. Press the SELECT button to move right to the next field.
    c. Press the MENU button to move left to the previous field.Press the SELECT button. An editing screen appears.
3. Press the SELECT button from the right-most field when the screen displays your desired setting to save the changes. (You may press the MENU button from the left-most field to abort.)

The third entry you *may* make is the secondary DNS server's IP address. This assumes that your site has a secondary (or backup) server; if not, this entry is not required.

1. Press the arrow button until the cursor underscores `SVR Secondary`.
2. On the editing screen:
    a. Press the up and down arrow buttons to select a value for each number in the secondary domain server's IP address.
    b. Press the SELECT button to move right to the next field.
    c. Press the MENU button to move left to the previous field.Press the SELECT button. An editing screen appears.
3. Press the SELECT button from the right-most field when the screen displays your desired setting to save the changes. (You may press the MENU button from the left-most field to abort.)

    If you are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you wish to set other configuration values, continue with the next section.

    If you have not changed the library's DNS configuration and are not setting other configuration values, press the MENU button until you exit all menus.

Dynamic Worldwide Name

Note: This feature is generally enabled at installation time. You must consult with your service representative and system administrator to enable it.

To correct re-configuration problems within a Fibre Channel network, 3.02 firmware includes the dynamic Worldwide Name (dWWN) enhancement. Previously, Fibre Channel devices contained fixed Worldwide names within the network. If a device (for example, a defective tape drive) required replacement, the new device was detected by the network as "unknown" and re-configuration of the network was required.

When enabled, dWWN assigns names to library drive *slots* rather than devices. When a drive is replaced, the new drive receives the same name as the one replaced, thereby eliminating the need for system re-configuration There are three Worldwide Names reserved for each drive: Node, Port A, and Port B.

Note: This feature also requires corresponding drive code that supports the dynamic Worldwide Name feature.

Microcode for other drives is in process and will be released with the next drive firmware versions.

Screen Characteristics

You also can change the operator panel's screen characteristics from the main configuration menu. The screen characteristics are saved in non-volatile memory.

To change the contrast and backlight (or brightness) of the operator panel screens:

1. At the main configuration menu, press an arrow button until the cursor underscores `DISPLAY INFO`.
2. Press the SELECT button. The display information menu will appear.
3. Press the arrow buttons to line up with the desired screen characteristic: `CONTRAST` or `BACKLIGHT`.

   An editing screen will appear.
4. Press the up and down arrow buttons to change the count value.

Note: To reset the screen characteristics to the default values, line up the cursor with `DEFAULT SCREEN CHARACTERISTICS` and press the SELECT button.

5. Press the SELECT button to save the changes. (You may press the MENU button to abort.)

6. If you have already changed the library's SCSI ID and are planning to exit the Main Configuration Menu at this time, you must press the RESET button. If you try to exit the main configuration menu, a message will appear requesting that you reset the library.

   If you have not changed the library's SCSI ID, you may exit the configuration menu to do other tasks.

Auto Clean

You will need to clean the drives occasionally to prevent read and write errors. Enabling the Auto Clean feature allows the library to initiate drive cleaning without your intervention. (A drive is cleaned with a special cleaning cartridge.)

The information below describes the auto cleaning enabled or disabled feature.:

Auto Clean Disabled: When a drive requires cleaning, you must enter the compatible cleaning cartridge into the CAP, using the Clean Drive routine. The robot will retrieve the cartridge, mount the tape into the drive, and return the cartridge to the CAP when cleaning is complete. You must then remove the cleaning cartridge from the CAP and manually keep track of its usage.

Auto Clean Enabled: When a drive requires cleaning, the robot will retrieve a compatible cleaning cartridge from the reserved cell in the library (these cell locations are shown in "Reserved Cells" on page 1-9) and mount it into the drive. When the cartridge dismounts, the robot will return the cleaning cartridge to its cell location within the library. The library will keep track of usage and post an FSC in the log when the warning threshold has been reached.

Cleaning Cartridge Requirements

Valid cleaning cartridges are those that match the drive types installed in the library. Other requirements are:

- All cleaning cartridges must have a "CLN" in their VOLSER label.
- T9840 cleaning cartridges must also have a "U" on their media ID labels.
- T9940 cleaning cartridges must have a "W" ID label.
- T10000 cleaning cartridges must have a "CT" ID label.
- Ultrium cleaning cartridges must either have labels specific to the drive manufacturer or they must be a universal cleaning cartridges for all Ultrium drives.
  For more label information, see Appendix A, "Cartridge Tape Information."

Cleaning Cartridge Usage

Cleaning cartridges will be used when the drive requires a cleaning. The drive request is sent from the drive to the host—the library does not request a cleaning action.

If there are multiple cleaning cartridges per drive types:

- One cartridge will be used until it reaches its warning count before proceeding to the next cartridge.
- Once all cartridges have reached their warning counts, the library will rotate through the cartridges until each cartridge reaches its expired status.
- Once all cartridges are expired, if a drive requires cleaning, mounts will still occur, but the library operator panel will display an asterisk on the top line and the drive status screen will display "clean needed." The "clean needed" status will remain until a new cleaning cartridge is entered into the library to satisfy the cleaning requirement.

See also "Cleaning Cartridge Usage Count" on page 3-24 and "Cleaning Cartridge Expiration" on page 3-24 for more information.

Enabling Auto Clean

There are two ways to enable the Auto Clean feature:

1. Manually load valid cleaning cartridges into any of the 11 cells that are reserved for cleaning and diagnostic cartridges. For the locations of these cells, refer to "Reserved Cells" on page 1-9.
2. Import valid cleaning cartridges through the CAP (see "Importing Cleaning Cartridges through the CAP" on page 3-21). For the location of the reserved cells, see "Reserved Cells" on page 1-9

The Auto Clean feature is automatically enabled if you load even one cleaning cartridge into the reserved cell area and then reset the library.

Manually Installing Cleaning Cartridges

To manually install cleaning cartridges in the reserved cells:

1. Unlock and open the front doors (see "Opening the Library Front Doors" on page 4-24)
2. Verify that the cleaning cartridges are right side up (the VOLSER numbers should be closest to the top edge and facing outward).

WARNING:
***Confined space:* While reaching inside the library, take care to avoid bumping your head or catching your clothes on protruding edges.**

ADVERTENCIA:
***Espacio limitado:* Al trabajar en el interior de la biblioteca, tenga cuidado de no golpearse la cabeza o de engancharse la ropa en los bordes salientes.**

CAUTION:
***Potential static electricity damage to electrical components.* Take precautions against electrostatic discharge by touching gray, unpainted metal (such as the library's frame) before reaching into the library. Avoid touching any electrical component.**

3. Place cleaning cartridges into any of the 11 designated cells.
4. Close and lock the front access door.

Importing Cleaning Cartridges through the CAP

A second way to enable Auto Clean is by importing cleaning cartridges from the CAP into the reserved cells, the procedure is to:

1. Press the MENU button to return to the Main Menu.
2. Press the arrow buttons until the cursor underscores `CLEANING INFORMATION`.
3. Press the SELECT button.

   The panel displays the Cleaning Info menu.
4. Press the arrow buttons until the cursor underscores `IMPORT CARTRIDGE.`
5. Press the SELECT button.

   The Import Clean Cartridges screen appears, which prompts you to:

   - Enter only cleaning cartridges—no data cartridges are allowed
   - Enter the cleaning cartridges into CAP A only

CAUTION:
Possible halt to operation or damage to components. **You must enter the cartridges properly or you could damage the robot or the drive, or cause the library to stop operating. Use only the correct cartridges for the drive types within the library.**

6. Load cartridges into the magazine. You can do this one of two ways:
    a. Pull out and down on the magazine handle
    b. Remove the magazine by lifting it out

CAUTION:
Possible damage to the hand assembly. **Before loading the magazine into the CAP, remove the magazine's retention cover by lifting the side edge.**

7. Enter the cartridges into the magazine so that the cartridges lie flat, with the VOLSER label facing toward you, the customer label facing down, and the reel facing away from you.
8. Return the magazine to its closed position. (If you have used a retention cover on the magazine, remove the cover before replacing the magazine.)
9. Press the SELECT button on the operator panel to close the CAP.

    The cleaning cartridges are audited by the robot and their types and VOLSERs are listed on the operator panel. You must now select each cartridge at the operator panel to import it into the library.
10. Select the cleaning cartridges you want to import by:
    a. Moving the cursor to the desired cartridge entry on the list
    b. Pressing the SELECT button. A selected cleaning cartridge is then highlighted (in reverse video)
    c. Repeating Steps a and b until you have selected all the cartridges you want to import

    Note: There is no undo available on this menu. If you select a cartridge by mistake, you must exit the menu by pressing the MENU button. Then you must start again at Step 10.

    d. Press the SELECT button to initiate the import.

Cleaning Cartridge Warning Count

After a predetermined count, a cleaning cartridge must be replaced and disposed of at the site.

The warning count should be set lower than the cartridge's recommended usage (or "maximum warning count" displayed on the operator panel); this will allow time to obtain a replacement cleaning cartridge. For example, if the maximum warning count equals 20 uses, you may want to set the warning count to 17 (or other, lower number).

An explanation of the cleaning cartridge warning count is found in "Cleaning Information Menu" on page 2-9.

If the Auto Clean feature is enabled, use the main menu screen on the operator panel to set the warning threshold.

Note: The Auto Clean feature is automatically enabled if you insert even one cleaning cartridge into the reserved cell area.

Check your tape drive's product manual for the recommended use and life of the drive's cleaning cartridge.

To set the warning count:

1. From the online status screen, press the MENU button. The main menu screen will appear.
2. Press the arrow button until the cursor lines up with `CLEANING INFO`.
3. Press the SELECT button.

   The `CLEANING INFO` screen will appear. It displays the number of cleaning cartridges in the reserved area at initialization.
4. Press an arrow button until the cursor is at the appropriate drive's `WARNING COUNT`.
5. Press the SELECT button for your choice.

   An editing screen appears. The editing screen displays the current setting for the cartridge warning count. The maximum recommended warning count is shown below the current setting.
6. Press the arrow buttons to change the warning count.
7. Press the SELECT button to save the changes. (You may press the MENU button to abort.)
8. Press the MENU button to return to the library status screen.

Cleaning Cartridge Usage Count

The cleaning cartridge usage count displays how many times a cleaning cartridge has been used.

An explanation of the cleaning cartridge usage count is found in "Cleaning Information Menu" on page 2-9.

To check the usage count of all cleaning cartridges (those in the reserved cells and those in the CAP):

1. Press the MENU button to return to the Main Menu.
2. Press the arrow buttons until the cursor underscores `CLEANING INFORMATION`.
3. Press the SELECT button.

   The panel displays the Cleaning Info menu.
4. Press the arrow buttons until the cursor underscores `CLEAN CARTRIDGE INFO.`
5. Press the SELECT button.

   The Clean Cartridges screen appears, listing all installed cleaning cartridges by drive type, VOLSER, and usage count.

   Note: If the usage count for a cleaning cartridge has reached its life limit, the export screen will display `EXPIRED`. You *must* remove this cartridge from the library.
6. Press the MENU button to exit the Clean Cartridges screen.

Cleaning Cartridge Expiration

A cleaning cartridge is determined as expired when the following sequence occurs:

- A drive has requested to be cleaned
- A cleaning cartridge is mounted on the drive
- After the cartridge is dismounted, the drive still requests a cleaning operation

You can determine if there is an expired cleaning cartridge by:

1. Viewing its usage as described in "Cleaning Cartridge Usage Count" on page 3-24
2. Viewing its usage through the Sun/StorageTek L-Series Library Admin screen
3. Observing that an asterisk (*) appears on the operator panel display; for example, `STK L700 (Code 3.00.13)*`.

Exporting Cleaning Cartridges through the CAP

When one or more cleaning cartridges have expired, you can export them from the reserved cells to the CAP with this procedure:

An explanation of expired cleaning cartridges is found in "Cleaning Cartridge Expiration" on page 2-10.

1. Press the MENU button to return to the Main Menu.
2. Press the arrow buttons until the cursor underscores `CLEANING INFORMATION`.
3. Press the SELECT button.

   The panel displays the Cleaning Info menu.
4. Press the arrow buttons until the cursor underscores `EXPORT CARTRIDGE.`
5. Press the SELECT button.

   The Export Clean Cartridges screen appears, which lists all reserved cell cleaning cartridges by drive type, VOLSER, and usage count.
6. Select the cleaning cartridges you want to export by:
   a. Moving the cursor to the desired cartridge entry on the list
   b. Pressing the SELECT button. A selected cleaning cartridge is then highlighted (in reverse video)
   c. Repeating Steps a and b until you have selected all the cartridges you want to export
7. Press the SELECT button to initiate the export. The CAP will open automatically. Remove the cartridges and the press `MENU` to exit.

Sun/StorageTek L-Series Library Admin

The optional Web interface to the L700e library is Model HRZNLSA, Feature code LS4X. Configuration and operation instructions are outlined in Appendix C, "Sun/StorageTek L-Series Library Admin."

The Sun/StorageTek L-Series Library Admin is an optional Web-based interface to the library. It lets a library's user configure, operate, and monitor the library through a workstation or PC that is running a Netscape or Microsoft browser. If you ordered this interface for your library, your service representative should install it for you.

Before you can use the Sun/StorageTek L-Series Library Admin to monitor the library or alter the library's configuration, your service representative must enter two values at the operator panel:

- The library's IP address
- The library's Web password

For instructions on how best to make these entries, see the documentation included in the Sun/StorageTek L-Series Library Admin shipping package. Information is also provided in Appendix C, "Sun/StorageTek L-Series Library Admin.".

For instructions on using the interface to alter the library's configuration or monitor library activity, access the online help files for the Sun/StorageTek L-Series Library Admin.

Table 3-1 lists the model and feature number.

Table 3-1. Sun/StorageTek L-Series Library Admin Model/Feature Code

Description	Model	Required Feature	Quantity
Sun/StorageTek L-Series Library Admin for L700/ 700e	HRZNLSA	CDRM	N/A
		LS4X (1 per tape library)	

Loading Tapes into the Library

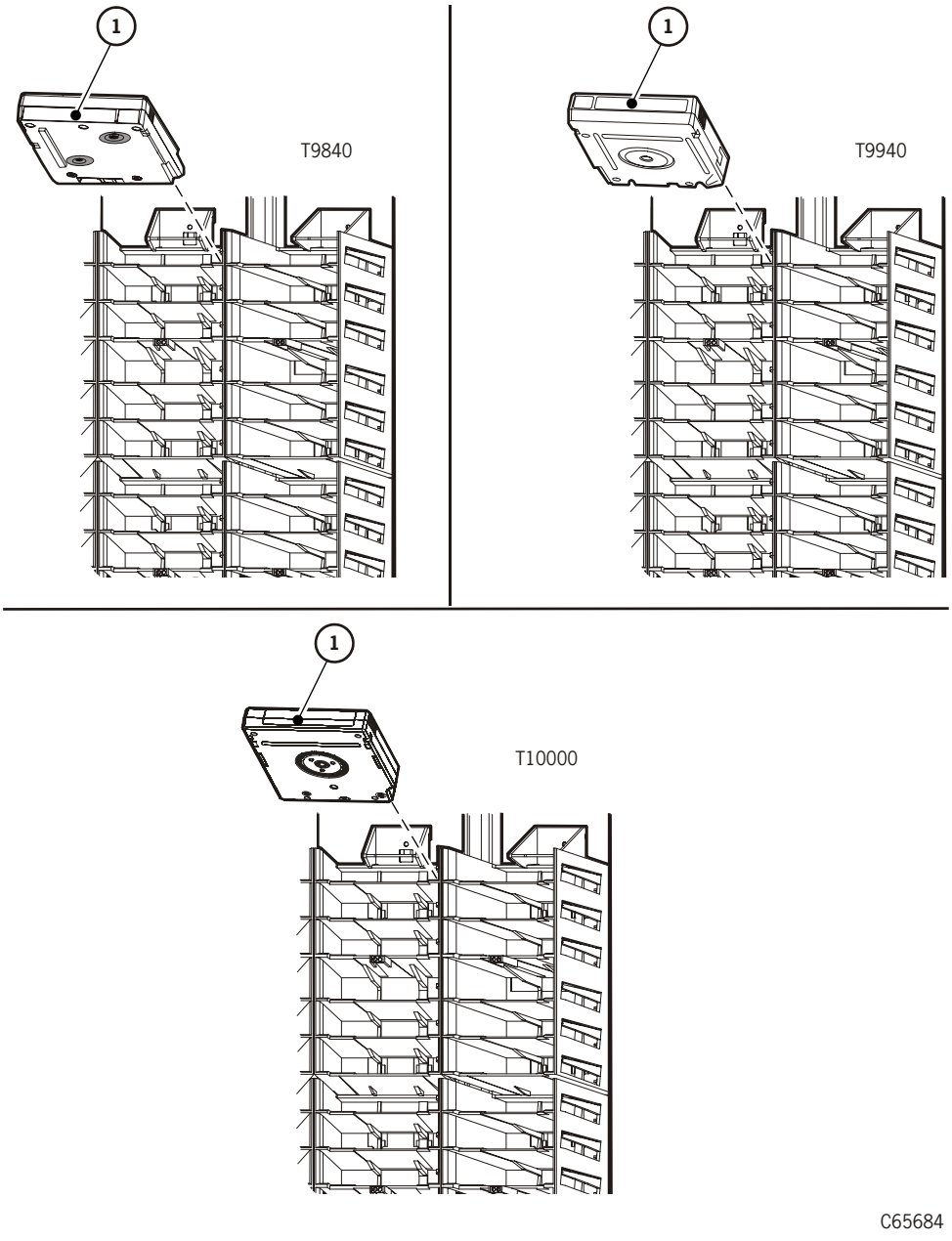
When you are ready to place the library into production, you may load data cartridges inside the library. The most efficient way to load a great quantity of tapes into the library is to manually load them into the cells.

WARNING:
***Confined space:* While working within the library, take care to avoid bumping your head or catching your clothing on protruding edges.**

ADVERTENCIA:
***Espacio limitado:* Al trabajar en el interior de la biblioteca, tenga cuidado de no golpearse la cabeza o de engancharse la ropa en los bordes salientes.**

Figure 3-1 and Figure 3-2 on page 3-28 illustrate how cartridges are placed into cells.

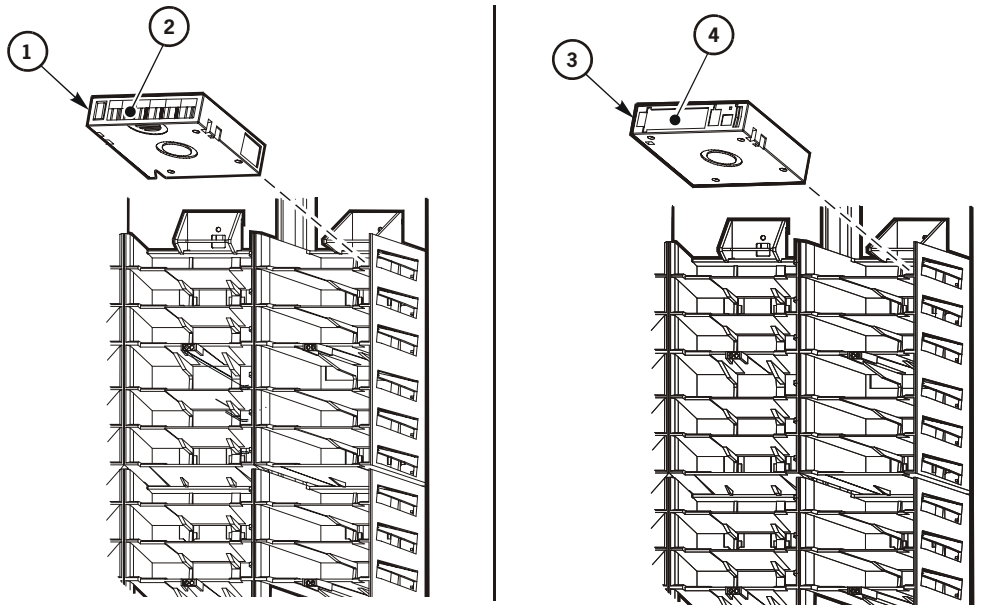
Figure 3-1. Placing Tapes into Storage Cells—T9x40 and T10000 (C65684)



1. Cartridge label

Note: Use only cartridges designed for your type of tape drives.

Figure 3-2. Placing Tapes into Storage Cells—Ultrium, DLT, and SDLT (C65333)



1. Ultrium cartridge	3. DLT and SDLT cartridge
2. Ultrium cartridge label	4. DLT and SDLT cartridge label

You must first unlock and open the main access door. This procedure is explained in "Opening the Library Front Doors" on page 4-24.

You may also load cartridges into array cells by using the CAP. While this method is more time-consuming to fully populate the library, the procedure is explained in "Importing Data Cartridges through the CAP" on page 4-12.

After you have loaded all the cartridges, close and lock the main door. The robot will automatically audit the cartridges and their locations within the library.

Placing the Library Online

When you are ready to use the library for production, you must first:

- Enter the system command to place all drives online
- When all drives are online, enter the command to place the library online
- Enter the command to upload the library audit data to the client system memory (see the following paragraphs)

Sending Library Audit Data to the Client

During an initialization, the library audits the location and VOLSER of all cartridges in the storage and reserve cells. The library also performs an audit when:

- You power on the tape library.
- You open and close the front library door.
- You make a request at the server console to audit the tape library.

You must follow every audit with a client command that loads the library audit data (the catalog) into client memory. For instructions on how to send this command, refer to your software and system publications.

Library Configuration Record

Record your library's configuration in Table 3-2.

Table 3-2. Library Configuration Record

L700e Tape Library Configuration Information	
Serial Number:_____	Code Version: _____
Library ID: _____	Pass-thru Port: ❑ Yes ❑ No
Number of Drives Installed: _____	
DLT7000	Single-ended ❑ Differential ❑ On bus ❑ Off bus ❑ Address: __ __ __ __ __ __ __ __ __ __
DLT8000	Single-ended ❑ Differential ❑ On bus ❑ Off bus ❑ Address: __ __ __ __ __ __ __ __ __ __
SDLT	Single-ended ❑ Differential ❑ On bus ❑ Off bus ❑ Address: __ __ __ __ __ __ __ __ __ __
T9x40	Differential ❑ Fiber Channel ❑ On bus ❑ Off bus ❑ Address: __ __ __ __ __ __ __ __ __ __
T10000	Differential ❑ Fiber Channel ❑ On bus ❑ Off bus ❑ Address: __ __ __ __ __ __ __ __ __ __
Ultrium	Single-ended ❑ Differential ❑ HVD ❑ LVD ❑ On bus ❑ Off bus ❑ Address: __ __ __ __ __ __ __ __ __ __
Fast Load: Enabled ❑ Disabled ❑	Auto Clean: Enabled ❑ Disabled ❑

Library Operation

4

This chapter contains the procedures for operating the library in:

- Automated mode
- Manual mode

Note: When the client controls the library, refer to your software publications and enter the command at the console to perform the desired activity. For some activities, you might have to ask your systems administrator for the required information.

Operating in Automated Mode

Automated mode is the normal operating mode of the library. When the library is online and the robot is mounting and dismounting cartridges, monitor your operator console and the library operator panel for messages and respond appropriately.

When a tape library is online, you also might need to:

- Monitor the operator panel for status messages
- Export cleaning cartridges
- Import cleaning cartridges
- Import data cartridges into the library through CAP
- Export data cartridges from the tape library through the CAP
- Replace a cleaning cartridge
- Manually clean a drive
- Review the FSC log
- Run diagnostic tests

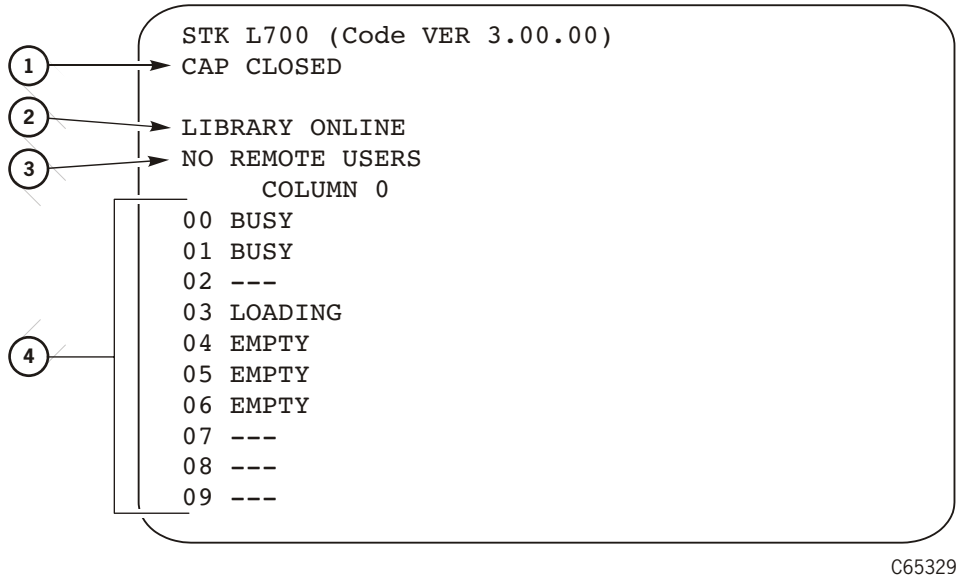
The following text describes how to perform these activities.

Monitoring Status Information

You can monitor CAP, library, remote user, and drive status information through the library status screen (see Figure 4-1 on page 4-2). This is the main screen on the operator panel. It displays after initialization is complete and also when you press the MENU button while viewing the Main Menu.

You also can monitor drive information, CAP magazine status, the cleaning cartridge usage count, and the library's "personality" information through operator panel menus.

Figure 4-1. Example Library Status Screen (C65329)



1. CAP status message
2. Library status message
3. Remote users status message
4. Drives status messages

CAP Status

The first line of status information on the library status screen indicates the condition of the CAP. Table 4-1 explains the messages that might appear on this line.

Table 4-1. CAP Status Messages

Message	Explanation
`OPEN`	The CAP door is currently open. (The *Open* indicator also is on.) You may insert cartridges or remove the CAP magazines. But you cannot view the CAP magazine contents through the operator panel menus.
`CLOSED`	The CAP door is currently closed.
`CLOSED(LOCKED)`	The CAP door is currently closed and locked. Before you can open the CAP door, you must issue a command from your system console.
`TRANSITION`	The CAP door has stalled while attempting to open.
`CAP (A, B, or blank) Closing and Auditing`	The CAP is closing and the library is auditing the cartridges in the CAP (3.08 firmware or higher.).
`CAP (A, B, or blank) Open Row NN Upside-Down`	The library has detected an upside-down LTO, DLT, or SDLT cartridge in the CAP and the CAP has opened. The row location of the upside-down cartridge is identified by NN (3.08 firmware or higher.).
`UNKNOWN`	The library does not recognize the current state of the CAP door.

Library Status

The library status line indicates the current state of the library: Table 4-2 explains the messages that might appear on this line.

Table 4-2. Library Status Messages

Message	Explanation
`LIB MAIN DOOR OPEN`	The library's front door is open. When you close it, the library will reset (initialize).
`LIB INIT REQUIRED`	The library requires initialization. You must press the RESET button.
`LIBRARY NOT READY`	The library is not available to perform operator-requested actions. Some status information might be available through the network interfaces.
`LIBRARY READY`	The library has completed initialization and is ready to perform requested actions.
`LIB MAINTENANCE MODE`	The library is offline because it is performing diagnostic tests.
`INTERVENTION REQUIRED`	The library is experiencing a problem. You should note the FSC (if the library has issued one) and call your service representative.
`LIB UNKNOWN STATE`	The library does not recognize its current state. You should note the FSC (if the library has issued one) and call your service representative.

Remote Users Status

Following the library status line is a message indicating the number of users who are currently accessing the library remotely. Currently, the status message on this line never changes.

Drive Status

Table 4-3 summarizes drive status messages that might appear on the library status screen:

Table 4-3. Drive Status Messages

Message	Explanation
INIT REQUIRED	You must initialize this drive.
NOT CONNECTED	This drive is not connected to a SCSI bus.
UNKNOWN DRIVE	The library does not recognize the type of drive in this location.
NOT COMMUNICATE	This drive is not communicating with the client or the drive power is off.
NOT FUNCTIONAL	This drive is not operating properly.
NOT LOADABLE	The library cannot load a cartridge into this drive.
EMPTY	This drive does not have a tape loaded.
CARTRIDGE IN	The drive contains a cartridge, but the cartridge is not loaded into the drive.
CLEAN NEEDED	This drive requires cleaning.
CLEAN FAILED	The attempt to clean this drive failed.
LOADING	The library is mounting a cartridge to this drive.
REWOUND	The cartridge in this drive has been rewound.
UNLOADING	The library is dismounting a cartridge from this drive.
LOADED	The library has loaded a cartridge into this drive.
REWINDING	The cartridge in this drive is being rewound.
BUSY	This drive is performing a read or write operation.
CLEANING	The drive is being cleaned.

Note: The operator panel displays only 16 lines per screen. If the library contains more than eight drives, you must use the down arrow button to scroll to Drives 08 and above.

Drive Information

To view details about an installed drive, including its serial number and firmware version:

1. Press the MENU button to display the Main Menu.
2. If necessary, press an arrow button until the cursor lines up with `DRIVE INFO`.
3. Press the SELECT button.

   A list of all installed drives will appear.
4. Use the arrow buttons until the cursor underscores the desired drive.
5. Press the SELECT button.

   The Drive Information Menu will appear (see Figure 2-7 on page 2-8). The screen lists the manufacturer, model, status, serial number, interface type, and firmware version of the selected drive. See Table 4-3 on page 4-5 for a list of drive status messages.

CAP Magazine Status

To check the status of a CAP magazine and its contents:

1. Press the MENU button to display the Main Menu.
2. If necessary, press an arrow button until the cursor lines up with `CAP STATUS`.
3. Press the SELECT button.

   A blank screen will appear.
4. Press the SELECT button again.

   The CAP Contents menu will appear. The screen lists the VOLSER of each cartridge in an installed magazine or it lists a status message. See Table 4-4 for the status messages that appear on this list.

Note: Each CAP has four magazines, numbered one through four, from the top location to the bottom.

Table 4-4. CAP Magazine Slot Status Messages

Message	Explanation
`EMPTY`	This magazine slot does not contain a cartridge.
`UNKNOWN`	This magazine slot contains a cartridge, but the library has not yet performed the necessary audit to identify the cartridge.
`UNREADABLE`	This magazine slot contains a cartridge, but the camera could not read the cartridge's VOLSER label.

CAP States

When exporting or importing cartridges through the CAPs, the following CAP states may be displayed:

Table 4-5. CAP States

State	Explanation
CAP A (B) Open	Specified CAP is open for exporting or importing of cartridges
CAP A (B) Closed	Specified CAP is closed and locked
CAP A (B) Transition	Specified CAP is stalled during an open or close transition. This message indicates a problem and an error is posted to the FSC log.
CAP A (B) Unknown	The specified CAP is in an unknown state. Consult the FSC logs.

Cleaning Cartridge Usage Count

You should periodically check the usage count of cleaning cartridges in the reserved cells. This ensures that you will have enough time to obtain replacement cartridges for those that will expire soon.

Cartridges in the Reserved Cells

To check the usage count of all cleaning cartridges (those in the reserved cells and those in the CAP):

1. Press the MENU button to return to the Main Menu.
2. Press the arrow buttons until the cursor underscores `CLEANING INFORMATION`.
3. Press the SELECT button.

   The panel displays the Cleaning Info menu (see Figure 2-8 on page 2-9).
4. Press the arrow buttons until the cursor underscores `CLEAN CARTRIDGE INFO`.
5. Press the SELECT button.

   The Clean Cartridges screen appears, which lists all installed cleaning cartridges by drive type, VOLSER, and usage count.

   Note: If the usage count for a cleaning cartridge has exceeded its warning count, the export screen will display `EXPIRED`. You must remove this cartridge from the library. To export the expired cartridge, see "Exporting Cleaning Cartridges through the CAP" on page 3-25.
6. Press the MENU button to exit the Clean Cartridges screen.

Library Personality Information

Viewing library personality information lets you determine the library's vendor and whether the personality module for the Sun/StorageTek L-Series Library Admin product is present and enabled.

To view the library's personality information:

1. Press the MENU button to return to the Main Menu.
2. Press the arrow buttons until the cursor underscores `CONFIGURATION`.
3. Press the SELECT button.

   The panel displays the Main Configuration Menu.
4. Press the arrow buttons until the cursor underscores `PERSONALITY MODULE`.
5. Press the SELECT button.

   The panel displays the Personality Module Info screen.
6. Press the down arrow to view a second screen of information.
7. To exit the Personality Module Info screen, press the MENU button.

The following status messages might appear on the Personality Module Info screen:

Table 4-6. Personality Module Status/Info Screen

Message	Explanation
Status:	
PRESENT	A recognizable personality module is attached to the logic card
NOT PRESENT	No personality module is attached to the logic card
UNKNOWN	No valid vendor information has been loaded into this library
Type: NORMAL	No personality upgrade is currently active; the factory-installed personality and vendor information are in effect
UPGRADE	A personality upgrade is available
USED UPGRADE	A personality upgrade is available, but the upgrade has been previously used
WRITE IN PROGRESS	A personality upgrade is in progress
VERSION:	The version number for the personality module. If a personality module is not present, this is the version of the vendor information.
LIBRARY VENDOR ID:	The identity number for the library vendor
LIBRARY VENDOR NAME:	The name of the library vendor
LIBRARY PRODUCT NAME:	If TYPE is NORMAL, this is the product name assigned by the library vendor. If TYPE is UPGRADE, this is the name of the product for which the upgrade is valid.
SCSI VENDOR NAME:	The library vendor name reported on the SCSI or Fibre Channel interface
SCSI PRODUCT NAME:	The library product name reported on the SCSI or Fibre Channel interface
Horizon: ENABLED	The personality upgrade for the Sun/StorageTek L-Series Library Admin product is available on the installed personality module
DISABLED	The personality upgrade for the Sun/StorageTek L-Series Library Admin product is not available

Exporting Cleaning Cartridges through the CAP

Note: This procedure assumes that you have:

- Loaded cleaning cartridges into the reserved cells
- Once the cleaning cartridges are loaded, reset the library.

These two steps enable the Auto Clean function.)

When one or more cleaning cartridges have expired, you can export them from the reserved cells to the CAP. To do export them:

1. Press the MENU button to return to the Main Menu"
2. Press the arrow buttons until the cursor underscores `CLEANING INFORMATION`.
3. Press the SELECT button.

   The panel displays the Cleaning Info menu (see Figure 2-8 on page 2-9).
4. Press the arrow buttons until the cursor underscores `EXPORT CARTRIDGE.`
5. Press the SELECT button.

   The Export Clean Cartridges screen appears, which lists all reserved cell cleaning cartridges by domain (or drive type), VOLSER, and usage count.
6. Select the cleaning cartridges you want to export by:
   a. Moving the cursor to the desired cartridge entry on the list
   b. Pressing the SELECT button.

      A selected cleaning cartridge is then highlighted (in reverse video)
   c. Repeating Steps a and b until you have selected all the cartridges you want to export
7. Press the SELECT button to export the cartridges.

Importing Cleaning Cartridges through the CAP

Note: This procedure assumes that you have:

- Loaded cleaning cartridges into the reserved cells
- Once the cleaning cartridges are loaded, reset the library.

These two steps enable the Auto Clean function.)

When you want import cleaning cartridges through the CAP into the reserved cells:

1. Enter the console command to unlock the CAP.
2. Press the CAP button on the operator panel to open the CAP.

   The *Open* indicator will light.

CAUTION:
Possible halt to operation or damage to components. **You must enter the cartridges properly, or else you might damage the robot or the drive or cause the library to stop operating. Use only cartridges designed for your type of drives.**

3. Load cartridges into the magazine.

   You can do this one of two ways:

   a. Pull out and down on the magazine handle.

   b. Remove the magazine by lifting it out (see Figure 4-2 on page 4-14).

Note: You can use the snap-on retention cartridge cover to keep cartridges in place when carrying the magazine. Remove the clear cover from the back of the magazine by lifting the side edge. To protect the cartridges, place the slots on one edge of the cover into the grooves on the side of the magazine's top panel and snap the other edge into place.

4. Enter the cartridges into the magazine so that they lie flat, with the VOLSER label facing toward you, the customer label facing down, and the reel facing away from you. (See Figure 4-3 on page 4-14 and Figure 4-4 on page 4-15.)

CAUTION:
Possible damage to the hand assembly. **Remove the magazine's retention cover before loading the magazine into the CAP.**

5. Return the magazine to its closed position.
6. Press the CAP button on the operator panel to close the CAP.
7. Press the MENU button to return the display to the Main Menu.
8. Press the arrow buttons until the cursor underscores `CLEANING INFORMATION`.

9. Press the SELECT button.

   The panel displays the Cleaning Info menu (see Figure 2-8 on page 2-9).

10. Press the arrow buttons until the cursor underscores `IMPORT CARTRIDGE.`

11. Press the SELECT button.

    The Import Clean Cartridges screen appears, which lists all reserved cell cleaning cartridges by domain (or drive type), and VOLSER.

12. Select the cleaning cartridges you want to import by:

    a. Moving the cursor to the desired cartridge entry on the list

    b. Pressing the SELECT button. A selected cleaning cartridge is then highlighted (in reverse video)

    c. Repeating Steps a and b until you have selected all the cartridges you want to import

    Note: *There is no "undo" available on this menu.* If you select a cartridge by mistake, you must exit the menu by pressing the MENU button. Then you must start again at Step 10.

13. Press the SELECT button to import the cartridges.

Importing Data Cartridges through the CAP

To unlock the CAP, open it, and import data cartridges:

1. Enter the console command to unlock the CAP.
2. Press the CAP A or CAP B button on the operator panel to open the CAP.

   The indicator will light.

CAUTION:
Possible halt to operation or damage to components. **You must enter the cartridges properly or you might damage the robot or the drive, or cause the library to stop operating. Use only cartridges designed for your type of drives.**

Refer to Figure 4-2 on page 4-14 through Figure 4-6 on page 4-16 while performing the following steps.

3. Load cartridges into the magazine.

   You can do this one of two ways:

   a. Pull out and down on the magazine handle.

b. Remove the magazine by lifting it out (see Figure 4-2 on page 4-14).

Note: You can use the snap-on retention cartridge cover to keep cartridges in place when carrying the magazine. Remove the clear cover from the back of the magazine by lifting the side edge. To protect the cartridges, place the slots on one edge of the cover into the grooves on the side of the magazine's top panel and snap the other edge into place.

4. Place the cartridges into the magazine so that they lie flat, with the bar code up and the reel facing away from you.

CAUTION:
Remove the retention cover before loading the magazine into the CAP.

5. Return the magazine to its closed position.

6. Press the CAP A or CAP B button on the operator panel to close the CAP.

Note: Sun/StorageTek strongly advises that you do *not* import unlabeled cartridges. Your client software determines what happens when you import a cartridge with an unreadable label. Under ordinary conditions, the camera on the hand audits the CAP and recognizes that a cartridge is present, but the hand does not move it. You must remove the cartridge from the CAP.

In this situation, your software might direct the library to stop operating. Some software might prompt you to type in a label number when no VOLSER is read. Typing in a label number might cause a problem later during an audit because the camera still will not be able to read the unreadable VOLSER on the cartridge.

Figure 4-2. Removing the CAP Magazine (C65027)

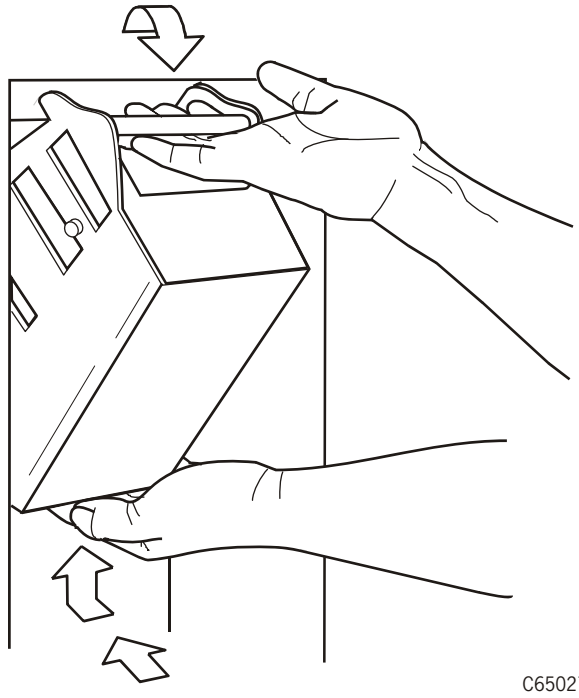


Figure 4-3. Placing DLT/SDLT Cartridges into the CAP Magazine (C65052)

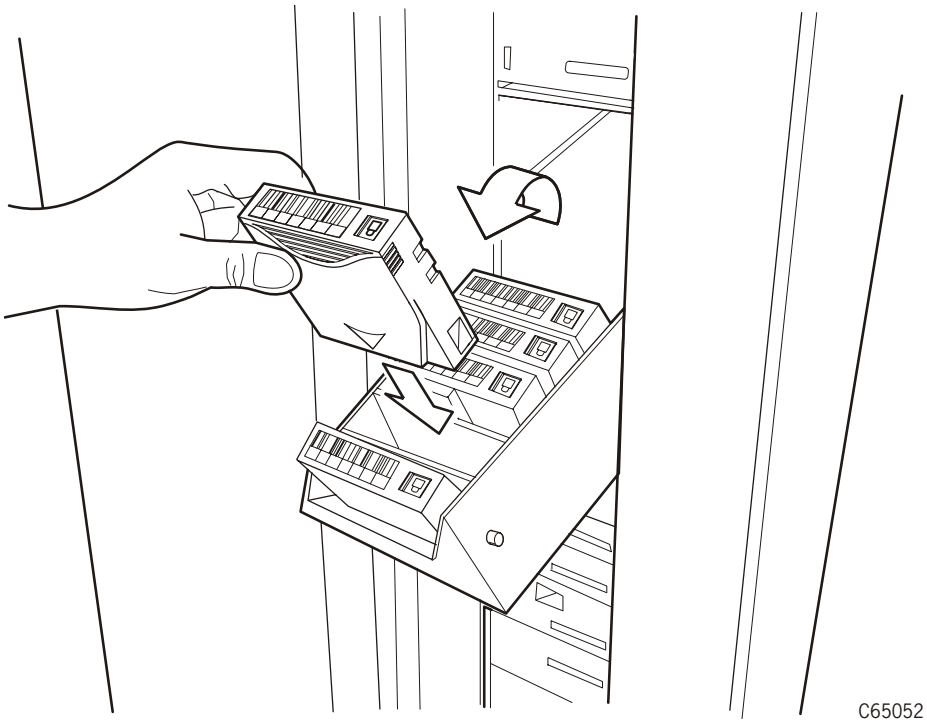


Figure 4-4. Placing T9x40 Cartridges into the CAP Magazine (C65135)

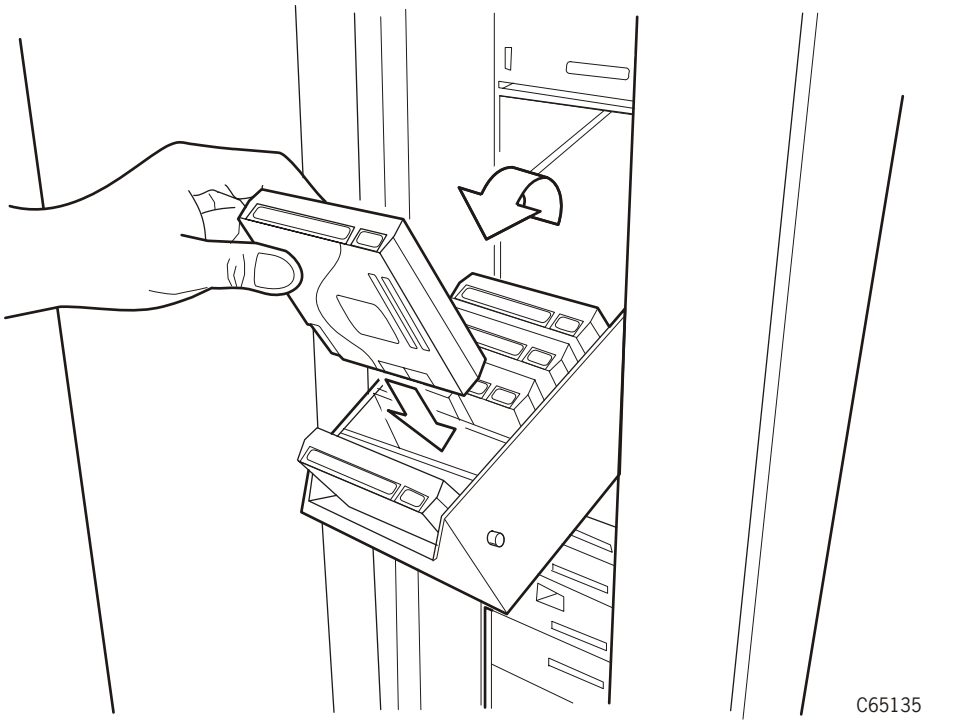


Figure 4-5. Placing T10000 Cartridges into the CAP Magazine (C65681)

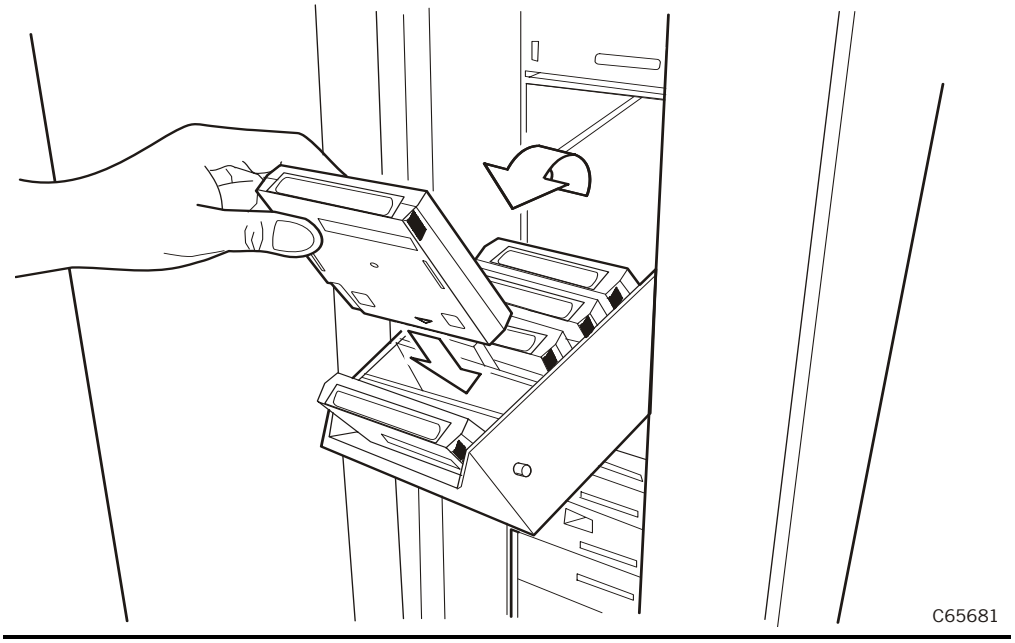
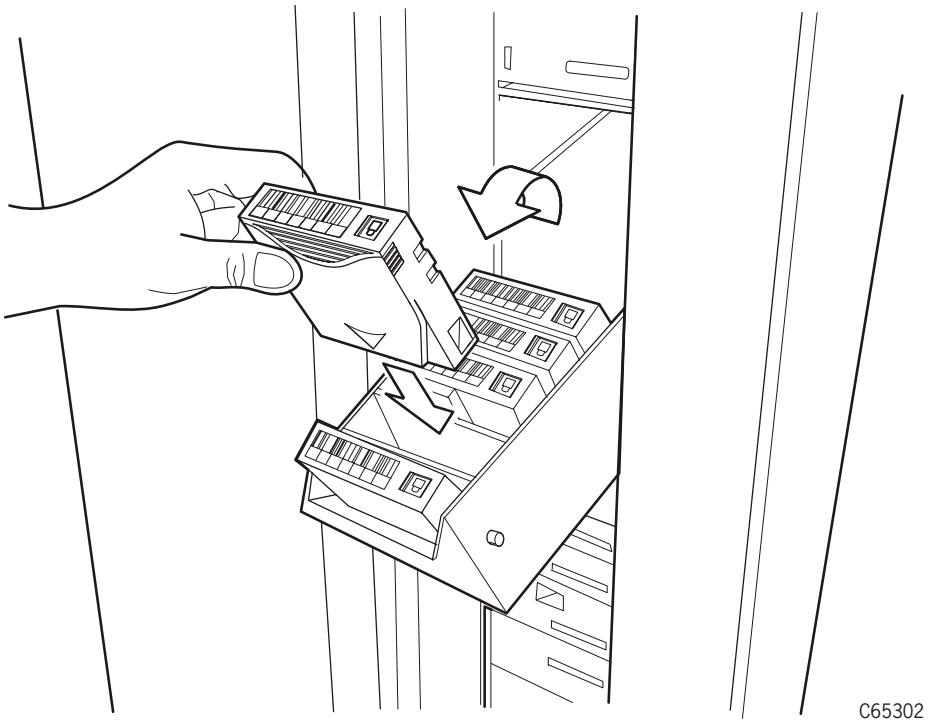


Figure 4-6. Placing Ultrium Cartridges into the CAP Magazine (C65302)



Exporting Data Cartridges through the CAP

To export data cartridges through the CAPs:

1. At the console, enter the VOLSERs of the cartridges you require.

   The robot will retrieve the cartridges and insert them into the CAP.

2. Enter the console command to open the CAP.

   This will unlock the CAP.

3. Press the CAP A or CAP B button on the operator panel to open the CAP.

4. Remove or pull down the magazine and remove the cartridges and store them *outside* the tape library (refer to "Storage of Cartridges" on page A-30).

5. Repeat these steps until you have removed all the required cartridges.

6. Press the CAP button to close the CAP

7. Refer to your console and your software documentation for further instructions.

Manually Cleaning a Drive

If you have not enabled the Auto Clean function on the library, then the library status screen will display `CLEAN NEEDED` whenever a drive requires cleaning.

To manually clean this drive:

1. Enter the console command to open the CAP.

   This will unlock the CAP.

2. Press the **CAP** button on the operator panel to open the CAP.
3. Insert the required cleaning cartridge into the CAP.
4. Press the **CAP** button to close the CAP.
5. Press the **MENU** button until the Main Menu displays.
6. Press the arrow buttons until the cursor underscores `DIAGNOSTICS`.
7. Press the **SELECT** button.

   The panel displays the Main Diagnostics Menu (see Figure 2-9 on page 2-11).

8. Press the arrow buttons until the cursor underscores `DRIVE DIAGNOSTICS`.
9. Press the **SELECT** button.

   The screen will display a list of all installed drives.

10. Use the arrow buttons to highlight the desired drive.
11. Press the **SELECT** button.

    The Diagnostics for Drive menu appears.

12. Press the arrow buttons until the cursor underscores `CLEAN DRIVE`.
13. Press the **SELECT** button.

    A message screen will appear to inform you that the drive will be cleaned at the next opportunity.

    When cleaning is completed, the robot will return the cleaning cartridge to the CAP.

    If you want to clean another drive (of the same type), press the **MENU** button to return to the list of drives, and repeat Steps 10 through 13.

14. When drive cleaning is completed, press the **CAP** button to open the CAP.
15. Remove the cleaning cartridge and make a record of how many times it has been used.
16. Press the **CAP** button to close the CAP.

Understanding Pass-thru Port (PTP) Operation

Two L700e frames can be joined together by a Pass-thru Port (PTP) mechanism. The primary function of the PTP is to satisfy a cartridge mount operation when all drives within a library are busy. The PTP transfers the required cartridge to the other library, where an idle drive can perform the mount operation.

PTP operation is automatic and no manual intervention is required. Communication between the two libraries occurs over serial cables connected to each library's controller card. As a safety feature, the doors of both libraries are also monitored by interlock switches; if the door of one library is opened, PTP operation to *both* libraries is immediately suspended to prevent any transfer of cartridges when you may be inside the library.

If your library is a standalone L700e, the operator panel will display `L700`; if the library is joined by a PTP, it will display `L700e`.

Software requirements for the PTP are either:

- For Unix-based servers, you must use Automated Cartridge System Library Software (ACSLS) version 6.0.1 or higher, with the Special Program Enhancement (SPE) for PTP operation, or
- For Microsoft Windows-based servers, you must use Sun/StorageTek Library Manager, version 2.0 or higher.

Reviewing FSC Logs

A Sun/StorageTek service representative might ask you to review the library's fault symptom code (FSC) log so that you can better analyze library-related problems. The FSC log records significant events and errors that the library has experienced during operation.

To review the FSC log:

1. Press the MENU button until the Main Menu displays.
2. If necessary, press the arrow buttons until the cursor underscores `FSC LOG`.
3. Press the SELECT button.

   The panel displays the FSC logs screen (see Figure 2-4 on page 2-6).
4. Use the arrow buttons to scroll through the log.

Here is a sample entry on the FSC logs screen, followed by an explanation of the entries:

```
3329    03    NONE
03/01/2004   14:46:14
```

3329	This four-character code is the FSC.
03	This value indicates the number of times this FSC has occurred.
NONE	This message indicates which, if any, mechanical device was involved.
03/01/2004	These digits indicate the date the FSC occurred. The fields from left to right are month, day, and year.
14:46:14	These digits indicate the time the FSC occurred. The fields from left to right are hour, minutes, and seconds.

Running Diagnostic Tests

Diagnostic tests let you exercise certain aspects of the library's operation. Tests are listed in Table 4-7.

Table 4-7. L700e Library Drive Diagnostic Tests

Test	Description
Clean Drive	This function is not a test. It moves a specified cleaning cartridge from the CAP to a drive and initiates drive cleaning. When cleaning is completed, it will return the cleaning cartridge to the CAP. This routine does *not* require the library to be offline.
Mount	Mounts a diagnostic tape to the selected drive.
Dismount	Dismounts a diagnostic tape from the selected drive.
Run Drive Check	Determines whether the specific drive is functioning. This test applies to DLT 8000, T9x40[1] and T10000[2] drives only.
Mount-Dismount	Mounts and dismounts a diagnostic tape on the selected drive.

1. T9x40 drives must have firmware version 1.28 or higher.
2. T10000 drives must have firmware version 1.28.101 or higher.

CAUTION:
***Potential system problem:* Diagnostic tests should be performed only by trained personnel.**

Before performing the diagnostic tests, be sure that the library and drives are offline.

Running Drive Diagnostic Tests

To run a diagnostic test on a drive:

1. Place the library and drives offline.
2. Press the MENU button until the Main Menu displays.
3. Press the arrow buttons until the cursor underscores DIAGNOSTICS.
4. Press the SELECT button.

   The panel displays the Main Diagnostics Menu.
5. Press the arrow buttons until the cursor underscores DRIVE DIAGNOSTICS.
6. Press the SELECT button.

   The screen will display a list of installed drives.
7. Use the arrow buttons to highlight the desired drive.
8. Press the SELECT button.

   The Diags for Drive menu appears.
9. Press the arrow buttons until the cursor underscores the desired test. For a description of the available tests, see Table 4-7 on page 4-19.
10. Press the SELECT button.

    If you selected MOUNT/DISMOUNT LOOP, an editing screen will appear:

    a. Use the arrow buttons to enter the desired value. (The up arrow button increases the value; the down arrow button decreases the value.)

    b. Press the SELECT button.
11. You will be prompted to confirm that you want the library in Maintenance Mode (offline) before beginning the test (ARE YOU SURE?). Confirm this by pressing the SELECT button. (You may press the MENU button to abort.)
12. Wait until the test is completed; the screen will display a message that either the test completed successfully or, if a problem occurred, the screen will display an error message and, in some cases, an FSC code.

Running a Get-Put Loop

During a Get-Put loop, the hand loads and unloads a cartridge from a storage cell. This tests the functionality of the hand assembly.

To run a Get-Put loop:

1. Place the library and drives offline.
2. Press the MENU button until the Main Menu displays.
3. Press the arrow buttons until the cursor underscores `DIAGNOSTICS`.
4. Press the SELECT button.

   The panel displays the Main Diagnostics Menu.
5. Press the arrow buttons until the cursor underscores `GET PUT LOOP`.
6. Press the SELECT button.

   The Get-Put Mode screen will appear.
7. You will be prompted to confirm that you want the library in Maintenance Mode (offline) before beginning the test (`ARE YOU SURE?`). Confirm this by pressing the SELECT button. You may press the MENU button to abort.
8. Wait until the test is completed; the screen will display `TEST COMPLETE` or, if a problem occurred, an FSC code.

Running a PTP Test

The PTP test simulates a cartridge pass-thru operation between two libraries connected by a pass-thru port. This test:

- Places a diagnostic tape from the source library into one of the PTP cells
- Moves the cartridge to the destination library
- The robot in the destination library removes and then returns the tape to the PTP cell
- The tape is then returned to the source library, where it is placed into its home cell.

To start the PTP test:

1. Be sure that both libraries are offline.
2. Make sure the main access doors are closed and the library menu is displayed.
3. Be sure there is a diagnostic cartridge in the reserved area of the source library.
4. From the status screen, press the MENU button.

   The main menu will appear.
5. Press the down arrow button to move the cursor down until it is next to `DIAGNOSTICS`.

6. Press the SELECT button.

   The DIAGNOSTICS screen will appear.

7. Press the down arrow button to move the cursor next to PTP DIAGNOSTICS.

8. Press SELECT.

   The operator panel will display NUMBER OF LOOPS = 1

9. If you wish to increase the number of loops, press the arrow button.

10. Press SELECT to start the test (or press MENU to stop or exit the test).

11. You will be prompted to confirm that you want the library in Maintenance Mode (offline) before beginning the test (ARE YOU SURE?). Confirm this by pressing the SELECT button.

If an error is encountered, consult the Event log for the FSC listed.

To re-start this test or to begin another test, press MENU to return to the DIAGNOSTICS menu.

Operating in Demo Mode

CAUTION:
Potential for error. **Running the library in Demo Mode causes the data cartridges to be rearranged. After Demo Mode is completed, you must reset the library and enter the client command to upload library audit data to the client.**

With the library in Demo Mode (demonstration mode), the hand takes a data cartridge from a storage cell, moves the cartridge, and places the cartridge back into a different storage cell.

To operate in Demo Mode:

1. Place the library and drives offline.

2. Press the MENU button until the Main Menu displays.

3. Press the arrow buttons until the cursor underscores DIAGNOSTICS.

4. Press the SELECT button.

   The panel displays the Main Diagnostics Menu.

5. Press the arrow buttons until the cursor underscores DEMO MODE.

6. Press the SELECT button.

   The Demo Mode menu appears.

7. Use the arrow buttons to enter the desired number of loops. The up arrow button increases the value by 100; the down arrow button decreases the value by 100.

Note: Sun/StorageTek does not recommend looping tests excessively.

8. Press the SELECT button.
9. You will be prompted to confirm that you want the library in Maintenance Mode (offline) before beginning the test (`ARE YOU SURE?`). Confirm this by pressing the SELECT button. (You may press the MENU button to abort.)
10. Wait until the test is completes. The screen will display `TEST COMPLETE`. or, if a problem occurred, an FSC code
11. Press the RESET button to reset the library.

Powering off the Library

To power off the library:

1. Enter the command at the system console to remove the tape library and drives from online status.
2. Press down on the switch or switches (circuit breakers) behind the right front door of the tape library.

Operating in Manual Mode

The following section describes operations you can perform when the tape library is in manual mode. Manual mode occurs when the tape library is not online.

When the library is offline, you might have to:

- Open the front door
- Move the robot
- Locate a cartridge in the storage cells
- Remove a cartridge from the hand
- Mount a cartridge in a drive
- Dismount a cartridge from a drive

Before starting any of these tasks, you must take precautions against electrostatic discharge (ESD).

CAUTION:
Potential static electricity damage to electrical components: **Take precaution against potential ESD damage by touching unpainted metal on the library frame *before* reaching into the library or touching any drives. Avoid touching any electrical components.**

After you have opened a library door:

1. With your finger, touch a gray, unpainted metal surface, such as the library frame just inside the front door.
2. Keep your body movement to a minimum as you touch the drives or library components.

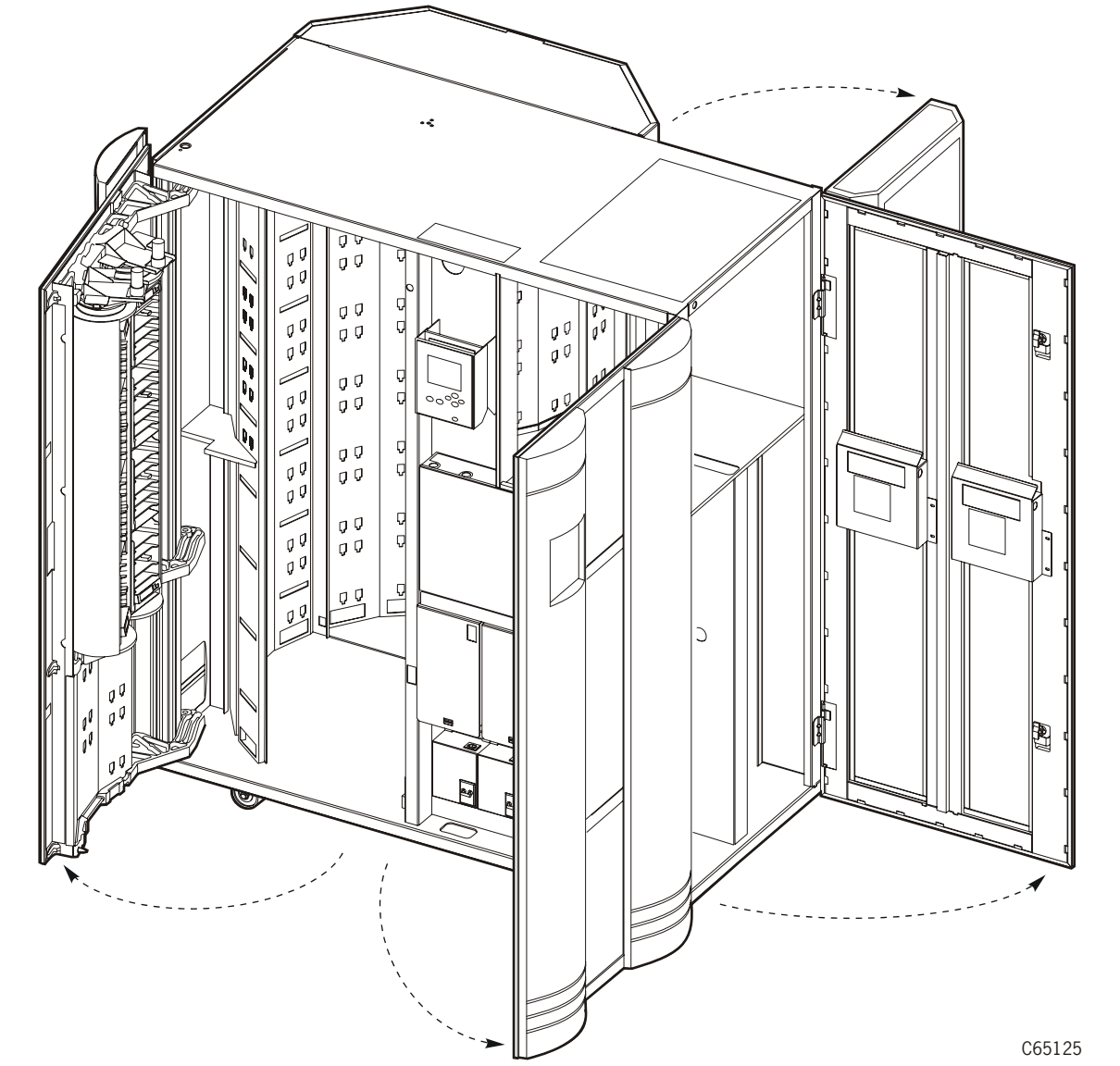
Antistatic wrist straps with clip-on ends are commercially available.

Opening the Library Front Doors

You must open the front doors to perform manual operations. Refer to Figure 4-7 on page 4-25 as you perform this procedure.

1. Make sure all jobs have ended and that the tape library is offline.
2. Open the tape library right front door by pulling on the left side of the door.
3. Open the tape library left front door by using a latch key to unlock both locks. Turn the key counterclockwise to unlock them, then pull open the door.

Figure 4-7. Opening the Access Doors (C65125)



Moving the Robot

After you open the tape library doors, you might need to move the robot to make it easier to access the cartridges or the drives.

Read and observe the following caution before you attempt to move any portion of the robot.

CAUTION:
***Potential equipment damage:* To prevent damaging the hand or Z carriage, make sure the reach mechanism on the hand is fully retracted before moving any part of the robot. Push the gripper mechanism into**

the retracted position. If the tape library goes offline due to a power failure, the reach mechanism might be extended into a storage cell or drive. If the robot is rotated when this condition exists, the hand could be damaged.

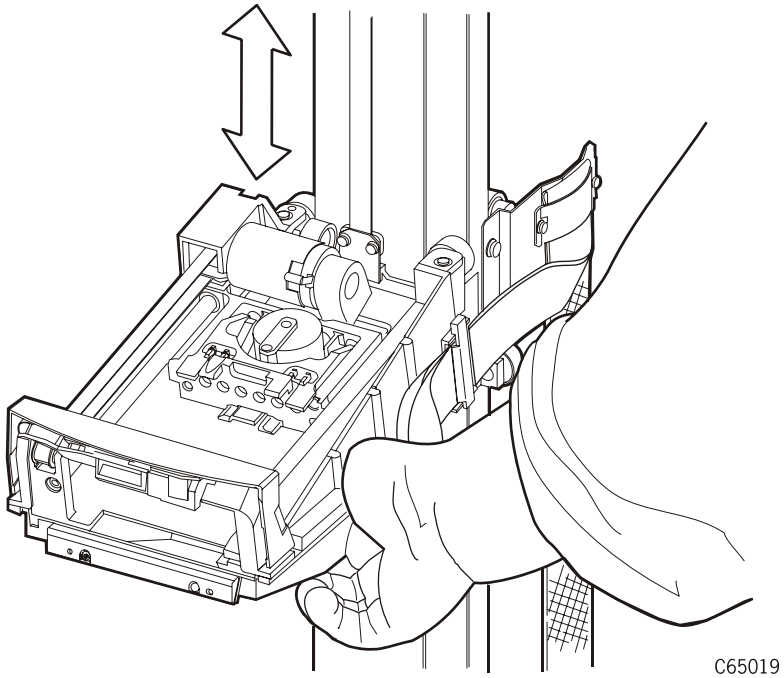
Move the Z column and Z carriage only as shown in Figure 4-8 and Figure 4-9 on page 4-27.

Take precaution against potential ESD damage by touching gray, unpainted metal on the library frame before reaching into the library. Avoid touching any electrical components.

Raising and Lowering the Hand-camera Assembly

If you need to raise or lower the hand, *slowly and carefully* move it by placing your fingers on the hand-camera assembly as shown in Figure 4-8.

Figure 4-8. Raising and Lowering the Hand-camera Assembly (C65019)

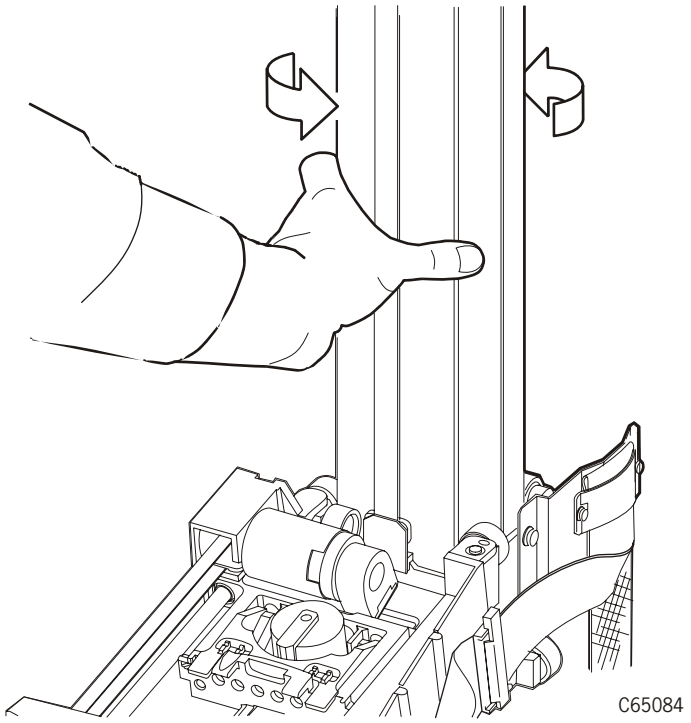


Rotating the Z Column

If you need to rotate the Z column, grasp it and *carefully* rotate it, as shown in Figure 4-9.

The Z column does not rotate a full 360 degrees. If the column meets resistance and stops before reaching the desired position, it has contacted a stopping mechanism. Do *not* force it. Rather, rotate the column in the opposite direction.

Figure 4-9. Rotating the Z Column (C65084)



Locating a Cartridge in the Storage Cells

Figure 1-3 on page 1-7 and Figure 1-4 on page 1-8 show the locations of the panels, rows, and columns of the cartridge storage cells in the library. The decal at the top of each column also provides location information. To remove a cartridge from a storage cell, slide out the cartridge.

Removing a Cartridge from the Hand

If the library loses power or goes offline, a cartridge might be left in the hand. You can remove it from the hand and manually mount it into a drive for a read/write operation.

CAUTION:
Possible equipment damage: **Follow the procedures described in "Moving the Robot" on page 4-25. Failing to do so could damage the hand.**

Make sure you do not touch any electronic components on the hand assembly. The components could easily be damaged.

To remove a cartridge from the hand:

1. Rotate the Z column; move the hand until it is facing the front door.
2. Push on the back of the reach mechanism (Figure 4-10) until the gripper is extended to its full position (Figure 4-11 on page 4-29).

Figure 4-10. Extending the Gripper (C65054)

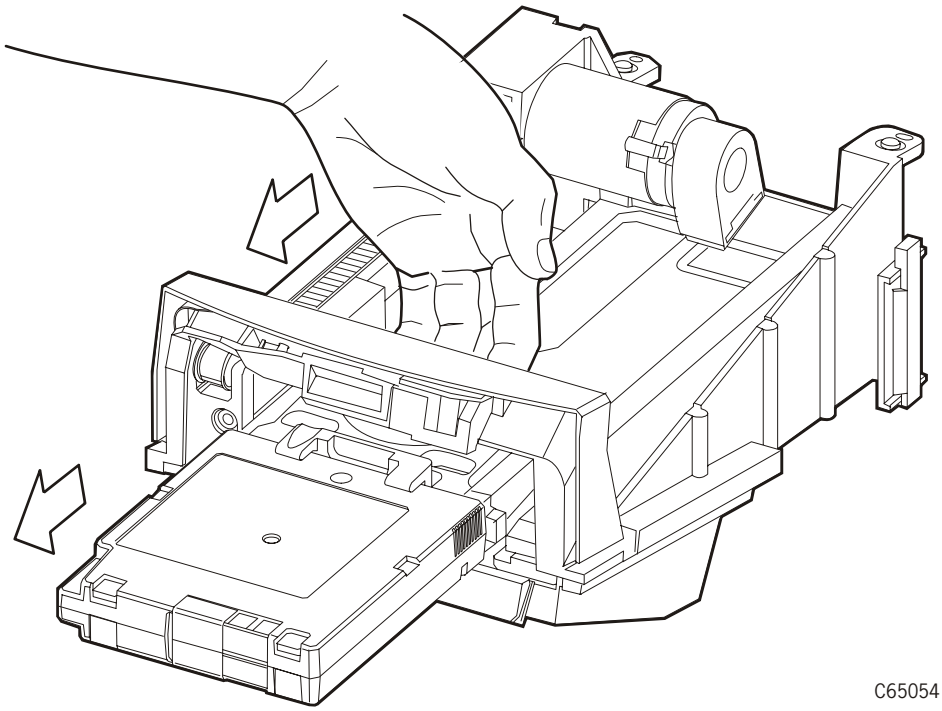
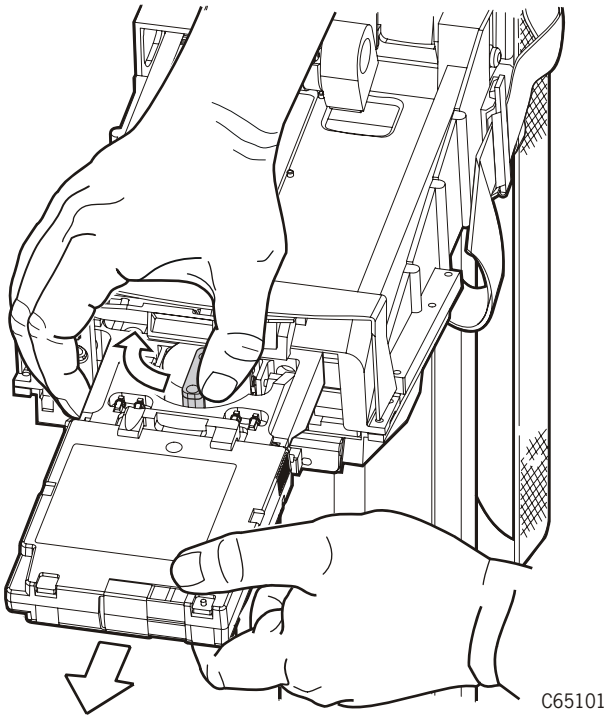


Figure 4-11. Removing a Cartridge from the Hand (C65101)



WARNING:
Heated components: **If the robot has been active, the solenoid switch might be hot to the touch. Wait for the solenoid to cool before touching it.**

ADVERTENCIA:
Componentes calientes: **Si el robot ha estado activado, el interruptor del solenoide puede estar caliente al tacto. Espere a que el solenoide se enfría antes de tocarlo.**

3. Hold the solenoid on top of the reach mechanism with one hand and grasp the cartridge with the other. Rotate the solenoid switch clockwise until the cartridge is released from the gripper, as shown in Figure 4-11.

CAUTION:
Potential equipment damage: **Make sure the gripper mechanism is fully retracted. If it is left extended and you turn the robot, the gripper mechanism will strike a storage cell. If it is left extended and the hand is facing the tape library door when it is closed, the door will strike the gripper mechanism.**

4. Push the gripper mechanism back into the hand until the mechanism is fully retracted.

Loading/Unloading Cartridges Manually

When the library is offline, you can—after taking adequate precautions—load a cartridge into a drive or unload a cartridge from a drive. The following pages provide manual load and unload procedures for DLT, Ultrium, T9x40, and T10000 drives.

Note: If you manually load any cartridges into a drive, you should manually unload them from the drive when the drive's operation is finished. Place them into a cell or remove them from the library.

Loading a Cartridge into a Load Handle Drive

Some drives in the library contain load handle mechanisms to assist the drive in loading cartridges. The load lever can be seen on the front of these drives. Follow the directions below to manually load a drive that contains a load handle.

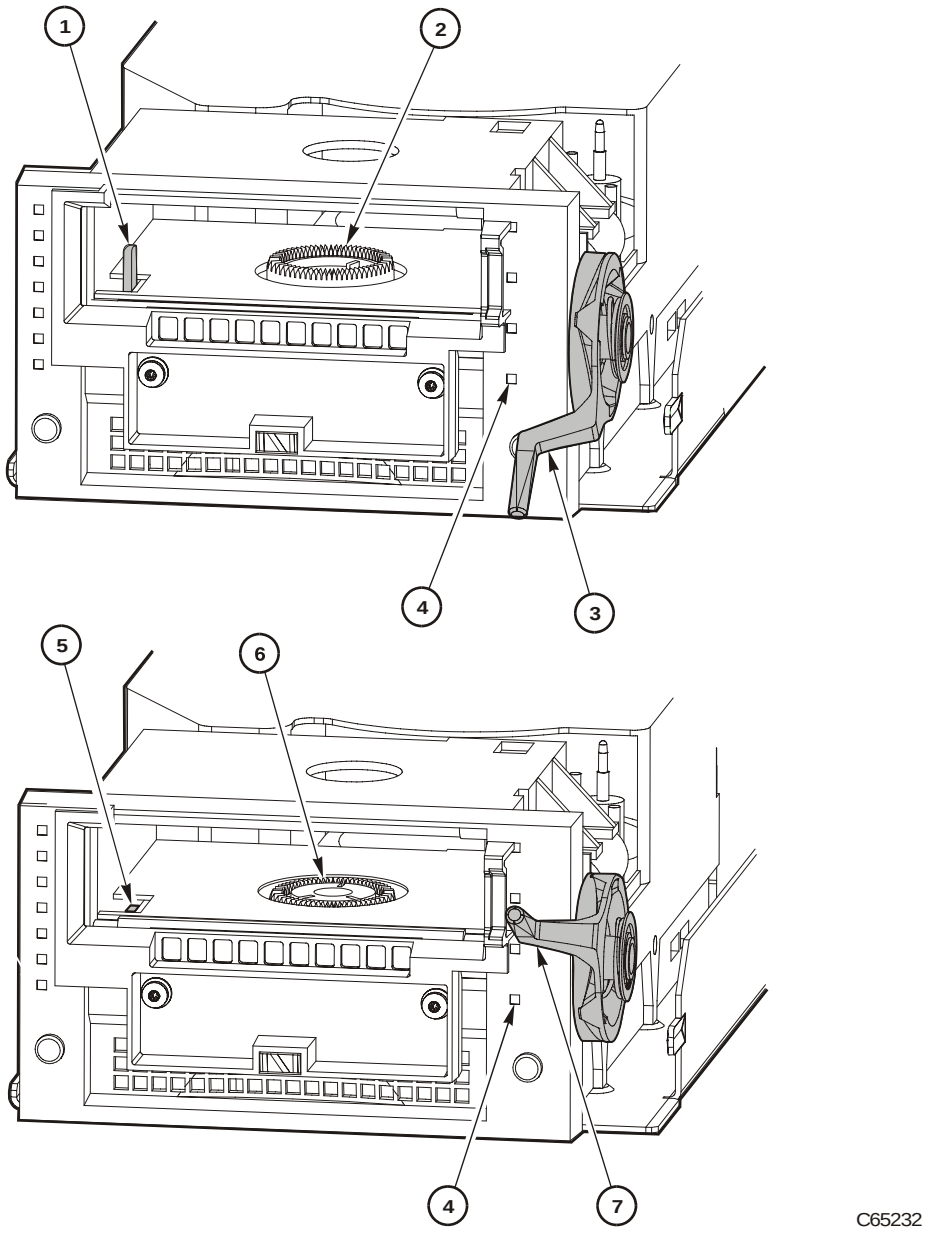
CAUTION:
***Potential equipment damage:* Before you load a cartridge into the drive, you must make sure power is on and the *Operate Handle* indicator is steadily on (not flashing).**

To load a cartridge into a load handle drive:

1. Obtain the cartridge VOLSER, location, and drive number from the console.
2. Open the tape library right front door by pulling on the left side of the door.
3. Open the library left front door by using a latch key to unlock both locks. See Figure 4-7 on page 4-25. Turn the key counterclockwise to unlock them, then pull open the door.
4. Locate the cartridge (see "Locating a Cartridge in the Storage Cells" on page 4-27).
5. Make sure the DLT handle is up (see Figure 4-12 on page 4-31) and the *Operate Handle* indicator is steadily on.

   Note: If the handle is in the down position, wait for the *Operate Handle* indicator to remain on steadily before moving it to the up position (see Figure 4-12 on page 4-31). If the *Operate Handle* indicator is flashing while the handle is up, move the handle to the down position and wait for the *Operate Handle* indicator to remain on steadily. Then move the handle to the up position.

Figure 4-12. Drive with Load Handle (C65232)

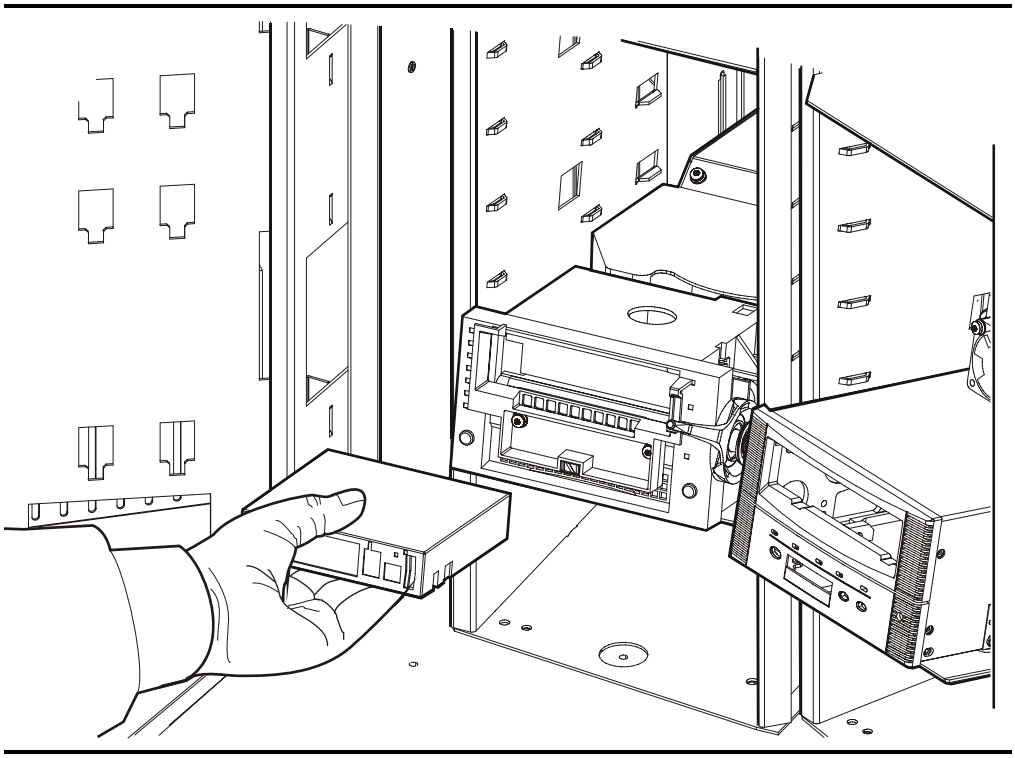


1. Cartridge hook (up)
2. Hub (up)
3. Handle (down)
4. Operate handle indicator
5. Cartridge hook (down)
6. Hub (down)
7. Handle (up)

CAUTION:
Potential equipment damage: **You must insert the cartridge properly or you will damage the drive. Use only DLT cartridges for DLT drives. Make sure the cartridge has a readable VOLSER label.**

6. Hold the cartridge so that the VOLSER label is facing you and the write protect switch is on the right side of the cartridge, as shown in Figure 4-13.
7. Insert the cartridge into the drive and push the cartridge into the back of the drive until it is firmly seated.
8. Lower the drive handle.

Figure 4-13. Loading a Cartridge into a Load Handle Drive (C65137)



Unloading a Cartridge from a Load Handle Drive

To unload a cartridge from a load handle drive:

1. Obtain the drive number from the console and place the drive offline.
2. Open the tape library right front door by pulling on the left side of the door.
3. Open the library left front door by using a latch key to unlock both locks. See Figure 4-7 on page 4-25. Turn the key counterclockwise to unlock them, then pull open the door.
4. Locate the desired drive.
5. Press the Unload button on the drive.
6. Wait (about 12 seconds) for the *Operate Handle* indicator to remain steadily on.

CAUTION:
Potential tape or equipment damage: **Wait five seconds before pulling the cartridge out of the drive. Immediately removing the cartridge may damage the cartridge or drive leaders.**

7. Raise the handle. The cartridge will eject about 4 cm (0.5 in.).
8. Gently pull the cartridge from the drive.

   Note: If the cartridge does not come out of the drive, remount the cartridge and return to Step 5.

9. Store the cartridge *outside* the tape library (refer to "Storage of Cartridges" on page A-30).

Loading a Cartridge into a T9x40 Drive

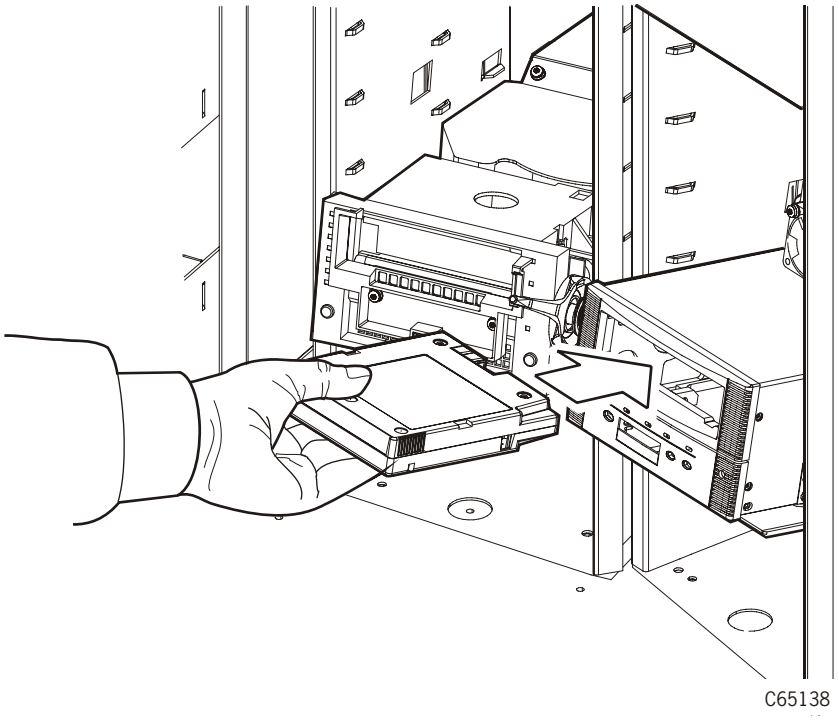
To load a cartridge in a T9x40 drive:

1. Obtain the cartridge VOLSER, location, and drive number from the server console.
2. Open the tape library right front door by pulling on the left side of the door.
3. Open the library left front door by using a latch key to unlock both locks. See Figure 4-7 on page 4-25. Turn the key counterclockwise to unlock them, then pull open the door.
4. Locate the cartridge (see "Locating a Cartridge in the Storage Cells" on page 4-27).
5. Insert the cartridge into the T9x40 drive using the direction shown in Figure 4-14 on page 4-34.
6. Wait for one of the following messages to display on the drive's front panel and take the appropriate action, if necessary:

   - The `Ready F` (File Protected) message displays when a write-protected cartridge loads successfully.

- The `Ready U` (File Unprotected) message displays when a cartridge that is not write-protected loads successfully.
- The `Ready A` (VolSafe-enabled) message displays when a write-enabled VolSafe cartridge loads successfully.
- The `NTReady` message displays when the tape in the cartridge has lost tension. Follow the instructions outlined in the *T9840 Tape Drive User's Reference Manual,* PN 95739, or the *T9940 Tape Drive Operator's Guide*, PN 95989, to correct this condition.
- The `LOADxxxx` message displays when the cartridge unsuccessfully loads, where the xxxx is a fault symptom code. Follow the instructions outlined in the *T9840 Tape Drive User's Reference Manual,* PN 95739, or the *T9940 Tape Drive Operator's Guide*, PN 95989 to correct this condition.

Figure 4-14. Loading a Cartridge into the T9x40 Drive (C65138)



Note: T9840B drives have purple switches; T9840A drives contain yellow switches.

Unloading a Cartridge from a T9x40 Drive

To unload a cartridge from a T9x40 drive:

1. Make sure that the T9x40 drive is not selected by the client.
2. Obtain the drive number from the server console and place the drive offline.
3. Open the tape library right front door by pulling on the left side of the door.

4. Open the tape library left front door by using a latch key to unlock both locks. See Figure 4-7 on page 4-25. (Turn the key counterclockwise to unlock them, then pull open the door.)

5. Press the Unload switch on the front panel of the drive.

   One of the following conditions can occur:

   - After the tape rewinds, the cartridge ejects from the T9x40 drive. Remove the cartridge from the T9x40 drive.
   - The cartridge fails to eject after the tape rewinds. Refer to the *T9840 Tape Drive User's Reference Manual,* PN 95739, or the *T9940 Tape Drive Operator's Guide*, PN 95989 to correct this condition.
   - If the Unload switch is pressed during a write operation, the T9x40 drive tries to write the remaining data before the cartridge unloads. If the `UnWrxxxx` (Unwritten Data) message displays, where `xxxx` is the fault symptom code, the attempt failed and some data remains unwritten to the tape.

     For more information about recovering from an Unwritten Data condition, refer to the *T9840 Tape Drive User's Reference Manual,* PN 95739 or the *T9940 Tape Drive Operator's Guide*, PN 95989.

Loading a Cartridge into a T10000 Drive

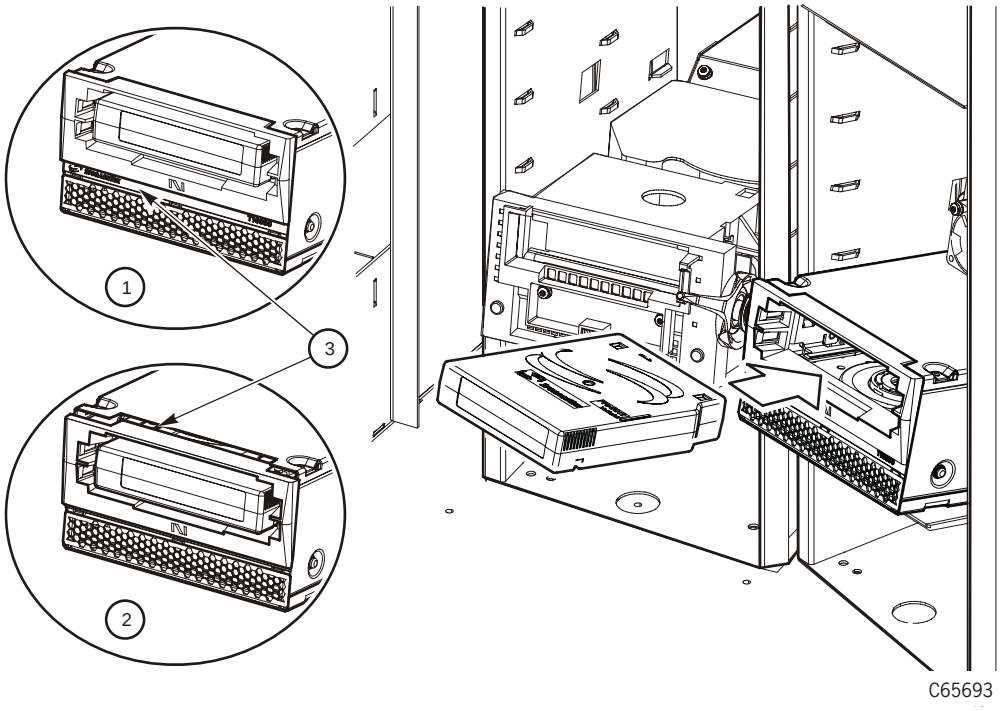
Note: A T10000 Tape Drive accepts only a T10000 tape cartridge.

1. Look into the front of the tape drive to be sure there are no obstructions.

2. Holding the tape cartridge with the hub side down as shown in Figure 4-15 on page 4-36, carefully insert the cartridge into the tape drive so that the front of the cartridge is flush with the bezel. The bezel immediately moves down (gap at the top of the bezel) and the cartridge loads.

   Note: If a cartridge fails to load, remove the cartridge and open the access door. If the leader is either missing or cracked near the hole at the end, the cartridge is defective. Attempt loading another cartridge.

Figure 4-15. Loading a Cartridge into the T10000 Drive (C65138)



1. Tape unloaded position
2. Tape loaded position
3. Gap position

Unloading a Cartridge from a T10000 Drive

1. Use Virtual Operator Panel (VOP) or library software to eject the cartridge. See *Virtual Operator Panel User's Guide*, PN 96179.

CAUTION:
***Tape damage*–Any resistance to the removal of the tape cartridge, beyond minimal friction of the interaction between the tape cartridge case and the elevator assembly, probably indicates that the leader is not fully rewound.**

2. Remove the cartridge when the top of the bezel is flush with the case (gap at the bottom of the bezel). Unlike other drives, the cartridge does not pop out of the T10000 drive when ready to unload.

   If you feel resistance, the leader may not be fully rewound. Use the VOP or library software to attempt another load followed by another unload operation. If that fails to correct the situation, contact your StorageTek service representative regarding a potential stuck tape cartridge. Do not forcefully remove a cartridge.

   Note: A T10000 Tape Drive does not "eject" the tape cartridge from the drive as other cartridge tape drives commonly do. Prior to this tape drive, the cartridge was usually pushed part way out of the tape drive when it was unloaded.

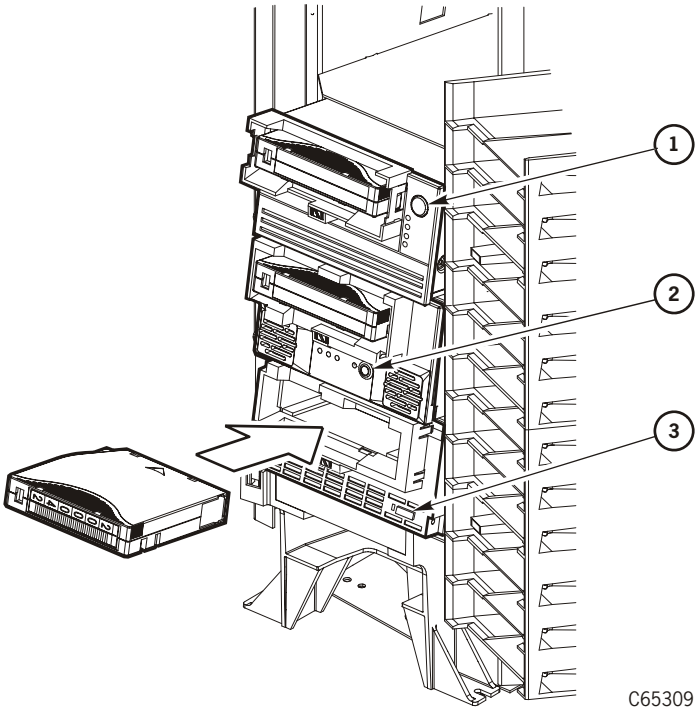
Loading a Cartridge into a Ultrium drive:

1. Obtain the cartridge VOLSER, location, and drive number from the server console.

CAUTION:
***Possible equipment problem:* You must open the library's front door before attempting to manually mount a cartridge to an Ultrium drive. A unique communication between the library and drive prepares the drive for manual operation.**

2. Open the tape library right front door by pulling on the left side of the door.
3. Open the library left front door by using a latch key to unlock both locks. See Figure 4-7 on page 4-25. Turn the key counterclockwise to unlock them, then pull open the door.
4. Locate the cartridge (see "Locating a Cartridge in the Storage Cells" on page 4-27).
5. Insert the cartridge into the Ultrium drive using the direction shown in Figure 4-16.

Figure 4-16. Loading a Cartridge into an Ultrium Drive (C65309)



1. Cartridge dismount button on HP Ultrium drive
2. Cartridge dismount button on Certance Ultrium drive
3. Cartridge dismount button on IBM Ultrium drive

Unloading a Cartridge from an Ultrium Drive

To unload a cartridge from an Ultrium drive:

1. Make sure that the drive is not selected by the client.
2. Obtain the drive number from the server console and place the drive offline.
3. Open the tape library right front door by pulling on the left side of the door.
4. Open the tape library left front door by using a latch key to unlock both locks. See Figure 4-7 on page 4-25. (Turn the key counterclockwise to unlock them, then pull open the door.)
5. Press the Unload button on the front panel of the drive.

   One of the following conditions can occur:

   - After the tape rewinds, the cartridge ejects from the drive. Remove the cartridge from the drive.
   - The cartridge fails to eject after the tape rewinds. Refer to the appropriate manufacturer's manual to correct this condition.

Returning the Library to Online Status

To return the tape library online for automated operations:

1. Refer to your specific drive publications for instructions on making the drives ready. For a DLT drive, make sure the *Operate Handle* light is on and the handle is up.

Note: If you manually load any cartridges, you must manually unload them and store them in a storage cell or remove them from the library.

2. Close and lock the tape library doors. The robot will perform an audit of the cells.
3. Place the tape library online by entering the command at the server operator console.
4. Give the client command to upload the audit data to the client.
5. Refer to your specific software publications for instructions on replacing the cartridges you removed and on inserting the cartridges into the storage cells.

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Sun/StorageTek Maintenance Support 5

This chapter describes what to do if problems occur with the tape library. In some cases, you might be able to correct the problem. In other cases, you must contact your service representative, as described in this chapter.

When the problem is caused by cartridge tapes, refer to Appendix A, "Cartridge Tape Information." When the problem is caused by cartridge tape drives, refer to your tape drive operator's guide.

Most of the time, a fault symptom code (FSC) will appear on the tape library operator panel display. Write down the display information, and give the information to your customer representative or to the staff at the Sun/StorageTek Remote Center. Write down the FSC as soon as it appears.

Customer Service Support Center

The Customer Service Support Center (CSSC) is available 24 hours a day, seven days a week, to customers with Sun/StorageTek maintenance contracts and to Sun/StorageTek employees. You can find additional information about the CSSC on Sun/StorageTek's external Web site at:

http://www.support.storagetek.com

Customer Initiated Maintenance

Customer-initiated maintenance begins with a telephone call from you to the CSSC. You receive immediate attention from qualified Sun/StorageTek personnel, who record problem information and respond with the appropriate level of support.

To contact the CSSC about a problem:

1. Use the telephone to call the Sun/StorageTek Customer Support Services at:

   ☎**800.525.0369** (inside the United States)

   ☎**303.673.4056** (outside the United States)

2. Describe the problem to the call taker. The call taker will ask several questions and will either route your call to or dispatch a support representative.

If you have the following information when you place a service call, the process will be much easier:

Account name	
Site location number	
Contact name	
Telephone number	
Equipment model number	
Device address	
Device serial number (if known)	
Urgency of problem	
Fault Symptom Code (FSC)	
Problem description	

Sun/StorageTek's Worldwide Offices

You may contact any of Sun/StorageTek's worldwide offices to discuss complete storage, service, and support solutions for your organization. You can find address and telephone number information on Sun/StorageTek's external Web site at:

http://www.storagetek.com

Cartridge Tape Information

A

This appendix describes how to prepare, inspect, store, clean, and repair cartridges. It also lists cartridge specifications.

Note: Do *not* use DATA D3 (helical recording) cartridges or 3480 cartridges in the L700e library.

Cartridge Tapes and Labels

Sun/StorageTek created starter kits to help you populate and begin using your library. Starter kits have pre-labeled cartridges with number ranges that are unique for each kit (so multi-media applications will not experience duplicate numbers).

Note: Pre-labeled cartridges are available from Sun/StorageTek. For information on ordering these cartridges, see "Ordering Tape Cartridges/Labels" on page A-13.

Sun/StorageTek does *not* supply cartridge labels. For a supplier of labels only, see "Ordering Tape Cartridges/Labels" on page A-13

Colored Cartridge Specifications

Colored cartridges are approved only if the measured reflection density is greater than 0.10 for DLT cartridges and 1.50 for T9840 cartridges, as measured by an X-Rite 404G color reflection densitometer. Measurements are:

Band width	ANSI Status T Wideband (380 to 780 nanometers)
Measuring range	Density (0.00 to 2.50) D
Accuracy	± 0.02 D
Repeatability	± 0.01 D
Aperture diameter	3.4 mm

The T10000 cartridge is only available in black.

For more information about colored cartridges, contact your Sun/StorageTek marketing representative.

Preparing Cartridges

The following pages describe how to prepare a cartridge for use in the tape library.

Handling a Cartridge

Improper handling of cartridges can result in a loss of data or damage to a library component.

To handle a cartridge correctly:

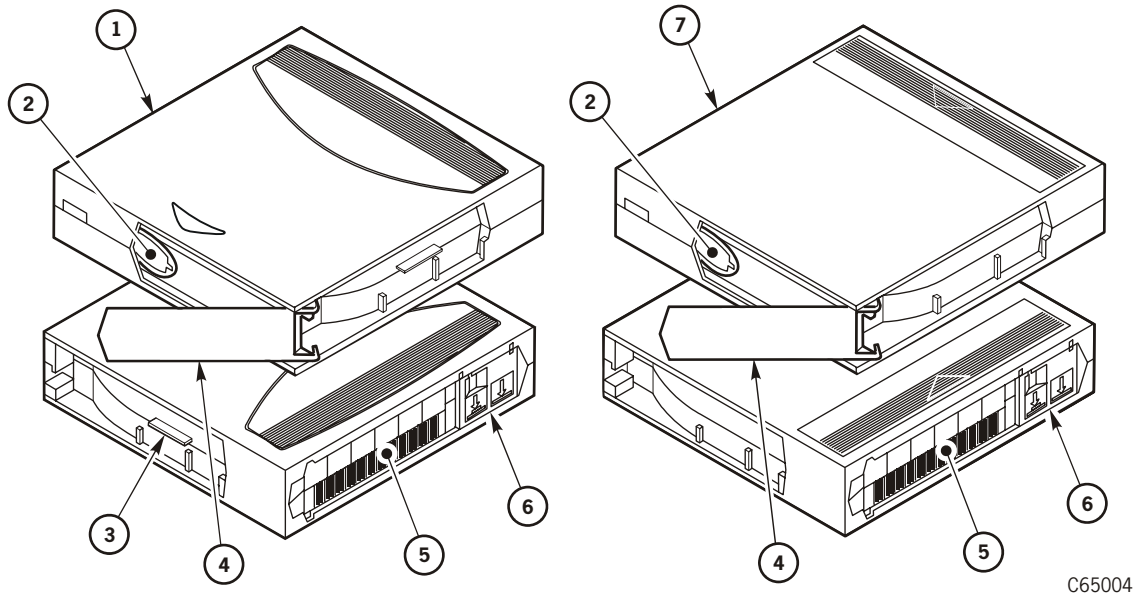
- Make sure the leader block is latched every time you pick up a cartridge.
- Keep cartridges *clean*.
- Inspect a cartridge before each use and *never* put a damaged cartridge into a drive or tape library. Never release a tape leader and pull tape from a cartridge.
- Never open a cartridge.
- Do not handle tape that is outside the cartridge; the tape edge might be damaged.
- Do not expose the tape or cartridge to direct sunlight or moisture.
- Do not expose a recorded cartridge to magnetic fields; this might destroy data on the tape.

Inspecting a Cartridge

A defective or dirty cartridge can damage a drive. Always inspect a cartridge before inserting it into a drive or inserting it into a tape library. Refer to Figure A-1 on page A-3 through Figure A-5 on page A-7. Look for:

- Cracked or broken cartridge
- Broken leader
- Broken tape access door
- Damaged file-protect selector or write-protect switch
- Liquid in the cartridge
- Labels not firmly attached or extending over the cartridge edge
- Any other obvious damage

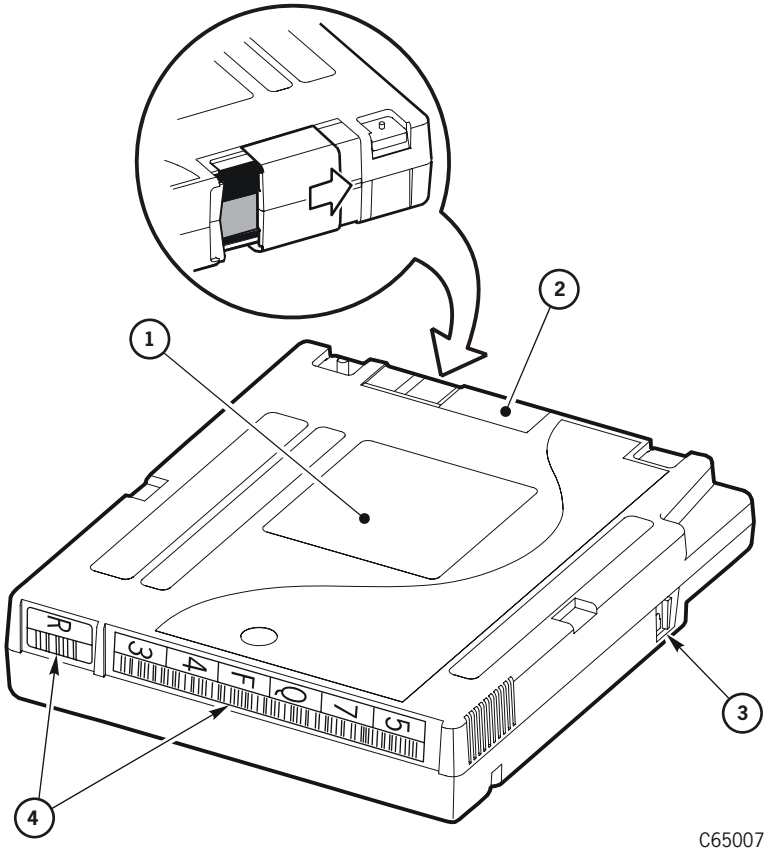
Figure A-1. DLT and SDLT Cartridge Components (C65004)



1. SDLT cartridge
2. Tape leader
3. SDLT cartridge identifier tab
4. Access door
5. Volume serial number (VOLSER) label
6. Read/Write-protect switch
7. DLT cartridge

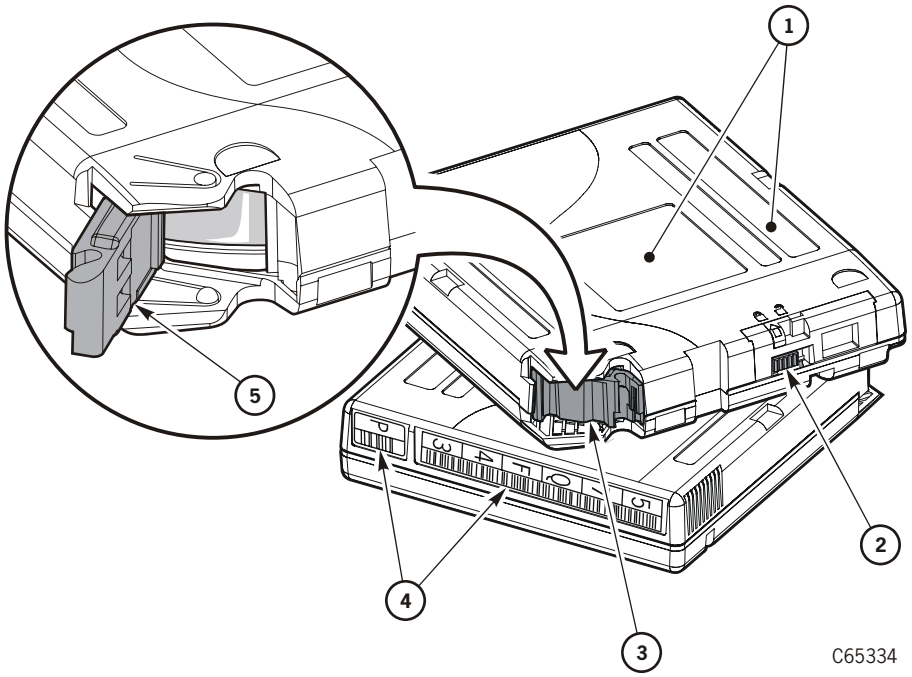
*For DLT-S4 components, see Quantum manual.

Figure A-2. T9840 Cartridge Components (C65007)



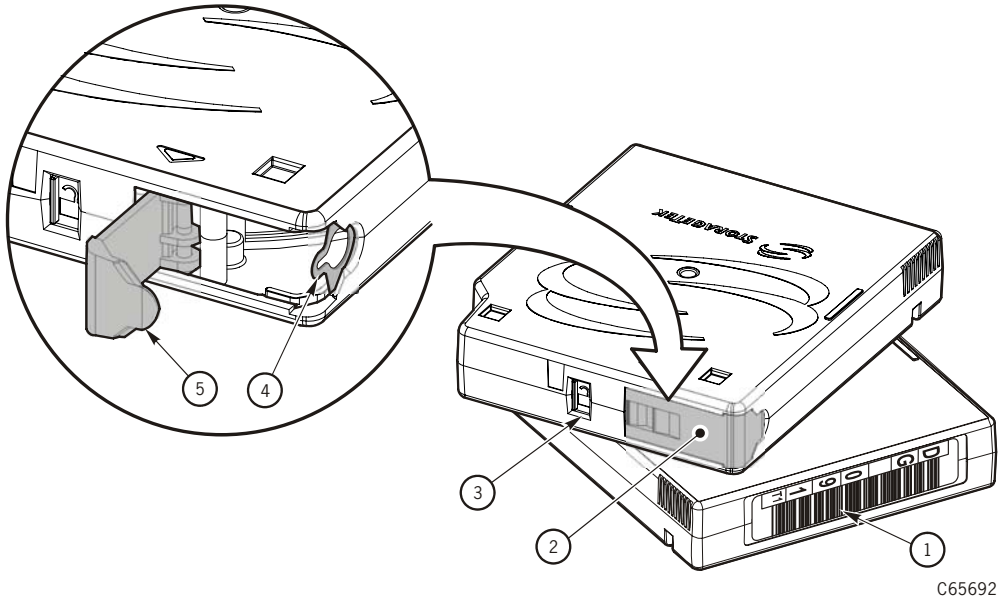
1. Customer label
2. Access door
3. Write-protect switch
4. Volume label and media type labels (Media: “R” = data, “U” = cleaning)

Figure A-3. T9940 Cartridge Components (C65334)



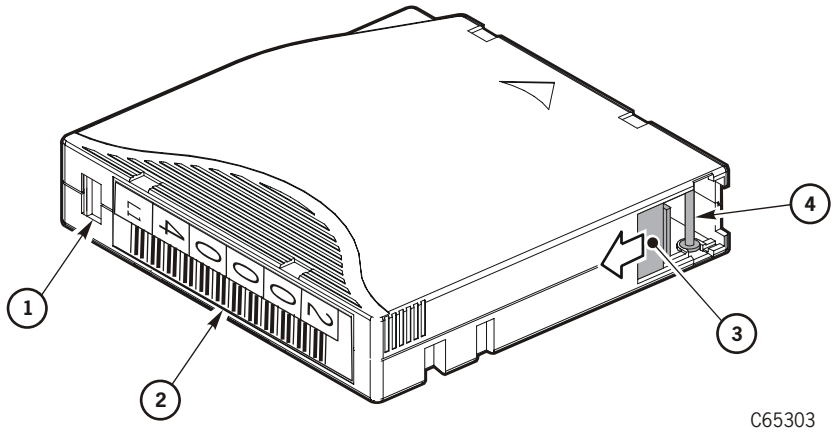
1. Customer and manufacturer's labels
2. Write protect switch
3. Access door (leader block—closed)
4. VOLID and media labels (Media label: "P" = data, "W" = cleaning)
5. Access door (leader block—open)

Figure A-4. T10000 Cartridge Components (C65692)



1. VOLID/Media ID Label (Media label: “T1” = data, “TS” = date, sport cartridge, “CT” = cleaning)
2. Access door (closed)
3. Write protect switch
4. Tape leader
5. Access door (open)

Figure A-5. Ultrium Cartridge Components (C65303)



1. Write-protect switch (Data Cartridge = red, Cleaning Cartridge = gray)
2. Volume serial number (VOLSER)
3. Access door
4. Leader pin

Ultrium cartridge codes are listed in Table A-1 and Table A-2 on page A-9 and Table A-3 on page A-10.

Table A-1. Ultrium 1 Cartridge Codes

Label	Type of Cartridge
	Data cartridge
L1	100 GB
LA	50 GB
LB	30 GB
LC	10 GB
	Cleaning
CU plus CLN	Universal cleaning cartridge for Ultrium drives
	Diagnostic
Lx plus DG	Diagnostic cartridge (apply a DG label to a blank data cartridge to be used for diagnostic tests)

Ultrium 2 Drives

SCSI (Hewlett Packard)

Support for Hewlett Packard models of Ultrium 2 Ultrium (LTO) SCSI drives is provided with library firmware version 3.03 and later.

Ultrium 2 drive/tape specifics include:

1. Uses standard Ultrium 2 cartridges
2. Reads/writes Ultrium 1 tape media
3. Interface: LVD SCSI
4. Model: LTO2ML
5. Feature code: HPLV
6. Cartridge memory: 4 KB
7. Cartridge Media ID: "L2" (200 GB)

The major improvements seen with the Ultrium 2 drives are:

- Increased native capacity of 200 GB
- Increased compressed capacity of up to 400 GB
- Data transfer rate of 40–80 MB/sec

Fibre Channel (IBM)

Support for IBM Ultrium 2 Fibre Channel drives is provided with firmware version 3.04 and later.

Ultrium 2 Fibre Channel specifics include:

1. Uses standard Ultrium 2 cartridges
2. Reads/writes Ultrium 1 tape media
3. Model: LTO2001
4. Feature code: IBFC
5. Cartridge Media ID: "L2" (200 GB)

.The major improvements seen with the Ultrium 2 drives are:

- Increased native capacity of 200 GB
- Increased compressed capacity of up to 400 GB
- Data transfer rate of 40–80 MB/sec

Table A-2. Ultrium 2 Cartridge Codes

Label	Type of Cartridge
	Data cartridge
L2	200 GB
	Cleaning
CU plus CLN	Cleaning cartridge for Hewlett Packard
	Diagnostic
L2 plus DG	Diagnostic cartridge (apply a DG label to a blank data cartridge to be used for diagnostic tests)

Ultrium 3 SCSI and Fibre Channel Drives

Support for Hewlett Packard models of Ultrium 3 (LTO) SCSI and HP/IBM Ultrium 3 Fibre Channel drives is provided with library firmware version 3.08.01 and later.

Ultrium 3 drive/tape specifics include:

1. Uses standard Ultrium 3 cartridges
2. Reads/writes Ultrium 2 tape media. Read only from Ultrium 1 tape media
3. Interfaces: LVD SCSI (HP) or Fibre Channel (HP/IBM)
4. Model code: LTO3001
5. Feature codes:
    a. Hewlett Packard: HPLV (LVD) and HPFC (Fibre Channel)
    b. IBM: IBFC (Fibre Channel)
6. Cartridge memory 4 KB
7. Cartridge Media ID for Ultrium 3 drives is:
    a. “L3” for 400 GB standard data cartridges
    b. “LT” for 400 GB WORM (Write Once, Read Many) cartridges

The major improvements seen with the Ultrium 3 drives are:

a. Increased native capacity of 400 GB

b. Increased compressed capacity up to 800 GB

c. Data transfer rate of 40–160 MB/sec

d. 400 GB WORM capability for Gen 3 WORM tape media.

Table A-3. Ultrium 3 Cartridge Codes

Label	Type of Cartridge
	Data cartridge
L3	400 GB
LT	400 GB WORM
	Cleaning
CU plus CLN	Universal cleaning cartridge for Ultrium
	Diagnostic
L3 plus DG	Diagnostic cartridge (apply a DG label to a blank data cartridge to be used for diagnostic tests)

Table A-4. Ultrium Cartridge Models

Description	Model Number
Ultrium 1 media cartridge	MEDLTOM
Ultrium 2 media cartridge	MEDLTO2
Ultrium 3 media cartridge	MEDLTO3
Universal cleaning cartridge	MEDCLNT
Required feature code:	
20-count 100 GB data cartridges (LTO1)	1C20
20-count 100 GB data cartridges (LTO2)	2C20
20-count 100 GB data cartridges (LTO3)	20LB
Universal cleaning cartridge	UNCL
EDP Vivid Color Labels	EVLA
Horizontal labels	HLBL
Vertical labels	VLBL

Ultrium 4 SCSI and Fibre Channel Drives

When available. support for Hewlett Packard models of Ultrium 4 (LTO) SCSI and HP/IBM Ultrium 4 Fibre Channel drives is provided with appropriate library firmware (3.15.02 or later).

Ultrium 4 drive/tape specifics include:

1. Uses Ultrium 4 cartridges
2. Reads/writes Ultrium 3 tape media. Read only from Ultrium 2 tape media
3. Interfaces: LVD SCSI (HP) or Fibre Channel (HP/IBM)

4. Model code: LTO4001
5. Feature codes:
    - Hewlett Packard: HPSC (LVD) and HP2FC (Fibre Channel)
    - IBM: IB4FC (Fibre Channel)
6. Cartridge memory 8 KB
7. Cartridge Media ID for Ultrium 4 drives is:
    a. "L4" for 800 GB standard data cartridges
    b. "LT" for 400 GB WORM cartridges
    c. "LU" for 800 GB WORM cartridges

The major improvements seen with the Ultrium 4 drives are:

- Increased native capacity of 800 GB
- Increased compressed capacity up to 1.6 TB
- Data transfer rate of 120 MB/sec
- 400 GB WORM (Write Once, Read Many) capability for Gen 3 WORM tape media
  800 GB WORM (Write Once, Read Many) capability for Gen 4 WORM tape media

Table A-5. Ultrium 4 Cartridge Codes

Label	Type of Cartridge
	Data cartridge
L4	800 GB
LU	800 GB WORM
	Cleaning
CU plus CLN	Universal cleaning cartridge for Ultrium
	Diagnostic
L4 plus DG	Diagnostic cartridge (apply a DG label to a blank data cartridge to be used for diagnostic tests)

Table A-6. Ultrium Cartridge Models

Description	Model Number
Ultrium 1 media cartridge	MEDLTOM
Ultrium 2 media cartridge	MEDLTO2
Ultrium 3 media cartridge	MEDLTO3
Ultrium 4 media cartridge	MEDLTO4
Universal cleaning cartridge	MEDCLNT
Required feature code:	
20-count 100 GB data cartridges (LTO1)	1C20
20-count 100 GB data cartridges (LTO2)	2C20
20-count 100 GB data cartridges (LTO3)	20LB
Universal cleaning cartridge	UNCL
EDP Vivid Color Labels	EVLA
Horizontal labels	HLBL
Vertical labels	VLBL

Ordering Tape Cartridges/Labels

Contact your authorized selling agent for Sun/StorageTek-approved labeled cartridges.

Note:

- You must select the volume serial number (VOLSER) range and other label options when ordering cartridges.
- If you choose to order additional labels, order them from any standard media vendor (such as those listed above).

Labels used in Sun/StorageTek libraries can be made by any vendor that produces a label that meets the Sun/StorageTek Label Specification. Some vendors (not all inclusive) are:

- EDP/Colorflex http://www.colorflex.com
- NetC http://www.netcllc.com
- WrightLine/American Eagle Systems http://www.americaneaglesys.com
- Dataware http://www.datawarelabels.com

These Web sites contain links to third party sites. These links are provided as a convenience to you and not as an endorsement by Sun/StorageTek. Sun/StorageTek is not responsible for the content of these linked Web sites and does not make any representations regarding the content or accuracy of any content on such Web sites.

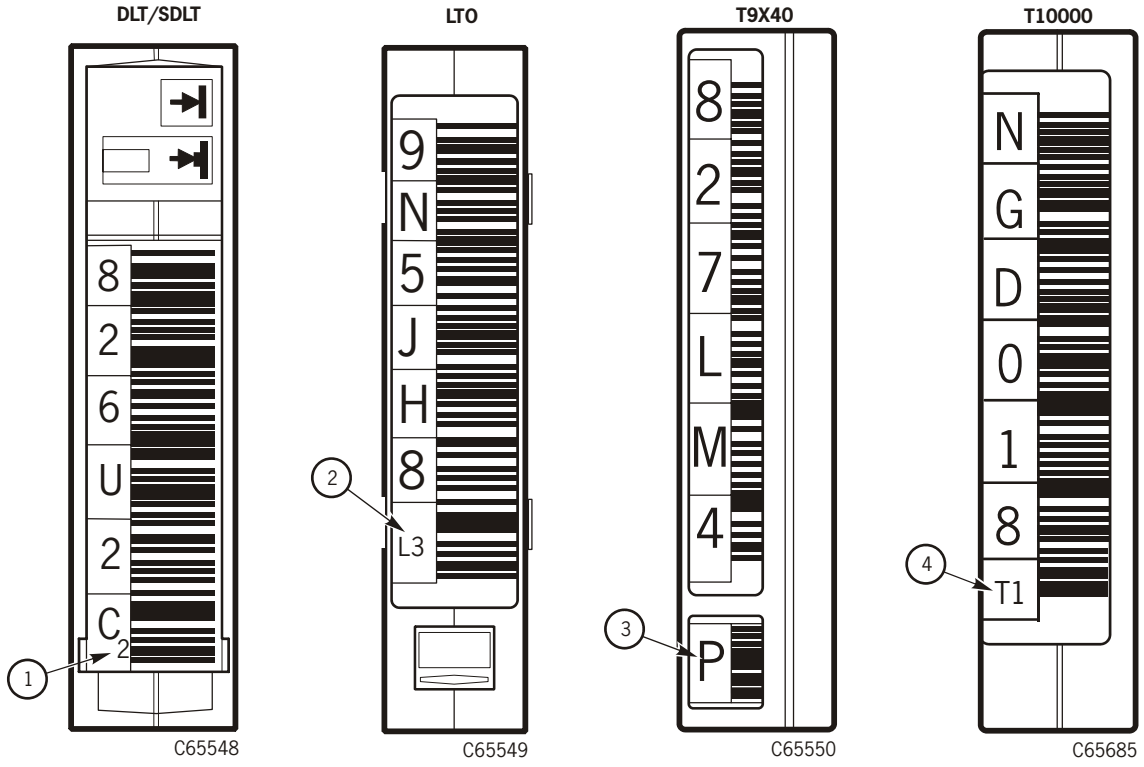
For technical questions, contact the Sun/StorageTek Sales Support at:

Telephone: 1.800.ask4stk (1.800.275.4785)
E-mail: sales_support@storagetek.com.

Cartridge Label Examples

Table A-7 through Table A-9 on page A-16 show examples of the various cartridge labels used by the drives in the library. Be sure to use the proper labels for each drive type.

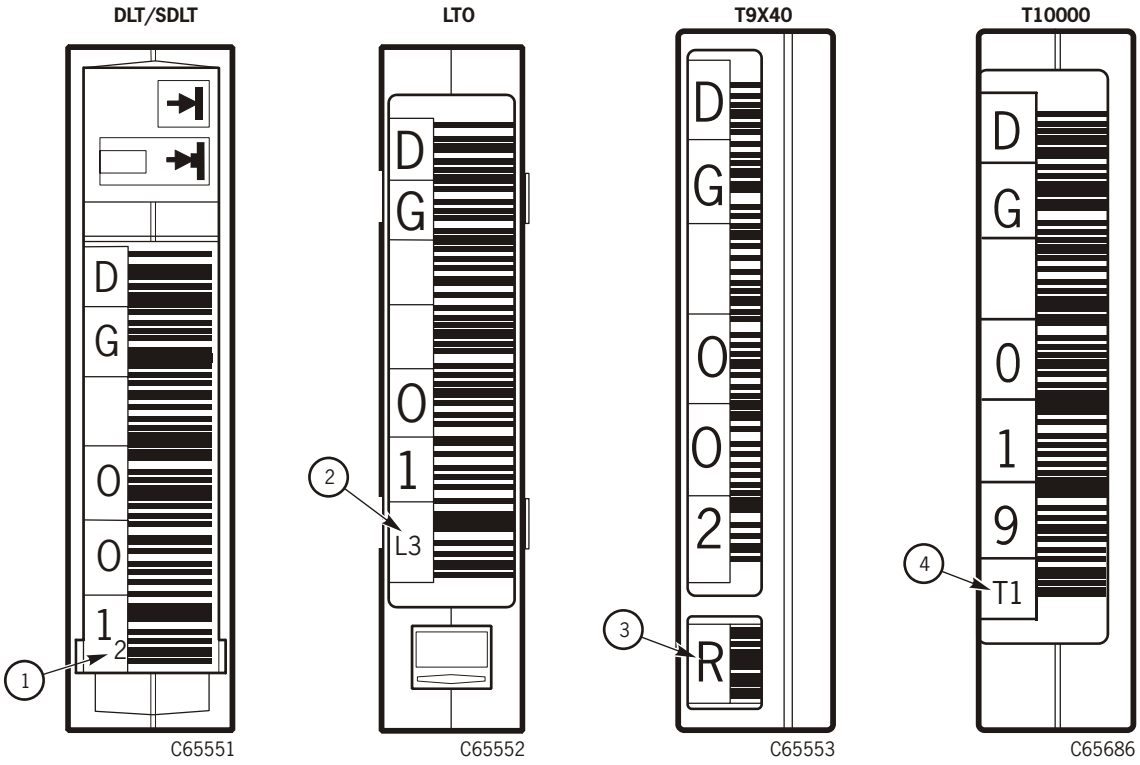
Table A-7. Label Examples—Data Cartridges



Data Cartridge Media ID Labels

The DLTtape Media ID (1) is incorporated into the tape label, and includes:	The LTO Media ID (2) is incorporated at the end of the tape label, and includes:	The Media ID label (3) for the T9x40 is at the end of the tape label, and includes:	The Media ID label (4) for the T10000 is at the end of the tape label, and includes:
B = DLT1 **C** = DLTtape III **D** = DLTtape IV **E** = DLTtape III-XT **S** = Super DLTtape I **2** = Super DLTtape II (shown) **4 =** DLTtape S4	**L4 =** 800GB **L3** = 400GB (shown) **L2** = 200GB **L1** = 100 GB **LA** = 50 GB **LB** = 30 GB **LC** = 10 GB **LT =** 400 GB (LTO3/4 WORM) **LU =** 800 GB WORM LTO4 (only)	**P** = 9940 (shown) **R** = 9840	**T1** = T10000 (shown) **TS =** T10000 Sport

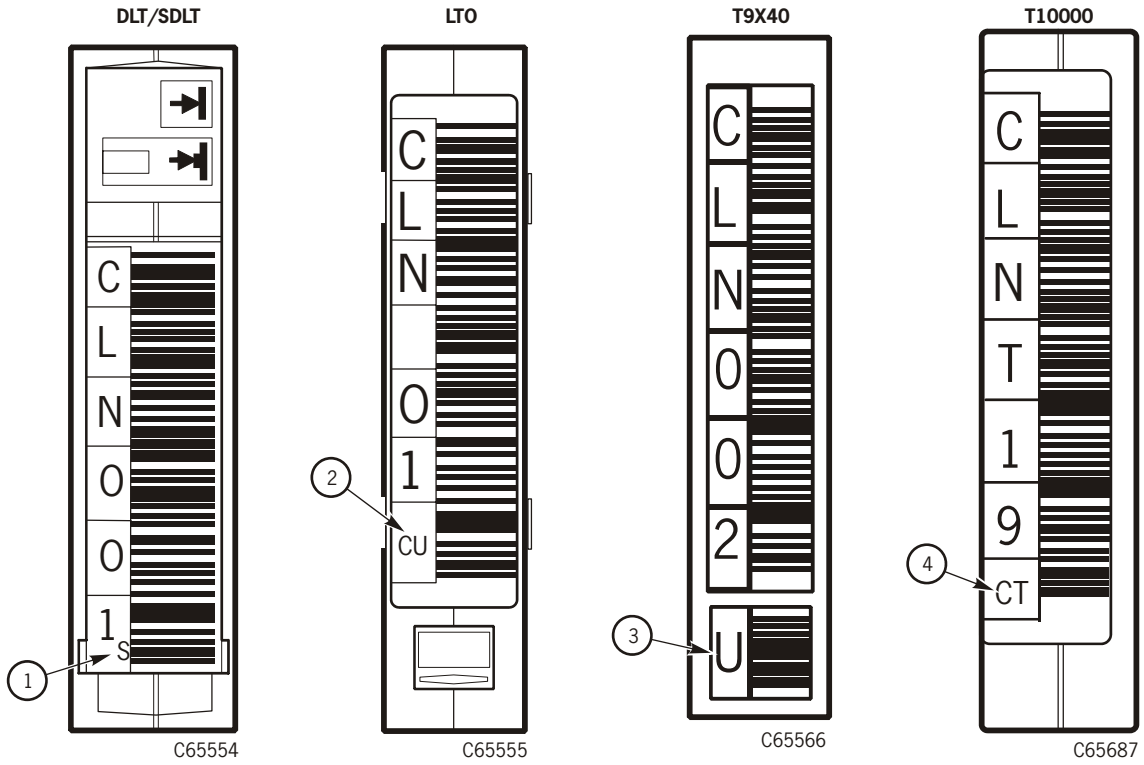
Table A-8. Label Examples—Diagnostic Cartridges



Diagnostic Cartridge Media ID Labels

DG = Diagnostic, plus the media ID label (1) to identify the type of cartridge. **B** = DLT1 **C** = DLTtape III **D** = DLTtape IV **E** = DLTtape III-XT **S** = Super DLTtape I **2** = Super DLTtape II (shown) **4 =** DLTtape S4	**DG** = Diagnostic, plus the Media ID label (2) to identify the type of cartridge: **L4** = 800GB **L3** = 400GB (shown) **L2** = 200GB **L1** = 100 GB **LA** = 50 GB **LB** = 30 GB **LC** = 10 GB **LT =** 400 GB LTO3/4 WORM **LU =** 800 GB LTO4 WORM	**DG** = Diagnostic, plus the Media ID label (3) to identify the type of cartridge: **P** = T9940 data **R** = T 9840 data (shown)	DG = Diagnostic, plus the Media ID label (4) to identify the type of cartridge: **T1** = T10000 (shown) **TS =** T10000 Sport

Table A-9. Label Examples—Cleaning Cartridges



Cleaning Cartridge Media ID Labels

CLN = Cleaning, plus the media ID label (1) to identify the type of cartridge: **B** = DLT1 **C** = DLTtape III, DLTtape IV, and DLTtape III-XT **S** = Super DLTtape I, Super DLTtape II and DLT-S4	**CLN** = Cleaning, plus the media ID (2) label to identify the type of cartridge: **CU** = Universal (shown)	**CLN** = Cleaning, plus the media ID label (3) to identify the type of cartridge: **U** = T9840 (shown) **W** = T9940	**CLN** = Cleaning, plus the media ID label (4) to identify the type of cartridge: **CT** = T10000

Applying Cartridge Labels to DLT Cartridges

Cartridge labels reflect the cartridge media and usage. The letter located next to the last number in the volume label reflects the media. Cleaning cartridges have "CLN" in the volume label, diagnostic cartridges have "DG" in the volume label.

The kinds of cartridge labels you might need to apply are:

- CompacTape III volume label
- CompacTape IIIXT volume label
- CompacTape IV volume label
- Diagnostic cartridge volume label
- Cleaning cartridge volume label

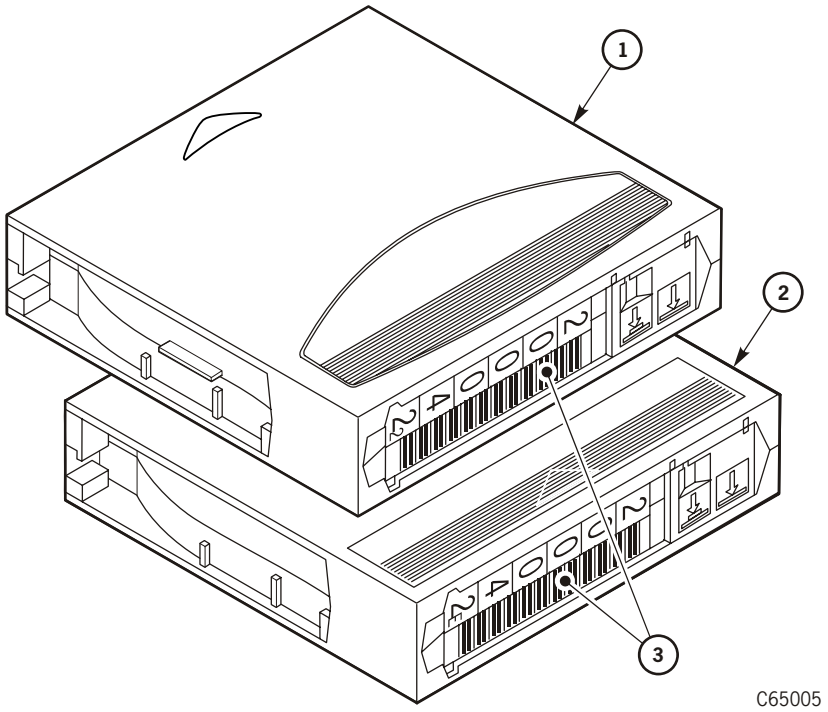
Refer to Figure A-6 on page A-18 and insert the label into the recessed area provided on each cartridge:

1. Make sure the cartridge has been at room temperature for at least 24 hours.
2. Clean the surface where the labels will be placed using a cleaning solution made for this purpose. Refer to "Cartridge Exterior—Cleaning" on page A-30.
3. Locate the label that you require and refer to Figure A-6 on page A-18:
   - CompacTape III has a "C" next to the far left number, bar code down.
   - CompacTape IIIXT has an "E" next to the far left number, bar code down.
   - CompacTape IV has a "D" next to the far left number, bar code down.
   - Diagnostic cartridge has "DG" at the beginning of the volume label.
   - Cleaning cartridge has "CLN" at the beginning of the volume label.
4. Hold the cartridge so the write-protect switch is toward you.
5. Refer to Figure A-6 on page A-18 and slide the label under the slots in the recessed area. If you prefer, peel the backing from the label and then slide it under the slots, pressing it into place.

Notes:

1. Make sure the labels are not placed elsewhere on the cartridge surface.
2. Make sure the edges of the labels do not curl; curling causes the cartridge to stick in the drive loader and the robot will misread the volume label.
3. Use labels that do not leave a residue when removed.
4. Make sure the label contains a volume label and media letter.

Figure A-6. Applying Cartridge Labels to DLT and SDLT Cartridges (C65005)



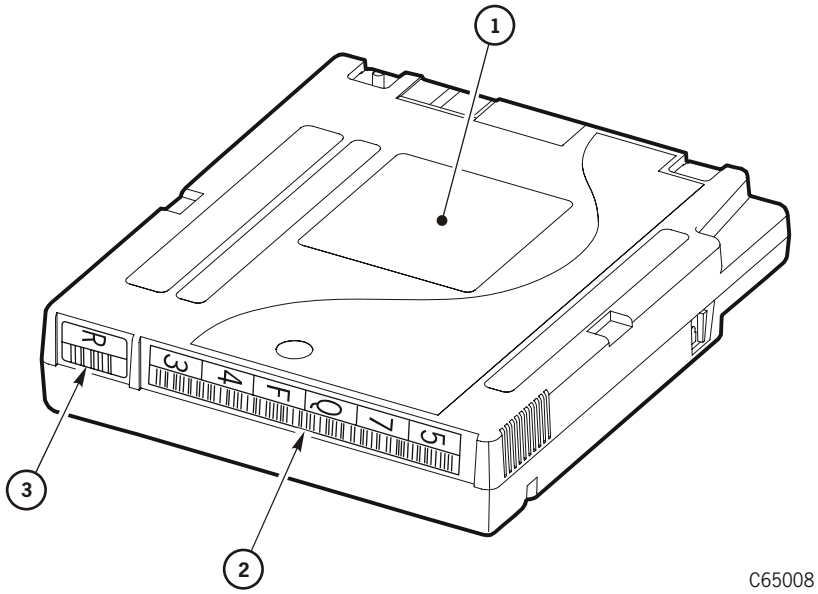
1. SDLT cartridge
2. DLT cartridge
3. Volume labels

Note: For DLT-S4 cartridges, refer to the Quantum publications.

Applying Cartridge Labels to T9840 Cartridges

Cartridge labels reflect the cartridge media and usage. The letter located next to the last number in the volume label reflects the media. Cleaning cartridges have "CLN" in the volume label, diagnostic cartridges have "DG" in the volume label.

Figure A-7. Applying Cartridge Labels to T9840 Cartridges (C65008)

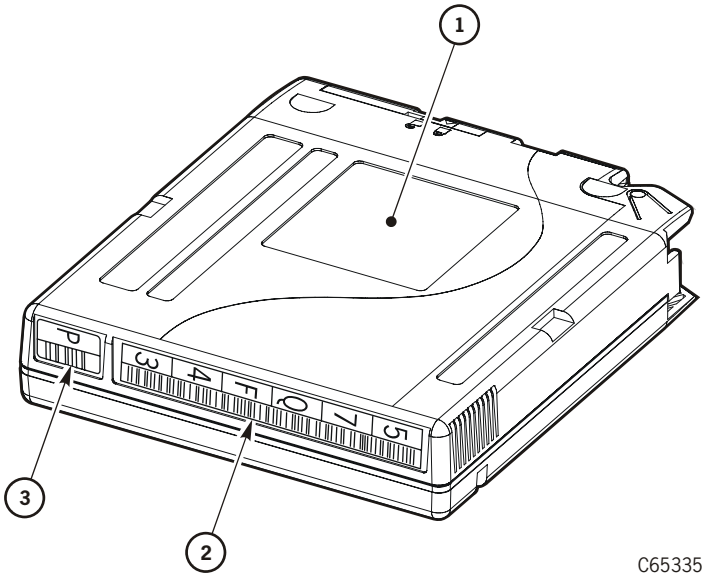


1. Customer label
2. Volume label
3. Media ID label ("R" = data, "U" = cleaning)

Applying Cartridge Labels to T9940 Cartridges

Cartridge labels reflect the cartridge media and usage. The letter located next to the last number in the volume label reflects the media. Cleaning cartridges have “CLN” in the volume label, diagnostic cartridges have “DG” in the volume label.

Figure A-8. Applying Cartridge Labels to T9940 Cartridges (C65335)

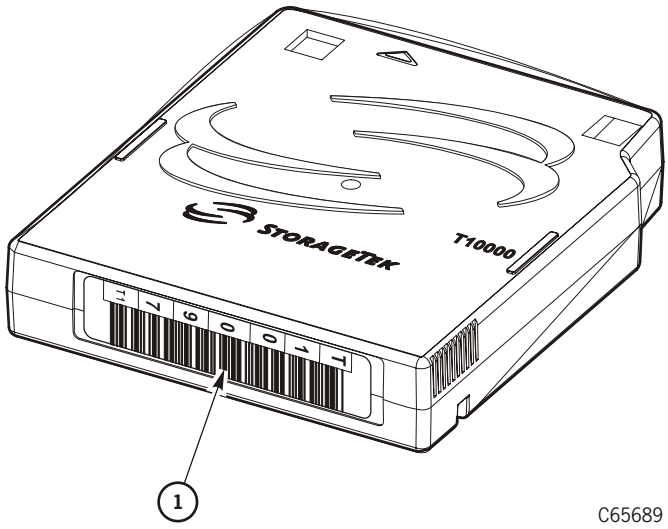


1. Customer label
2. Volume label
3. Media ID label (“P” = data, “W” = cleaning)

Applying Cartridge Labels to T10000 Cartridges

Cartridge labels reflect the cartridge media and usage. The letter located next to the last number in the volume label reflects the media. Cleaning cartridges have "CLN" in the volume label, diagnostic cartridges have "DG" in the volume label.

Figure A-9. Applying Cartridge Labels to T10000 Cartridges (C65689)

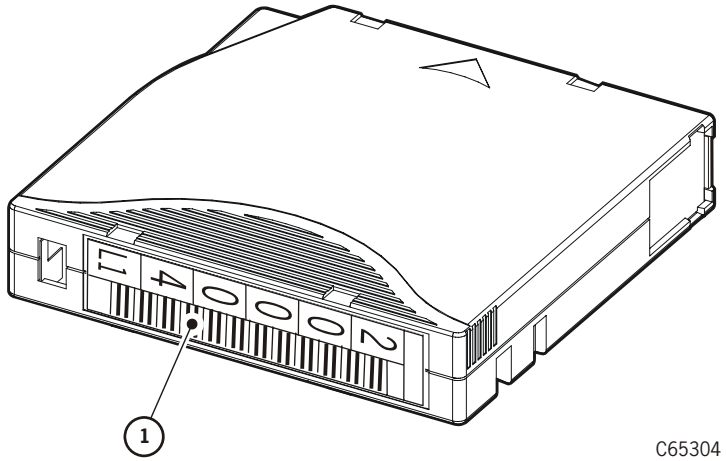


1. Volume/Media ID label ("T1" = data, "CT" = cleaning)

Applying Cartridge Labels to Ultrium Cartridges

Cartridge labels reflect the cartridge media and usage. The letter located next to the last number in the volume label reflects the media. Cleaning cartridges must match the drive type (see note below); diagnostic cartridges have "DG" in the volume label.

Figure A-10. Ultrium Cartridge Label (C65304)



Note: For cleaning cartridges, you must have a cartridge and label that matches the drive type:

1. Label location:
   - For Hewlett-Packard Ultrium cleaning cartridges, the prefix is CLNH
   - For IBM Ultrium cleaning cartridges, the prefix is CLNI
   - For Certance Ultrium cleaning cartridges, the prefix is CLNS
   - For universal cleaning cartridges, the prefix is CLNU
   - See Table A-1 on page A-7 for label codes.

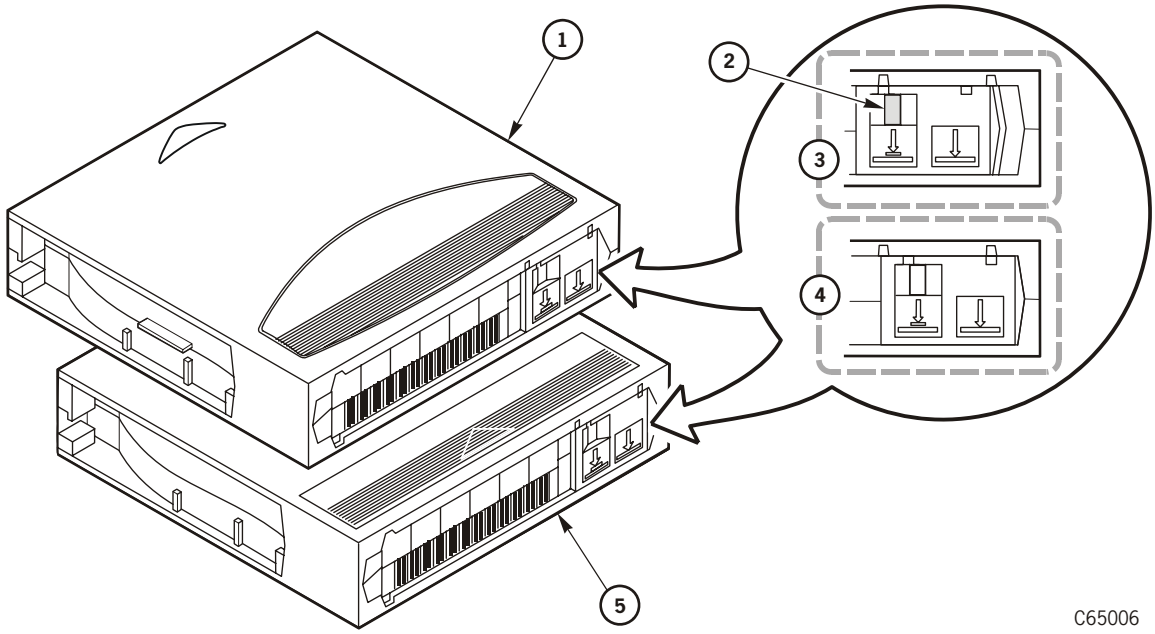
Setting the DLT and SDLT Write-protect Switch

Note: For DLT-S4 cartridges, refer to the Quantum publications.

Slide the write protect switch (Figure A-11) to the right to write-enable the tape (orange indicator not showing). In this position, the drive can write as well as read data. This setting is recommended when inserting cartridges into the tape library.

Slide the switch to the left (orange indicator showing). In this position, the drive can only read data from the tape, but cannot write data to it.

Figure A-11. Setting the DLT and SDLT Write-protect Switch (C65006)



1. SDLT cartridge*
2. Orange indicator
3. Write-protect position
4. Write-enabled position
5. DLT cartridge

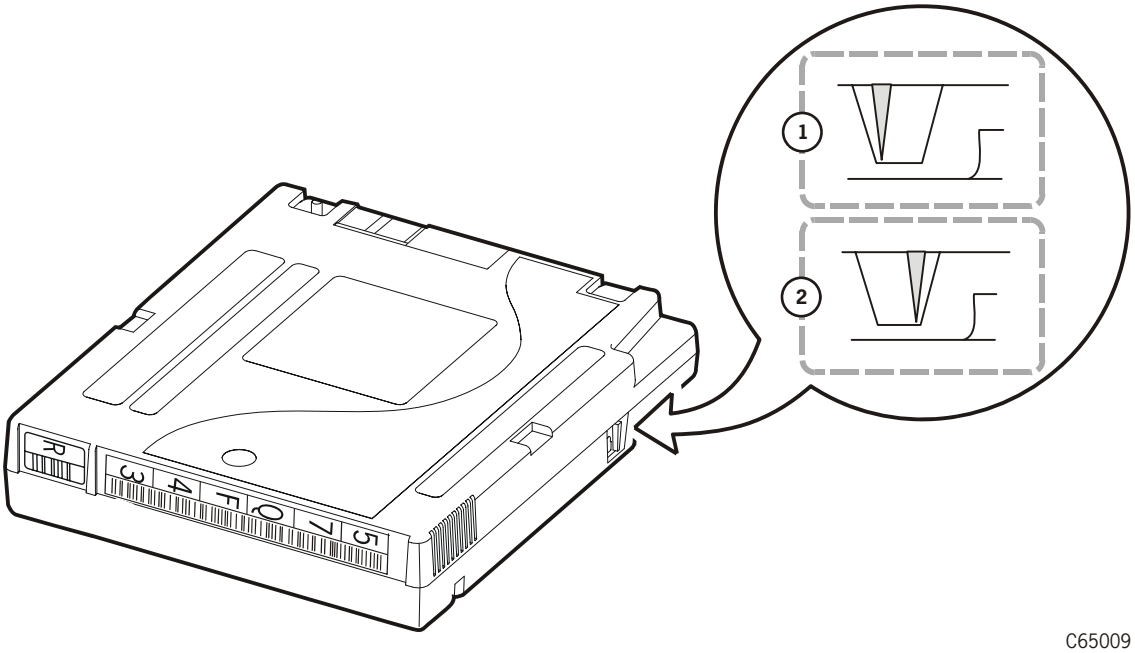
Note: Consult Quantum documentation for DLT-S4 cartridge information.

Setting the T9840 Write-protect Switch

Slide the write protect switch (Figure A-12) to the left to write-enable the tape ("open lock" symbol). In this position, the drive can write as well as read data. This setting is recommended when inserting cartridges into the tape library.

Slide the switch to the right ("closed lock" symbol). In this position, the drive can only read data from the tape, but cannot write data to it.

Figure A-12. Setting the T9840 Write-protect Switch (C65009)



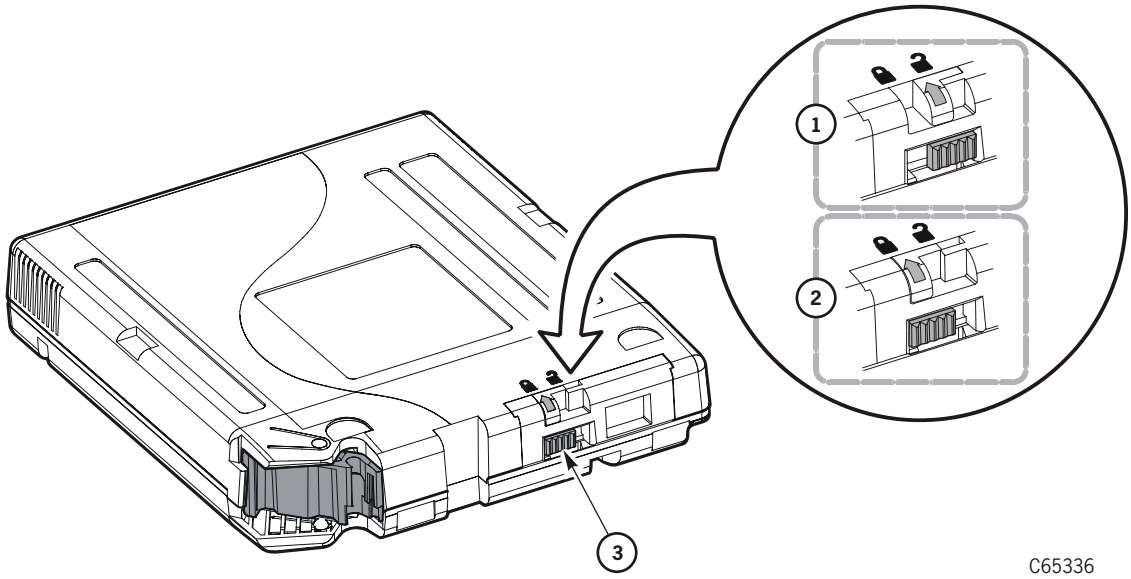
1. Write-enabled position
2. Write-protect position

Setting the T9940 Write-protect Switch

Slide the write protect switch (Figure A-13) to the right to write-enable the tape ("open lock" symbol). In this position, the drive can write as well as read data. This setting is recommended when inserting cartridges into the tape library.

Slide the switch to the left ("closed lock" symbol). In this position, the drive can only read data from the tape, but cannot write data to it.

Figure A-13. Setting the T9940 Write-protect Switch (C65336)



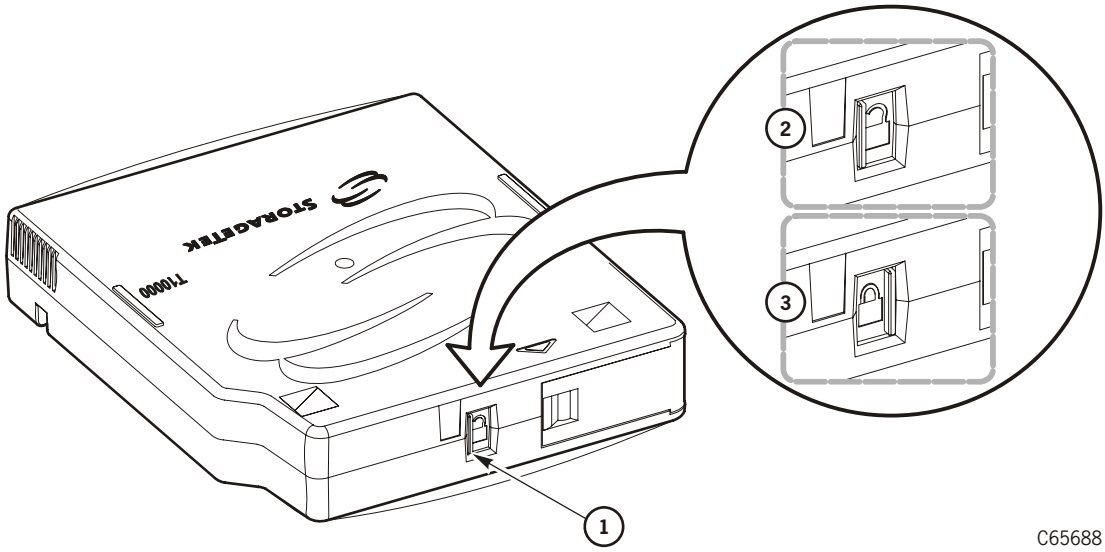
1. Write-enabled position
2. Write-protect position
3. Write-protect switch

Setting the T10000 Write-protect Switch

Slide the write protect switch (Figure A-14) to the left to write-enable the tape ("open lock" symbol). In this position, the drive can write as well as read data. This setting is recommended when inserting cartridges into the tape library.

Slide the switch to the right ("closed lock" symbol). In this position, the drive can only read data from the tape, but cannot write data to it.

Figure A-14. Setting the T10000 Write-protect Switch (C65688)



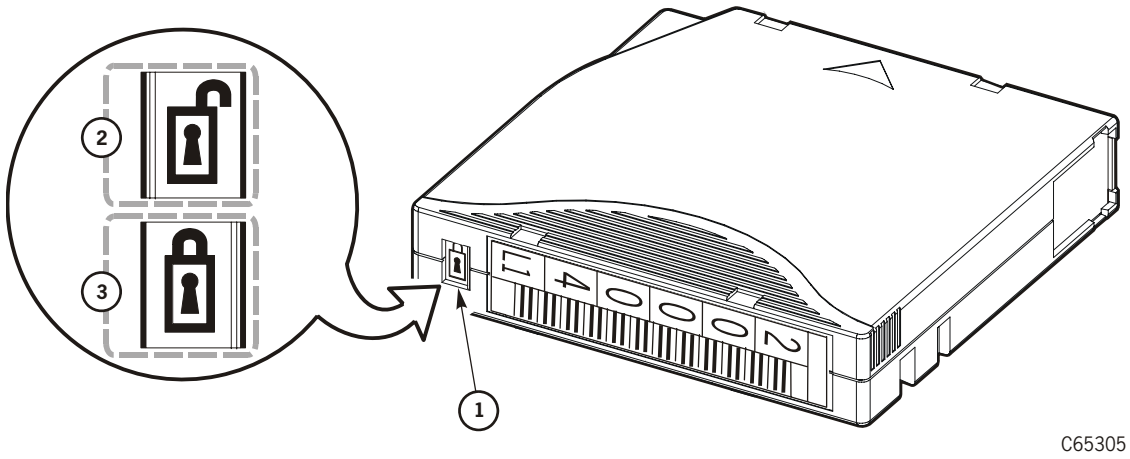
1. Write-protect switch
2. Write-enabled position
3. Write-protect position

Setting the Ultrium Write-protect Switch

Slide the write protect switch (Figure A-15) to the left to write-enable the tape ("open lock" symbol). In this position, the drive can write as well as read data. This setting is recommended when inserting cartridges into the tape library.

Slide the switch to the right ("closed lock" symbol). In this position, the drive can only read data from the tape, but cannot write data to it.

Figure A-15. Setting the Ultrium Write-protect Switch (C65305)



1. Write-protect switch (Data Cartridge = red, Cleaning Cartridge = gray)
2. Write-enabled
3. Write-protected

Maintaining Cartridges

The following pages list cartridge environmental specifications, describe how to store and clean cartridges, use cleaning cartridges, and repair a detached leader block.

DLT Cartridge Environmental Specifications

The following specifications refer to the operating and storage environments for DLT cartridges.

Table A-10. DLT Cartridge Environmental Specifications

Operating environment	
Temperature	10° to 40°C (50° to 104°F)
Relative humidity	20% to 80% noncondensing
Wet-bulb temperature	25°C (77°F) maximum
CAUTION: ***Potential cartridge damage:* Tape temperatures above 49°C (120°F) might damage the tapes. If during storage or transportation a cartridge has been exposed to conditions exceeding the above values, before using the cartridge, keep the cartridge within those operating environment specifications for at least as long as the time that the cartridge exceeded the specifications, up to two hours. Make sure that the cartridge has no moisture on it.** **When storing DLT cartridges, the stray magnetic field at any point on the tape shall not exceed 4000A/m. Make sure that the cartridge has no moisture on it.**	
Cartridge storage environment	
Temperature	16° to 32°C (61°to 90°F)
Relative humidity	20% to 80% non condensing
Wet-bulb temperature	26°C (79°F) maximum
Cartridge storage environment for cartridges intended for archiving data for one year or more	
Temperature Relative humidity	18° to 26°C (64° to 79°F) 20% to 60%

For more information on DLT cartridges, visit the Quantum web site at

http://www.quantum.com

T9x40 and T10000 Cartridge Environmental Specifications

Refer to the following manuals for T9840, T9940 and T10000 cartridge environmental specifications:

- *T9840 Tape Drive User's Reference Guide*, part 95739
- *T9940 Tape Drive Operator's Guide*, part 95989
- *T10000 Tape Drive Operator's Guide*, part 96174

Ultrium Cartridge Environmental Specifications

The following specifications refer to the operating and storage environments for Ultrium cartridges.

Table A-11. LTO Ultrium Cartridge Environmental Specifications

Operating environment[1]	
Temperature	10º to 45ºC (50º to 113ºF)
Relative humidity	20% to 80%
Wet-bulb temperature	26ºC (78.8ºF) maximum
Cartridge storage environment (archive)[2]	
Temperature	16º to 25ºC (61º to 77ºF)
Relative humidity	20% to 50%
Wet-bulb temperature	26ºC (78.8ºF) maximum
Cartridge storage environment (non-archive)	
Temperature	16º to 32ºC (61º to 90ºF)
Relative humidity	20% to 80%
Wet-bulb temperature	26ºC (78.8ºF) maximum
Cartridge shipping environment (unrecorded)[3]	
Temperature	-23º to 49ºC (-10º to 120ºF)
Relative humidity	20% to 80%
Wet-bulb temperature	26ºC (78.8ºF) maximum

1. The conditioning time before use is 24 hours.
2. Archival storage is one to 10 years.
3. The shipping environment must not exceed the limit of the storage environment, archive or non-archive, for longer than 10 days.

Storage of Cartridges

When you store a cartridge:

- Leave it in its protective wrapping until you are ready to use it.
- Choose a clean environment that duplicates the conditions of the room in which it is used.
- Make sure it has been in its operating environment for at least 24 hours.

Cartridge Exterior—Cleaning

CAUTION:
Potential cartridge damage: **Do not use certain solvents to remove labels or to clean cartridges because they can damage the cartridges. Do not use acetone, trichloroethane, toluene, xylene, benzene, ketone, methylethyl ketone, methylene chloride, ethyldichloride, esters, ethyl acetate, or similar chemicals.**

Wipe all dust, dirt, and moisture from the cartridge with a lint-free cloth.

Use Sun/StorageTek Tape Cleaner Wipes, PN 4046289-01, to clean the cartridges. These wipes are saturated with isopropyl alcohol. Do not let any solution touch the tape or get inside the cartridge.

Repair of a Detached Leader Block

When a tape is damaged, use a backup tape. If a leader block is detached, there is no obvious damage to the cartridge or tape, and you have no backup tape, you may repair the leader block using a repair kit provided by your supplier. You can use the tape once to copy the data onto another tape.

Library Elements and Diagrams

B

This appendix provides diagrams of the tape library elements for both L700e standalone libraries and L700e libraries joined by a Pass-thru Port (PTP). For L1400M Tape Library differences information, refer to Appendix D.

The wall diagrams depict the SCSI element locations for all cell locations. The locations are noted at the top of the columns in hexadecimal (denoted by the "h" at the end of the number) and decimal.

The drive types and locations will vary with your tape library options. Each drive column displaces 60 cell locations.

Figure B-1. Standalone Library Elements—1 CAP, 1 Drive Column (C65048)

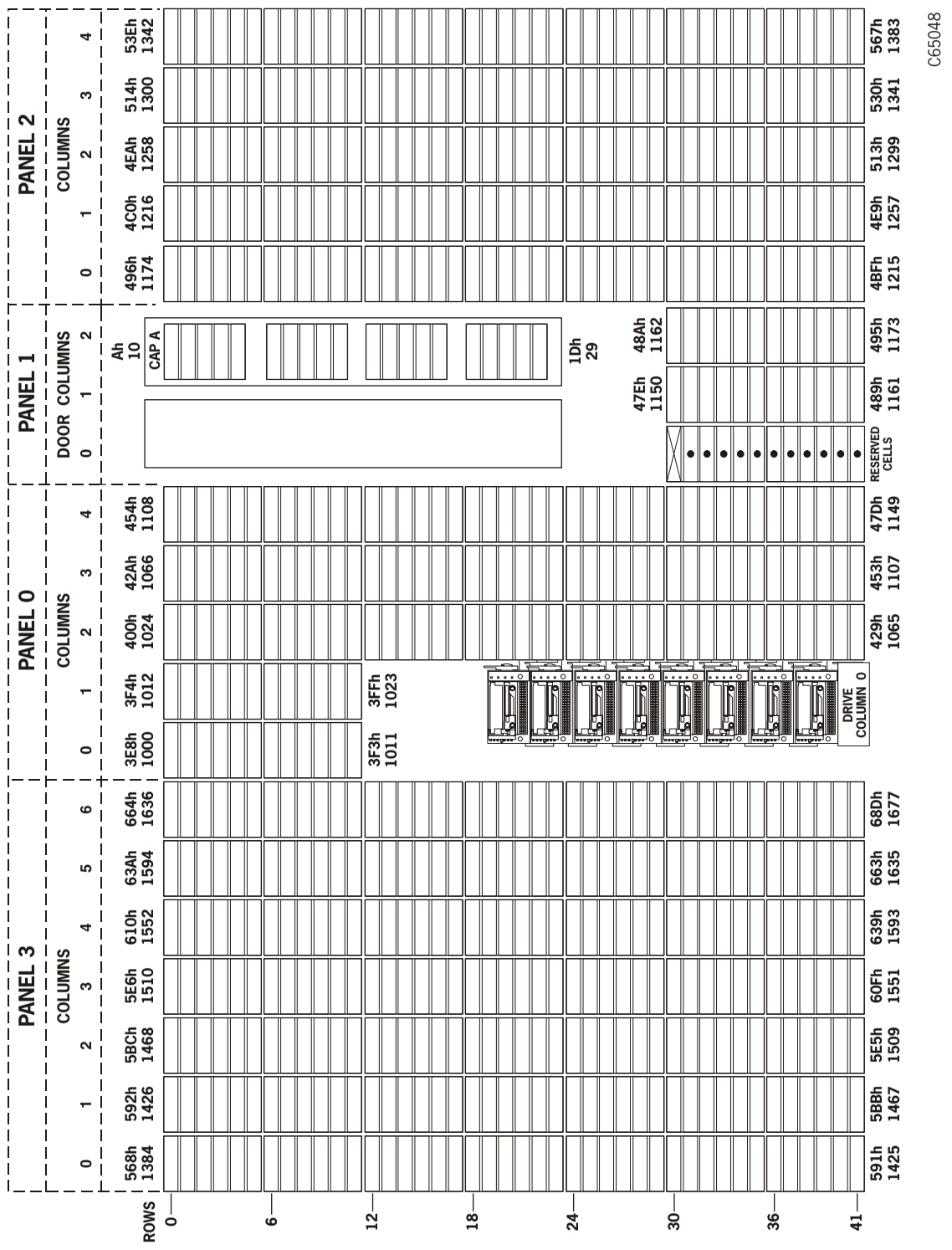


Figure B-2. Standalone Library Elements—1 CAP, 2 Drive Columns (C65049)

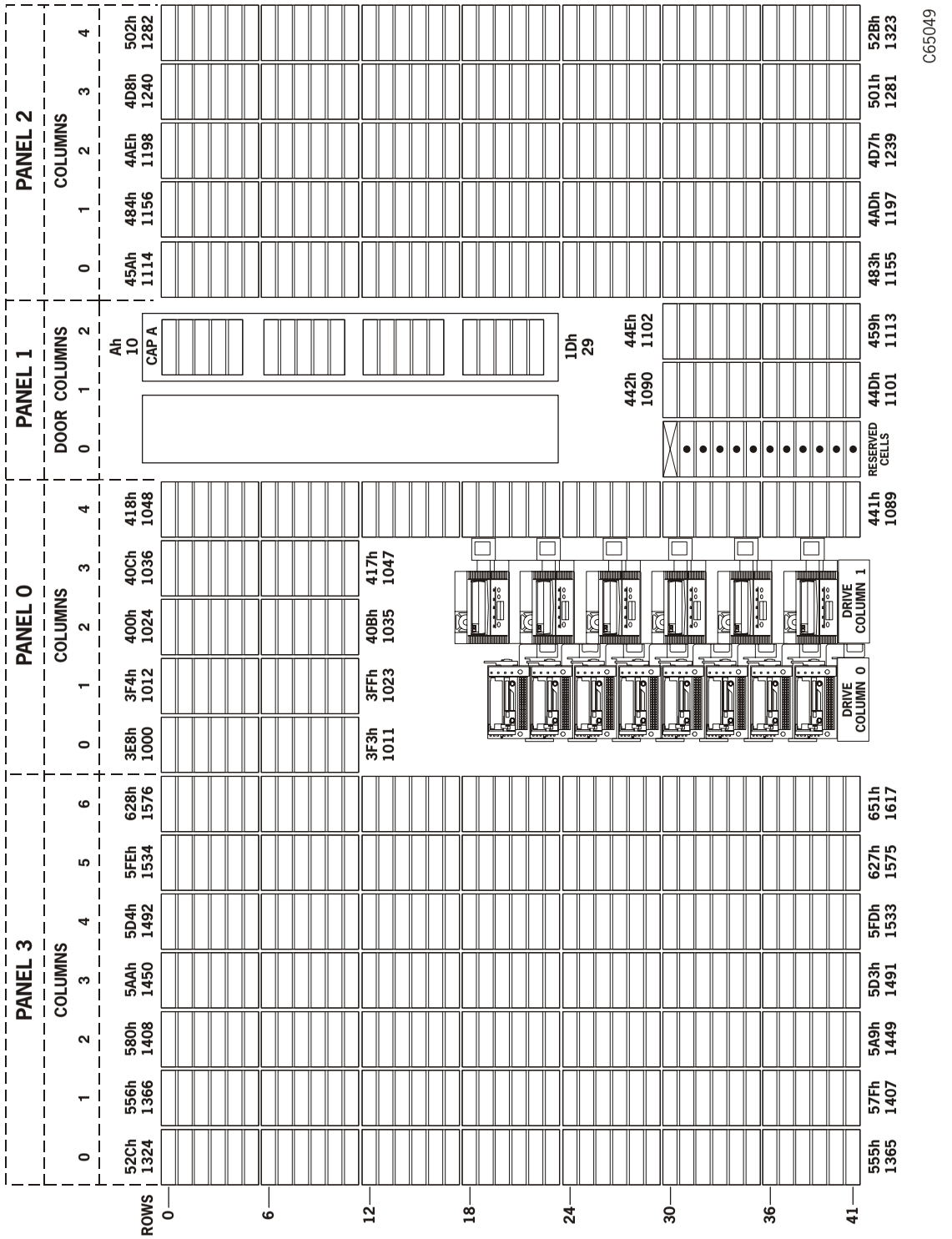


Figure B-3. Standalone Library Elements—2 CAPs, 1 Drive Column (C65050)

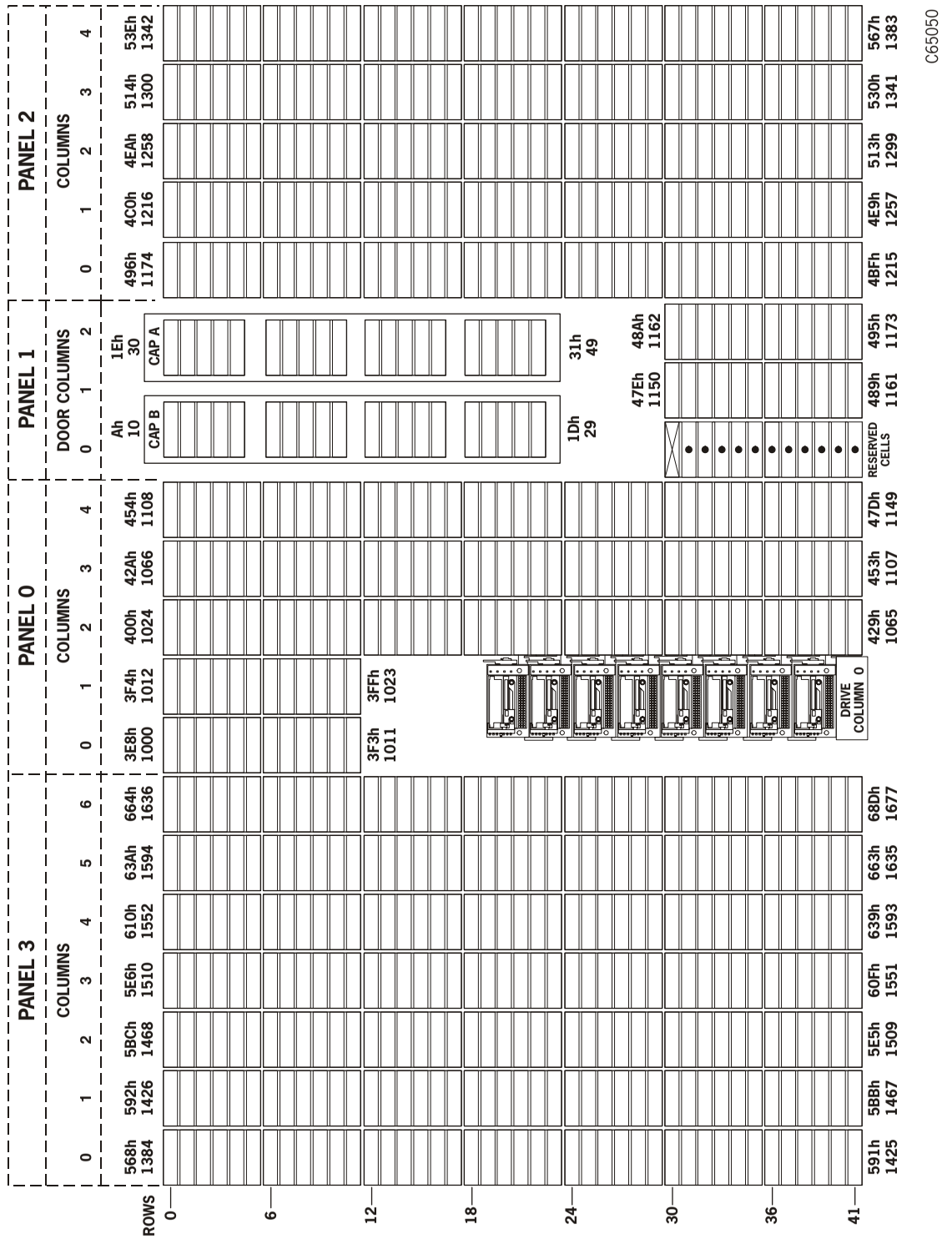


Figure B-4. Standalone Library Elements—2 CAPs, 2 Drive Columns (C65051)

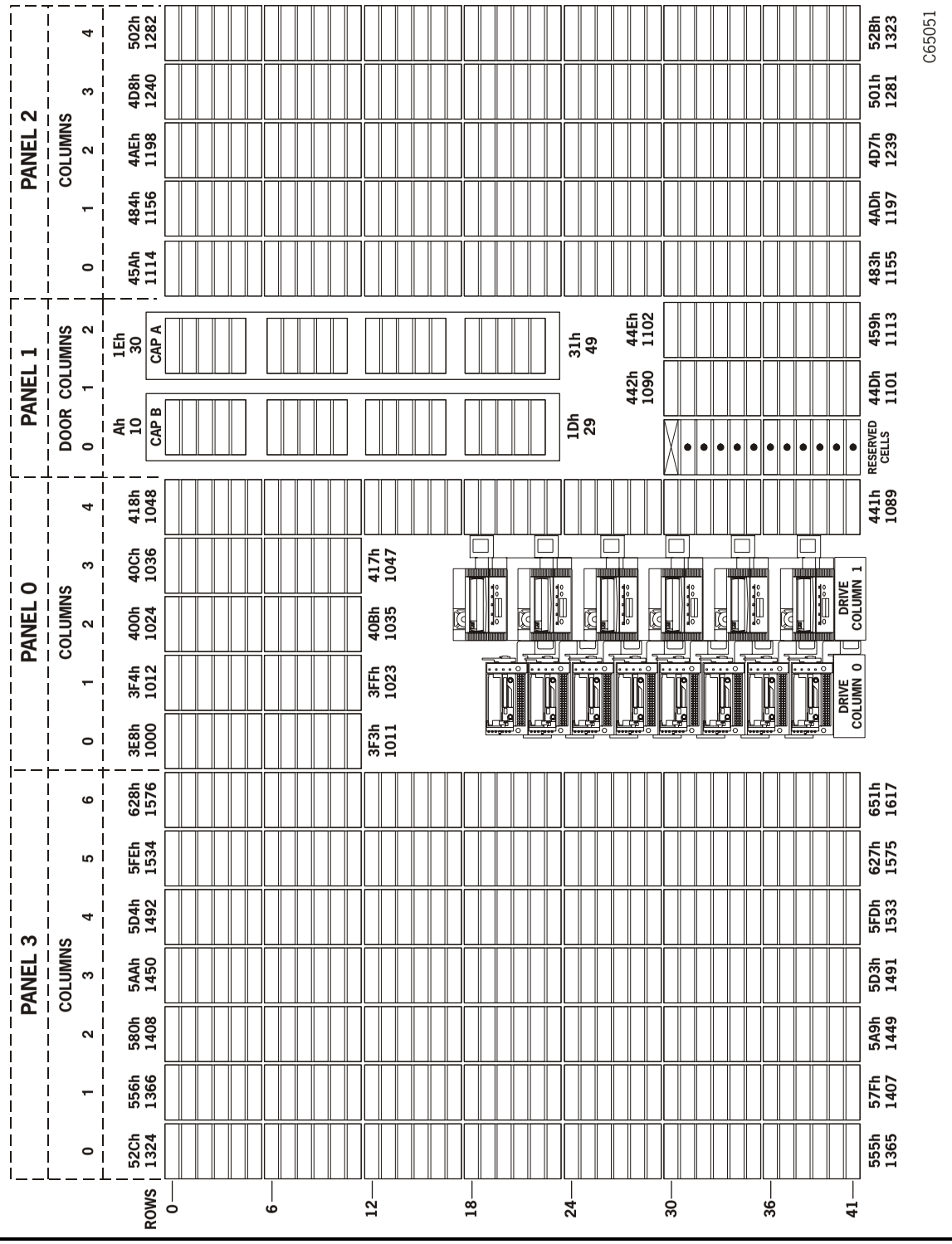


Figure B-5. PTP Library Elements—1 CAP, 1 Drive Column (C65399)

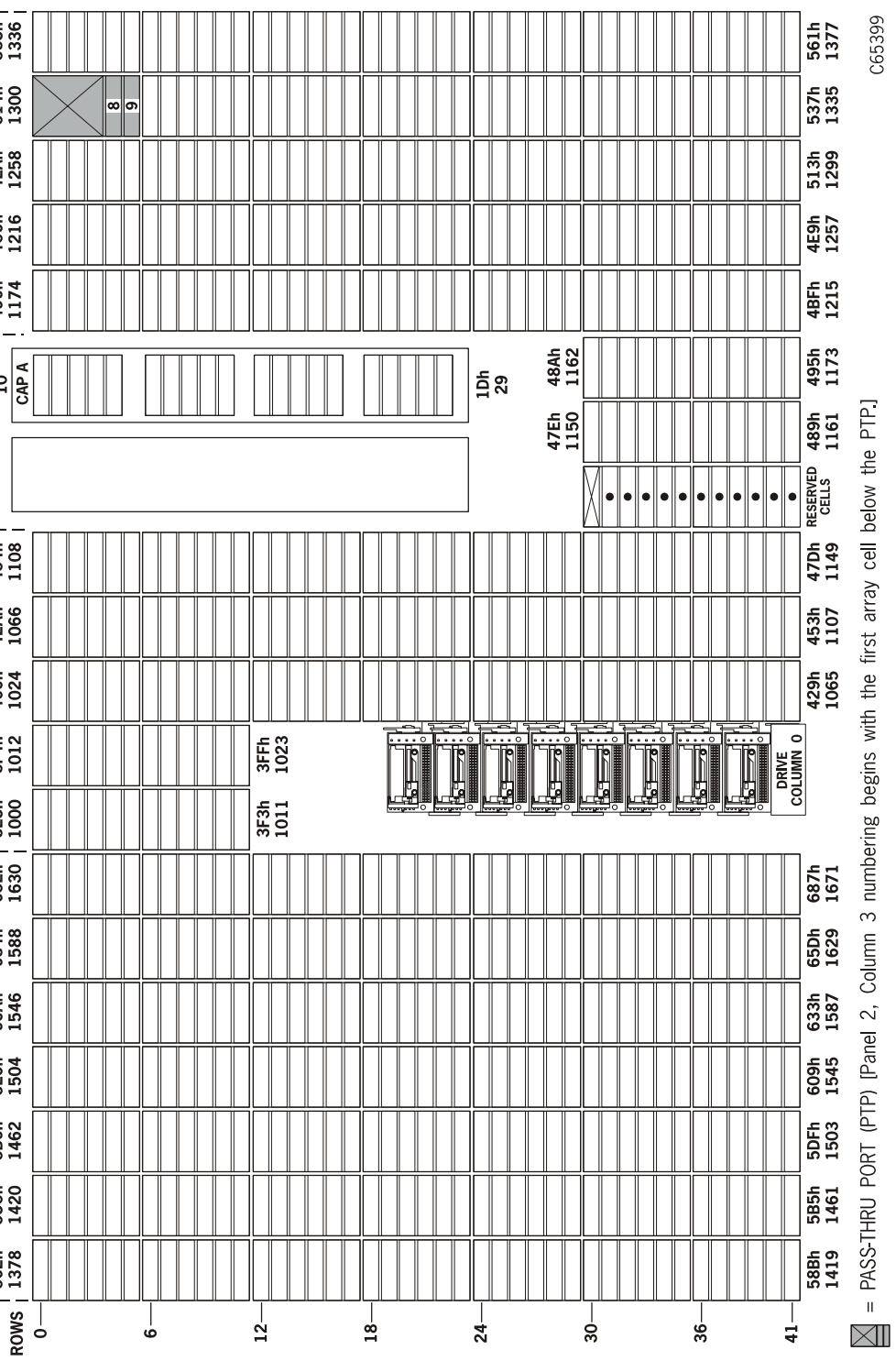


Figure B-6. PTP Library Elements—1 CAP, 2 Drive Columns (C65400)

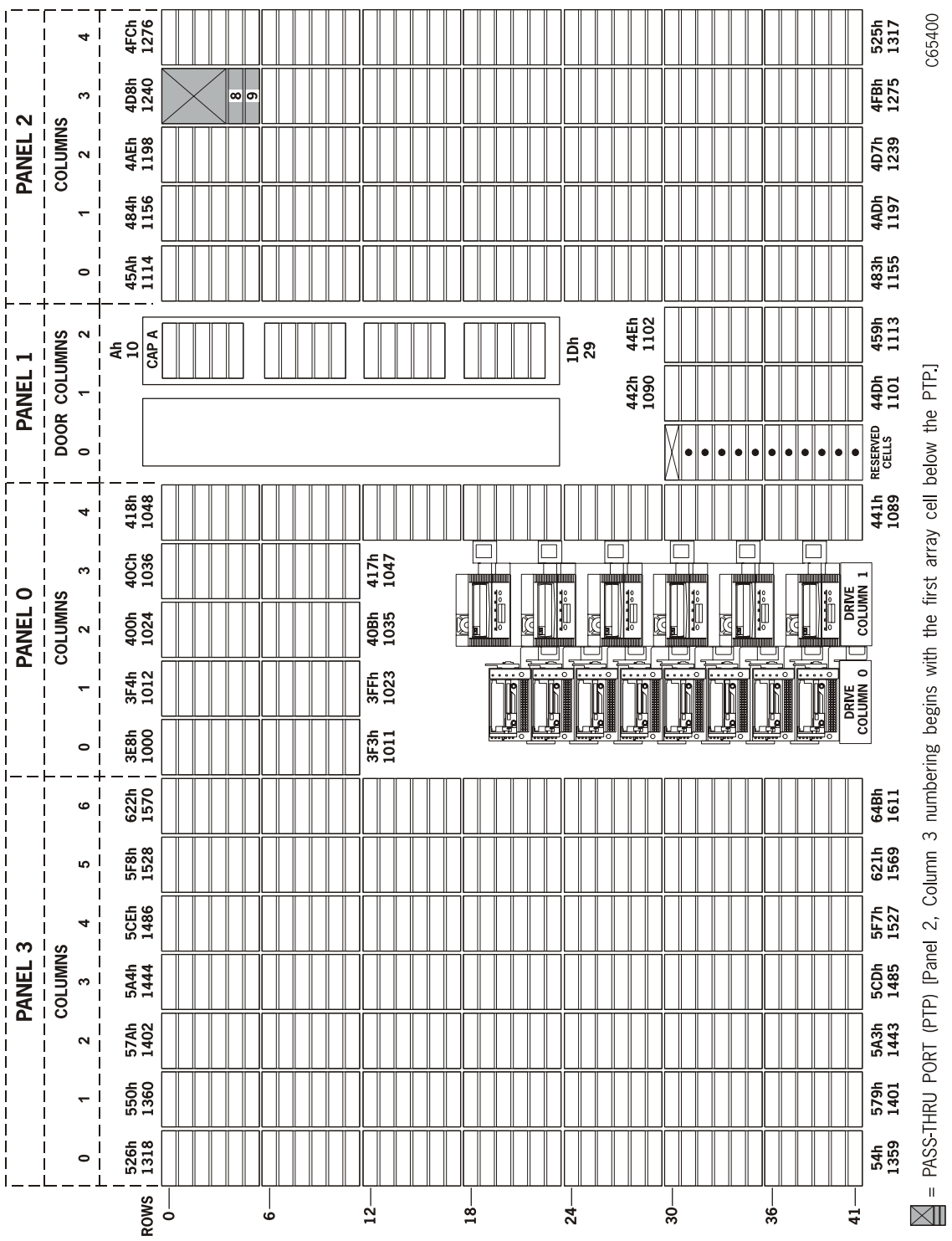


Figure B-7. PTP Library Elements—2 CAPs, 1 Drive Column (C65401)

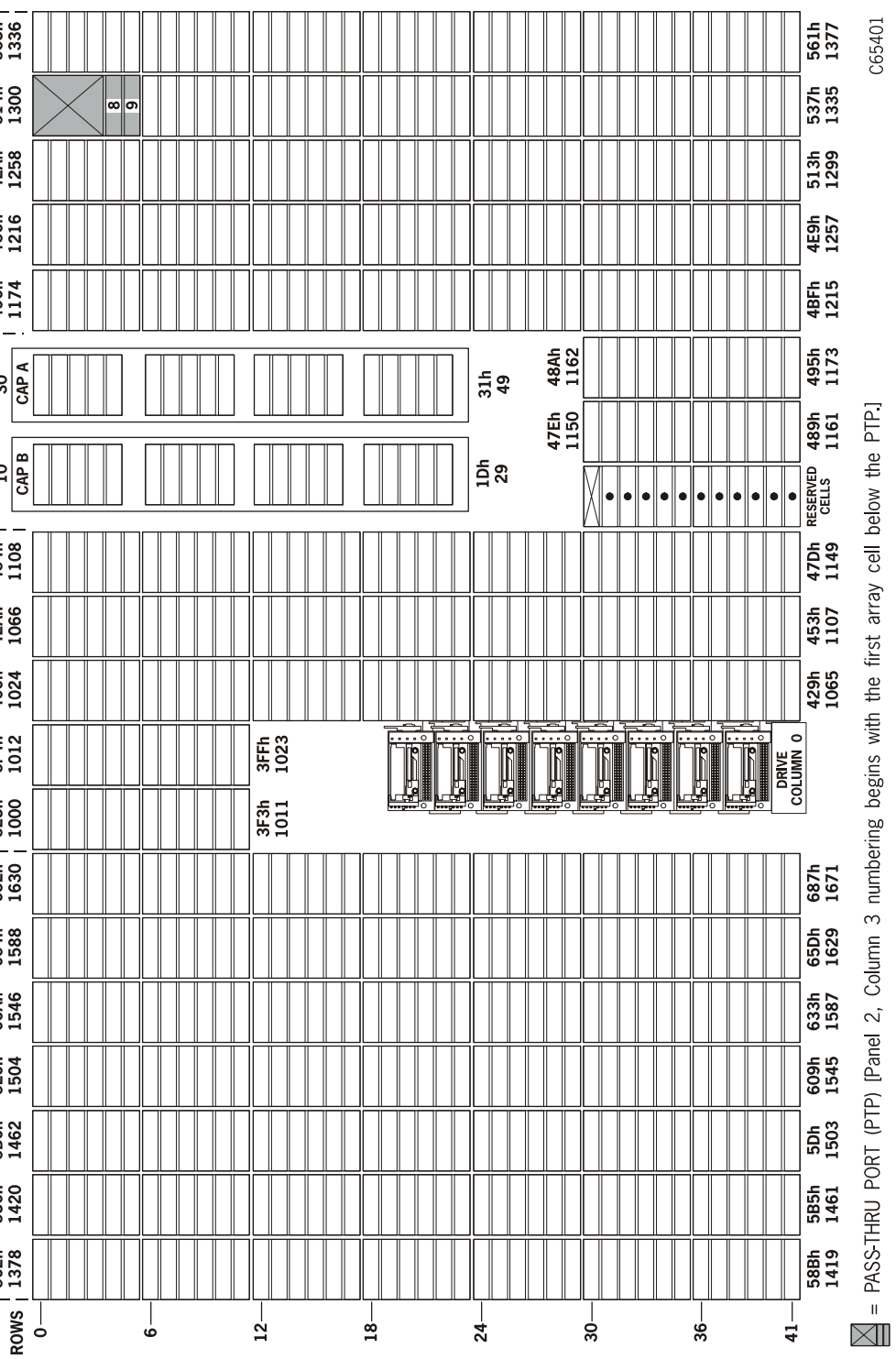
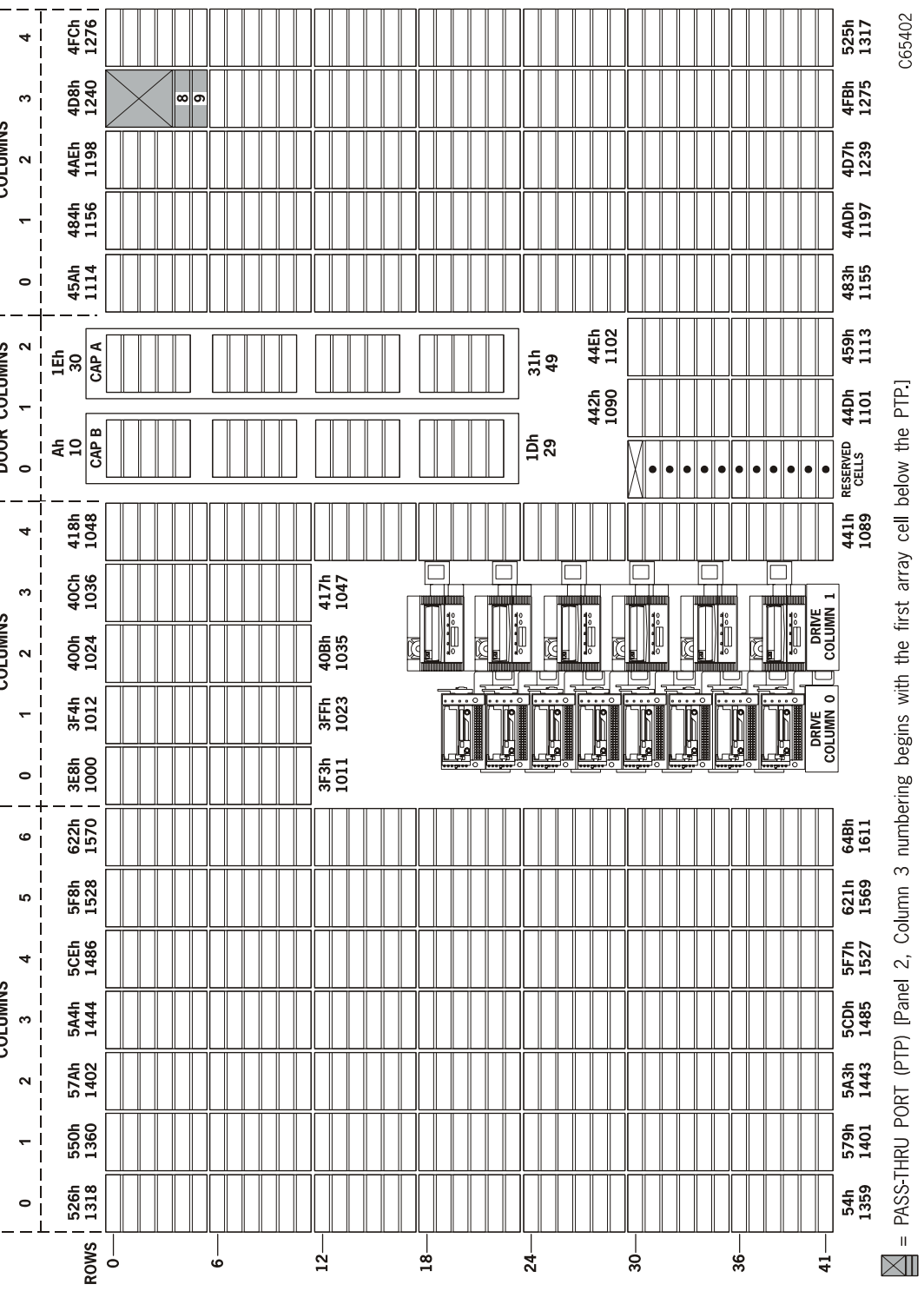


Figure B-8. PTP Library Elements—2 CAPs, 2 Drive Columns. (C65402)



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Sun/StorageTek L-Series Library Admin

C

Sun/StorageTek's L-Series Library Admin is an optional (standard with the L1400M libraries) software product that resides internally in the library and is activated by using a Web browser. This product provides a Web-based, graphical user interface (GUI) that enables customers to monitor and perform library operations remotely.

Some of the features of Library Admin include the ability to:

- Get a virtual view of the library's cells
- Load microcode
- Generate useful reports on the library, drives, FSCs, and media
- Obtain valuable statistics on the library, drive, cells, and cleaning cartridge
- View and modify the configuration of the library, drives, and network
- Set the cleaning cartridge threshold
- Enable SNMP and add trap recipients

For more information about Sun/StorageTek's L-Series Library Admin, visit:

http://www.storagetek.com/products/product_page59.html

Requirements

Before installing the L-Series Library Admin, verify that the following requirements are met:

- Minimum system requirements:
  - 200MHz processor
  - 64 MB RAM (96 MB preferred).
- Microcode level 2.20.00 and later contains the L-Series Library Admin software.
- Library Personality Module.
- Java™ Plug-in Software 1.4 or later.

  You can download the Java plug-in from:

  http://java.sun.com/j2se/1.4.2/download.html
- Netscape Navigator 4.5 and later *or* Internet Explorer 5.0 and later

Note: After Library Admin is installed, the Web-based GUI with the Java plug-in is intuitive, easy to use, and requires minimal training.

Installation Instructions

Note: When the operator panel displays "Web Enabled," the Personality Module is installed and Library Admin is enabled.

To install the L-Series Library Admin:

1. Make sure the library is powered-on and initialized.
2. Make sure the library network configurations have been completed. See "Network Entries" on page 3-13 for more information.

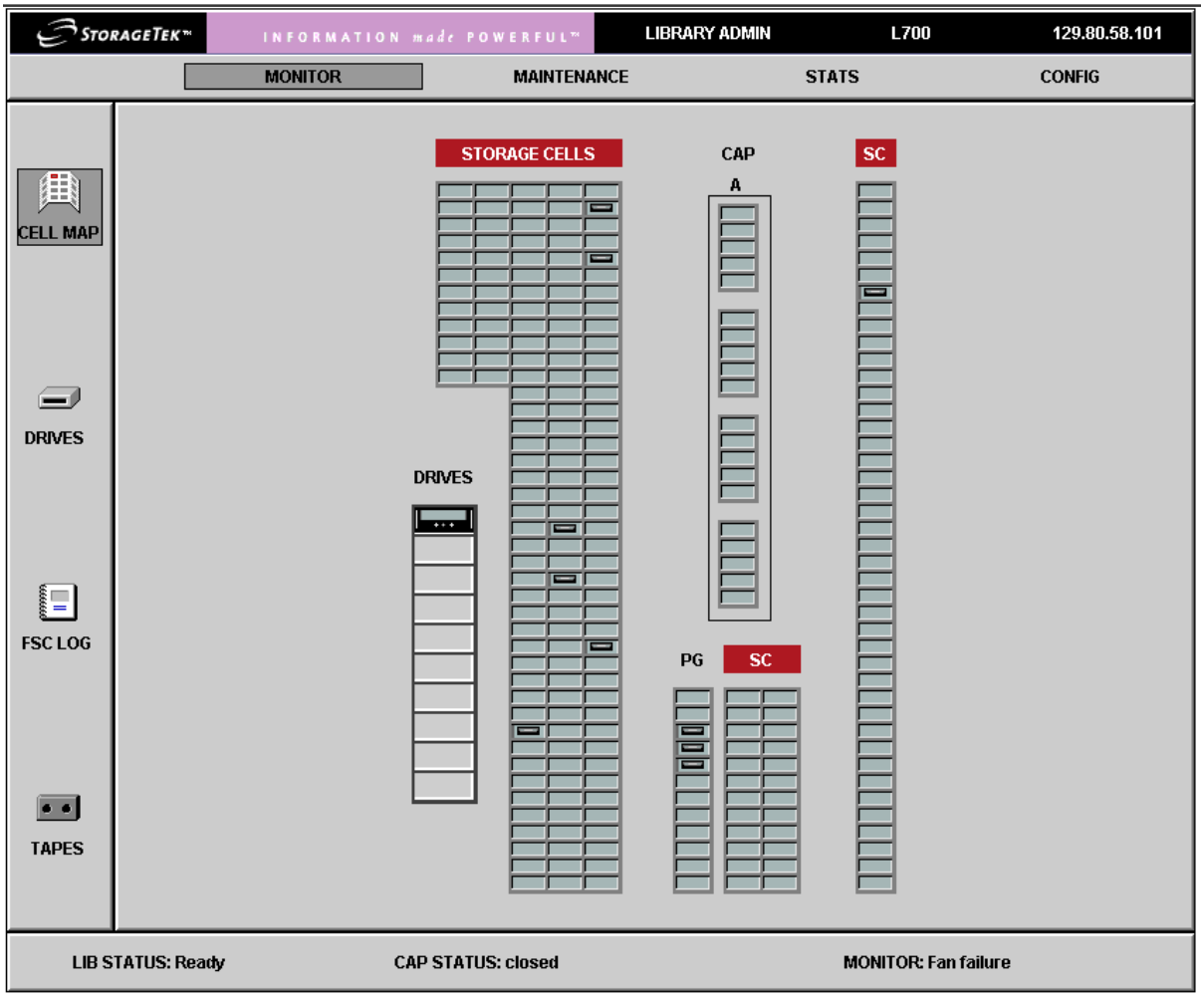
Referring to Figure C-1 on page C-3:

3. Make sure the Ethernet (Enet) cable is connected.
4. Connect the Personality Module to the DB9 connector.

   Note: The Library Admin software is *disabled* if the Personality Module is not installed.

5. Reset the library (cycle power or open and close the front door).
6. Start the L-Series Library Admin by accessing Netscape or Internet Explorer and entering your library name or IP address at the Address Bar.

Figure C-1. Library Admin Screen Example



1. Shown is an example of the initial Library Admin Monitor Screen that shows the cell maps for the library.
2. The top and the left navigation bars allow you to select various functions as described in Table C-1 on page C-4.

Table C-1. Library Admin Functions

Select Tab…	For Information About...
Monitor	• Cell map • Drive status • FSC log • Tape inventory
Maintenance	• Diagnosing a problem • Performing a code load • Generating reports • Rebooting the library
Statistics	• Library • Drives • Cells • Cleaning cartridge
Configuration	• Library • Drives • Network • Cleaning count threshold

Library Statistics

Library statistics are divided into two major categories: counters and composite information. Both categories are explained in the following sections.

Counters

Counters are composed of 8-bit, 16-bit, and 32-bit elements. Each type is explained below.

8-bit Counters

8-bit counters have values from 0 to 2^8 minus 1 (or 255).

Drive Statistics

Drive statistics are composed of the following information, based upon the absolute element location of the drive:

1. PUT Retries: the number of times a PUT operation was retried for the specified location. Generally, two retries will be logged for one failed motion.
2. GET Retries: the number of times a GET operation was retried for the specified location. Generally, two retries will be logged for one failed motion.
3. Mount Count: the number of mount operations to a specified location

Cell Statistics

Cell statistics are composed of the following information, based upon the absolute element location of the cell:

1. PUT Retries: the number of times a PUT operation was retried for the specified location. Generally, two retries will be logged for one failed motion.
2. GET Retries: the number of times a GET operation was retried for the specified location. Generally, two retries will be logged for one failed motion.

16-Bit Counters

16-bit counters (Table C-2) have values from 0 to 2^{16} minus 1 (or 65,535).

Table C-2. 16-Bit Counters

Bin	Description
IPL	Number of times the machine was booted. No distinction is made between powering-on or pressing the `RESET` button
Door Open	Number of times the left access door (L700/700e) or access door (L180) has been opened
GET Retries	Number of times a GET operation required a retry operation. A single move will have two retries before failing
GET Failures	Number of times a GET operation failed. For every failed GET operation, there will be two GET retries logged.
PUT Retries	Same as GET retries, but for PUT operations
PUT Failures	Same as GET failures, but for PUT operations
Label Retries	Same as GET retries, but for label reading operations
Label Failures	Same as GET failures, but for label reading operations
Target Retries	Same as GET retries, but for targeting operations
Target Failures	Same as GET retries, but for targeting operations

32-Bit Counters

32-bit counters (Table C-3) have values from 0 to 2^{32} minus 1 (or 4,294,967,295).

Table C-3. 32-Bit Counters

Bin	Description
Move Count	Number of successful sets of GET/PUT operations (a single move consists of one GET and one PUT operation)
Mount Count	Same as move count, except that the move here involves mounting/dismounting a tape to/from a drive
Uptime Second Count	Number of time (in seconds) that the machine has been running
Empty Read	Number of times an empty cell was detected
Target Read	Number of successful targeting operations
Label Read	Number of time a cartridge label was read
Label Read 1*	Number of times algorithm 1 read a label
Label Read 2*	Number of times algorithm 2 read a label
Label Read 3*	Number of times algorithm 3 read a label
Label Unread 1*	Number of times algorithm 1 could not read a label
Label Unread 2*	Number of times algorithm 2 could not read a label
Label Unread 3*	Number of times algorithm 3 could not read a label
* Added for the purpose of tracking new vision algorithms supplied with firmware Versions 2.21.00 and later.	

Composite Information

Composite information contains statistics that keep track of *groups of data*, using units of time or some other discrete measurement. Composite information is supplied for Cartridge Access Port (CAP) usage, library–wide drive performance, and individual drive performance.

Cartridge Access Port (CAP) Usage

CAP usage counters are 16-bit. The definitions are supplied below.

PUT Count

The CAP PUT count (Table C-4) is the number of times a PUT was executed to a CAP, with bins incrementing when a CAP is opened. This provides an indication of how a CAP is being used. For example, if five PUTs were executed to a CAP, the "5" bin (see bin list below) would increment by one. Counts in the 21+ bin would indicate that the CAP is being used for normal operations, not just export operations.

Table C-4. CAP PUT Count

Bin	PUTs executed between CAP opens
Idle	0
1	1
2	2
3	3
4	4
5	5
6–10	6–10
11–15	11–15
16–20	16–20
21+	21 or more

GET Counts

The CAP GET count (Table C-5) is the number of times a GET was executed from a CAP, with bins incrementing when a CAP is opened. This provides an indication of how a CAP is being used. For example, if 10 GETs were executed from a CAP, the "6–10" bin (see bin list below) would increment by one. Counts in the 21+ bin would indicate that the CAP is being used for normal operations, not just import operations.

Table C-5. CAP GET Count

Bin	GETs executed between CAP opens
Idle	0
1	1
2	2
3	3
4	4
5	5
6–10	6–10
11–15	11–15
16–20	16–20
21+	21 or more

Library–Wide Drive Performance

Job rate intervals are set to five and 15 minutes to best understand peak machine usage. These intervals were chosen because such data can generally be applied to thermal behavior of electromechanical components.

As examples, one customer may only require peak machine performance for a time less than five minutes. If so, some electromechanical components may not heat sufficiently to cause short- or long-term reliability issues. On the other hand, another customer may require peak performance for a full 15 minutes or longer. In this case, peak performance indicates that components will reach higher operating temperatures and, therefore, require more costly components.

Note: Drive mount times are included in this statistics; these times vary widely, depending on the drive type. As a result, these statistics cannot be used to determine if a library is meeting its published Exchanges Per Hour (EPH) specification.

Library-wide drive performance counters are 32-bit.

Five Minute Job Rate

This pool of statistics defines the hourly drive job rate the library was given during continuous five minute intervals (Table C-6). For example, if 13 mounts were executed during one five minute interval, the "151–175" usage bin (see below) would increment by one (13 mounts/5 minutes x 60 minutes/hour = 156 mounts per hour). If no mount activity takes place during a five minute interval, the "idle" bin will increment by one.

Table C-6. Library-Wide Performance—Five Minute Job Rate

Bin	Number of mounts within a five minute interval
Idle	0
1–25	1–2
26–50	3–4
51–75	5–6
76–100	7–8
101–125	9–10
126–150	11–12
151–175	13–14
176–200	15–16
201–225	17–18
226–250	19–20
251–300	21–25
301–350	26–29
351–400	30–33
401–450	34–37
451–500	38–41
501–550	42–45
551–600	46–50
611–650	51–54
651–700	55–58
701+	58+

Fifteen Minute Job Rate

This pool of statistics defines the hourly drive job rate the library was given during continuous fifteen minute intervals (Table C-7). For example, if 31 mounts were executed during one fifteen minute interval, the "101–125" usage bin (see below) would increment by one (31 mounts/15 minutes x 60 minutes/hour = 124 mounts per hour). If no mount activity takes place during a five minute interval, the "idle" bin will increment by one.

Table C-7. Fifteen Minute Job Rate

Bin	Number of mounts within a fifteen minute interval
Idle	0
1–25	1
26–50	2–3
51–75	4–5
76–100	6
101–125	7–8
126–150	9–10
151–175	11
176–200	12–13
201–225	14–15
226–250	16
251–300	17–20
301–350	21–23
351–400	24–26
401–450	27–30
451–500	31–33
501–550	34–36
551–600	37–40
601–650	41–43
651–700	44–46
701+	47+

Individual Drive Performance

Performance statistics for individual drives is the third component of composite information. The counters for these statistics are mixed; a listing and an explanation are provided in Table C-8.

Table C-8. Individual Drive Performance

General[1] – No Data Transfer*		
Bin	**Counter**	**Explanation**
Serial Number		Tracking is done by serial number rather than location. This allows for drive positional changes with no loss or inaccurate information. In addition, two extra information slots are allocated above the maximum drive count to allow for temporary swapping of drives.
PUT Retries	8-bit	Number of times a PUT was retried on this drive
GET Retries	8-bit	Number of times a GET was retried on this drive
Mount Count	16-bit	Number of times a mount was executed on this drive
Idle Time	32-bit	How long (in seconds) the drive has not been able to transfer data across the host interface (for example, no cartridge loaded, loading, unloading); this is counting occurrences of time available for data transfer.
Specific[2] – Data Transfer Possible*		
Minimum	16-bit	Cartridge spent less than 30 seconds in a drive (probably a 9840-style drive)
30 sec to 5 minutes	16-bit	Cartridge spent from 30 seconds to 5 minutes in a drive
5 minutes to 10 minutes	16-bit	Cartridge spent from 5 minutes to 10 minutes in a drive
10 minutes to 30 minutes	16-bit	Cartridge spent from 10 minutes to 30 minutes in a drive
30 minutes to 60 minutes	16-bit	Cartridge spent from 30 minutes to 60 minutes in a drive
More than 60 minutes	16-bit	Cartridge spent more than 60 minutes in a drive

1. "General" refers to statistics that relate to non-data transfer drive activities.
2. "Specific" excludes loading/unloading activities and counts only the time that data may be transferred to/from the drive.

L1400M Library Differences

D

This appendix identifies how the L1400 Library Solution differs from the L700e Tape Library from an operation standpoint.

The L1400 Library Solution consists of:

L1400M or L1400M1	• The first library in the L1400 Library Solution. • Has a maximum capacity of 678 slots, with customer access to 200 slots.
L1400P1	• The second library in the solution, connected to the first library by a pass-thru port (PTP). • Has a maximum capacity of 672 slots. • Does not include access to any additional slots, however, the initial 200 slots from the L1400M/L1400M1 can be moved to this library using slot balancing/partitioning. • Capacity upgrades are purchased as a feature of the L1400M/ L1400M1 library.

General Information

Tape Library Components

Tape Drives

The T10000 tape drive requires SN3300 router/L1400M Interface Control Module firmware version 5.64F or later.

L1400M: StorageNet 3300 Fibre Channel Router

The router is a 2x1 SCSI to fibre channel router. It sits in the L1400M library control path and provides enhanced control features to the library. In this respect it acts more like a library control module than a router.

L1400M1: L1400M Interface Control Module

The L1400 Interface Control Module is embedded in the L1400M1 library and serves the same function as the SN3300 router of the L1400M library.

Library Capacity

The L1400M/L1400M1 library ships with all 678 slots included in the library. The L1400P1 library ships with 672 slots—6 slots are lost to the PTP. The customer has access to 200 slots in the L1400M/L1400M1 library. Access to the remaining slots is managed by the StorageNet 3300 Fibre Channel Router in the L1400M library or the L1400M Interface Control Module in the L1400M1 library. The L1400P1 library does not include access to any slots in the library. All capacity must be purchased as features of the L1400M/L1400M1 library.

Note: Adding a second drive column reduces library capacity by 60 slots.

When necessary, the customer places an order for the number of additional slots they require and request a soft key that they type into the license page of the router web interface; the router then allows access to the additional slots. Refer to "Library Capacity" on page D-6 for the procedure to upgrade library capacity.

Standard Interface

Sun/StorageTek L-Series Library Admin (Web based) is standard with the L1400M Tape Library. Refer to "Sun/StorageTek L-Series Library Admin" on page 1-13 for more information.

Optional Interfaces

Optional user interfaces for the L1400M Tape Library include Sun/StorageTek Framework Library Monitor, and Sun/StorageTek Backup Resource Monitor.

For more information on Sun/StorageTek Framework Library Monitor and Sun/StorageTek Library Manager, refer to "Optional Interfaces" on page 1-13.

Backup Resource Monitor

Sun/StorageTek Backup Resource Monitor (BRM) is an optional software solution that simplifies the complexity and management of the backup environment through centralized visualization of backup applications, fabric switches, and tape libraries.

BRM's web browser-based graphical user interface provides complete visibility of backup operational information at a summary or detailed level including job statistics, policies, schedules, event codes, media statistics, fabric configuration, and tape library utilization.

BRM provides robust backup application support for Veritas NetBackup, Legato NetWorker, and IBM Tivoli Storage Manager. BRM supports fabric switches from Brocade and McData, and provides comprehensive reporting on Sun/StorageTek L-series and ACSLS attached tape libraries.

BRM automatically collects vital information about the backup environment, and stores it in an open, industry-standard MS-SQL database, facilitating historical trending and capacity forecasting functions.

Library Partitioning

Partitioning is available on the L1400M1 library (and the L1400M library with SN3300 firmware version 5.6.43, or higher). Partitioning, controlled by the L1400M Interface Control Module or the SN3300 router on the L1400M library, allows you to assign cartridge slots, CAP slots, drives, and backup applications to partitions. Each partition is presented to the application as a different L700e library. A maximum of six partitions can be created.

Slots are assigned to existing partitions by specifying up to 10 element address ranges. Ranges are defined by first identifying which library they are from, library 0 or library 1, as determined by the interface control port to which the library is connected. Normally, the L1400M will be connected to port 0 and the L1400 will be connected to port 1. While slots within a partition can span across libraries, each range within a partition is restricted to one library.

- Partitions can consist of any number of slots, with a minimum of one
- Slots can only be assigned to one partition, not shared
- Slots are only available if assigned to a partition
- Slots are assigned to partitions by defining element address ranges
- Up to 10 element address ranges can be defined per partition

CAPs

CAP slots are assigned in the same manner as other slots.

- CAP slots can only be assigned to one partition, no sharing
- CAP slots count towards the limit of 10 element address ranges
- In a dual-library solution, there can be two CAP As and two CAP Bs, one in each library. In a dual-library solution, a partition may only contain slots from one CAP A and/or one CAP B. In other words, a partition cannot contain slots from both CAP As, etc.

Drives

Drives are assigned to partitions by their element address.

- Any number of drives can be assigned to a partition by their element address.
- Control commands to the drive are restricted, but the data path is not physically separated, so any host can see the drive, just not access it through the robot. Thus applications can only mount tapes to drives assigned to their partition.

Hosts

Hosts are assigned to partitions via device maps. A map is automatically created for each partition; allowing connectivity to only that partition. You may create more complex maps, as needed. Select one or more hosts to connect to a map and access the partition

- A host can use an automatically-created map to connect to one partition.
- Multiple hosts can map to the same partition
- User-defined maps can allow a host to connect to multiple partitions.

Partitions and Backup Applications

Each partition is presented to a backup application as its own L700e library with a unique SCSI serial number. The serial number is an 11-character string consisting of three parts:

- "STK"
- The serial number of the router
- The partition number with leading zeros.

Replacing the Interface Control Module and Saving the Partitioning Information File

Partitioning information can be saved to a file and loaded into the new L1400 Interface Control Module. In this case, the control module serial number remains the same, even if they are edited. However, if new partitions are created, the serial numbers will incorporate the new control module serial number. This may require a reconfiguration of the backup applications. Thus, saving the interface control configuration file will afford the customer some flexibility when they rebuild their environments, but eventually they will need to rebuild.

Configuration

The L1400M ships with all the cartridge slots installed in the library. However, the customer only has access to 200 of these slots (assuming no additional slots have been licensed). The interface control module (router) sees all the library resources but provides access to the slots based on the number of slots the customer has licensed.

Additional slots upgrades in the library (300 - 1,344) are all sold under the L1400M library model, there are no capacity upgrades for the L1400. However, as with the L700, the second frame (L1400) is required for the customer to scale beyond 678 slots.

Slot Assignment

L1400M with SN3300 Firmware Version 5.6.10

This method releases slots sequentially based on the element addresses of the slots. The library provides the results of the read element status to the router. The router provides access to the number of slots that have been licensed by the customer based on the element address. These physical slots are released sequentially by the router based on the element address. Element addresses start at 1000 (panel 0, column 0, row 0), so for a 400 slot license, elements 1000-1399 would be released to the customer.

Each additional capacity upgrade is added to the end of the sequence. In the above example if the customer ordered the CAPC feature (400 to 500 slots), then the additional 100 slots would be sequentially added after element address 1399. Thus, the customer would now have access to slots with the element addresses of 1000-1499.

As with the single frame, incremental licensed slots are added at the end of the sequence. This process almost always means that the slots are added to a second library.

L1400M1 (or L1400M with SN3300 Firmware Version 5.6.43, or higher)

L1400M1 libraries come standard with access to 200 cartridge slots. The default assignment for these slots is element addresses 1000-1999. However, these element addresses can be changed through the web interface of the Library Control Module (see "Configuring Licensed Capacity (Slot Balancing)" on page D-16). Any capacity beyond the initial 200 slots must be licensed (see "Configuring Licensed Capacity (Slot Balancing)" on page D-16).

This method provides the customer a more flexible means of managing their cartridge capacity. The user can input ranges of element addresses (e.g., 1200-1286) for use into the router's management interface. The interface control module will release those user identified slots as licensed slots. The end user can identify up to 10 ranges of slots for use. The following error messages will be displayed:

- When the total slots of the entered ranges exceed the total number of licensed slots; this error does not prevent the library from functioning, it is purely informational.
- When a range is entered that is outside the cell addresses defined by the read element status (e.g., valid range is 1000 through 1677 for a library without a second drive column or PTP); this prevent the slots from being assigned.

No error message is displayed if the total number of slots selected is less than the total number of licensed slots.

Slots can also be reassigned, by editing/entering new user defined ranges. Care must be taken when assigning ranges because media can be stranded. Media in previously accessible slots could be inaccessible if slots are changed. However, the ranges can easily be changed to include the stranded media.

The benefit of assigning slots in this manner is that the customer typically does not incur a penalty for installing the second drive column, where as with the L700 they would lose 60 slots. The customer does lose the 60 2nd drive column slots if they have maxed out the slots in the L1400M and then install the 2nd drive column. However, they regain these slots when they add the second frame (L1400P1). While slot loss can occur it is minimized by the Continuous Capacity™ technology. PTP slots are never lost.

Library Capacity

The L1400M/L1400M1 Tape Library ships with all 678 slots included, but only the first 200 slots are enabled. Slot upgrades controlled by the StorageNet 3300 Fibre Channel Router in the L1400M and the L1400M Interface Control Module in the L1400M1. Slot upgrades are available in 100 slot increments and purchased as features of the L1400M/L1400M1 library.

There are three steps to configure upgraded library capacity:

1. Place a sales order for the required capacity (refer to the *L180/L700x/L1400x Ordering and Configuration Guide*).
2. Obtain a softkey for the additional capacity (see "Obtain a Capacity Upgrade or Library Partitioning Softkey" on page D-7). This process can take up to two business days. Your order for additional capacity must be completed before you can obtain a softkey.
3. When the softkey arrives, configure additional capacity on the router's (L1400M) or interface control module's (L1400M1) web-based interface.
   See "Configuring Additional Capacity."

Library Partitioning

Library partitioning is an optional feature that allows the library to be shared with multiple hosts/backup applications.

There are three steps to configure library partitioning:

1. Place a sales order for the required capacity (refer to the *L180/L700x/L1400x Ordering and Configuration Guide*).
2. Obtain a softkey for library partitioning (see "Obtain a Capacity Upgrade or Library Partitioning Softkey"). This process can take up to two business days. Your order for additional capacity must be completed before you can obtain a softkey.
3. When the softkey arrives, configure library partitioning on the interface control module's (L1400M1) web-based interface. See "Enable Library Partitioning" on page D-26

Obtain a Capacity Upgrade or Library Partitioning Softkey

1. Verify that the order for capacity upgrade or library partitioning is complete.
2. Fill out the online L1400 Software Key Order Form to request a softkey at the following URL:

   http://www.support.storagetek.com/GlobalNavigation/Support/ToolsAndServices/Tools/swkeys/GENERALPUBLIC/L1400MKey_Order.htm

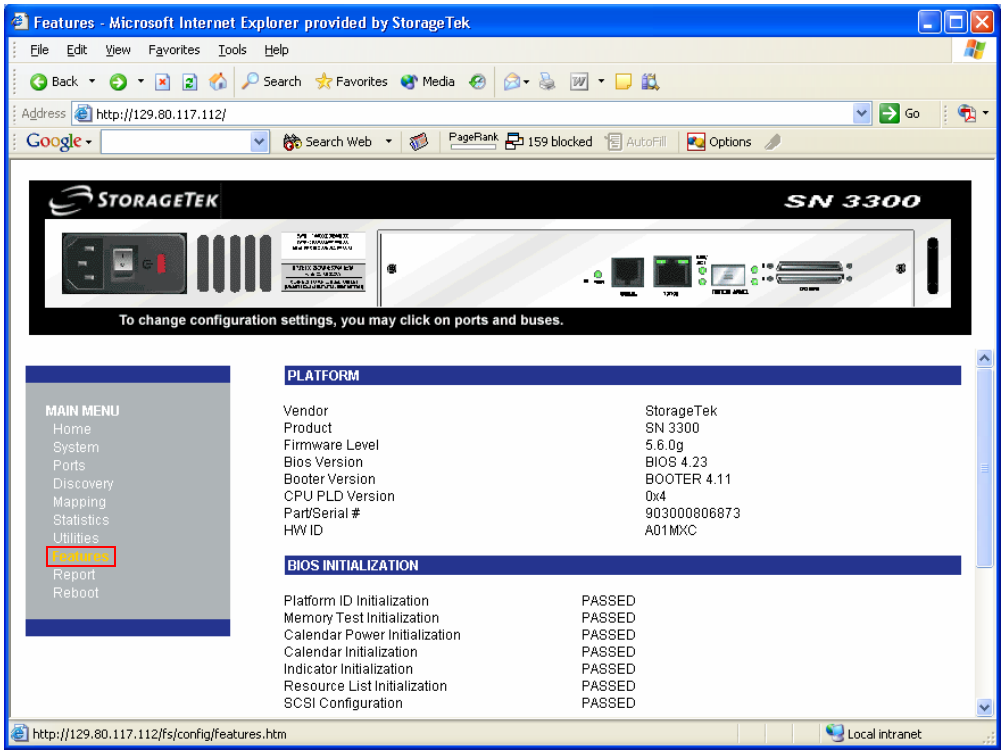
   Note: Either the sales order number or the customer site ID will be required, as well as an e-mail address where the key will be sent.
   The soft license key is generated and sent out by e-mail within two business days.

Configuring Additional Capacity

L1400M Library with SN3300 Firmware Version 5.6.10

Use this procedure to configure additional capacity for the L1400M library with SN3300 firmware version 5.6.10.

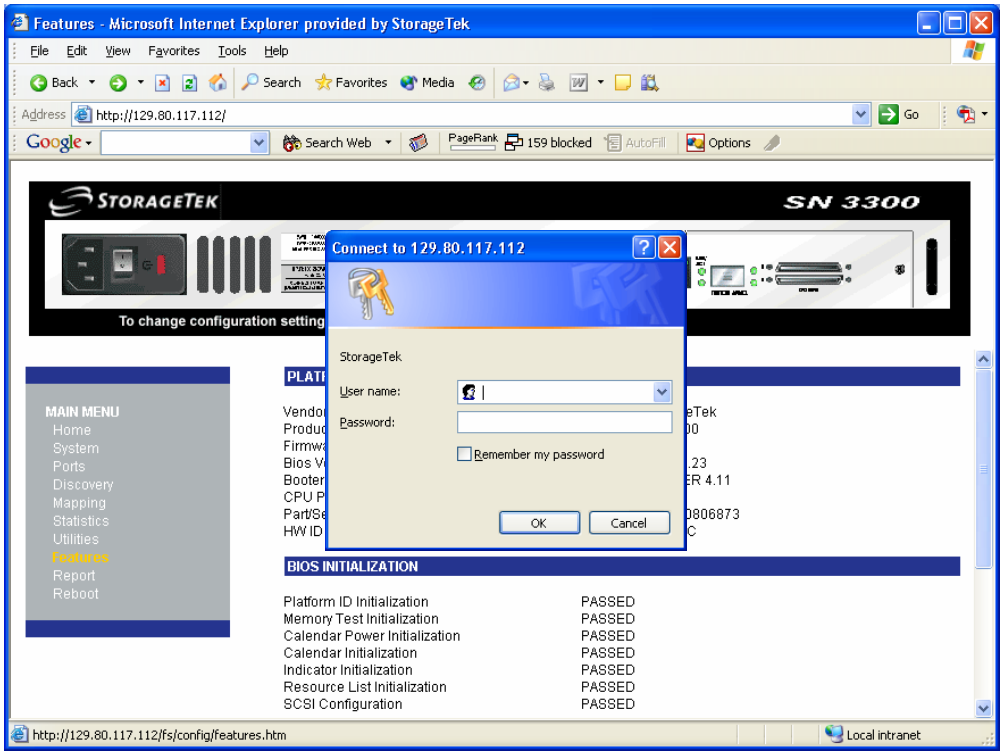
1. Connect your PC to the router's Ethernet port using an Ethernet crossover cable.
2. Using a standard internet browser such as Microsoft Internet Explorer or Netscape Navigator, open the router's web-based interface and type the router's IP address (`1.1.1.1` default for new router) in the browser's `Address` line. The router's home page appears:



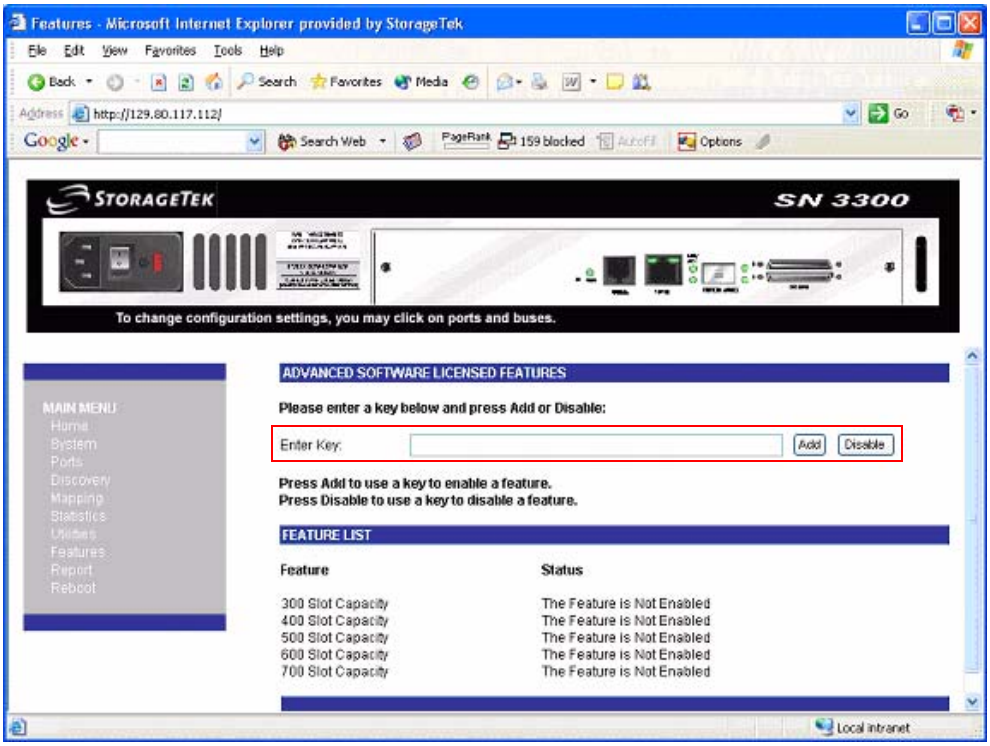
3. On the home page, click on `Features` in the `MAIN MENU` on the left side of the screen.

4. The network password dialog box appears. Enter the User Name and Password:

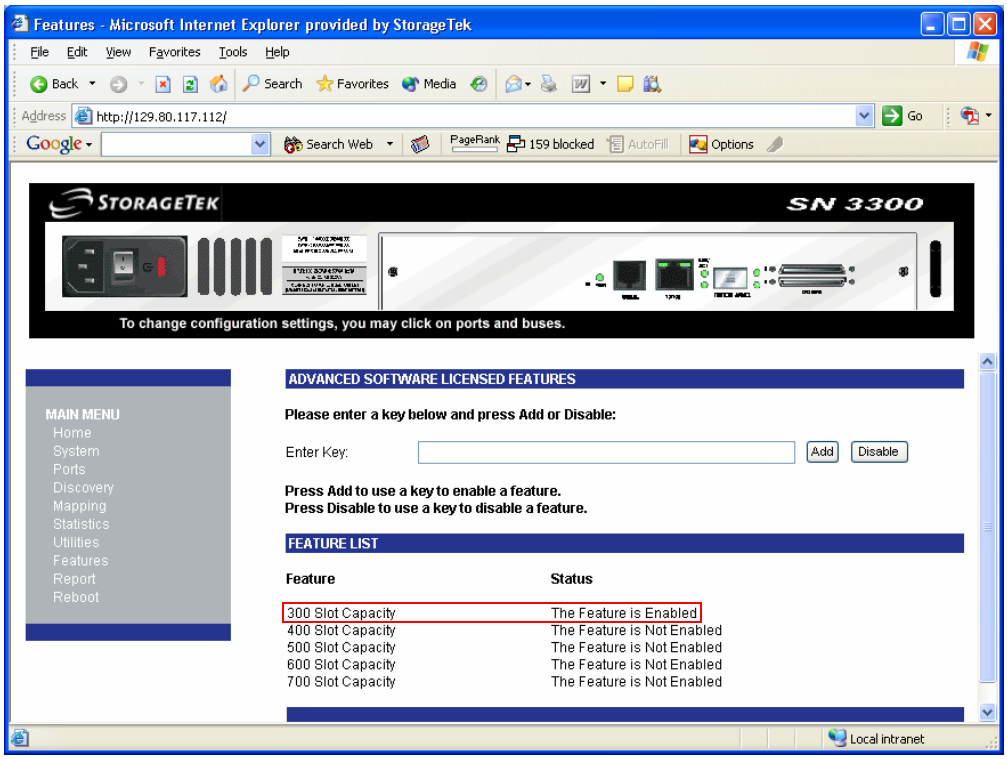
   User Name: `root`
   Password: `password`



5. The Features page appears. Type the softkey in the `Enter Key` field, then click the `Add` button.



6. The Features page displays the capacity enabled by the softkey entered. In the screen below, an additional 100 slots have been enabled, for a total of 300 slots:



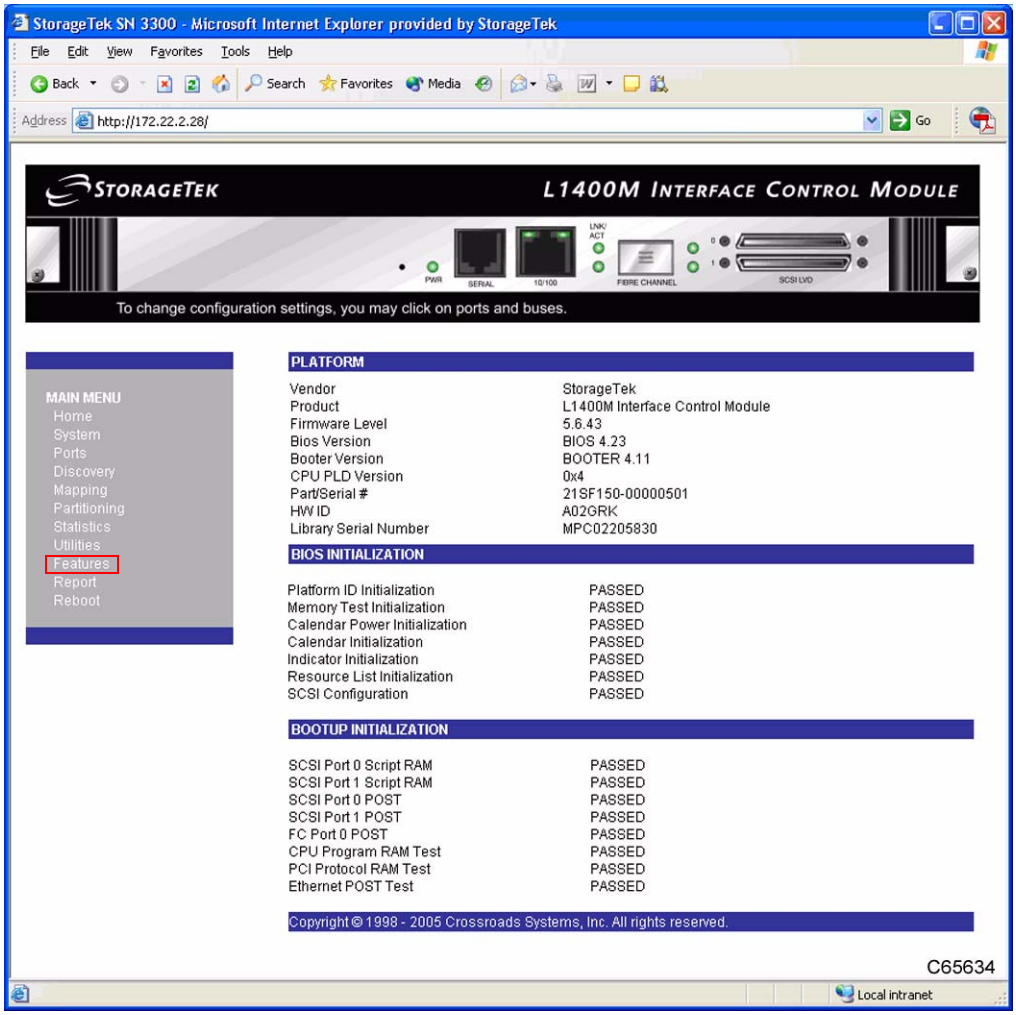
7. In the Main Menu, click Reboot and follow the instructions to reboot the router. After the control module reboots (requires about 32 seconds), the home page appears.

Note: To disable a capacity licence, re-enter the its softkey and you will return to the previously licensed state. Enter the key again to reactivate the capacity license. Lower-level capacity licenses do not have to be disabled before a new higher-capacity license.

L1400M1 Library (or L1400M Library with SN3300 Firmware Version 5.6.43, or higher

Use this procedure to configure additional capacity for the L1400M1 Library or the L1400M library with SN3300 Fibre Channel Router firmware version 5.6.43, or higher.

1. Connect your PC to the router's Ethernet port using an Ethernet crossover cable.
2. Using a standard internet browser such as Microsoft Internet Explorer or Netscape Navigator, open the router's web-based interface and type the router's IP address (`1.1.1.1` default for new router) in the browser's `Address` line. The home page appears:

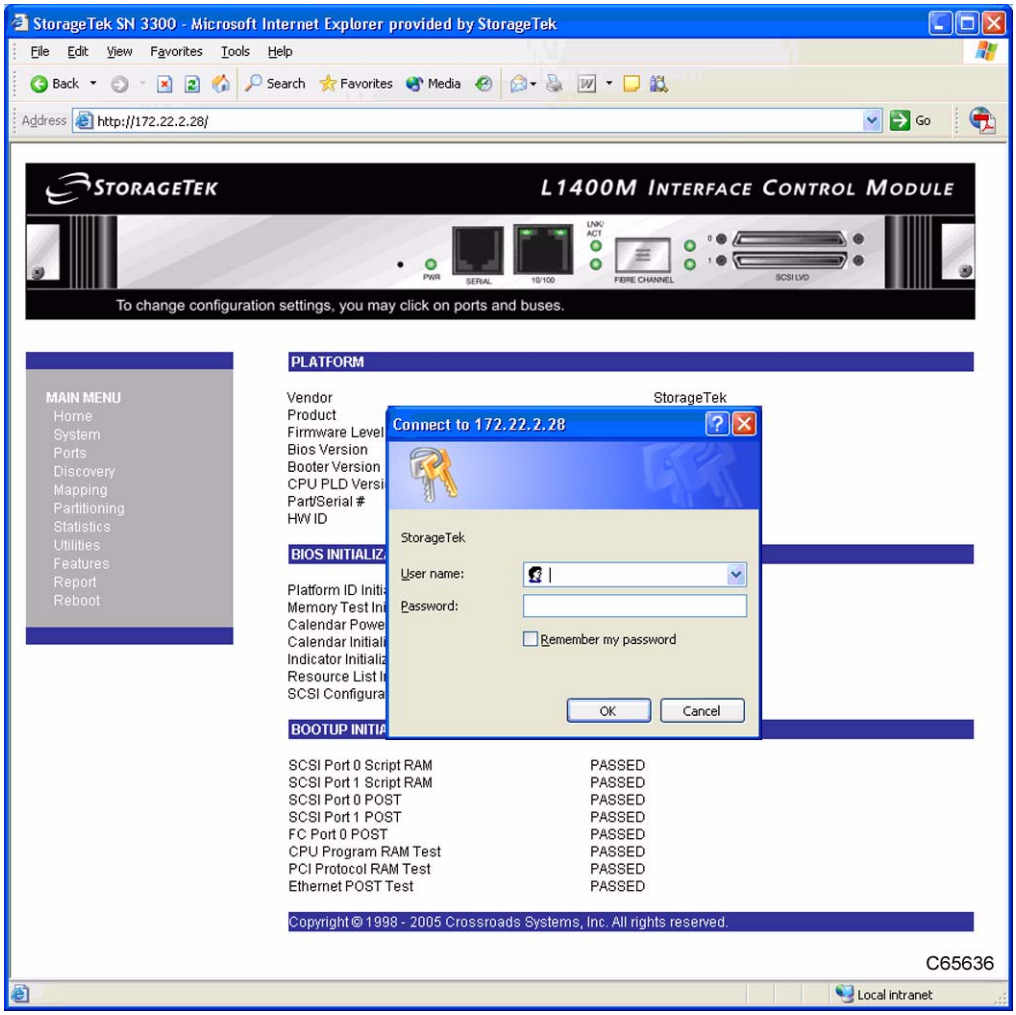


Note: For the L1400M library with SN3300 firmware version 5.6.43, or higher; the graphic at the top of the screen shows the SN3300 Fibre Channel Router and the PLATFORM area shows SN3300 information. All other screen areas in this procedure are identical.

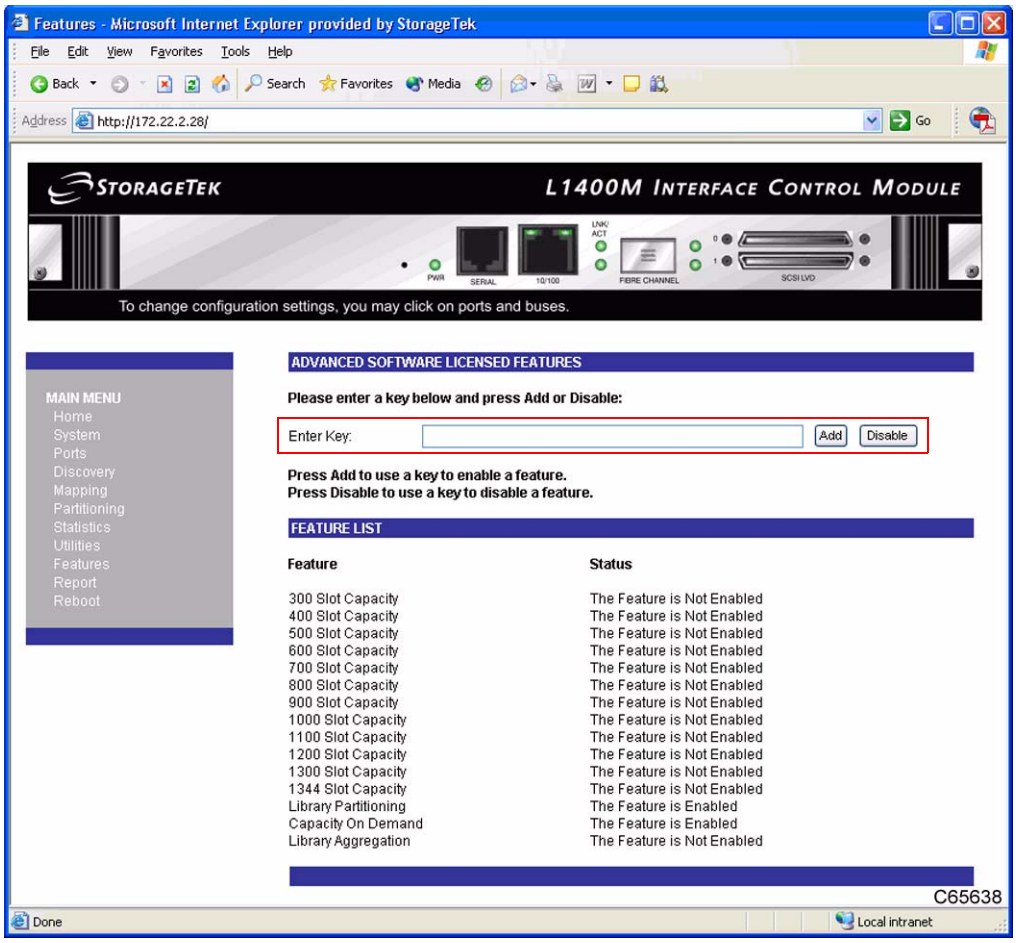
3. On the home page, click on `Features` in the `MAIN MENU` on the left side of the screen.

4. The network password dialog box appears. Enter User Name and Password and click the `OK` button:

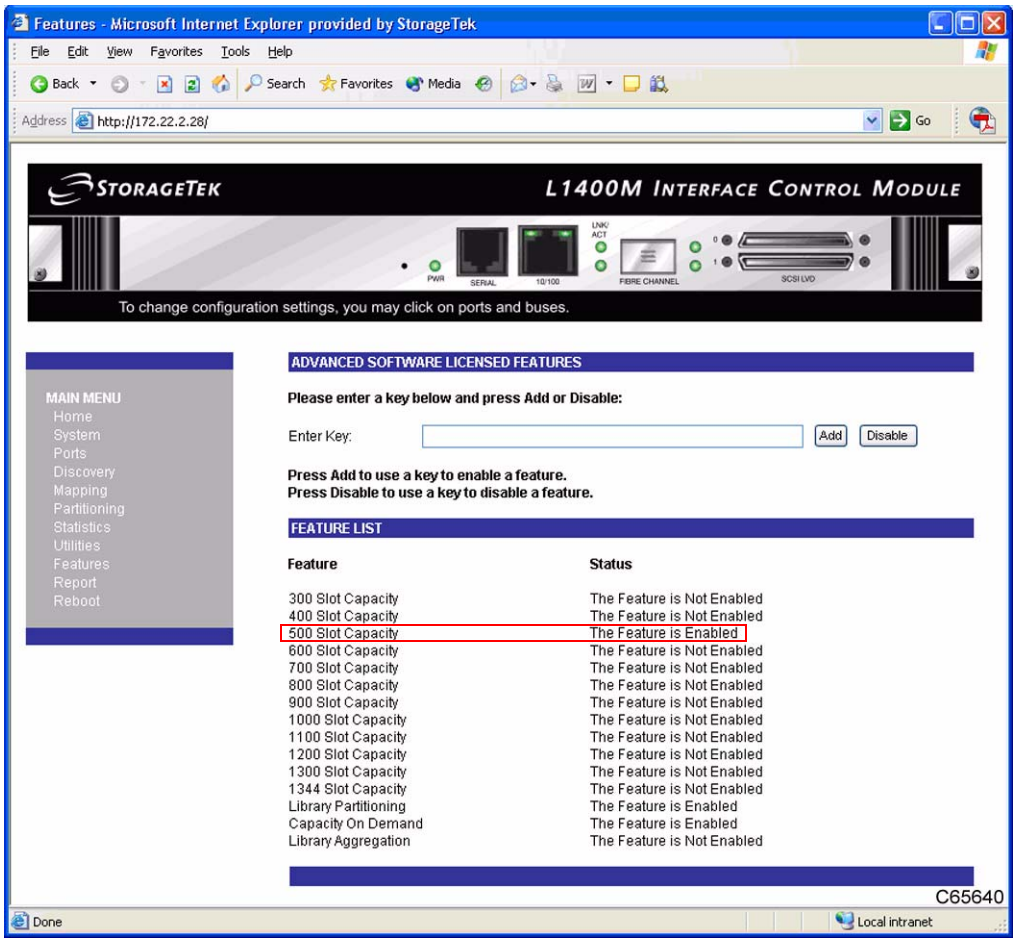
   User Name: `root`
   Password: `password`



5. The Features page appears. Type the softkey in the `Enter Key` field, then click the `Add` button.



6. The Features page displays the capacity enabled by the softkey entered. In the screen below, an additional 300 slots have been enabled for a total of 500 slots:



7. In the Main Menu, click Reboot and follow the instructions to reboot the router. After the control module reboots (requires about 32 seconds), the home page appears.

Note: To disable a capacity licence, re-enter the its softkey and you will return to the previously licensed state. Enter the key again to reactivate the capacity license. Lower-level capacity licenses do not have to be disabled before a new higher-capacity license.

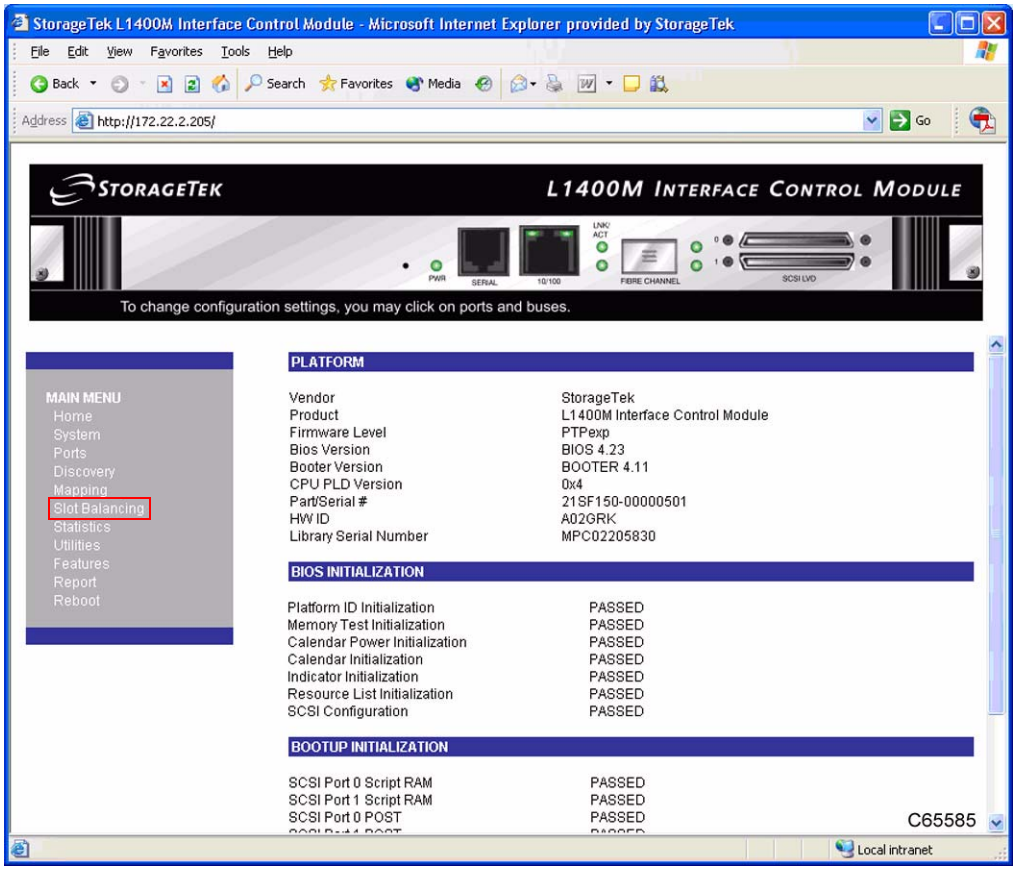
Configuring Licensed Capacity (Slot Balancing)

Use Slot Balancing to assign your licensed capacity to element addresses when:

- Continuous Capacity enabled (default)
- Library Partitioning not enabled

Note: Once library partitioning has been purchased and enabled, `Slot Balancing` is replaced by `Partitioning` in the `MAIN MENU`. Use library partitioning to balance slots between two connected L1400M libraries. See "Configuring Library Partitions" on page D-24.

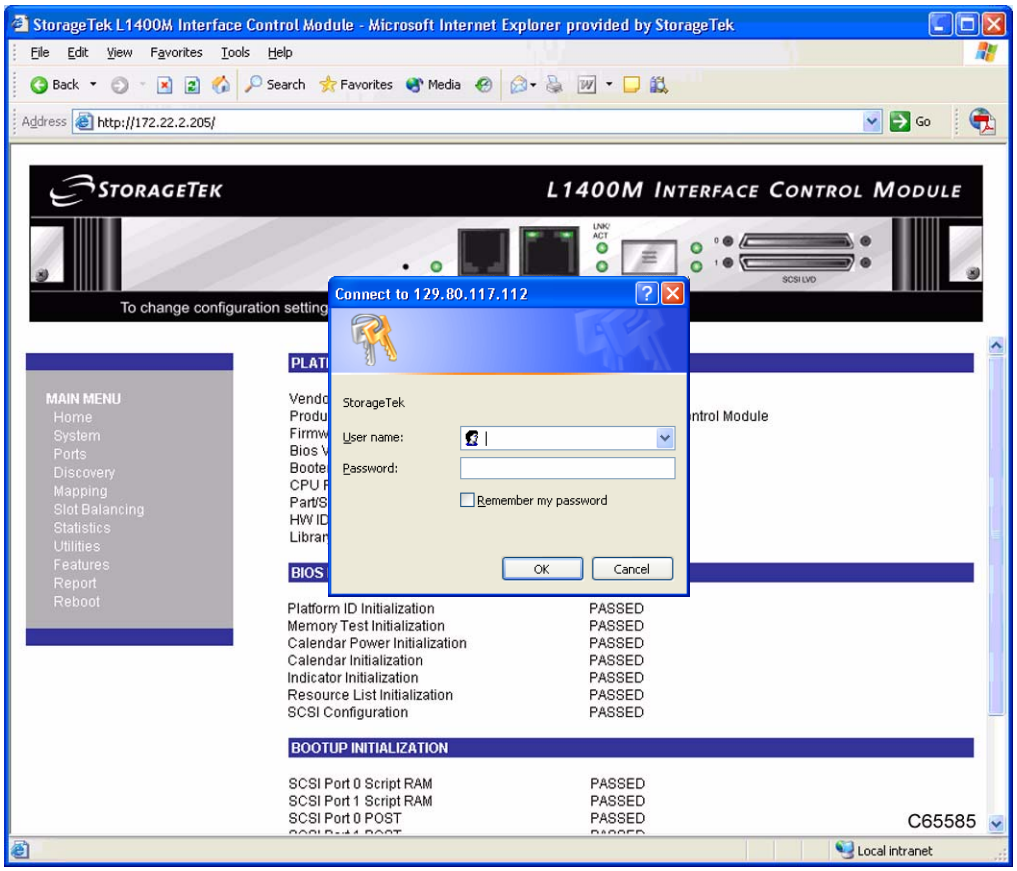
1. Connect your PC to the router's Ethernet port using an Ethernet crossover cable.
2. Using a standard internet browser such as Microsoft Internet Explorer or Netscape Navigator, open the control module's web-based interface by typing its IP address (`1.1.1.1` default for new control module) in the browser's `Address` line. The control module's home page appears:



3. On the home page, click on `Slot Balancing` in the `MAIN MENU`.

4. The network password dialog box appears. Enter User Name and Password and click the OK button:

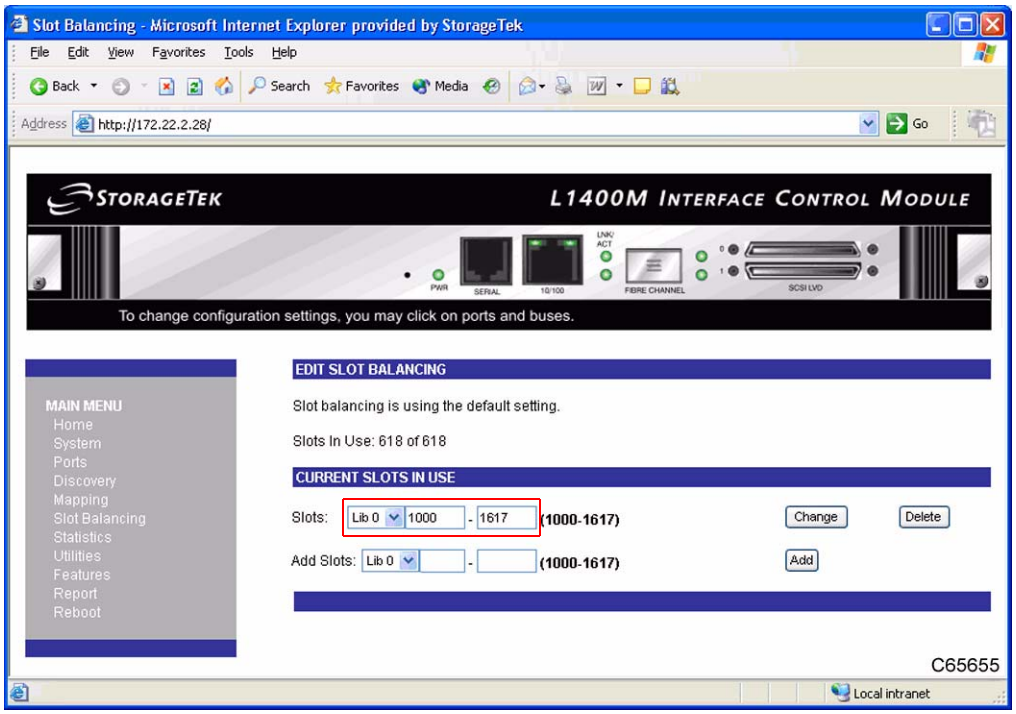
   User Name: `root`
   Password: `password`



5. The `Edit Slot Balancing` page appears. Determine the slot address ranges you wish to use in Lib 0 (the L1400M/L1400M1 library) and Lib 1 (the L1400P1 library)

Notes: When the `Edit Slot Balancing` page first appears, all slots are assigned to Lib 0 in the `Slots` line.

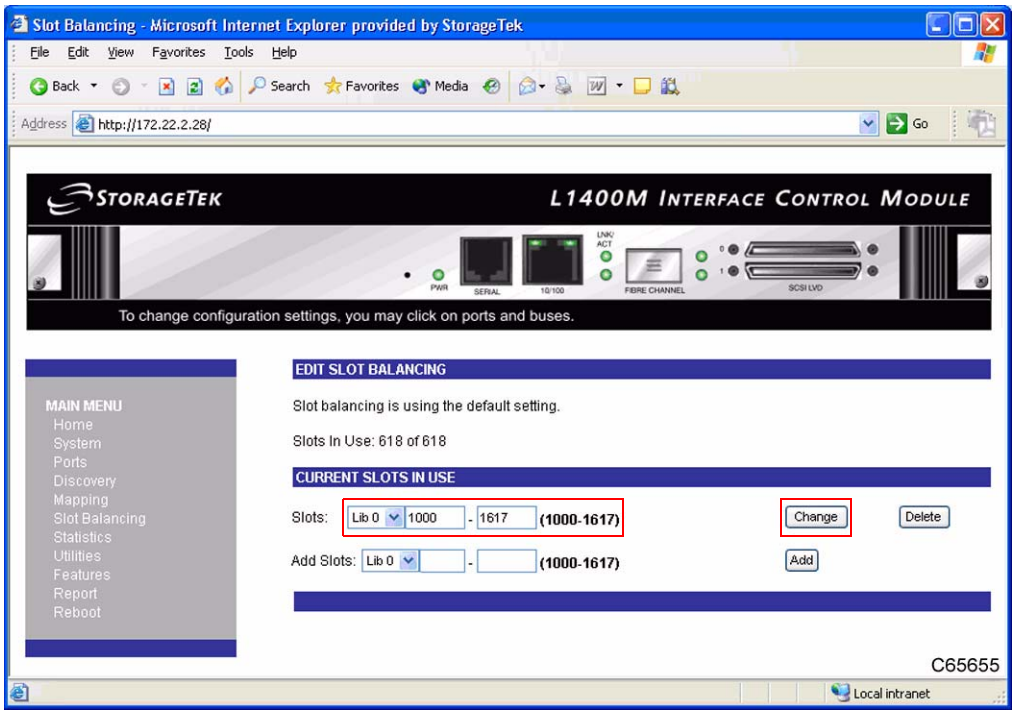
You must identify at least one slot for Slot Balancing.



6. In the `Slots` line, change the starting and ending slot address to your requirements, and then click the `Change` button.

Notes: Enter the starting address in the first box and the ending cell address in the second box.

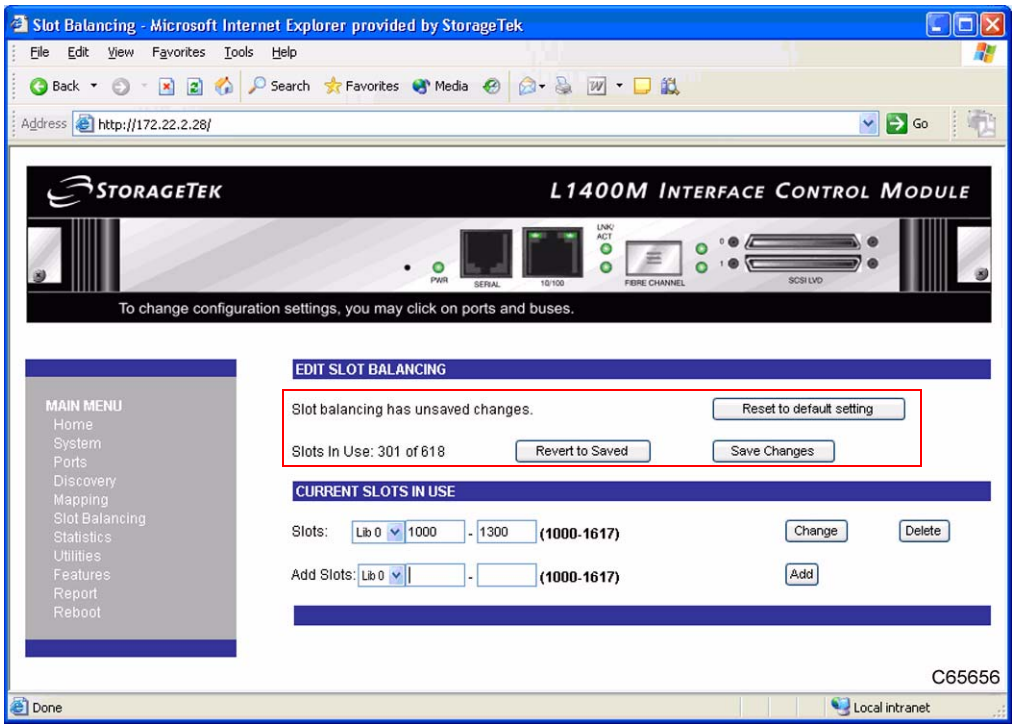
If your entry exceeds the available slots, an error message appears when you click the `Change` button. Acknowledge the message and reenter the cell range.



7. The `Slot balancing has unsaved changes.` message and three buttons appear:

- `Reset to default setting` button: Returns slot assignments to the default setting. In this case 1000 - 1617)
- `Revert to Saved` button: Reverts settings to the previously saved configuration.
- `Save Changes` button: Saves the changes made in the Slots line.

Note: In the example below, slots 1000 through 1300 are being assigned to Lib 0.

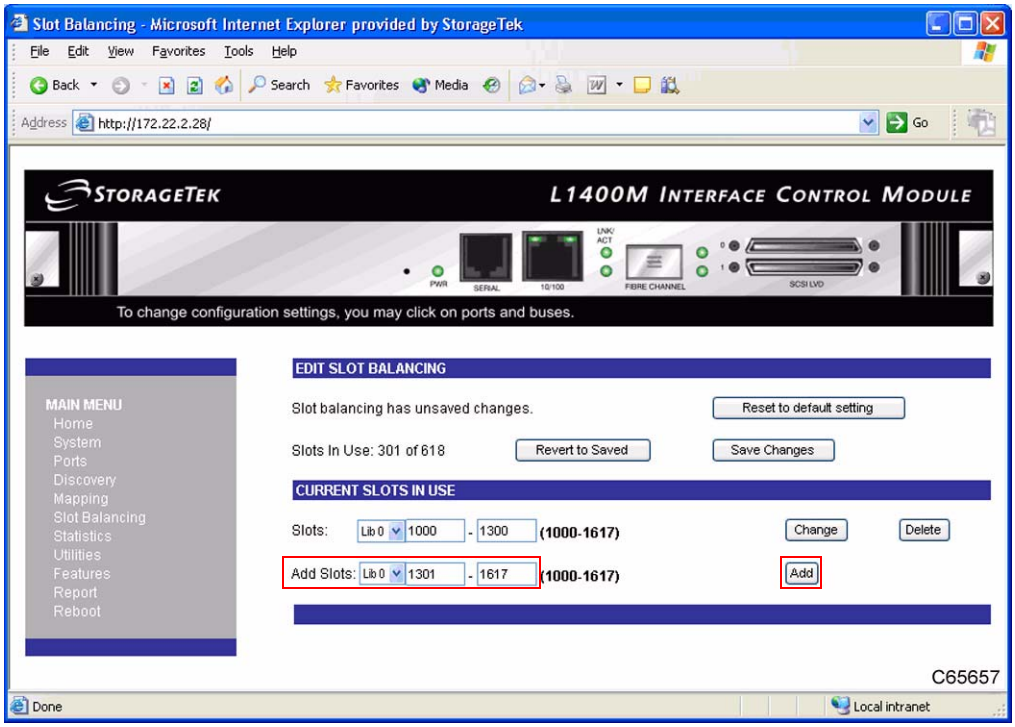

Slot Balancing - Microsoft Internet Explorer provided by StorageTek
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://172.22.2.28/
Go
STORAGETEK
L1400M INTERFACE CONTROL MODULE
PWR
SERIAL
10/100
LINK/ ACT
FIBRE CHANNEL
SCSI LVD
To change configuration settings, you may click on ports and buses.
MAIN MENU
Home
System
Ports
Discovery
Mapping
Slot Balancing
Statistics
Utilities
Features
Report
Reboot
EDIT SLOT BALANCING
Slot balancing has unsaved changes.
Reset to default setting
Slots In Use: 301 of 618
Revert to Saved
Save Changes
CURRENT SLOTS IN USE
Slots: Lib 0 1000 - 1300 (1000-1617)
Change
Delete
Add Slots: Lib 0 - (1000-1617)
Add
C65656
Done
Local intranet

8. In the `Add Slots` line, select `Lib 1` from the pull-down menu.

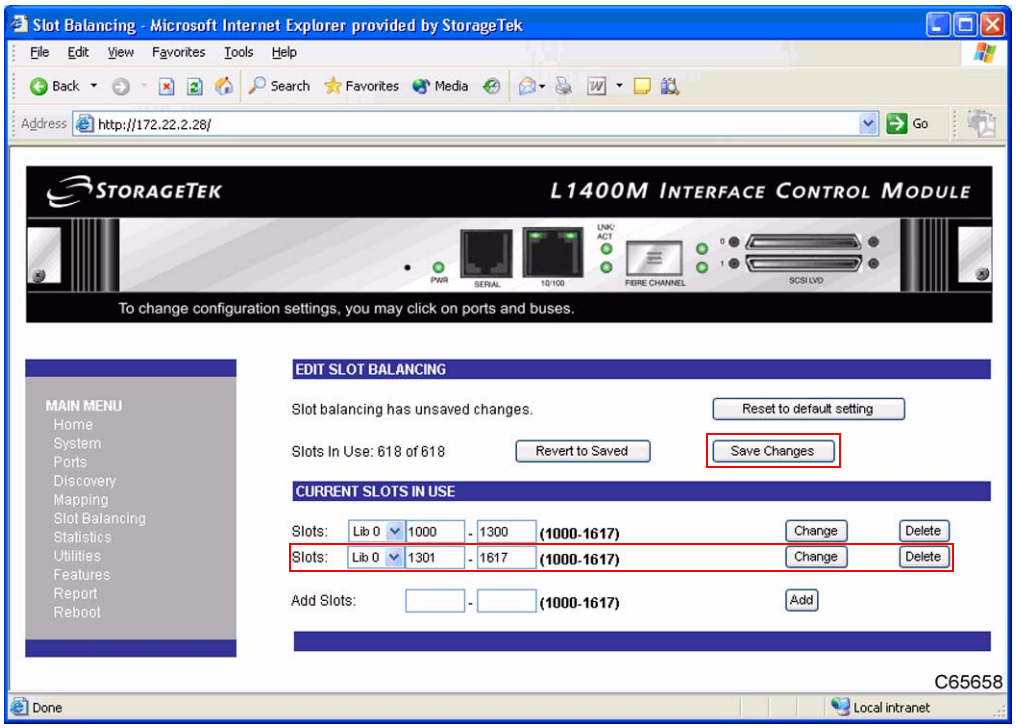
9. Enter the starting and ending slot addresses for Lib 1, and then click the `Add` button.

   Note: In the example, the remaining slots (1301 through 1617) are assigned to Lib 1.

   The new slot range does not have to be sequential from the previous range as shown in this example.

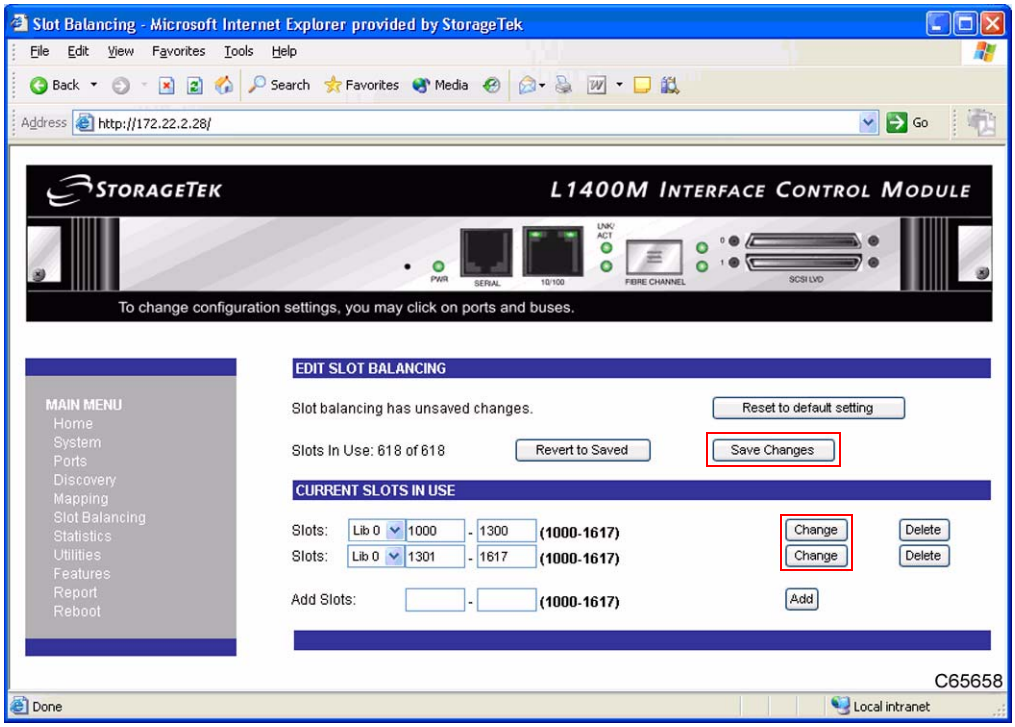


10. A new `Slots` line appears below the first, showing the added slots. Click the `Save Changes` button.



11. If you make a mistake and wish to make changes at this time, type your new starting/ending addresses in the text entry boxes and click the appropriate `Change` button.

12. Click the `Save Changes` button when finished.



Configuring Library Partitions

Enable Library Partitioning and Create the First Partition

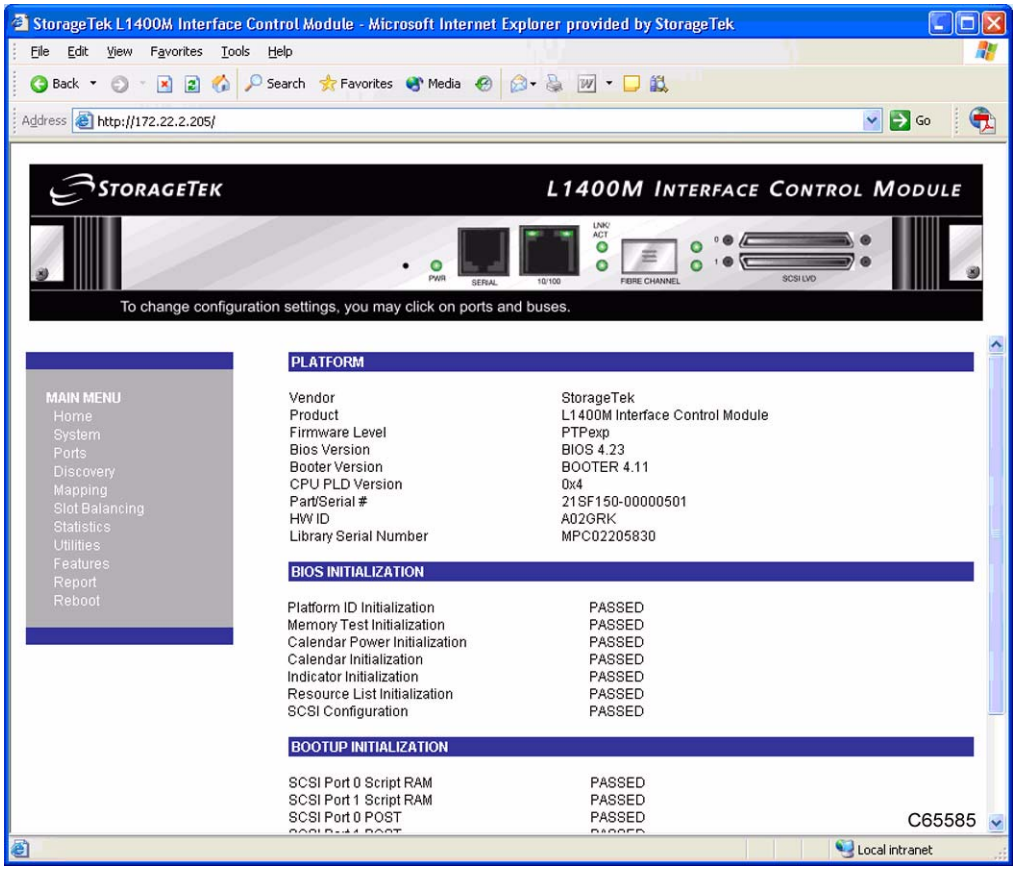
This procedure shows how to enable library partitioning and configure the first partition. To add a up to five additional partitions after configuring the first partition, see "Add a Partition" on page D-45. To delete a partition, see "Delete a Partition" on page D-58.

Library partitioning requires:

- An L1400M1 library, or
- An L1400M library with SN3300 firmware version 5.6.43, or higher
- A softkey to enable the function. See "Obtain a Capacity Upgrade or Library Partitioning Softkey" on page D-7.

1. Connect your PC to the router's Ethernet port using an Ethernet crossover cable.

2. Using a standard internet browser such as Microsoft Internet Explorer or Netscape Navigator, open the control module's web-based interface by typing its IP address (`1.1.1.1` default for new control module) in the browser's `Address` line. The control module's home page appears:

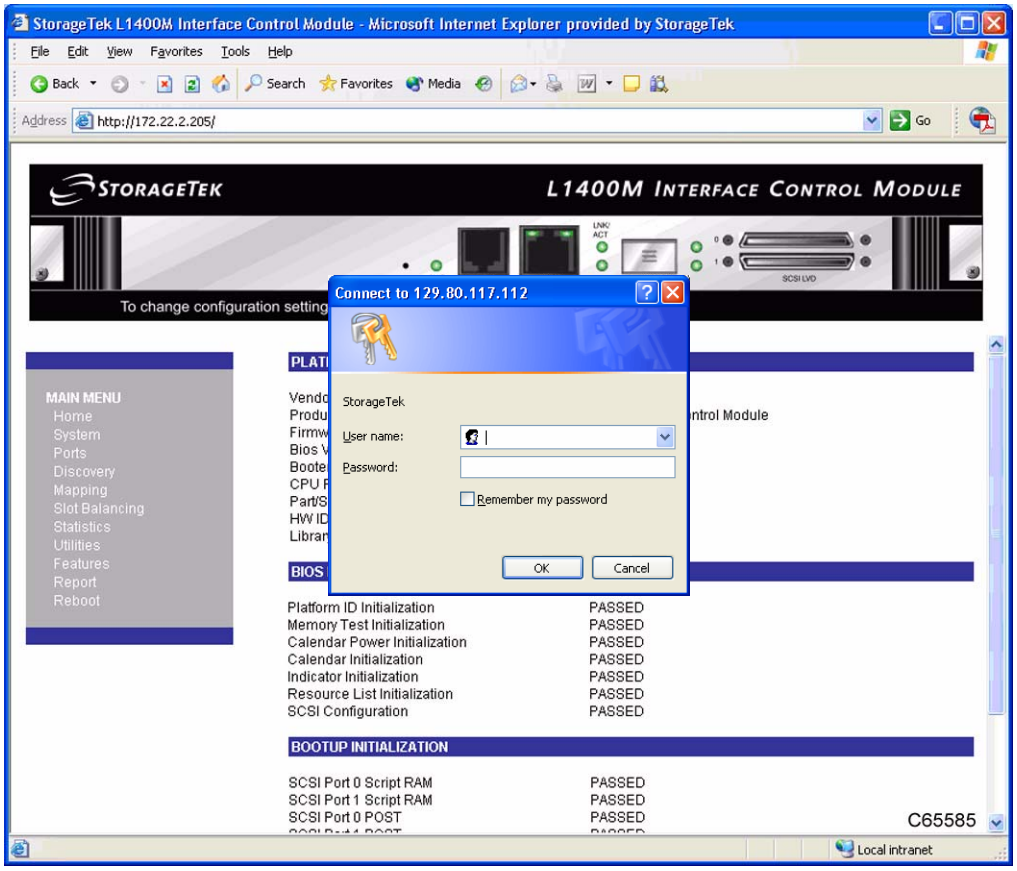


Note: If you are configuring library partitioning on an L1400M library with SN3300 firmware 5.6.43, or higher; the SN3300 Fibre Channel Router is displayed in the graphic at the top of the screen. In addition, the PLATFORM area on the home. page shows SN3300 information. All other portions of the following screens are identical.

Enable Library Partitioning

1. On the home page, click on `Features` in the `MAIN MENU`. The network password dialog box appears.

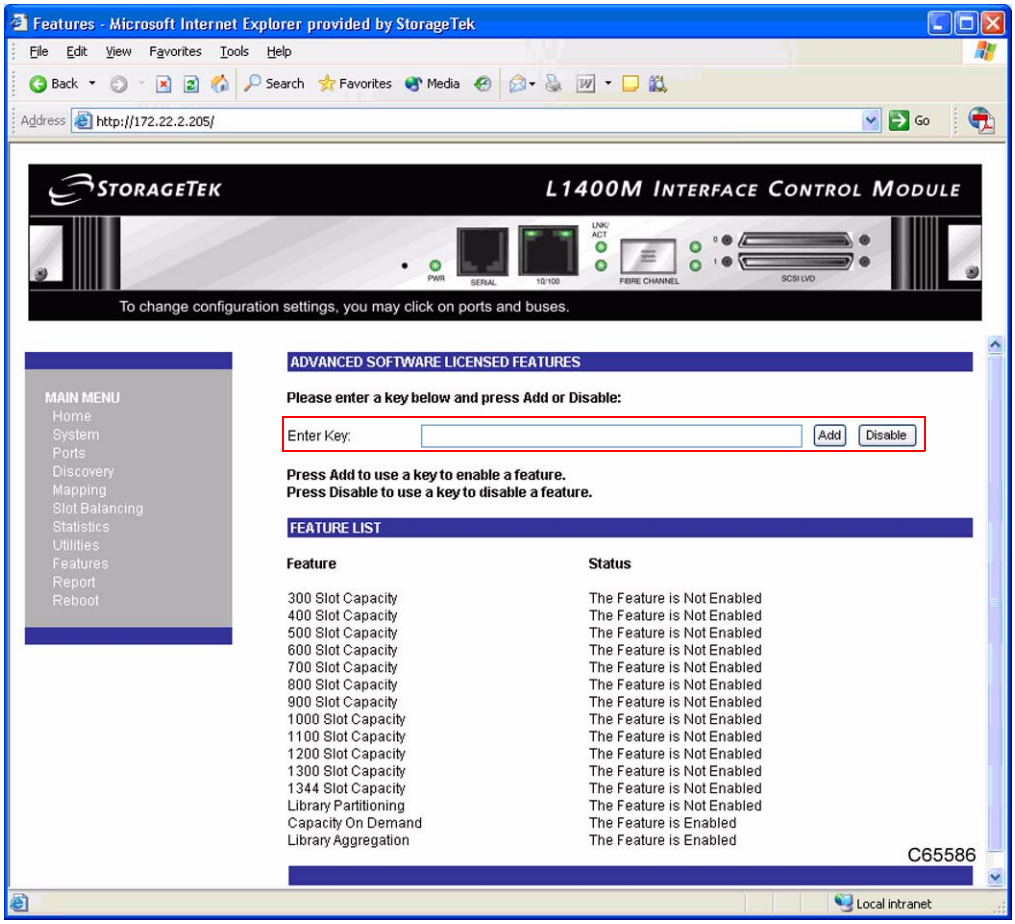
Note: If you are already logged into the control module, the Partitioning menu appears instead of the network password dialog box, go to step 3.



2. Enter User Name and Password:

   User Name: `root`
   Password: `password`

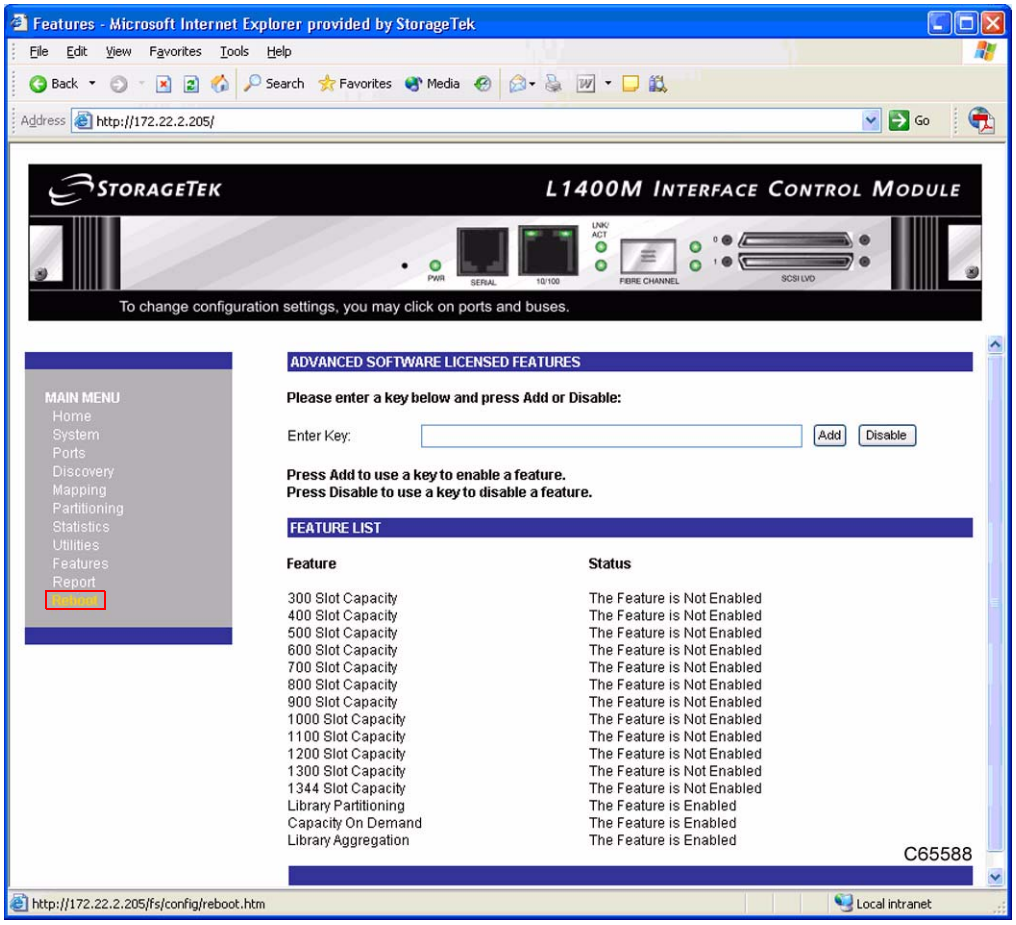
3. The `Advanced Software Licensed Features` page appears:



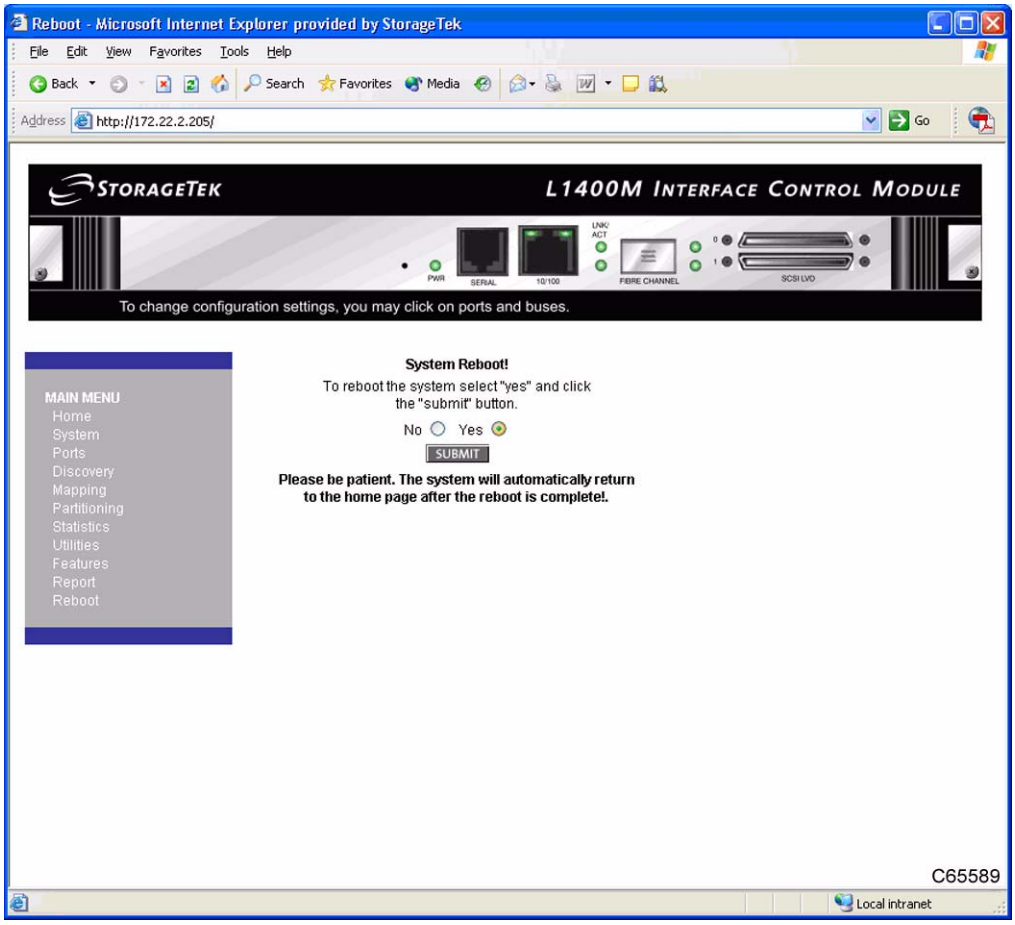
4. Type the softkey in the `Enter Key` field and click the `Add` button. A dialog box appears, indicating softkey acceptance and requesting that you reboot the router. Click OK.

Note: If an invalid softkey message is displayed, click `OK` and reenter the softkey. You may also copy the softkey from the email and paste it into the `Enter Key` field.

5. In the Main Menu, click `Reboot`.

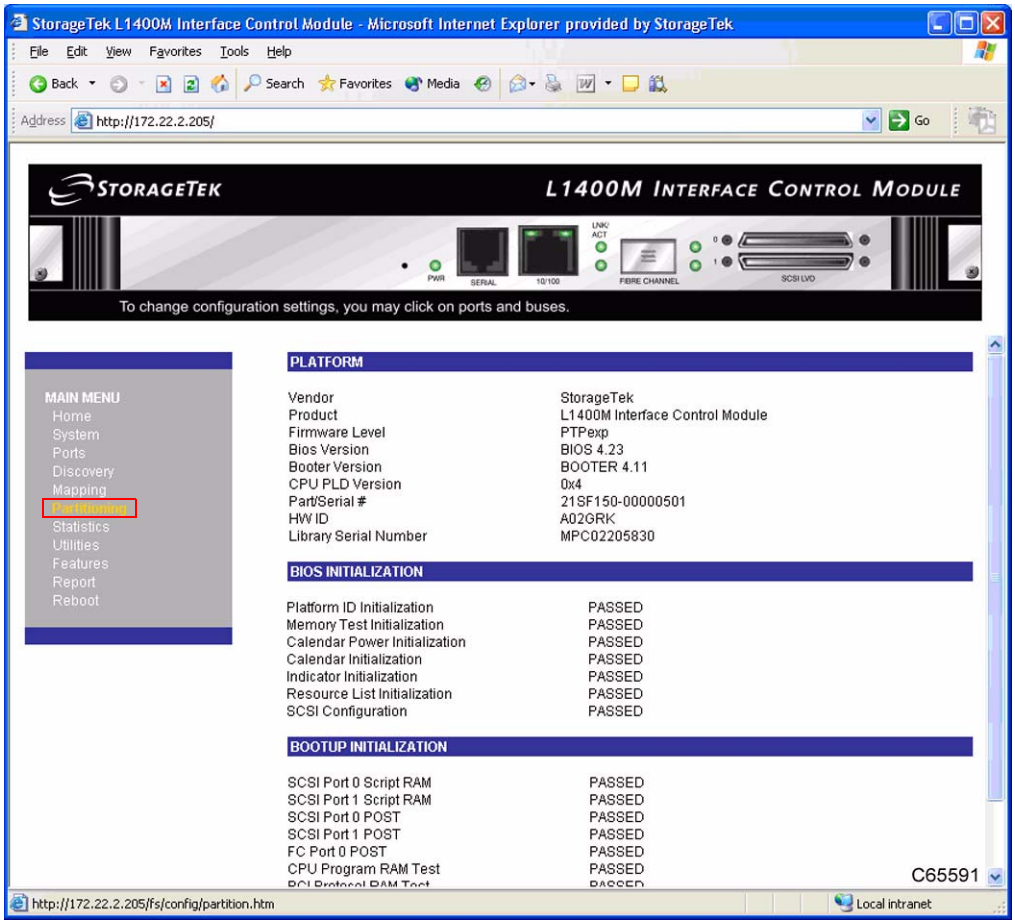


6. On the `System Reboot` screen, select `Yes` and click the `Submit` button.



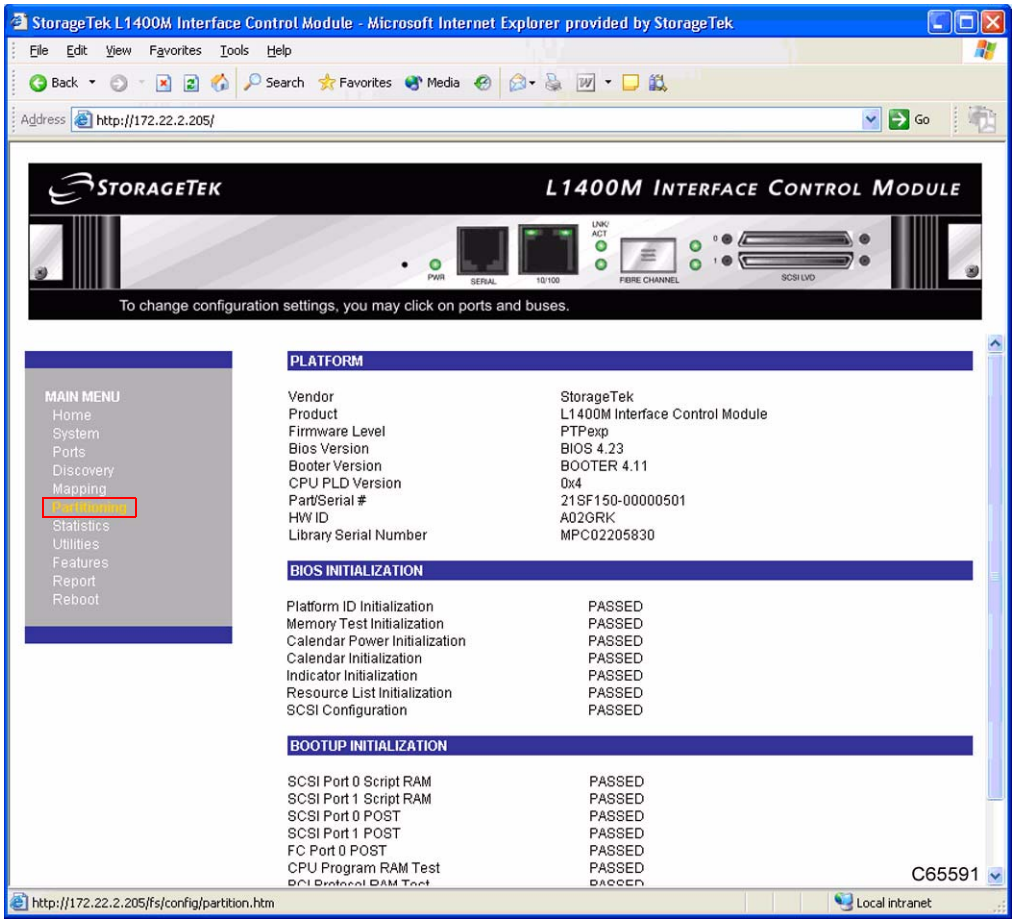
7. After the control module reboots (requires about 32 seconds), the home page appears with the `Partitioning` menu item displayed in the `MAIN MENU`.

   Note: You may have to click the Refresh button in the browser toolbar to display the home page.

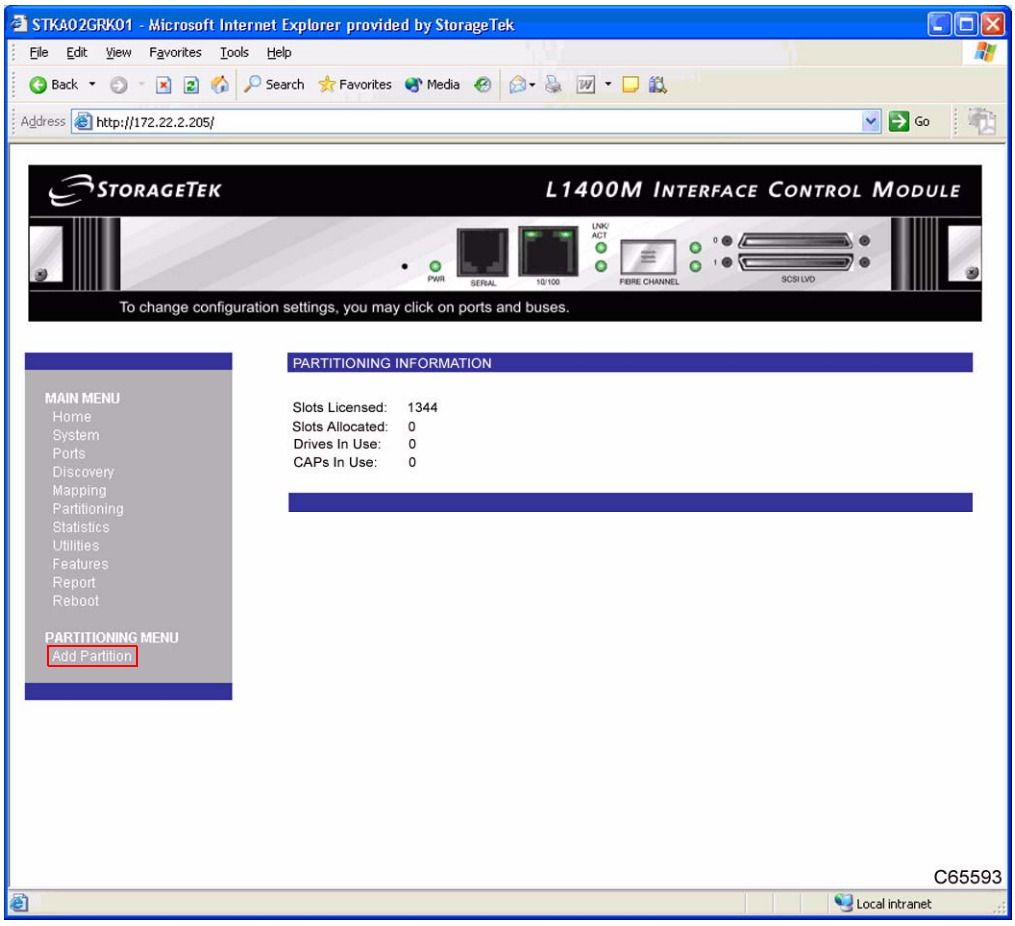


Add the First Partition

8. In the `MAIN MENU`, click `Partitioning`.



9. The Partitioning menu appears. Click the `Add Partition` button in the `PARTITIONING MENU`.

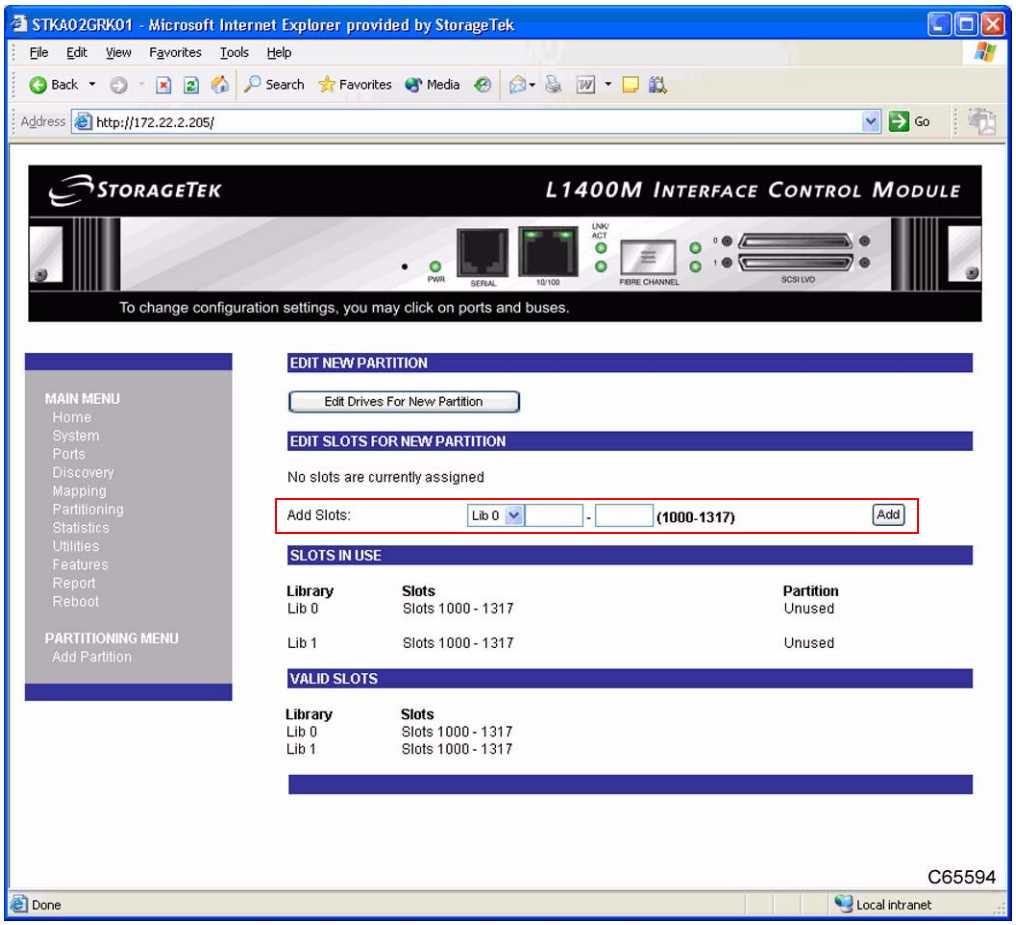


10. The `Edit New Partition` screen appears.

Note: The `Slots In Use` list displays slots that have been mapped for Library 0, and Library 1 (if an L1400P1 is connected with a pass-thru port). Since we are configuring the first partition, `Unused` is displayed in the `Partition` column for both libraries.

Lib 0 is the L1400M/L1400M1 library and Lib 1 is the L1400P1 library.

The `Valid Slots` list shows the slots that have been discovered for Library 0 (and Library 1 if an L1400P1 is connected with a pass-thru port).


STKA02GRK01 - Microsoft Internet Explorer provided by StorageTek
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://172.22.2.205/
Go
STORAGETEK
L1400M INTERFACE CONTROL MODULE
PWR
SERIAL
10/100
LNK/ ACT
FIBRE CHANNEL
SCSI LVD
To change configuration settings, you may click on ports and buses.
MAIN MENU
Home
System
Ports
Discovery
Mapping
Partitioning
Statistics
Utilities
Features
Report
Reboot
PARTITIONING MENU
Add Partition
EDIT NEW PARTITION
Edit Drives For New Partition
EDIT SLOTS FOR NEW PARTITION
No slots are currently assigned
Add Slots:
Lib 0
(1000-1317)
Add
SLOTS IN USE
Library
Slots
Partition
Lib 0
Slots 1000 - 1317
Unused
Lib 1
Slots 1000 - 1317
Unused
VALID SLOTS
Library
Slots
Lib 0
Slots 1000 - 1317
Lib 1
Slots 1000 - 1317
C65594
Done
Local intranet

11. In the Add Slots line, select the desired library (Lib 0 or Lib 1) from the drop-down menu, then enter the desired range of cell addresses.

Notes: Valid cell addresses are shown in bold next to the second text entry box. Refer to "Library Elements and Diagrams" on page D-62 for cell address locations.

Enter the starting cell address in the first box and the ending cell address in the second box.

If your entry exceeds the available slots, an error message appears. Acknowledge the message and reenter the cell range.

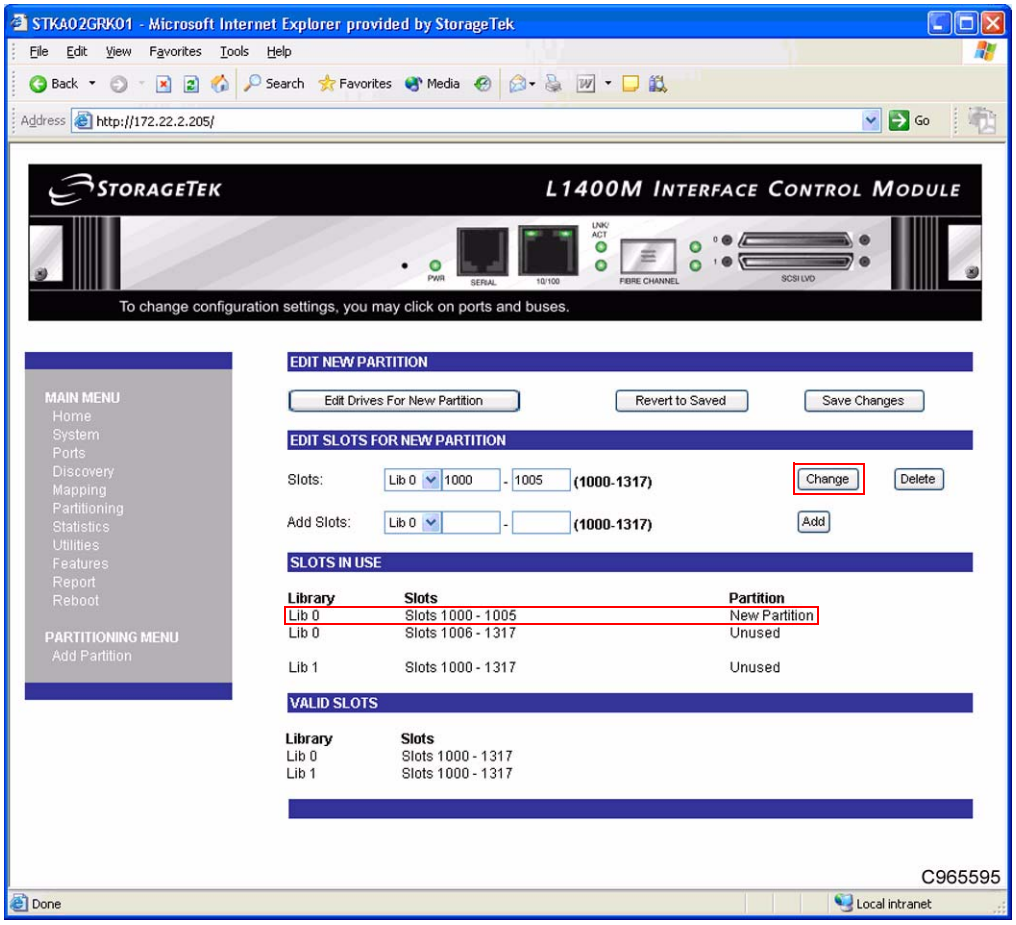
12. When you are finished, click the `Add` button.

13. The new partition appears in the `Slots in Use` section, but will not have a partition number until a drive is assigned to the partition.

Notes: If you wish to change your entry, enter the new cell range and click the `Change` button.

You can add up to 10 slot ranges in each partition in this manner.

14. To enter additional cell ranges, return to step 11.


STKA02GRK01 - Microsoft Internet Explorer provided by StorageTek
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://172.22.2.205/
Go
STORAGETEK
L1400M INTERFACE CONTROL MODULE
PWR
SERIAL
10/100
LNK/ ACT
FIBRE CHANNEL
SCSI LVD
To change configuration settings, you may click on ports and buses.
MAIN MENU
Home
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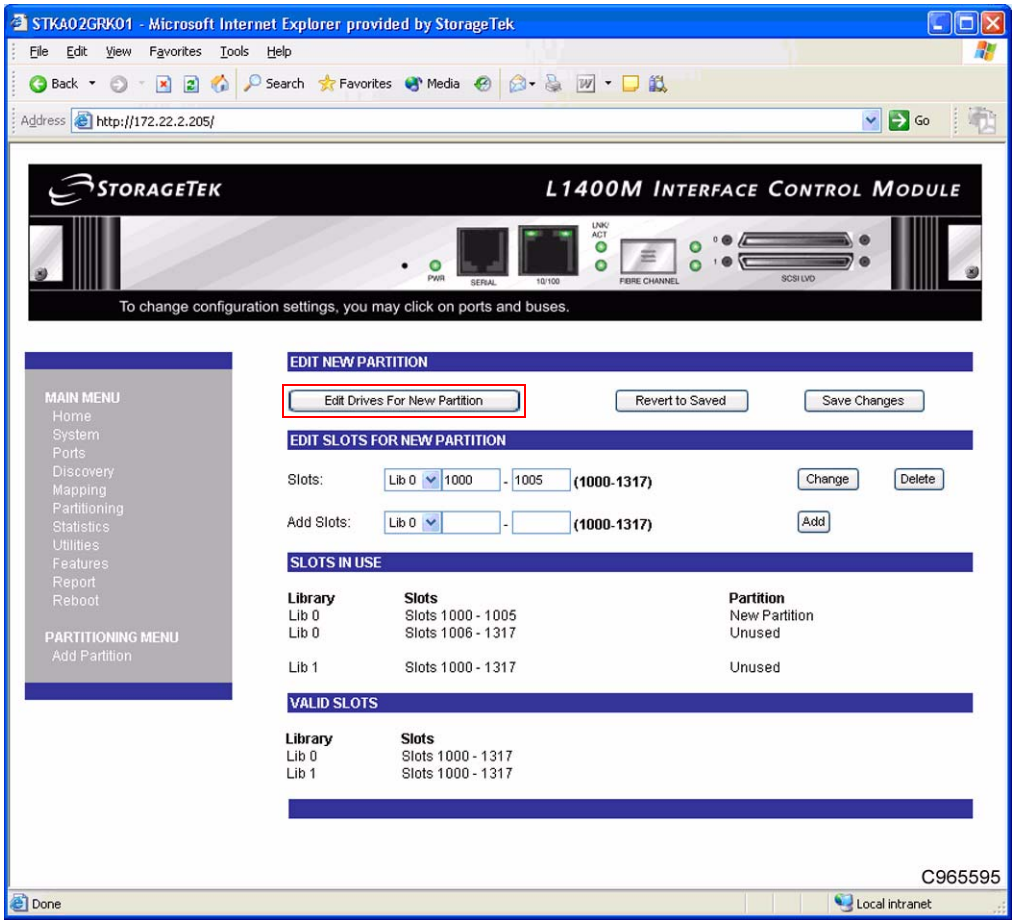
Utilities
Features
Report
Reboot
PARTITIONING MENU
Add Partition
EDIT NEW PARTITION
Edit Drives For New Partition
Revert to Saved
Save Changes
EDIT SLOTS FOR NEW PARTITION
Slots: Lib 0 1000 - 1005 (1000-1317)
Change
Delete
Add Slots: Lib 0 - (1000-1317)
Add
SLOTS IN USE
Library Slots Partition
Lib 0 Slots 1000 - 1005 New Partition
Lib 0 Slots 1006 - 1317 Unused
Lib 1 Slots 1000 - 1317 Unused
VALID SLOTS
Library Slots
Lib 0 Slots 1000 - 1317
Lib 1 Slots 1000 - 1317
C965595
Done
Local intranet

15. Click the `Edit Drives for New Partition` button.

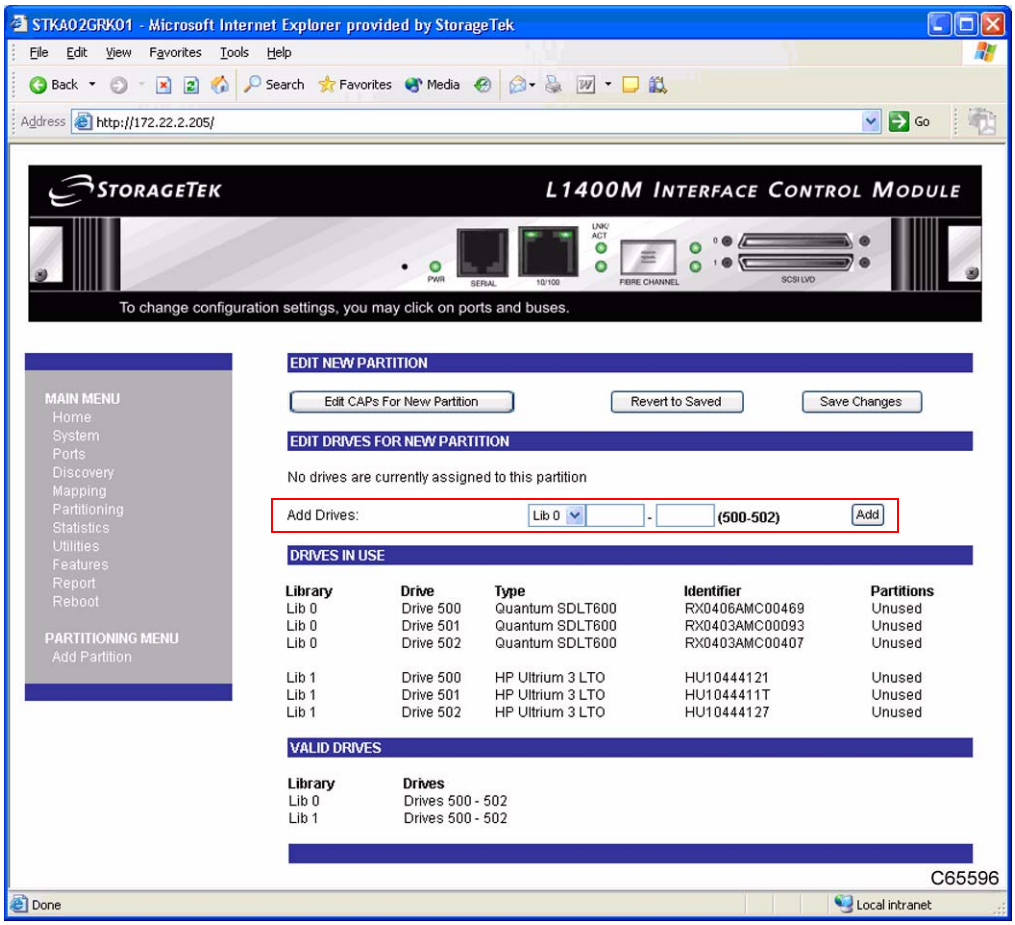
    Note: You must assign at least one drive to the partition.



16. The Edit Drives for New Partition screen appears.

Note: The `Drives in Use` list shows mapping information for each drive in the library. Drives mapped to a partition show the partition number in the `Partition` column. Since no drives have been assigned, the figure below shows Unused for all drives.

The `Valid Drives` list shows all discovered drives.



17. In the `Add Drives` line:

a. Select the desired library from the drop-down list (Lib 0 or Lib 1)

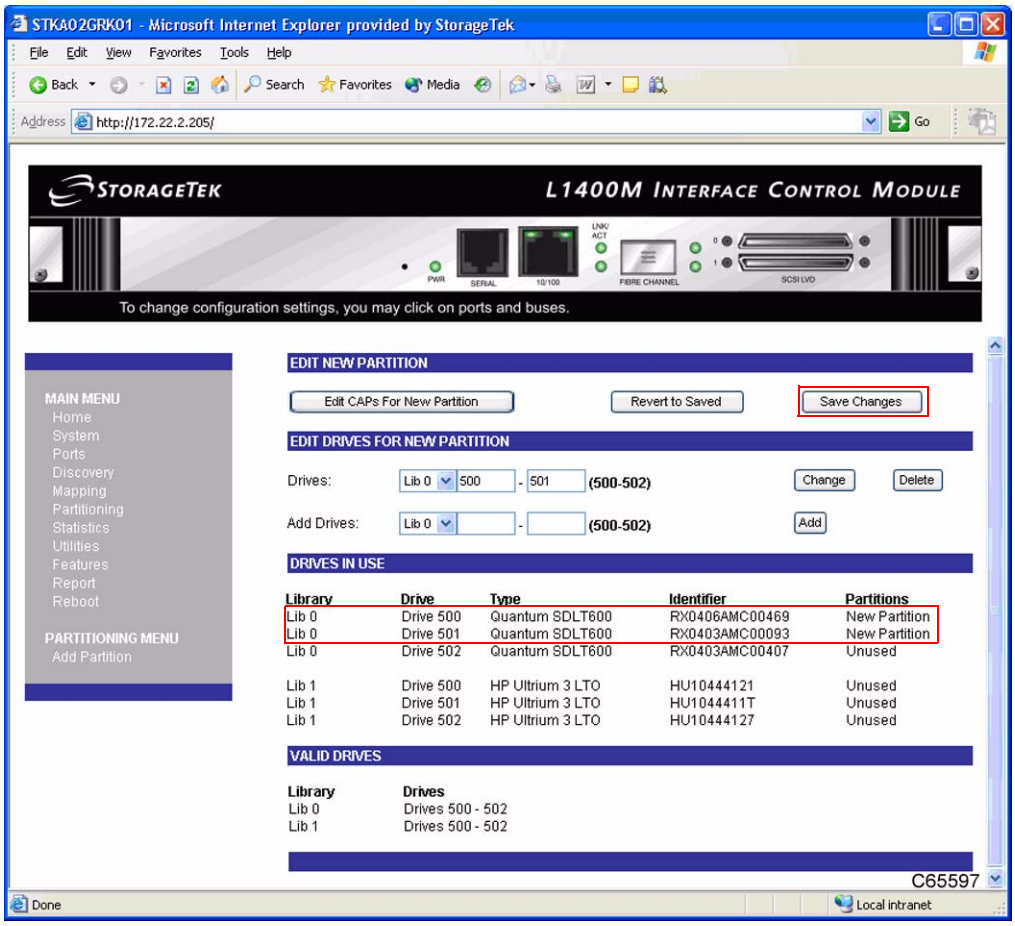
b. Enter a range of drives in the text entry boxes. Valid drives are shown in bold next the second text entry box.

Notes: Enter the starting drive number in the first box and the ending drive number in the second box. To enter only one drive, enter the same drive number in both boxes.

If your entry exceeds the available drives, an error message appears. Acknowledge the message and reenter your drive range.

18. When finished, click the `Add` button.

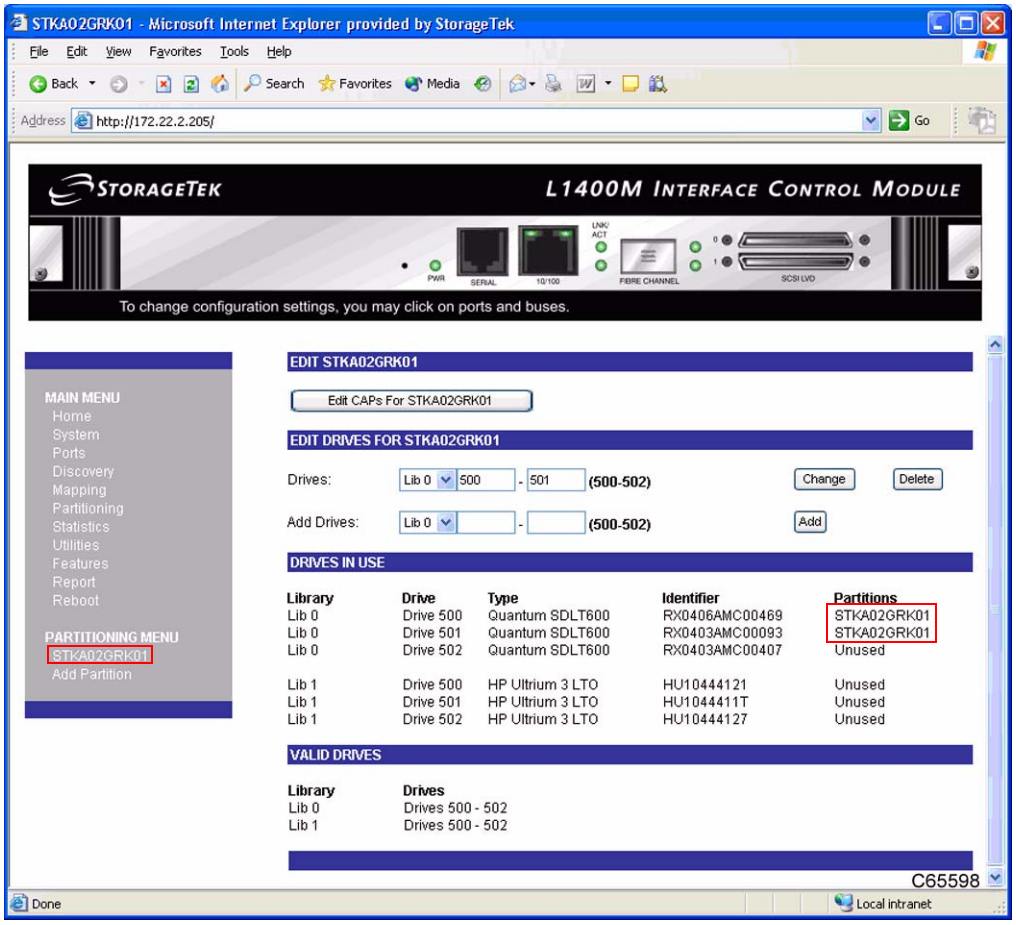
19. The `Partition` column updates with `New Partition` for the assigned drive(s).



20. Click the `Save Changes` button.

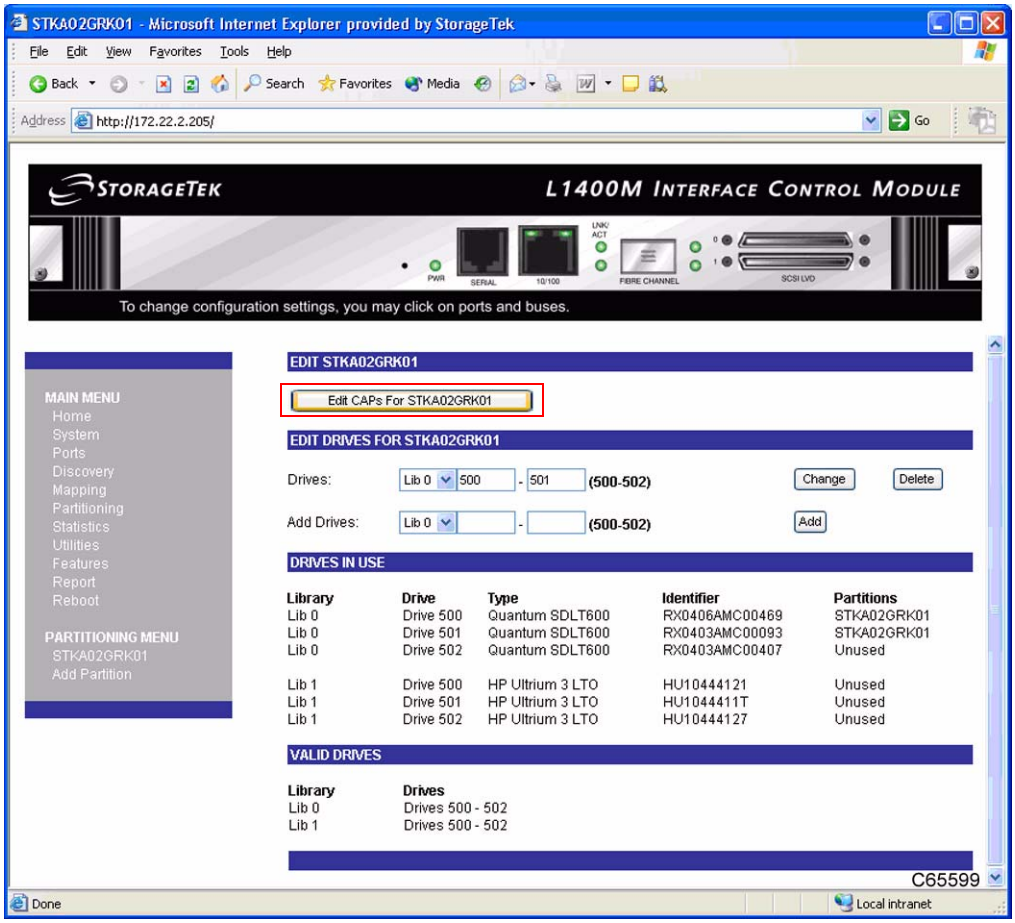
21. The partition name appears in the PARTITIONING MENU and the `Partition` column updates with the partition name for the assigned drives.

    Note: Partition names are in the form `STKSSSSSSNN`, where `STK` represents Sun/StorageTek, `SSSSSS` represents the serial number of the control module, SN3300 router, or library; and `NN` represents the partition number. In this example, the name of partition 2 for this control module would be `STKA02GRK02`.



Assign CAP Slots to the Partition

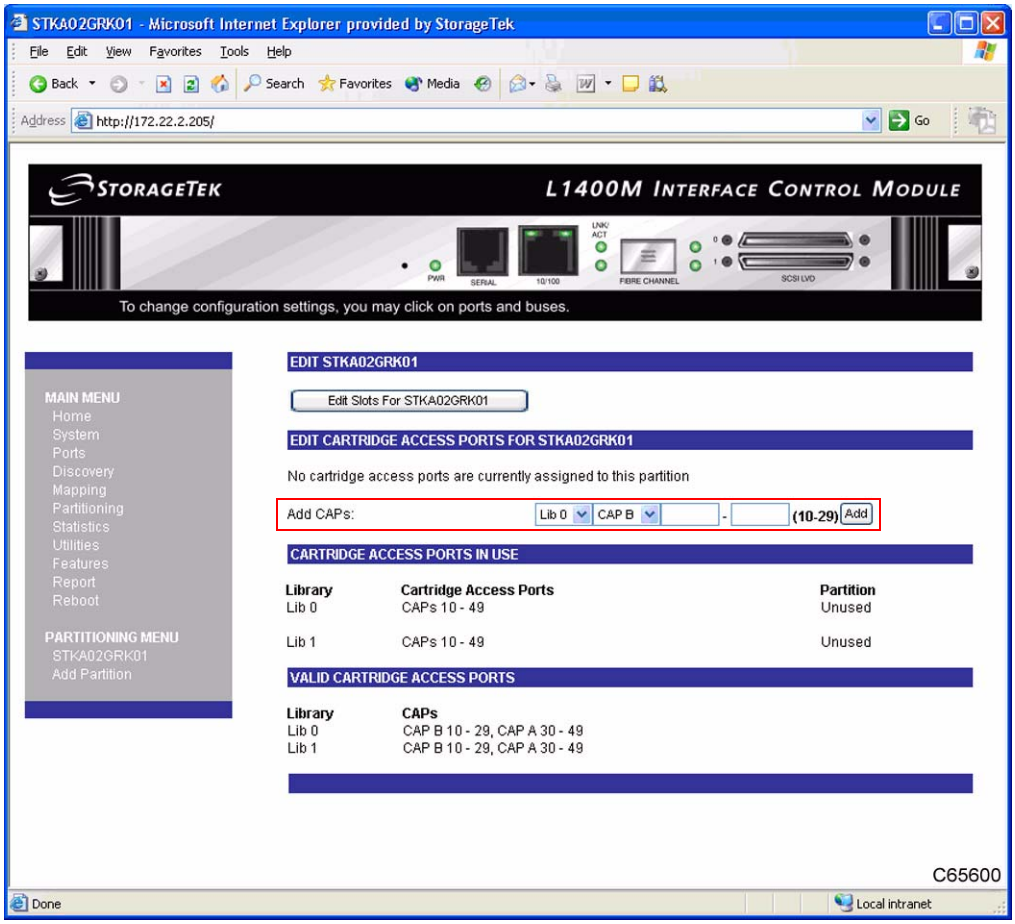
22. Click the `Edit CAPs for STKA02GRK01` button.



23. The Edit Cartridge Access Ports for STKA02GRK01 screen appears.

    Note: The `Cartridge Access Ports in Use` list shows CAP cell mapping information.

    `Valid Cartridge Access Ports` displays available CAP cells.



24. In the `Add CAPs` line:

    a. Select the desired library from the drop-down list (Lib 0 or Lib 1)

    b. Select the desired CAP (CAP A or CAP B)

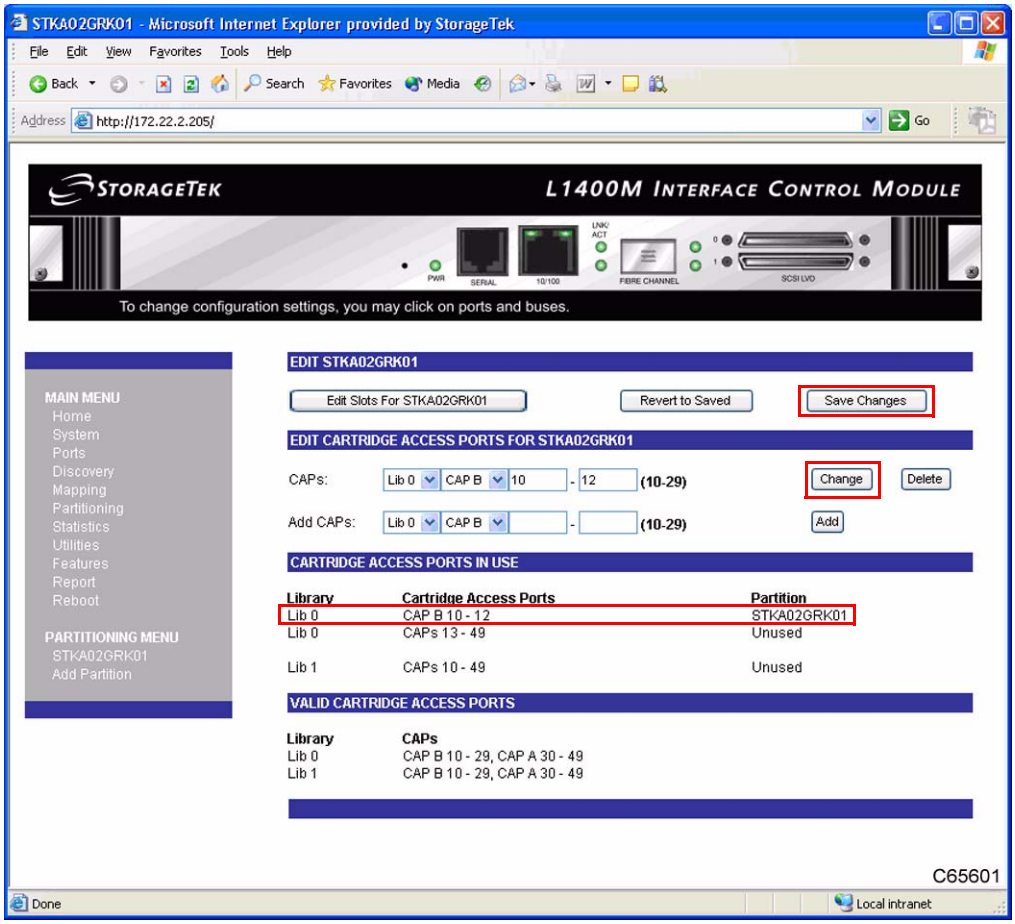
    c. Enter a range of CAP cells in the text entry boxes. Valid cells are shown in bold next the second text entry box.

    Note: Enter the starting CAP cell address in the first box and the ending CAP cell address in the second box. To enter only one cell, enter the same cell address in both boxes.

    If your entry exceeds the available cells, an error message appears. Acknowledge the message and reenter your cell address range.

25. When finished, click the Add button.

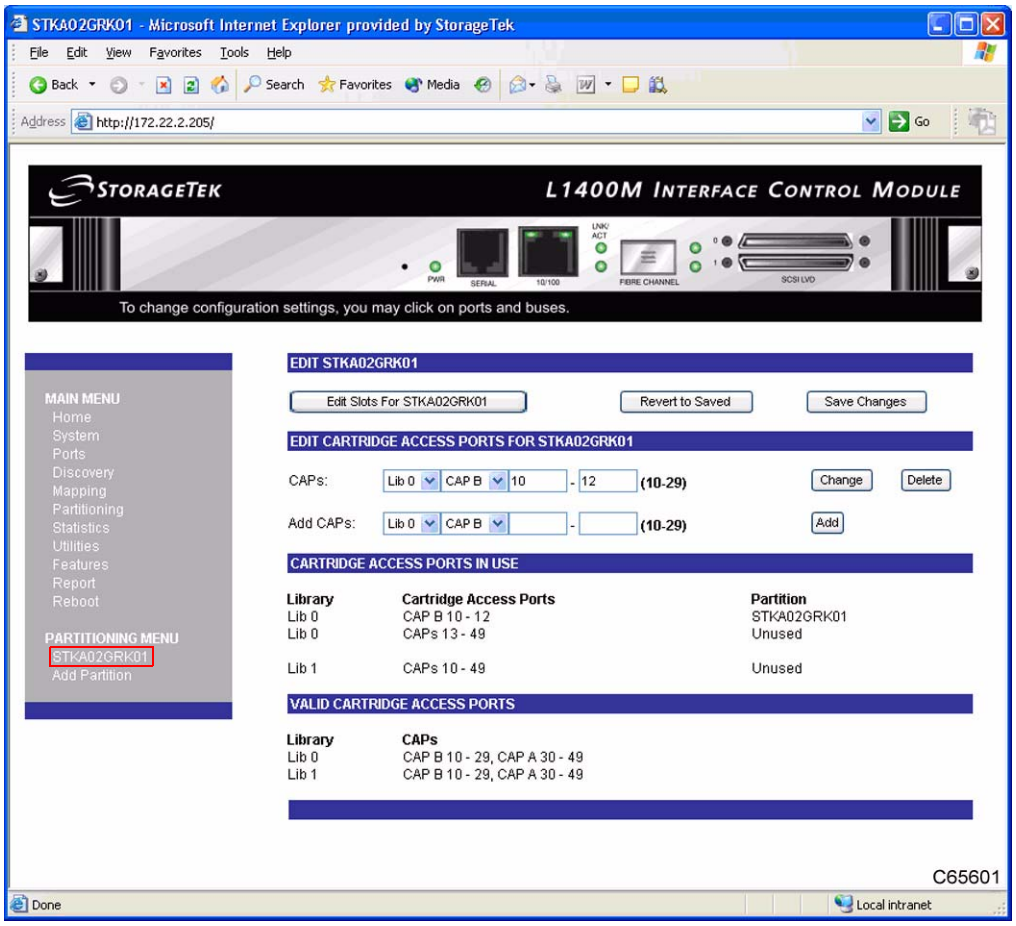
26. The `Cartridge Access Ports In Use` list updates with assigned CAP cells and partition name.



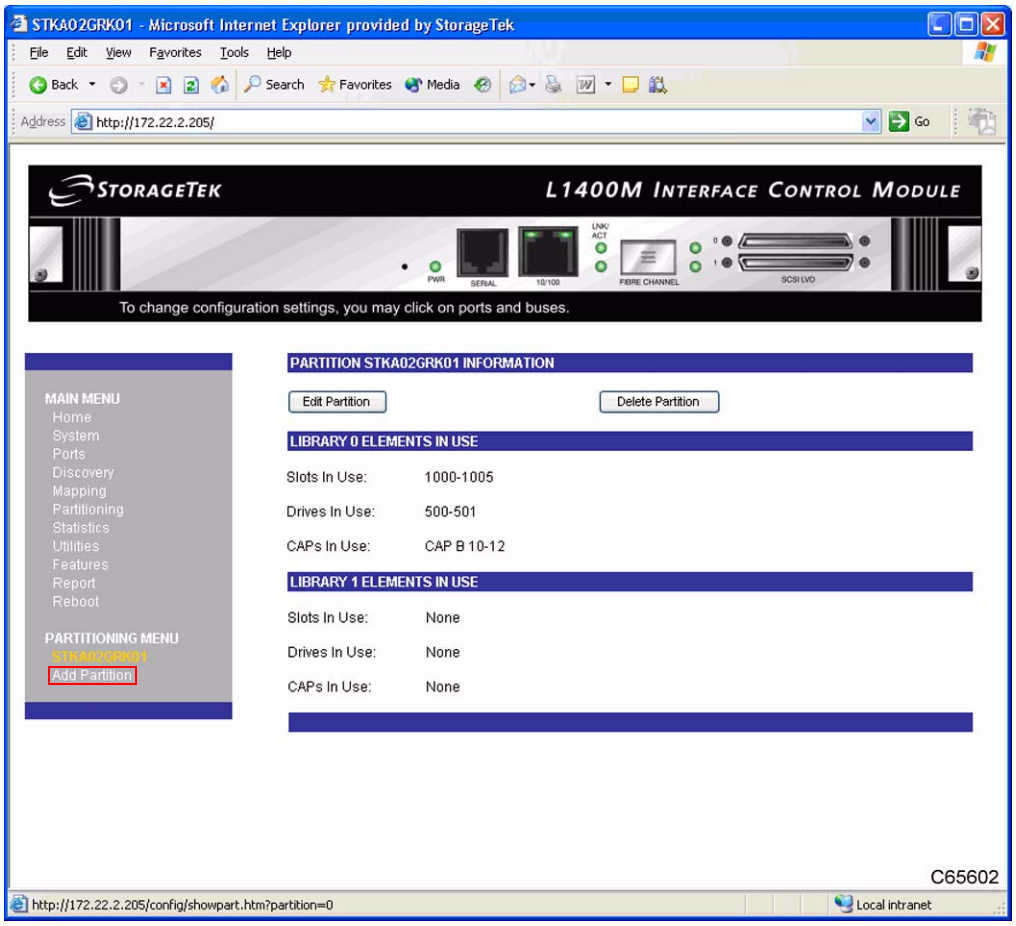
a. If you need to make a correction, enter it on the `CAPs` line and then click the `Change` button.

b. If your entries are correct, click the `Save Changes` button.

27. To view the saved partition information, click the partition name in the MAIN MENU.



28. The `Partition Information` screen appears, showing the current partition configuration.



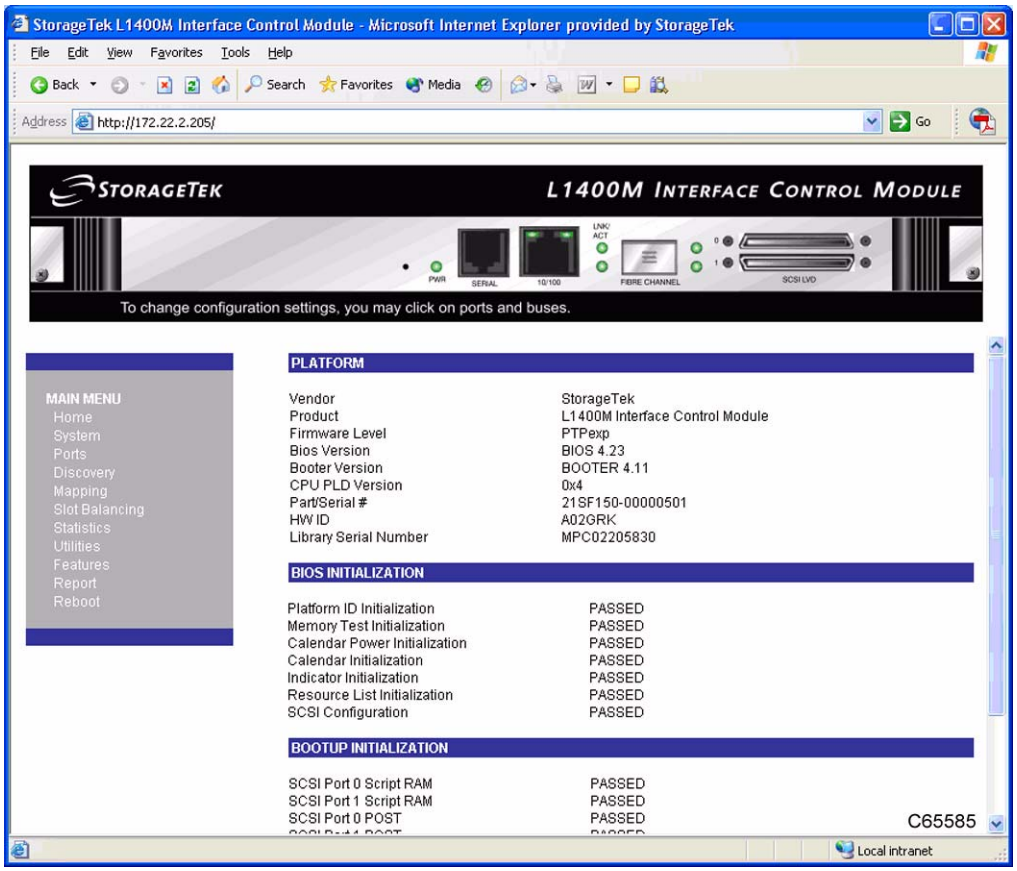
29. To add another partition, click `Add Partition` at the bottom of the `PARTITIONING MENU` and return to step10.

Add a Partition

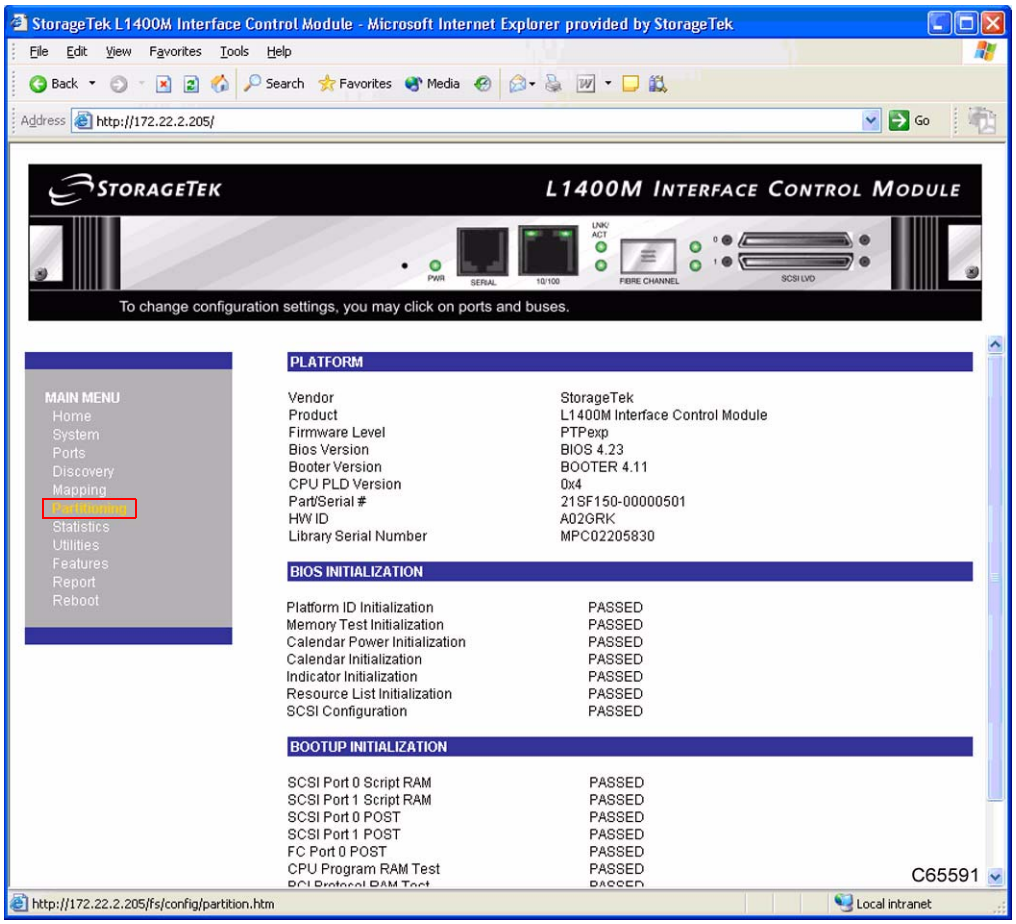
This procedure shows how to add a partition after the first one has been created. You can create up to six partitions.

1. Connect your PC to the router's Ethernet port using an Ethernet crossover cable.
2. Using a standard internet browser such as Microsoft Internet Explorer or Netscape Navigator, open the control module's web-based interface by typing its IP address (`1.1.1.1` default for new control module) in the browser's `Address` line. The control module's home page appears:

Note: If you are adding a partition on an L1400M library with SN3300 firmware 5.6.43 or higher, the SN3300 Fibre Channel Router is displayed in the graphic at the top of the screen. In addition, the PLATFORM area on the home. page shows SN3300 information. All other portions of the following screens are identical.

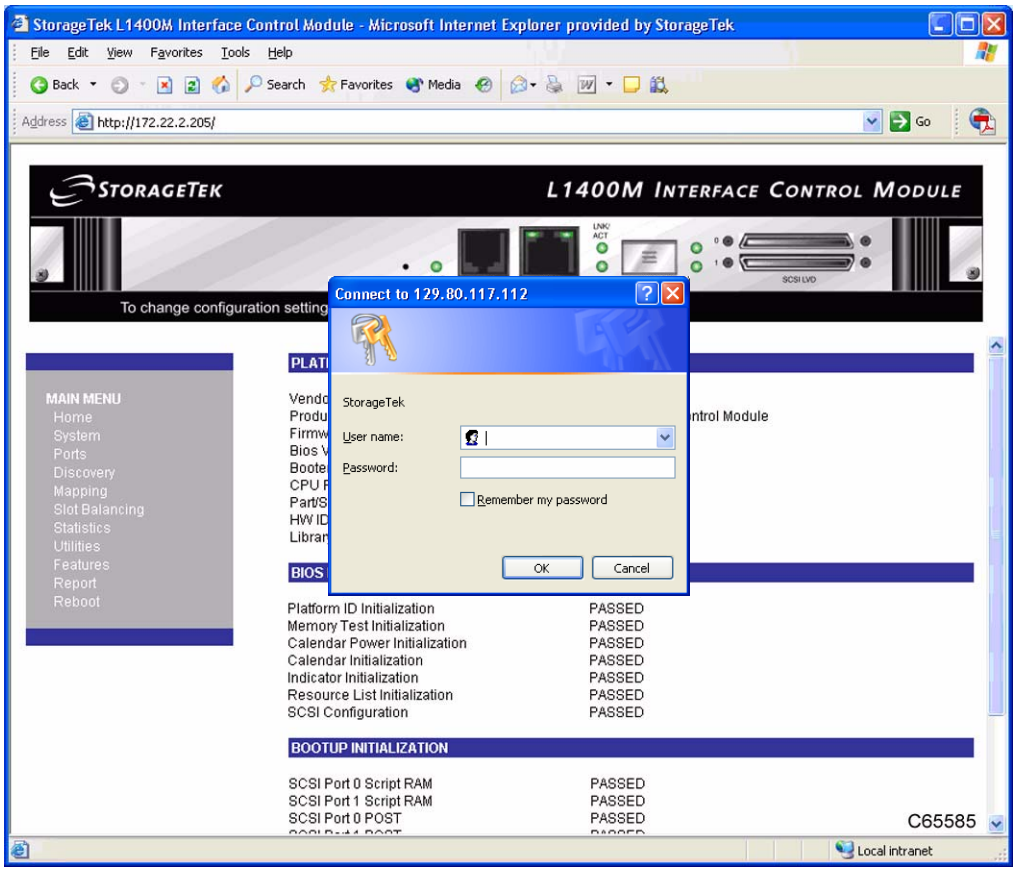


3. In the `MAIN MENU`, click `Partitioning`.



4. The Enter Network Password dialog box appears.

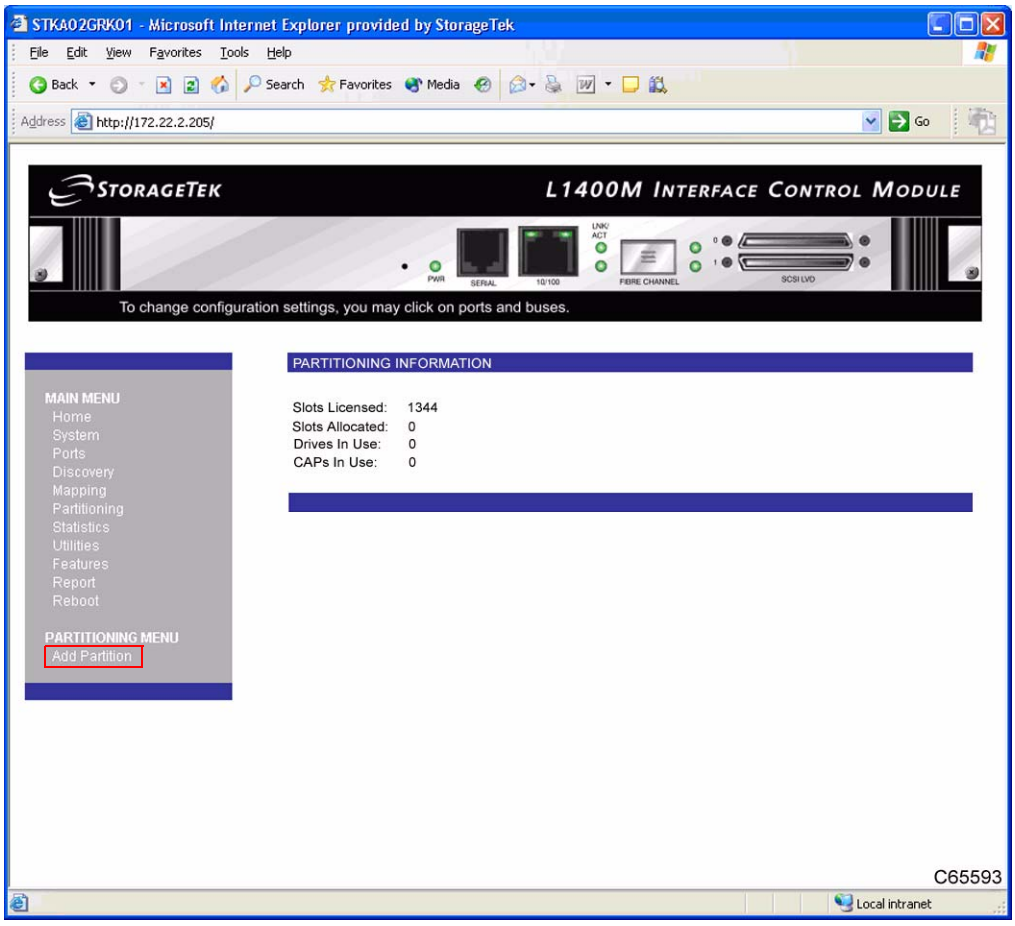
Note: If you are already logged into the control module, the Partitioning menu appears instead of the Enter Network Password dialog box, go to step 6.



5. Enter User Name and Password:

   User Name: `root`
   Password: `password`

6. The Partitioning menu appears. Click `Add Partition` in the `PARTITIONING MENU`.

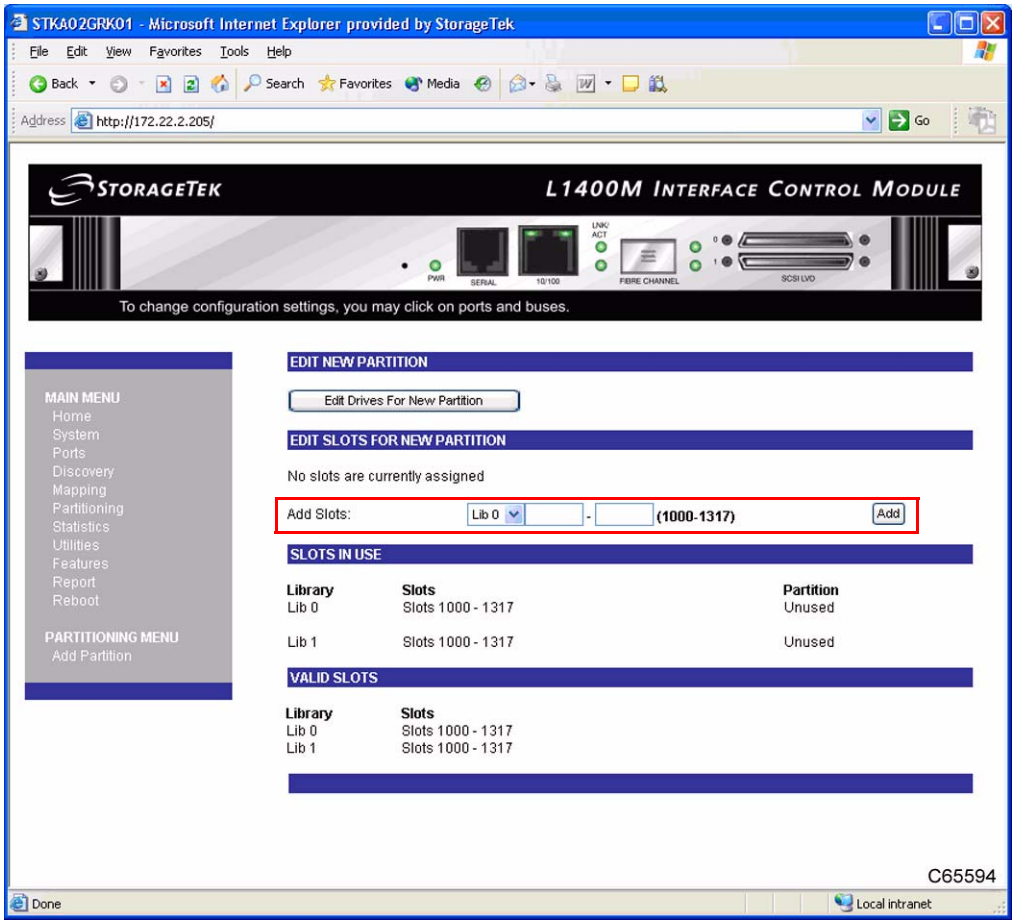


7. The `Edit New Partition` screen appears.

   Note: The `Slots In Use` list displays slots that have been mapped for Library 0, and Library 1 (if an L1400P1 is connected with a pass-thru port). Since we are configuring the first partition, `Unused` is displayed in the `Partition` column for both libraries in the figure below.

   Lib 0 is the L1400M/L1400M1 library and Lib 1 is the L1400P1 library.

   The `Valid Slots` list shows the slots that have been discovered for Library 0 (and Library 1 if an L1400P1 is connected with a pass-thru port).



8. In the Add Slots line, select the desired library (Lib 0 or Lib 1) from the drop-down menu, then enter the desired range of cell addresses.

   Note: Valid cell addresses are shown in bold next to the second text entry box. Refer to "Library Elements and Diagrams" on page D-62 for cell address

locations. Enter the starting cell address in the first box and the ending cell address in the second box.

If your entry exceeds the available slots, an error message appears. Acknowledge the message and reenter the cell range.

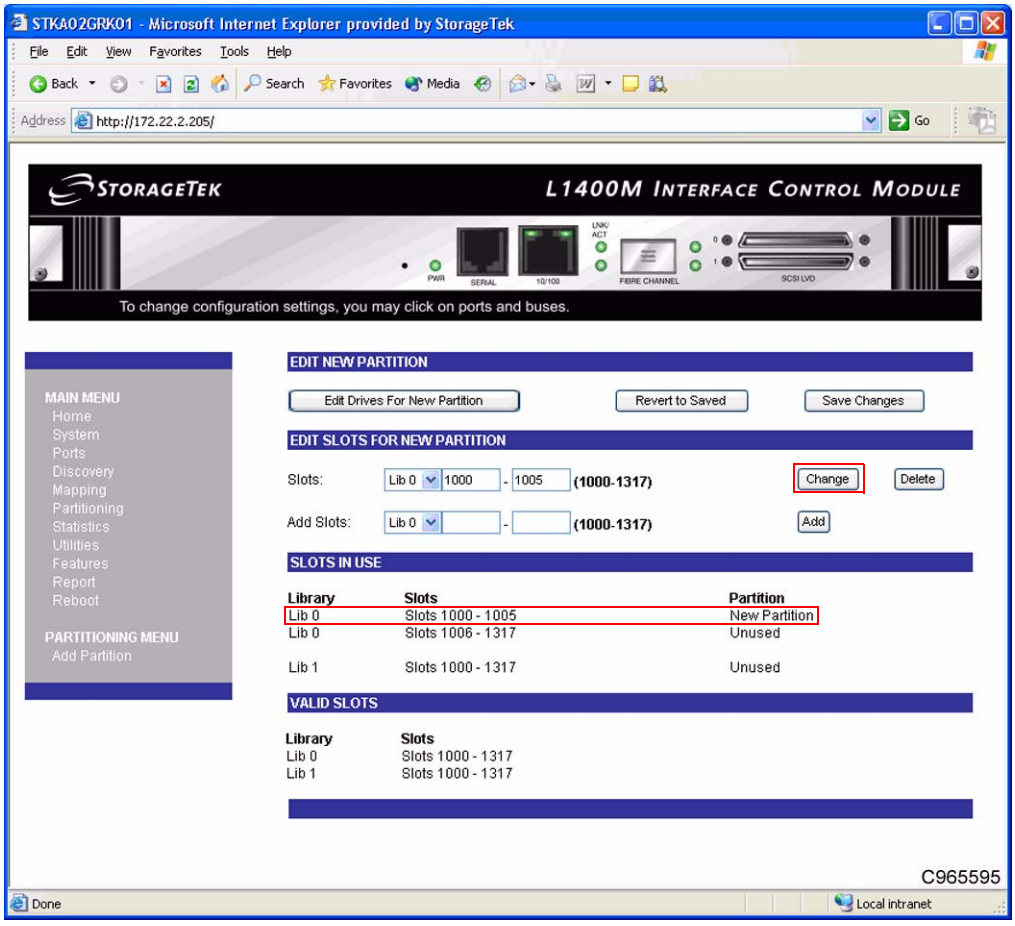
9. When you are finished, click the `Add` button.

10. The new partition appears in the `Slots in Use` section, but will not have a partition number until a drive is assigned to the partition.

    Note: If you wish to change your entry, enter the new cell range and click the `Change` button.

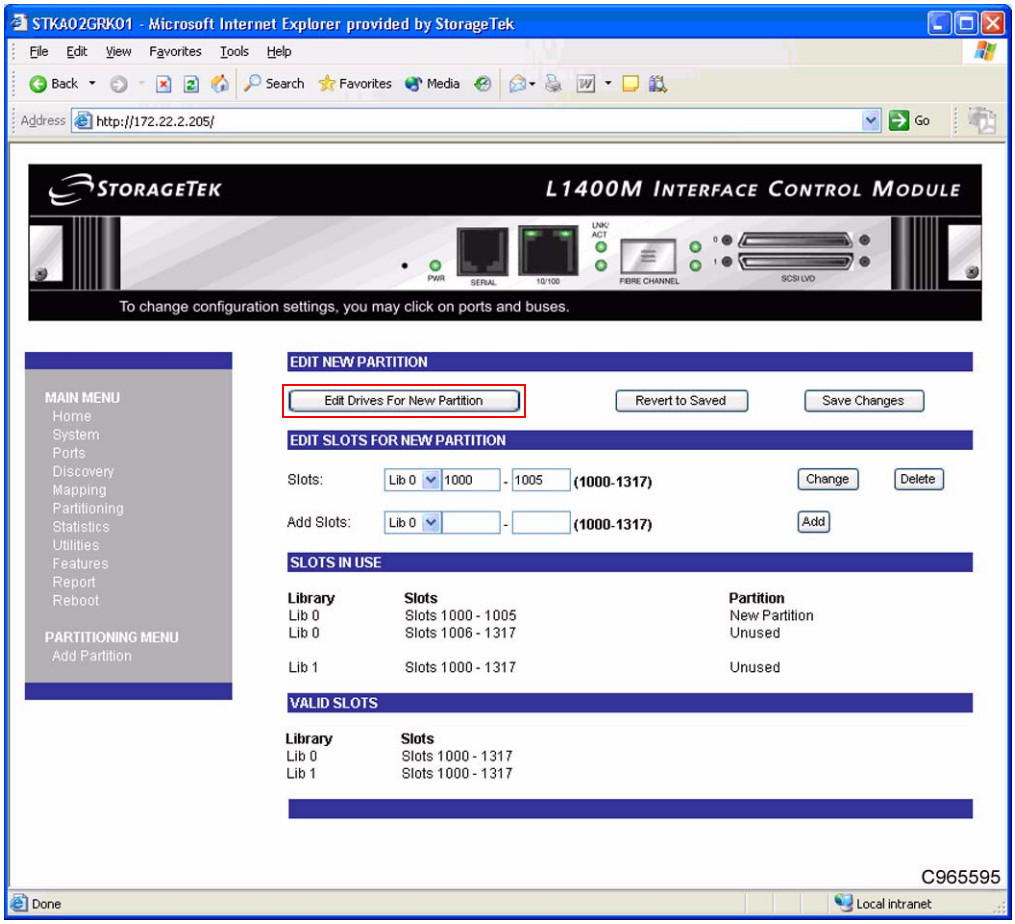
11. To enter additional cell ranges, return to step 7.

    Note: You can add up to 10 slot ranges in each partition in this manner.



12. Click the `Edit Drives for New Partition` button.

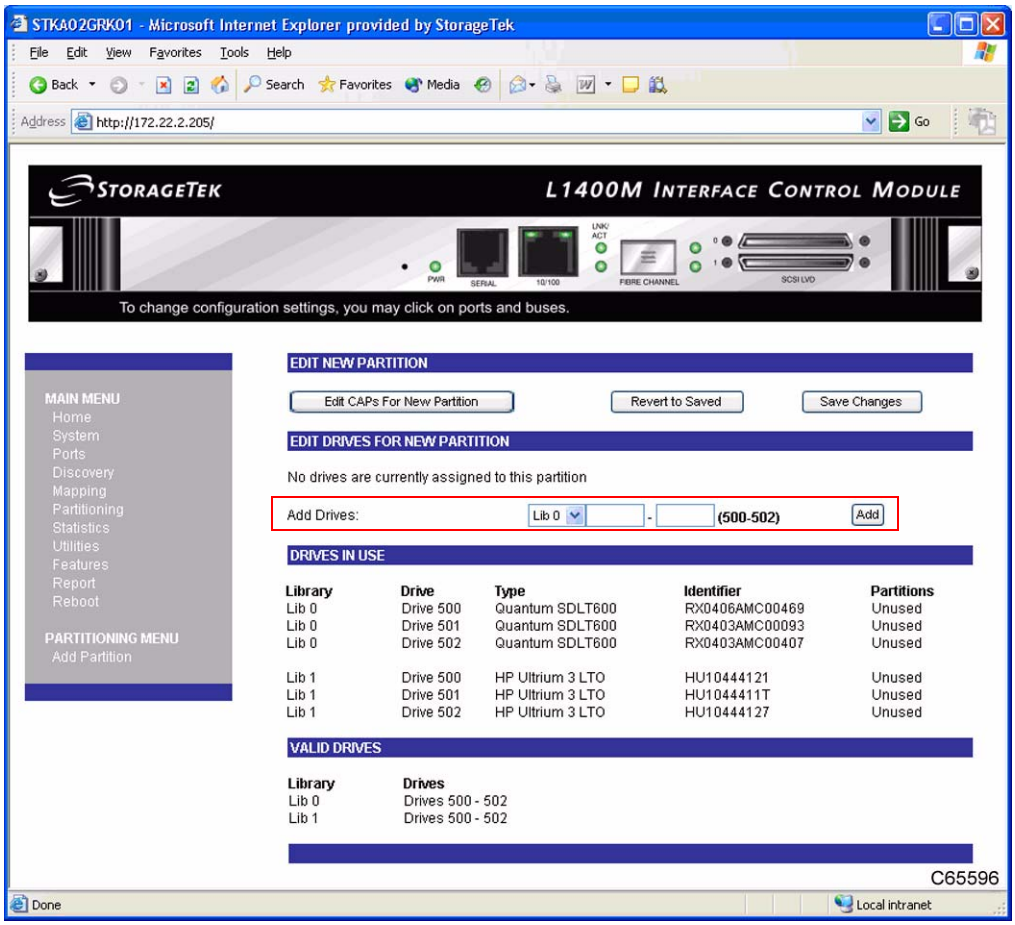
    Note: You must assign at least one drive to the partition.



13. The Edit Drives for New Partition screen appears.

    Note: The `Drives in Use` list shows mapping information for each drive in the library. Drives mapped to a partition show the partition number in the `Partition` column. Since no drives have been assigned, the figure below shows Unused for all drives.

    The `Valid Drives` list shows all discovered drives.



14. In the `Add Drives` line:

    a. Select the desired library from the drop-down list (Lib 0 or Lib 1)

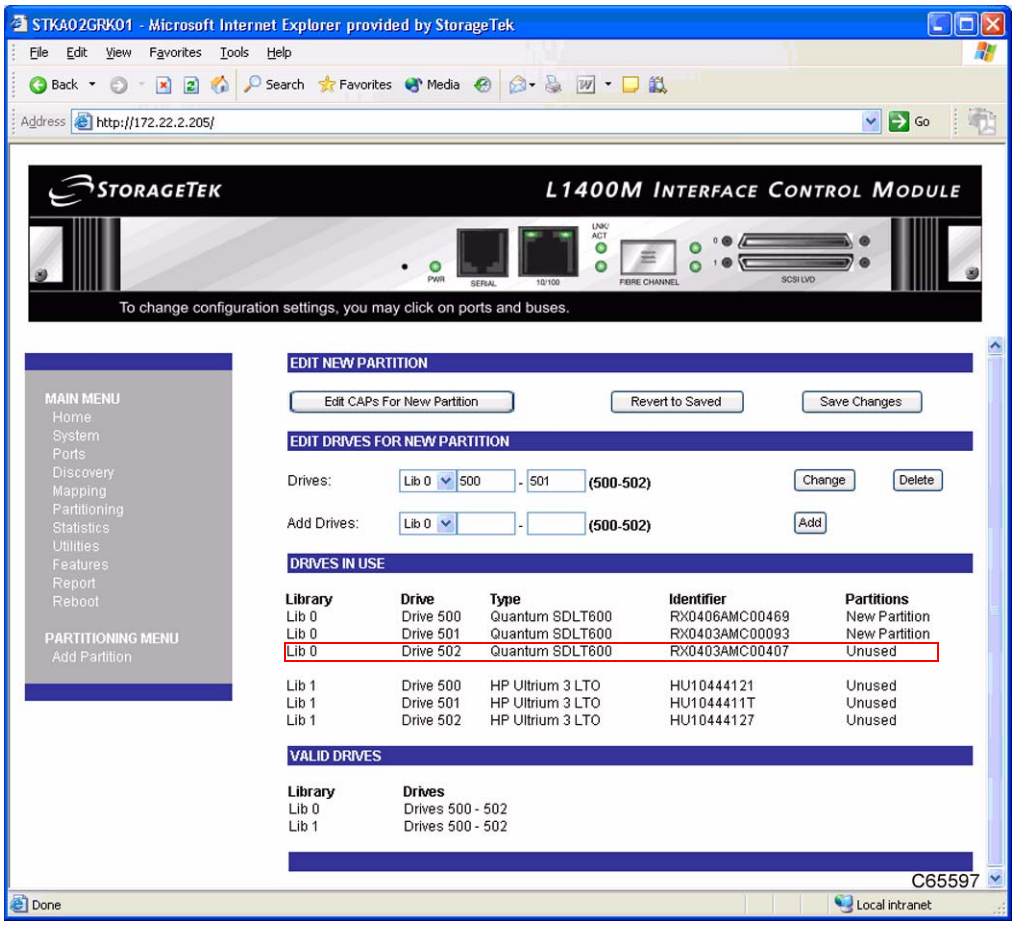
    b. Enter a range of cells in the text entry boxes. Valid cell addresses are shown in bold next the second text entry box.

    Note: Enter the starting drive number in the first box and the ending drive number in the second box. To enter only one drive, enter the same drive number in both boxes.

    If your entry exceeds the available drives, an error message appears. Acknowledge the message and reenter your drive range.

15. When finished, click the `Add` button.

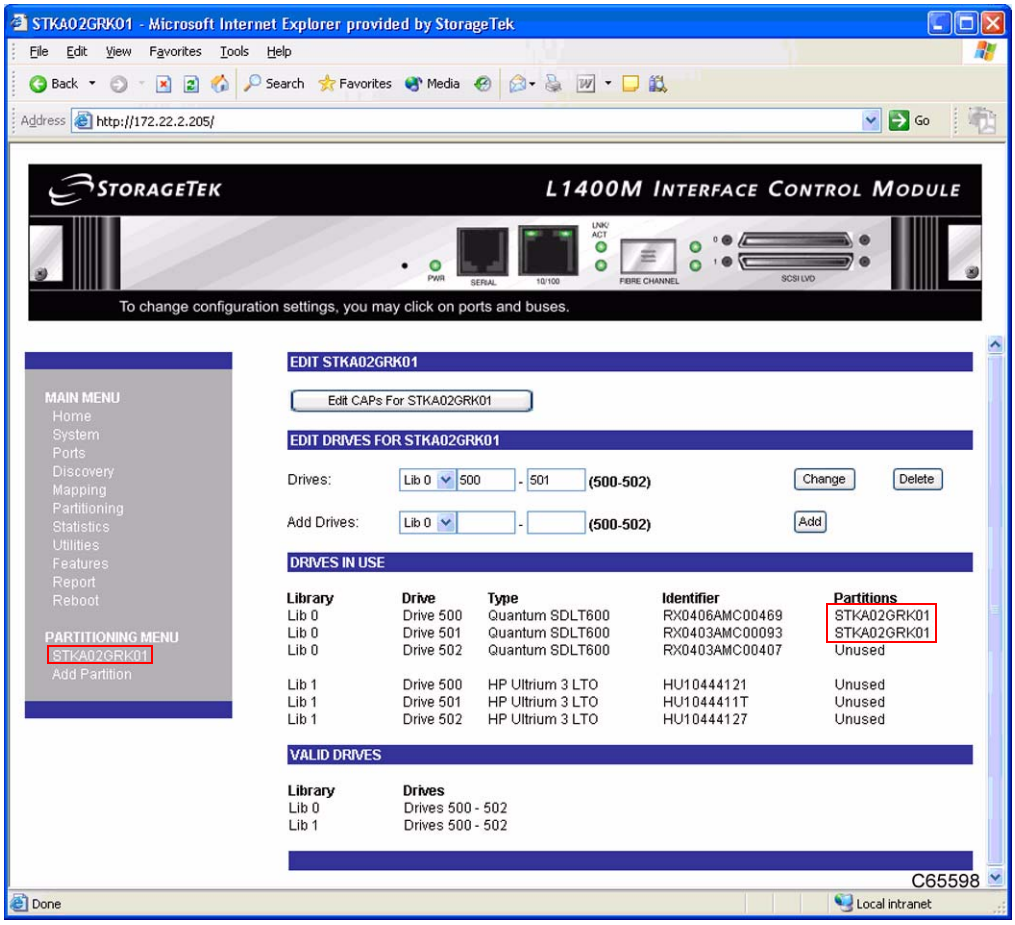
16. The `Partition` column updates with `New Partition` for the assigned drive(s).



17. Click the `Save Changes` button.

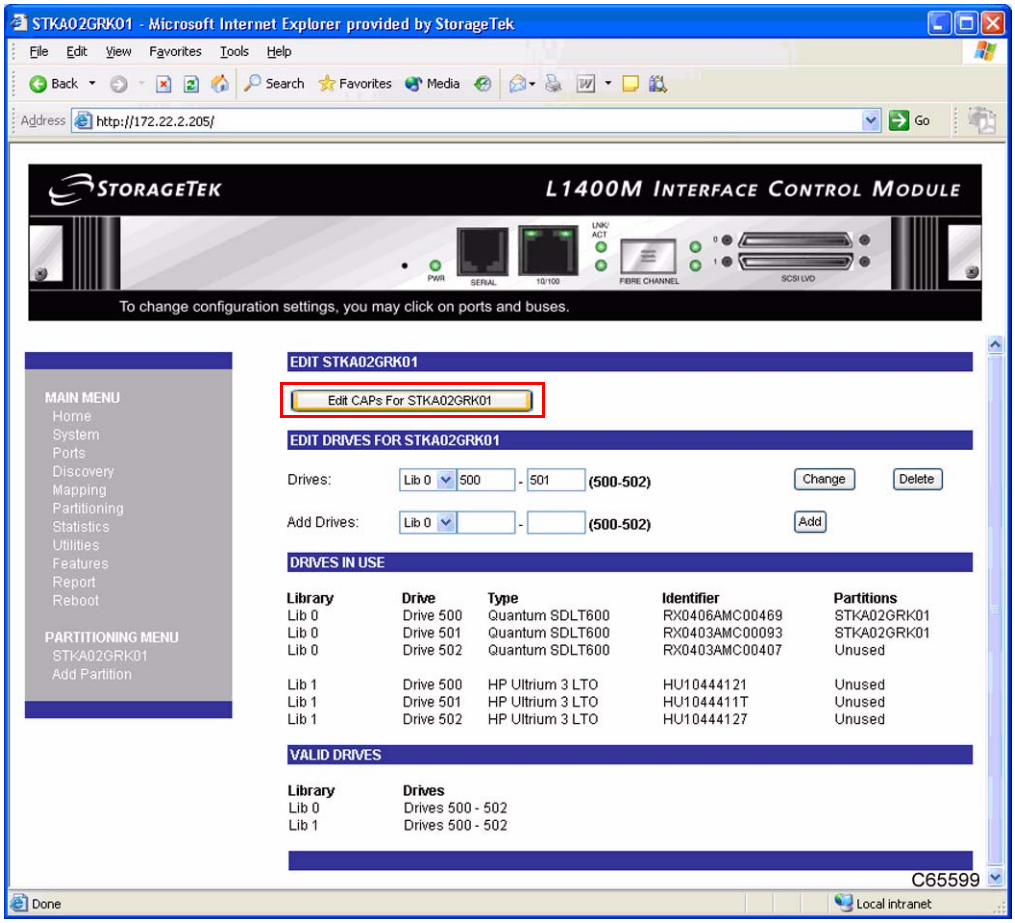
18. The partition name appears in the PARTITIONING MENU and the `Partition` column updates with the partition name for the assigned drives.

    Note: Partition names are in the form `STKSSSSSSNN`, where `STK` represents Sun/StorageTek, `SSSSSS` represents the serial number of the control module, SN3300 router, or library; and `NN` represents the partition number. In this example, the name of partition 2 for this control module would be `STKA02GRK02`.



Assign CAP Slots to the Partition

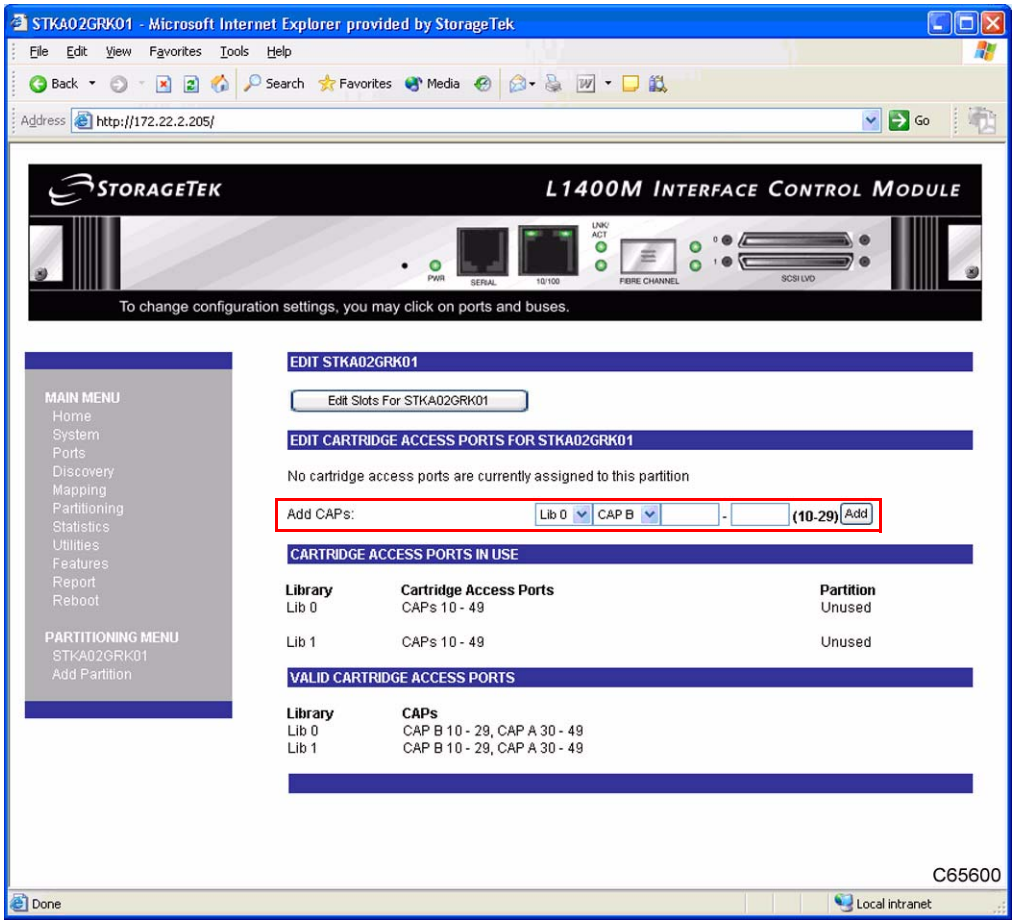
19. Click the `Edit CAPs for STKA02GRK02` button.



20. The Edit Cartridge Access Ports for STKA02GRK02 screen appears.

    Note: The `Cartridge Access Ports in Use` list shows CAP cell mapping information.

    `Valid Cartridge Access Ports` displays available CAP cells.



21. In the `Add CAPs` line:

    a. Select the desired library from the drop-down list (Lib 0 or Lib 1)

    b. Select the desired CAP (CAP A or CAP B)

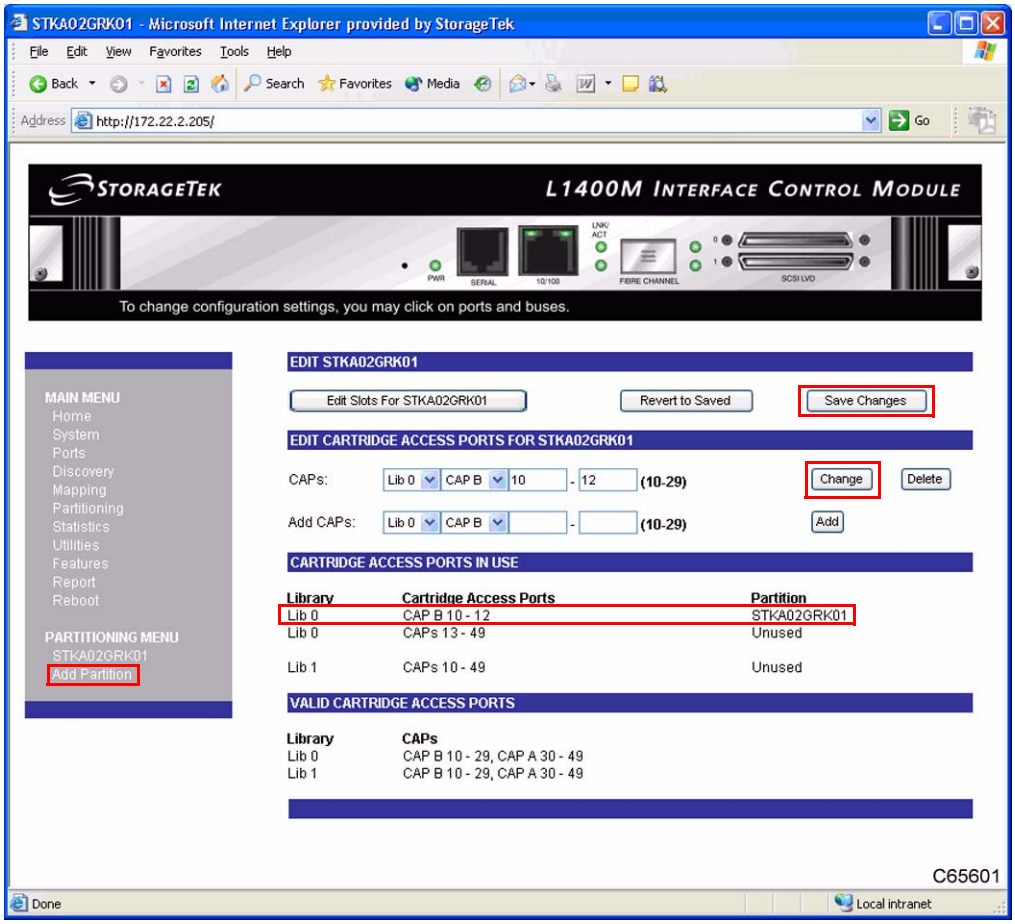
    c. Enter a range of CAP cells in the text entry boxes. Valid cells are shown in bold next the second text entry box.

    Note: Enter the starting CAP cell address in the first box and the ending CAP cell address in the second box. To enter only one cell, enter the same cell address in both boxes.

    If your entry exceeds the available cells, an error message appears. Acknowledge the message and reenter your cell address range.

22. When finished, click the Add button.

23. The `Cartridge Access Ports In Use` list updates with assigned CAP cells and partition name.



   a. If you need to make a correction, enter it on the `CAPs` line and then click the `Change` button.

   b. If your entries are correct, click the `Save Changes` button.

24. To add another partition, click `Add Partition` at the bottom of the `PARTITIONING MENU`.

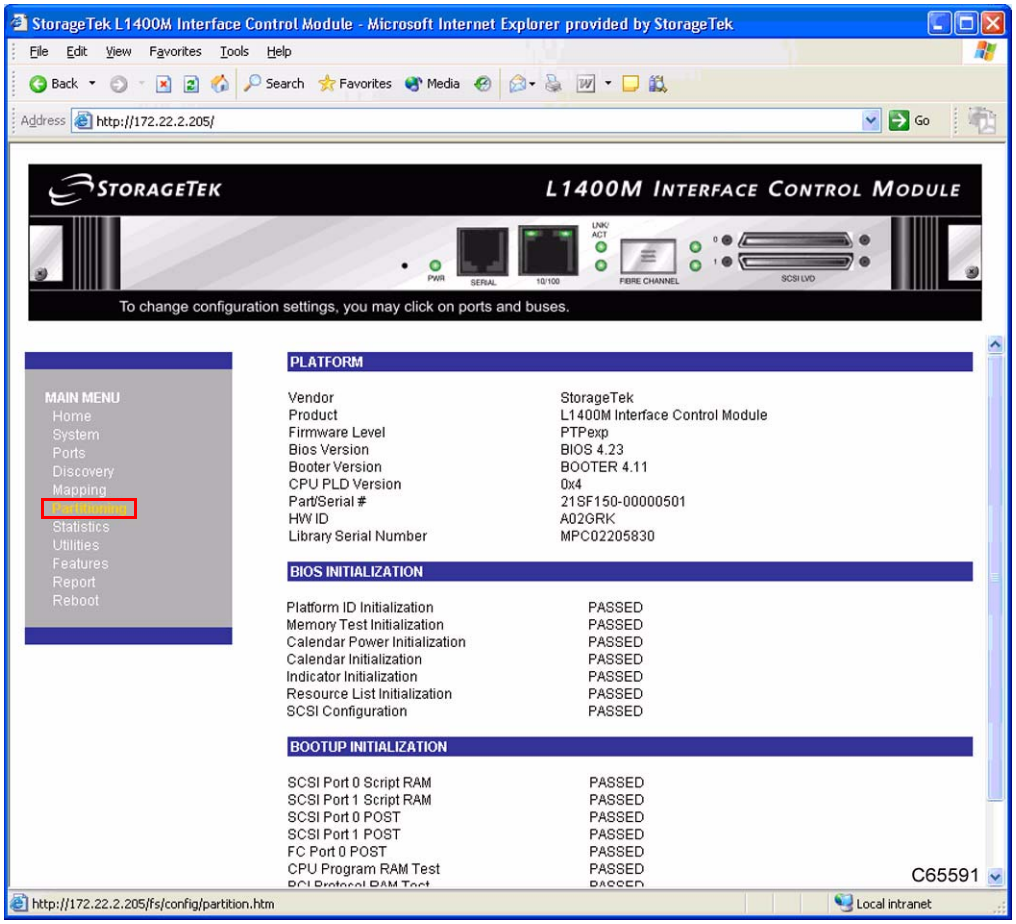
Delete a Partition

This procedure shows how to delete a partition.

1. Connect your PC to the router's Ethernet port using an Ethernet crossover cable.
2. Using a standard internet browser such as Microsoft Internet Explorer or Netscape Navigator, open the control module's web-based interface by typing its IP address (`1.1.1.1` default for new control module) in the browser's `Address` line. The control module's home page appears:

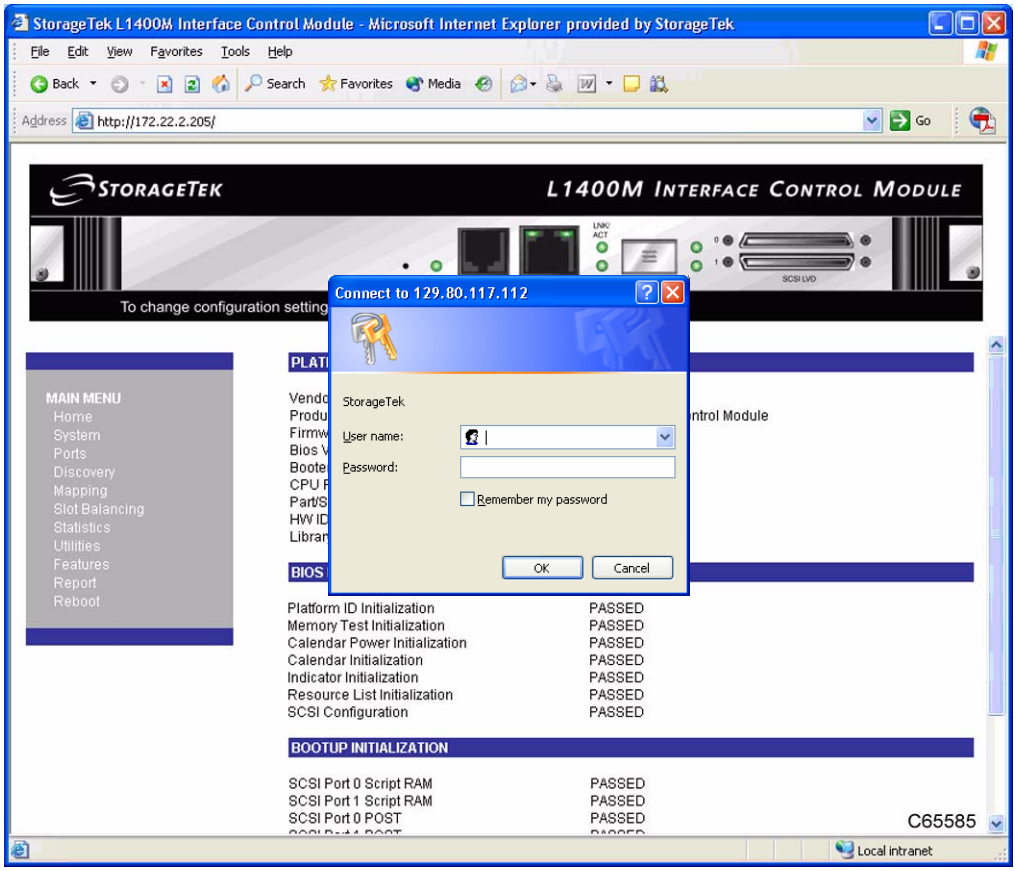
Note: If you are deleting a partition on an L1400M library with SN3300 firmware 5.6.43, or higher; the SN3300 Fibre Channel Router is displayed in the graphic at the top of the screen. In addition, the PLATFORM area on the home. page shows SN3300 information. All other portions of the following screens are identical.

3. In the `MAIN MENU`, click `Partitioning`.



4. The Enter Network Password dialog box appears.

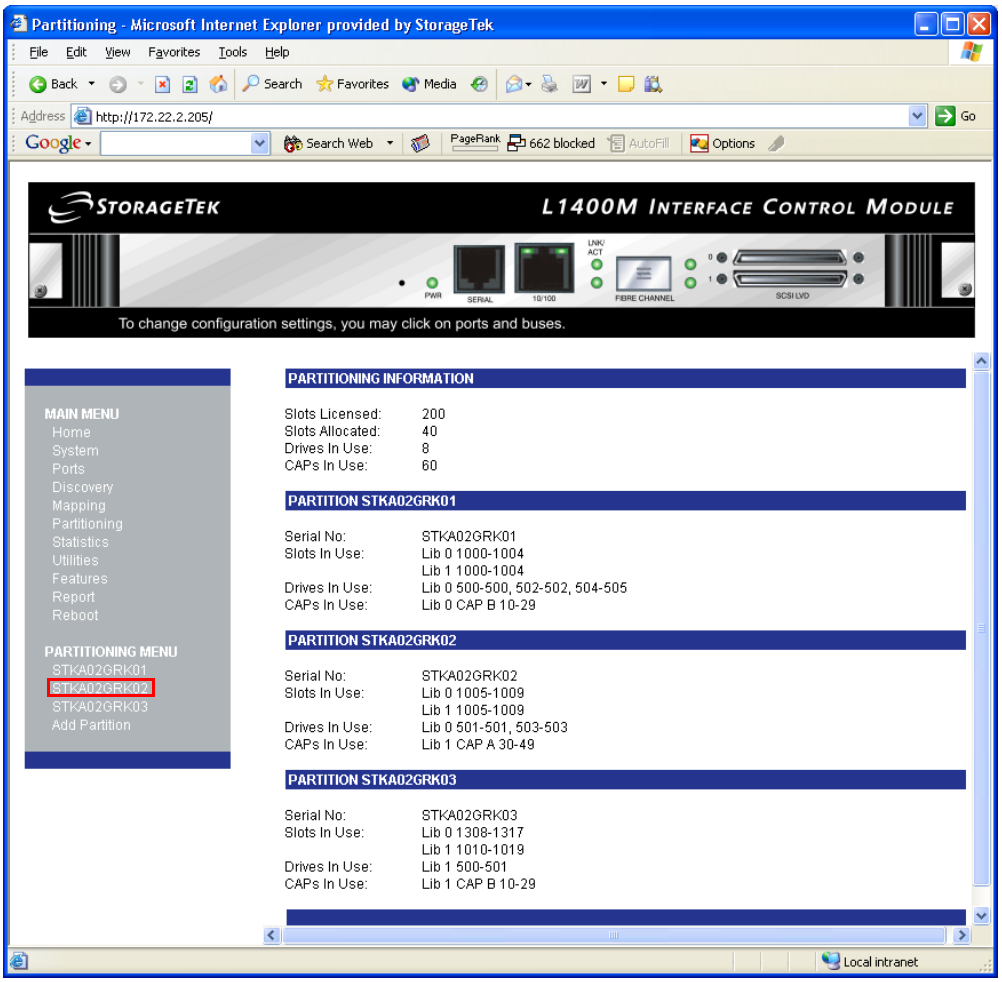
Note: If you are already logged into the control module, the Partitioning menu appears instead of the Enter Network Password dialog box, go to step 6.



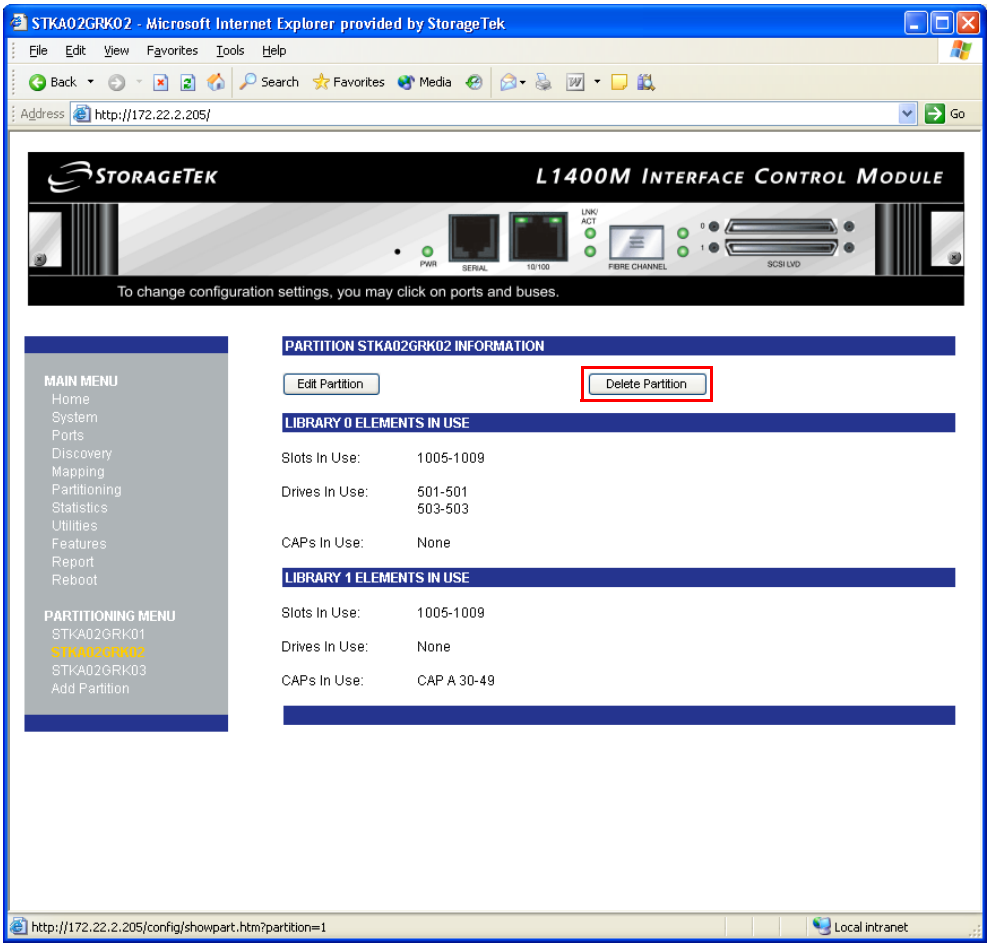
5. Enter User Name and Password:

   User Name: `root`
   Password: `password`

6. The Partitioning menu appears. In the PARTITIONING MENU, click the partition you wish to delete.



7. The information screen for the selected partition appears. Click the `Delete Partition` button.



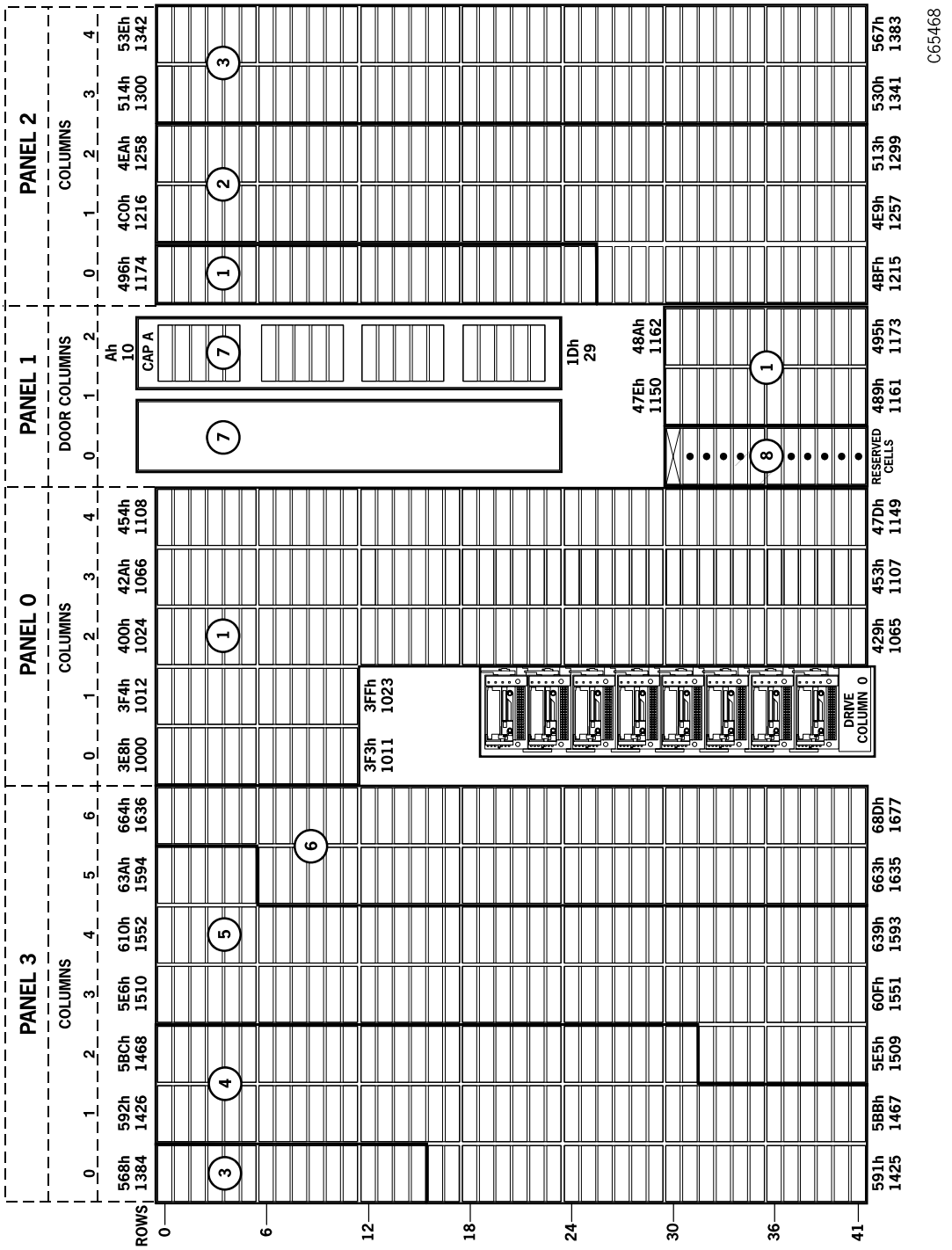
Library Elements and Diagrams

L1400M Library with SN3300 Firmware Version 5.6.10

Figure D-1 on page D-63 through Figure D-2 on page D-64 identify the L1400M library elements with SN3300 firmware version 5.6.10.

These wall diagrams show the SCSI element locations for all cell locations. The locations are noted at the top of the columns in hexadecimal (denoted by the "h" at the end of the number) and decimal.

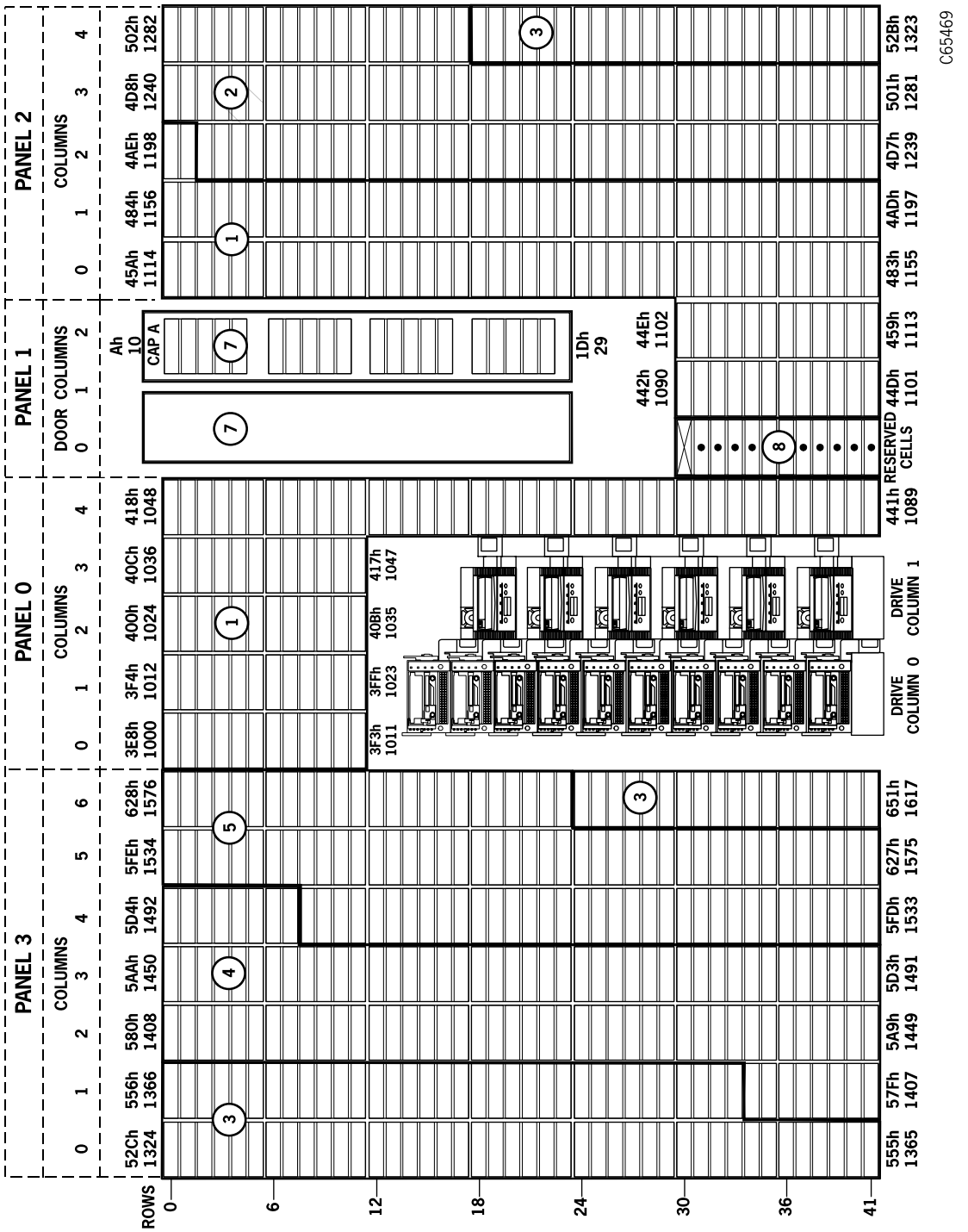
Figure D-1. L1400M Library Elements (One Drive Column, No PTP)



1. Initial 200 slots
2. 201-300 slots
3. 301-400 slots
4. 401-500 slots
5. 501-600 slots
6. 601-700 (678) slots
7. CAPs (B optional)
8. Reserved (cleaning/ diagnostic)

Note: This cell map applies to the L1400M library with SN3300 firmware version 5.6.10 only.

Figure D-2. L1400M Library Elements (Two Drive Columns, No PTP)



1. Initial 200 slots
2. 201-300 slots
3. 301-400 slots
4. 401-500 slots
5. 501-600 slots
6. 601-700 (678) slots
7. CAPs (B optional)
8. Reserved (cleaning/ diagnostic)

Note: This cell map applies to the L1400M library with SN3300 firmware version 5.6.10 only.

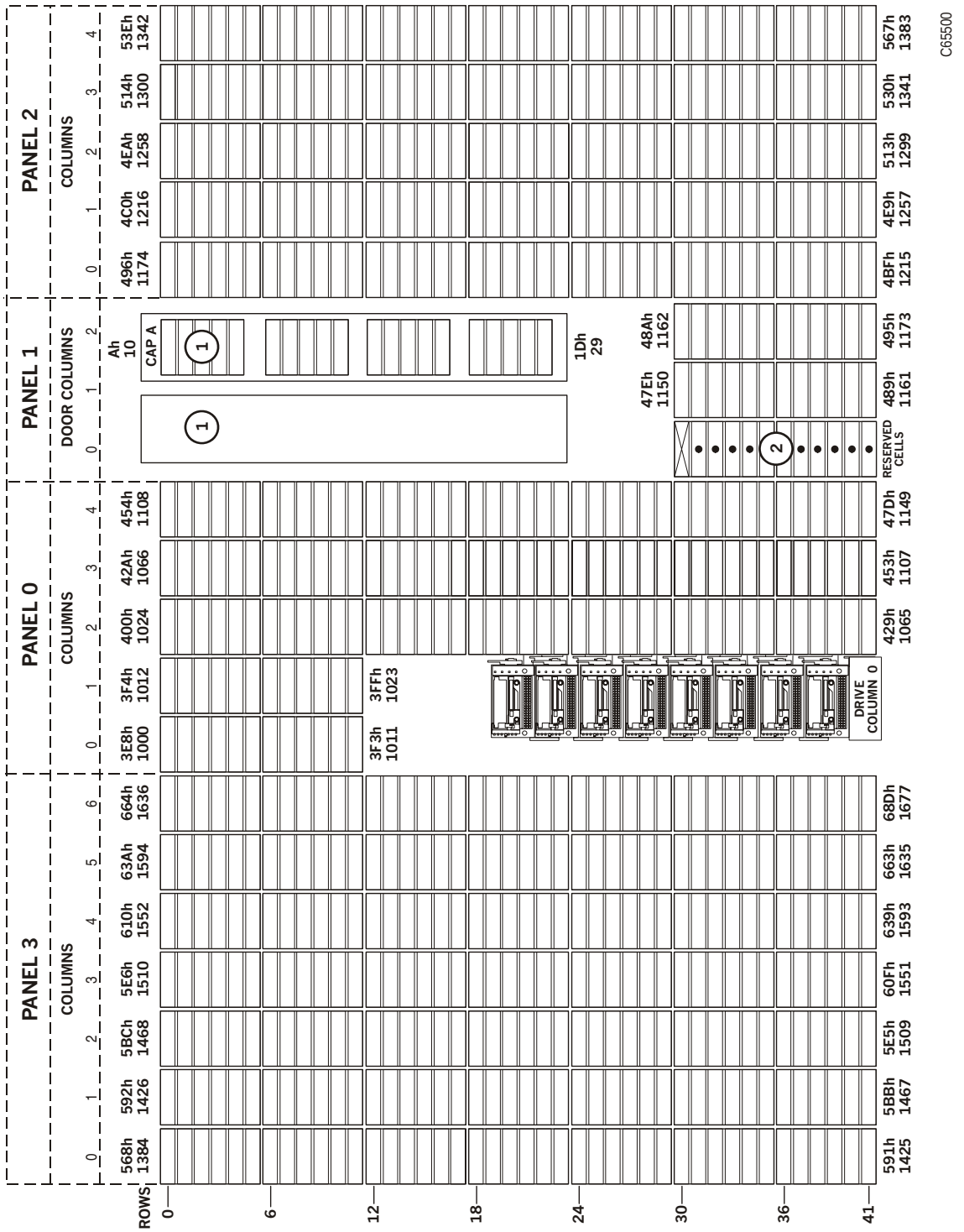
L1400M Library with SN3300 Firmware Version 5.6.43, or higher; L1400M1 library, or L1400P1 Library

Figure D-3 on page D-66 through Figure D-7 on page D-70 identify library elements for the following libraries:

- L1400M library with SN3300 firmware version 5.6.43, or higher
- L1400M1 library
- L1400P1 library.

These wall diagrams show the SCSI element locations for all cell locations. The locations are noted at the top of the columns in hexadecimal (denoted by the "h" at the end of the number) and decimal.

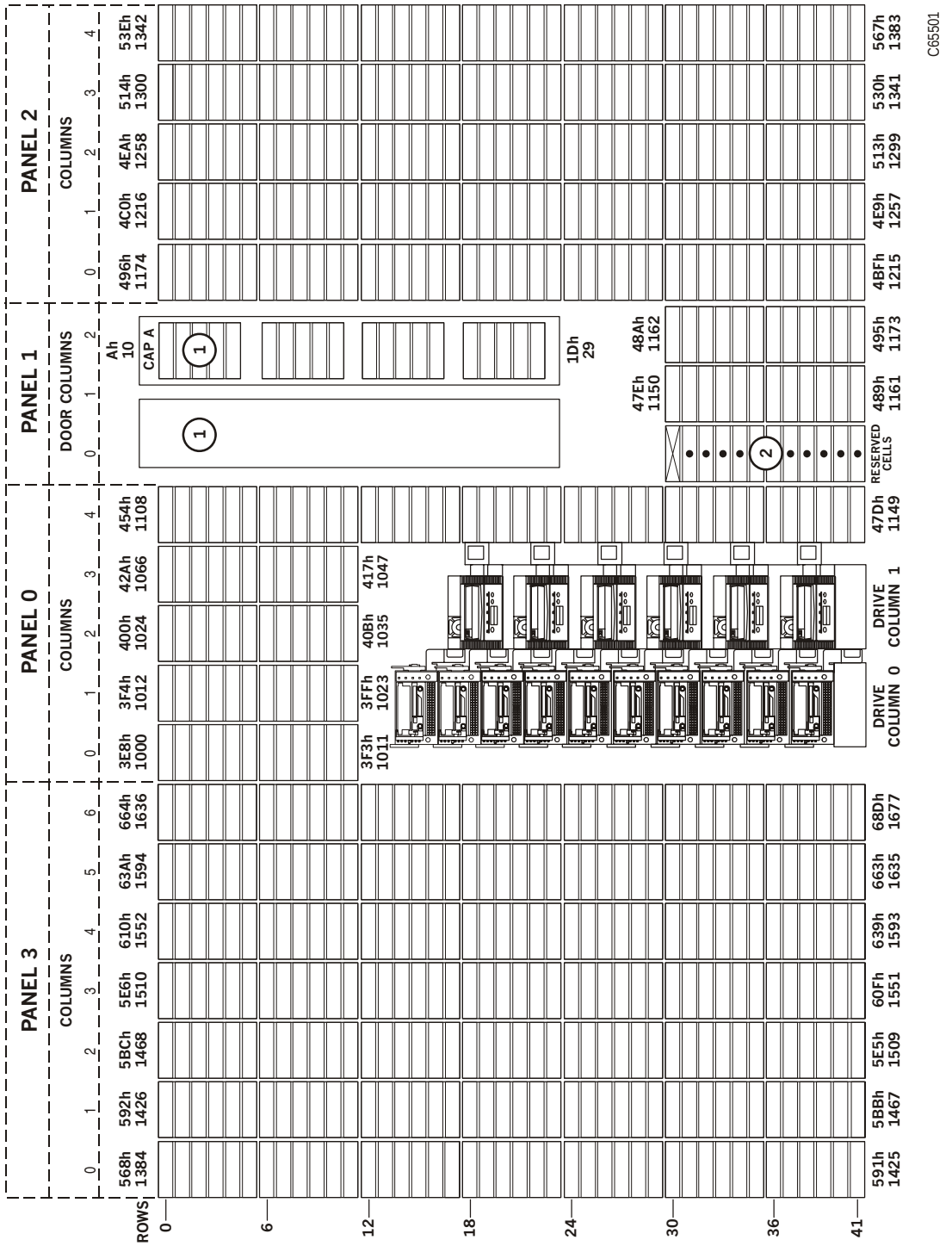
Figure D-3. L1400M/L1400M1, One Drive Column (No PTP)



1. CAPs (B optional)
2. Reserved (cleaning/diagnostic)

Note: This cell map applies to the L1400M library when SN3300 firmware version is 5.6.43, or higher.

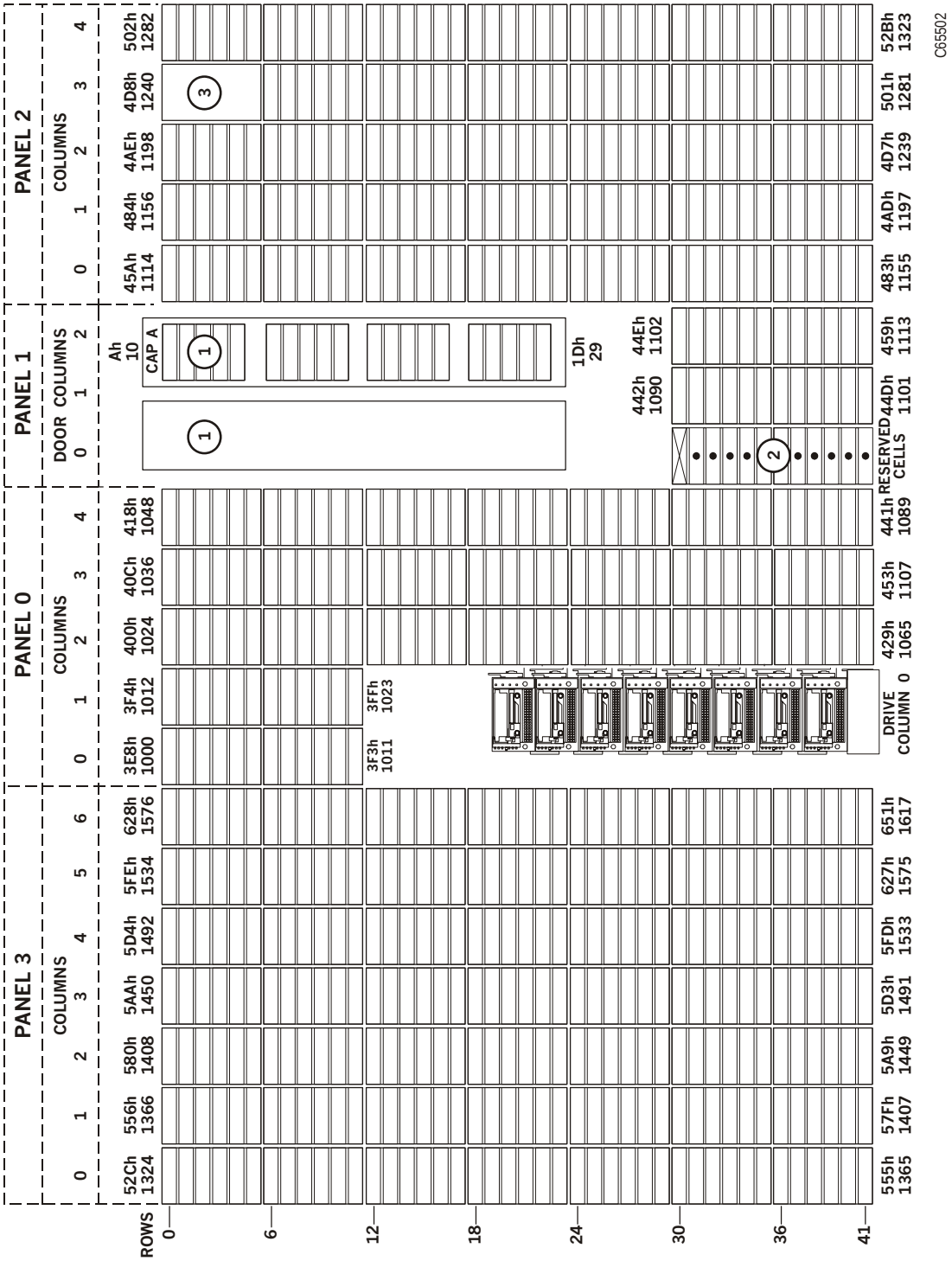
Figure D-4. L1400M/L1400M1, Two Drive Columns (No PTP)



1. CAPs (B optional)
2. Reserved (cleaning/diagnostic)

Note: This cell map applies to the L1400M library when SN3300 firmware version is 5.6.43, or higher.

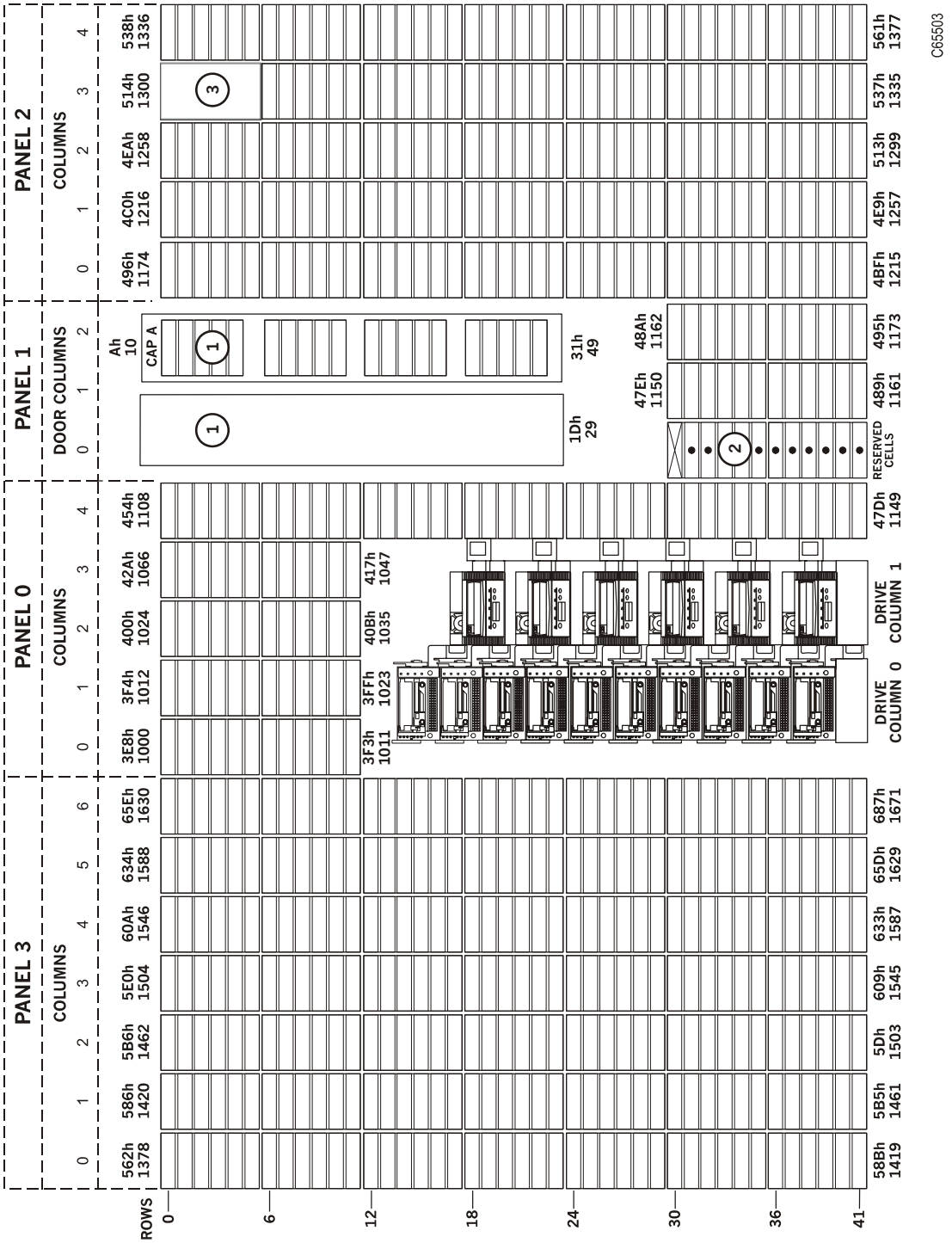
Figure D-5. L1400M/L1400M1/L1400P1, One Drive Column (With PTP)



1. CAPs (B optional)
2. Reserved (cleaning/ diagnostic)
3. PTP

Note: This cell map applies to the L1400M library when SN3300 firmware version is 5.6.43, or higher.

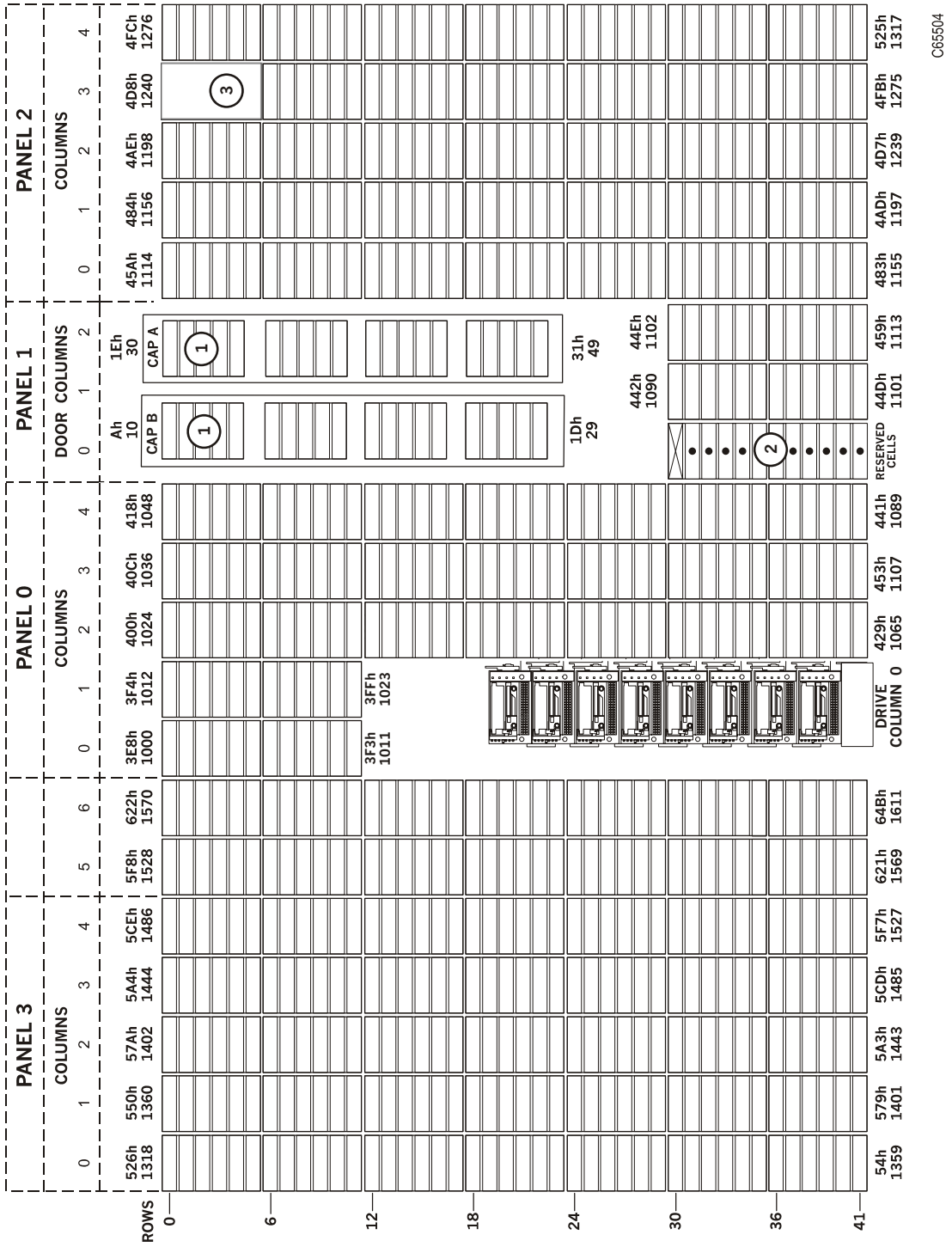
Figure D-6. L1400M/L1400M1/L1400P1, Two Drive Columns (With PTP)



1. CAPs (B optional)
2. Reserved (cleaning/ diagnostic)
3. PTP

Note: This cell map applies to the L1400M library when SN3300 firmware version is 5.6.43, or higher.

Figure D-7. L1400M/L1400M1/L1400P1, One Drive Column (With CAP B and PTP)



1. CAPs
2. Reserved (cleaning/ diagnostic)
3. PTP

Note: This cell map applies to the L1400M library when SN3300 firmware version is 5.6.43, or higher.

Sun/StorageTek L-Series Library Admin

Sun/StorageTek L-Series Library Admin is standard with the L1400M Tape Library. Refer to Appendix C, "Sun/StorageTek L-Series Library Admin" for system requirements, installation instructions, and other information.

Sun/StorageTek Backup Resource Monitor

Sun/StorageTek Backup Resource Monitor (BRM) is an optional software solution that simplifies the complexity and management of the backup environment through centralized visualization of backup applications, fabric switches, and tape libraries.

BRM's web browser-based graphical user interface provides complete visibility of backup operational information at a summary or detailed level including job statistics, policies, schedules, event codes, media statistics, fabric configuration, and tape library utilization.

BRM provides robust backup application support for Veritas NetBackup, Legato NetWorker, and IBM Tivoli Storage Manager. BRM supports fabric switches from Brocade and McData, and provides comprehensive reporting on Sun/StorageTek L-series and ACSLS attached tape libraries.

BRM automatically collects vital information about the backup environment, and stores it in an open, industry-standard MS-SQL database, facilitating historical trending and capacity forecasting functions.

Key features of BRM are:

- Comprehensive, automated, and secure data collection
- Centralized web-based graphical user interface
- Asset Management and Tracking
- Detailed Backup and Restore Reports
- Backup Storage Area Network Topology Visualization
- Backup Exception Reports
- Library Media Inventory Listing
- Media Trending and Forecasting
- Fabric Switch Configuration and Port Status
- Tape Library Configuration, Utilization, and Events
- Backup Media Search Functions

For installation and operating instructions, refer to the *Sun/StorageTek Backup Resource Monitor User Guide* at:

https://www.support.storagetek.com/GlobalNavigation/Support/CurrentProducts/Software/ShowContents.htm?ID={8B970BE5-70CF-4EC5-AF6E-5A68DC6D3E35}

Software Specifications

Installation:

Backup Resource Monitor software is customer installable. Typical installation time is less than one hour. BRM supports heterogeneous servers, HBAs, databases, logical volume managers, file systems, file-specifications

Operating Environment:

Server - software requirements:

- Windows 2000 Server, Service Pack 2+
- Microsoft IIS 5.0+
- Microsoft SQL Server 2000 or MSDE
- Backup Resource Monitor software requires an MS-SQL Server 2000 database. If no database is detected, Backup Resource Monitor software will install a database during installation

Client server - software requirements:

- Windows NT, 2000, XP
- Microsoft Internet Explorer 5.5+

Server - hardware requirements:

- 2 x 850 MHz CPU
- 1 GB RAM
- 18 GB available disk space
- Sun/StorageTek recommends installing Backup Resource Monitor software on a dedicated server for maximum performance.
- Hardware requirements may vary depending on the size of the backup environment

Tape library prerequisites

- Connection from Backup Resource Monitor software server to library
- Version 2.0 + of SNMP MIB
- L-Series tape library personality module installed
- SNMP services enabled on the library

Glossary

A - B - C - D - E - F - G - H - I - J - K - L - M - N - O - P - Q - R - S - T - U - V - W - X - Y - Z

This glossary defines abbreviations and new or special terms in this publication.

Some of the definitions are taken from other glossaries. The letters in the parentheses that follow some definitions indicate the source of the definition:

(A) *The American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI).

(E) The ANSI/Electronic Industries Association (EIA) Standard-440-A, *Fiber Optic Terminology*.

(I) The *Information Technology Vocabulary*, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and International Electrotechnical Commission (ISO/IEC/JTC1/SC1).

(IBM) *The IBM Dictionary of Computing*, copyright 1994 by IBM.

(T) Draft international standards committee drafts, and working papers being developed by the ISO/IEC/JTC1/SC1.

A

acknowledgement (ack) A message sent by the receiver of a communication, acknowledging its receipt.

Advanced Interactive Executive (AIX) IBM's implementation of the UNIX (trademark of AT&T Bell Laboratories) operating system. The RISC System/6000 system, among others, runs the AIX operating system. (IBM).

American Power Conversion (APC) The supplier for the L700 uninterruptible power source (UPS).

audit 1) 1) An operation to catalog or record the physical location of a cartridge tape in an automated library (2) A process by which a specified volume serial number location in the tape inventory is physically verified.

Automated Cartridge System Library Software (ACSLS) The software within a UNIX-based server that interfaces the server and hosts; it also maintains a list of all tapes within a library storage module.

automatic mode (1) A relationship between a library and all attached hosts. A library operating in automatic mode handles cartridges without operator intervention. This is the normal operating mode of a library that has been placed online to all host central processing units. (2) A relationship between a library and the client. In automated mode, the robot moves the cartridges among the storage cells, CAP, and drives in response to client commands. This is the normal operating mode of a library that is communicating with the client.

B

backward read compatible (BRC) The ability of an SDLT 220 tape drive to read recorded data from an earlier version of DLT tape drive. *Contrast with* "NBRC" (below).

C

camera A system that reads volume serial number labels on cartridges, instead of scanning the labels with a laser. A camera performs faster and more accurately than a laser scanner.

CAP *See* cartridge access port.

cartridge 1) A storage device that consists of magnetic tape on supply and take-up reels, in a protective housing. (IBM) (2) A container that holds magnetic tape on a supply reel and is inserted into a drive for read and write operations.

In the 9840/T9840, the cartridge has both the supply and take-up reels. In the T9940, the cartridge has only a single supply reel with the take-up mechanism residing in the drive.

cartridge access port (CAP) (1) In a Sun/StorageTek library, a mail slot through which an operator feeds tape cartridges into and retrieves tape cartridges from a library. (2) A device in the library that allows an operator to insert or remove cartridges during library operations. (3) A storage device that allows an operator to insert or remove cartridges during automated library operations.

cartridge drive The unit that houses the magnetic-tape transports and controllers that store and retrieve data for the host system in a cartridge subsystem.

cartridge tape A composite of the plastic housing and the magnetic tape.

catalog (1) The inventory of all cartridge tape storage locations in a library; this inventory is by library number, panel, row, column. (2) A stored list of backed up files and directories and the locations of the backup copies.

CCITT Consultative Committee for International Telephone and Telegraph.

cell (1) A slot in the library in which a cartridge is stored. (2) The location in which a cartridge is stored in a library. (3) A place in which a cartridge resides in a library. (4) The location in the library in which a cartridge is stored.

command line interface (CLI) For firmware 2.20 and lower—the SER1 port on the MPC card. For firmware 3.00 or later, the CSE port on the MPC card. For MPB firmware only, the CSE port on the Master library's door frame.

configuration (config) (1) The manner in which the hardware and software of an information processing system is organized and interconnected. (T) (2) The physical description of a library listing the panel types, cartridge capacity, type of host connection, and number of drives.

customer services engineer (CSE) A service representative who supports and services customer's products.

CSE port A port on the MPC card for loading 3.00 or later firmware.

D

daisy chain (1) A method of device interconnection for determining interrupt priority by connecting the interrupt sources serially. (2) A device interconnection cable.

diagnostic programs Automated offline tests that a service representative uses to evaluate and troubleshoot equipment.

diagnostic tests *See* diagnostic programs.

Direct Memory Access (DMA) An operation in which the electronics bypass the microprocessor and directly access the memory.

domain (1) A shared user authorization database which contains users, groups, and their security policies. (2) A set of interconnected network elements and addresses that are administered together and that may communicate.

Domain Name Service (DNS) A service that translates domain names into IP addresses. Because domain names are alphabetic, they are easier to remember than IP addresses.

drive (1) A device for moving magnetic tape and controlling its movement. (IBM) (2) A device for moving tape and controlling its movement. (T) (3) A device that moves magnetic tape and includes the mechanisms for reading and writing data on the tape. (3) An electromechanical device that moves magnetic tape and includes the mechanisms for writing and reading data to and from the tape. *See also* tape drive.

Dynamic Host Configuration Protocol (DHCP) (1) Server software that automatically sets the library IP address, subnet mask, and name. (2) Server software that automatically sets IP address, net mask, and gateway. (IBM)

E

electronically erasable programmable read-only memory (EEPROM) A nonvolatile sequential access memory device that can be written onto when a change of contents is required.

electrostatic discharge (ESD) An undesirable discharge of an accumulated electrical charge (static) that can severely damage delicate components and degrade electrical circuitry.

Enterprise Systems Connection (ESCON) (1) An IBM-patented set of products and services that provide a dynamically connected environment, over fiber-optic cable, within a mainframe or client server enterprise. (2) A set of IBM products and services that provide a dynamically-connected environment within an enterprise. (IBM).

Ethernet (1) A local area network (LAN) architecture developed by Xerox Corporation. The Ethernet specification served as the basis for the IEEE 802.3 standard, which is one of the most widely implemented LAN standards. (2) A 10 Mb/s baseband local area network that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by using collision detection and transmission. Ethernet uses carrier sense multiple access with collision detection. (IBM) (3) A trademark for a local area network (LAN) protocol. (4) A type of networking technology for local area networks that uses coaxial cable to carry signals between computers at a rate of 10 Mb/s.

Ethernet address A six-byte address that makes a library accessible to a network. *See also* Ethernet, Internet Protocol (IP) address, library name, and subnet mask.

event examination A file, accessible through the operator panel, that contains events that occurred during the functional operation of the tape library.

F

Fabric (1) The Fibre Channel topology similar to a telephone switch in that the initiator of a call to the receiving port simply provides the receiver with the port address, and the fabric routes the transmission to the correct port. A fabric differs from a point-to-point or arbitrated loop topology in that it provides for interconnections between ports without having a point-to-point connection. The fabric also serves as a media-type converter. (2) The hardware that connects workstations and servers to storage devices in a SAN. A fabric enables any-server-to-any-storage device connectivity using a Fibre Channel switch.

Fabric login The process by which a Fibre Channel node establishes a logical connection to a fabric switch.

fault symptom code (FSC) A four-character hexadecimal code generated in response to an error to help isolate failures within the device.

fiber Any filament made of dielectric material that guides light, regardless of its ability to send signals.

fiber-optic cable (1) A jacketed cable of thin strands of glass that carries pulses of light that transmit data for high-speed transmissions over medium to long distances. The cable can be single mode, which carries a single signal from a laser or light-emitting diode light source, or multimode, which carries multiple signals from either light source. (2) A technology that uses glass (or plastic) threads (fibers) to transmit data. A fiber optic cable consists of a bundle of glass threads, each of which is capable of transmitting messages modulated onto light waves. Fiber-optic cables have several advantages over traditional metal cables, such as: greater bandwidth, less susceptible to interference, thinner and lighter than metal cables, and they can transmit data digitally rather than analogically. (3)

Fibre Channel (FC) (1) The National Committee for Information Technology Standards standard that defines an ultra high-speed, content-independent, multilevel data transmission interface that supports multiple protocols simultaneously.

Fibre Channel supports connectivity to millions of devices over copper and/or fiber-optic physical media and provides the best characteristics of both networks and channels over diverse topologies. (2) The standard from the National Committee for Information Technology Standards that defines an ultra high-speed, content-independent, multilevel data transmission interface that supports multiple protocols simultaneously. Fibre Channel supports connectivity to millions of devices over copper and/or fiber-optic physical media and provides the best characteristics of both networks and channels over diverse topologies.

Fibre Channel Arbitrated Loop (FC_AL) (1) An arrangement of Fibre Channel stations such that messages pass from one to the next in a ring. (2) One of three Fibre Channel topologies where 2 to 126 devices interconnect serially in a single-loop circuit.

Fibre Channel protocol The mapping of SCSI-3 commands over a Fibre Channel interface.

fibre connection (FICON) An ESA/390 and zSeries computer peripheral interface. The I/O interface uses ES/390 and zSeries FICON protocols (FC-FS and FC-SB-2) over a Fibre Channel serial interface that configures units attached to a FICON-supported Fibre Channel communications fabric.

firmware An ordered set of instructions and data stored in a way that is functionally independent of main storage; for example, microprograms stored in a ROM. (T) *See also* microcode. (2) *See* microcode.

field replaceable unit (FRU) An assembly that is replaced in its entirety when any one of its components fails. (IBM)

G

Gateway A 32-bit, or 4-byte number, in doted decimal format (typically written as four numbers separated by periods, such as 107.4.1.3 or 84.2.1.111) that is applied to an IP Address to identify router interface.

H

hand-camera assembly (1) A part of the library robot whose function is grasping cartridge tapes and moving them between storage cells and tape drives. The camera reads cartridge volume serial numbers during library audits and normal operation. (2) A part of the library robot whose function is grasping cartridges and moving them among the cartridge access port, the storage cells, and the drives. The camera reads the volume serial number labels during library audits.

Hardware Support Services (HSS). The remote diagnostic center at Sun/StorageTek. Hardware support services engineers (HSSEs) can access and test Sun/StorageTek equipment and software, through telecommunications lines, from certain remote customer installations. Previously referred to as the remote diagnostic center (RDC) or the Customer Support Remote Center (CSRC).

HBA *See* host bus adapter.

host bus adapter (HBA) (1) A circuit installed in a multi-platform host or device that interfaces between the device and the bus. (2) An I/O adapter that sits between the host and the interface that manages the transfer of information between the host and the device. To minimize the impact on host processor performance, the host bus adapter performs many low-level interface functions automatically or with minimal processor involvement.

hub A Fibre Channel Arbitrated Loop switching device that allows multiple servers and targets, such as storage systems, to connect at a central point. A single hub configuration appears as a single loop.

I

initial program load (IPL) (1) A process that activates a machine reset and loads system programs to prepare a computer system for operation. Processors having diagnostic programs activate these programs at initial program load execution. Devices running firmware usually

reload the functional firmware from a diskette or disk drive at initial program load execution. (2) The initialization procedure that causes an operating system to commence operation.

initialization (1) The startup and initial configuration of a device, system, piece of software, or network. (2) The operations required for setting a device to a starting state, before the use of a data medium, or before implementation of a process. (T)

Internet Protocol (IP) A stacked set of protocols, developed by the United States Department of Defense, to facilitate communication between dissimilar computers over networks.

Internet Protocol (IP) address (1) A four-byte value that identifies a device and makes it accessible through a network. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be from zero to 255. For example, 129.80.145.23 could be an IP address. *See also* Ethernet address, library name, subnet mask.
(2) A four-byte value that identifies a library and makes it accessible through a network. IP addresses are logically divided into two parts: the network (similar to a telephone area code), and the system on the network (similar to a phone number). *See also* Ethernet address, library name, subnet mask.

in-transit cartridges Cartridges left in the robot hand. The Data Management Software must recover these cartridges to a known location to clear out the software in-transit record.

in-transit record A temporary record written by the host software, noting that a cartridge has been moved from its home cell. After this cartridge returns to its home cell, the record erases.

K

kernel (1) A section of code that handles the multitasking within the library storage module (LSM). It is responsible for intertask communication and is the heart of the operating system for the LSM. (2) The central module of an operating system. It is the part of the operating system that loads first, and it remains in main memory. (3) The essential part of UNIX or other operating systems, responsible for resource allocation, low-level hardware interfaces, and security (4) An essential subset of a programming language, in terms of which other constructs are (or could be) defined. Also known as a core language.

L

lb An abbreviation for pound.

library name An assigned name that maps to the Internet Protocol (IP) address for a library. *See also* Ethernet address, Internet Protocol (IP) address, subnet mask.

Linear Tape-Open (LTO) (1) A technology developed jointly by HP, IBM, and Certance for new tape storage options. LTO technology is an open format, which means that users have multiple sources of products and media. The open nature of LTO technology also provides a means of enabling compatibility between different vendors' offerings. (2) An open specification for tape storage devices.

M

magazine (1) A container that holds cartridges in the cells provided and is inserted into the CAP. (2) A removable container that holds cartridges and is placed into the cartridge access port (CAP).

machine activated routing switch (MARS) An electronic switching mechanism built by Giltronix that either the Customer Service Remote Center or the machine can activate to select a port for communications.

manual mode (1) A relationship between a library and all attached hosts. Libraries operating in manual mode are placed offline to and do not communicate with all host central processing units and require human assistance to perform cartridge operations. (2) A relationship between a library and

the client. A library operating in manual mode does not communicate with the client and requires human assistance to perform cartridge operations. Manual mode occurs when the robot is unavailable to the client. (3) A library operating mode in which all clients are placed offline and requires human intervention to perform cartridge load and unload operations. (4) A relationship between a library and all attached clients. Tape libraries operating in manual mode have been placed offline to all client CPUs and require human assistance to perform cartridge operations.

master (PTP) The library that powers the pass-thru port.

media format Format of data written on tape (36-track, compressed, and so on).

micro (µ) A prefix that means one, one-millionth (10^{-6}).

microcode (1) A code, representing the instruction of an instruction set, that is implemented in a part of storage that is not program-addressable. (IBM) *See also* firmware. (2) The lowest-level of instruction that directly controls a microprocessor. *See also* firmware.

Mode Select command The command used in Fibre Channel that specifies operational parameters and options for a logical unit. The Mode Select command shows the fields to be changed and the default values for these fields.

Mode Sense command The command used in Fibre Channel that returns the current operating modes and parameters of a device to the host. The Mode Sense command also returns the default parameters or information in which fields and bits can be changed using the Mode Select command.

modulator/demodulator (modem) An electronic device that converts computer digital data to analog data for transmission over a telecommunications line (telephone line). At the receiving end, the modem performs the reverse function.

MPC card (1) The central processing unit card for the tape library. (2) The main logic card in the library.

MPF card The DC power supply card for the tape library.

MPK card An EEPROM-based module that holds upgraded library feature data. *See also* personality module.

MPU card The Fibre expansion card for the tape library.

MPV card The Fibre (PCI) interface card between the library and drives.

N

negative acknowledgement (NACK) Used by the recipient of a communication to tell the sender that the data was not accurately received.

network gateway A four-byte notation that makes the library accessible to a large network, which consists of two or more subnets, through a gateway connection.

network file system (NFS) A distributed file system and its associated network protocol.

non-backward read compatibility (NBRC) The inability of an SDLT 220N tape drive to read recorded data from an earlier version of DLT tape drive. *Contrast with* "BRC" (above).

non-maskable interrupt (NMI) An interrupt which cannot be shut off by executing a disable interrupt instruction on the microprocessor. These interrupts are principally reserved for fatal conditions (for example, parity errors, watchdog timer faults).

non-volatile random access memory (NVRAM) A section of memory that will retain its information even when power is removed from the equipment.

O

offline Not available for functional use by the host CPU.

online State of being controlled directly by or in direct communication with a computer. Available for functional use.

open fiber control (OFC) Open Fiber Control (OFC) cables incorporate a safety mechanism that prevents damage to the human eye when the connection (link) is disconnected.

oz An abbreviation for ounce. A unit of weight equal to 28.35 grams.

P

pass-thru port (PTP) an automatic mechanism that transfers cartridge tapes from one library to another.

personality Synonymous with the MPK card, which holds library upgrade feature data.

personality module (1) A small piece of hardware, which connects to the library through a DB9 connector. The hardware can contain a small amount of data. Sun/StorageTek uses this device to enable features on the library and/or to store "personality" information like the vendor name. (2) A connector key, which connects to the library through a DB9 connector. The personality module stores the library cell capacity information. A module or flash file that causes the operator panel to display a vendor's identification.

power distribution unit (PDU) A device for the distribution of AC line power from one inlet to multiple outlets. Multiple PDUs, in a rack-mount cabinet or deskside storage system, provide higher availability because the power continues if one PDU (or its alternating current [AC] source if the PDUs use separate AC sources) loses power.

PRX card The interconnecting card between the MPC card and the Z motor/hand logic. Z motor power and tachometer lines connect to this card, along with signal lines to/from the hand.

PRY card The interconnecting card between the MPC card and the theta motor/hand logic. Theta motor power and tachometer lines connect to this card, along with signal lines to/from the hand.

Q

quiesce (1) Allowing all activity to complete before any new activity is allowed to start. (2) To bring a device or an application to a state where all processing has been suspended and there are no tasks in progress.

R

recoverable error Error condition that can be automatically corrected (for example, by initiating a retry operation) and, when corrected, allows continual processing of a job, program, or hardware function.

reinitialize the library To cause the library to rerun its start-up diagnostic routine and audit. During the start-up diagnostic routine, the library calibrates its motors and vision. The audit loads into the MPC card the location and volume serial number of every cartridge in the library. To reinitialize the library, the operator may power it off and power it back on or open and close the main library door.

remote center *See* Hardware Support Services.

request geometry (1) A host software request for the physical configuration of a library storage module. (2) A client software request for the physical configuration of the tape library.

RESET button Pressing this button starts an initial program load (IPL) of the library.

reserved cells The cells in the library in which only cleaning cartridges, diagnostic cartridges, or "swapped" data cartridges may reside. Only one of these cells is a swap cell.

RISC Reduced Instruction Set Controller technology.

RISC System/6000 An IBM processor that can be used as a server through a network.

robot (1) An electromechanical device that moves cartridge tapes between storage cells and tape drives. (2) An electromechanical device that moves cartridges among the cartridge access ports, the storage cells, and the drives. (3) Electromechanical device for locating and moving cartridges.

S

SCSI-3 The set of SCSI commands used specifically for Fibre Channel. SCSI-3 comes in a Generic Packetized Protocol (SCSI-3 GPP) and Fibre Channel Protocol (SCSI-3 FCP), chosen by SCSI as its primary implementation of SCSI on Fibre Channel. SCSI-3 FCP allows queuing of commands from the initiator at the target, retains the half-duplex nature of the parallel SCSI-2, and permits a single operation, such as a READ command, to operator over a single port pair between an initiator and a target.

SCSI bus (1) The interface connecting peripheral devices to a host operating system. (2) Any parallel, multi-signal, I/O bus that implements some version of the SCSI standard. A wide SCSI bus may connect up to16 initiators and targets. A narrow SCSI bus may connect up to 8 initiators and targets.

SCSI commands The SCSI-3 Fibre Channel Protocol (FCP) commands issued by either the initiator or target in an arbitrated loop topology to perform a specific SCSI task. A direct correspondence exists between the SCSI task and the Fibre Channel exchange. A Fibre Channel exchange can correspond directly to either a single SCSI command or a group of linked SCSI commands.

SCSI device A host adapter or control unit attached to the SCSI bus. *Synonymous with* target.

SCSI ID The bit-significant representation of an address on the SCSI bus.**SER1** For pre-3.00 firmware, the port on the MPC card used for command line interface—running diagnostic tests, clearing of FSC log—through a laptop at 38,400 baud rate. Unused for post-3.00 firmware.

servo Device that uses closed-loop feedback to govern physical positioning.

small computer systems interface (SCSI) A type of data or control interface between the tape library/ tape drives and a server or client.

servo power interrupt (SPI) A signal that removes voltage to a motor if overtravel is detected in the motor or a safety condition exists (for example, the main access door to the library storage module is open). When the sensor or switch is made, the drive current to the motor disables and an error posts. The SPI prevents a servo runaway condition for an out-of-range motor; it also prevents motors from starting up while the access door is open.

Simplified Network Management Protocol (SNMP) (A protocol for monitoring and managing systems and devices in a network.

small computer systems interface (SCSI) (1) A local interface operating over a wide range of transfer rates using a common command set for all devices attached to the interface. It connects host computer systems to a variety of peripheral devices. (2) An intelligent input and output bus that provides a standard interface/protocol between operating systems and peripheral devices. (3) A collection of ANSI standards and proposed standards which define I/O buses for connecting storage subsystems or devices to hosts using host bus adapters. *See also* SCSI-2, SCSI-3.

SNMP *See* Simple Network Management Protocol.

standby (PTP) The library attached to a master PTP library and under the control of the master PTP.

stoplock A servo stopped condition, holding the motor in a fixed position by electronically locking onto a tachometer line. Synonyms: Locked-on-a-Line, Detent.

storage cells (1) The slots where cartridge tapes are kept in the library. (2) A location where data

cartridges are kept in the library. (3) The locations where cartridges are kept in the library.

Sun/StorageTek Framework Library Monitor An optional interface that monitors several SCSI-attached libraries.

Sun/StorageTek L-Series Library Admin An optional interface that simulates internet browser operation for the library.

Sun/StorageTek Library Monitor Provides sharing and common robotics control for SCSI-attached libraries and PTP operation.

Subnet mask A four-byte notation that resolves routing within a network. (*See* IP address, Ethernet address, and library name.)

swap cell The cell among the reserved cells into which the robot might temporarily place a cartridge.

T

tape drive (1) A device for moving magnetic tape and controlling its movement. (IBM) (2) A device for moving tape and controlling its movement. (T) (3) A device that moves magnetic tape and includes the mechanisms for reading and writing data on the tape. (3) An electromechanical device that moves magnetic tape and includes mechanisms for writing and reading data to and from the tape. *See also* drive.

tape transport interface (TTI) An interface to control/monitor tape movement.

target (1) A SCSI device that performs an input/output operation requested by the initiator. (2) A marker on components in the library storage module used by the robot for calibration during audits.

terminator power (TERMPWR) A SCSI bus signal for device termination networks.

TERMPWR *See* terminator power.

theta motor The motor responsible for the lateral movement of the hand mechanism in the tape library.

thumbscrew The large, cylindrical, rough-edged handle on the rear of a drive tray that, when a person turn it, lets the person secure the drive to the drive column.

Transmission Control Protocol/Internet Protocol (1) This is the basic set of communication protocols used on the Internet. (2) A set of communication protocols that supports peer-to-peer connectivity functions for both local and wide area networks. (IBM)

U

Ultra SCSI An enhancement of SCSI that results in doubling the throughput speeds to 20 MB/s for 8-bit SCSI and 40 MB/s for 16-bit SCSI.

Ultra2 SCSI An enhancement of SCSI that results in doubling the throughput speeds to 40 MB/s for 8-bit SCSI and 80 MB/s for 16-bit SCSI. The SCSI specification only recognizes LVD Ultra2 SCSI at this speed with a maximum allowable cable length of 12 m (39 ft).

Ultra3 SCSI A form of SCSI capable of transfers up to 160 MB/s. There is no single ended or high voltage differential Ultra3 SCSI specification. Specifications only define wide, 16-bit, SCSI buses.

Ultrium The single hub implementation of the LTO specification for tape storage devices.

uninterruptible power supply (1) A power supply that includes a battery to maintain power in the event of a power outage. (2) A buffer between utility power and the load that maintains, uninterrupted or sustained, power during outages.

unrecoverable error Error condition that cannot be automatically corrected and which requires external intervention for possible correction. It causes termination of a job, program, or hardware function.

V

vectored interrupt (VI) An interrupt which directly generates an ID of the cause of the interrupt and places it on the bidirectional bus for the microprocessor to read.

VOLID Volume identification. *See* volume serial number.

volume A data carrier that mounts and dismounts as a unit; for example, a reel of magnetic tape or a disk pack.

volume serial number (VOLSER) (1) An alphanumeric label that the host software uses to identify a volume. It attaches to the spine of a cartridge and is both human- and machine-readable. (2) A number in a volume label assigned when a volume is prepared for use in a system. (IBM) (3) A six-character alphanumeric label used to identify a volume.

VOLSER *See* volume serial number.

W

warning count A user-determined limit that indicates the number of times a cleaning cartridge will be used before it must be exported from the library.

watchdog timer A timer which must be refreshed before it expires. If not refreshed, an NMI is generated, indicating that the functional firmware has failed to execute properly.

write-protect (WP) (1) To restrict the writing onto a data set, file, or storage area of a user or program not authorized to do so. (2) To set the switch on a cartridge tape to prevent data from being written on the tape. Reading data is still possible. (3) To set the switch on a cartridge to prevent data from being written on the tape. *See also* file-protect.

Z

Z carriage (1) The assembly that moves the hand vertically up and down the Z-column to the storage cells, the drives, and the cartridge access port in a library storage module or library. (2) The portion of the robot on which the hand rests.

Z column The column which allows the hand mechanism in the tape library to move vertically.

Z motor (1) The mechanism that moves the hand assembly vertically in a library storage module or library. (2) The motor responsible for the vertical movement of the hand assembly in the library.

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